

# The effects on GP prescribing of joining a commissioning group

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## SUMMARY

**Background:** It is not known to what extent general practitioners (GP) can change their prescribing upon joining a commissioning group and what features of a commissioning group may promote prescribing change. The opportunity to study potential prescribing change arose with the formation of a limited number of Primary Care Commissioning Groups (PCCGs), a precursor of Primary Care Groups (PCGs) and Primary Care Trusts (PCTs).

**Methods:** This was a controlled study of general practice prescribing costs. All practices ( $n = 24$ ) within one inner city PCCG were compared with matched controls that were not part of a PCCG. Cross sectional survey data was collected from the PCCG practices to determine possible reasons for prescribing change.

**Results:** The total annual prescribing cost rose by 4.0% in the PCCG practices and by 6.9% in controls ( $P = 0.01$ ). Significant cost containment was found for gastrointestinal prescribing ( $P = 0.03$ ), attributable to differences in the cost of proton pump inhibitors (PPIs) which fell by 0.7% in the PCCG but rose by 7.3% in controls ( $P = 0.03$ ). Total relative savings in the PCCG practices amounted to around £220 000. General practitioners making the greater savings in PPI costs within the PCCG, were more likely to report being influenced by information from the prescribing adviser.

**Conclusion:** General practice prescribing costs were contained to a greater degree in practices participating in the PCCG. The differences in gastrointestinal prescribing were most marked for PPIs which were specifically targeted by the prescribing adviser. The GPs themselves attributed their own prescribing change to information provided by the prescribing adviser. Other factors operating within the PCCG may also have influenced prescribing such as a more locally based management system, different financial incentives and a greater degree of co-operative working amongst GPs.

**Keywords:** controlled trial, prescribing adviser, prescribing change, primary care

## INTRODUCTION

In the year prior to the formation of the Primary Care Groups (PCGs) in England and Wales, a total of 40 national pilots were formed to test models of general practitioner (GP) commissioning groups (1). One of these was the North Lambeth Primary Care Commissioning Group (PCCG) which aimed to generate prescribing savings to be re-invested in local health improvement projects whilst simultaneously trying to improve prescribing quality. In pursuit of this aim, a full time prescribing adviser was appointed.

Prescribing advisers have been shown to be effective in reducing prescribing costs (2) although in the largest controlled trial (3), prescribing change was achieved following a highly intensive intervention (five full time pharmacists working in eight practices). North Lambeth PCCG employed one full time prescribing adviser and 2 months after the PCCG 'went live', a prescribing cost reduction

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strategy had been devised which was to be implemented by the prescribing adviser. All 26 practices were expected to reduce the cost of gastro-intestinal prescribing, and in particular, the rapidly rising cost of proton pump inhibitors (PPIs). Practice specific cost reduction strategies were also devised such as increasing generic prescribing, therapeutic substitution (4) or reduced prescribing of drugs of limited clinical effectiveness. The PCCG adopted two other prescribing goals aimed at improving prescribing quality in asthma and wound management which are not described further in this article.

By acting collectively for the first time, practices may have been influenced by financial and managerial factors associated with joining a new group (5). All the practices accepted a cash limited prescribing budget. Savings could not be retained by the practice although a modest Prescribing Incentive Scheme (6) (with sums averaging £625 per GP) was in operation to reward practices adopting PCCG prescribing goals. Financial prescribing performance data was widely available and may have influenced some who did not wish to appear as outliers (7). If the scheme were to have an effect, it would be through the specific actions of the prescribing adviser and from the sense of collective ownership and responsibility that the PCCG offered.

To study the impact of these multiple influences upon prescribing costs, we embarked upon a controlled intervention study. We limited the study to changes in gastrointestinal and overall prescribing costs and aimed to determine if change occurred relative to a group of matched practices and, if so, whether change occurred globally or was concentrated in PPI prescribing (advice on PPI prescribing was given to all practices). Finally, we aimed to gauge the reasons why GPs thought that their own prescribing had changed after 1 year and compared these with objective evidence of changed prescribing.

## METHODS

Twenty-six practices joined the North Lambeth PCCG in April 1998 but two of these ceased practising over the course of 1 year. Prescribing analysis and cost (PACT) data was obtained for each of the remaining 24 practices. The data covered cost

information (Net Ingredient Cost or NIC) for total prescribing and for each component of gastrointestinal prescribing [products listed under Chapter 1, British National Formulary (8)]. PACT data also provided information on the numbers of prescriptions (items) issued in each category. Other methods of gauging prescribing volume such as Average Daily Quantity (ADQ) were not utilized as they were not readily available at the time of the study.

PACT data on registered populations was used to standardize the demographic variation between registered populations of each practice by applying cost based weightings. The Age, Sex and Temporary Resident Originated Prescribing Unit (ASTRO-PU) is the most appropriate denominator for analysing total prescribing costs (9). Prescribing analysis of individual categories of drugs requires another denominator – the Specific Therapeutic group Age-sex Related Prescribing Unit (STAR-PU) (10). This measure takes account of the fact that prescribing patterns for many drug groups differ according to age and sex. Thus, gastrointestinal prescribing tends to be more heavily weighted towards prescribing in the elderly than total prescribing although children, being low consumers of gastrointestinal preparations, receive a correspondingly low weighting. STAR-PU weights have been derived for gastrointestinal drugs (BNF chapter 1) and for ulcer healing drugs (BNF section 1.3); the choice of denominator was determined by the category of data being analysed. As yet, no STAR-PU weighting has been derived for either PPIs or H<sub>2</sub> blockers and data in this category was analysed using the ulcer healing STAR-PU. Cost based ASTRO-PUs were used throughout the most recent revisions, ASTRO (97)-PUs and STAR (97)-PUs (11).

Combining prescribing cost information with the weightings above enabled us to derive a financial value for prescribing in each practice in the form of NIC per ASTRO-PU or STAR-PU. Similar values for the volume of prescribing were also derived.

Each of the 24 practices in the North Lambeth PCCG was matched with a control practice by the Prescribing Support Unit, Leeds. Matching was according to the following criteria: list size, ASTRO (97)-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 were single handed. Apart from

**Table 1.** (a) Comparison of matching characteristics for 24 North Lambeth PCCG practices and controls, in the year prior to intervention. (b) Population and weighted prescribing variables in North Lambeth PCCG and in controls

|   | PCCG practices<br>mean (10th and<br>90th centiles) | Control practices<br>mean (10th and<br>90th centiles) | Difference between PCCG<br>and control practices: |                  |
|---|--|---|---|------------------|
|   |  |   | <i>t</i> -test                                    | <i>P</i> -value  |
| Patient list size                             | 5999 (1579, 12 534)                                | 5890 (1441, 12 183)                                   | <i>t</i> = 0.09,                                  | <i>P</i> = 0.93  |
| Total prescribing costs:<br>mean NIC/ASTRO-PU | £14.99 (£10.74, £18.19)                            | £18.30 (£14.77, £24.22)                               | <i>t</i> = -3.65,                                 | <i>P</i> = 0.001 |
| Costs of PPI drugs:<br>mean NIC/ASTRO-PU      | £0.48 (£0.21, £0.74)                               | £0.56 (£0.32, £0.95)                                  | <i>t</i> = -1.40,                                 | <i>P</i> = 0.17  |

  

|   | PCCG<br>practices | Control<br>practices |
|---|-------------------|----------------------|
| Total number of registered patients         | 143 986           | 141 366              |
| Total number of ASTRO-PUs                   | 511 251           | 519 149              |
| Total number of STAR-PUs (gastrointestinal) | 1 212 779         | 1 252 473            |
| Mean number of STAR-PUs (ulcer healing)     | 885 792           | 913 830              |

training status and dispensing status the variables were grouped into quartiles for matching purposes. Comparisons between matched practices are summarized in Table 1a and a summary of the total numbers of patients and weighted prescribing units is given in Table 1b. Matching of all characteristics that had the potential to influence prescribing was not possible. For example, we were unable to match for the prescribing indicators in use in non-PCCG practices, the size of financial rewards available for achieving these targets and the intensity of input from a local prescribing adviser.

Data was obtained for the same time period for each matched pair, covering the year prior to the start of the PCCG (1997/8) and the following year (1998/9). The rate of change was determined by comparing data for the 2 years.

One year after the formation of the PCCG, each of the 69 GP principals was sent a questionnaire enquiring into possible reasons why their own prescribing might have changed. Questionnaires were not sent to control practices because they had been anonymized.

Analysis of PACT and questionnaire data was performed using SPSS for Windows version 7.5. The significance of any differences between matched practice pairs over the course of 2 years

was determined using the independent samples *t*-test. Projections of cost savings were derived by multiplying the baseline cost of prescribing in intervention practices by the mean annual cost increase in controls; the difference between actual and predicted prescribing costs was an indication of potential savings achieved by PCCG practices. Correlations between questionnaire and prescribing variables were performed using Spearman's test for ordinal data.

## RESULTS

Overall prescribing costs rose in both the North Lambeth PCCG practices and in the controls, but the rise was greater in the control practices. Significant cost containment was observed for PPIs, ulcer healing drugs, gastrointestinal drugs and for total prescribing costs (Table 2). The difference in H2 blocker cost containment between the two groups was not significant. More detailed analysis revealed that the relative reduction in total prescribing costs remained significant even when the costs of gastrointestinal prescribing were removed from the calculation. In contrast, there were no significant reductions in the volume (measured by the number of items) of any of the categories of prescribing.

**Table 2.** Prescribing changes in the North Lambeth PCCG and in matched controls: cost differences NB all chapters and sections refer to the British National Formulary (BNF) (8)

|   | Mean cost (£) for NLPCCG |        |          | Mean cost (£) for controls |        |          | Independent<br><i>t</i> -test |
|---|--------------------------|--------|----------|----------------------------|--------|----------|-------------------------------|
|   | 1997/8                   | 1998/9 | % Change | 1997/8                     | 1998/9 | % Change |                               |
| NIC all drugs<br>£ per ASTRO-PU                                 | 14.99                    | 15.60  | 4.0%     | 18.30                      | 19.56  | 6.9%     | $t = -2.70, P = 0.010$        |
| NIC gastrointestinal drugs<br>£ per STAR-PU<br>(BNF, chapter 1) | 0.75                     | 0.68   | -9.2%    | 0.91                       | 0.89   | -2.4%    | $t = -2.61, P = 0.012$        |
| NIC ulcer healing drugs<br>£ per STAR-PU<br>(BNF, section 1.3)  | 0.78                     | 0.68   | -12.6%   | 0.91                       | 0.87   | -4.9%    | $t = -2.21, P = 0.032$        |
| NIC H2 blockers<br>£ per STAR-PU<br>(BNF, section 1.3.1)        | 0.30                     | 0.20   | -31.9%   | 0.35                       | 0.26   | -24.5%   | $t = -0.68, P = 0.502$        |
| NIC PPIs<br>£ per STAR-PU<br>(BNF, section 1.3.5)               | 0.48                     | 0.47   | -0.7%    | 0.56                       | 0.60   | 7.3%     | $t = -2.30, P = 0.026$        |

Matching of practices resulted in the two groups, North Lambeth PCCG and control practices, having very similar mean list sizes and costs of PPI prescribing (Table 1a). Control practices did have significantly higher total prescribing costs but higher overall costs were not significantly related to subsequent total prescribing savings (Spearman's  $r = 0.18, P = 0.21$ ) nor to PPI prescribing savings (Spearman's  $r = -0.12, P = 0.31$ ).

Bivariate analysis revealed no significant differences in prescribing savings (in any prescribing category) according to training practice status nor practice list size. However, practices with a higher initial NIC per STAR-PU for PPIs tended to make greater mean reductions in their PPI prescribing costs: Spearman's  $r = 0.37, P = 0.01$ .

Prescribing change amongst fundholders and non-fundholders was compared. Fundholding had not been used as a matching category because the different fundholding waves may not have been directly comparable. There were seven fundholders amongst the North Lambeth PCCG practices and seven amongst the controls. As it could be argued that the North Lambeth PCCG practices were no longer true fundholders, comparison was made between the seven control fundholders and the remaining 17 control practices. The rise in total

costs amongst fundholders and non-fundholders was similar (£1.12 and 1.31, respectively;  $t = 0.52, P = 0.62$ ) as was the rise in PPI costs (£0.06 and 0.03, respectively;  $t = -1.11, P = 0.28$ ).

Savings within the PCCG attributable to the lower rate of rise in total prescribing costs were quantified. The mean annual cost increase (NIC) in the intervention practices was 4.0% and in controls 6.9%. Final year costs in the intervention practices were £8 053 421. Had the costs of intervention practices increased at the same rate as controls, their costs would have increased to £8 271 995. This represents a predicted saving of £218 574 (2.6%). For PPI's, the final year costs were £421 682 (11 034 items) against a projected value of £455 439, amounting to a predicted saving of £33 757 (7.4%). The mean cost of each item of PPIs was £38.22.

The responses to questionnaire variables are summarized in Table 3. GPs in practices making the largest savings on PPIs were likely to report being more strongly influenced by cost and quality information from the prescribing adviser (Spearman's  $r = -0.25, P = 0.045$  and  $r = -0.31, P = 0.013$ , respectively). The strength of other possible influences (see Table 3) on prescribing did not correlate significantly with reduced PPI costs.

**Table 3.** Reasons given by GPs in intervention practices for changes in their own prescribing over the course of 1 year

| Influence of the following factors on prescribing   | Not at all | A little bit | Quite a bit | Quite a lot | A lot |
|---|------------|--------------|-------------|-------------|-------|
| (1) 'Information from the prescribing adviser that might help reduce prescribing costs', <i>n</i> = 65    | 13         | 25           | 20          | 4           | 3     |
| (2) 'Information from the prescribing adviser that might help improve prescribing quality', <i>n</i> = 63 | 15         | 26           | 14          | 7           | 1     |
| (3) 'PACT data for the practice sent out by the Prescription Pricing Authority', <i>n</i> = 64            | 16         | 27           | 17          | 3           | 1     |
| (4) 'Peer pressure from other GPs in the PCCG', <i>n</i> = 65   | 37         | 20           | 6           | 2           | 0     |
| (5) 'Information comparing and ranking your own practice with others in the PCCG', <i>n</i> = 64          | 23         | 24           | 13          | 3           | 1     |
| (6) 'Exceeding your practice prescribing budget', <i>n</i> = 64   | 13         | 36           | 11          | 4           | 0     |

## DISCUSSION

Against a background of annually rising prescribing costs, practices within the North Lambeth PCCG contained their prescribing costs to a greater degree than matched control practices. In aiming to reduce the costs of gastrointestinal prescribing, the most significant relative reductions were achieved in PPI prescribing. Therapeutic substitution (12) probably accounted for the observed changes: the options included reducing the dose of PPIs from a treatment to maintenance dose and switching to cheaper alternatives within the PPIs. Simply reducing the number of prescriptions issued in order to reduce costs was not observed in this study. The nature of successful strategies for reducing total prescribing costs is far less apparent and the data do not allow for more detailed analysis but change did occur in total prescribing costs quite independent of the reductions in gastrointestinal prescribing.

Matching of PCCG and control practices produced comparable groups for all the initial matching criteria except for total prescribing costs which were higher in control practices. But there was no evidence that this mismatch affected the interpretation of prescribing change because practices with higher total costs were not more likely to make greater savings. Indeed, the achievement of greater savings in PCCG practices occurred in spite of lower baseline prescribing costs. On the other hand, the fact that control practices were anonymised prevented further investigation of local initiatives which may have affected their prescribing

relative to the prescribing within the PCCG. True matching of practices is an imperfect art as the prescribing culture of each practice may well be unique and within each practice, individual GPs appear to have their own prescribing thresholds (13). For this reason, the more cautious method of un-paired analysis has been given in the results although re-analysis of the data using paired tests showed no additional areas of significance.

Practices in the control group would have been subject to the national prescribing influences current at the time of study. Although individual control practices could not be identified, fund-holding practices would have been able to retain all their prescribing savings and non-fundholding practices were generally able to retain savings up to £3000 (14). These were much larger financial inducements than those operating in the PCCG. For GPs in the PCCG, reduced personal financial gain may have been counterbalanced by the incentive of shared savings to be invested in locally based public health projects. Prescribing adviser input was likely to have been more intense in the PCCG practices although the 'dose effect' could not be calculated. Traditionally, one or two prescribing advisers were based in the health authority and practices were usually visited about once per year. This compares with the more intensive intervention made possible in the PCCG with a locally based prescribing adviser covering under one-fifth of the practices in the health authority area, visiting each practice an average of just over three times during the year and offering monthly prescribing information sheets tailored to the objectives of the

PCCG and individual practice prescribing patterns (S. Golding, personal communication). The locally based PCCG prescribing adviser was able to develop a more positive relationship with practices than had previously been possible with the limited resources of the Health Authority adviser.

It is possible to model a broad approximation of the number of patients who changed their PPI medication based on the results and observed saving of almost £220 000. Several assumptions are required. The mean cost of each PPI item (£38.22) approximates to 6 weeks of treatment with the full dose of the most frequently prescribed PPI in the PCCG, omeprazole, based on 1998/9 costs. In 1 year of continual use, each patient would have required 8.5 of these prescriptions, costing around £325 (£38.22 × 8.5). The most common recommendation for saving PPI costs was either to change to a maintenance dose or substitute a lower cost PPI (such as lansoprazole or pantoprazole). Such changes would both have resulted in savings of around one-third (£108 per patient pa). As there was no significant reduction in prescription numbers, the total predicted savings of £33 757 could have been achieved by 313 patients having their prescription changed out of a total of around 1300 patients on full dose PPIs (11034 PPI items/8.5 = 1298). This equates to each of the 69 GPs in the PCCG changing the scripts, in-line with the prescribing policy, for four or five of their patients (313/69 = 4.54). Translating PACT data into approximate numbers of patients who had their prescribing changed gives a readily understood approximation of the effect size of the change. Such change in PPI prescribing would seem a reasonably modest goal for primary care in general, particularly when much PPI prescribing is for non-specific abdominal pains (15). It is remarkable that such a small number of patients per GP are required to change their use of PPIs over a year to generate substantial savings.

Our study is the first controlled study of prescribing costs to conduct a parallel questionnaire survey. Questionnaire responses enable assessment of the prescribing GP's own opinion on the reason for change. Both cost and quality information from the prescribing adviser emerged as the factors most significantly associated with actual PPI prescribing change, although few GPs rated any of the factors as powerful influences and 22%

claimed that they were not influenced at all by information from the prescribing adviser. These two factors are difficult to disentangle and indeed, both may have been influential. In reducing the cost of PPIs, GPs may have been responding to cost pressure or they may have seen their actions as rising from an improvement in quality as they progressively embarked upon *H. pylori* testing and eradication in order to reduce the costs of maintenance PPI therapy (15). On the other hand, other factors that might have been thought to influence PPI prescribing were not associated with actual change, supporting the views of others (16, 17) on the limited impact of both PACT data and financial factors. Freedom of information about the prescribing characteristics of neighbouring practices is a feature of PCGs (7) but contrary to our expectations, we found no evidence that this factor was related to success at reducing PPI costs. Either the technique had no impact or the initial local controversy surrounding its introduction adversely affected responses to the question.

The role of the prescribing adviser was attributed the greatest importance in those practices making the larger PPI savings. But the exact nature of successful intervention has not been characterized. It is unclear whether the cost and quality information that GPs stated had influenced them were better conveyed in mail-outs to each practice or, more likely, in direct visits to the practice following the model of academic detailing (18–20). It is also unclear which of the targeted prescribing categories were most amenable to change. Nearly all the cost of gastrointestinal prescribing consists of H2 blockers and PPIs and it was clear that the observed change occurred in PPI costs – precisely where the prescribing intervention had been targeted. On the other hand, significant change was observed in overall prescribing costs, even excluding gastrointestinal prescribing. It might be assumed that this was the result of several successfully applied but different practice-specific interventions designed to reduce costs. But our study does not have sufficient power to detect the effect of multiple unique interventions.

This survey has concerned prescribing change within a model of a GP commissioning group that no longer exists. It would not now be possible to conduct a similar study because all practices are necessarily part of a PCG structure rendering

impossible the selection of non-PCG control practices. If anything, the potential impact of a prescribing adviser is greater within the current PCGs because their activity is supported by features which were not part of the PCCG such as the unified budget, health improvement programmes and clinical governance. It remains possible, however, that successful reductions in expenditure might not be replicable, in part because of subjective factors such as the enthusiasm of personnel working within an early pioneering and voluntary model. Universal and compulsory systems may not be characterized by such motivation. However, the model of one prescribing adviser offering practice visits and information to a similar number of practices to that in our study is now widely used by PCGs (7).

Substantial savings in total drug costs coupled with changed gastrointestinal prescribing have been demonstrated in this study. Although the questionnaire provided clues rather than proof as to the reasons for that change, the predominant influence appeared to be the effect of the prescribing adviser. Further work needs to be conducted to determine which interventions wielded by prescribing advisers are the most likely to be effective, whether it is possible to change the prescribing of GPs who report that they were not influenced by the prescribing adviser and which areas of prescribing are most amenable to change.

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