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**Trends in Health Care Commissioning  
in the English NHS:  
An Empirical Analysis**

**CHE Research Paper 11**



# Trends in health care commissioning in the English NHS: an empirical analysis

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March 2006

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## **Acknowledgements**

NPCRDC and CHE receive funding from the Department of Health (DH) for policy research. The views expressed are those of the authors and not necessarily those of the DH.

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## **Abstract**

In recent years there have been marked changes in organisational structures and budgetary arrangements in the English NHS, potentially altering the relationships between purchasers (primary care organisations (PCOs) and general practices) and providers. Using data on elective hospital admissions from 1997/98 to 2002/03 we find that commissioning has become significantly more concentrated at PCO and GP level. There was a reduction in the average number of different providers used by PCOs (16.7 to 14.2), an increase in the average share of admissions accounted for by the main provider (49% to 69%), and an increase in the average Herfindahl index (0.35 to 0.55). About half the increase in concentration arose from the increase in the number of purchasing organisations from 100 to 302. The rest was due to mergers amongst providers and the abolition of fundholding. GP fundholding practices which held budgets for elective admissions had less concentrated admission patterns than non-fundholders whose admissions were paid for by their primary care organisation. There was an increase in concentration of admissions for both types of GP practice but fundholders used more providers, had smaller shares at their main provider, and had smaller Herfindahl indices.

**Keywords:** concentration, Herfindahl, purchasing, budgets, elective admissions





## Introduction

Health care delivery is characterised by a substantial degree of geographical monopoly. Research in the UK and elsewhere has focused on measuring market concentration and the scope for competition amongst providers [1-4]. However, even where the potential for competition exists, the role of the purchaser is vital because unless they use their leverage, there will be little incentive for providers to respond.

The aim of this paper is to examine the extent to which English NHS purchasers of elective hospital care concentrate their admissions amongst providers and the extent to which they switch their business amongst them. In recent years there have been major changes in organisational and budgetary arrangements and there has been a trend to mergers amongst providers. By examining elective hospital admission data from 1997/98 to 2002/03, we explore whether these factors have had any impact on measures of the concentration of use of providers and commissioners' willingness to switch amongst providers. We also compare trends in the commissioning measure for fundholding general practice which held a budget for elective admissions and for non-fundholding practices whose patients' admissions were paid for by their local health authority. The analysis identifies the impact of alternative purchasing arrangements and provides a baseline for analysing the impact of more recent policy developments, including the recent reintroduction of practice level budgets, which are intended to alter commissioning patterns.

## Purchaser/provider relationships in the NHS

### Internal market

In the UK National Health Service (NHS) almost all care is provided free at the point of use. NHS patients register with gate-keeping general practitioners (GPs) who are the only route by which NHS patients can access elective (non-emergency) secondary care.

In 1991 a Conservative government introduced the NHS internal market. Purchasers and providers of secondary health care were split. NHS hospitals were removed from the direct control of Health Authorities (HAs). HAs became purchasers of health care, constrained by a budget determined by a needs weighted capitation formula. NHS hospitals remained within the public sector but were required to compete for contracts from purchasers. As part of the 1991 reforms, larger general practices could volunteer to become fundholders [5]. Fundholding practices were given annual budgets by their Health Authority to purchase elective hospital procedures. Non-fundholding practices continued to have all health care expenditure on their patients covered by their HA from its budget. By the time fundholding was abolished by the new Labour government in April 1999, around 50% of practices had elected to join the fundholding scheme.

In the early days of the internal market considerable policy emphasis was placed on shifting the balance of power away from providers towards purchasers (HAs and GP fundholders). Purchasing was seen as the "engine driving the reforms", the contracting process was a means of encouraging provider competition and responsiveness, and purchasers were told: "if a provider does not deliver satisfactory value for money .... consider moving your health care business elsewhere" [6]. Purchasers were expected to move away from services based on historical configurations to patterns better reflecting the needs of their populations. The evidence suggests that patterns of contracting remained largely unchanged, aside from small shifts of marginal activity in areas where some choice of provider existed [2,7-9]. There were concerns about how much leverage purchasers could have when faced with powerful providers defending historical patterns of service provision [10]. Mergers amongst hospitals also created larger providers with powerful vested interests of clinicians who could be unresponsive to demands of purchasers.

The pattern of utilisation of hospitals for patients was determined by GPs and patients and by the commissioning arrangements with providers made by HAs. The contracts HAs made with providers were most often block contracts under which the amount the HA paid to the provider did not vary with the number of patients treated. GPs have always been able to refer patients to any provider subject only to the provider's willingness to accept them. Fundholding GPs had a greater incentive to "shop around". First, they could make budget savings by finding providers with lower prices whereas any

savings achieved by non-fundholders accrued to the HA, not the practice. Second, although all practices could search for providers with better quality, fundholders could also hope to extract better quality terms since they paid a price per admission and so could reduce provider revenue by taking their business elsewhere. Non-fundholders had no such threat because of the block contract between the HA and the provider.

After the introduction of the internal market, GP choice of provider continued to be influenced by personal knowledge of providers, professional experience and the desire to retain historical relationships [11,12]. Early studies of referral patterns reported limited signs of GPs making substantial shifts or switching referrals to out of area providers [13-15].

There is some evidence to suggest that fundholders were more active purchasers in search of lower prices and better quality [3,5,16] that providers were more responsive to fundholders than to HAs [17]. For example, patients of fundholders had shorter waiting times for elective procedures than patients of non-fundholding practices [18-20]. Other studies have suggested that inertia and a reluctance to move away from historical patterns left the overall situation largely unchanged, especially in some specialist services [21-26].

## **New Labour**

With the election of the Labour government in May 1997 policy rhetoric shifted away from a focus on purchasing, contracts, markets and competition towards commissioning, long term agreements, and collaboration. Commissioning was intended to be strategic and based on the patient experience, rather than on the purchase of individual elements of the service.

Fundholding was abolished in April 1999 (by which time around 50% of the population were in fundholding practices). Budgets for purchasing health care were removed from HAs and devolved to smaller, newly created, Primary Care Groups (PCGs), later replaced by Primary Care Trusts (PCTs) which have populations of around 180,000, compared with HAs which had average populations of around 550,000. HAs' other functions were shifted to these new primary care organisations and HAs were abolished in April 2003.

The development of PCGs and PCTs shifted responsibility for commissioning firmly to primary care and PCTs now spend over 80% of the healthcare budget. Whilst the emphasis was on developing long-term co-operative relationships with providers, PCOs were encouraged to "look at new models for service delivery rather than committing resources on a historical basis to traditional providers through block agreements" [27]. However, less than a quarter of PCOs felt they had effective leverage over providers of hospital care, with smaller PCOs believing they had less leverage than larger ones [28]. There appeared to be very limited switching of contracts in the early days of primary care based commissioning, even where choice of provider existed [28,29].

## **Recent policy initiatives**

Recent policy initiatives have been intended to strengthen the role of Primary Care Organisations (PCOs) as purchasers of health care services. First, a prospective payment regime (payment by results (PBR)) using fixed national tariffs has been introduced, so that payments to providers follow the patients they treat [30]. Second, by April 2006 patients must be offered a choice of provider or their first out-patient appointment at the time of referral by their GP [31]. The expectation is that providers who are more responsive to patients and GPs will gain income, and those who are not will lose income and eventually fail. Third, diversity in the supply of health care has been encouraged by allowing entry of private and public providers, including new independent diagnostic and treatment centres. Fourth, from April 2005, a variant of fundholding has been reintroduced, with practices able to opt to hold budgets for secondary care [32]. The hope is that it will enable budget holding GPs the power to contract on behalf of their patients for a wider choice of services in a variety of different settings [33].

## **Research questions**

Studies of the effects of these policy changes on commissioning have usually been small scale and qualitative and little is known about trends in commissioning patterns. In this paper we examine the

extent to which purchasers concentrate their patients' use of secondary care amongst hospitals, whether patterns of concentration have been stable over time, and whether purchasers switch providers. By comparing the trends in the concentration of hospital use of patients in fundholding and non-fundholding practices we also aim to establish whether changes in budgetary arrangements have the power to change longstanding commissioning patterns. In particular we investigate whether fundholding practices were more "active" commissioners in that they had a less concentrated use of providers and were more likely to switch providers. We use a data set of all elective admissions over the period from 1997/98 to 2002/03 which covers the ending of the internal market, the abolition of fundholding, and the introduction of primary care led commissioning. We can thereby examine whether these major changes in organisational and budgetary arrangements had any impact on commissioning patterns and also provide a baseline against which the effects of the most recent sets of policy initiatives can be assessed.

## Data and methods

### Data sources

Data were collated from three main sources: Hospital Episodes Statistics (HES) for admissions, General Medical Statistics (GMS) for practice characteristics and the database assembled for the AREA project [34] for socio-economic characteristics and provider characteristics. Data sources are described more fully in Dusheiko *et al* [20]. Table 1 gives summary statistics for the variables included in the final models.

We use the admissions for elective hospital care to construct measures describing commissioning patterns. Gatekeeping general practices have always had discretion in their choice of provider, even when the budget for secondary care was held by the higher level commissioning organisations to which they belong. Thus it is of interest to construct measures of commissioning patterns at both practice level and at the more aggregated level of the organisations (HAs and PCTs) which held budgets and had formal responsibility for commissioning. Measures only at the practice or the higher level could give a misleading account of changes. For example, a PCT with 10 practices whose admissions were evenly spread over 10 providers would have the same PCT level of concentration of commissioning as a PCT with 10 equal sized practices each of which used a single different provider. Conversely, practice level concentration measures would be the same if each of the 10 practices all used the same provider or if they each used a single different provider but the PCT level measures would differ.

Finished Consultant Episodes (FCE)s for elective (non-emergency) admissions to English hospitals were obtained from HES for the six-year period 1997/98 to 2002/03. Each FCE was linked to the patient's general practice and to the NHS Trust (provider) where treatment took place. Only FCEs for patients in practices which were in existence over the entire period were included. GP practices which ceased to exist during the panel were dropped and new practices were not added.

To assess the trends in patterns of admissions to provider Trusts from higher level commissioning units over time we required units with stable geographies that were also relevant for commissioning. During the period for which we have data there were major changes in administrative structure and geographies. In 1997/98 the basic higher level units for commissioning were 100 HAs which had average populations of around 550,000. In 2002/03 the basic organisational units were 302 PCTs which had average populations of around 180,000. Since our measures of commissioning patterns are affected by the size of the market (the population for whom care is purchased) we constructed time series of commissioning measures based on frozen populations for HAs and PCTs.

To create the frozen HA level commissioning variables we aggregated elective admissions for practices within the HAs they belonged to in 1997/98. Then commissioning measures were constructed for the frozen HAs for each year from 1997/98 to 2002/03 by using the admissions from the practices they contained in 1997/98. Similarly we created frozen PCT level commissioning measures by aggregating elective admissions within the PCTs to which the practices belonged in 2002/03. Since we are primarily concerned with the trends in the commissioning variables over the period, using populations with reasonably stable sizes ensures that any changes are due to real changes in the way admissions of a given population are concentrated amongst providers, rather than

**Table 1: Descriptive statistics for GP practice level variables**

Variable	Definition	Data Source	Obs	Mean	Std. Dev.	Min	Max
NumProv99	Number of providers used by GP practice which accounts for 99% of admissions	HES	56388	7.738	4.394	0	28
MainShare	Share of elective admissions at main provider	HES	55194	0.711	0.173	0.111	1
Herfindahl	Herfindahl concentration index	HES	55194	0.573	0.201	0.084	1
AddShare	Share of admissions at providers added between years		42919	0.060	0.169	0.0005	1
DropShare	Share of admissions at providers dropped between years	HES	43487	0.125	0.258	0.0005	1
fundholder	Standard GP fundholder	PPA	58284	0.377	0.485	0	1
praclist	Total practice listsize 3-yr moving average	GMS statistics (1998)	45843	5874.837	3671.490	1001.5	34218.33
listpergp	List size per wte GP 3-yr moving average	GMS statistics (1998)	45843	2064.812	507.424	541.6	9347
gpcontracept	Proportion GPs providing contraceptive services	GMS statistics (1998)	45223	0.129	0.258	0	1
gpsingle	Practice is single handed	GMS statistics (1998)	45234	0.266	0.442	0	1
mmr2prac	Proportion of GPs doing MMR2	GMS statistics (1998)	45237	0.314	0.345	0	1
gpdeput	Proportion of GPs permitted to use deputy	GMS statistics (1998)	45248	0.762	0.396	0	1
dispensingprac	Practice has dispensing status	GMS statistics (1998)	45107	0.149	0.356	0	1
distacute	Average distance from GP practice to 5 nearest providers	OCS/AREA project	52271	24.742	10.844	11.757	109.095
distprivate	Mean distance to nearest 5 private hospitals	OCS/AREA project	52271	22.719	9.860	10.458	98.989
acutebeds	Average beds at 5 nearest acute providers	OCS/AREA project	52271	505.031	134.402	173.789	997.256
privatebeds	Accessibility to private beds	OCS/AREA project	52271	39.308	16.163	8.406	124.781
residential	Residential places per person over 75	DoH/AREA project	52271	0.008	0.007	0	0.168
cmf0-74	Comparative mortality factor under age 75	ONS/AREA project	52271	105.071	23.127	55.404	213.648
lowbirthwght	Percentage of low birthweight babies	ID/AREA project	52271	7.539	1.477	2.421	12.973
disability	Proportion of population with attendance allowance/Disability living allowance claims	ID/AREA project	52271	5.434	2.065	1.237	16.614
incapacity	Incapacity/Severe disability allowance claimants	AREA project	52271	101.437	52.659	13.772	434.157
educdepriv	DETR index of education deprivation (ward level attributed to practices)	ID/AREA project	52271	0.269	0.757	-2.285	2.792
notuniv	Percentage of the population aged 17 not going to University	ID/AREA project	52271	85.148	6.641	44.814	98.327
jobseekers	Proportion eligible population claiming job seekers allowance	AREA project	52271	4.977	3.356	0.265	20.55
unemployment	Unemployment rate	1991 census/AREA project	52271	0.102	0.050	0.017	0.394

to changes in the size of the populations. The levels of commissioning variables in 2002/03 calculated for the frozen 2002/03 PCT population based series provide an accurate measure of the commissioning variables for the populations covered by the main commissioning organisations (PCTs) in that year. Similarly the levels of the variables for 1997/98 from the 1997/98 frozen HA series is an accurate measure of the commissioning variables for the populations covered by the main commissioning organisation (HAs) in that year.

We also calculated the same commissioning measures at practice level for our panel of GP practices. The measures will be affected by the number of patients in the practice but few of our practices had major changes in population over the period. When we analyse practice commissioning measures we also allow for the effect of practice list size.

Practice-level variables were constructed to control for factors influencing the concentration of hospital use by each GP practice in the analysis of fundholding effects. These included practice-level mean waiting time data derived from HES. Data on practice populations were taken from the PCT database at the National Primary Care Research and Development Centre (NPCRDC). Demographic effects were allowed for by including the age and sex proportions of the practice population as explanatory variables in the models. We coded practices as fundholding only if they were standard fundholders (holding a budget for elective admissions). Community fundholders who had a budget for district nursing, health visiting and other services provided outside hospital were classified as non-fundholders. We had data on practice characteristics, based on the Department of Health's General Medical Statistics, from the NPCRDC website. We also had information on the socio-economic characteristics of the practice populations for 1999 and data on supply factors including distance from practice populations to NHS Trusts (providers), private hospitals, residential and nursing homes, numbers of beds and consultants at NHS Trusts.

## Commissioning measures

We constructed five measures for each of the three types of commissioning unit (frozen 1997/98 HAs, frozen 2002/03 PCTs, GP practices) to describe the patterns of use of providers for elective admissions.

*NumProv99<sub>it</sub>*: the number of providers used by patients in population  $i$  in period  $t$  which accounts for 99% of admissions. For each provider  $j$  used by population  $i$  in year  $t$  we count the elective admissions  $x_{ijt}$  from population  $i$  to the provider, calculate the share  $x_{ijt} / \sum_k x_{ikt}$ , rank the providers in decreasing order by share, and construct the cumulative relative frequency. We truncate the measure at the 99th centile since the total number of providers used was sensitive to use of providers with a very small number of admissions from population  $i$ .

*MainShare<sub>it</sub>*: the share of admissions for population  $i$  at the provider which had most elective admissions from the population in year  $t$ :  $\max_j x_{ijt} / \sum_k x_{ikt}$ . The *MainShare* variable gives an indication of how important the largest provider is for the  $i$ th population.

*Herfindahl<sub>it</sub>*: the Herfindahl index for population  $i$  in period  $t$  is  $\sum_j (x_{ijt} / \sum_k x_{ikt})^2$ . The Herfindahl is the standard measure of overall market concentration and has the advantage that it is based on admissions to all the providers used. The reciprocal of the Herfindahl is the number of equal sized firms which would produce the same degree of concentration and is a useful alternative measure of concentration.

The number of providers, the share of the largest provider, and the Herfindahl measure concentration of use but do not provide any information about the volatility of market shares since they do not depend on the identity of providers in any given year. A population could have the same Herfindahl in two years with the same set of providers or with an entirely new set. We are interested in how much switching of providers takes place. Hence we constructed two measures based on changes in the identity of providers used by populations. However the identity of providers used may change because of mergers, with no change in actual patterns of use of hospitals. Hence we need to remove the effect of mergers from our switching measures.

We list the providers used by patients in unit  $i$  in year  $t$  and in year  $t+1$ . We delete all providers who were new in year  $t+1$  because they had been produced by mergers in the previous year. We also delete all providers who were used in year  $t$  but not in year  $t+1$  who had been involved in mergers in year  $t$ . We then use the purged list of providers for population  $i$  to calculate two measures of switching:

$AddShare_{it+1} = \sum_{k \in N_{it+1}} x_{ikt+1} / \sum_{j \in P_{it+1}} x_{ijt+1}$  is the share of elective admissions for population  $i$  in year  $t+1$  at providers who were new in year  $t+1$ .  $N_{it+1}$  is the set of new providers  $t+1$  in the purged list and  $P_{it+1}$  is the set of all providers used by patients in unit  $i$  in year  $t+1$ .

$DropShare_{it+1} = \sum_{k \in D_{it+1}} x_{ikt} / \sum_{j \in P_{it+1}} x_{ijt+1}$  is the ratio of the sum of elective admissions for population  $i$  in year  $t$  at providers who were used in year  $t$  but not in  $t+1$  to the total admissions for population  $i$  in year  $t$ .  $D_{it+1}$  is the set of providers on the purged list who were used by population  $i$  in year  $t$  but not in year  $t+1$ .

Notice that there is no reason why the two switching measures should be equal since for example a commissioner might drop one large provider and increase use at all other existing providers without using any new providers.

The first three concentration variables are calculated for all six years and the two switching measures for the change between each of two adjacent years in the six year panel (giving five years).

## Regression models

The trends in concentration and switching at frozen HA or frozen PCT level indicate whether the major changes in organisational and financial structure had an effect on commissioning patterns. But they do not enable us to determine which was responsible for any trend we observe since they were introduced simultaneously. However, there was one significant change in budgetary arrangement which might have been expected to affect admission patterns and which affected populations differentially: the abolition of fundholding in 1999/00. We therefore compare the changes in the commissioning measures for fundholding and non-fundholding practices over the period to identify the effect on the commissioning behaviour of fundholding practices with the abolition of fundholding. We can thereby test whether changes in budgetary arrangements affect commissioning patterns.

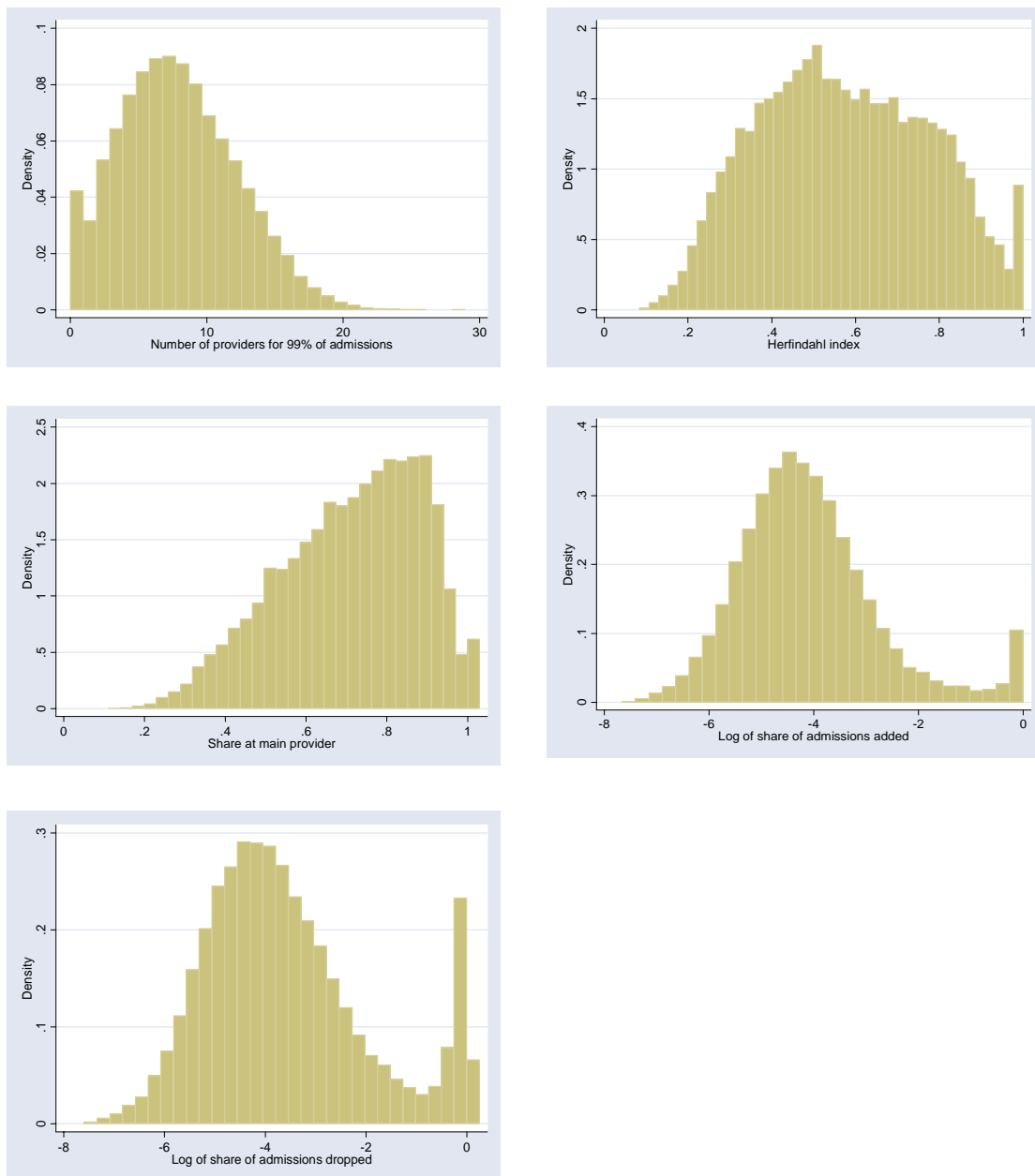
We estimated difference in difference regression models of practice level commissioning measures. To increase the precision of the tests for an effect of the abolition of fundholding on fundholders we include a wide range of practice level covariates, some of whose effects are also of interest in their own right. We selected the covariates after examining variance inflation factors for signs of multicollinearity and dropping highly collinear variables [35]. We used STATA Version 8 to estimate a variety of panel data models: pooled Ordinary Least Squares (OLS), fixed effects, random effects and generalised estimation equation (GEE) models [36]. The estimated effects of the fundholding regime were qualitatively insensitive to the estimation method. We report only the results from the GEE models which provide estimates of the effects of time invariant covariates but without the need to assume that these are uncorrelated with unobserved practice effects. Robust standard errors were employed throughout.

We include Health Authority dummy variables in all models to allow for unobserved effects from socio-economic factors, higher level purchasing policies, and variations in provider supply conditions. The results were not greatly affected by the use of these dummies. We dropped practices whose 3-year moving average practice population size was ever less than 1000. Since waiting times may be affected by the choice of provider but may also in turn affect the number of admissions and hence possibly our commissioning variables, we ran models with and without the mean practice-level waiting time. The waiting variable made little difference to the results and we report results for the reduced form models without waiting times.

Since the five practice level commissioning variables are jointly determined by practice decisions we also estimated seemingly unrelated regression (SUR) models with the three concentration measures

(number of providers used, Herfindahl index, share of admissions at main provider). Similarly, we ran SUR models for the measures of switching. The correlation matrices of the residuals from the two SUR models showed correlations in the errors between share at main provider and Herfindahl, but not the number of providers used. The DID estimates of the effect of fundholding for the SUR models were similar to those from the separate regressions and so we do not report the SUR results.

We chose the functional forms for the equations by inspecting the distributions of the dependent variables, using Box-Cox transformations of the dependent variable, and applying PE tests of the linear versus log linear models [37]. The distributions of the five variables are shown in Figure 1. The three concentration measures were estimated in levels. The two switching measures were right skewed and were transformed into logs for running the regressions.



**Figure 1: Distribution of commissioning measures for GP practices, all electives, all years**

## Results

### Higher level commissioning trends

Table 2 reports the five commissioning measures for frozen 1997/98 HA and frozen 2002/03 PCT populations from 1997/98 to 2002/03. We focus on the frozen PCT measures since these are the current set of purchasing organisations and the trends in the measures are the same for frozen PCTs and frozen HAs. In 2002/3 the average number of providers used by the 302 PCTs was 14.2 (CI: 13.5, 14.9). All confidence intervals are 95% and based on the unweighted distributions. The distribution of shares of admissions across providers was highly skewed. The main provider accounted, on average, for 69% (CI: 0.67, 0.71) of a PCT's admissions and the Herfindahl was 0.55 (CI: 0.52, 0.57), equivalent to 1.8 equal size providers. PCT commissioning appears to be highly concentrated. Comparison with the frozen HA measures for 2002/03 shows the effect of the change in size of commissioning unit due to the replacement of 100 HAs with 302 PCTs. The increase in the number of providers used who account for 99% of admissions from using frozen HAs rather than actual PCTs in 2002/03 is relatively small (15.8 versus 14.2) whereas the proportionate effect on the share at main provider (57.4% versus 69.4%) and the Herfindahl (0.43 versus 0.55) is somewhat greater.

**Table 2: Higher level commissioning trends 1997/8 – 2002/3**

	Year	Frozen 1997/8 Health Authorities (n = 100)				Frozen 2002/3 Primary Care Trusts (n = 302)			
		Mean	SD	Min	Max	Mean	SD	Min	Max
NumProv99	97/98	16.700	7.027	4	35	14.914	7.188	3	39
	98/99	15.420	6.634	3	30	13.864	7.103	1	46
	99/00	15.360	6.544	3	35	13.897	6.545	2	41
	00/01	15.360	6.185	3	31	13.798	6.240	2	36
	01/02	15.300	6.191	3	29	13.639	5.947	2	27
	02/03	15.820	6.590	3	32	14.156	6.228	2	31
MainShare	97/98	0.494	0.175	0.242	0.918	0.629	0.180	0.193	0.967
	98/99	0.508	0.180	0.242	0.919	0.650	0.182	0.223	0.982
	99/00	0.516	0.189	0.216	0.920	0.661	0.175	0.205	0.946
	00/01	0.527	0.183	0.218	0.911	0.672	0.172	0.188	0.970
	01/02	0.553	0.190	0.267	0.904	0.681	0.173	0.273	0.971
	02/03	0.574	0.192	0.253	0.901	0.694	0.168	0.295	0.968
Herfindahl	97/98	0.354	0.168	0.143	0.845	0.475	0.193	0.111	0.935
	98/99	0.369	0.175	0.136	0.847	0.501	0.197	0.132	0.965
	99/00	0.378	0.184	0.119	0.848	0.510	0.190	0.122	0.896
	00/01	0.387	0.176	0.122	0.831	0.522	0.187	0.119	0.941
	01/02	0.409	0.186	0.171	0.818	0.533	0.190	0.168	0.944
	02/03	0.428	0.189	0.164	0.817	0.546	0.188	0.180	0.937
AddShare	98/99	0.0355	0.1085	0.0004	0.6467	0.0416	0.1400	0.0002	0.8908
	99/00	0.0275	0.0808	0.0005	0.6243	0.0407	0.1379	0.0005	0.9232
	00/01	0.0093	0.0423	0.0002	0.3416	0.0097	0.0461	0.0003	0.6749
	01/02	0.0288	0.1165	0.0003	0.8412	0.0306	0.1227	0.0004	0.9526
	02/03	0.0088	0.0130	0.0004	0.0620	0.0099	0.0201	0.0005	0.2022
DropShare	98/99	0.0881	0.2174	0.0007	0.9812	0.0982	0.2251	0.0006	0.9537
	99/00	0.0680	0.1558	0.0006	0.9070	0.0690	0.1737	0.0003	0.9519
	00/01	0.0334	0.1293	0.0003	0.7776	0.0340	0.1350	0.0004	0.8460
	01/02	0.1092	0.2306	0.0007	0.9191	0.0968	0.2250	0.0008	0.9540
	02/03	0.0929	0.2146	0.0003	0.9132	0.1042	0.2475	0.0004	0.9824

Moreover commissioning appears to have become more concentrated between 1997/98 and 2002/03. There was a decrease of 9% in the average number of providers used from 14.9 (CI: 14.1, 15.7) to 13.6 (CI: 13.0, 14.3) in 2001/02, although the decrease was not statistically significant at the 5% significance level. There was a noticeable increase in the final year to 14.2 providers (CI: 13.5, 14.9).



The share of admissions at the main provider increased significantly between 1997/98 and 2002/03 from 0.63 (CI: 0.61, 0.65 ) to 0.69 (CI: 0.67, 0.71). The Herfindahl index also increased significantly from 0.48 (CI: 0.45, 0.50) to 0.55 (CI: 0.52, 0.57) over the same time period.

There was no systematic overall trend in the share of admissions at new providers or dropped from existing providers. In 1998/99 and 1999/00 new providers had just over 4% of admissions but this fell to 1% in 2000/01, then rose to 3% and finally fell back to 1% in 2002/03. The share of admissions at providers who were dropped fell from 10% in 1998/99 to 7% in 1999/00 to 3.4% in 2000/01 and then rose to 10% in 2001/02 and 2002/3. The share of admissions dropped at providers is much greater than the share at new providers which is consistent with the increasing trend in concentration and suggests purchasers tend to shift patients from dropped providers to existing providers, rather than to new providers.

### Practice level commissioning trends

Table 3 shows trends in the GP practice level Herfindahl index. Commissioning is highly concentrated at practice level: in 2002/03 for all elective admissions the average Herfindahl was 0.60, 7.93 providers accounted for 99% of admissions, and the main provider accounted for 73.3% of admissions. As with the frozen HA and PCT higher level populations shown in Table 2, hospital admissions have also become more concentrated at practice level. The mean practice Herfindahl for all elective admissions increased from 0.54 to 0.60 between 1997/98 and 2002/03.

Payment by results (PBR) was introduced for 15 elective Healthcare Resource Groups (HRGs) in April 2004, as the first step in a roll-out, covering treatments with either waiting time or other policy priorities. Table 3 shows the average practice level Herfindahls for these HRGs. The mean Herfindahl for the 15 HRGs in 2002/03 was 0.65. The 15 HRGs account for 13.7% of total elective admissions so that although the mean Herfindahl for the 15 PBR HRGs is larger than for all 535 elective HRGs, the increase is quite small. Table 3 also shows the mean practice Herfindahl for one of the PBR HRGs (BO2 - phakoemulsification cataract extraction with lens implant) which accounts for 1.7% of elective admission. The Herfindahl is extremely high (0.85) and this is reflected in the fact on average only 1.42 providers account for 99% of a practice's BO2 cataract admissions.

**Table 3: Practice level commissioning trends 1997/8 – 2002/3: Herfindahl indices**

	General practices				
	n	Mean	Std Dev.	Min	Max
<b>All elective HRGs</b>					
1997/98	9225	0.541	0.198	0.090	1
1998/99	9297	0.562	0.204	0.084	1
1999/00	9318	0.569	0.203	0.089	1
2000/01	9343	0.581	0.199	0.092	1
2001/02	9376	0.590	0.201	0.122	1
2002/03	9397	0.600	0.200	0.089	1
<b>15 Initial payment by results HRGs</b>					
1997/98	8855	0.600	0.225	0.128	1
1998/99	8757	0.618	0.227	0.136	1
1999/00	8649	0.630	0.222	0.156	1
2000/01	8601	0.637	0.219	0.134	1
2001/02	8921	0.653	0.220	0.160	1
2002/03	8527	0.652	0.217	0.146	1
<b>Cataract extractions (BO2)</b>					
1997/98	8128	0.851	0.207	0.222	1
1998/99	8611	0.848	0.202	0.220	1
1999/00	8772	0.849	0.198	0.208	1
2000/01	8810	0.845	0.196	0.210	1
2001/02	8859	0.852	0.192	0.236	1
2002/03	8835	0.851	0.192	0.228	1

## Budgets and practice level commissioning patterns

The reintroduction of fundholding under the label of practice based commissioning makes it of interest to look in some detail at the effect of fundholding on commissioning patterns. Table 4 shows the five commissioning measures for fundholding and non-fundholding practices for the last two years of fundholding (1997/98 and 1998/99) and the first four years post-fundholding.

**Table 4: Commissioning trends for fundholder and non-fundholder practices**

	Year	Fundholding GP practices					Non-fundholding GP practices				
		n	Mean	SD	Min	Max	n	Mean	SD	Min	Max
NumProv99	97/98	3658	9.010	4.351	0	28	5960	6.716	4.231	0	25
	98/99	3655	8.832	4.371	0	25	5913	6.779	4.298	0	26
	99/00	3652	8.879	4.341	0	25	5886	6.876	4.253	0	22
	00/01	3645	8.931	4.352	0	26	5873	6.933	4.239	0	26
	01/02	3648	8.845	4.330	0	25	5836	6.912	4.115	0	24
	02/03	3640	9.130	4.520	0	24	5807	7.171	4.270	0	24
MainShare	97/98	3653	0.675	0.171	0.162	1	5572	0.690	0.179	0.159	1
	98/99	3658	0.695	0.173	0.125	1	5639	0.705	0.180	0.164	1
	99/00	3655	0.703	0.167	0.172	1	5663	0.710	0.179	0.143	1
	00/01	3650	0.717	0.161	0.128	1	5693	0.719	0.175	0.167	1
	01/02	3643	0.722	0.162	0.167	1	5733	0.727	0.175	0.194	1
	02/03	3638	0.733	0.158	0.111	1	5759	0.733	0.174	0.172	1
Herfindahl	97/98	3653	0.526	0.191	0.090	1	5572	0.552	0.202	0.097	1
	98/99	3658	0.550	0.197	0.084	1	5639	0.570	0.209	0.102	1
	99/00	3655	0.559	0.192	0.089	1	5663	0.576	0.209	0.103	1
	00/01	3650	0.573	0.189	0.092	1	5693	0.586	0.206	0.108	1
	01/02	3643	0.580	0.189	0.141	1	5733	0.597	0.207	0.122	1
	02/03	3638	0.593	0.187	0.089	1	5759	0.605	0.207	0.115	1
AddShare	98/99	3514	0.0530	0.1401	0.0005	1	5057	0.0871	0.2047	0.0006	1
	99/00	3515	0.0468	0.1327	0.0006	1	5096	0.0826	0.2089	0.0007	1
	00/01	3487	0.0273	0.0861	0.0006	1	5040	0.0591	0.1740	0.0006	1
	01/02	3469	0.0429	0.1312	0.0005	1	5081	0.0751	0.2042	0.0005	1
	02/03	3521	0.0283	0.0719	0.0005	1	5139	0.0669	0.1859	0.0006	1
DropShare	98/99	3525	0.1128	0.2327	0.0006	1	5106	0.1326	0.2626	0.0005	1
	99/00	3545	0.1059	0.2234	0.0006	1	5124	0.1375	0.2650	0.0005	1
	00/01	3535	0.0972	0.2312	0.0006	1	5081	0.1014	0.2430	0.0006	1
	01/02	3560	0.1172	0.2426	0.0006	1	5222	0.1496	0.2796	0.0007	1
	02/03	3552	0.1213	0.2594	0.0005	1	5237	0.1535	0.2974	0.0007	1

All elective admissions

Table 5 has the estimates of the effects of fundholding on commissioning from the panel data models. The coefficients on the variables *Diff in diff 1998/99 - 2002/03* indicate the difference in difference estimates of the effect of the fundholding scheme in each of these years compared to the baseline year 1997/98. Table 6 reports the estimates of the difference between fundholder and non-fundholder practice commissioning over time holding all other factors in the regressions in Table 5 constant and Figure 2 plots these changes.

**Table 5: GP commissioning patterns: all elective admissions**

	NumProv99	MainShare	Herfindahl	ln(AddShare)	ln(DropShare)
1998/99	0.0165 [0.45]	0.0138 [7.98]**	0.0161 [8.24]**		
1999/00	0.0995 [2.39]*	0.0177 [8.13]**	0.0205 [8.40]**	-0.0521 [2.24]*	-0.1575 [4.75]**
2000/01	0.1526 [3.51]**	0.0250 [10.56]**	0.0279 [10.50]**	-0.3567 [13.94]**	-0.6259 [19.49]**
2001/02	0.1184 [2.62]**	0.0378 [14.30]**	0.0424 [14.26]**	-0.2327 [8.63]**	0.0447 [1.23]
2002/03	0.2061 [0.68]	0.0207 [1.86]	0.0222 [1.62]	0.1894 [1.85]	0.1455 [1.16]
Standard fundholder	0.5090 [7.56]**	-0.0125 [3.51]**	-0.0179 [4.62]**	-0.0576 [2.04]*	0.0749 [2.18]*
Diff in diff 1998/99	-0.2521 [4.30]**	0.0069 [2.66]**	0.0092 [3.16]**		
Diff in diff 1999/00	-0.2585 [4.00]**	0.0102 [3.22]**	0.0120 [3.39]**	0.0808 [2.34]*	-0.1392 [2.76]**
Diff in diff 2000/01	-0.2430 [3.61]**	0.0167 [4.77]**	0.0186 [4.74]**	0.0553 [1.45]	0.0476 [0.94]
Diff in diff 2001/02	-0.2813 [4.02]**	0.0113 [2.99]**	0.0137 [3.23]**	0.1324 [3.22]**	-0.0828 [1.53]
Diff in diff 2002/03	-0.2260 [3.17]**	0.0174 [4.90]**	0.0208 [5.27]**	0.1004 [2.93]**	-0.0090 [0.19]
praclist	0.2416 [26.09]**	-0.0016 [3.54]**	-0.0020 [4.16]**	-0.0580 [25.93]**	-0.0456 [23.24]**
listpergp	0.4361 [9.68]**	0.0013 [0.55]	-0.0006 [0.24]	-0.1667 [12.25]**	-0.1042 [8.46]**
gpcontracept	-0.2009 [2.82]**	0.0022 [0.49]	0.0070 [1.43]	-0.0117 [0.56]	0.0146 [0.72]
gpsingle	-0.7692 [13.54]**	-0.0014 [0.47]	0.0010 [0.31]	0.4079 [21.41]**	0.2763 [15.63]**
mmr2prac	-0.1112 [2.35]*	0.0041 [1.67]	0.0040 [1.47]	0.0510 [2.40]*	0.0576 [2.66]**
gpdeput	-0.2230 [2.90]**	0.0221 [4.27]**	0.0262 [4.65]**	-0.0981 [4.73]**	-0.1197 [6.15]**
dispensingprac	0.3514 [4.47]**	-0.036 [8.36]**	-0.0426 [8.98]**	0.1670 [9.10]**	0.1474 [8.45]**
distacute	-0.0343 [4.79]**	0.0051 [14.57]**	0.0069 [16.42]**	0.0012 [0.67]	-0.0016 [0.90]
distprivate	0.0485 [6.69]**	-0.0029 [8.82]**	-0.0044 [11.06]**	0.0109 [6.08]**	0.0062 [3.53]**
acutebeds	-4.3913 [16.88]**	0.0708 [4.84]**	0.1087 [6.67]**	-0.1569 [2.25]*	-0.3139 [4.23]**
privatebeds	0.3304 [0.17]	-0.2231 [1.92]	-0.2909 [2.35]*	-0.8190 [1.66]	-0.7945 [1.53]
residential	10.9272 [2.71]**	-0.1621 [0.69]	-0.0364 [0.14]	-1.4252 [1.36]	3.0467 [3.23]**
cmf0-74	0.0106 [3.98]**	0.0004 [2.56]*	0.0005 [2.52]*	-0.0015 [2.31]*	0.0012 [1.93]
lowbirthwght	-0.0564 [2.13]*	0.0096 [6.10]**	0.0112 [6.51]**	-0.0284 [4.43]**	-0.0139 [2.31]*
disability	0.0222 [0.58]	-0.0086 [3.82]**	-0.0120 [4.85]**	0.0105 [1.03]	-0.0534 [4.95]**
incapacity	-0.0024 [1.35]	0.0004 [3.22]**	0.0005 [3.64]**	-0.0020 [3.91]**	0.0014 [2.73]**
educdepriv	-0.5593	0.0278	0.0330	-0.0674	-0.0352

	[8.22]**	[7.09]**	[7.63]**	[3.87]**	[2.18]*
notuniv	-0.0167	-0.0004	-0.0007	-0.0050	-0.0082
	[2.30]*	[1.07]	[1.46]	[2.86]**	[5.13]**
jobseekers	-0.1890	0.0026	0.0041	-0.0126	-0.0289
	[7.52]**	[1.73]	[2.50]*	[1.97]*	[4.61]**
unemployment	5.9076	-0.7291	-0.8046	2.5471	0.5748
	[3.10]**	[6.36]**	[6.45]**	[5.26]**	[1.21]
Constant	8.3348	0.8801	0.6847	-6.0223	-11.2845
	[1.45]	[2.95]**	[2.04]*	[1.99]*	[3.29]**
Observations	44420	44472	44472	35325	35526
Number of practices	7606	7607	7607	7508	7502

z statistics in brackets. \* significant at 5%; \*\* significant at 1%. All regressions also include age and sex proportions of practice populations and higher level purchaser dummy variables

**Table 6: Practice commissioning patterns: difference between fundholders and non-fundholders, all elective HRGs**

	NumProv99	MainShare	Herfindahl	lnAddShare	lnDropShare
Difference in 1997/8	0.5090	-0.0125	-0.0179		
	[7.56]**	[-3.51]**	[-4.62]**		
Difference in 1998/9	0.2569	-0.0056	-0.0087	-0.0576	0.0749
	[4.06]**	[-1.65]	[-2.35]*	[-2.04]*	[2.18]*
Difference in 1999/0	0.2505	-0.0023	-0.0059	0.0232	-0.0643
	[4.04]**	[-0.69]	[-1.59]	[0.92]	[-1.95]
Difference in 2000/1	0.2660	0.0042	0.0007	-0.0023	0.1224
	[4.31]**	[1.27]	[0.19]	[-0.10]	[3.86]**
Difference in 2001/2	0.2277	-0.0012	-0.0042	0.0748	-0.0079
	[3.72]**	[-0.33]	[-1.09]	[2.85]**	[-0.23]
Difference in 2002/3	0.2830	0.0049	0.0029	0.0428	0.0658
	[4.41]**	[1.49]	[0.79]	[2.05]*	[2.14]*

z statistics in brackets. \* significant at 5%; \*\* significant at 1%. Fundholders minus non-fundholders. Derived from models in Table 5.

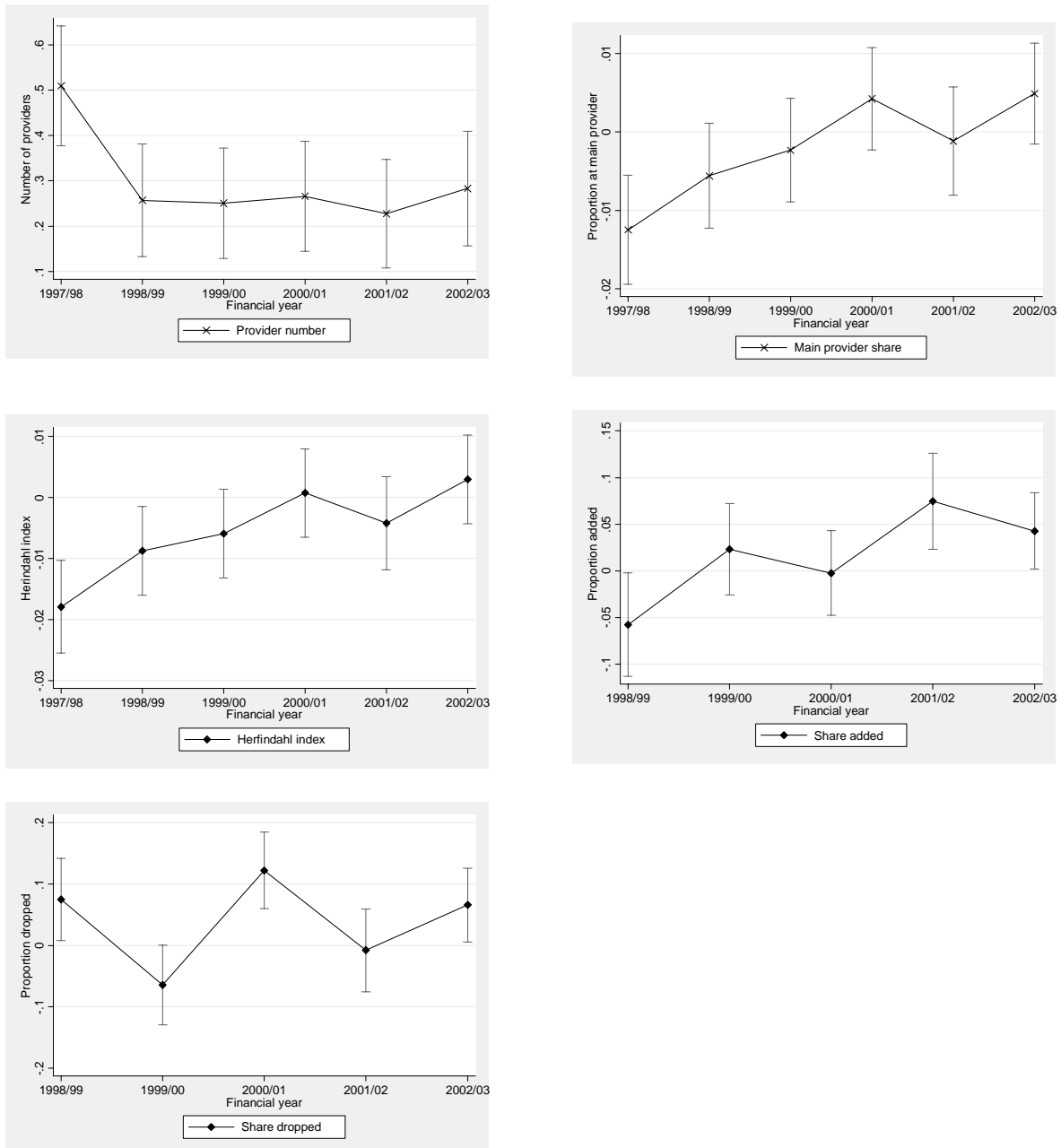
The year coefficients show the changes in the commissioning measures which are not due to changes in budgetary arrangements. We see that the underlying trend in number of providers was positive and that the number used increased over the period by 0.21 (compared to an average of 7.59 in 1997/98). By contrast the upward trends in the share at the main provider (2% over the period against a 1997/98 mean of 68.4% and the Herfindahl (0.02 over the period compared to an average of 0.54 in 1997/98) suggest increasing concentration over the period.

Consider first the number of providers used. The fundholder coefficient indicates that in 1997/98 fundholders used more providers than non-fundholders and the DID coefficients indicate that the difference was reduced in 1998/99 and subsequent years (see also Table 6, column 1 and Figure 2).

The ending of the fundholding regime had a significant effect on the proportion of fundholders' patients sent to a practice's main provider and their Herfindahl index. During the fundholding regime fundholders had a significantly smaller share of admissions to their main provider. Their Herfindahl was also smaller. After the abolition of fundholding these differences disappeared (see Table 6, columns 2 and 3, and Figure 2). There was no significant difference between fundholder and non-fundholder practices in the share of patients sent to their main provider and the practice Herfindahl index in the post fundholding period 1999/00 – 2002/03 (see Figure 2).

We also investigate the influence of fundholding and the effect of the abolition of fundholding on the extent to which practices added patients at new providers or dropped patients from existing providers. Between the last two financial years of fundholding (1997/98 – 1998/99), fundholding practices

dropped a significantly higher proportion of patients from existing providers and added significantly fewer patients relative to non-fundholders (see Figure 2). Following the abolition of fundholding, between the financial years 1998/99 and 1999/00, fundholder practices added significantly more patients to new providers and dropped significantly fewer patients from existing providers than non-fundholder practices. Over the remaining years in which primary care organisations were in place, we do not find any significant difference between fundholder and non-fundholder practices in terms of the proportion of patients dropped year to year from existing providers. There is evidence, however, that a significantly higher proportion of fundholder admissions were admitted to new providers in the post-fundholding years (see Figure 2).



**Figure 2: Comparison of commissioning patterns between fundholder and non-fundholder practices**

The regression results suggest that fundholders were more active purchasers than non-fundholders but that this effect dissipated in the years following the abolition of the system.

The other variables in the regression model were included primarily to give greater precision to the estimate of the effect of fundholding but some are of interest in their own right. Larger practices with more patients per GP use more providers, though, less intuitively, they have more concentrated admissions. Dispensing practices were more likely to have patients admitted to more hospitals, their admissions were less concentrated with a smaller proportion of their patients admitted to a main provider and they had smaller Herfindahl indices. Practices with a greater proportion of deputising GPs use fewer hospitals and have more concentrated admissions. Single-handed GPs, GPs providing contraceptive clinics and those who undertake MMR2 vaccination used significantly fewer hospitals. Practice characteristics associated with a higher proportion of admissions switched to new providers or dropped from existing providers include single-handed GPs, dispensing practices and MMR2 practices. Larger practices were less likely to admit patients to new providers, but were more likely to drop patients from an existing provider. Practices with more patients per GP and with a higher proportion of deputising GPs were significantly less likely to add new providers or to drop existing ones.

Measures of access to secondary treatment had generally plausible effects on commissioning patterns. Practices with a greater distance to their five nearest providers, and with a greater number of beds at their five nearest providers use fewer providers and have more concentrated admissions. GP practices with a greater distance to their five nearest private hospitals use more NHS providers and have less concentrated admissions. The greater the number of private beds at the five closest private providers, the less concentrated are the practice's admissions. There is evidence that practices with more beds at their closest five providers were likely to have a smaller share of patients added or dropped from providers, but practices with greater distance to private providers were more likely to send patients to new providers or to drop existing providers.

Some of the associations between the socio-economic characteristics of the practice population and commissioning variables are also plausible. For example, the negative association of the number of providers used and the two measures of educational deprivation may suggest that the less educated groups are less vocal and less involved in making decisions about the location of treatment and GPs therefore are more conservative in their purchasing behaviour. Other associations are less easy to rationalise. Practices with higher comparative mortality factors, lower birthweights, and higher disability scores had higher Herfindahls which might suggest that practices with less healthy patients are less willing to shop around. But practices with higher disability scores had lower Herfindahls. The opposite effects of the unemployment rate and the proportion of the population with a jobseekers allowance may be due to jobseekers being counted as unemployed and picking up characteristics other than employment status.

## **Discussion and conclusions**

Use of providers for elective care is highly concentrated and has become more concentrated over time. In 1997/98 the average HA Herfindahl for elective admissions was 0.35 and in 2002/03 the average Herfindahl for PCTs was 0.55. Similarly the average share of admissions at the main provider for HAs in 1997/98 was 49.4% and in 2002/03 the average share at the main provider for PCTs was 69.4%. These are major changes and arise from the reduced size of these higher level commissioning units as 100 HAs were converted into 302 PCTs, the reduced number of providers due to mergers, and to changes in budgetary arrangements after the abolition of fundholding in 1999/00.

There have been suggestions that PCTs are too small to be effective commissioners and that one way to give them more leverage over providers is to merge them into larger units. This would reduce the concentration of admissions. If the 302 PCTs in 2002/03 had been merged back into the 100 HAs in existence in 1997/98, the 2002/03 Herfindahl would have been reduced to 0.43. Similarly the share at the main provider would have been reduced from 69.4% to 57.4%. Thus even this drastic reorganisation would not reduce concentration to the high levels obtaining in 1997/98. Only around half of the increase in actual concentration between 1997/98 and 2002/03 was due to the replacement of the 100 HAs operating in 1997/98 by the 302 PCTs in existence in 2002/03.

Our analysis of practice level commissioning patterns suggests that fundholders were more active purchasers: they had smaller Herfindahls and had a smaller share of admissions at their main provider. This suggests that the reintroduction of fundholding under the label of practice led

commissioning will lead to a small but non-trivial reduction in concentration for the practices which opt to hold a budget. The overall effect will depend on the proportion of practices which opt to hold a budget.

Our analysis is subject to some caveats. Measures of concentration are of interest because the simple industrial organisation theory of private markets suggests that concentrated markets yield lower welfare than competitive markets. The notion is plausible, though not uncontested even in private markets. But its relevance to public health care sector markets with predominantly non-profit orientated providers, regulated prices, and zero prices for patients is less obvious. The quality and effectiveness of the commissioning role cannot be assessed solely in terms of observed purchasing patterns. Although we might expect purchasers that are actively seeking out better value services and more appropriate care for their patients to use a wider range of providers or to switch between providers, this is not necessarily the case. Instead, purchasers may have been successful using “contestable collaboration” to strike better deals with their existing local providers rather than shifting their business elsewhere [38]. There may be good reasons for developing long-term relationships with local providers, especially if purchasers are using their professional experience to assess the expertise of clinical services as they will always be more informed about those that are local to them. Relative stability may also reflect patient preferences if there is a general reluctance to travel to more distant providers and our results indeed suggest that practices further away from their 5 nearest acute providers use fewer providers than other practices and send a higher proportion of patients to their main provider. Whilst we might expect to see some shifts in future as the supply-side of the market alters and purchasers take advantage of new entrants to the healthcare market (e.g. treatment centres), it is also possible that new primary-care based services will be developed to provide effective substitutes for some types of secondary care. This suggests that the purchasing patterns we observe in secondary care may fail to capture the full impact of practice-led commissioning.

Whether or not anything substantial will change in secondary care as a result of the latest round of policy shifts related to expansion of choice and practice-led commissioning, remains to be seen. A recent review of the evidence of the impact of primary care-led commissioning concluded that there was little evidence to suggest it had made a significant impact on secondary care services [39]. However, evidence from the UK and elsewhere suggests that a whole range of factors will influence the success of alternative commissioning arrangements, including the degree to which there is control over the budgets, timely and accurate information, adequate management support and clinical ownership [39].

Our analysis suggests that the major changes in the structure and organisation of the health service since 1997/98 have led to an increase in the already high level of commissioning for elective care. Our results will provide a baseline for evaluating the impact of new policies aimed specifically at changing the status quo.

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