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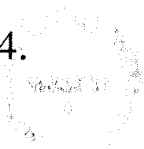
**INTERVENTIONS TO CHANGE GENERAL  
PRACTITIONER PRESCRIBING IN PRIMARY  
CARE ORGANISATIONS.**

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DM Thesis

Faculty of Medicine, Health and Biological Sciences

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UNIVERSITY OF SOUTHAMPTON

ABSTRACT

FACULTY OF MEDICINE, HEALTH AND BIOLOGICAL SCIENCES

Doctor of Medicine

INTERVENTIONS TO CHANGE GENERAL PRACTITIONER PRESCRIBING IN  
PRIMARY CARE ORGANISATIONS.

By Mark Ashworth

What interventions are effective in influencing prescribing by general practitioners (GPs)? Two studies were conducted – a matched comparison survey of prescribing change in 26 practices forming a GP Commissioning Group (which piloted new ways to modify GP prescribing) and a longitudinal survey of 145 prescribing advisers (who were responsible for administering prescribing incentive schemes in their area).

The effectiveness of differing financial incentives in influencing prescribing has already been described. This thesis supports the notion that non-profit making financial incentives, such as generating prescribing savings to be re-invested in other aspects of health care for the local community, may also be an effective motivator of prescribing change. GPs considered educational interventions to be the most effective approach but if prescribing were to change, interventions needed to tap into their professional values such as autonomy or the sense of belonging to a peer group. Interventions to change prescribing may be better targeted at individual GPs rather than the GP partnership as a whole since evidence was found that GPs tend to behave as individuals when considering prescribing change but collectively as partnerships in their approach to managerial issues.

Since the formation of Primary Care Organisations (PCOs) in 1999, the predominant influence on prescribing has shifted away from emphasis on cost control toward attempts to improve prescribing quality. The effectiveness of interventions to improve prescribing quality is harder to demonstrate and remains largely unknown.

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## DEFINITIONS & ABBREVIATIONS

### *National Health Service (NHS)*

The National Health Service was formed in the United Kingdom in 1948. It is the system encompassing primary, secondary, tertiary care and community services. It is responsible for the delivery of state-funded, free-at-the-point-of-entry health care to the whole population

### *Department of Health*

The Department of Health sets overall policy on all health issues and is responsible for the provision of health services through the NHS.

### *Primary Care Group (PCG)*

Primary Care Groups started functioning in 1999. They swept away the previous era of fundholding and non-fundholding general practices, replacing these with a system covering all general practices in England and Wales. They acted as a commissioning and purchasing agency for many of the services provided in primary and secondary care. Notably, their functions excluded the purchase of psychiatric services and community services such as district nursing and health visiting. They were generally run by a Board consisting of a chief executive (usually a health service manager) and a Chair (usually a GP). The Board consisted of representatives of most primary care health professionals. They generally cover localities consisting of a population of around 100,000.

### *Primary Care Trust (PCT)*

The framework for Primary Care Trusts was also initiated in 1999 although the majority of PCGs opted not to take on the additional responsibilities of PCTs for at least two years. By April 2003, all only PCTs remained. Unlike their predecessors, PCTs commissioned and purchased all community services and most secondary services (still excluding psychiatry – this became the responsibility of the newly formed Mental Health Trusts). They took over most of the functions of health authorities including public health. The management structure was more dependant on health service managers – they ran the Board. Local primary care health professionals were represented on the Professional Executive Committee. They generally cover localities consisting of a population of around 150,000.

### *Primary Care Organisation (PCO)*

The term, 'Primary Care Organisation', is a generic term covering PCGs and PCTs.

### *Strategic Health Authority (SHA)*

In 2002, the English NHS Regional headquarters were merged with the 95 health authorities to form 28 SHAs. Their role is to strategically develop the local health services within their areas. They will also manage the performance of PCTs and Mental Health Trusts in their areas.

### *National Institute of Clinical Excellence (NICE)*

NICE was set up in 1999. It is part of the NHS and its role is to provide patients, health professionals and the public with information on current 'best practice'. The guidance covers the clinical management of specific conditions and includes

appraisals of various drug treatments, offering judgements about the most cost-effective treatment options.

#### *National Service Frameworks (NSFs)*

NSFs are produced by the Department of Health and define national standards for the care of patients with specified conditions or for the delivery of services. NSFs were launched in 1999 with the appearance of the Mental Health NSF. Subsequent NSFs include coronary heart disease and diabetes. Each of the NSFs offer prescribing recommendations.

#### *Prescribing Analysis and Cost Data (PACT data)*

PACT data is the one type of prescribing feedback received by all GPs throughout England and Wales. The summary is produced by the Prescription Pricing Authority in Newcastle. The statistics are provided by the Prescribing Support Unit in Leeds. It is a quarterly summary of the practice's average prescribing costs for each prescribing category. It allows comparison with average health authority and national prescribing patterns. It also offers a summary of generic prescribing and the 'Top Twenty' most expensive products prescribed.

Drug abbreviations used in the text:

ACEIs:	Angiotensin converting enzyme inhibitors
NSAIDs:	Non-steroidal anti-inflammatories
SSRIs:	Selective serotonin re-uptake inhibitors
PPIs:	Proton pump inhibitors

## INTRODUCTION

Prescribing is one of the core activities of general practitioners (GPs). Most consultations with a general practitioner result in a prescription being issued. Prescribing is also important to health service managers and taxpayers, accounting for about 13% of National Health Service (NHS) expenditure in 2000/01 and about 18% of the budgets of Primary Care Trusts (PCTs), the organisations responsible for managing primary care at a local level.<sup>1,2</sup> Prescribing is a central feature of national policy developments in recent years. These have promoted a quality driven agenda, with both National Service Frameworks and the National Institute of Clinical Excellence (NICE) emphasising the central importance of high quality prescribing.<sup>3,4</sup>

### **Policy initiatives and prescribing**

#### *1) The Greenfield Report*

In 1982, the Greenfield Report proposed a series of measures to address some of the key prescribing issues of the time.<sup>5</sup> The major recommendations were:

- That GPs should be provided with feedback on their own prescribing
- Regional Medical Officers should visit GPs with high prescribing costs
- All doctors should receive regularly updated versions of the British National Formulary and have a free subscription to Drugs and Therapeutics Bulletin.
- Promotion of generic prescribing

Many of these recommendations were acted upon, notably the development of Prescribing Analysis and Cost (PACT) data, sent to all GPs since 1988.<sup>6</sup> PACT data provides GPs with information about their prescribing costs and volumes and generic prescribing rates, comparing their values with local and national norms.

## *2) The development of GP fundholding*

In 1990, the National Health Service and Community Care Act introduced an “internal market” such that GPs became “purchasers” and secondary care organisations were termed, “providers”.<sup>7</sup> GPs could opt to become fundholders and be allocated a budget for purchasing secondary care services directly for their own patients. If they chose not to become fundholders, then the local Family Health Services Authority (later, the Health Authority) purchased secondary care on their behalf. Part of the concept of fundholding included holding a cash-limited budget for prescribing. Non-fundholders were never allocated budgets for any of their activity but so that they could at least become more aware of the financial aspects of prescribing, they were given a nominal budget, termed an ‘Indicative Prescribing Amount’. These nominal budgets were never cash-limited.

## *3) The Audit Commission prescribing review*

The Audit Commission produced a review of prescribing in primary care in 1994 termed, “A Prescription for Improvement”.<sup>8</sup> This report proposed:

- The use of incentive schemes for non-fundholding GP practices
- Local prescribing advisers to visit each practice focussing on feedback of prescribing issues
- Targeting reductions in prescribing for groups of medicines that were deemed inappropriate (“drugs of limited clinical effectiveness”)

## *4) National Service Frameworks and the National Institute of Clinical Excellence*

In 1998, the Department of Health released a consultation document, “A First Class Service”. A series of quality initiatives were announced in this publication. National

Service Frameworks were announced as a means of setting national standards for high quality care in a variety of clinical areas. The National Institute of Clinical Excellence was formed to provide national guidance on effectiveness and cost effectiveness of treatments and particularly to review new and potentially expensive treatments before they were licensed for use. Part of the reason for standardisation was the perceived inequalities that had developed under the internal market, particularly ‘post-code prescribing’ in which different communities experienced differing levels of access to prescription medicines, particularly to high cost drugs.

#### *5) Primary Care Groups and Primary Care Trusts*

In April 1999, GP fundholding was swept aside and all GP practices were regrouped into Primary Care Groups (PCGs). These were the health policy centrepiece of the new Labour government which had come to power in 1997 announcing their intention to abolish the “internal market”. Policy advisers acknowledged some of the successes of fundholding but the benefits were perceived to have been achieved at the price of unacceptable inequalities of health care.<sup>9</sup> Collaboration was to replace competition and was seen to be the means not only of a fairer system, but also of greater efficiency. The rationale for the development of PCGs was elaborated in the government White Paper, ‘The New NHS’.<sup>10</sup> In April 1999, 481 PCGs were created in England. Unlike fundholding, membership of this new system was not optional. All GPs, practice and community nurses came under the overall control of PCGs. They were given five principal functions:

- To contribute to the Health Improvement Programme devised by the local Health Authority
- To promote the health of the local population

- To commission health services (both in hospitals and in the community)
- To monitor the performance of services from NHS Trusts
- To develop primary care and help integrate this with community care and social services

The focus of activity would no longer be individual GP practices, but would shift toward the health (& social care) needs of the local community.

To support these changes, the funding of primary care was changed. ‘Unified budgets’ were introduced. The unified budget covered the prescribing costs of all GPs, the cash-limited budget for primary care (which traditionally funded the primary care infrastructure of staff budgets, computer expenditure and premises developments) and the Hospital and Community Health Services budget (the funding for all community services outside general practice such as district nursing, health visiting, community family planning, speech therapy, chiropody etc., together with the funding for all hospital care).<sup>11</sup> Previously, only fundholding GPs had a cash-limited prescribing budget; from now on, all GPs would have a cash-limit to their prescribing. If this budget was exceeded, then there would be less money available for other sections of the ‘unified budget’ resulting in reductions either in secondary care, community services or to invest in the infrastructure of primary care.

PCGs were only intermediate organisations. Eventually, it was intended that all would develop the increased responsibilities and autonomy required to become Primary Care Trusts (PCTs). These organisations would be virtually independent to their ‘parent’ health authorities. Within one year, 17 PCGs opted for PCT status. In April 2001, just two years after the first PCGs appeared, there were 164 PCTs



covering 48% of the population of England. The last remaining PCGs developed into PCTs in April 2003. At the same time, a process of mergers between neighbouring PCOs was taking place such that the original 481 PCOs in 1999 had been slimmed down to 302 in April 2003.

#### *6) Primary Care Organisations in 2003*

In 2001, the Department of Health initiated its strategy, 'Shifting the Balance of Power'.<sup>12</sup> This programme was designed to build on the successes of Primary Care Groups and Trusts, collectively known as Primary Care Organisations (PCOs). The process of de-centralisation required a strategic overview about the structures required to support PCOs. It was decided that continuing the role of health authorities could threaten the independence and development of PCOs. As a result, in October 2002, the 95 health authorities in England were merged to create 28 Strategic Health Authorities, each with a strategic and performance management relationship with PCOs.<sup>12</sup> They ceased to have any health care commissioning or provision role.

In April 2003, all eight of the NHS Regional Offices were closed. Their powers were devolved to Strategic Health Authority level. Regional prescribing advisers had a substantial input into the overall strategy and implementation of prescribing initiatives within PCOs. This role will now reside within the Strategic Health Authority.

### **Literature Review**

To study the recent literature concerning prescribing change in primary care, I embarked on a systematic literature review. I searched the databases, 'Medline' and

‘Embase’. The ‘Embase’ database is particularly noted for its inclusion of a wide variety of peer reviewed prescribing journals.

Articles were located using the following search terms:

- “prescri\*” (the use of the asterisk enabled the words ‘prescribing’ and ‘prescription’ to be identified)
- “primary care” or “family practice” (the latter term was included since it is the term used in north America)
- “presc\* change” (this term was used to identify articles specifically about interventions to achieve prescribing change)
- “pharmacist” (this term was used to search for primary care interventions involving community pharmacists)

The search duration was set at 1985 to the current year, inclusive. The beginning of the search was set rather arbitrarily but sufficiently early to include papers referring to prescribing change before the advent of GP fundholding in 1990.

Titles of papers were tabulated. Papers relating to secondary care or to clinical pharmacology were discarded. Abstracts were obtained for all other papers. Full papers were obtained if the abstract related to the theme of interventions to change GP prescribing in primary care or primary care organisations. References at the end of each paper were manually screened for other related publications and abstracts obtained for these papers. I used the manual reference search to check that my primary search strategy involving Medline and Embase had not inadvertently omitted any major journals containing prescribing articles.

The full papers obtained (n = 183) formed the basis of the literature reviewed in both the Introduction and Discussion sections of this thesis.

## **Prescribing change**

### *1) The impact of GP fundholding*

GP fundholding is known to have changed GP prescribing patterns. But the changes were not substantial. Fundholding practices reduced their prescribing costs in the first year of fundholding, relative to non-fundholders.<sup>13</sup> There was a similar, but smaller, relative reduction in the following two years. Thereafter, the rate of increase in prescribing costs paralleled the rate in non-fundholding practices. The total reduction in prescribing costs attributable to fundholding amounted to 6% of the prescribing budget. But over a six year study period, the relative savings were dwarfed by the overall 66% rise in prescribing costs.<sup>13</sup>

Cost containment in fundholding practices was achieved in two ways. Relative to non-fundholders, they had a greater increase in their rate of generic prescribing. Secondly, they reduced the cost per prescription but there was no reduction in the number of items prescribed.<sup>13</sup>

Initial assessments of the impact of fundholding on prescribing were more optimistic. In 1993, Bradlow and Coulter<sup>14</sup> compared eight fundholding practices with seven non-fundholding practices, all in the Oxford region. All non-fundholding practices exceeded their indicative prescribing budget whereas five of the eight fundholders

made savings on their prescribing budget, ranging from 2.9% – 10.7%. Analysing these results, it appeared that the lack of incentives to curb prescribing costs had contributed to the budgetary overspends of non-fundholders. In the same year, Maxwell *et al.*,<sup>15</sup> reported a study from nine fundholding and six non-fundholding practices in Scotland. The prescribing costs over two years rose by 24% in the non-fundholders and by 11% in the three Tayside practices and 16% in the six Grampian practices.

Taken together, these early assessments and several others, suffered from two methodological flaws. Firstly, the control groups were compromised. Soon after the study by Maxwell *et al.*,<sup>15</sup> all the non-fundholding practices became fundholders. Secondly, the behaviour of first wave fundholders appeared to differ from those of subsequent waves. The first wave fundholders made greater relative savings and appeared to have behaved as enthusiastic innovators, more determined to make changes than their successor fundholders.<sup>13</sup> Perhaps the enthusiasm for change was confined to just a small minority of practices, those that had leapt at the first opportunity to become fundholders, and this scheme did not have the same dynamic effect on other groups of GPs.

## *2) Parallel schemes in non-fundholding practices*

When researchers from Oxford revisited the practices that they had studied two years earlier, they found the trend reversed: cost increases were greatest in the fundholders.<sup>16</sup> Similar findings were reported from Wilson *et al.*, in Liverpool.<sup>17</sup> They concluded that the prescribing patterns of later waves of fundholders and of

non-fundholders were converging. One postulated reason was the development of prescribing incentive schemes for non-fundholders.

When fundholding began in April 1991, the consequences of overspending were clear. There would be less money available in the other two elements of fundholding budgets – the budget for staff and the budget for purchasing hospital care. On the other hand, prescribing savings could be used to improve the practice's care of patients in approved ways or to supplement the staff or hospital purchasing budgets. Non-fundholding practices had none of these incentives. Merely given 'indicative prescribing budgets', they were informed of their prescribing spend relative to their budget but there were no penalties for exceeding the budget, neither were there any incentives to make savings. Against the background of the early reported successes of fundholding, a scheme was devised for non-fundholders. Termed the 'Prescribing Incentive Scheme', non-fundholding practices were able to retain a proportion of their prescribing savings.<sup>18</sup> Unlike fundholding, there would be no penalty on overspends. In practice, the incentives were much smaller than those available to fundholders. Eligibility for incentives and the sums awarded were determined locally and varied substantially. In Liverpool, non-fundholding practices were not eligible for reward payments unless they already achieved 50% generic prescribing rates.<sup>17</sup> The rapid catch-up in generic prescribing rates by non-fundholding practices partly explained the disappearance of differences in prescribing costs between these two groups of practice in Liverpool.<sup>17</sup> Typical schemes allowed non-fundholding practices to keep up to half their prescribing savings with a ceiling of around £2500 per GP.<sup>18</sup> Again, savings had to be invested in locally approved schemes for the improvement of services in the practice.

Evaluating the effectiveness of the first year of the scheme for non-fundholders, Bateman *et al.*, found evidence of relative prescribing savings.<sup>19</sup> They reported on all non-fundholding practices in the Northern Region (n = 459) and concluded that £1.54m had been saved on prescribing budgets as a result with £420,000 re-invested as incentive scheme payments to the practices making savings. Unlike fundholding savings which were only available to practices underspending their prescribing budget, the Prescribing Incentive Scheme enabled overspending practices to receive reward payments if it was decided that they had fulfilled various requirements demonstrating high quality prescribing. A further £43,000 was allocated to these practices resulting in a total sum of £463,000 returned to non-fundholding practices. The net savings of the Northern Region scheme were £1.1m.

It therefore appears that financial incentives introduced in 1993, albeit modest, influenced the prescribing behaviour of non-fundholders and altered the balance between fundholders and non-fundholders, reducing the relative advantages of fundholding.

### *3) Pharmacist interventions*

In 1994, the Audit Commission recommended that prescribing advisers should visit all practices and provide feedback of their prescribing patterns. Most of these prescribing advisers were based in health authorities. Early reports had suggested that pharmacists and prescribing advisers could successfully influence prescribing.<sup>20,21</sup> However, these interventions had not been subjected to a controlled trial. In 1996, facing the highest prescribing costs per patient in England, Doncaster health authority

devised an intervention led by community pharmacists in an attempt to control costs.<sup>22</sup> All 50 practices were offered the intervention but only eight accepted. The health authority invested in five pharmacists to visit and work with these eight practices. They particularly targeted generic prescribing, clinical audit, repeat prescribing reviews, formulary reviews and the setting up of pharmacist run asthma and gastrointestinal clinics at which patients were offered a review of their medication. Differences between the eight intervention practices and eight matched practices in the same area showed significant cost containment in the intervention practices. Overall, prescribing savings of £347,000 were generated which was offset by an expenditure of £163,000 on the five pharmacists plus the administrative and training costs of running the scheme. Since the study was not conducted as a randomised controlled trial, findings need to be interpreted cautiously. Response bias is likely to have influenced the apparent savings generated since practices volunteering to take on intensive pharmacist interventions probably represent those most enthusiastic to make prescribing changes.

Interventions by multiple prescribing advisers based in a small number of practices are the exception rather than the rule. More usually, health authority based prescribing advisers offer practice-specific information and practice visits in an attempt to influence prescribing. These interventions may be cost-based aimed at generating prescribing savings, but increasingly, there has been an emphasis on quality based and educational advice. In a two year study of all 66 practices within one Family Health Services Authority in Gwent, the prescribing adviser devised five quality indicators concerning antibiotic prescribing.<sup>23</sup> The one third of practices

randomised to receive face to face visits had greater changes to their antibiotic prescribing than those receiving written feedback or no intervention at all.

Further evidence of the effectiveness of outreach visits comes from a study in Sweden. Pharmacists were randomly allocated to 67 out of 134 health centres; the other 67 practices acted as controls. They provided four educational sessions to the practices about the use of statins to prevent coronary heart disease.<sup>24</sup> Compared to controls, the intervention practices had a 20% increase in their use of lipid lowering drugs. It was concluded that this model of 'academic detailing' was an effective intervention for influencing prescribing patterns.

#### *4) GPs' views on prescribing change*

Using a qualitative methodology, Armstrong et al. carried out interviews with 18 GPs about their recent changes to their prescribing patterns.<sup>25</sup> Each of the GPs could recall recent changes to their prescribing. Overall, GP prescribing was relatively stable with, perhaps, three or four changes over a six month period. The cues to changing their prescribing differed between GPs. For some, it was educational inputs such as reading or the influence of a respected hospital consultant. One of the most powerful influences was the GP's clinical experience. Sometimes this was the result of unexpected clinical successes such as the example of one patient responding dramatically to fluoxetine. At other times, potential adverse events triggered the prescribing change such as the example of a pharmacist telephoning the GP about a potentially serious interaction between erythromycin and theophylline. Even when change had occurred, it was seen as precarious, and reinforcement was needed if it was to be sustained. For the most part, this support came from the effect of the drug



on a few chosen patients. If this change resulted in negative feedback, the ‘experiment’ was stopped and the GP reverted to previous prescribing patterns.

## **Changing GP performance**

### *Systematic reviews*

Interventions to change prescribing behaviour are just one facet of wider initiatives to achieve other behavioural change in the delivery of health care. Many types of intervention may be successful.

Systematic reviews of rigorous studies provide the best evidence of the effectiveness of different strategies. Oxman *et al.*, reviewed 102 trials.<sup>26</sup> Dissemination of information alone resulted in little measureable change in physician behaviour. Examples of such interventions were conferences, post-graduate lectures or the mailing of unsolicited information. Intended behaviour change covered a wide range of activities including prescribing, preventive services, treatment of specific conditions such as diabetes or hypertension and the use of diagnostic and secondary care facilities. He concluded that there are no “magic bullets” for improving the quality of patient care, but that there are a wide range of available interventions which, if used appropriately, could lead to important improvements in professional practice.

Bero *et al.*, identified 18 reviews of interventions to improve the performance of health professionals.<sup>27</sup> The evidence for effectiveness of each of these interventions are summarised in Table 1.

**Table 1 – Evidence for the effectiveness of interventions to change the behaviour of health professionals. Table taken from Bero *et al.*<sup>27</sup>**

**Interventions to promote behavioural change among health professionals**  
**Consistently effective interventions**

- Educational outreach visits (for prescribing in North America)
- Reminders (manual or computerised)
- Multifaceted interventions (a combination that includes two or more of the following: audit and feedback, reminders, local consensus processes, or marketing)
- Interactive educational meetings (participation of healthcare providers in workshops that include discussion or practice)

**Interventions of variable effectiveness**

- Audit and feedback (or any summary of clinical performance)
- The use of local opinion leaders (practitioners identified by their colleagues as influential)
- Local consensus processes (inclusion of participating practitioners in discussions to ensure that they agree that the chosen clinical problem is important and the approach to managing the problem is appropriate)
- Patient mediated interventions (any intervention aimed at changing the performance of healthcare providers for which specific information was sought from or given to patients)

**Interventions that have little or no effect**

- Educational materials (distribution of recommendations for clinical care, including clinical practice guidelines, audiovisual materials, and electronic publications)
- Didactic educational meetings (such as lectures)

As a result of these reviews, ‘educational outreach’, otherwise known as, ‘academic detailing’ has come to be considered as one of the most effective interventions. But what are the key components of successful educational interventions?

One of the most detailed summaries of the components of successful educational outreach within the context of prescribing change has been provided by Avorn and Sourmerain.<sup>28</sup> The techniques of educational outreach are:

- Investigating baseline knowledge and motivations for current activity
- Focussing programmes on specific categories of physicians as well as on their opinion leaders
- Defining clear educational and behavioural objectives
- Establishing credibility through a respected organisational entity, referencing authoritative and unbiased sources of information and presenting both sides of controversial issues
- Stimulating active participation by physicians in educational interactions
- Using concise graphic educational materials that highlight essential messages
- Providing positive reinforcement of improved practices in follow-up visits

Having identified educational inputs as one of the most effective interventions, we have little research based information on the types of practices likely to respond to such an approach. The effectiveness of outreach visits has not been evaluated across a range of different general practices. In a study by Freemantle *et al.*, 75 practices agreed to be randomised to receive outreach visits focussing on four prescribing guidelines (aspirin in secondary coronary heart disease prevention; ACEIs in heart failure; NSAIDs in osteoarthritis; the choice of antidepressants).<sup>29</sup> Each practice

received two visits per guideline. Practices receiving the intervention significantly changed their guideline compliance. But the impact was modest. The overall result was a 5.2% improvement in the number of eligible patients treated according to the guideline recommendations. This mean figure varied according to practice size. In larger practices, the improvement was 1% whereas in single handed and two partner practices the improvement was 13.5%. It was concluded that educational outreach visits did not appear to have been an effective intervention for larger practices.

## **The management of change**

### *Theories of change management*

If changing prescribing behaviour is just one facet of changing the behaviour of health care professionals, then this in turn is just one facet of the wider discipline of managing change within organisations.

One of the leading proponents of the ‘diffusion of innovations’ school of thought has suggested that the first step in introducing change is to understand the components of change itself. Rogers observed 3500 successful innovations, mostly concerning the adoption of technological advances by groups within societies and by organisations. As a social theorist, he identified seven features that make an innovation more likely to be adopted: <sup>30</sup>

- It offers advantages relative to the status quo
- It is compatible with existing needs, values or previous ideas
- It is not too complex
- It involves relatively little risk to the user
- It can be tried out

- Its effects are observable
- The proposer is credible

The second step is to know how people within an organisation respond to change. In order to initiate change, the focus of effort should initially be concentrated on those most likely to respond. He identified five distinctive categories:

- innovators
- early adopters
- early majority
- late majority
- laggards

To initiate change, Rogers postulated that the first efforts are best concentrated on the innovators in order to gain confidence and credibility.

Another leading theorist in the field of change management, Kotter, has identified eight reasons why change efforts may fail: <sup>31</sup>

- Not establishing a great enough sense of urgency
- Not creating a powerful enough group to lead the change
- Lacking a vision
- Under-communicating the vision
- Not removing obstacles to the new vision
- Not systematically planning for, or creating, short-term successes
- Declaring success too soon
- Not making the changes part of the culture

Each of these criteria from both Rogers and Kotter were intended to be generalisable and applicable over a wide range of organisational structures. They have been applied to the management of prescribing change by PCOs. Specifically, a series of study guides and workshops focussing on the problems of reducing antibiotic prescribing have been based on these principles.<sup>32</sup>

### **Quality indicators in primary care**

Quality improvement is one of the fundamental strategies for the development of healthcare. In its most recent guise, it has been termed ‘clinical governance’.<sup>33</sup> The clinical governance movement brought prominence to quality improvement at the level of individual practitioners, at practice level and from the perspective of health service managers who are accountable for quality issues.

#### *1) What are quality indicators?*

Measurement is an important part of quality improvement. Features that are measured in this context are termed, ‘quality indicators’. A more formal definition of ‘quality indicators’ has been given by Lawrence and Olesen:<sup>34</sup>

“retrospectively measurable elements of practice performance for which there is evidence or consensus that they can be used to assess the quality of care provided and hence change it”

Quality indicators infer a judgement about the quality of care provided. In contrast, performance indicators monitor health care performance without any necessary

inference about quality.<sup>35</sup> Indicators may be developed for three fundamental aspects of care elaborated by Donabedian:<sup>36</sup>

- structures (staff, equipment, appointment systems)
- processes (prescribing, investigations, doctor-patient interactions)
- outcomes (morbidity and mortality, patient satisfaction)

Most quality indicators measure processes in the absence of good outcome data at primary care level.<sup>37</sup>

## *2) Consensus methods of developing quality indicators*

Because of the relative weakness of the evidence base for primary care, many indicators have to be developed using consensus methods. Consensus methods are structured facilitation techniques that explore consensus among a group of experts. Several techniques exist but the three basic techniques summarised by Campbell *et al.*,<sup>35</sup> are:

- Delphi technique: a postal method involving two or more rounds of questionnaires. The researchers clarify a problem, develop questionnaire statements to rate, select panellists to rate them, conduct anonymous postal questionnaires and feed back results between rounds.
- Nominal group technique: a group of experts meet together and are asked to suggest, rate or prioritise a series of questions and then to re-rate them after discussion.
- RAND appropriateness method: this is a mixture of the above two models. Firstly, the researchers conduct a systematic literature review and generate indicators base on this review. Panellists are selected and then a postal survey

is conducted in which the panellists are asked to rate the preliminary indicators. The next round of consultation is face to face at which panellists discuss and re-rate each indicator.

The RAND appropriateness method, developed at the RAND University of California is the only method to combine expert opinion and evidence ('RAND' is the name of a non-profit making American 'think tank'; the acronym stands for 'Research AND Development').

### *3) Features of quality indicators*

Steiner and Norman have produced a summary of the five key criteria of an ideal quality indicator: <sup>38</sup>

- Acceptability: the results have to be acceptable to both the measurer and the subjects being measured.
- Feasibility: information about quality of care is often driven by the availability of the data. If the desired condition cannot readily be measured, then its use as a quality indicator is limited.
- Reliability: the measurement should be reproducible.
- Sensitivity to change: this is an important and often neglected requirement for quality indicators. Few indicators have been researched over long time periods.
- Validity: face validity demonstrated by consensus group and content validity by being based on rigorous evidence



## **The selection of prescribing indicators**

Prescribing indicators have been developed using the same techniques as for quality indicators in general.

### *Using consensus methods to select prescribing indicators*

Prescribing indicators reflecting the quality of long-term prescribing were considered by Cantrill *et al.*<sup>39</sup> An expert group of nine people suggested a possible 103 criteria relating to long term prescribing. The group then ranked these criteria producing 20 items which generated 34 possible prescribing indicators. Two rounds of the Delphi technique later, these 34 possible indicators had been whittled down to just thirteen (table 2). It was the intention of this exercise to apply these indicators to the medical records of patients on long term medication. But it was acknowledged that such information gathering from clinical records was labour intensive and unlikely to be of value in routine use.

**Table 2. Prescribing indicators reflecting the appropriateness of long term prescribing.**<sup>39</sup>

<ul style="list-style-type: none"><li>• The indication for the drug is recorded in the medical record and upheld by the BNF</li><li>• The reason for prescribing a drug of limited value is recorded and valid</li><li>• Compared with alternative treatments in the same therapeutic class, which are just as safe and effective, the drug prescribed is either one of the cheapest or a valid reason is given for using an alternative</li><li>• A generic product is prescribed if one is available</li><li>• If a potentially hazardous drug-drug combination is used, the prescriber shows knowledge of the hazard</li><li>• If the drug is contraindicated, the prescriber gives a valid reason</li><li>• If the total daily dose is outside the range stated in the BNF, the prescriber gives a valid reason</li><li>• If the dosing frequency is outside the ranges stated in the BNF, the prescriber gives a valid reason</li><li>• If the duration of treatment is outside the ranges stated in the BNF, the prescriber gives a valid reason</li><li>• When considering the patient's total regimen, the dosing schedule is as simple as possible</li><li>• Prescribing for hypertension adheres to evidence-based guidelines in the BNF</li><li>• Prescribing for asthma adheres to evidence-based guidelines in the BNF</li><li>• Patient's medication has been reviewed within the previous 12 months</li></ul>
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General practitioners have been involved in the development of prescribing indicators. Bateman *et al.*,<sup>40</sup> described how a consensus group of eight GPs developed and agreed standards for thirteen aspects of prescribing in four areas of prescribing:

- Generic prescribing
- Prescribing within specific therapeutic groups (such as a selection of antibiotics, topical NSAIDs, atenolol and propranolol as a % of all B-blockers)
- Drugs of limited clinical value
- Standards bases on prescribing volume (benzodiazepines).

One limitation of this approach is that the indicators are all based on the measurement of PACT (Prescribing Analysis and Cost) data which only link prescribing data with practices and individual GPs. PACT data do not link prescribing information with the clinical indications for a given prescription.<sup>41</sup>

Rather than devising new prescribing indicators, existing indicators have been subjected to validity and reliability testing. Campbell *et al.*, tested 41 PACT based prescribing indicators generated mainly from the set of indicators produced by the Prescribing Support Unit in Leeds.<sup>42</sup> Using a Delphi technique, they sought to identify which of the most commonly used prescribing indicators were valid and reliable as indicators of quality or cost minimisation. Of the 41 indicators tested, only seven were rated valid and reliable for cost minimisation and five for quality (table 3). The final outcome resulted in a range of indicators with a relatively narrow focus and large areas of prescribing were not covered by these indicators.

**Table 3. The use of prescribing indicators rated valid and reliable to assess prescribing performance.<sup>42</sup>**

<p><b>Cost indicators</b></p> <ul style="list-style-type: none"><li>• Generic prescribing rate</li><li>• Potential generic savings as % of total drug expenditure</li><li>• Antibiotic generic prescribing rate</li><li>• <math>\beta</math> blocker generic prescribing rate</li><li>• % of total NIC of modified release NSAID preparations</li><li>• NIC/DDD for ulcer healing drugs</li><li>• Overall prescribing cost/ASTRO-PU (excluding high cost and specialist drugs)</li></ul> <p><b>Quality indicators</b></p> <ul style="list-style-type: none"><li>• Ratio of bendrofluazide 2.5 mg items to all bendrofluazide items</li><li>• % of antibiotic items contained in predefined list (health authority, primary care group, or practice formulary)</li><li>• Items/STAR-PU for antibiotics</li><li>• DDDs benzodiazepines/benzodiazepine STAR-PU (including zopiclone and zolpidem)</li><li>• Ratio of co-trimoxazole items to trimethoprim items</li></ul>
<p><b>Key:</b> ASTRO-PU=age sex temporary resident originated prescribing unit, DDD=defined daily dose, NIC=net ingredient cost, NSAID=non-steroidal anti-inflammatory drug, STAR-PU=specific therapeutic groups age sex related prescribing unit</p>

## **Aims and Methodologies: study 1.**

### *1) Introduction*

As a practising GP since 1987, I had witnessed the inception of GP fundholding in April 1991 (although our own practice opted to remain non-fundholding) and its subsequent replacement by PCGs in April 1999 and then by PCTs which were initiated locally in April 2002. Our own area, north Lambeth, had been selected as one of the Pilot sites for testing some of the principles of PCGs. A total of 40 Pilot sites, termed Primary Care Commissioning Groups (PCCGs) were developed in England.<sup>43</sup> Originally intended to last for two years, the political pressure for change was such that PCGs were introduced after just one year of piloting.<sup>44</sup>

The impetus for forming the PCCG came from the vision of Peter Holland and Toby Lewis at the health authority (see Acknowledgements) who were aware of three factors unique to north Lambeth. Firstly, north Lambeth was the most deprived locality in the health authority area. Secondly, it had the lowest proportion of fundholding general practices – fundholding was much more popular in the more affluent areas such as Dulwich. And thirdly, the area was making considerable prescribing savings based on the difference between the prescribing budgets for local practices and the actual prescribing spend. Had the practices been fundholding, these savings could have been returned to local practices to invest in commissioning additional health care. Because most practices were not fundholding, not only did the practices and the locality ‘lose’ this money, but it could also not be retained by the health authority, which, in turn, had to pass the savings back to support the national prescribing budget.

My own role was as GP adviser to the health authority team applying to the NHS Executive for approval of our PCCG proposals. I was involved in discussing the original concept ('how could non-fundholding practices retain and invest prescribing savings?') and drafting proposals that fulfilled the requirements for PCCGs set out at the time by the NHS Executive.<sup>45</sup> In the end, our proposal was accepted and we were one of forty national PCCGs each one of which acted as a Pilot for the subsequent development of PCGs. The emphasis in our proposal was on four goals, all relating to prescribing:

- to retain the prescribing savings already being made by the practices in our locality
- to further increase the prescribing savings by encouraging cost reduction where we identified that savings could most readily be made. After comparative analysis of PACT data, we decided that reductions in the prescribing of proton pump inhibitors would be the best strategy
- to enhance the quality of prescribing, even if this meant increasing prescribing cost. After a consultation exercise with prescribing advisers, GPs and practice nurses, we decided to promote improvements to the quality of asthma prescribing, self management plans for asthma and education in inhaler technique for all patients
- to invest the prescribing savings in locally agreed health improvement projects. After consulting our public health colleagues, we decided that savings should be invested in the health care of all patients in the locality and used to purchase additional orthopaedic and cardiac surgery procedures and to implement a hepatitis B vaccination campaign for local intra-venous drug users.

Since prescribing change was the focus of our PCCG, a prescribing committee was required to facilitate and implement these changes. I did not apply to be Chair of the prescribing committee since I considered that this could be a conflict of interest in any evaluation. However, I was voted in as one of the two GP representatives on the prescribing committee and played an active role in monthly meetings for a period of a year.

Finally, my own role was as evaluator. In this role, I worked for STaRNet London, the health authority, the PCCG and the department of general practice. Supervised by David Armstrong (see Acknowledgements), I conducted an evaluation of the PCCG, or, as it became known locally, the 'Prescribing Pilot'.

## *2) Research questions*

I had been interested in the subject of prescribing change ever since starting practice as a GP. The formation of a PCCG in my own area, north Lambeth, gave me the opportunity to develop this interest. In April 1998, all the GPs (n = 72) in all north Lambeth practices (n = 26) joined to form the PCCG. For the first time, non-fundholding practices could generate substantial prescribing savings but unlike fundholders, the PCCG decreed that these savings could not be retained by the practice. Instead, savings were to be pooled and spent collectively on health improvement for the local community.

The primary research questions arising from this development were:

- Could objective prescribing change be demonstrated after one year of operation as a commissioning group?

- What was the relationship between prescribing interventions and prescribing change?

Other subsidiary research questions included:

- Were GPs motivated to change their prescribing on joining a commissioning group?
- What were the characteristics of the more motivated and the less motivated GPs?
- What were the characteristics of the early responders to a prescribing questionnaire compared to the late responders?
- What was the influence of individual practices on the response of GPs to prescribing initiatives?
- What were the characteristics of the prescribing incentive scheme administered by the commissioning group?

These research questions arose out of the questions being asked at the time by health authority managers, prescribing advisers and GPs. The atmosphere at the time was enthusiastic. There was a pioneering feel amongst participants eager to test new ways of working. There was a feeling of pride too, that local health professionals could shape national policy. Amidst this enthusiasm there was dissent from some GPs who we were aware had felt somewhat pressurised into joining a commissioning group. They had expressed concerns that such a group would come at a cost to their independence. It was important to both capture the mood of the participants but also to engage in a critical and dispassionate evaluation. We had to question whether these



initiatives worked. And even if they did, were the achievements generalisable or did they only apply to groups with a similar sense of self-determination and enthusiasm?

Given my own awareness that there was some dissent amongst fellow GPs, I was determined to maximise the questionnaire response rates so that we could determine the size of the dissenting group and their main concerns. From the outset, I decided that since every single GP in the PCCG was personally known to me, I would use this relationship to boost response rates. Non-responders would be followed up with further copies of questionnaires. Persistent non-responders would be followed up by a phone-call (usually timed to coincide with the end of their morning surgeries), a visit ('I thought it might be easier if I popped over to collect your questionnaire when you've had time to look at it') or, to those who had still not returned a questionnaire, an invitation out for a tapas and glass of wine to aid completion. At the same time, it was important to ensure that recipients of the questionnaire were aware of their freedom to abstain. It was also important, given my personal relationship with the GPs, that they were assured (and convinced of the assurances) of the confidential nature of their responses and the fact that I, as a colleague, would only analyse the responses of coded questionnaires rather than named questionnaires. Statements about the confidentiality of responses were placed at the top of the questionnaire.

### *3) Research methodology*

The ideal methodology for investigating prescribing change would be a randomised, double blind, controlled trial. Such trials are superior to other trial methodologies for a number of reasons.<sup>46</sup> But the requirements of randomisation and double blinding would not have been possible with an intervention of this nature. The intervention

could never be double blind since GPs and prescribing advisers could not be unaware whether they were administering the 'active' rather than the 'dummy' intervention. Randomisation may have been possible but the financial arrangements for sharing prescribing budgets and the nationally agreed accounting requirements meant that individual practices could not be randomly allocated to either join or not join the PCCG. Only large groups of GPs covering a community with a population of around 100,000 were eligible to adopt the responsibilities of PCCGs.

Instead, a longitudinal, before and after, design was chosen. Such a design has advantages over a cross-sectional study since information can be compared between two snapshots: a description before a given intervention can be compared with a description after the intervention. Furthermore, the subjects can be paired enabling information on within-subject change to be gathered as well as overall change by the whole group of subjects.

Longitudinal data can be used to support the hypothesis that an observed change is the result of a given intervention. But longitudinal data cannot prove causality. An observed change may merely be the result of an underlying secular change. In other words, the observed change might have happened anyway, regardless of the intervention. Evidence that observed change is unlikely to be the result of a secular trend can be obtained by matching the subjects. If there is no observed change in the matched comparison group but there is change in the intervention group, then something unique must have occurred in the intervention group. Again, causality has not been proven. The unique event resulting in change may have been another unknown factor, unrelated to the intervention. The more factors that are used in the

matching process, the more likely it is that differences between the groups are causally related to the intervention. Longitudinal surveys may offer higher level data that more powerfully implies causation by generating repeated measures. For example, a time series analysis may reveal a step change at the time of a given intervention. However, our intervention did not occur at one single time point but was spread throughout the year. We were therefore only able to measure prescribing (PACT data) and prescribing attitudes (questionnaire data) at two time points: before and after the intervention.

For these reasons, a matched comparison group was selected and longitudinal data were compared between the intervention and comparison group.

#### *4) Data Collection*

Two types of data were collected:

- Process data from GPs – this took the form of questionnaires sent to each GP
- Outcome data from PACT – prescribing data for each practice

#### *5) The questionnaires*

Two questionnaires were designed. The first was sent to all GPs in the north Lambeth PCCG (n = 72) on 1<sup>st</sup> April 1998, the first day that the ‘Prescribing Pilot’ went ‘live’. The second questionnaire was sent in the final week of March 1999, which marked the end of the ‘Prescribing Pilot’.

Questionnaires could not be sent to the matched comparison practices (see below) since the requirement of the matching process was that the identity of the practices

would remain confidential and that no attempt was made to trace or contact these practices.

I designed, produced the first draft and piloted both questionnaires. The first questionnaire was finalised with the help of David Armstrong. The second was finalised with the help of David Armstrong, Azeem Majeed, Robert Lea and Heather Gray (see Acknowledgements). Both questionnaires are reproduced in the Appendix.

Both questionnaires elicited background demographic information about the GP and their practice. The first questionnaire recorded responses scored on a four or five point Likert scale. It contained the following sections:

- a series of interventions, drawn from a literature review, that might influence prescribing. GPs were asked to comment on how much each of these interventions might affect their own prescribing.
- a series of questions about the GP's attitude to financial and managerial aspects of the 'Prescribing Pilot'.
- a series of questions about the GP's attitude to prescribing interventions utilised by the 'Prescribing Pilot'.
- questions about the GP's perception of their current prescribing characteristics.
- questions about the expectation of personal and practice prescribing change.

The second questionnaire covered the same areas as the first. But instead of asking about expectations of prescribing change, the second questionnaire had two additional sections:

- questions about GP's perception of the most effective prescribing interventions during the course of the 'Prescribing Pilot'.
- questions about the actual changes in personal prescribing attributable to the 'Prescribing Pilot'.

#### 6) *PACT data*

PACT data for each of the 26 practices in the 'Prescribing Pilot' were obtained from the health authority which, in turn, had obtained this information from the Prescription Pricing Authority in Leeds. Data provided information on both the cost and volume of prescribing in each practice. Although held at individual GP level, the data were aggregated at practice level since individual GP data can be misleading. GP level PACT data are derived from patient registration information so that each prescription is ascribed to the registered GP rather than the GP who actually issued the prescription. In single handed practices, there is usually no distinction unless locums or assistants have been employed. In group practices, particularly those that do not have a personal list system, the chances are high that a prescription may not have been issued by the registered GP.

Cost data were analysed using:

- Total Actual Cost – this figure represents the actual financial cost of each prescription issued by the GP and dispensed in the community. This measure is favoured by prescribing advisers since it allows the adviser to see the actual cost and compare this with the budget allocation. It is required to define the degree of prescribing overspend or underspend. I used this figure for determining the total underspend of the 'Prescribing Pilot'.

- Net Ingredient Cost – this is a standardised national figure for prescribing cost. It represents the sum that is reimbursed to the pharmacist for each product. Unlike the Total Actual Cost which varies according to pharmacist, drug supplier and region within the United Kingdom, the Net Ingredient Cost remains the same throughout the country. This is the cost measure preferred by researchers. I used this figure to compare prescribing costs in the intervention and matched comparison practices.

Volume data were analysed using:

- ASTRO-PUs (Age, Sex and Temporary Resident Originated Prescribing Units) – these prescribing units are a weighted measure of the registered practice list.<sup>47</sup> Simple comparison of the prescribing volume between two practices would be misleading unless the age, sex and registration status of patients was not taken into account. For example, older people are given more prescriptions so a practice with a disproportionately large elderly population might appear to have unusually high prescribing volumes until this factor was ‘corrected’ by using the ASTRO-PU formula. Each practice is given an ASTRO-PU value which is approximately two to four times its registered list size. The weightings are applied in ten year age bands. I used this denominator for comparing total prescribing volumes between matched practices.
- STAR-PUs (Specific Therapeutic group Age-sex Prescribing Unit) – these prescribing units are weighted measures so that prescribing volumes can be further standardised according to therapeutic group.<sup>48</sup> The therapeutic groups are those listed in the chapters and subheadings of the British National

Formulary.<sup>49</sup> This measure takes account of the fact that prescribing patterns for many drug groups differ according to age and sex. Thus, for example, STAR-PUs for antibiotics show a relatively heavy weighting for children under 5 years of age, making allowance for the fact that this group are large consumers of antibiotics. In contrast, STAR-PUs for gastrointestinal drugs tend to be more heavily weighted toward prescribing in the elderly with hardly any weighting for children. STAR-PUs have been developed for all gastrointestinal drugs and for ulcer healing drugs. As yet, there are no STAR-PU weightings for H2 blockers nor for proton pump inhibitors.

NB Volume data may also be standardised using Average Daily Quantities (ADQs), a measure which ‘corrects’ the prescription for the total duration of treatment.<sup>50</sup> Simply counting the number of prescriptions issued may give a misleading impression about the true prescribing volume. Thus, comparisons between two practices may appear to show that one prescribes double as much antidepressants than a second practice. But if the second practice issued all their prescriptions for double the duration of the first practice, then the true prescribing volumes would have been identical. Standardising the volume of prescriptions by using the ADQ correction overcomes this difficulty. Unfortunately, at the time of the study, ADQ data were not routinely available and comparisons had to be made between practices using the number of prescriptions issued per ASTRO-PU or per STAR-PU.

Quality information was analysed using:

- the Health Authority’s ‘Quality Index’. The Health Authority, in common with many others, had developed a quality index based on therapeutic

categories identified using PACT data and which were considered to represent either good or poor quality prescribing. The index comprised nine prescribing indicators: generic prescribing, benzodiazepine volume, antibiotic volume, the ratio of inhaled corticosteroids to bronchodilators and the volumes of five drugs of limited therapeutic value (cough suppressants, antidiarrhoeals, appetite suppressants, nasal decongestants, topical anti-inflammatories). Each of the nine items could be scored from zero to three, according to a locally developed scale. The maximum possible score for high quality prescribing was 27. This index had been developed after consultation and applied to all local practices for some five years before the start of the 'Prescribing Pilot'.

#### *7) Matched comparison practices*

Matching was undertaken for all practices in the North Lambeth PCCG. Twenty six practices joined the PCCG but two ceased practising over the course of the year. The twenty four remaining practices were matched by the Prescribing Support Unit, Leeds according to the following characteristics: list size, ASTRO-PUs per patient, patient to GP ratio, dispensing status and training status. None of the pairs were dispensing practices, four pairs were training practices and 10 pairs were singlehanded.

The condition of being able to access PACT data for these practices was that their identity was confidential and that no attempt could be made to identify nor contact the practices. It was not possible therefore, to gain further information about the closeness of matching. Several other variables may have contributed to differences between the prescribing patterns of the two groups of practices. For example, we were unable to determine the nature of any prescribing intervention in the comparison



practices, the methods used by the local prescribing adviser nor the size of financial rewards offered for fulfilling local prescribing targets. We did, retrospectively, confirm that none of the matched practices were located within other national PCCGs.

#### *8) Dataset creation*

The data from the two questionnaires were coded and entered onto computer using the statistical package, SPSS for Windows.<sup>51</sup> A longitudinal dataset was compiled linking GP respondents to the first and second questionnaires.

PACT data covering prescribing cost and volume at practice level for the financial years 1997/8 and 1998/9 were also entered into the SPSS dataset. A matched, longitudinal dataset was produced by linking practice data for the 'intervention group' and the matched comparison group of practices.

#### *9) Data analysis*

The primary analysis was directed towards examining the significance of differences in prescribing volumes and costs between the intervention group and the comparison group, taking into account the baseline levels.

A broad based understanding of quantitative statistical methods would be required for analysis of the results of this study. I planned to undertake all the primary statistical analysis myself and to seek help and advice from academics familiar with the use of statistical methods (see Acknowledgements). For the background statistical concepts, I have drawn heavily on Armstrong, Calnan and Grace.<sup>52</sup>

### *9a) Standard deviation*

The classic bell shaped curve describes the 'normal variation' of a continuous variable within a population. Standard deviation is a statistical method enabling a description of the spread - is the bell shaped curve flat and widely distributed or pointed and narrowly distributed?

The standard deviation is a standardised measure of the deviation of each variable from the mean (hence its name). The difference between every single value and the mean is calculated, squared (to get rid of negative signs) and added up. The resultant figure is often described as the sum of the squares of the differences from the mean. This sum is divided by the number of values and the square root of this figure is the standard deviation. It is also known as the 'variance'.

Standard deviation give a precise description of some features of the distribution curve: 68% of all values fall within one standard deviation either side of the mean, 95% of all values fall within two standard deviations and 99.73% of the values fall within three standard deviations.

### *9b) Parametric and non-parametric data*

When choosing a type of statistical test to analyse data, it is necessary to know whether the dataset contains parametric data or non-parametric data. Parametric simply means, 'normally distributed'.

Parametric tests can be used to analyse any data that are measured using an interval scale and which are also normally distributed. If there are doubts about whether the

data are normally distributed or if the measurements are at a 'lower' level than interval data (that is, nominal or ordinal data), then non-parametric tests are used.

### *9c) Paired and un-paired data*

Sometimes we want to compare the average values for a given variable (say, prescribing savings) between two groups. If the two groups are quite unrelated, we have to use un-paired tests to determine the significance of any differences between the two groups.

On the other hand, if the two groups are very similar or identical, the more sensitive statistical test, "paired analysis", may be used. However, our data did not fulfil the requirements for a paired test since the matching process was only able to match for a few criteria (see below) and could not produce two, near identical groups. As a result, all our data are analysed using un-paired tests.

### *9d) Probability values*

In social science and medical research, it is conventional to regard a probability of one in twenty, that is a p value of 0.05 or less, as significant. If a given result would only have occurred 1 in 20 times then it is considered 'unlikely' to have occurred by chance alone.

Care has to be taken in selecting a level of significance. If twenty different associations are explored in our database, it is likely that one of them will have a p value less than 0.05 by chance alone. Thus the strength of association is weakened by looking for multiple associations. Depending on how many associations are explored,

a p value of 0.01 or even 0.001 might be more reasonable – otherwise associations may be assumed when no such association exists (a so-called “Type 1 error”. A Type 1 error is defined as occurring when the null hypothesis that there is no significant difference between the groups is falsely rejected).

#### *9e) Chi-squared test*

The chi-squared test is a test of significance for simple data that can be placed into a 2x2 (or, less commonly, a 3x2, or nx2) table. For example, we can compare the significance of any differences between fundholders (a yes/no variable) with prescribing underspends (another yes/no variable). If the p value is under 0.05, then the association is ‘unlikely’ to have arisen by chance alone. The calculation is performed by comparing the observed results with the ‘expected’ results which would have occurred if there were no difference between the two groups.

Sometimes, the numbers in one of the four boxes of a 2x2 table are small. For the chi-squared test to give an accurate result, each of the expected (not observed) values in the boxes should be five or more. Using our example of fundholders and prescribing underspends, it is likely that one of the boxes will contain a value under five since the total sample size was 24 practices and just nine were fundholding. Under these circumstances, the probability that differences were unlikely to have arisen by chance alone cannot be reliably determined. There is a loss of statistical power. The Yates correction has to be applied and this improves the statistical power to an extent – although the lack of adequate numbers will always reduce statistical power.

#### *9f) t-test: Levene's test for equality of variances*

t-tests are used to compare the means between two groups. But the data must be normally distributed. In our dataset, the prescribing spends of each practice were fairly close to a normal distribution. We could then use the t-test to compare the prescribing spend of the 24 practices in the intervention group with that of the 24 practices in the comparison group.

The gap between the means of two groups does not, on its own, tell us if the difference between the two groups is significant. Knowledge of the variance within each group is also needed to tell us by how much the groups differ. When comparing means, the standard error of the mean (rather than the standard deviation) is used: the standard error is the standard deviation divided by the square root of the number of cases in the sample.

Part of the calculation of the t value involves deciding whether the variances of the two groups being compared are equal. It is assumed that there is no significant difference between the variances of the two groups. But if there is a significant difference, then the p value of 'Levene's test for equality of means' will be  $< 0.05$ . If this is the case, we need to obtain the t value using the method that does not assume equal variances. This calculation will somewhat reduce the sensitivity of the test.

#### *9g) Mann-Whitney U test*

The Mann-Whitney U test is a test used for comparing averages of non-parametric data. For example, the responses to the Likert scales used on our questionnaires constitute non-parametric data.

The method of calculation for most non-parametric tests, including the Mann-Whitney U test, is to convert the actual value of an observation into a rank. By ranking observations, extreme outliers have less power to influence the average than would be the case if the actual value is used for the calculation. In other words, using the rank rather than the actual value smoothes out the data, reducing the excessive influence of a few outliers.

#### *9h) Spearman's and Pearson's correlations*

Correlations are a measure of how much two ordinal or interval variables change in parallel with each other.

Correlation calculations produce a correlation coefficient. A value of zero implies no correlation whatsoever between two variables. A value of +1.0 means that for every unit increase of the first variable, there is a corresponding unit increase in the second variable. On the other hand, a negative coefficient means that the second variable decreases as the first variable increases.

If the data are parametric, then Pearson's  $r$  test is used to give a correlation coefficient. If not, then Spearman's rank correlation coefficient is used.

#### *9i) Factor analysis*

Factor analysis is a complex concept but like all the above tests, easy to perform using the statistical package, SPSS for Windows. Perhaps by reason of the ease with which

it may be performed, it is even more important to understand the meaning of the results that might emerge from such an analysis.

Factor analysis is a method for finding clusters of variables that are connected within a much larger pool of variables. The existence of clusters of variables, each strongly correlated with each other, suggests that these variables could all be measuring aspects of an underlying dimension. It is this dimension that is called a ‘factor’ (or ‘latent variable’).

The method of calculation using SPSS for Windows gives the option of sifting the data to look for a number of underlying factors. The pre-intervention questionnaire given to GPs in the PCCG elicited over 50 variables. Were any of them clustered together to form a ‘latent-variable’? In fact, some responses elicited using Likert scales were found to cluster (see Discussion). In particular, all the variables describing educational inputs from the prescribing adviser clustered together. That is, each respondent tended to give the educational questions a similar scoring – those who gave a score of five to one of the variables were more likely to give high scores to all the others, and so on. This clustering suggested that a ‘latent variable’ or ‘factor’, which I have termed the ‘educational variable’, had more overall importance than a few conspicuous scores to some of the individual educational questions could have achieved.

The actual technique of measurement using SPSS for Windows requires weighting levels for factor extraction. A decision has to be made about how important the factors should be before they appear in the extraction. Too low a weighting and a

profusion of factors is generated. Too high a weighting and no factors emerge at all. This weighting is termed the Eigen value. Statisticians differ in their interpretation of how high the Eigen value should be before a factor is considered to have become statistically important.

I found the technique an interesting way to explore the data. However, it had two major drawbacks from my own perspective. Firstly, it could not be used to test hypotheses – it was merely a way of conducting a detailed trawl of a dataset to see if important relationships might have been overlooked. Research is often described as concerned with testing theories or hypotheses. Factor analysis reverses the process and the more disparate the linked variables, the more challenging it is to try to explain the findings. But the explanation appears, to me, to be *post hoc* rather than theory driven. Nevertheless, research is concerned with improving our understanding of the world and in that respect, the output could be considered as contributing to the research effort. Perhaps more fundamentally, I found factor analysis unsatisfactory because it generated a bewildering number of different interpretations of the same dataset depending on what level was set for the Eigen value. Previously important factors that appeared when the level was set at a high level, were then swamped and distorted by other factors when the level was set at a lower level. It did appear that the results could, to a degree, be used to suit several desired messages. Certainly, multiple ‘explanations’ emerged from the same dataset. It has been used more consistently in the discipline of psychology, where factor analysis has been established as a reliable tool for uncovering personality types.<sup>53</sup>



#### 9j) *Intra-class correlation coefficients (ICCs)*

The intra-class correlation coefficient is a measure of the variance between groups divided by the sum of the variance within groups and between groups. It is a measure of clustering. An ICC value of zero indicates that there is no clustering at all of values within groups; a value of 1.0 could only be produced if everyone within a group gave identical responses, which were different to the other groups. .

When comparing the average values for several groups, the usual parametric instrument of analysis is the ANOVA (Analysis of Variance) test (for non-parametric data, it is the Kruskal Wallis test). If there are significant differences between the means, then the ANOVA test will yield a significant p value. I consulted three statisticians to help me in the analysis of our results which had suggested a pattern of questionnaire responses within practices (see Acknowledgements). They advised that I could use a parametric analysis even though the questionnaire data were derived from Likert scales, providing that I grouped questions into categories. The questionnaires were designed in an attempt to elicit attitudes toward two fundamental aspects of joining the PCCG – prescribing change and the new managerial and financial ethos. I grouped the questions into these two categories, pooled the responses to the Likert scales and emerged with a dataset containing, initially, just two variables. The scores for the prescribing variable and the managerial/financial variable were normally distributed and could now be compared using parametric instruments. The ANOVA test showed that there was no significant difference between practices for the prescribing variable ( $p > 0.05$ ) but that the managerial/financial variable did differ significantly between practices.

However, the ANOVA statistic simply tells us that the means for the managerial/financial variable differed between practices. It does not tell us the degree to which views were homogenous within a practice. Just because there is a large difference in attitude between practices, does not mean that there is any consensus within that practice. I wanted to take this further and determine the degree to which the two main issues arising during the 'Prescribing Pilot' had unified or divided partnerships.

After much discussion with the statisticians, it was agreed that the ICC was the correct test to interpret clustering. It is a multi-level statistic which can be used to explore simultaneous practice and GP level data. It cannot, however, be calculated using SPSS for Windows and I had to use the STATA programme to derive ICCs. The results of the ICC analysis are discussed further in the Discussion.

## **Aims and Methodologies: study 2**

### *1) Introduction*

Having gained some experience exploring prescribing issues working at the level of local PCCG practices all known personally to me, I became interested in pursuing some of these questions in a wider area.

During the course of my own involvement in the PCCG, I became aware of the difficulties in promoting prescribing change. One year later, all general practices in England and Wales were grouped into PCOs. Most of these were PCGs but a few, from the outset, secured 'Trust' status and took on the additional responsibilities of a

PCT. Our experience within the ‘Prescribing Pilot’ would have to be replicated in each locality. Prescribing advisers would have overall responsibility for overseeing the prescribing strategy for each locality. PCO based prescribing advisers had four key tasks:

- to agree prescribing budgets for each practice
- to agree prescribing indicators applicable to each practice
- to agree targets for each prescribing indicator to be achieved by each practice
- to agree the level of financial incentives available to practices achieving their prescribing targets

Our experience suggested that each of these tasks would require the building of consensus amongst all prescribing GPs and complex local negotiations. I was also aware that each area had, to an extent, to ‘re-invent the wheel’ – there was little central guidance on how prescribing advisers were to fulfil their responsibilities. As a result, many different outcomes were possible. I was interested in both the diversity and common themes to prescribing strategies in different areas.

## *2) Research questions*

Perhaps the central duty of the prescribing adviser in each PCO was to implement a local Prescribing Incentive Scheme. These schemes were a statutory responsibility.<sup>54</sup>

<sup>54</sup> They encompassed all four roles of prescribing advisers. Since each scheme had to be published by the PCO, I had the opportunity to study and compare these schemes across a large number of PCOs.

The primary research questions arising from this development were:

- what financial incentives were chosen by each PCO and how were they likely to influence prescribing?
- what prescribing indicators were selected by each PCO and were they more likely to influence the cost or the quality of prescribing?

Other subsidiary research questions included:

- what range of financial incentives were available to GPs?
- what was the likely impact (intended or unintended) on prescribing of high and low financial incentives?
- what range of prescribing indicators were adopted by PCOs?
- what was the likely impact (intended or unintended) on prescribing of different prescribing indicators?
- how did the incentive schemes develop over time?
- what was the effect of encouraging practices to share prescribing information?

These research questions arose out of the discussions taking place amongst GPs and prescribing advisers as they came to terms with the implications of PCOs. The arrival of PCGs and PCTs in April 1999 was sooner than most had anticipated (nationally, PCCGs were originally intended to be two-year pilots <sup>44</sup>). And unlike fundholding, participation was not optional. All practices had to be part of the new PCO structure. It took PCCGs much of their first year to build a functioning management team.<sup>43</sup> For most PCOs, it appeared that their Prescribing Incentive Scheme would be devised in haste. It had to take immediate effect. Many of the key personnel had not been appointed by PCOs. It seemed highly likely that there would be much diversity in the schemes and possibly some idiosyncratic selections of indicators. Here was both a

research opportunity and an opportunity to share developments such that other PCOs, and particularly prescribing advisers, could benefit from information sharing.

### *3) Research Methodology*

We wanted to conduct a survey. Unlike in the earlier study of our own PCCG, it was not feasible to locate a comparison group since all practices had, effectively, joined the ‘intervention group’ by becoming part of a PCO. From now on, it would only be possible to make comparisons within an intervention group.

It might have been possible to conduct a qualitative analysis of the experiences of all the key players involved in developing the Prescribing Incentive Scheme in each PCO. But qualitative analysis is labour intensive and less well suited to a survey of a large number of participants. I decided that a more quantitative analysis was needed since this would allow me to survey a much wider area and involve larger numbers of prescribing advisers. In preliminary discussions with prescribing adviser groups, the need appeared to be to find out what each was doing across a large geographical area. Prescribing advisers themselves were grouped into NHS Regional groups, meeting with their Regional prescribing adviser on a regular basis. In my own area, the London and South-East NHS Regions had already formed a larger group of prescribing advisers, collaborating on aspects of prescribing work. Having already developed links with this larger group, I had the opportunity to work more closely with them, further my own research interest, but also to support them in their work with the newly emergent PCO structures.

In order to obtain and disseminate information from as large a group as possible, I decided to adopt the methodology of a longitudinal survey.

#### *4) Data Collection*

Just as in the previous study, two main types of data were collected although the source of the data differed:

- Process data from prescribing advisers – these were in the form of responses to questionnaires sent to each prescribing adviser
- Outcome data from each PCO – these were in the form of financial prescribing data

#### *5) Prescribing Incentive Scheme questionnaires*

Two questionnaires were designed. The first was sent by post to all prescribing advisers in the London and South East NHS Regions (n = 145) in autumn 2000, covering the 1999/2000 Prescribing Incentive Scheme. The second was sent by e-mail in autumn 2001 covering the 2000/01 Scheme (n = 113).

I devised the first questionnaire after discussion with prescribing advisers at two Regional prescribing advisers groups. Together, we compiled a list of key questions about the Prescribing Incentive Schemes in each PCO. The first and second questionnaires were piloted on small groups of community pharmacists working for the PCO who were not part of the Regional prescribing advisers' group. The first questionnaire was finalised in discussion with Stacey Golding and Azeem Majeed (see Acknowledgements).

I also devised the second questionnaire. This was drafted after presentation of the results of the first questionnaire to a regional prescribing advisers meeting. At this meeting, it was suggested that the response rate would be improved if it were distributed by e-mail since the whole group had a well established pattern of e-mail communication. This suggestion was adopted. The second questionnaire was finalised in discussion with Azeem Majeed, Hugh Gravelle, Robert Lea and Heather Gray (see Acknowledgements). The questionnaires have been reproduced in the Appendix.

Both questionnaires elicited attitudinal responses using a five point Likert scale and descriptive responses using a yes/no format. The questionnaires had sections covering:

- basic information about the role of the prescribing adviser
- description of prescribing indicators (both PACT and non-PACT based)
- description of financial incentives
- description of requirements for achieving financial incentives
- reasons for choosing prescribing indicators
- perceptions of whether the indicators would favour cost savings or prescribing quality improvements or both
- description about whether practices shared prescribing information

#### *6) Financial prescribing information questionnaires*

Financial prescribing information was often not available until nine months after the completion of the preceding financial year. This delay meant that most PCO prescribing advisers were unable to respond to the financial prescribing information

requested in the first distribution of the prescribing incentive scheme questionnaires. For this reason, the financial questions were sent again to prescribing advisers nine months after the initial distribution of the questionnaires.

The delay in receiving financial information occurred because PACT data were only available in arrears of between 6-12 weeks (depending on the month of analysis). PACT data then had to be discussed by PCO financial leads in order to reconcile the prescribing budget with the actual prescribing spend. Only when the degree of underspend or overspend was agreed could decisions be taken about allocating Prescribing Incentive Scheme reward payments. In many PCOs, the practices themselves had to produce an annual report describing the extent to which they had fulfilled the requirement of the Prescribing Incentive Scheme. Only when the prescribing advisers had received information from each practice and were aware of the funds available as reward payments could these payments be made out to practices. Often there was further delay whilst the payments were approved by the PCO Board. As a result, most PCOs were unable to provide comprehensive financial prescribing information for our survey until well into the following financial year.

Questionnaires sent to each prescribing adviser (see Appendix) elicited financial information covering:

- PCO prescribing budget
- PCO prescribing spend
- PCO decisions about funding the Prescribing Incentive Scheme – total PCO budget for the Prescribing Incentive Scheme, maximum reward payments to



practices and individual GPs, proportions of practices successfully achieving reward payments

Background demographic information describing practice and patient characteristics of each PCO were obtained from the National PCG database developed by the National Primary Care Research and Development Centre, Manchester.<sup>56</sup> This dataset enabled us to obtain information for each PCO covering: population size, number of GPs, % GPs qualified in UK, % GPs aged over 50 years, % course organisers, % GP Trainers, % population eligible for deprivation payments.

#### *7) Dataset creation*

The data from the questionnaires were coded and entered onto computer using the statistical package, SPSS for Windows. A longitudinal dataset was compiled linking prescribing adviser respondents to the first and second questionnaires. Financial information for each PCO was then added when it became available. Demographic information from the National PCG database was added into the information for each PCO.

#### *8) Data analysis*

The primary analysis was directed towards examining the size of financial incentives available to GPs under the Prescribing Incentive Scheme and whether this was related to the overall state of the PCO prescribing budget or the preference by the PCO for cost based prescribing indicators or quality based indicators.

Just as in the first study, statistical methods employed for the analysis of the data used the more cautious non-parametric methods unless the data were normally distributed and justified parametric analysis.

## **METHODS AND RESULTS**

See the following eight papers.

Study 1 covers aspects of the evaluation of prescribing change in the North Lambeth Primary Care Commissioning Group (PCCG) and constitutes papers referenced 57-60.

Study 2 covers the development of prescribing incentive schemes in the London and South East NHS Regions and constitutes papers referenced 61-64.

The following papers were removed from this thesis due to copyright.

Ashworth, M. Armstrong, D. Colwill, S. Cohen, A. Balazs, S.. (2000). Motivating General Practitioners to change their prescribing: The incentive of working together.. *Journal of Clinical Pharmacy and Therapeutics*. 25, 119-124.

<https://doi.org/10.1046/j.1365-2710.2000.00270.x>

Armstrong, D. Ashworth, M.. (2000). When Questionnaire response rates do matter: a Survey of general practitioners and their views of NHS changes. . *British Journal of General Practice*. June, 479-480.

DOI not available.

Ashworth, M. Armstrong, D. . (2003). Partnership effects in general practice: identification of clustering using intra-class correlation coefficients. *British Journal of General Practice*. November, 863-865.

DOI not available.

Ashworth, M. Armstrong, D. Colwill, S.. (2002). The effects on GP prescribing of joining a commissioning group. *Journal of Clinical Pharmacy and Therapeutics*. 27, 221-228.

<https://doi.org/10.1046/j.1365-2710.2002.00414.x>

Ashworth, M. Golding, S. Shepard, L. Majeed, A. (2007). Prescribing incentive schemes in two NHS regions: cross sectional survey. *British Medical Journal*. 324, 1187-1188.

<https://doi.org/10.1136/bmj.324.7347.1187>

Ashworth, M. Golding, S. Majeed, A. . (2002). Prescribing indicators and their use by primary care groups to influence prescribing.. *Journal of Clinical Pharmacy and Therapeutics*. 27, 197-204.

<https://doi.org/10.1046/j.1365-2710.2002.00405.x>

Ashworth, M. Lea, R. Gray, H. Graville ,H. Majeed, A.. (2003). The development of prescribing incentive schemes in primary care: a longitudinal survey. *British Journal of General Practice*. June, 468-470.

DOI not available.

Ashworth, M. Lea, R. Gray, H. Graville ,H. Majeed, A.. (2004). How are primary care organizations using financial incentives to influence prescribing?. *Journal of Public Health*. 26 (1)

<https://doi.org/10.1093/pubmed/fdh100>

## DISCUSSION

### Principal Findings – Study 1

#### *1) The views of general practitioners about prescribing change*

Immediately prior to joining a pilot commissioning group, 93% of GPs reported that they expected their prescribing to change.<sup>57</sup> This finding was more optimistic than expected. Although most expected changes in their prescribing, they were not expecting revolutionary change – the modal response was ‘a little bit’.

At the time, there was concern that non-fundholding GPs would not accept the principle of cash limited prescribing budgets. We found no evidence for this; on the contrary, non-fundholders were enthusiastic about the possibility of generating prescribing savings and reported low levels of concern about overshooting their new cash limited prescribing budgets.

The concept of financial rewards available for investment in the health care of the local community rather than being received by individual practices was completely new. Most attempts at using financial factors to influence prescribing had assumed that self-interest would be the only motivator. The results of this study suggest that a more altruistic focus may be a potent factor

By examining the clustering of questionnaire responses using factor analysis, a pattern emerged. Those questions relating to the role of educational interventions as a means of effecting prescribing change were generally answered positively. Less positive,

were the responses to questions about formularies and financial factors as potential influences on prescribing change.

Given the climate of opinion in 1998 and the fact that 30% of the GP sample were still fundholders, it was surprising that financial rewards to change prescribing appeared to be shunned in favour of educational interventions. It seemed that GPs themselves remained unconvinced of the effectiveness of financial rewards to change prescribing. They appeared to be stating a preference for educational interventions rather than financial rewards.

A further theme emerging from this study was the concept that GPs might be motivated by altruistic and collectivist factors rather than self interest and individual factors. The ethos of fundholding had, in part, been that financial savings made on health service budgets could contribute to increased income for the practice. The PCCG operated on another incentive – that there would be no personal gain from prescribing budgetary savings. Already, this collectivist philosophy appeared to have taken root and inspired participating GPs.<sup>57</sup> The ideas of collectivist working were developed further by David Armstrong who, in the paper, helped me link these with the work of Freidson (see ‘Discussion - Meaning of the first study: possible explanations and implications for clinicians and policymakers’) who described the commitment of individual doctors to the professional group and its core values and ideals.<sup>65</sup>

## *2) Questionnaire response rates*

We found marked differences in how GPs responded to questionnaires eliciting their views about joining a commissioning pilot. As a result of considerable effort, a 100% response rate was achieved. The majority (74%) returned their questionnaires promptly (we termed these, the ‘prompt responders’). Those remaining, termed ‘reluctant responders’, tended to give very different answers to questions and to represent a different group of GPs. Reluctant responders were older, less likely to have the MRCGP qualification and have larger list sizes. In a questionnaire focussed on prescribing change, it was the prompt responders who reported the most enthusiasm for change and commitment to the aims of the commissioning group. Comparing the responses of reluctant responders with prescribing data for their practices, those who responded after several promptings had lower scores on the health authority’s ‘Prescribing Quality Index’ a marker of cost-effective prescribing.

From these results, it appeared that ‘reluctant responders’ to our questionnaire survey had a different attitude toward the collectivity of the group. Had we accepted lower questionnaire response rates, we would have missed the viewpoints of those less well bonded to the collaborative group.

I had been aware of the dissent amongst a minority of GPs from the start which was one reason why I strove for and achieved a 100% response rate. I observed that prompt responders were giving responses more favourable to the new system of working than those who only responded to much prompting. To accept lower response rates would have been to underestimate the size of dissent. These findings



support the need to obtain much higher response rates than has traditionally been thought acceptable by researchers.

### *3) Patterns of questionnaire responses within GP partnerships*

Questionnaire data from the original pre-commissioning pilot were linked with similar questionnaires sent to all remaining GPs when the pilot had finished its work, one year later.<sup>59</sup> A larger, longitudinal dataset was therefore constructed and used to study the practice effect on responses. Intra-class correlations (ICCs) were used to explore the clustering of attitudes to prescribing within GP partnerships. There was little evidence of clustering, suggesting that GPs acted individually in this respect. In addition to prescribing questions, both questionnaires contained questions about managerial issues, particularly about financial incentives for prescribing change and collective working. Unlike the responses to prescribing issues, attitudes to managerial issues clustered strongly within practices suggesting that in this respect, GPs did not act individually but were strongly influenced by their own partnerships.

I observed that responses to managerial and financial questions in both questionnaires appeared to cluster within practices – in other words, it appeared that there was a ‘party line’ within each practice reflected in similarities of response to attitudinal questions based on managerial and financial issues raised by the formation of the PCCG. In contrast, I had noted that prescribing attitudes appeared to be individually held and did not cluster within practices. I postulated that GP partnership itself was the factor that held sway over GPs’ attitudes to managerial and financial issues. In contrast, GP partnership did not appear to have exerted a controlling influence on prescribing attitudes. Having made this observation, I needed to quantify it. I took

advice and learnt about the use of ICCs (see Introduction). There is very little literature about the effects of GP partnership. There is no literature about the use of intra-class correlations to analyse questionnaire responses at GP level and at practice level. Our observation and subsequent publication of this methodology seems to be unique and offers a new way of interpreting GP level and practice level data.

*4) Containing prescribing costs – evaluation of an intervention with a matched comparison group.*

Commissioning pilots were the last chance to investigate the effect of commissioning on GP prescribing using a comparison group. One year later, all practices were required to join commissioning groups (PCOs), thus removing the opportunity to compare with matched practices unaffected by commissioning. Our study, matching the practices in the North Lambeth PCCG with practices selected by the Prescribing Support Unit, Leeds, found a significant difference in cost increases between the two groups.<sup>60</sup> Mean prescribing costs within the commissioning group had risen significantly less than in comparison practices: 4.0% (95% confidence levels, 2.8%, 5.2%) compared with 6.9% (95% confidence levels, 5.8%, 8.1%) in the comparison group. Moreover, the major area of prescribing savings compared to the non-intervention group, was for proton pump inhibitors which were one of the key prescribing targets of the Prescribing Pilot. Mean costs of proton pump inhibitor (PPI) prescribing fell by 0.7% (95% confidence levels, -3.8%, 2.8%) in commissioning group practices but increased by 7.3% (95% confidence levels, 5.1%, 9.6%) in the comparison group. Within the framework of a matched comparison study, we had been able to demonstrate relative prescribing cost savings and particularly in the prescribing category that was the subject of multi-faceted

interventions (such as prescribing adviser visits, educational information about the use of PPI medication, practice based PACT data, comparative PACT prescribing data with other named local practices, literature about changing PPI medication to less expensive alternatives and practice based formularies).

It was also possible to derive financial figures for the total savings attributable to the lower rate of rise in prescribing costs in the PCCG compared to the matched comparison practices. Had the total prescribing costs of intervention practices risen to the same extent as comparison practices, their costs would have risen by an additional £220,000. For PPIs the projected savings amounted to £34,000.

Financial savings can be further extrapolated down to the level of individual GPs. I calculated that savings of £34,000 in prescriptions for PPIs would have required approximately 300 patients to switch to the alternative products recommended by the PCCG prescribing adviser (changes from a treatment PPI dose to a maintenance dose or changes from a PPI to a lower cost PPI – such a change reduces average prescribing costs by about a third). This equates to each of the 69 GPs in the PCCG changing their repeat prescribing, in line with the PCCG prescribing recommendations, for four or five of their patients. I considered that this type of analysis made the results more intelligible to readers and colleagues and provided a simple way of summarising the achievements of the GPs within the PCCG. Moreover, such changes seemed attainable. Indeed, it was surprising that so few patients required changes to their prescriptions in order to generate substantial savings.

Our longitudinal survey linked observations on actual prescribing change with questionnaire responses. These responses enabled us to determine possible reasons for the observed prescribing changes – at least in the opinion of the GP respondents. Of all the actual prescribing interventions, GPs considered that the role of the prescribing adviser was the most effective. Furthermore, practices making the largest savings in PPI prescribing were more likely to have reported the importance of the prescribing adviser's role. In contrast, formularies, financial pressures, PACT data sent out by the Prescription Pricing Authority and peer pressure from other GPs in the PCCG were not considered to have influenced these GPs' prescribing. But the exact nature of the successful intervention by the prescribing adviser was not characterised.

I considered that these results formed the central core of the findings of the first study. These findings provided a response to the original research question: could objective prescribing change be demonstrated after one year of operation as a commissioning group?

## **Principal Findings – Study 2**

### *1) Prescribing incentive schemes in the London and South East NHS Regions - prescribing indicators*

Our work was the first peer reviewed publication describing the prescribing indicators and financial incentives used by PCOs attempting to influence prescribing.<sup>61-64</sup>

By far the most frequently used indicator was the 'generic prescribing indicator', an indicator describing the proportion of all prescriptions written for a generic drug as opposed to a non-generic prescription which uses the 'trade name' for a drug made by

just one drug company manufacturer. Non-generic prescriptions are almost always more expensive than generic prescriptions. Antibiotics, gastro-intestinal drugs and non-steroidal anti-inflammatories (NSAIDs) were the next most frequent prescribing indicators in both years of the longitudinal survey. The emphasis of most of these indicators is on cost control rather than on improvements to prescribing quality although antibiotic indicators were predominantly used to improve prescribing quality.

The use of non-PACT data as prescribing indicators had not been widely observed before our study. We found that even in the first year of PCGs and PCTs, 63% were using non-PACT data as an indicator. By the second year, non-PACT based indicators were in almost universal use – 96% of PCOs were using these indicators. Non-PACT based indicators generally favour quality improvement whereas PACT data alone tend to be more useful in controlling costs.<sup>41</sup>

I noted a marked shift in the types of indicators in use in the PCOs' second year of operation. I was able to provide evidence that indicators used to influence prescribing had shifted toward an emphasis on quality rather than cost during the two years of our survey. Cost based prescribing indicators were reported less frequently. The most conspicuous rise in quality based indicators was in the proportion of PCOs using indicators describing the statin prescribing

## *2) Prescribing incentive schemes in the London and South-East NHS Regions – financial incentives*

Prescribing indicators were applied to all practices for the first time with the advent of PCOs in 1999. Unlike the experience of the 'Prescribing Pilot' when financial rewards had to be re-invested in commissioning additional healthcare for the local community, these indicators were directly linked to practice based rewards for prescribing change. In the first year, we found some confusion about administering these rewards. Incentive payments were not associated with prescribing overspends or underspends. Some PCOs (22%) made reward payments to all their practices whereas some (9%) made no payments to any practice. Moreover, large rewards were not clearly connected with either cost or quality based prescribing achievements. Some PCOs awarded the highest permitted incentive payment of £45,000 to some of their practices but this appeared to be based more on success at achieving savings on their practice prescribing budget rather than for any improvements in prescribing quality. Both practices receiving £45,000 were two partner, ex-fundholding practices. When these results were first presented (Society for Academic Primary Care conference, Leeds, 2001), there was considerable interest in the magnitude of the payments and this made the front page of the GP weekly newspapers at the time. I had to be particularly careful to protect the anonymity of the practices and of the PCOs making such large payments.

Conflict also arose over eligibility for reward payments: regardless of the quality of prescribing, 39% made payments to practices merely for restraining prescribing costs. This arrangement suggested the possibility that 'low quality' prescribing could be rewarded provided that it was also low in cost.

By the second year, the incentives were more closely aligned to the prescribing goals of the PCO. More incentives were tied to the achievement of quality goals. High quality prescribing was encouraged in most PCOs (even if this would have resulted in increased prescribing costs) including those that were already overspent in their own PCO prescribing budget. Furthermore, 86% of PCOs were able to offer reassurance to their practices that they would still be eligible for reward payments even if they had overspent their prescribing budget. It became clearer over the course of the study that prescribing advisers, trying to implement incentive schemes, were torn between allegiance to professional values encouraging investment in better healthcare for the local community and allegiance to a financially driven system which saw prescribing as a high spending area of primary care that could be used to generate savings for the PCO. On balance, the two-year survey offered some support to the idea that boosting prescribing quality was a higher priority for PCOs than generating prescribing savings.

Nevertheless, some GPs received a mixed message from PCOs throughout the two years of the survey. Just over half the PCOs continued to reward underspent practices, even if quality targets had not been achieved. A GP simply in search of a large financial reward might have achieved this more by cutting cost (and fulfilling budgetary indicators) than by improving quality (and fulfilling quality prescribing indicators).

It was only in the second year survey that I was able to obtain reliable data for the total budgetary allocations for each PCOs' Prescribing Incentive Scheme. In the first

year survey, many prescribing advisers were uncertain about the total sums available as reward payments. By the second year, 89% of PCO prescribing advisers were able to provide this information. This enabled me to derive a figure for the median reward payment per GP - £1220 (inter-quartile range, £470 - £4330). This figure was an original finding and it was the first time that an average reward payment per GP had appeared in the peer reviewed literature. And it turned out to be a figure of some importance.

Knowledge of both the maximum available payments and the median available payments enabled me to investigate which of the two figures appeared to have the strongest association with success at PCO budgetary control. The significance of the association was far stronger for the median payment. In discussion with Hugh Gravelle (see Acknowledgements) we considered that this finding could be developed into an economic theory about financial incentive payments. If indeed, financial incentives were an influence in promoting budgetary control, then the average rather than the maximum payment appeared to be the more effective influence. The implication would be that GPs are more influenced by achievable moderate financial gains (the average payments) rather than by 'jackpot' type gains (the maximum payments) only available to a few.

During the course of the first study of the North Lambeth PCCG, I had learned the advantages of a high response rate. I used some of the same techniques to improve the response rate in the survey of Regional prescribing advisers. Although I reported response rates of 91% and 89% to the two Regional surveys of prescribing indicators, these were only obtained after three mailings (e-mailings in the case of the second



survey), follow up phone calls and the promise that results would be presented back to the Regional prescribing advisers' meetings and to the individual PCO. The response rates to the first mailing were 48% and 39% respectively. Obviously, prescribing advisers had the right not to answer and I made clear that non responders could not be identified (reassurance was necessary that there would not be a 'name-and-shame' approach to increasing the response rate). Nevertheless, I gained the impression that the offer of personal and group feedback of information that could help the advisers in their own role, was a significant factor in improving response rates.

### **Strengths and weaknesses of the study – Study 1**

#### *1) The views of general practitioners about prescribing change*

The survey of GPs' attitudes before joining a pilot commissioning group provided a unique opportunity to gauge GP opinion in anticipation of the formation of PCOs, a year later.<sup>57</sup> Unlike other surveys of GP opinion, there was no opportunity for response bias because a 100% response rate was achieved. Questionnaire face validity was supported by the finding of modest expectations of prescribing change. However, conclusions based on questionnaire responses need to be interpreted cautiously. Although responses indicated that GPs accepted the underlying collectivist ethos, responses may have been influenced by the sentiment that they were expected to appear enthusiastic at the outset and that expression of dissent may somehow have undermined their colleagues and the new commissioning group. More importantly, surveys finding that GPs expect to change need to be corroborated from another source, preferably by objective prescribing data demonstrating that intentions translate into prescribing change.

In order to capture the full extent of the changes, the first questionnaire had been timed to greet each GP on April 1<sup>st</sup> 1998, the very first day that the 'Prescribing Pilot' went live. The timing may have both captured the mood at the outset but also given a distorted impression of GP attitudes captured at the beginning of a possible 'honeymoon' period. Responses may have been overly optimistic about what could be achieved. In particular, expectations of prescribing change may have been unrealistic.

## *2) Questionnaire response rates*

The analysis of questionnaire response rates was an opportunistic finding.<sup>58</sup> Its greatest strength was the achievement of a 100% response rate, something almost unique in health service research which has traditionally accepted response rates of 60%.<sup>66</sup> As such, the work did not set out to test the theory that reluctant responders to a questionnaire survey differ in important respects from prompt responders. This may have affected the validity of the findings. Possibly the process of chasing up the final few needed to achieve a 100% response rate contributed to the dissatisfaction expressed by reluctant responders. Indeed, the final few responders were invited to complete their questionnaires over a tapas and glass of wine (see Introduction). These responders were not completing the questionnaire under the same conditions as other responders. In other words, the methodology itself could have distorted the responses and contributed to the findings.

### *3) Patterns of questionnaire responses within GP partnerships*

Again, the pattern of questionnaire responses prompted an opportunistic observation. Responses to prescribing questions did not cluster within practices whereas responses to financial and managerial questions demonstrated a marked practice effect.<sup>59</sup> The use of ICCs in medical research has traditionally been confined to calculations of the clustering effects that may distort randomisation and the calculation of sample sizes that may need to be increased to allow for the possible effects of clustering. Use of ICCs to unravel the relatively unexplored and unreported dynamics of GP partnership is a new development. However, the calculation of ICCs gives rise to particularly wide confidence intervals unless samples are very large (over a thousand respondents). Statisticians themselves differ on which of the five methods for calculating confidence intervals is the most appropriate.<sup>67</sup> With broad confidence intervals, conclusions about the effects of GP partnerships on prescribing attitudes need to be treated with caution. Nevertheless, the consistency of the pattern of ICCs (low for prescribing attitudes and high for managerial/financial attitudes) points to findings that may be more robust than implied by the broad and overlapping confidence intervals. So, for example, this pattern of ICCs was present in the sum of all managerial/financial or prescribing questions and remained if the two questionnaires (pre and post the PCCG) were analysed separately. Similarly, the pattern remained if the questions were further subdivided into one of several financial/managerial topics or prescribing topics.

### *4) Containing prescribing costs – a matched comparison*

Our study of prescribing change on joining a Primary Care Commissioning Group is the only reported study using a matched comparison group to explore prescribing

change attributable to commissioning groups.<sup>60</sup> The national evaluation of commissioning groups did not analyse changing prescribing patterns by using a comparison group.<sup>43</sup> As such, the demonstration of reduced prescribing costs, particularly in the area targeted by the PCCG, proton pump inhibitors, was a unique finding. However, the comparison was not a randomised controlled trial and the process of matching may have been insufficient. It was only possible to control for some of the factors that may have influenced prescribing (see Introduction). Other factors could not be controlled in the matching process – we had no information on the prescribing indicators used by the health authorities in the control practices, the intensity of visits by prescribing advisers nor even the potential financial rewards available under other locally based prescribing schemes. Imperfect matching resulted in higher baseline prescribing costs in the comparison group. Nevertheless, this mismatch should not have influenced the main findings since practices with lower baseline starting costs were just as able to make cost savings as those with higher starting costs. Anonymisation of comparison practices meant that further information could not be obtained from these practices to corroborate our findings.

The results of the study were further strengthened by the inclusion of prescribing questionnaire responses for the intervention practices (but not for the comparison group practices which remained anonymised). This was another unique feature of the study enabling a more robust interpretation of the findings. So, for example, having found relative reductions in PPI prescribing amongst practices in the ‘intervention group’, the role of the prescribing adviser in this change would have remained conjectural without questionnaire data. But questionnaire data demonstrated a link:

that practices with the greatest PPI savings also reported that they were most influenced by the prescribing adviser.

The weakness of this study is that causal relationships cannot be demonstrated using this study design. I have not been able to demonstrate that an intervention from the prescribing adviser actually caused the prescribing change nor what type of intervention might have been most effective or even efficient.

### **Strengths and weaknesses of the study – Study 2**

#### *1) Prescribing incentive schemes in the London and South-East NHS Regions - prescribing indicators*

The strengths of the second study were a high response rate to each component of the questionnaires, the longitudinal design and the findings themselves which emphasised the increasing role of quality improvement, often at the expense of cost containment. Quality indicators may have been even more widely used than we reported. The National Tracker Survey of PCOs found that 22% of prescribing targets were not linked with incentive schemes and we would not have recorded these in our survey.<sup>68</sup>

In their survey, covering 52 randomly selected PCO prescribing advisers, the Manchester and Kings' Fund team found the same three most frequently used prescribing indicators as reported in our survey (generic, antibiotic, proton pump inhibitors).<sup>68</sup> However, they did not report the breakdown of these indicators in any further detail. Some of our most important findings were contained in the breakdown of the indicators. We found 11 types of antibiotic indicators, some designed to reduce antibiotic costs but most designed to reduce antibiotic volumes and 'unnecessary'

antibiotic prescribing.<sup>62</sup> We also found examples of idiosyncratic indicators within some of the categories that have not been reported by other surveys. For example, one PCO was rewarding GPs for prescribing cerivastatin which was subsequently withdrawn because of serious side effects. Another PCO was using a diabetic indicator aiming for over 80% of oral hypoglycaemics as metformin. Such an indicator, enthusiastically applied, could have adversely affected diabetic care in that particular community. I considered that it was this degree of detail, not previously reported in the literature, which was of the greatest interest to the Regional prescribing advisers. They were the first recipients of the results. Detail about indicators in use in neighbouring PCOs enabled them to compare and contrast their own schemes with Regional colleagues. The prescribing advisers reported to me that my presentation of information had informed them as they debated the next annual selection of PCO prescribing indicators.

## *2) Prescribing incentive schemes in the London and South-East NHS Regions – financial incentives*

The strength of the survey was the high response rate (enabling me to capture the full diversity of the schemes) and its longitudinal design (enabling me to report on the rapid pace of change and the direction of that change in the first two years). Higher response rates were achieved for financial questions in the second year as we learnt, from our first year experience, the time of the year when prescribing advisers could realistically provide us with this information. As a result, the response rate to the key question about the size of the maximum payments made to GPs under the scheme rose from 47% to 70% in the second year.

The ManMed study conducted by researchers in York surveyed all PCOs in England not included in the National Tracker Survey.<sup>55</sup> They sent questionnaires to the 329 remaining PCOs and, compared to our own response rate, achieved a much lower rate of 46%. In their survey, they found that 13% of PCOs made no incentive payment to practices based on achievement of budgetary targets in spite of the legislation requiring payment to be made.<sup>54</sup> These results support our findings – our own survey found that 9% of PCOs made no incentive payment to practices.

The size of the financial rewards available under the incentive scheme were described. The initial results were surprising, indicating substantial payments to just a few GPs in some PCOs. These payments far exceeded any other incentive payments made to GPs for reaching other primary care performance targets such as cervical smear and vaccine targets. But the response rate to these questions of 47% was much lower than for other sections of the questionnaire. Since high reward payments were controversial, the low response rate may have favoured responses from those PCOs offering more modest payments.

A further problem with the validity of the results was that prescribing advisers knew the size of incentive scheme payments made to individual practices but were often unaware of the total number of GP partners in the practice who would be sharing this reward. Thus practice level data were more readily supplied than GP level data although the economic incentive is more likely to relate to the sum received per GP rather than per practice. Sums of £45,000 per practice, the largest permissible payment, are likely to have a very different impact when they are shared among 12

partners in a large practice (reported in one instance) compared to a two partner practice (two such recipient practices were reported in our survey).<sup>61</sup>

A significant relationship was found between PCOs that had made budgetary savings and which also had larger average incentive scheme payments. Our study design did not enable us to determine whether this was cause or effect. I would have been particularly interested to know whether incentive scheme payments were merely a form of redistributing end-of-year prescribing savings or whether the payments themselves had inspired GPs to make those savings. Our results may have provided a clue, but no more. We identified a group of PCOs which had successfully reversed their first year overspends, transforming this into a second year underspend.<sup>64</sup> These PCOs made larger incentive scheme payments than other PCOs which remained overspent in the second year. Of course, this again does not prove that the larger incentive scheme payment caused the second year underspend. But it is a possible explanation of the findings. Clearer proof of a causal relationship would require PACT data analysis to determine if savings were made in the same therapeutic categories that had been rewarded in the incentive scheme. A qualitative methodology could have contributed to the search for causes – interviews with prescribing advisers and GPs might have shed light on the influence of larger incentive scheme payments.

### **Meaning of the first study: possible explanations and implications for clinicians and policymakers**

#### *1) The views of general practitioners about prescribing change*



General practitioners expressed a preference and a willingness to change their prescribing in response to educational initiatives from the commissioning group prescribing adviser.<sup>57</sup> Expected prescribing change was not associated with interventions that might impinge on the professional autonomy of GPs such as practice formularies, feedback about prescribing overspends or disclosure of prescribing variables to all other GPs in the commissioning group. The importance of educational practice visits ('academic detailing') in changing prescribing patterns has already been elaborated.<sup>26,27</sup> Possibly the education itself is the 'active ingredient' of the intervention. Equally, the success of this approach might be less to do with the educational tools employed and more related to the fact that it taps into one of the fundamental professional values – clinical autonomy.

Freidson observed that the key to professional status for medicine was clinical autonomy.<sup>65</sup> In historical terms, Freidson saw the emergence of medicine as a powerful profession and attributed this to its struggle to persuade public and state that autonomy would best serve patients' interests. Increasingly, professional dominance is being eroded by the rise of consumerism. But Freidson argued that the medical profession had adapted in an attempt to preserve this, their greatest attribute. In response to the increasing power of the citizen, he pointed to increasing formalisation of the methods by which professions control their own members. So instead of professional autonomy being claimed by each practitioner, the new model bolstered autonomy through its own elite to whom it delegated clinical autonomy. Armstrong explored ways in which these theories of clinical autonomy might have influenced prescribing decisions for the then relatively new selective serotonin re-uptake inhibitors (SSRIs).<sup>70</sup> He concluded that a new autonomy was emerging in which an

emphasis on patient centredness accounted for many of the decisions about whether to prescribe the new SSRIs. This autonomy was likely to further strengthen the profession by justifying clinical discretion to the public.

In our survey, we found that those least inclined to change their prescribing had lower prescribing quality and that this group of GPs were least aware when their prescribing costs exceeded their practice budget.<sup>57</sup> Their immunity to suggestions about prescribing change from the prescribing adviser (when they had the greatest reason of all GPs to make some changes) could become a significant issue for PCOs. Rather than batter them with yet more prescribing advice, another solution becomes apparent. These GPs appeared to have less sense of belonging to the values and ideals of the commissioning group. It is possible that attempts to engender greater identification with their professional group could restrain prescribing ‘outliers’ (those GPs who, on any measurable prescribing indicator, appear to differ substantially from their peers) and that prescribing change would become a consequence of adopting the norms of the professional group.

PCOs may also achieve prescribing change by adopting the second manifestation of clinical autonomy as set out by Freidson, patient centredness.<sup>70</sup> It is possible that prescribing advisers were valued for the pure educational content of their interactions with practices. But in the light of Freidson’s analysis, this perception could be revised. The value placed on the prescribing adviser’s educational interventions may have been tapping into the desire for GPs to be given more prescribing options that they could then present to their patients in the name of patient-centredness. This

might explain the lack of interest by GPs in our survey in other, more centralised ways of controlling prescribing.

## *2) Questionnaire response rates*

The implications of differing types of responses according to the eagerness or reluctance of GPs to return questionnaires is relatively apparent.<sup>58</sup> PCOs are likely to have to consult GPs on a variety of issues. If the opinions of reluctant responders are ignored, the PCO may become unduly influenced by the enthusiasts who respond quickly. Later responses are less likely to be sympathetic to initiatives from the PCO. PCOs will have to find ways of engaging with this sector of the GP population if they are to foster a truly collective way of working with the full diversity of GP opinion. Less vocal or dissenting GPs will readily become excluded with the danger that they could become marginalised.

In terms of prescribing change, the late responders reported less commitment to the aims of the commissioning group, namely the generation and re-investment of prescribing savings in local health projects. Late responders to questionnaires appear to bear similarities to the ‘laggards’ identified by Rogers.<sup>30</sup> We were not able to obtain individualised prescribing data from these GPs to verify differences in their prescribing patterns – this is one of the limitations of PACT data.<sup>41</sup> But their questionnaire responses suggest a more conservative approach to prescribing. Rogers suggests that each of the five types of responses to managerial change requires a different approach and that those trying to achieve change should first be able to identify their target audience before trying to get them to alter their prescribing. Tactics for PCOs to persuade this group to alter prescribing habits need to begin by

acknowledging the unique characteristics of ‘laggards’, identifying the GPs who may be termed ‘laggards’ and then seeking to engage them in the process of change. PCOs need to guard against assuming that the same techniques are likely to be successful with all GPs.

### *3) Patterns of questionnaire responses within GP partnerships*

There is very little literature about GP partnerships and prescribing. As such, our study provides an important glimpse of the often mysterious, even secretive, world of GP partnership.<sup>71</sup> By demonstrating the independence of prescribing attitudes to practice effects, prescribing interventions can be targeted at the appropriate level. These results suggest that PCOs should approach GPs individually rather than as groups. In marked contrast, financial and managerial attitudes were held at practice level and PCOs wishing to address these issues might be better to intervene at practice rather than individual level.

It seems that private industry has been aware of the power of one-to-one meetings with GPs for many years.<sup>72</sup> It is these intense, direct and individualised approaches that are most likely to be effective in changing prescribing throughout a large commissioning group. Prescribing change is therefore labour intensive. If our results are confirmed, it would seem that PCOs opting to save costs by developing cheaper, simpler, practice level meetings with GPs will fail to maximise their potential to change prescribing. At the time of discovering these findings (using the technique of intra-class correlations), I was unaware of the work of Freemantle et al.<sup>29</sup> They subsequently reported their findings that an educational intervention did have a modest effect on changing prescribing activity. But prescribing changes were largely

confined to smaller practices amongst the sample of 69 practices. They did not use intra-class correlations to explore their data but they drew very similar conclusions to the conclusion that I had reached: “In conclusion.... educational outreach presented in a group manner is unlikely to be worthwhile in larger practices”.<sup>29</sup>

#### *4) Containing prescribing costs – a matched comparison*

Findings from the matched comparison study of prescribing change demonstrated substantial savings which were attributed to membership of the commissioning group and the interventions of the prescribing adviser.<sup>60</sup> Based on these results, the costs of investment in a full time prescribing adviser are far outweighed by prescribing cost savings generated by commissioning group initiatives and implemented by the prescribing adviser. As such, the findings support investment in prescribing advisers.

This study is likely to have under-estimated the benefits of employing a prescribing adviser. Cost savings were only one part of the intended prescribing change in our PCCG. Two quality improvements were also planned. These were improvements to asthma management (treatment concordance and improved uptake of inhaler advice) and to wound management (the provision of training and protocols to practice and community nurses covering current best practice in wound management). Neither of these were readily amenable to measurement (at least, not using the study design which I had adopted). It is one of the ironies of measuring prescribing change that cost savings are far easier to demonstrate than quality improvements. Prescribing cost improvements can be simply studied using standardised PACT data. PCOs will find it far harder to provide objective evidence of quality improvement. The use of non-PACT indicators is likely to favour prescribing quality improvements rather than cost

control but measurement of these indicators has rarely been subjected to rigorous reliability and validity testing. Moreover, such data may be more useful in describing clinical care but they are more labour intensive to gather.<sup>39</sup> This brings to mind an editorial by Roland and Marshall commenting on the dangers of the development of primary care being guided simply by what is most readily measurable.<sup>69</sup> Similarly, Campbell et al<sup>42</sup> had already noted that the purer the methodology in deriving prescribing indicators, the more limited the application of these indicators. It seems that current research methodology may not be entirely meeting the needs of PCOs as they attempt to promote the development and quality of primary care.

### **Meaning of the second study: possible explanations and implications for clinicians and policymakers**

#### *Prescribing incentive schemes in the London and South East NHS Regions*

National guidance gives PCOs considerable freedom in interpreting how they implement prescribing incentive schemes.<sup>54</sup> Our work suggests that PCOs were initially struggling in their newly acquired responsibility to administer a prescribing incentive scheme for all GPs. One year later, change had been rapid and the approach to influencing prescribing, more standardised. PCOs have learnt that cost containment can go hand in hand with measures for improved prescribing quality. Virtually all PCOs have adopted indicators that explicitly support quality improvements. The four remaining PCOs without any clear-cut prescribing quality indicators in our year two study<sup>63</sup> subsequently adopted these in the third year (personal communication with four respective prescribing advisers).

One aspect of potential conflict for PCOs requires further elaboration. In both years that were surveyed, there was a potential conflict between the promotion of high quality prescribing which was clearly part of the government agenda for change and the requirements to maintain budgetary control.<sup>61,63</sup> A mixed message was given to practices by the majority of PCOs. Even in the second year when goals were more clearly defined, we found some PCOs penalising overspent practices even in the presence of high quality prescribing whilst others rewarded underspent practices even in the presence of low quality prescribing. By making rewards conditional on achieving certain specified markers of good prescribing and extending rewards to overspent practices fulfilling the measures of high quality prescribing, PCOs could more overtly reinforce the national policy emphasis on quality improvement.

Since the completion of our survey, the new General Medical Services (GMS) contract for general practitioners has been announced.<sup>73</sup> There will still be a place for influencing prescribing. But the specific role of the Prescribing Incentive Scheme will be in doubt. Several prescribing quality improvements will be rewarded under the new contract. For example, the new contract encourages pharmacological interventions to improve the secondary prevention of cardiovascular disease, including more widespread and targeted prescribing of statins. Since statin indicators were a principal focus of Prescribing Incentive Scheme rewards, this indicator may have to be modified to avoid 'double payment' to GPs. The implication is that Prescribing Incentive Schemes will have to adapt considerably in 2004/5 to avoid duplication of effort and of incentive.

## Unanswered questions and future research

Many questions remain unanswered and much work still needs to be done. The key outstanding questions relating to the work presented and to the role of PCOs are:

- What are the ‘active ingredients’ of educational visits by prescribing advisers that are most likely to generate prescribing change?
- What are the characteristics of those GPs most likely to be ‘early adopters’ of prescribing initiatives?
- What are the characteristics of the ‘laggards’, those GPs who rarely respond to prescribing initiatives and, accepting their reluctance to change, how might they be successfully motivated to make changes to their prescribing?
- What are the most effective cost containment strategies now that almost all PCOs have substantially increased their generic prescribing levels?
- Prescribing attitudes may not cluster at practice level but evidence is lacking to guide PCOs about the effectiveness of prescribing interventions targeted at individual or at practice level – should they do both?
- Research evidence offers little information about the ideal size of financial incentives needed to motivate prescribing change. Are larger reward payments cost effective?
- If financial rewards are less effective than educational visits and the effect of financial incentives diminishes over time,<sup>16</sup> should all financial rewards simply be scrapped and the money re-invested in further prescribing educational activity?
- The new GMS contract for GPs and the current Prescribing Incentive Scheme may not be able to co-exist. Will the Prescribing Incentive Scheme be able to offer ‘added value’ in the presence of a new contract that, for the first time in



primary care, will reward certain aspects of high quality prescribing? Or is the 'contract' the best way to influence GP prescribing ,after all?

- There are a multitude of prescribing indicators available to PCOs. But few have been subjected to rigorous reliability and validity testing. The evidence base is particularly lacking for quality indicators. Which are the most effective indicators for influencing prescribing, particularly for improving prescribing quality?

Future research into interventions to change general practitioner prescribing in PCOs will need to build on the solid achievements already made by GPs in changing their prescribing behaviour.

### **Conclusions – interventions to change GP prescribing in primary care organisations.**

Prescribing change is most likely to be achieved when the prescribing goals of the PCO are closely aligned to the values of a GP acting as an autonomous health professional.

GPs themselves consider that they would be most likely to change their prescribing as a result of educational interventions. Education may be delivered in a variety of forms but those considered most effective require interactive learning and active participation rather than more passive forms of learning.

Financial incentives play a role in changing prescribing. Mean levels of financial reward that can realistically be achieved by GPs are likely to be more influential in

changing prescribing than very large rewards available only to a few. On the other hand, not-for-profit financial rewards may also be a potent motivator of prescribing change. Without any possibility of personal or practice financial reward, the opportunity to generate additional financial investment in the health of the local community may spur GPs on to make prescribing savings.

Interventions to change prescribing may be better targeted at individual GPs rather than the GP partnership as a whole. Attitudes such as the approach to financial and managerial issues cluster within GP partnerships. On the other hand, attitudes to prescribing change appear to be less dependant upon the practice and are more individually held. As such, GPs are unlikely to respond in a unified fashion to practice level interventions aimed at changing prescribing.

The driver of prescribing change has shifted away from an emphasis on prescribing cost control toward a more balanced emphasis giving weight to quality improvement. Changes in prescribing cost are simple to measure and are well validated. Prescribing quality improvements are harder to measure, often ambiguous and poorly validated.

## APPENDIX

The four questionnaires which formed the basis of the two studies are reproduced below:

- **Questionnaire 1:** ‘North Lambeth GP Commissioning Group Questionnaire’
- **Questionnaire 2:** ‘North Lambeth Primary Care Commissioning Group Questionnaire’
- **Questionnaire 3:** ‘Prescribing Incentive Schemes’ Questionnaire’
- **Questionnaire 4:** ‘Prescribing Incentive Schemes’ Questionnaire – an e-mail questionnaire for PCG/T lead prescribing advisers’

The first two questionnaires were sent to all GP principals participating in the North Lambeth PCCG – one on the day that the PCCG began on 1<sup>st</sup> April 1998 and the second a year later when the PCCG changed its status, becoming a PCG.

The remaining two questionnaires were sent to all PCO based prescribing advisers in the London and South-East NHS Regions. The first related to information describing their prescribing incentive schemes in the year 1999/2000 and the second related to the year 2000/01.

Copy of Questionnaire 1:

NORTH LAMBETH GP COMMISSIONING GROUP QUESTIONNAIRE

Code no.

The North Lambeth GP Commissioning Group (the NLGPCG or ‘Pilot’) starts on 1st April 1998. We would like to know your views about some of the issues surrounding prescribing that have been brought into focus by this Pilot.

The evaluation of the Pilot will be conducted by a group consisting of David Armstong (UMDS General Practice), John Balazs, Mark Ashworth and Sonia Colwill. Although each questionnaire is coded, your identity will be treated in full confidence. The code ‘key’ will be kept independently at GKT Department of General Practice so that individual results cannot be linked to names.

Many of the questions have several options for the answer - please ring or tick just one answer.

O-----O

Your own prescribing

(these questions only refer to your own prescribing and do not refer to your partnership if you are in a group practice)

1) How would you describe your own prescribing (please tick one box).

much higher cost than local GPs	<div></div>
a little higher cost than local GPs	<div></div>
about the same cost as local GPs	<div></div>
a little lower cost than local GPs	<div></div>
much lower cost than local GPs	<div></div>

2) In maintaining your current prescribing pattern and costs, do you think that you ever compromise good patient care?

Never  rarely  sometimes  often

3) How easy do you think it would be to reduce your current prescribing costs?

easy  with a little difficulty  with quite a lot of difficulty  With great difficulty

4) Do you expect your own prescribing to change as a result of the Pilot?

not at all  a little bit  quite a lot  a lot

5) Please rate each of the factors listed below according to **how likely they might be to influence your own prescribing.**

	not at all	a little bit	quite a lot	a lot
a) evidence based information summaries				
b) health economic assessments of prescribing				
c) PACT data on your ‘Top Twenty’ most expensive drugs over the last quarter				
d) relative costs of drugs within the same therapeutic group				
e) visits to your practice by a pharmaceutical adviser working for the Pilot				
f) a formulary developed by your own practice team				
g) a formulary devised for use throughout all practices in the Pilot				
h) overshooting your prescribing budget				
i) knowing that your practice <u>prescribing quality indicators</u> will be freely available to colleagues within the Pilot				
j) knowing that your practice <u>prescribing costs</u> will be freely available to colleagues within the Pilot				

6) What do you think is/are the greatest obstacle(s) to change in your own prescribing?

**The prescribing Pilot**

7) Which of the following best expresses your views on the prescribing Pilot?

	strongly agree	agree	neutral	disagree	strongly disagree
a) I think it will be a success					
b) I feel committed to the aims of the Pilot					
c) I feel coerced into the Pilot:					
d) I joined out of solidarity with other local GPs					
e) I joined because I was frustrated that savings on our previous Target Budgets could not be retained					
f) I joined because I thought that much larger savings on prescribing could be made if there were sufficient incentives					
g) I think that there will be pressure on all our prescribing budgets					
h) I think that some GPs will find it very difficult					
i) I do not think that the Pilot will make any difference to prescribing					
j) I feel unhappy about other GPs seeing my own prescribing quality indicators					
k) I feel unhappy about other GPs seeing my own prescribing costs					

8) Do you think that pressure for prescribing change should be:

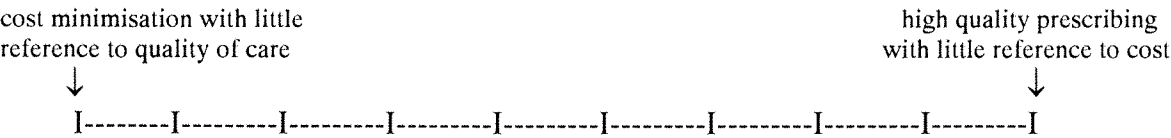
targeted at all GPs

only targeted at those with high prescribing costs


9) In what areas of prescribing do you think there are the greatest potential for savings?

10) In what areas of prescribing would you like to see more money spent?

11) Do you think that the prescribing Pilot should put greater emphasise on cost reductions or high quality prescribing (please mark with a cross where you feel your own viewpoint is along the spectrum of viewpoints):



Patients’ views

12) How do you think that patients might influence the Pilot?

	strongly agree	agree	neutral	disagree	strongly disagree
a) I think patients will be resistant to any changes in their prescriptions					
b) I find that prescribing pressure from patients is a strong influence upon my own prescribing					
c) I would be happy to spend more time with patients who I think need to have their medication changed as a result of the Pilot					

Thank you for taking the time to complete this questionnaire. Please could you post it in the enclosed SAE.

Copy of Questionnaire 2:

Code no.

NORTH LAMBETH PRIMARY CARE COMMISSIONING GROUP  
QUESTIONNAIRE

The North Lambeth Primary Care Commissioning Group (PCCG) finishes on 31st March 1999. We would like to know your views about some of the prescribing issues arising out of this Pilot.

Although each questionnaire is coded, your identity will be treated in full confidence. The code 'key' will be kept independently at GKT Department of General Practice so that individual results cannot be linked to names. Please send your replies in the stamp addressed envelope enclosed.

O-----O

Your own prescribing

(these questions refer to your own prescribing and **not** to your partnership if you are in a group practice)

1) How would you describe your own prescribing costs compared with other GPs in the North Lambeth PCCG (please tick one box)?

- quite a lot higher cost
- a little higher cost
- about the same cost
- a little lower cost
- quite a lot lower cost

2a) LSL Health Authority uses a Quality Index to quantify prescribing quality\*\*.

How would you describe your own prescribing quality, as measured by this Quality Index, compared to other GPs in the North Lambeth PCCG (please tick one box)?

- quite a lot higher Quality Index rating
- a little higher Quality Index rating
- about the same Quality Index rating
- a little lower Quality Index rating
- quite a lot lower Quality Index rating

\*\* The Quality Index used by LSL consists of ten measures: generic prescribing, ratio of inhaled corticosteroids to bronchodilators, bendrofluazide ratio, volumes of benzodiazepines, appetite suppressants, antibiotics, topical NSAIDs, antidiarrhoeals, cough suppressants and nasal decongestants.

2b) If it were possible to change the way that the 'Quality Index' is calculated, would you like to see any components changed, removed or others added? (please give details).

(Please complete overleaf if you need more space)



3a) Do you think that you have been able to *reduce your prescribing costs* in any way over the last year?

not at all	<input type="checkbox"/>	a little bit	<input type="checkbox"/>	quite a bit	<input type="checkbox"/>	quite a lot	<input type="checkbox"/>	a lot	<input type="checkbox"/>
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3b) If so, can you give an example?

4a) Do you think that you have been able to *improve your prescribing quality* in any way over the last year?

not at all	<input type="checkbox"/>	a little bit	<input type="checkbox"/>	quite a bit	<input type="checkbox"/>	quite a lot	<input type="checkbox"/>	a lot	<input type="checkbox"/>
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4b) If so, can you give an example?

**The North Lambeth PCCG identified THREE priority areas for prescribing change: GI prescribing, asthma prescribing and wound management.**

5a) Do you think that your *GI prescribing* has changed over the last year?

not at all	<input type="checkbox"/>	a little bit	<input type="checkbox"/>	quite a bit	<input type="checkbox"/>	quite a lot	<input type="checkbox"/>	a lot	<input type="checkbox"/>
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5b) If so, can you give an example?

5c) Do you think that your *asthma prescribing* has changed over the last year?

not at all	<input type="checkbox"/>	a little bit	<input type="checkbox"/>	quite a bit	<input type="checkbox"/>	quite a lot	<input type="checkbox"/>	a lot	<input type="checkbox"/>
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5d) If so, can you give an example?

5e) Do you think that your *prescribing of wound management products* has changed over the last year?

not at all	<input type="checkbox"/>	a little bit	<input type="checkbox"/>	quite a bit	<input type="checkbox"/>	quite a lot	<input type="checkbox"/>	a lot	<input type="checkbox"/>
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5f) If so, can you give an example?

6) Please rate each of the factors listed below according to how strongly you think that they influenced your prescribing during the year of the North Lambeth PCCG.

	not at all	a little bit	quite a bit	quite a lot	a lot
a) Practice visits by the North Lambeth prescribing adviser					
b) Practice visits by a community pharmacist					
b) Educational material sent out by the prescribing adviser (the so called 'educational flyers')					
c) Information comparing and ranking your own practice with others in North Lambeth					
d) PACT data for the practice sent out by the Prescription Pricing Authority					
e) Information from the North Lambeth prescribing adviser that might help to reduce prescribing costs					
f) Information from the North Lambeth prescribing adviser that might help to improve prescribing quality (as measured by the 'Quality Index')					
g) Peer pressure from other GPs in the North Lambeth PCCG					
h) Not wishing to be an 'outlier' on any of the measures of prescribing in North Lambeth					
i) Wishing to generate as much prescribing savings as possible					
j) Wishing to improve prescribing quality as measured by the Quality Index as much as possible					
k) Prescribing pressure from patients during the consultation					

### Prescribing issues arising during the year 1998/9

7) How have you responded to the introduction of new drugs over the last year?

	strongly agree	agree	neutral	disagree	strongly disagree
a) I am happy to prescribe orlistat (Xenical) for obese patients					
b) I am happy to prescribe a leukotriene antagonist (Montelukast or Singulair) to asthmatic patients					
c) I would like to prescribe Viagra (sildenafil) to patients on demand on the NHS					
d) I am happy to prescribe donepezil (Aricept) to patients with dementia					

8a) Overall, how do you think your own amount of antibiotic prescribing compares to other GPs in the North Lambeth PCCG?

quite a lot higher ☐

a little higher ☐

about the same ☐

a little lower ☐

quite a lot lower ☐

8b) Reduction of antibiotic prescribing has had a high profile in the last year.

Compared to a year ago:

	less likely	a little less likely	un-changed	a little more likely	more likely
a) How likely are you to prescribe antibiotics to adults with sore throats?					
b) How likely are you to prescribe antibiotics to an adult under 60 years old with uncomplicated bronchitis?					
c) Having decided to prescribe antibiotics to an adult with a urinary tract infection (UTI), how likely are you to prescribe a short antibiotic course (3 days or less)?					
d) When you see patients with infections which you consider to be viral, how likely are you to end the consultation without giving an antibiotic?					
e) In general, are your patients more or less likely to expect an antibiotic?					

9) Which of the following best expresses your views on the North Lambeth PCCG?

	strongly agree	agree	neutral	disagree	strongly disagree
a) I am unhappy that any prescribing savings generated by our own practice would have to be shared by other practices					
b) This experience has persuaded me that sharing budgets with other GPs is the way forward					
c) I think that membership of the North Lambeth PCCG has improved my relationships with local GPs					
d) I do not think that GPs in the North Lambeth PCCG can work together with shared goals					
e) I do not think that the North Lambeth PCCG has made any difference to prescribing					
f) I feel happy about other GPs seeing my own practice prescribing costs					
g) I feel happy about other GPs seeing my own prescribing quality indicators					
h) Nurse have an increased role in prescribing in my practice					
i) I would have liked more say in how prescribing savings were spent					

Thank you for taking the time to complete this questionnaire. Please could you post it in the enclosed SAE.

Copy of Questionnaire 3:

Code no.

PREScribing INCENTIVE SCHEMES' QUESTIONNAIRE

Every PCG has its own locally derived Prescribing Incentive Scheme. The development of incentive schemes has resulted in each area having its own unique set of prescribing indicators and its own way of rewarding practices whose prescribing achieves certain goals. We are conducting this survey in each PCG within the London Region and the former South East Thames Region to determine the range of methods used to control prescribing. After completion, the results will be fed back to each PCG. Please send your replies in the Freepost envelope enclosed to reach us by **day/month/2000**.

Background details:

Name: e-mail:  
PCG: telephone no.

Key personnel and instruments that might influence prescribing:

1a) How many sessions per week do you work as a prescribing adviser for the PCG? (NB one week full time equals 10 sessions)  sessions  
1b) What proportion of the practices in your PCG have you visited over the last 12 months?  %  
1c) Does your PCG have a prescribing formulary? Yes ☐ No ☐  
1d) Does your PCG have a Prescribing Committee? Yes ☐ No ☐  
1e) If yes, which health professionals are represented on the Prescribing Committee?

Prescribing performance measures used in your PCG's prescribing incentive scheme (PIS):

2a) Do you have a generic prescribing target as part of the PIS? Yes ☐ No ☐  
2b) If yes, what is the target  %  
2c) Have you any targets based on improving prescribing *quality* as part of the PIS? (e.g. reducing antibiotic item prescribing) Yes ☐ No ☐  
2d) If you do have targets based on improving prescribing *quality*, which therapeutic groups have been selected and what is the target for each one?

2e) Have you any targets based on reducing prescribing *cost* as part of the PIS? (e.g. reducing proton pump inhibitors) Yes ☐ No ☐

2f) If you do have targets based on reducing prescribing *cost*, which therapeutic groups have been selected and what is the target for each one?

2g) If there any other prescribing indicators that are part of the PIS, please describe which therapeutic groups these cover together with the target for each indicator.

### Devising the prescribing incentive scheme (PIS) targets

3a) What process did your PCG use to devise the PIS targets for 1999/2000?

3b) What, if any, are the key differences between the 1999/2000 PIS targets and the targets used by your health authority in the previous year (1998/99)?

3c) What, if any, are the key changes proposed between the 1999/2000 PIS targets and the 2000/2001 targets?

### Communicating PIS target information

4a) How do you feed back interim results to each practice?

4b) Are the PIS target achievements for any individual practice available to all other practices in the PCG? Yes ☐ No ☐

4c) If yes, are these other practices identified by name? Yes ☐ No ☐

### The incentives

5a) What approximate proportion of practices in your PCG will receive a reward under the PIS for the year 1999/2000?

5b) What is the largest sum of money that can be received under the 1999/2000 PIS in your area? (please can you make sure that it is clear whether your answer refers to an absolute sum of money per practice or per GP, or amount per ASTRO-PU etc.)

5c) Will there still be a reward under the PIS if the practice achieves all its prescribing targets but the local PCG has overspent its 1999/2000 unified budget?

5d) Will a practice that underspends its prescribing budget still be able to keep its prescribing savings even if it doesn't reach the prescribing quality targets?

**Improving quality or saving money**

6a) Do you think that the PIS in your PCG will improve the quality of prescribing?  
(please ring one point along the line below which represents a range of opinion)

Yes, a lot	Yes, quite a lot	Yes, a little	No, not at all
1----- ----- ----- ----- ----- ----- ----- -----			

6b) Do you think that the PIS in your PCG will reduce the cost of prescribing?

Yes, a lot	Yes, quite a lot	Yes, a little	No, not at all
1----- ----- ----- ----- ----- ----- ----- -----			

Thank you. Please return to us in the enclosed Freepost envelope, or fax it to us on 020 7587 5296.  
Stacey Golding (North Lambeth PCG prescribing adviser), Mark Ashworth (Starnet lead GP)

Copy of Questionnaire 4:

PRESCRIBING INCENTIVE SCHEMES' QUESTIONNAIRE -

an e-mail questionnaire for PCG/T lead prescribing advisers

We are e-mailing each prescribing adviser in both London and the South East Regions to ask for your help in compiling an up to date summary of all the prescribing incentive schemes that are used in your PCG/T. Please could you look at the questions below and let us know as much detail as possible about the methods that you are using to control prescribing.

A similar survey was conducted last year by Dr Mark Ashworth, STaRNet lead GP, King's College London. The results from that survey are being published in the *British Medical Journal* and the *Journal of Clinical Pharmacy & Therapeutics*. The paper has highlighted the strengths of prescribing advisers and their interventions.

All responses will be anonymised before analysis and no PCG/Ts will be identifiable in any published work arising from this study. Replies can either be in **freetext** or as a **capital X** in the relevant boxes and should be e-mailed back to the Regional Prescribing Adviser. Please return your replies by, **day/month/2001**.

Thank you, *Heather Gray, Robert Lea, Mark Ashworth.*

Background details:

What is your name? .....  
What is your job title? .....  
Which PCG/T are you working for? .....  
(please give your fax or telephone no. if not replying by e-mail): .....

1) Influencing prescribing

What are the main methods used in your PCG/T to influence prescribing?  
(please tick one or more boxes)

financial incentives	practice visits	written feedback of prescribing data	prescribing formularies	educational meetings	practice based pharmacists
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Other (please specify): (?include financial sanctions, peer pressure)

Of all these methods, which do you think is the single most effective way to influence prescribing?

2) Prescribing performance indicators

What *non-PACT based* indicators did you use in your Prescribing Incentive Scheme (2000/1)? (NB the first four of these indicators can only be reliably obtained by using a practice based disease register)

statin use in 2 <sup>o</sup> prevention	aspirin use in 2 <sup>o</sup> prevention	B-blocker use 2 <sup>o</sup> prevention	ACE inhibitor use in heart failure	repeat prescribing audit	following antibiotic guidelines
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Other non-PACT based indicators (please specify):

Total no. of non-PACT based indicators used in your Prescribing Incentive Scheme:

What *PACT based* indicators did you use in your Prescribing Incentive Scheme (2000/1)?

generic prescribing	antibiotic indicators	gastro-intestinal indicators	NSAID indicators	benzodiazepine indicators	antidepressant indicators	anti-psychotic indicators
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
asthma prescribing	ACE inhibitor prescribing	statin prescribing	aspirin prescribing	B-blocker prescribing	diabetes prescribing	drugs of limited clinical value
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Other PACT based indicators (please specify):

Total no. of PACT based indicators used in your Prescribing Incentive Scheme:

3) Selecting indicators

Have any of the indicators been chosen as a direct response to the following:

	Yes	No
Coronary Heart Disease NSF	<input type="text"/>	<input type="text"/>
Mental Health NSF	<input type="text"/>	<input type="text"/>
Older People NSF	<input type="text"/>	<input type="text"/>
NICE guidelines	<input type="text"/>	<input type="text"/>
Local HimP	<input type="text"/>	<input type="text"/>
Local clinical governance programme	<input type="text"/>	<input type="text"/>
Consultation with GPs	<input type="text"/>	<input type="text"/>
Need to contain prescribing cost	<input type="text"/>	<input type="text"/>
Primary Care Investment Plan (PCIP)	<input type="text"/>	<input type="text"/>
Need to reduce secondary care referrals	<input type="text"/>	<input type="text"/>

Other (please specify):



**4) Changes in your Prescribing Incentive Scheme**

**What are the main changes between your 2000/1 Prescribing Incentive Scheme and your current (2001/2) Scheme?**

**Is any of the earmarked funding for practices under the Primary Care Incentive Scheme (a Department of Health initiative launched in summer 2001) being used for incentive related to prescribing in 2001/2? If so, how much of the funding is being used in this way?**

**What changes are proposed for next year's Prescribing Incentive Scheme (2002/3)?**

**5) The incentives**

**Please list the following:**

Total PCG/T prescribing budget 2000/1 (including contingencies):  
Total PCG/T prescribing spend 2000/1:  
Total amount paid to practices under the Prescribing Incentive Scheme (PIS) 2000/1:

£
£
£

Size of population covered by your PCG/T  
No. of GP principals in your PCG/T (as whole time equivalents):  
No. of practices in your PCG/T:  
No. of practices who received a payment under the PIS, 2000/1:  
Maximum sum received by any practice under the PIS, 2000/1:  
Maximum sum received by a wte GP under the PIS, 2000/1:


**6) Issues arising from your 2000/1 Prescribing Incentive Scheme (PIS)**

If your PCG/T overspends its prescribing budget, will the money available for the PIS be reduced?  
If a practice overspends its prescribing budget, will it still be eligible to receive a PIS payment (if other criteria are met)?  
If a practice underspends its prescribing budget, will it still be eligible to receive a PIS payment even if it fails to meet quality criteria?  
If your PCG/T underspends its prescribing budget, is it likely that the budget will be scaled back in the following year?

Yes	No

**7) Priorities in your 2000/1 Prescribing Incentive Scheme (PIS)**

I think it is more important to make savings on the PCG/T prescribing budget than merely to break even on the budget:

Strongly agree	Agree	Slightly agree	Slightly disagree	Disagree	Strongly disagree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

I think it is more important to improve prescribing quality even if this means that the PCG/T budget is overspent:

Strongly agree	Agree	Slightly agree	Slightly disagree	Disagree	Strongly disagree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**8) Sharing prescribing information between practices**

	Yes	No
Are individual practices able to view the 2000/1 PIS target achievements for all other practices in the PCG/T?	<input type="checkbox"/>	<input type="checkbox"/>
If yes, are these other practices identified by name?	<input type="checkbox"/>	<input type="checkbox"/>

*Please e-mail this back to us at the above Regional e-mail address or fax it to us on the confidential fax line:*

*020 7587 5296. Thank you very much for your help.*



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