OCCASIONAL PAPER 3

Financing Family Health Service Authorities

The allocation of their administrative resources

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Contents

Executive summary

- When FPCs assumed independence in 1985, there was a widespread belief that their inheritance of resources was unequal.
- The DHSS addressed this issue by introducing a staff equalisation formula, but this was widely criticised.
- The Society of FPCs — now the National Association of Health Authorities and Trusts (NAHAT) — requested the King's Fund Institute to investigate the possibility of producing a more acceptable formula.
- We have analysed variations in FPC expenditure data for 1987/88 and 1988/89 with the aim of identifying plausible factors which explain them.
- Our results identify four sets of arguments to account for variations in spending patterns: density/deprivation; population mobility; economies of scale; and, a London factor.
- Using the results from our statistical analysis we have illustrated the allocations which each FPC/FHSA and region would receive based on our proposed formula.
- On the basis of our analysis we illustrate the variations in existing allocations at a regional level. In relative terms, eight regions are currently over-resourced and six under-resourced. North Western is currently the most over-resourced by nine per cent and Wessex the most under-resourced by seven per cent.
- One of the most striking results to emerge from these analyses is the contrast between well-endowed and under-resourced authorities with similar characteristics. For example, in 1988/89, we estimate that one high spending authority received in excess of 50 per cent more than it should have done in relation to a low spending counterpart.

1 Background

1.1 In 1985 the government amended the NHS Act of 1977 to establish Family Practitioner Committees (FPCs) as autonomous authorities, removing their previous dependence on DHAs for staff and administrative costs and funding them in their own right directly from the Department of Health. The new legislation not only changed their status but also extended their functions. The newly independent FPCs became responsible for planning and developing primary care, assessing needs and identifying priorities in their area. Yet the relative size of budgets were not reassessed at the same time to enable FPCs to fulfill their new role; finance continued to be allocated to them on an historical basis. Immediately prior to April 1985 FPCs negotiated with their lead DHA an amount for their administrative costs. Expenditure on premises and rates was dealt with separately, although in many cases this was based on notional costs.

1.2 Within the FPC community, there was a substantial measure of agreement that there were large inequalities in the pre-1985 allocation of resources to FPCs and hence the Department of Health devised a formula to redistribute resources in England on a more equal basis. The formula was based on an assessment of variations in staffing levels (since staff accounted for 70-80 per cent of FPC expenditure) between them. FPCs which varied from the allocation formula in terms of their staff complement had their allocation adjusted in 1987/88 by £5000 (subsequently £5500) for each member of staff.

1.3 The formula deployed explained over 90 per cent of variations in staffing levels in 1985 and was as follows:

Staff Complement = 5.24 + 1.85 (registration transactions) + 1.35 (GMS Expenditure) + 3.6 (No. of DHAs)

If the FPC had computerised its activities the coefficient for registration transactions was reduced by 25 per cent to 1.38. In the financial year 1988/89 all budgets had to reflect the post-computerisation allocation formula.

1.4 This resource allocation process was criticised by the FPC community for a number of reasons. Three examples follow. Some felt that the formula made no attempt to assess the appropriate level of staffing or take account of the changing role of FPCs. Others, that the indicators used were inappropriate, without any particular rationale or *a priori* reasoning. Fi-

nally, there was a general belief that the £5000 adjustment to budgets for each member of staff gained or lost was far too arbitrary.

1.5 In any event, the Department only adjusted budgets by 60 per cent of the theoretical equalisation. In addition, it invited FPCs to debate the formula. In a letter to FPC chairs in July 1987 which laid out the formula, the Department stated that it would

> "... be receptive to suggestions for modifying the formula next year."

1.6 In response to this invitation the Society of FPCs set up a joint working party with the Society of FPC Administrators to put forward suggestions for a resource distribution formula to be effective from 1989/90. Working with the Department an attempt was made to find a more acceptable formula but this did not prove possible in the time then available.

1.7 In the summer of 1989 the Society of FPCs approached the King's Fund Institute to ask whether it would carry out the necessary analysis to make recommendations on a more appropriate formula for distributing resources between FPCs. An interim report (King's Fund Institute Discussion Paper 1) was presented to the Society in November 1989. The analysis, at that stage, suggested that four arguments accounted for 90 per cent of the variation in FPC expenditure in the financial year 1987/88:

- density/deprivation;
- complexity of negotiations;
- economies of scale;
- London factor.

The Institute recommended that further work should be carried out to explore these factors in more detail and to test the robustness of the allocation formula. In particular, it was thought to be essential to investigate (a) variations in expenditure data for more than one year and (b) more census based indicators of area characteristics.

1.8 Legislative changes in the late 1980s have had profound implications for all parts of the NHS. The most immediate consequences for the local management of family practitioner services relevant to this study are set out below:

- From 17 September 1990, Family Practitioner Committees (FPCs) became Family Health Services Authorities (FHSAs).
- Resource allocation to individual FHSAs will become a regional health authority responsibility from 1 April 1991, although the Department of

Health will remain responsible for distributing the national budget to English regions.

- Since 1989, FPCs have received substantial real increases in their budgets to reflect the wide range of responsibilities which they have assumed.

For our purposes, the change of name is irrelevant. The new role of regions can be easily accommodated, but, because detailed expenditure data is not yet available, our empirical analyses have not taken any account of the post-1989 increases in resource levels.

1.9 This report develops the analysis outlined in the interim report and makes recommendations about the allocation of resources to both individual FHSAs and regional health authorities.

1.10 From September 1990, Family Practitioner Committees (FPCs) weere renamed as Family Health Service Authorities (FHSAs). In the remainder of this report we refer to them for convenience as FHSAs even when we are reporting some aspect of their pre-1990 existence or activity.

2 Aim of the study

2.1 The principal objective of our investigation is to produce specific recommendations about the distribution of administrative resources to FHSAs. It is important to be clear at the outset, however, that there are a number of different approaches to resource allocation. These include:

- attempts at a detailed relative estimation of workload and responsibilities;
- administrative and political bargaining;
- crude adjustment for single factors such as population;
- statistical examinations of plausible, underlying patterns within historically determined allocations.

No doubt others would choose to list more and possibly different approaches and perhaps to describe them in different ways. The point to make is that there is no unambiguously right way to allocate resources to FHSAs. What can and should be attempted is to distribute finance on the basis of reasonable and explicit criteria which take account of identifiable pressures facing individual authorities. We believe that this can best be done in relation to FHSAs by producing a formula which is underpinned by convincing statistical evidence and then being prepared to make individual adjustments where a justifiable case for doing so can be made.

2.2 Against this background, we believe that the historically determined pattern of FHSA expenditure has been adjusted in a rough and ready way to reflect differential workloads for many, although certainly not all, authorities. The starting point for our study, therefore, is an assumption that the identification of intuitively plausible factors which affect variations in expenditure between FHSAs can lead to a rational and practical method for resource allocation.

2.3 We began our study, therefore, with two basic aims:

1) To examine actual variations in FHSA expenditure and relate those to characteristics of FHSAs and their areas where there is an intuitively appealing reason for believing that they could explain patterns of spending.

2) To recommend a formula for allocating resources between FHSAs and illustrate the results.

3 Expenditure data used

3.1 Expenditure data was obtained for the financial years 1987/88 and 1988/89 from the Department of Health. One immediate practical issue was that there are a number of different definitions of FHSA expenditure which could legitimately be used to examine variations. Expenditure can be defined as either net or gross, by total, staff or non-staff expenditure and can include or exclude 'housekeeping costs'.

3.2 We decided to exclude housekeeping costs following a procedure suggested by the Society of FPCs. At present these are allocated separately to FHSAs because they are effectively beyond FHSA control and vary significantly between FHSAs on a historical basis. For example, some FHSAs inherited the publicly owned assets which they occupy, others in district health authority accommodation have until recently only had to pay notional costs, whilst others have to pay substantial rents for leasehold property. We have also excluded maintenance and repair costs relating to premises for similar reasons. One point for the Department of Health and regional directors of finance to note is that some consideration ought to be given to the costs and benefits of the differential access to and use of property by FHSAs.

3.3 For the present exercise, we decided that the most appropriate definition to use as a basis for a distribution formula is total net expenditure excluding 'housekeeping costs'. This has been standardised by OPCS population, so that all expenditure data is expressed as £ per thousand population.

4 | Framework for analysis

4.1 The principal objective of this analysis is to explain variations in expenditure between FHSAs. The model that we have employed to do this is set out in Figure 1. Our analysis examines a variety of variables which describe each of the three groups of factors which impact on FHSA expenditure — workload, area characteristics and special circumstances — and these are discussed in more detail below.

4.2 Workload variables were obtained from FHSA performance indicator (PI) data for the two financial years analysed. We found it convenient to categorise them into nine groups as set out below. (For a full description of the PIs within the sub groups see Appendix 1.)

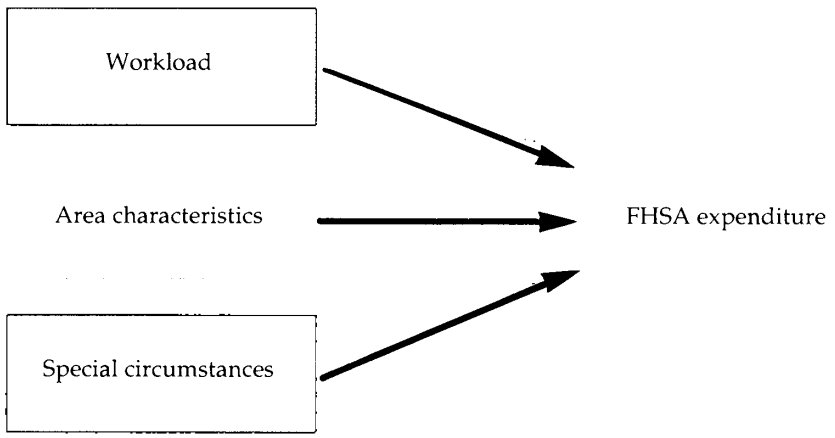
- Number of Contractors
- Number of Support Staff
- Turnover of Contractors
- Non-GMP Contractor Workload
- Allocations and Complaints
- Other FHSA Workload
- GMP Workload — Fees and Claims
- GMP Characteristics
- Miscellaneous

4.3 Variables covering area characteristics were obtained from two sources. First, the set of performance indicators provided basic information on the estimated OPCS population for the two years and two proxies for health need; standardised mortality rates for under 65s and perinatal mortality. In addition, we calculated population density. Second, the small area statistics from the 1981 census were aggregated to FHSA area and used to calculate a variety of variables, as shown in Appendix 2. These cover population characteristics — such as age, ethnicity, economic status, housing tenure, car ownership and housing amenities. In addition we calculated both Jarman's under privileged area score and Townsend's material deprivation index.

4.4 Finally, it was important to take account of any special circumstances relating to FHSA expenditure in the two relevant years. This included taking account of FHSAs which were computerised or moved or extended their existing premises, any of which could be expected to have one-off revenue expenditure consequences, such as the purchase of new office equipment, or time delay in reducing the staff complement after computerisation. In the event, these factors proved not to be statistically significant.

4.5 The aim of our statistical modelling was to find the most robust model across both financial years. We built on the results presented in our interim report, and analysed both years simultaneously with the same independent variables. Variables were only retained in the equations if they were statistically significant in both years and satisfied *a priori* expectations of an intuitively plausible kind. Thus our final results show two equations containing the same variables, although they have slightly different coefficients for the two years we analysed.

Figure 1 Factors affecting variations in FHSA expenditure



5 Explaining the models

5.1 The final set of variables which best explains the variations in spending for both financial years — using a priori reasoning, parsimony and statistical significance as the principal criteria — are set out in Table 1. At the margin a number of different census variables could be included in the model. However, whilst individually they were statistically significant, they added very little to the overall explanatory power of the model and have only a tiny impact on the coefficients. We therefore excluded these variables in the interests of both intuitive reasoning and parsimony.

Table 1 Variations in FHSA expenditure, England

	Regression equations	
Variables	1987/88	1988/89
Constant	1266.44	1426.24
Population	-0.001	-0.00134
	(-7.96)	(-9.47)
Population^2	0.000000000521	0.000000000605
	(5.99)	(6.87)
Population mobility	9.91	10.90
	(3.05)	(3.86)
Density	-0.07	-0.08
	(-3.85)	(-4.15)
Density^2	0.0000189	0.0000171
	(9.09)	(7.59)
London	288.3	292.3
	(6.06)	(6.18)
Adjusted R^2	**0.901**	**0.892**

Note: t-statistics are shown in brackets

5.2 There appear to be four sets of arguments which can be used to account for 90 per cent of the variations in FHSA expenditure:

- density/deprivation;
- population mobility;
- economies of scale;
- a London factor.

5.3 A number of points are worth noting immediately. First, the model is very similar to that outlined in our interim report. The principal difference is that population mobility — the difference between registered and OPCS population — has replaced the number of DHAs relating to individual FHSAs as an explanatory variable. The second is that population density is retained as the best proxy for a variety of area characteristics such as deprivation despite investigating a large number of combinations of 1981 census variables including the well known Jarman and Townsend indices.

5.4 The extent to which population density is closely associated with common area-level characteristics of deprivation can be illustrated by using multiple regression analysis to explore observed variations in density. Table 2 shows the results of using 1981 census indicators to account for population density in 1988/89. Four measures of the proportion of the population who are ethnic minorities, unemployed, single parents or living in overcrowded accommodation can be seen to account for more than 80 per cent of the variations between FHSA areas.

Table 2 Accounting for variations in FHSA population density, 1988/89

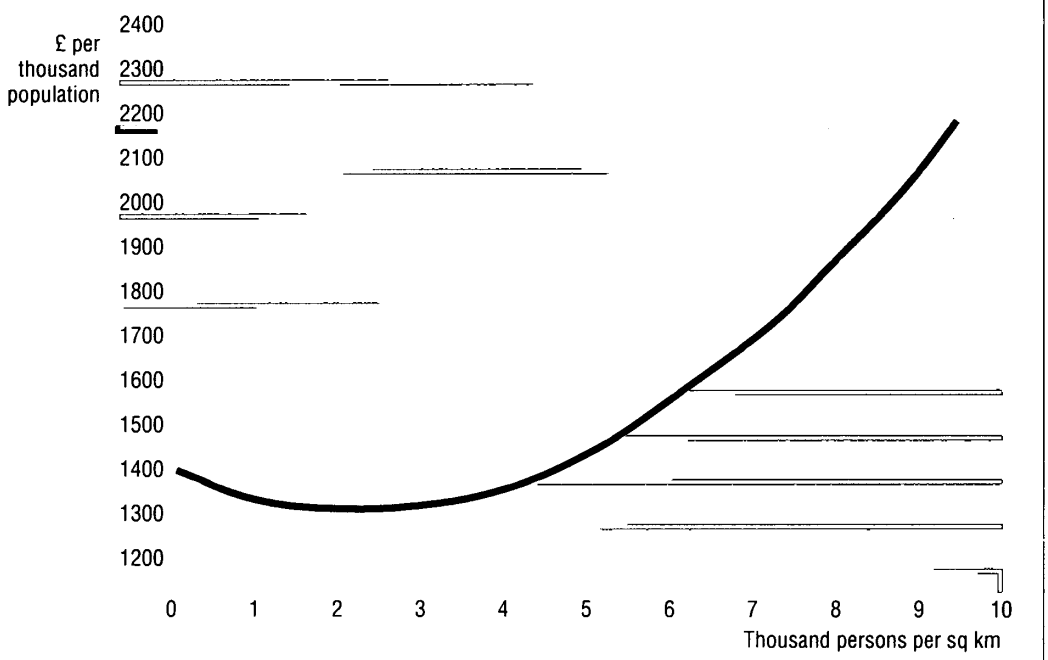
Variables	Coefficients	t-statistics
Constant	-2,294.5	
Ethnic minority*	119.83	5.878
Unemployment*	68.36	2.094
One Parent Families*	587.90	1.917
Houses with 1 – 3 rooms*	164.22	7.562
Adjusted R^2	**0.82**	

* For full explanation of variables see definitions in Appendix 2

5.5 The relationship between population density and FHSA expenditure is non-linear and is illustrated in Figure 2 for the year 1988/89. This shows a J-shaped curve with a turning point at approximately 2,300 people per square kilometre. Two arguments can be used to account for the differences in the relationship either side of the turning point.

The most significant impact of population density for the majority of authorities exemplifies the extent to which deprivation increases the need for expenditure. In particular, the gradient of the line for FHSAs with a population density greater than 4,000 people per square kilometre is very steep and reflects the extra resources required to meet their obligations in deprived inner city areas. In addition, however, the relationship illustrated in Figure 2 provides support for the view that the most sparsely populated areas also face some additional pressures on expenditure related to such factors as excessive travel costs and rural dispensing.

Figure 2 Density adjusted base *£ per thousand population, 1988/89*

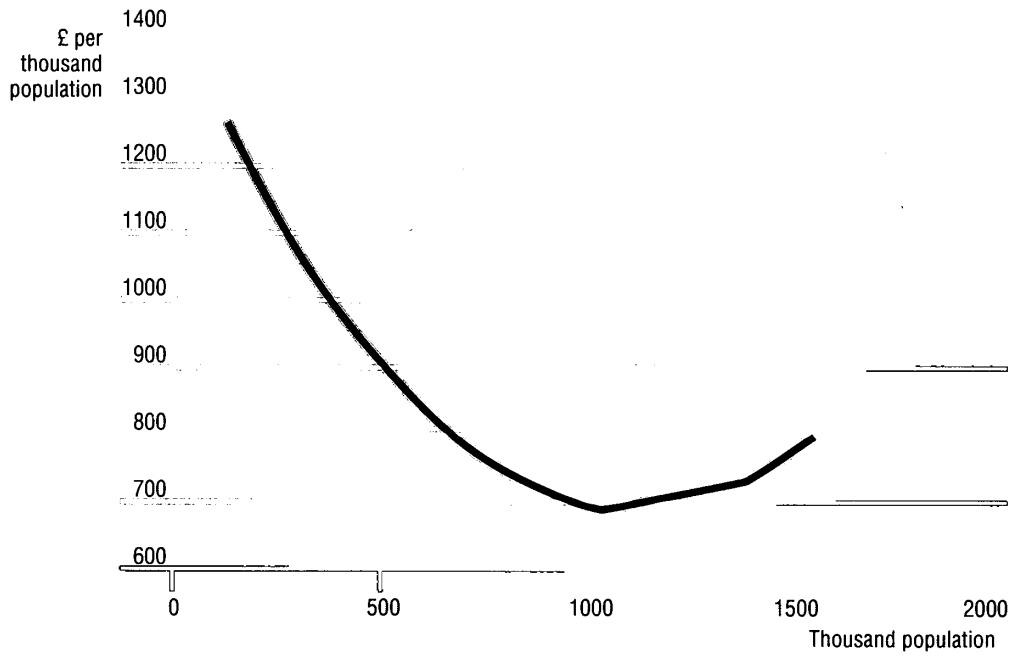


5.6 Population mobility, which is defined as the difference between the FHSA-registered and OPCS estimates of population, is positively related to administrative expenditure. This seems plausible. A highly mobile population with large numbers of people moving on and off GPs' lists could be expected to increase the demands on FHSAs.

5.7 The economic theory of the firm suggests that an organisation's average costs will vary with its output. As the size of the organisation increases its average costs will fall until it reaches its optimal size. This is known as economies of scale and occurs for a variety of reasons such as: more optimal use of factors of production; the ability of staff to specialise; and, an increase in the firm's purchasing power in the market place. Beyond the optimal size for a specific organisation, any increase in output will result in higher average costs, i.e. the firm will experience diseconomies of scale. The non-linear relationship between the size of FHSAs and their expenditure reflects this theory and is illustrated in Figure 3. The resources needed by FHSAs per thousand population decrease as the population increases to its optimal size of 1.1m. Beyond this point FHSAs begin to experience diseconomies of scale and need additional resources as their population rises.

5.8 Table 1 shows that a positive relationship exists between FHSA's location in London and its expenditure. This would be expected because of the higher costs of staff and other factors of production in London.

Figure 3 Scale adjusted base *£ per thousand population, 1988/89*



5.9 Any regression equation, no matter how much of the variation in expenditure it explains, will throw up anomalies which can only be explained by a knowledge of the FHSAs concerned. In these cases special circumstances or characteristics may mean that there are strong reasons to justify minor adjustments to the base data to prevent them biasing the results and to take account of their special characteristics.

5.10 This was true for Surrey which was classified as a small county but because of the its close proximity to London, particularly as its offices are in Surbiton, is likely to have to offer London remuneration to its staff and face higher costs in relation to other factors of production. We therefore recoded it as a London FHSA.

6 Applying the results

6.1 The practical consequences of using the results from Table 1 as a basis for allocating resources to FHSAs are illustrated in Table 3. We have used the coefficients for the 1988/89 equation and the relevant basic data is shown in Table 4. A small number of FHSAs have been selected to illustrate the way in which the proposed allocations are estimated from the different components of the regression equations. The first column shows the basic allocation per thousand population adjusted for the density of the population. The next three columns show the impact on individual authorities of adjusting for scale, population mobility and location in London. On the right hand side of the table, the total allocation per thousand population is translated into a total sum proposed for the authority and then compared with actual levels of expenditure.

6.2 The non-linear relationship between FHSA expenditure and population density can be clearly seen with the data for the illustrative FHSAs. As Tables 3 and 4 show, Norfolk is the most sparsely populated area and received a density adjusted base allocation of £1415.7 per thousand population. Bury, which has a higher population density but is still below the turning point described in para. 5.5, received a lower allocation of £1340.5 per thousand population. Beyond the turning point, as the problems of urban areas begin to impact on FHSAs' expenditure, the estimated allocation rises. For example, Liverpool which has a population density of 4156 persons per sq km and requires £1394 per thousand population can be contrasted with Kensington, Chelsea and Westminster which with a density of 8686 persons per sq km requires £2030 per thousand population.

6.3 The impact of population mobility on FHSAs' expenditure can be seen to increase linearly. Table 4 shows that Norfolk has the lowest population mobility of the illustrative FHSAs and Kensington, Chelsea and Westminster the highest. This is reflected in their allocation per thousand population for population mobility with Norfolk receiving £3.50 and Kensington, Chelsea and Westminster £511.80.

6.4 As outlined in para. 5.7, the scale factor has a non-linear relationship with FHSA expenditure. Thus FHSAs with small populations such as South Tyneside have their allocation reduced by £194 per thousand population whilst larger FHSAs such as Lambeth, Lewisham and Southwark have their allocation reduced by £632 because of the economies of scale they can

Table 3 Predicted allocations to illustrative FHSAs

£ per thousand population

FHSA	Density adjusted base	Population mobility	Scale	London	Total	Predicted allocation	Actual expenditure	Actual as % of predicted
						£	£	%
Bury	1,340.5	63.2	-215.5	0	1,188.3	207,920.4	255,164.0	122.7
Hampshire	1,397.0	45.1	-622.7	0	819.4	1,264,313.0	1,040,986.0	82.3
Kensington Chelsea & Westminster	2,029.7	511.8	-342.1	292.3	2,491.7	735,825.3	756,781.0	102.9
Lambeth Lewisham & Southwark	1,801.3	339.0	-632.3	292.3	1,800.3	1,233,905.0	1,276,403.0	103.4
Liverpool	1,393.9	109.7	-494.6	0	1,009.1	473,898.2	463,556.0	97.8
Norfolk	1,415.7	3.5	-660.1	0	759.1	565,015.9	606,077.0	107.3
South Tyneside	1,335.8	33.6	-193.6	0	1,175.8	183,107.1	182,361.0	99.6

exploit. Hampshire which is beyond the turning point of 1.1 million people experiences diseconomies of scale and thus has its expenditure per thousand population reduced by less than some smaller authorities.

6.5 The London FHSAs receive £292 per thousand population for the additional costs associated with London. Our analysis suggests there is no statistical justification for distinguishing between inner and outer London. The additional costs that might be expected to be found in inner London are adjusted by the inclusion of population density.

6.6 The final column of Table 3 shows whether the FHSAs — using our estimation criteria — are relatively over or under-resourced at present. For example, numbers less than 100 imply underfunding. Thus, Hampshire is currently under-resourced by 17 per cent whilst Bury is over-resourced by 23 per cent.

6.7 An illustration of the extent to which our proposed approach can impact on seemingly similar authorities is shown in Box 1.

6.8 One final point worth making about the regression results is that a number of the outliers — those authorities which our model predicts least well — are at the very top and bottom of the population size distribution for FHSAs. This may imply that special caution should be taken in determining final allocations to FHSAs serving the smallest and largest communities.

Table 4 Base data for illustrative FHSAs 1988/89

FHSA	OPCS Population	Persons per sq km	Population Mobility*
Bury	174,979	1,767.5	5.80
Hampshire	1,542,947	408.5	4.14
Kensington Chelsea & Westminster	295,313	8,685.7	46.95
Lambeth Lewisham & Southwark	685,383	7,531.7	31.10
Liverpool	469,642	4,156.1	10.06
Norfolk	744,332	138.7	0.32
South Tyneside	155,726	2,433.2	3.08

* Registered population minus OPCS population as a percentage of OPCS population.

1

Comparison of high and low spending FHSAs

The statistical data set out below illustrate the differences in actual spending levels and proposed allocations for 1988/89 for two FHSAs which had very similar basic characteristics. The scale and inflation factors in total are the same for both FHSAs, but the low spender benefits to some extent from being a more densely populated area.

	High spender	Low spender
Basic characteristics		
Population	235,000	249,000
Density	2.4	3.6
Population mobility	2.8	4.1
Proposed allocation per 1000 population		
Scale adjusted base	£ 1,144.5	£ 1,130.4
Inflation	£ 30.5	£ 44.9
Sub total	£ 1,175.0	£ 1,175.3
Density	£ -90.4	£ -61.5
Total	£ 1,084.6	£ 1,113.8
These estimates can be translated into a proposed cash allocation of	£ 255,586.0	£ 277,800.0
Compared with actual expenditure of	£ 306,824.0	£ 218,318.0
Therefore, the level under/over-resourced	+20%	-21%

In summary, the well resourced FHSA spent 40 per cent more than the less well-endowed FHSA when it should have received 8 per cent less. The high spending FHSA actually received in excess of 50 per cent more than it should relative to its needs compared with the low spending FHSA.

7 New allocations

7.1 The proposed allocation for each FHSA which would have applied in 1988/89 has been estimated in the following way. For both 1987/88 and 1988/89 predicted levels of expenditure were estimated using the results shown in Table 1. These were expressed as a percentage of actual expenditure in each year. The mean of the two percentages is then multiplied by actual expenditure in 1988/89 to produce a proposed allocation.

7.2 The 1988/89 allocations per thousand population for each FHSA are listed in Appendix 3, and can be compared with the mean percentage difference between predicted and actual expenditure for the two financial years which we examined.

7.3 In Table 5 we have set out the implications of our analysis for regional health authorities. The table shows the total allocation they would have

Table 5 Regional allocations to FHSAs, 1988/89

Regional Health Authority	Actual Expenditure	Proposed Allocation	Actual as a % of proposed
	£	£	%
Northern	2,915,615.7	3,016,804.0	96.6
Yorkshire	3,124,911.1	3,122,246.4	100.1
Trent	3,978,946.0	3,764,228.0	105.7
East Anglia	1,628,607.0	1,603,911.2	101.5
North West Thames	4,481,183.0	4,338,517.2	103.3
North East Thames	4,592,189.0	4,870,794.1	94.3
South East Thames	3,953,702.0	4,056,852.0	97.5
South West Thames	3,311,882.7	3,258,843.8	101.6
Wessex	2,353,053.0	2,530,135.3	93.0
Oxford	2,195,418.0	2,157,886.9	101.7
South Western	2,832,394.0	2,886,833.8	98.1
West Midlands	4,347,412.0	4,601,262.1	94.5
Mersey	2,148,537.0	2,120,472.4	101.3
North Western	4,129,140.8	3,774,336.2	109.4

Note: The allocation for Avon is attributed to South Western Region only.

received in 1988/89 to distribute to FHSAs, and the new allocations derived from our work. The final column shows whether they would have been over or under-resourced. This is illustrated in Figure 4, which shows North Western Region is the most over-resourced whilst Wessex is the most under-resourced.

7.4 Intra regional distributions are shown in Figures 5 and 6. Figure 5 shows FHSAs in North Western Region, where all but one, Wigan (592), are currently estimated to be over-resourced. The opposite picture is illustrated by West Midlands Region shown in Figure 6 where only Warwickshire and Birmingham are over-resourced.

Figure 4 Regional allocations *Percentage difference between actual and predicted, 1988/89*

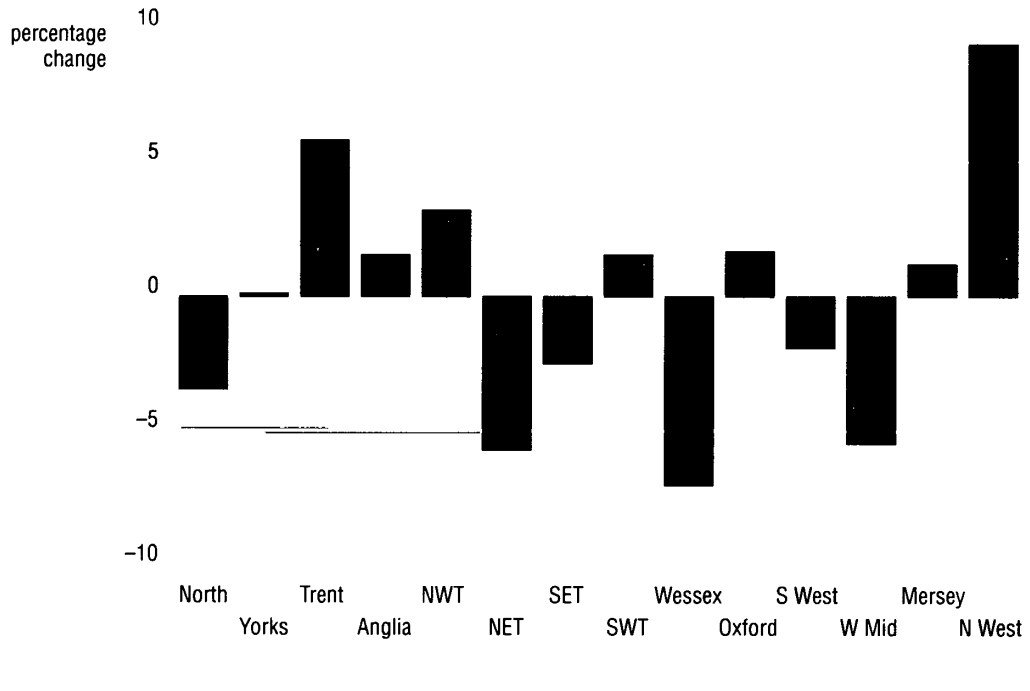


Figure 5 FHSA allocations, North Western

Percentage difference between actual and predicted, 1988/89

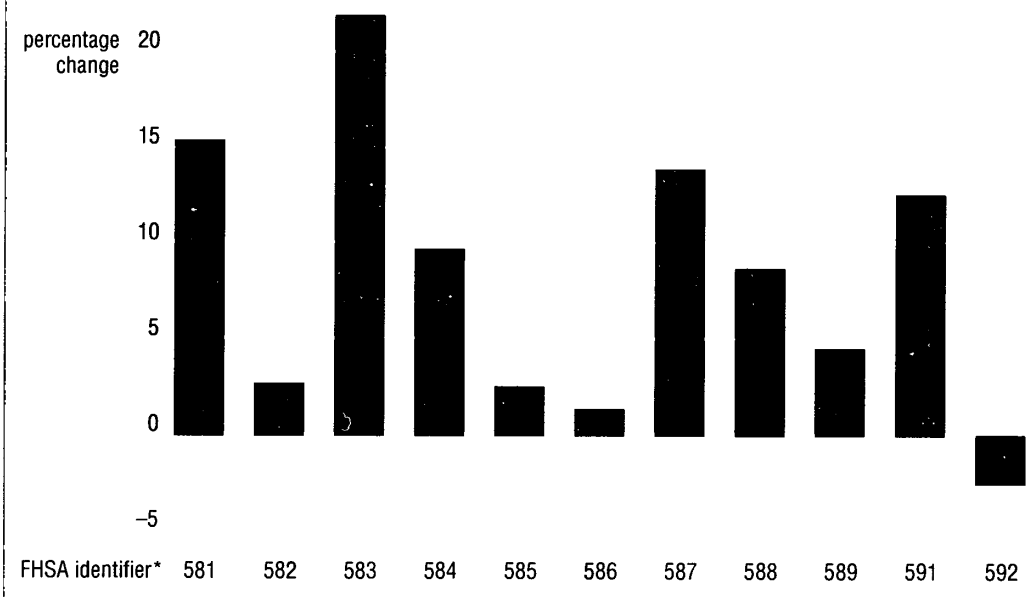
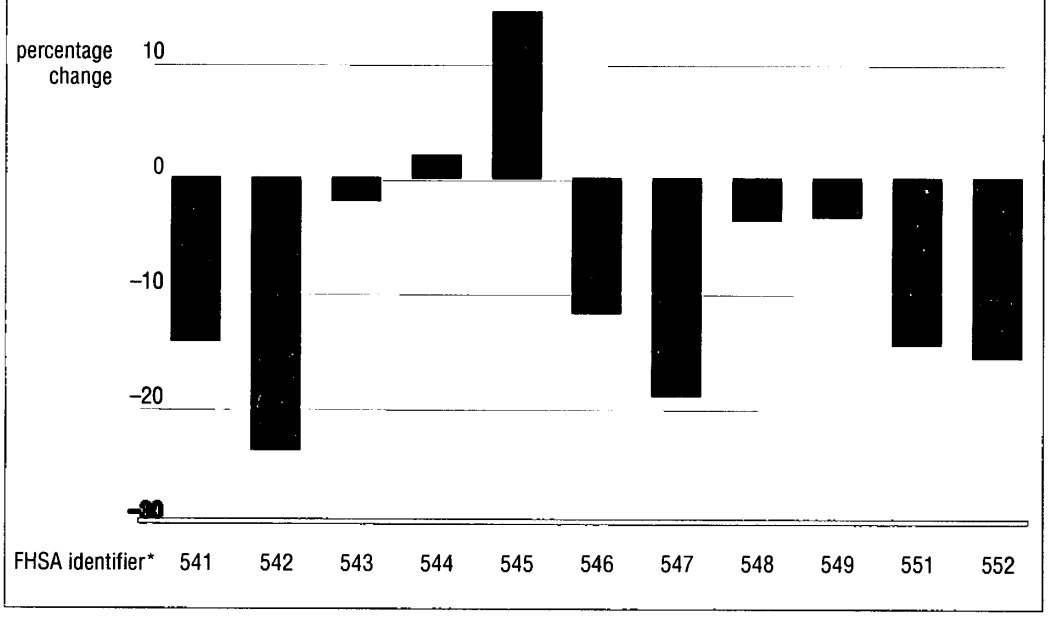


Figure 6 FHSA allocations, West Midlands

Percentage difference between actual and predicted, 1988/89



*See Appendix 3 for FHSA names

8 Conclusion

8.1 The purpose of the analysis reported in this paper has been to identify a relatively simple method of allocating administrative resources to FHSAs. As we explained in para. 2.1, there are numerous bases on which allocations could be made and none of them are necessarily superior to others. We were encouraged to believe, however, that a successful attempt to identify meaningful underlying factors within existing patterns of spending would be regarded at the very least as a sensible starting point for discussions about future allocations.

8.2 What we have done, therefore, having examined a large number of possible factors, is to identify a four variable model which accounts for 90 per cent of the observed variation in FHSA spending levels in 1987/88 and 1988/89. The results of our model have then been used to estimate proposed allocations for FHSAs.

8.3 We are confident that our estimates represent a reasonable allocation for most authorities. However, they should not be accepted uncritically or without any prospect of modification to take account of more qualitative information available at the regional or local level. For example, a good case might be made for adjusting the allocations to take account of the special circumstances of the very smallest and largest FHSAs. Indeed the Department of Health in its 1989/90 and 1990/91 allocations has recognised that certain core costs were likely to apply even to the smallest FHSAs.

8.4 Similarly, it may be that some regions might be interested in exploring the detailed difference that inclusion of additional explanatory factors make at the margin to our proposed allocations. Given the opportunity, we remain keen to explore these and other possibilities with interested parties.

8.5 One area of particular interest for future work when data for the early 1990s becomes available will be a re-examination of the significance of population mobility for resource allocation purposes. The emphasis in present primary health care policy on incentives to cover higher proportions of patients for procedures such as vaccination and screening is likely to improve the accuracy of population estimates in the future. This may affect the long-term robustness of the models we have outlined in this paper and should be investigated in due course.

8.6 One area where we believe that there is less justification for making further adjustment to our approach would be to take account of the work by Birch and Maynard on the regional distribution of family practitioner services (*Journal of the Royal College of General Practitioners*, December 1987). Birch and Maynard suggest, for example, that the most under-doctored region in relation to one measure of the need for general practitioners is North Western. One point made to us is that our work is incompatible with Birch and Maynard's results. We firmly believe, however, that there is no necessary relationship between the number of contractors in an area and need for administrative resources once account has been taken of the factors included in our models. So, although Birch and Maynard found that the North Western Region was the most under-resourced in terms of GPs and we suggest that it is the most over-resourced in terms of administrative finance, this does not necessarily mean the two approaches are incompatible. This can be illustrated quite clearly in the case of Northern region which was the second most under-resourced area in terms of GPs according to Birch and Maynard and is the fourth most under-resourced in relation to administrative finance.

Appendix

1 FHSA workload variables

Number of contractors

GMPs per 10,000 patients on lists.

Dentists per 10,000 OPCS population.

Pharmacies per 10,000 OPCS population.

Opticians per 10,000 OPCS population.

Number of support staff

WTE ancillary staff per partnership. Practice nurse per partnership.

Turnover

Turnover GMPs per GMP.

Turnover in dentists per dentist.

Turnover in pharmacies per pharmacy.

Turnover in opticians per optician.

Non-GMP contractor workload

Courses of dental treatment per 10,000 OPCS population.

Prescriptions dispensed per 10,000 OPCS population.

Sight tests per 10,000 OPCS population.

Allocations and complaints

No. of formal allocations per 1,000 registered population.

No. of formal & informal complaints re GMPs per GMP.

No. of formal & informal complaints re dentists per dentist.

No. of formal & informal complaints re pharmacists per pharmacy.

No. of formal & informal complaints re opticians per optician.

FHSA workload

Registered transactions as per cent registered population.

Cervical cytology recalls by FHSAs (or assisting) per 10,000 females 20-64.

Dispensing GMPs as per cent GMPs.

Dispensing patients as per cent registerd population.

Exemption and prepayment certificates issued by FHSA per 10,000 non-age exempt population.

GMP workload – fees and claims

Per cent night visit claims involving deputising services.

Cervical cytology fees £1,000 per 10,000 females 35-64.

Night visit and imm & vac fees paid £1,000 per 10,000 registered population.

Ordinary and IUD contraceptive fee claims per 10,000 females 16-49.

No. maternity medical services claims per 100 births.

GMP characteristics

Per cent GMPs with list size <1,000.

Per cent GMPs with list size >2500.

Per cent GMPs <65 with single-handed practices.

Per cent GMPs >65.

Per cent GMPs with consent to use deputising services.

Miscellaneous

Net ingredient cost £1,000 per 10,000 OPCS population.

Appendix

2 Population and area characteristics

Dummy for inner London FHSAs.

Dummy for outer London FHSAs.

Dummy for large county FHSAs.

Dummy for large city FHSAs.

Dummy for small city FHSAs.

OPCS population.

Number of DHAs.

Population mobility (per cent registered population >OPCS population).

Perinatal mortality.

Standardised mortality rate for <65s.

Proportion of population aged 65 or over.

Proportion of population who are pensioners living alone.

Proportion of population aged under 5.

Proportion of persons in households who are single parents.*

Proportion of population who are in social class V.

Proportion of economically active population who are seeking work or temporarily sick.*

Proportion of residents who live in households without exclusive use of bath or inside WC.

Proportion of residents who live in households with more than one person per room.

Proportion of residents who have changed address in year prior to census.

Proportion of population whose head-of-household's birthplace was in New Commonwealth and Pakistan.*

Proportion of all economically active people who are temporarily sick.

Proportion of all persons who are permanently sick.

Proportion of residents who live in households with more than one and a half persons per room.

Proportion of residents who live in owner occupied households.

Proportion of residents who live in local authority households.

Proportion of residents who live in a household with no car.

Proportion of economically active men who are seeking work or temporarily sick.

Proportion of economically active women who are seeking work or temporarily sick.

Proportion of residents in households with 1-3 rooms.*

Proportion of population which is economically active.

Proportion of residents in household with no bath.

Proportion of residents in households without exclusive use of an indoor WC.

Proportion of private households without a car.

Proportion of private households not owner occupied.

Proportion of private households with more than one person per room.

Proportion of population with head-of-household in social class IV or V.

Proportion of households with four or more dependent children.

Proportion of households without exclusive use of bath or inside toilet.

Proportion of households without exclusive use of bath.

Proportion of households without exclusive use of inside toilet.

Jarman's underprivileged area score.

Townsend's material deprivation index.

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*See reference in Table 2

3 Appendix

New allocations per thousand population to FHSAs, 1988/89

FHSA Identifier	Name	Actual Expenditure	Multiplier*	New Allocation
	Northern			
321	Cleveland	846.22	104.91	887.80
322	Cumbria	877.63	106.24	932.38
323	Durham	905.54	92.25	835.38
324	Northumberland	993.80	111.43	1107.37
325	Gateshead	1252.60	92.16	1154.44
326	Newcastle-upon-Tyne	992.80	113.15	1123.33
327	North Tyneside	1071.51	100.45	1076.38
328	South Tyneside	1171.04	97.23	1138.60
329	Sunderland	855.53	118.52	1013.97
	Yorkshire			
341	Humberside	680.65	111.73	760.52
342	North Yorkshire	784.69	100.41	787.90
343	Bradford	955.93	101.17	967.16
344	Calderdale	1185.25	97.05	1150.29
345	Kirklees	961.32	103.82	998.06
346	Leeds	801.07	91.35	731.80
347	Wakefield	1223.83	90.59	1108.65
	Trent			
361	Derbyshire	748.63	94.30	705.93
362	Leicestershire	852.38	88.46	754.00
363	Lincolnshire	758.65	109.56	831.18
364	Nottinghamshire	817.87	86.13	704.43
365	Barnsley	1197.87	91.99	1101.91
366	Doncaster	929.57	114.25	1062.01
367	Rotherham	1144.82	94.30	1079.54
368	Sheffield	836.96	96.14	804.64

* The multiplier was used to calculate the new allocations for 1988/89 from the actual expenditure in that year. It is the mean of the predicted allocation as a percentage of actual allocation in each of the two years as explained in paragraph 7.1.

	East Anglia			
381	Cambridgeshire	826.03	105.55	871.90
382	Norfolk	814.26	89.13	725.75
383	Suffolk	758.46	102.33	776.15
	North West Thames			
401	Bedfordshire	840.35	108.96	915.61
402	Hertfordshire	749.98	91.23	684.23
402	Barnet	1610.24	97.25	1565.94
404	Brent & Harrow	1634.64	97.61	1595.58
405	Ealing Hammersmith & Hounslow	1452.47	100.35	1457.55
406	Hillingdon	1658.24	86.51	1434.48
407	Kensington Chelsea & Westminster	2562.64	94.97	2433.85
	North East Thames			
421	Essex	757.29	111.69	845.85
422	Barking & Havering	1260.40	99.64	1255.81
423	Camden & Islington	2317.66	101.14	2344.03
424	City & East London	1660.55	105.83	1757.33
425	Enfield & Haringey	1266.91	117.68	1490.95
426	Redbridge & Waltham Forest	1414.41	96.77	1368.67
	South East Thames			
441	East Sussex	759.98	99.80	758.45
442	Kent	816.83	100.57	821.50
443	Greenwich & Bexley	1243.42	98.12	1220.00
444	Bromley	1183.78	113.63	1345.18
445	Lambeth Southwark & Lewisham	1862.32	104.64	1948.69
	South West Thames			
461	Surrey	1033.33	101.08	1044.46
462	West Sussex	822.08	94.77	779.07
463	Croydon	1618.02	102.18	1653.29
464	Kingston & Richmond	1335.84	107.28	1433.04
465	Merton Sutton & Wandsworth	1345.32	90.69	1220.08
	Wessex			
481	Dorset	957.00	92.70	887.16
482	Hampshire	674.67	123.36	832.25
483	Wiltshire	876.70	99.81	875.04
484	Isle of Wight	1512.13	90.14	1363.08

	Oxford			
501	Berkshire	860.94	95.05	818.37
502	Buckinghamshire	896.98	96.30	863.75
503	Northamptonshire	842.14	103.93	875.27
504	Oxfordshire	879.73	99.26	873.20
	South Western			
521	Avon	807.26	98.56	795.63
522	Cornwall and Isles of Scilly	905.81	112.36	1017.75
523	Devon	738.60	96.07	709.59
524	Gloucestershire	874.02	102.38	894.84
525	Somerset	938.71	107.59	1009.97
	West Midlands			
541	Hereford and Worcester	705.04	116.21	819.33
542	Shropshire	734.40	130.72	959.98
543	Staffordshire	664.82	101.62	675.60
544	Warwickshire	1008.15	98.39	991.90
545	Birmingham	878.60	87.40	767.93
546	Coventry	959.95	113.06	1085.27
547	Dudley	855.10	121.86	1041.98
548	Sandwell	1030.07	103.58	1066.98
549	Solihull	1102.73	103.38	1140.01
551	Walsall	869.00	116.82	1015.19
552	Wolverhampton	875.33	118.90	1040.80
	Mersey			
561	Cheshire	764.60	90.93	695.22
562	Liverpool	987.04	103.89	1025.39
563	St Helens & Knowsley	931.74	104.65	975.02
564	Sefton	960.04	105.07	1008.67
565	Wirral	1033.46	97.34	1005.94
	North Western			
581	Lancashire	845.71	86.83	734.34
582	Bolton	1069.50	97.48	1042.57
583	Bury	1458.25	82.07	1196.73
584	Manchester	1115.06	91.29	1017.96
585	Oldham	1122.00	97.56	1094.64
586	Rochdale	1119.69	98.85	1106.83
587	Salford	1302.25	88.14	1147.85
588	Stockport	1135.75	91.97	1044.55
589	Tameside	1074.93	95.82	1030.02
591	Trafford	1313.94	88.94	1168.57
592	Wigan	956.71	102.70	982.50

Note: The allocation for Avon is attributed to South Western Region only.

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