Alterations in prescribing by general practitioner fundholders: an observational study

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Abstract

Objectives—To compare prescribing in general practices before and after they become fundholders to assess whether this affected prescribing patterns.

Design—Analysis of prescribing data (PACT) for one year before and one year after practices become first, second, or third wave fundholders and comparison with practices that were not fundholders during any part of the study.

Main outcome measures—Prescribing costs (net ingredient cost per prescribing unit), prescribing volume (items per 1000 prescribing units), net ingredient cost per item, and percentage of generic prescribing.

Setting—Former Mersey Regional Health Authority.

Subjects—100 fundholders (20 first wave, 31 second wave, 49 third wave) and 312 non-fundholders.

Results—Prescribing costs and volume rose throughout the study in all groups. In all three fundholding waves the rate of increase of prescribing costs was significantly lower than for non-fundholders. Both cost per item and prescribing volume tended to decrease, the former probably because of a significant increase in generic prescribing. Fundholding and non-fundholding practices differed in several respects.

Conclusion—Fundholding has altered practice prescribing patterns compared with those of non-fundholders, increasing generic prescribing and reducing the rate of increase of prescribing costs.

Introduction

Under general practice fundholding money saved on prescribing may be used for other aspects of patient care; conversely, any overspend on prescribing may be financed out of other parts of the fund.¹ This is an incentive for fundholders to contain prescribing costs.^{2,3} Two small studies have shown that first wave fundholders contain prescribing costs more effectively than non-fundholders by increasing generic prescribing,^{4,5} limiting the increase in cost per item,^{4,5} and reducing the volume of prescribing.⁵ An Audit Commission report showed that first and second wave fundholders had lower prescribing costs and a slower rate of increase in prescribing costs than non-fundholders.⁶ This was further confirmed by the Minister for Health in responses to a House of Commons Select Committee.⁷

The pattern of prescribing seen in these small studies may not occur in all fundholders or among fundholders who joined the scheme after the initial wave. It is not clear whether it is fundholding that has brought about the changes in prescribing or whether these reflect other factors, including a continuation of historical behaviour. We investigated the changes in

prescribing among the first three waves of fundholders and among non-fundholders in one region during the transition to fundholding.

Methods

We studied prescribing in fundholding and non-fundholding practices using prescribing analysis and cost (PACT) data, which records costs and numbers of all dispensed NHS prescriptions at individual practice level. We used PACTLINE, a computer software package for analysing PACT data available to family health services authorities and the regional health authority, to collect data on the following measures: rates of generic prescribing, the number of prescription items dispensed (as a crude measure of prescribing volume), and costs of the drugs dispensed (as the summated net ingredient cost). The denominator for these last two measures is the prescribing unit: in an attempt to allow for demographic differences between practices patients under 65 are counted as one prescribing unit, while those aged 65 and over count as three.

We examined four general measures of prescribing: prescribing costs (net ingredient cost per prescribing unit), the volume of prescribing (items per 1000 prescribing units), the average cost per item (net ingredient cost per item), and the percentage of generic prescribing. Data studied were the difference between the measures of prescribing for each fundholding practice and the simultaneous pooled median of non-fundholding practices. These data were examined at monthly intervals for 12 months before each fundholding practice became a fundholder and for 12 months after—that is, for first wave fundholders from April 1990 to March 1992, for the second wave from April 1991 to March 1993, and for the third wave from April 1992 to March 1994.

Subjects—Consent was sought from all first, second, and third wave fundholding practices in the former Mersey Regional Health Authority area to use their individual prescribing data. Consent was not sought from non-fundholders, since only aggregated data were used. Data from practices which came into existence or ceased to exist during the study period were excluded. The non-fundholding group consisted of all practices which were never fundholders during any part of the study period.

Statistical analysis—To determine whether prescribing had altered as a result of practices becoming fundholders we took two approaches: in both we took the pooled median non-fundholder values of each prescribing measure as a control value and subtracted those from the corresponding fundholder value for each month. In the first analysis we used Spearman's rank correlation and 95% confidence intervals for ρ to investigate the relation between time and these differences over the 24 month study period; the results were

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graphed for each wave. Secondly, we compared the first and last six months of the study with respect to these differences. These periods were chosen to avoid changes in prescribing that pre-empted fundholding status and which occurred after the periods on which prescribing budgets were set. The median of the fundholder values and of the non-fundholder values, and the median difference between the values, are presented with their 95% confidence intervals. A two tailed Wilcoxon signed ranks test was used to compare the differences in each period; the 95% confidence interval for the median difference of differences is presented.

Results

Two fundholding practices declined to participate. Data from 20 first wave fundholders, 31 second wave fundholders, and 49 third wave fundholders were compared with aggregated data from 312 non-fundholding practices (see table I).

Net ingredient cost per prescribing unit rose in all groups during the period studied (table II), but the

difference in net ingredient cost per prescribing unit between all waves of fundholders and non-fundholders in the last six months was significantly greater than in the first six months (table II). Rank correlation showed a statistically significant interdependence between time and the difference in net ingredient cost per prescribing unit for all waves of fundholders and non-fundholders (figure, table III). Fundholders seemed to have increased their net ingredient cost per prescribing unit to a lesser extent than non-fundholders.

Prescribing volume (items per 1000 prescribing units) rose in all groups over the period studied (table II). First and second wave fundholders had lower prescribing volumes than non-fundholders throughout the study (table II, figure). Rank correlation showed a statistically significant interdependence of time and difference in prescribing volume for both first and second wave fundholders but no such difference for third wave fundholders compared to non-fundholders (figure, table III). Comparison of the first and last six months of the transition period, however, suggested that the difference in prescribing volume between all waves of fundholders and non-fundholders in the last six months was significantly greater than in the first six months (table II). Prescribing volume increased less in fundholders than in non-fundholders.

Net ingredient cost per item increased in all groups (table II). First wave fundholders had a higher net ingredient cost per item than non-fundholders in both the first and last six month period (table II, figure). Rank correlation showed a statistically significant interdependence of time and the difference in net ingredient cost per item between third wave fundholders and non-fundholders during the study, with the difference between third wave fundholders and non-fundholders decreasing towards the end of the study (table III, figure). The differences in net ingredient cost per item for the first and last six months of the study in the third wave increased significantly. There was weak evidence of such a change in the second wave but none in the first wave. The tendency for second and third wave fundholders to prescribe less expensive items than non-fundholders increased.

Generic prescribing—All groups increased their rate of generic prescribing during the study period (table II). At the beginning generic prescribing rates were similar in fundholders and non-fundholders. By the end, however, second and third wave fundholders had a higher generic prescribing rate than non-fundholders (table II). Differences in the rate of generic prescribing between all waves of fundholders and non-fundholders increased during the study period (tables II and III, figure).

Discussion

This study shows that fundholders have contained prescribing costs more effectively than non-fundholders. This change in prescribing habits has coincided with practices joining the fundholding scheme and has occurred in each successive wave of fundholders. The containment seems to have been achieved by both reducing the volume of prescribing (a more difficult option since it is generally easier to change what to prescribe than whether to prescribe⁸) and reducing the cost per item, with different waves giving different emphasis to each.

A reduction in cost per item was associated with an increased proportion of generic prescribing, which may explain a large part of the cost containment seen, particularly in third wave fundholders. Other changes in prescribing such as substitution with a less expensive drug or a change in the true volume of prescribing—with, for example, shorter prescriptions or lower doses—cannot be excluded since they would not

TABLE I—Practice characteristics of fundholders and non-fundholders

	No (%) of training practices	No (%) of singlehanded practices	LISI (C) 92 index median (95% confidence interval)
First wave (n=20)	16 (80)	0	7.4 (5.2 to 10.6) (n=18)
Second wave (n=31)	9 (29)	3 (1)	12.6 (8.8 to 19.3) (n=29)
Third wave (n=49)	11 (22)	8 (16)	14.0 (9.9 to 19.9) (n=47)
Non-fundholders (n=312)	37 (12)	77 (25)	17.4 (15.8 to 19.1) (n=291)

TABLE II—Median (with 95% confidence interval) of fundholder values and corresponding non-fundholder values and differences over six month periods and comparison of differences between periods for four prescribing measures. For net ingredient cost per prescribing unit and items per 1000 prescribing unit a six monthly total was calculated for each practice; for net ingredient cost per item and generic percentage a monthly mean value for the six months was calculated for each practice

			Comparison between periods	
	Months 1-6	Months 19-24	Median difference (95% confidence interval)	Two tailed P
<i>Net ingredient cost per prescribing unit</i>				
First wave	16.66 (15.37 to 19.07)	19.95 (19.37 to 20.78)		
Non-fundholders	18.67 (18.17 to 19.07)	23.43 (22.87 to 23.92)		
Difference	-1.97 (-3.25 to 0.44)	-3.31 (-3.88 to -2.47)	1.18 (0.66 to 1.83)	<0.001
Second wave	20.66 (19.43 to 22.48)	23.80 (22.79 to 25.40)		
Non-fundholders	21.17 (20.61 to 21.64)	25.82 (25.26 to 26.99)		
Difference	-0.32 (-1.54 to 1.50)	-2.08 (-3.09 to -0.48)	1.68 (1.03 to 2.41)	<0.001
Third wave	24.43 (23.54 to 24.96)	27.14 (26.03 to 27.54)		
Non-fundholders	24.13 (23.65 to 24.64)	27.50 (26.93 to 28.27)		
Difference	0.32 (-0.58 to 0.84)	-0.43 (-1.54 to -0.04)	0.87 (0.35 to 1.33)	0.002
<i>Items per 1000 prescribing units</i>				
First wave	2922 (2601 to 3134)	3141 (2929 to 3581)		
Non-fundholders	3491 (3409 to 3635)	3908 (3833 to 4013)		
Difference	-568 (-889 to -356)	-786 (-997 to -346)	89 (21 to 206)	0.019
Second wave	3213 (2840 to 3624)	3650 (3075 to 3832)		
Non-fundholders	3644 (3551 to 3772)	4053 (3913 to 4139)		
Difference	-434 (-806 to -22)	-399 (-973 to -217)	110 (32 to 213)	0.003
Third wave	3734 (3396 to 3962)	3946 (3647 to 4371)		
Non-fundholders	3797 (3742 to 3924)	4221 (4056 to 4379)		
Difference	-77 (-415 to 151)	-263 (-561 to 163)	70 (19 to 118)	0.019
<i>Net ingredient cost per item</i>				
First wave	5.77 (5.71 to 6.36)	6.24 (6.06 to 6.81)		
Non-fundholders	5.48 (5.39 to 5.57)	6.00 (5.88 to 6.13)		
Difference	0.30 (0.24 to 0.89)	0.24 (0.06 to 0.81)	0.09 (-0.05 to 0.18)	0.180
Second wave	6.19 (5.76 to 6.71)	6.81 (6.15 to 7.13)		
Non-fundholders	5.91 (5.80 to 5.99)	6.51 (6.35 to 6.64)		
Difference	0.31 (-0.13 to 0.82)	0.30 (-0.36 to 0.62)	0.16 (0.01 to 0.34)	0.040
Third wave	6.63 (6.32 to 7.02)	6.92 (6.47 to 7.19)		
Non-fundholders	6.42 (6.28 to 6.60)	6.73 (6.61 to 6.87)		
Difference	0.22 (-0.09 to 0.61)	0.18 (-0.27 to 0.45)	0.20 (0.09 to 0.32)	<0.001
<i>Generic prescribing rate (%)</i>				
First wave	37.08 (34.99 to 39.71)	43.24 (39.08 to 47.21)		
Non-fundholders	38.21 (37.21 to 39.01)	39.74 (38.74 to 40.98)		
Difference	-0.91 (-2.99 to 1.72)	3.37 (-0.79 to 7.34)	-2.75 (-5.26 to -1.31)	<0.001
Second wave	40.52 (36.94 to 47.09)	47.33 (45.66 to 51.49)		
Non-fundholders	38.92 (38.13 to 39.99)	41.81 (40.48 to 43.37)		
Difference	1.48 (-2.11 to 8.05)	5.59 (3.92 to 9.75)	-3.13 (-5.17 to -1.55)	<0.001
Third wave	42.98 (40.08 to 44.79)	56.76 (53.35 to 57.98)		
Non-fundholders	39.87 (38.96 to 41.33)	49.55 (48.69 to 51.55)		
Difference	2.90 (-0.01 to 4.71)	6.64 (3.24 to 7.86)	-2.19 (-4.40 to -0.21)	0.033

TABLE III—Results of analysis of rank correlation between time and the difference between each wave of fundholders and non-fundholders for each prescribing measure

	Net ingredient cost per prescribing unit			Items per 1000 prescribing units			Net ingredient cost per item			Generic prescribing		
	Spearman's ρ	95% Confidence interval	P*	Spearman's ρ	95% Confidence interval	P*	Spearman's ρ	95% Confidence interval	P*	Spearman's ρ	95% Confidence interval	P*
First wave	-0.783	-0.902 to -0.556	<0.001	-0.709	-0.865 to -0.428	<0.001	-0.073	-0.463 to 0.340	0.734	0.898	0.776 to 0.955	<0.001
Second wave	-0.723	-0.872 to -0.451	<0.001	-0.449	-0.721 to 0.055	0.030	-0.077	-0.466 to 0.337	0.719	0.926	0.834 to 0.968	<0.001
Third wave	-0.501	-0.752 to -0.122	0.014	-0.292	-0.622 to 0.126	0.166	-0.442	-0.717 to -0.047	0.032	0.710	0.430 to 0.866	<0.001

*Two tailed P for Spearman's ρ .

Median differences in (a) net ingredient cost per prescribing unit, (b) items per 1000 prescribing units, (c) net ingredient cost per item, and (d) generic prescribing rate between non-fundholders and each wave of fundholders against time. (First 12 months were before fundholding, second 12 months were first year of fundholding)

be detected by the crude figure of items per 1000 prescribing units. Nevertheless, a systematic change in item size between fundholders and non-fundholders during the study periods does not seem likely. The item, which can be as few as 10 tablets or as many as several hundred, has rightly been criticised as being a crude measure of prescribing volume.⁹ The "defined daily dose" is rapidly gaining acceptance as a more accurate measure, but it is not yet used in PACT data and could not be calculated for the aggregated data used in this study.

Similarly, the "prescribing unit" only partly

addresses the effects of a patient's age on prescribing and does not consider other demographic factors such as sex. More sophisticated prescribing units, such as the ASTRO-PU (age, sex, and temporary resident originated prescribing unit),¹⁰ were not available for all of the study period. Caution is therefore necessary when studying prescribing using only aggregated PACT data.

A COMPLETE POPULATION OF PRACTICES

Unlike previous studies, we examined an almost complete population of fundholders (in three waves) and non-fundholders as opposed to small samples of one wave, and we attempted to investigate whether changes in prescribing patterns were due directly to the influence of fundholding or whether they were a continuation of historical prescribing patterns. Also, we deliberately chose not to consider the performance of fundholders against their prescribing budgets or non-fundholders against their indicative prescribing amounts, since such budgets and amounts were often set arbitrarily, and the setting of budgets varied from area to area. In general, fundholders have saved on their budgets while non-fundholders have exceeded their amounts, but in some areas fundholders were set more generous budgets than non-fundholders.^{2,11}

A study in Scotland showed no evidence that fundholders as a group inflated their prescribing costs in the preparatory year or earlier to secure a better budget.¹² We did not have access to data from before April 1990 and cannot confirm this for first wave fundholders. But data covering the period before the preparatory year were available for second and third wave fundholders, and we found no evidence of any inflation in drug costs in prospective fundholders compared with non-fundholders in those periods.

CHARACTERISTICS OF FIRST WAVE FUNDHOLDERS

Before joining the scheme first wave fundholders had similar prescribing costs per prescribing unit, a lower prescribing volume, but a higher cost per item than non-fundholders. Second wave fundholders had similar prescribing costs per prescribing unit and per item but a lower prescribing volume than non-fundholders, and third wave fundholders had similar prescribing patterns to non-fundholders (table I). Historically therefore, first wave fundholders prescribed differently from their non-fundholding colleagues. Practices becoming fundholders were large well organised practices¹² whose management skills were probably also reflected in their prescribing.

Their prescribing pattern—of lower overall cost and volume but higher cost per item—is also characteristic of practices in more affluent areas,¹³ where there is more prescribing of expensive prophylactic therapies and relatively less of inexpensive drugs, such as paracetamol. This suggests that first wave fundholders, and to a lesser extent later waves, were located in more affluent parts of Mersey region. This is supported by work in other regions¹⁴ and by the practice characteristics described in this study (table I). These show that fundholders were more likely to be training practices, to have many partners, and to have

Key messages

- Fundholding practices have contained prescribing costs more effectively than non-fundholding practices
- Financial incentives can bring about changes in prescribing over relatively short periods
- There is a need to ensure that improvements in cost containment are not to the detriment of prescribing quality

lower deprivation scores. This pattern became less pronounced in later waves.

The measure of deprivation used, the low income scheme index, is based on the percentage of prescribed items which are exempt from prescription charges under the low income scheme.¹⁵ We chose it because it provides a single score for practices; is based on data from 1992, in the middle of our study period; and was available for 94% of the practices in the study. This index has, however, been criticised for lack of validation at the level of the individual practice and for using a prescribing derived index to study prescribing.¹⁶ Nevertheless, after exploring other deprivation indices, we thought it was adequate for the simple descriptive purposes of this study. We use it simply to illustrate that early wave fundholders were not typical practices, so the observed prescribing patterns may owe as much to these possible confounders as to fundholding.

DOES FUNDHOLDING AFFECT PRESCRIBING?

The costs and volume of prescribing and rate of generic prescribing rose in all groups throughout the study period, though to a lesser extent in fundholders of all waves than in non-fundholders. Because of this, we chose to study differences from non-fundholding practices to answer the primary question: does fundholding affect prescribing? Since this baseline shifts between each wave of fundholding, only broad comparisons can be made between waves of fundholder.

An example of the shifting baseline is the decrease in the difference in the generic prescribing rate and in net ingredient cost per item between third wave fundholders and non-fundholders towards the end of the study due to changes in prescribing by non-fundholders (figure). This could have been due to non-fundholder prescribing incentive schemes introduced in 1993 or to increased generic prescribing by would-be fourth wave fundholders who, under local rules, had to achieve 50% generic prescribing before entering the scheme.

Changes in prescribing seen between months 1-6 (April to September) and 19-24 (October to March) might be attributed to seasonal differences; however, since we studied differences between fundholders and non-fundholders, only a systematic difference in seasonal rates between the two groups would explain the results, and this seems unlikely. The data for months 25-30 for first and second wave fundholders further confirm the trends seen.

LIMITATIONS OF FINANCIAL INCENTIVES

The changes in prescribing which we saw occurred over relatively short periods and apparently in

response to joining the fundholding scheme. Clearly, the possibility of saving money on a prescribing budget has proved to be an effective incentive to fundholders to alter their prescribing habits.

Nevertheless, the limitations and dangers of such incentives need to be recognised. Such incentives focus on cost rather than on cost effectiveness. Improvements in cost containment must not be made to the detriment of prescribing quality, a point emphasised by local prescribing advisers.¹⁷ The professional integrity of the prescriber is at present the major safeguard of patient care in this area. Better ways of defining and measuring quality of prescribing are needed, ideally involving a measure of the morbidity that causes the prescribing.

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Conflict of interest: None.

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Correction

Randomised double blind comparison of terbinafine and itraconazole for treatment of toenail tinea infection

Two editorial errors and an author's error occurred in this paper by M Bräutigam *et al* (7 October, pp 919-22). The legends to figures 1 and 2 are transposed; the P value in figure 2 is $2P < 0.01$ [not $2P < 0.05$]; and the first sentence of the Patients and methods section should read, "The study was performed in men and women aged 18 or over who had a clinical diagnosis of distal subungual or proximal onychomycosis and a growth of dermatophytes in a mycological culture up to 12 weeks before [not after] the start of the treatment."