Work in progress

The development and limitations of the weighted capitation formulae constructed for the use in the setting of prescribing budgets in English general practice

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I. Introduction

During the early 1990s, governments in many developed countries introduced prescribing budgets into the primary care sectors of their publicly-funded health care systems in an attempt to control their expenditure on pharmaceuticals (Freemantle and Bloor, 1996). In April 1991, prescribing budgets were introduced into English general practice as part of the fundholding and indicative prescribing scheme (DoH, 1989). The schemes were designed to control the growth in public expenditure on drugs and to reduce the variation in prescribing costs that existed between general practitioners (GPs) in different parts of the country. Initially, practice-level prescribing budgets were set on a historic cost basis. However, this approach was criticised for being inequitable and for possibly rewarding high cost, inefficient practices with more funds (Day and Klein, 1991; Glennerster, Matsaganis and Owens, 1992). In response, a move to budgets set on a weighted capitation basis was recommend as a means of promoting equity whilst ensuring that funding levels reflected local patient needs.

Since the mid-1970s, weighted capitation formula for the distribution of health care resources within the National Health Service (NHS) have been based upon the principle of 'horizontal equity', which has been defined as the 'equal treatment of individuals who are equal in "relevant respects"' (Culyer and Wagstaff, 1992, p.7). Architects of the various formula used within the NHS have attempted to operationalise this concept, often by taking the 'relevant respect' to be 'need'. In the health economics literature, 'need' has been generally accepted to be the 'capacity to benefit' from health care, with the appropriate benefit taken to be an improvement in or the maintenance of a patient's health status (Williams, 1974; Culyer, 1976). Under this definition, health authorities or practices with patients with an equal 'capacity to benefit' from available health care interventions should be set equal budgets per head. As discussed below, measuring 'need' and producing a robust and workable formula for setting weighted capitation budgets for NHS services has presented major challenges for the architects of such measures, particularly those designed to help with the setting of practice-level prescribing budgets.

The limited explanatory power of the weighted capitation formula used to help set prescribing budgets in the NHS from 1993/94 onwards led to a growing debate about the desirability of its use during the budget-setting process. Majeed (1996) argued that variations in general practice prescribing costs were too large to be explained by such measures. In response, he suggested that the rigid, inflexible application of weighted capitation formulae to set practice-level prescribing budgets should be avoided. In a similar vein, Majeed and Head (1998) argued that weighted capitation formulae were very crude tools for determining general practice prescribing budgets and should only be used as a guide to allocations. Greenhalgh (1998) concluded that such formulae should not be used as substitutes for factors such as reflection or negotiation during the budget-setting process. Maxwell, Howie and Pryde (1998) reported that the formula used to set practice-level budgets within the NHS failed to take account of factors such as patient values, beliefs and expectations when budgets were set. Finally, Smith (1999) argued that the formula chosen by the NHS to set prescribing budgets did not reflect *all* patient related variations in costs, random variations in need and differences in clinical practice. In consequence, he argued that such formulas should be used with great caution within the NHS.

Despite concerns about the use of weighted capitation formulae in the setting of practice-level prescribing budgets, the *new NHS* white paper announced that, from April 1999 onwards, all practices in England would be allocated a budget for prescribing under the auspices of the newly established Primary Care Groups (PCGs). In response, in section II of this paper the construction and limitations of the formulae developed to help set practice-level prescribing budgets within the NHS is discussed. Section III examines a model produced by researchers at the University of York to help the resource allocation process. Section IV suggests that both the weighted capitation formulae used for setting practice-level prescribing budgets and the York model are limited in their ability to set practice-level drugs budgets on the basis of need. In conclusion, it is argued that the empirical approaches adopted during the construction of these formulae and models may have institutionalised historic prescribing patterns, with the result that they fail to fulfil their promises of promoting needs based budget-setting in primary care.

II. The development of weighted capitation formulae for prescribing

As practice-level prescribing budgets had not been set prior to April 1991, the NHS lacked a robust weighted capitation formula for their allocation. At the time, the only available prescribing cost denominator was the Prescribing Unit (PU), which weighted patients under 65 years of age as 1 and those 65 and over as 3. The PU was used by many health authorities to help compare costs between practices within their areas. However, evidence suggested that the measure failed to account for differences in age-and-sex related differences in NHS prescribing spends (Sleator, 1993). In response, the Age, Sex and Temporary Resident Originated Prescribing Unit (ASTRO-PU) was developed, which contained weights believed to 'reflect the present distribution of prescribing costs, in relation to age and sex, in English general practice' (Roberts and Harris, 1993, p.485). Although superior to the PU, the architects of the new measure stated that 'many factors other than the age and sex structure of a practice population influence prescribing' and that its 'weightings account for only about 25% of the variations in costs between practices' (Harris and Roberts, 1993, p.488).

From 1993/94 onwards, health authorities in England were advised to use the ASTRO-PU to help set prescribing budgets for fundholding and non-fundholding practices (NHSME, 1993). Acknowledging the limitations of the measure, the Department of Health (DoH) advised that, before confirming their budgets, health authorities should consider representations from local practices about the relevant factors that needed to be taken into account. Amongst the relevant local factors, the DoH suggested: prescribing quality, changes in the number and/or distribution of patients in need of high cost drugs, patients in nursing/residential homes, and relative levels of local morbidity and deprivation. Despite these guidelines, health authorities received little advice on how these factors should be taken into account when prescribing budgets were set.

In response to a request from the local health authority, Whynes, Baines and Tolley (1996) attempted to explain the variation in costs per ASTRO-PU amongst a number of practices in Lincolnshire using a range of routinely collected practice and patient characteristics data collected during 1993/94. During their study, the authors found that fundholding status, possession of a practice formulary and higher generic prescribing rates were associated with lower average spends. Higher night visiting rates and proportionally more patients holding a prescription charge exemption certificate, on the other hand, were associated with higher average spends. The multiple regression model constructed during the study found that, together, these factors accounted for 43 per cent of the variation in average costs per ASTRO-PU amongst the practices sampled.

Not only was the measure unable to explain 75 per cent of the variation in prescribing costs per practice at a national level, but the explanatory power of the ASTRO-PU was also challenged by changes in prescribing patterns over time. Evidence from the Statistical Bulletin (DoH, 1996) suggested that general practice prescribing patterns had changed significantly since the measure's construction during the early 1990s. In response, the ASTRO-PU's weights were recalculated using data from the period November 1995 to October 1996. As Table 1 shows, the new measure, entitled the ASTRO(97)-PU, gave larger weights to patients under the age of 65 and reduced some of the weights for older patients. Given their superior accuracy, the architects of the ASTRO(97)-PU suggested that its 'new weightings should be used for budget setting' (Lloyd, Roberts and Sleator, 1997, p.85).

Using data from 107 Lincolnshire practice from 1995/96, Baines and Whynes (1998) compared the relative explanatory power of the ASTRO(97)-PU and ASTRO-PU and examined whether rural practices with permission to dispense drugs to their own patients affected their performance. Based upon univariate regression modelling, the authors found that the former measure was no more successful than the latter at explaining the variation in prescribing costs between the practices sampled. However, their results suggested that both measures explained more of the variation amongst dispensing than non-dispensing practices. The authors concluded that the weights embodied in the ASTRO-PU and ASTRO(97)-PU may be more applicable to dispensing practices, implying that the principle of 'local flexibility' should be followed during the budget-setting process.

The architects of the ASTRO(97)-PU responded to the Baines and Whynes paper by stating that they disagreed with the conclusion regarding dispensing practices and that, whilst their results may have held amongst the Lincolnshire practices sampled, they did not hold nationally (Lloyd and Roberts, 1999). Using data from 1996/97 for 8,922 English practices with list sizes over 500 patients, Lloyd and Roberts reported the results of a regression model that suggested that the ASTRO(97)-PU had lower explanatory power amongst practices with more dispensing patients. In consequence, they suggested that the results presented by Baines and Whynes could not be supported. Although the sampling of different practices and different years produced differences in the measure's explanatory power, the authors advised strongly against any move away from the current method of determining the ASTRO(97)-PU's weights.

Reflecting upon the debate about the use of the ASTRO-PU and the ASTRO(97)-PU in the setting of practice-level drugs budgets, Roberts (1998) discussed four approaches to allocating prescribing resources within the NHS. He argued that, whilst budgets based upon the assessment of the needs of individual patients were the best basis for allocating prescribing funds, the NHS did not currently possess the information or systems required for doing so. As a result, he stated that historic costs, weighted capitation formula, or a mixture of the two approaches, were often used during the budget-setting process. Given the limitations of historic cost budgets or a mixed approached based upon past spends and some form of capitation benchmark, Roberts argued that a formula based upon the ASTRO-PU and the census variable 'permanent sickness' could be used to allocate prescribing monies within the NHS. As such an approach would only provide a proxy for patient needs, he concluded that, in the NHS, it will be 'important to realize and state the limitations of all resource allocation methodologies that adopt, as they must, a "broad brush" approach to population health needs' (Roberts, 1998, p.1464).

III. The York weighted capitation model

To help implement the objectives outlined in the *new NHS* white paper, the NHS Executive commissioned researchers at the University of York, with support from the Prescribing Support Unit in Leeds, to develop a needs based capitation formula for allocating prescribing budgets to health authorities and PCGs in England (Rice, Dixon, Lloyd and Roberts, 1999). In order to fulfil this brief, the researchers at York attempted to use statistical methods to explain practice-level variations in prescribing costs using a range of practice and patient characteristics data collected by the NHS and the 1991 census. Following their analysis, the researchers recommended a regression model that used a range of 'need' and 'supply' variables to explain variations in prescribing costs per ASTRO(97)-PU.

As Table 2 shows, the final model chosen by the researchers at York explained 40 per cent of the variation in prescribing costs per ASTRO(97)-PU amongst 8,506 English practices, which were sampled using data from 1997/98. The final model included four census variables that were said to represent 'need' and five practice characteristics variables that were taken to represent 'supply'. Variables to account for list-inflation and to correct for the assumed endogeneity of fundholding status were also included. As the model explained 40 per cent of the variation in costs per ASTRO(97)-PU, the majority of variation remained unexplained. Given the NHS Executive's intention to use the York formula to help allocate prescribing funds, the robustness of the model should be examined before its use. In particular, the approach to modelling adopted by the York researchers, the construction of the dependent and explanatory variables should be examined.

During the model building process, the York researchers used a variation of the 'general to specific' approach. The general model included 25 need and 6 supply variables, which were removed iteratively to form the specific model by removing variables with non-significant or counter-intuitive signs. Following this process, the census variables for permanent sickness, dependants in no carer households, students and babies were chosen because, in principle, they captured the effects of particular patient 'needs' on variations in drug costs per ASTRO-PU. The supply variables, on the other hand, were selected because prior studies and/or economic reasoning suggested that they should be included in the model. However, under this approach, if the theoretical reasoning supporting the inclusion of a particular variable was flawed then it may have been incorrectly included in the final model. By the same reasoning, relevant variables may have been omitted.

An assumption made by the York researchers was that the system of primary care prescribing being modelled was stationary. However, it is possible that some components of the system had a time variant mean. Within econometrics, a time series is said to be 'stationary' if its mean is independent of the time period in which it is calculated, and when its variance is bounded and does not change systematically with time (Cuthbertson, Hall and Taylor, 1992). In the context of primary care prescribing, there are several aspects of the system that may be liable to significant change in relatively short time periods, for example:

- medical technology
- drug prescribing costs (new products, patent expiry)
- the structure of general practice and the approach to budgetary control
- the demographic structure (natural change, slow but less than the 10 year census interval)
- patient expectations and demand

Supposing these factors are non-stationary then the regression model could lead to incorrect inferences (Johnston and DiNardo, 1997). If the York model is to be used to define practice budgets in subsequent time periods, it should demonstrate its ability to predict prescribing cost patterns over a number of time periods. In consequence, the York model should be tested for temporal fit and stability in years other than its year of construction and should not rely solely on econometric and statistical tests of goodness of fit in order to determine its predictive ability. However, if the system being modelled is subject to substantial changes then this approach may also be unable to predict future prescribing trends.

The dependent variable used in the York model consisted of a ratio of prescribing costs to the total number of ASTRO(97)-PUs. In consequence, the 'needs' and 'supply' variables included in the model either explained variations in costs, variations in ASTRO(97)-PU weights, or a mixture of the two. Although the York model was designed to be needs based, the use of the ASTRO(97)-PU's weights in the construction of the dependent variable meant that the model was unable to directly capture differences in 'need' in the sense generally accepted by most health economists. Indeed, the measure's weights were based upon demographic differences in average patient costs and not upon the ability of individual patients to benefit from available medicines. As a result, the dependent variable used in the York model did not directly measure variations in needs-adjusted expenditure as generally understood within health economics, but simply divided practice prescribing costs by a set of demographic weights constructed using data from 1995/96.

Not only did the ASTRO(97)-PU fail to directly measure need, but its use in the modelling process may have affected the variables included in York model for the following reasons. Firstly, if the correction variable included in the final model failed to account for the significant inaccuracies in patient list-sizes evident amongst some practices, lower costs per ASTRO(97)-PU may have been associated with higher levels of list-inflation and not lower levels of need. Secondly, if prescribing patterns changed significantly between 1995/96 and 1997/98, the model may have accounted for inaccuracies in the ASTRO(97)-PU's weights and not need. Finally, the model may have explained differences in the rate of 'primary non-compliance' (that is, the non collection of issued prescriptions) amongst different patient groups in the practices sampled, as Beardon *et al* (1993) found that non-redemption rates varied with age, sex, prescription charge exemption status and whether a patient saw a trainee GP.

The 'needs' variables included in the York model were based upon responses to questions asked by the 1991 census, which were aggregated from household to electoral ward level and then assigned to each practice in the sample on the basis of patient post-codes. Given the nature of the questions asked, the census variables included in the model did not measure 'need' in the sense described in Section I. For example, the permanent sickness variable was designed to measure the proportion of the population unable to work due to long-term illness or disability and was not designed to measure their capacity to benefit from prescribed drugs. Similarly, the variables for dependants with no carers, students and babies were designed to collect socio-economic data about the general population and were not meant to measure practice-level variations in need. In consequence, the regressors included in the York model should only be taken as variables that have a significant relationship with the dependent variable, prescribing costs per ASTRO(97)-PU, and should not be taken as accurate measures of 'need' in the sense generally accepted within health economics.

The 'supply' variables selected for the York model represented a range of different practice types and the average size of GP lists. According to the model, dispensing status, non-involvement in the training practice scheme and number of GPs per patient were associated with higher average costs per ASTRO(97)-PU. Single handed and fundholding practices, on the other hand, had lower levels of demographically adjusted expenditure. Despite their inclusion in the final model, the construction of some of the supply variables should be questioned before they are considered for use in the budget-setting process. Firstly, the inclusion of dispensing status as a dummy variable should be questioned, as Lloyd and Roberts (1999) found that costs per ASTRO(97)-PU varied with the number of dispensing patients and not simply with dispensing status. Similarly, the dummy variable for training practices may be misleading as the number of partners within a practice that are accredited to provide postgraduate training may vary and such variation may affect costs. Finally, evidence on the effects of the fundholding scheme suggests that a single dummy for all fundholding practices may be inappropriate, as first wave practices tended to have lower than average costs before and throughout the scheme's lifetime, whilst other practices tended to make savings only during their first participating year (Baines, Tolley and Whynes, 1997).

IV. Discussion

The architects of the ASTRO(97)-PU and the researchers who built the York model opted for a 'positive approach' to explaining variations in practice-level prescribing costs. In other words, they decided to base their research upon actual NHS prescribing patterns observed during the years in which they sampled their data. Alternatively, if they had adopted a 'normative approach', the architects of the ASTRO(97)-PU and the York researchers would have been required to specify what weights *should* be given to different determinants of prescribing cost variations, rather than simply reporting the factors that they found to be influential. As discussed in sections II and III, the positive approach embodied a number of limitations. Firstly, such work may have been guilty of 'historicism' in the sense that, despite constant changes in medical knowledge and pharmacological technology, it implied that future prescribing patterns could accurately be predicted by those observed in the past (Popper, 1957). Secondly, no formula or model – however refined – is likely to be able to capture all of the variation in prescribing costs due to immeasurable factors such as individual prescribing behaviour, random error and inadequacies in the data collection process (Carr-Hill, Rice and Smith 1998). Therefore, researchers should ask how much of the variation in prescribing costs needs to be explained for a formula or model to be useful during the resource allocation process. Finally, the positive approach may institutionalise past prescribing patterns, with the result that weight capitation formulae may differ little from historic costs as a basis for setting budgets.

Although a positive approach may be criticised for historicism, its inability to explain all variations in costs and for institutionalising past prescribing patterns, the main criticism of the approach is that it falls foul of the 'naturalistic fallacy' in the sense that it attempts to derive 'ought' from 'is'. According to Searle (1964, p.43), 'no set of *descriptive* statements can entail an *evaluative* statement without the addition of at least one evaluative premise'. In this context, Searle's statement implies that, for a budget-setting process to allocate funds on a fair basis according to need, information other than historic prescribing patterns is required. In consequence, the ASTRO(97)-PU and the York model cannot, by themselves, specify how horizontal equity may be achieved in the setting of practice-level prescribing budgets.

The limitations of a positive approach suggests that some normative input may be required into the development of any formula or model designed for resource allocation purposes. However, a move away from a positive approach would require criteria for judging a 'good' resource allocation process, as statistical tests or goodness-of-fit would no longer be appropriate. Alternatively, any such process could be judged in terms of its ability to predicted future prescribing costs. However, this approach would also be limited if the formula was used to set the budgets of the practices whose costs it was trying to predict. Moreover, if budgets are to be set on a horizontal equity basis according to need, the outcomes of the budget-setting process should be measured against criteria other than costs. In consequence, it is suggested that any new budget-setting formula is subject to piloting and evaluation in a small number of practices before its general use within the NHS.

Finally, it is important that any econometric model should meet the requirements of the resource allocation process before its use. To this end, there have been calls for such models to be simple, easy to understand and transparent (Hancock and Porteous, 1997). In response, we would argue that these criteria are not necessary to the success of the resource allocation process. For example, the quantity theory of money could be described as a simple, understandable and transparent model of the macroeconomy; however it would be alarming if it were in use by governments to set policy today. Far more important than simplicity, understandability and transparency is model efficiency in the sense that it is technically robustness. The only caveat should be that the model is implementable by those who need to implement it, who may be able to manipulate complex formulae.

Summary

The final model chosen by the York researchers failed to directly measure the 'need' for prescribed drugs in the sense generally understood by most health economists, as the ASTRO(97)-PU and the census variables that they used were unable to measure the ability of patients to benefit from prescribed drugs. In consequence, if the model is used to promote 'horizontal equity' in the sense defined in section I, the 'relevant respects' in which practices and PCGs would be equal would not necessarily be need. Finally, in order to avoid falling foul of the naturalistic fallacy, formulae and models constructed for resource allocation purposes require some normative input. However, such an approach requires criteria other than statistical testing or goodness-of-fit in order to judge whether the resulting allocation method meets need and promotes fairness.

References

Baines, D., Tolley, K. and Whynes, D. (1997) Prescribing, budgets and fundholding in general practice. London: Office of Health Economics.

Baines, D. and Whynes, D. (1998) The use of the ASTRO-PU and the ASTRO(97)-PU in the setting of prescribing budgets in English general practice. *Journal of Clinical Pharmacy and Therapeutics* **23**, 229-234.

Baines, D.L., Tolley, K.H. and Whynes, D.K. (1997) Prescribing, budgets and fundholding in general practice. London: Office of Health Economics.

Bloor, K. and Freemantle, N. (1996) Lessons from international experience in controlling pharmaceutical expenditure II: influencing doctors. *BMJ* **312**, 1525-1527.

Carr-Hill, R., Rice, N. and Smith, P.C. (1998) Towards Locally Based Resource Allocation in the NHS. York: University of York.

Culyer, A.J. (1976) Need and the National Health Service: Economics and Social Choice. London: Martin Robertson.

Culyer, A.J. and Wagstaff, A. (1992) Need, Equity and Equality in Health and Health Care. York: University, Centre for Health Economics.

Cuthbertson, K., Hall, S.G. and Taylor, M.P. (1992) Applied Econometric Techniques. London: Harvester Wheatsheaf.

Day, P. and Klein, R. (1991) Variations in budgets of fundholding practices. *BMJ* **303**, 168-170.

Department of Health (1989) Working for patients. London: HMSO.

Department of Health (1996) Statistics of prescriptions dispensed in the Family Health Services Authorities: England 1985 to 1995. *Statistical Bulletin*

Department of Health (1996) Statistical Bulletin: Statistics of prescribing in the family Health Services Authorities: England 1985 to 1995. London: Government Statistical Service.

Department of Health (1997) The new NHS: Modern, Dependable. London: HMSO.

Glennerster, H., Matsaganis, M. and Owens, P. (1992) A foothold for fundholding. London: King's Fund Institute.

Greenhalgh, T. (1998) Effective prescribing at practice level should be identified and rewarded. *BMJ* **316**, 750-753.

Hancock, K. and Porteous, S. (1997) Determinants of relative need for indicative prescribing budgets: a statistical analysis of the variation of prescribing costs between GP practices in Scotland in 1995. Liverpool: Health Economics Study Group Meeting.

Johnston, J. and Di Nardo, J. (1997) Econometric Methods (4th ed.). London: McGraw-Hill.

Lloyd, D.C. and Roberts, D.J. (1999) Letter to the Editor. *Clinical Pharmacy & Therapeutics* **24**, 157-158.

Lloyd, D.C.E.F., Roberts, D.J. and Sleator, D. (1997) Revision of the weights for the Age Sex Temporary Resident Originated Prescribing Unit. *British Journal of Medical Economics* **11**, 81-85.

Majeed, A. (1996) Allocating budgets for fundholding and prescribing. *BMJ* **313**, 1274-1275.

Majeed, A. and Head, S. (1998) Capitation based prescribing budgets will not work. *BMJ* **316**, 748-753.

Maxwell, M., Howie, J.G.R. and Pryde, C.J. (1998) A comparison of three methods of setting prescribing budgets, using data derived from defined daily dose analyses of historic patterns of use. *British Journal of General Practice* **48**, 1467-1472.

National Health Service Management Executive (1993) Indicative prescribing scheme: Guidance on setting amount. EL(93)a, London: DoH.

Popper, K. (1957) *The Poverty of Historicism*, Reading: Cox & Wyman Ltd.

Rice, N., Dixon, P., Lloyd, D. and Roberts, D. (1999) Derivation of a needs based capitation formula for allocating prescribing budgets. *Economics Discussion Paper University of York Centre for Health*

Roberts, D. (1998) Prescribing allocation: theory into practices (Editorial). *British Journal of General Practice* 1463-1464.

Roberts, S.J. and Harris, C.M. (1993) Age, sex, and temporary resident originated prescribing units (ASTRO-PUs): new weightings for analysing prescribing of general practices in England. *British Medical Journal* **307**, 485-488.

Searle, J.R. (1964) How to derive "ought" from "Is". *Philosophical Review* **73**, 43-58.

Sleator, D.J.D. (1993) Towards accurate prescribing analysis in general practice: accounting for the effects of practice demography. *British Journal of General Practice* **43**, 102-6.

Smith, P.C. (1999) Setting budgets for general practice in the new NHS. *BMJ* **318**, 776-779.

Whynes, D.K., Baines, D.L. and Tolley, K.H. (1996) Explaining variations in general practice prescribing costs per ASTRO-PU (age, sex, and temporary resident originated prescribing unit). *BMJ* **312**, 488-489.

Williams, A.H. (1974) Need as a concept (with special reference to Health). In: Culyer, A.J. (Ed.) *Economic Problems and Social Goals*, pp. 60-76. London: Martin Robertson]

Table 1. ASTRO-PU and ASTRO(97)-PU weights

	ASTRO-PU		ASTRO(97)-PU		% difference	
Age bands	Male	Female	Male	Female	Male	Female
0-4	1	1	1	0.8	0.00%	-20.00%
5-14	1	1	1.4	1.2	40.00%	20.00%
15-24	1	2	1.7	2.1	70.00%	5.00%
25-34	1	2	2.0	2.4	100.00%	20.00%
35-44	2	3	2.8	3.2	40.00%	6.67%
45-54	3	4	4.4	5.4	46.67%	35.00%
55-64	6	6	7.6	7.2	26.67%	20.00%
65-74	10	10	10.1	9.6	1.00%	-4.00%
≥75	10	12	11.8	10.6	18.00%	-11.67%
Temps.	0.5		0.5		0.00%	

Table 2. Recommended York capitation formula for prescribing

Independent variables	Coefficient	*t*-value
Need		
Proportion of adult population permanently sick	0.594	11.399
Proportion of dependants in no carer households	0.027	2.172
Proportion of working age who are students	-0.233	-9.241
Percentage of babies in the population	1.88	17.572
List inflation	-0.083	-8.094
Supply		
Dispensing practice	0.682	6.808
Not a training practice	0.324	4.017
Number of GPs per patient	909.61	4.021
Single handed practice	-0.504	-4.585
Group fundholding practice	-1.145	-17.284
Endengous GP fundholding mills ratio variable	-0.564	-1.749
R^2	0.406	
Constant	24.99	23.106

Source: Rice, Dixon, Lloyd and Roberts (1999)