

Controversies in primary care

Setting prescribing budgets in general practice

General practice prescribing costs have risen rapidly in recent years, and there are wide variations between practices in rates and costs of prescribing. Setting general practice prescribing budgets with a capitation based formula seems to offer a solution to these problems. However, capitation based formulas may unfairly penalise legitimate variations and increases in prescribing costs. We therefore asked Azeem Majeed and Trisha Greenhalgh to give their views on the subject.

Capitation based prescribing budgets will not work

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Many health authorities are considering introducing capitation based prescribing budgets for their general practices.¹ There are two important factors driving this process. The first is cost containment. Drugs prescribed by general practitioners now account for 11% of all NHS spending (see table). Furthermore, general practice prescribing costs have been rising more quickly than both the average rate of inflation and the total NHS budget.² Many NHS managers and treasury officials are unhappy with this rapid rate of increase and see considerable scope for savings in general practitioners' prescribing costs. For example, the Audit Commission estimated that prescribing costs could be reduced by about £425m if all general practitioners prescribed like the doctors in 50 general practices which the commission identified as being "good" prescribers.³

The second factor behind the increasing interest in capitation based budgets is the belief that such budgets will help to ensure that resources are allocated more fairly among general practices. There are wide variations in prescribing costs between general practices, and it is not clear whether these variations are clinically justified. To many people, these variations

suggest that the prescribing of general practitioners is either inefficient or inappropriate.

Capitation based budgets seem to offer a solution to tackling the dual problems of unacceptable variations in prescribing costs and increasing drug costs in general practice. It is assumed that capitation based budgets will encourage general practitioners (especially those with high prescribing costs) to examine their prescribing more critically, resulting in more cost effective and appropriate prescribing. Even where the introduction of capitation based budgets is not being considered, health authorities have been advised by the NHS Executive to consider giving general practices with above average costs a smaller increase in their prescribing budget than practices with below average costs.⁴ The implicit assumption is that, over a number of years, practices will move towards the average and that the variation in prescribing costs between practices will be reduced.

Are capitation based budgets the best method of allocating general practice prescribing budgets and will such budgets be fairer than existing budgets, which are usually based on historical prescribing patterns?

What formula should be used

The first problem that proponents of capitation based budgets are faced with is what formula to use to allocate budgets. The NHS Executive does have a capitation based formula that it uses to help allocate prescribing budgets to health authorities. Health authorities could use the same formula (which contains weightings for age, sex, and chronic illness) to help set the budgets of their own general practices. However, there is no direct measure of chronic illness available at general practice level, only proxy measures derived from census data, which are of uncertain accuracy.^{5,6} Health authorities could construct their own formulas using locally available data, assuming that they can competently use statistical techniques such as

Cost of drugs prescribed by general practitioners in United Kingdom from 1985 to 1995

Year	Cost (% of total NHS spending)
1985	£1706m (9.5)
1986	£1849m (9.6)
1987	£2074m (9.9)
1988	£2316m (10.1)
1989	£2533m (10.1)
1990	£2796m (10.1)
1991	£3104m (10.0)
1992	£3490m (10.0)
1993	£3901m (10.6)
1994	£4278m (11.0)
1995	£4488m (11.0)

multiple linear regression and multilevel modelling. Unfortunately, when such methods have been used to examine the variation in prescribing costs between general practices only about 30-40% of this variation has been explained.⁷⁻⁹ What is not currently known is the cause of the remaining 60-70% of the variation in prescribing costs.

If this unexplained variation is caused mainly by idiosyncratic prescribing by general practitioners, then it would be reasonable for health authorities to introduce capitation based budgets gradually and to start moving practices with high prescribing costs towards the average for the health authority. However, it is also possible that the unexplained variation in prescribing costs is a result of differences in the clinical characteristics of practice populations or because some general practices are better at identifying and treating groups of patients who need long term medication, such as those with asthma or ischaemic heart disease. If this is the case then using capitation based budgets may lead to unfair reductions in the budgets of some practices and excessively large increases in the budgets of others. Clearly, large and rapid changes in prescribing budgets would be disruptive for general practices and would be difficult to justify while the reason for the large variations in prescribing costs remains unknown.

High and low cost prescribers

An examination of general practices with low and high prescribing costs reveals some distinct patterns of prescribing (see box). There are low cost prescribers whose costs are low because of poor quality prescribing, usually due to inadequate identification and management of patients with chronic diseases. Giving such practices larger prescribing budgets will not correct their poor clinical practice and nor will it address the needs of their patients. Other low cost practices seem to be prescribing very effectively. They have a high rate of use of generic drugs, a low rate of use of drugs of limited therapeutic value, and make little use of new, more expensive drugs when there is an older and cheaper drug of similar effectiveness available.

When high cost prescribers are examined two main groups also appear. There are some high cost prescribers whose prescribing is of poor quality. They make little use of generic drugs and extensively use expensive drugs and drugs of limited therapeutic value. Other high cost prescribers seem to be practising high quality medicine. These practices usually run specialist disease management clinics, often serve populations with a high need for care, and have in place effective mechanisms for identifying and treating patients with chronic diseases. Because they offer a high quality service, they often attract patients with complex health needs, and this further increases their prescribing costs.

A capitation based formula classifies practices only as low cost or high cost prescribers and tells us nothing about their quality of prescribing. This information can come only from a detailed analysis of practices' prescribing data combined with information collected directly from each practice on the use of formularies and practice guidelines and on local factors that increase or decrease the demand for drugs.

A tale of two practices

Practice A

This is a three doctor practice with a list size of 4400 patients in an inner city area. The practice's age weighted prescribing costs are currently 15% below the health authority average. The practice runs disease management clinics for conditions such as asthma, hypertension, ischaemic heart disease, and diabetes. The practice also takes on the prescribing of expensive drugs for conditions such as infertility and hormonal disorders. The practice has an above average rate of generic prescribing and a low rate of prescribing drugs of limited therapeutic value.

A recent audit showed that the practice had no patients admitted for the emergency treatment of asthma during the past year. With a capitation based formula, the practice would receive a substantially larger prescribing budget. However, as the practice seems to meet the needs of its population with its current budget, it is not clear what it would do with these extra funds.

Practice B

This is a nine doctor training practice with 15 200 patients. Although situated in a relatively affluent health authority, the practice is located in one of the area's pockets of deprivation. The practice's age weighted prescribing costs are currently 12% above the health authority average. The practice provides high quality care and runs chronic disease management clinics, provides extra services such as anticoagulant monitoring and regularly audits its prescribing. The generic prescribing rate is above average. Despite this, the practice's prescribing costs remain high, and it has great difficulty in staying within its prescribing budget. With a capitation based formula, the practice would lose a substantial part of its current prescribing budget, and this would affect the practice's ability to meet the needs of its patients.

Implications for general practitioners

If health authorities are considering the introduction of capitation based budgets then general practitioners will need to prepare for this. At least one general practitioner in each practice should have a sound grasp of the practice's prescribing data. The practice should also collate information on factors that could increase the demand for drugs—such as the transfer of care from hospitals to general practice, a high prevalence of chronic disease in the practice population, and patients living in nursing or residential homes.

Improving how drug budgets are allocated

There are several actions that health authorities could take to improve how they allocate prescribing budgets (see box overleaf). For example, they could exclude patients who need high cost drugs, such as growth hormone and cyclosporin, before calculating prescribing budgets. Recent developments in the information supplied by the Prescription Prescribing Authority to health authorities (PACT data) make it fairly straightforward to separate the costs of these drugs from other drug costs.¹⁰

Unfortunately, it is more difficult to identify high cost patients (usually those with chronic diseases who are taking many different drugs) by means of routinely available information. Information on these patients can only be obtained directly from each general practice in an authority. Hence, health authorities need to start systematically collecting information from practices about patients with chronic conditions such as asthma or ischaemic heart disease or who are living in nursing homes. Health authorities will also need to know about the quality of care provided by general practitioners, particularly whether they have prescribing policies in place and how well they identify and manage patients with chronic diseases.

Setting accurate drug budgets and improving the quality of prescribing

- Remove the costs of expensive drugs (usually defined as drugs that cost more than £2000 a year) from practices' drug budgets
- Weight appropriately for age and sex—the best current method of weighting is to use ASTRO-PU (age, sex, and temporary resident adjusted prescribing units)
- Discuss with practices special factors that could increase prescribing costs, such as patients in nursing and residential homes
- Discuss with practices how they manage patients with chronic diseases such as ischaemic heart disease and asthma
- Examine practices' prescribing, analysis, and cost (PACT) data to identify areas in which there is prescribing of ineffective drugs or in which costs could be saved through therapeutic substitution or increased generic prescribing
- Discuss with practices whose prescribing is of poor quality why this is and how the quality of their prescribing can be improved
- Provide regular feedback of prescribing data and reinforcement of good practice

Improving the quality of prescribing

Health authorities need to develop better methods of monitoring and analysing the prescribing carried out by their general practices, and of feeding back the results of their analyses to general practices. Many health authorities are doing this by developing prescribing indicators for feedback to general practices.¹¹⁻¹³ All health authorities now have access to detailed information on the rates and costs of prescribing by their general practices. This information can be used to identify areas in which financial savings could be made or in which the quality of prescribing could be improved.

Prescribing costs also need to be considered together with other NHS costs. For example, general practitioners could argue that, by increasing the prescribing of drugs such as cholesterol lowering drugs for people with ischaemic heart disease and of treatments for asthma, they will improve the health of these patients and reduce the likelihood of them suffering complications. This in turn will improve these patients' quality of life and reduce demand on hospital services. Even when problems are identified with general practitioners' prescribing, changes in prescribing practice will not be easy to achieve and will require various different educational methods and continual reinforcement of good practice.^{14 15}

Effective prescribing at practice level should be identified and rewarded

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In the administrative corridors of the European Union there is no longer any talk of cows, sheep, or pigs but only of "grain consuming units" or GCUs. A similar level of bureaucratic jargon has come to surround what used to be known as patients in the British NHS, who, for the purposes of administering the funds that pay for their medication, are now known as "prescribing units" (PUs). Just as one cow consumes as much grain as three or four sheep and therefore counts as several GCUs, so a person over the age of 65, who is said to consume, on average, three times as many prescription

Conclusions

Capitation based formulas are currently very crude tools for determining general practice prescribing budgets and should be used only as a guide to setting prescribing budgets and not as their ultimate determinant. If health authorities apply capitation based budgets inflexibly this may lead to practices becoming reluctant to register patients with high prescribing costs.¹⁶ Hence, health authority pharmaceutical and medical advisers will still have to use their knowledge of local factors and their judgment when setting prescribing budgets. There are many problems with the methods currently used to allocate prescribing budgets, and these methods do need to be improved. General practitioners also need to ensure that their prescribing is appropriate and cost effective. Unfortunately, there are no easy solutions to these problems, only a lot of hard work for both health authorities and general practitioners.

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items as someone aged under 65, is generally counted as three prescribing units.¹ Attempts by statisticians and health economists to explain and refine the prescribing unit²⁻⁸ have generally been little read and poorly understood by those with most to gain or lose by the formulas produced. Yet the principle behind the jargon is simple, and the implications of an invalid model for capitation based drug budgets far reaching.

General practitioners in England and Wales are expected to keep the total cost of their drug prescribing within specified limits (indicative prescribing budgets⁹)

allocated by their district health authority (previously the family health services authority) and generally calculated on the basis of their previous year's performance plus a small allowance for inflation and real cost increases (the much criticised "historical allocation formula"). Although there is currently no binding sanction against general practitioners who exceed their indicative prescribing budgets, there is, buried within the small print of the latest NHS white paper, the news that, from 1999, primary care groups will have a unified budget for commissioning, prescribing, and practice administration—in other words, general practitioners' prescribing will be cash limited.¹⁰ In the interim, many health authorities, encouraged by central office,¹¹ are introducing a variety of financial incentives for practices to remain within particular targets for total prescribing costs.¹²

Hence, there is considerable interest in developing a robust mathematical model that successfully predicts legitimate variation in prescribing costs and exposes (with a view to modifying or penalising) idiosyncratic variation. Given the number of potential influences on the total cost of a general practitioner's prescribing (see box) and the passion with which general practitioners have traditionally guarded their freedom to prescribe as they choose, it is small wonder that attempts to produce such a model have so far generated more heat than light.¹³

Measures of prescribing cost

It is important to understand the principles behind the different types of research that have tried to unravel the complex influences on general practitioners' prescribing costs. If the focus of the research is the impact of doctor or patient factors on the decision to prescribe or the choice of drug, the unit of analysis must be the individual prescriber (and, perhaps, the individual consultation).¹⁴ If the focus is organisational factors (such as fundholding status or use of locum doctors), the unit of analysis must be the practice. If, however, the focus is a demographic variable (such as age or sex), aggregated data from a large geographical area (regional or national) must be used so that the effects of differences in local morbidity, practice organisation, and prescribing behaviour are smoothed out.

Demographic variables

A national sample of 90 practices drawn from 80 health authority areas was used to refine the crude prescribing unit (weighted only by a flat factor of 3 for patients aged over 65) to take account of sex, finer gradations of age, and the proportion of temporary residents (a highly mobile population increases prescribing costs, and patients often register as temporary residents simply because they forgot to bring their tablets on holiday with them).³ In another analysis, data from over 500 practices were used to determine average costs by different therapeutic group according to age and sex.⁷ The resulting ASTRO-PU (age, sex, and temporary resident adjusted prescribing unit, which used nine different age bands),⁴ the formula of which has recently been updated to take account of changing broad trends in general practitioner prescribing,¹⁵ and STAR-PU (specific therapeutic group age-sex related prescribing unit)⁷ provide more sophis-

Factors that potentially affect total prescribing costs

At national or regional level

- National morbidity trends
- New therapeutic advances

At health authority level

- Local morbidity trends
- Specific incentives
- Confounding commercial factors (for example, all orders for mail order appliances from a manufacturer operating within one health authority area will register as prescribed within that authority)
- Hospital initiated prescriptions

At practice level

- Fundholding status
- Dispensing status
- Training or teaching status
- Repeat prescribing system
- Specific morbidity (such as proportion of drug addicts)
- Deprivation
- List inflation
- Workload
- Use of locums or deputies
- Use of practice formulary

At individual prescriber level

- Policy of active searching for conditions to treat (such as hyperlipidaemia)
- Threshold for treating particular conditions
- Adherence to guidelines and protocols (including decision support systems)
- Policy for dealing with drug company representatives
- Postgraduate education and professional development

At individual patient level

- Morbidity (such as conditions that are particularly expensive to treat)
- Deprivation
- Expectations
- Health education

titated weightings for legitimate variations in costs, especially in practices with unusual demographic or epidemiological features.

These and other national or regional analyses have shown, for example, that, while women receive more drugs (and hence account for a disproportionate prescribing volume), men tend to receive more expensive items (and hence reduce sex differences in total prescribing costs). Children aged under 5 receive twice as many drugs as older children or young adults, but their medication tends to be low cost and of short duration so that they also account for high prescribing volume but not, in general, for high costs. Although patients aged over 65 receive about three times as many prescription items, their medicines are generally more costly, accounting for 4.6 times the prescribing costs of younger adults.³

Morton-Jones and Pringle analysed the effect of 24 demographic, morbidity, and practice variables on prescribing costs by means of a multiple regression model. They concluded that 81% of the variation in net ingredient cost at health authority level per patient was explained by just two demographic variables (number of pensioners and the mobility of registered populations measured by list inflation) and two proxy

measures of morbidity (standardised mortality ratios and number of prepayment certificates issued).³ Indeed, the surprising aspect of macro-level analyses like this is how much, rather than how little, of the variability can be predicted by how few indicators of need.

Other macro-level studies have analysed the influence of fundholding.^{5 16 17} Their findings are conflicting and contested,⁶ but, overall, there are few consistent differences in prescribing costs between fundholders and non-fundholders that are not explained by underlying sociodemographic variables. Similar regional or national studies which compared dispensing with non-dispensing practices demonstrated a tendency of the former to prescribe more items and more brand name preparations.^{18 19} Deprivation—whether defined in terms of standard deprivation indices, unemployment rates, or proportion of practice population receiving low income benefit—has also been shown to have considerable influence on prescribing costs.²⁰

Individual variables

Once the unit of analysis is narrowed to practice level or below, variations in costs are less readily explained—precisely because the effects of individual doctor and patient factors are unmasked. Adjustments for demographic variables with the ASTRO-PU probably account for about 25% of the variation between practices' costs,⁴ leaving most of the variation to be explained by local morbidity patterns, practice variables, and doctor-patient variables. Given that genuine variations in morbidity at the practice level are difficult to distinguish from variations in ascertainment of morbidity, patients' expectations, and individual doctors' threshold for reaching for the prescription pad, we should not be surprised when preliminary models seem to raise more questions than they answer.

Capitation based models

In an analysis of the prescribing behaviour of 131 general practitioners in a single health authority, Majeed et al recently attempted to derive a capitation based formula from demographic data and practice organisational factors (such as whether the practice was fundholding, computerised, had more than two partners, etc).²¹ They found poor correlation between most of these variables and net ingredient cost per patient, and found that a crude correction for age together with the generic prescribing rate explained only about a third of variability in costs between practices.

Majeed and Head conclude, probably rightly, that capitation based formulas should not be used as a substitute for reflection or negotiation when setting budgets at the practice level.²² They justifiably ask for particularly expensive drugs to be omitted from assessment of targets, so that vulnerable groups are not perceived (or treated) as a financial liability. And they rightly point out that rigid enforcement of indicative budgets will create a perverse incentive for general practitioners to eschew the assiduous search for unmet need (such as diabetes or hyperlipidaemia) or the prophylactic treatment of particular conditions (such as asthma).¹³

Factors identified by Audit Commission for improving general practitioners' prescribing practice

- Prescription by generic rather than brand name
- Use of a preferred list of drugs (formulary) to ensure that the most effective and cost effective medicine is selected for a particular condition
- Reduce prescription of drugs with limited therapeutic efficacy
- Reduce prescription in areas where overprescribing is known to occur

Improving the formula for allocating prescribing budgets

In their wholesale rejection of a capitation formula, Majeed and Head fail to take account of many things that are known about prescribing at the micro-level as opposed to the macro-level. An independent report from the Audit Commission identified several factors that showed high variability between practices and through which, if the worst performing practices improved to the level of the best, substantial savings could be made and patient care improved (see box).²³ Using multiple regression modelling, Whynes et al found that two morbidity variables—proportion of certificates of payment exemption for prescriptions (a proxy for level of chronic illness) and number of night visits (possibly a proxy for deprivation)—and one doctor related variable (proportion of items prescribed generically) explained 42% of variation between practices in costs per ASTRO-PU.⁸

Neither Majeed et al nor Whynes et al addressed other factors identified by the Audit Commission, but it would be potentially possible to develop proxy measures within existing data systems for non-use of formularies (such as number of different diuretics or non-steroidal anti-inflammatory drugs prescribed) and to identify marker drugs for prescription of products of low therapeutic efficacy (such as peripheral vasodilators or appetite suppressants) or those for which therapeutically equivalent cheaper alternatives exist. Practices that record diagnostic as well as prescribing data electronically would be amenable to scrutiny of their prescribing patterns for particular conditions, such as the frequency of antibiotic use for minor respiratory infections.

The British National Primary Care Research and Development Centre is currently undertaking preliminary research into the development of quality markers such as these for general practitioner prescribing (M Roland, personal communication). Ideally, a marker drug should have a single specific clinical indication and no clinical reason for differences between practices. In a recent region-wide survey, Roberts et al used specific marker drugs for prescribing of brand name drugs, those of low therapeutic efficacy, and those with cheaper therapeutic equivalents to monitor the impact of a regional prescribing incentive scheme.¹²

Valid standards for these and other hypothetical quality markers²⁴ in general practitioner prescribing must surely be determined externally (for example, by evidence assisted peer review) rather than simply by measuring what some or all general practitioners

currently achieve. Only by directing analysis at particular compounds and therapeutic areas, and perhaps only by measuring health outcomes along with prescribing costs, will effective and efficient prescribing be distinguished from simple cost containment.

Given the variability in needs and expectations within and between practice populations, a truly equitable, all encompassing formula for allocating prescribing budgets is probably impossible. But indirect evidence suggests that it is theoretically possible for health authorities to identify an approximate band within which a practice's prescribing costs should remain. The time is surely ripe for a pilot study to test the feasibility of this notion.

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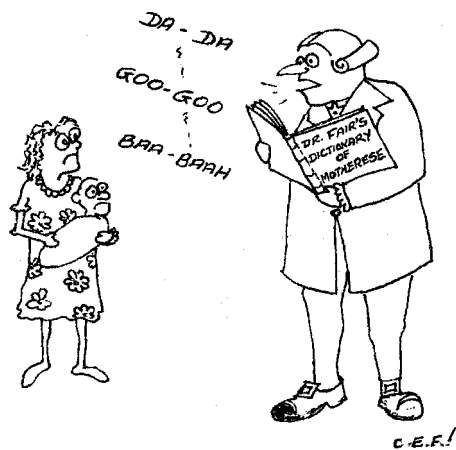
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New medical words

Motherese

Reading about the seemingly miraculous, if controversial, technology of cochlear implantation, I came across the word motherese. It is not to be found in my Stedman's or Dorland's medical dictionaries, nor in the Oxford nor the Webster, but it seems to be in common use among audiologists and otologists.

Motherese is the language spoken, all over the world, by mothers to their babies, before and after birth, and it is the earliest language a baby hears. The instinct of a mother to talk and sing to her baby is fundamental—as fundamental as the instinct a native woman in the jungle has to pluck a flower and put it in her hair. A baby deprived of motherese through deafness, or, to a lesser degree, through separation from the parents, is indeed handicapped. Perhaps a baby who does not hear a mother's lullabies is later in life the one who is tone deaf, who has a "tin ear."



Thinking about motherese, I realised that I have been using it in the examination of babies and infants for many years. In examining such patients the trickiest part is the examination of the throat and ears. I find that if my approach with the otoscope is accompanied by a whispered patter of words a baby, even at a few weeks of age, will stop and listen—stop for long enough to permit a quick look at the tympanic membranes. Using this technique may bring questioning looks from the mother, but usually she recognises that motherese is being spoken.

Older children of prerationalising age (up to 5 or 6) also respond to a whispered or spoken patter, which includes familiar maternal phrases such as "keep still now" and "don't move an inch." Including the words "please," or "let me see, please," often helps: the children recognise them from the training in good manners they have been receiving from their mother.

By the time they graduate, medical students have usually had little experience in hands on contact with small babies. Coming usually from middle class backgrounds, they have probably never changed a nappy or been able to familiarise themselves with the natural movements and reactions of these active, small patients. In the wards the nurses fiercely protect their charges from the too close attention of novices. I feel that the use of motherese might well be taught to students as part of their paediatric training.

The quietly persevering specialists and parents who are trying to help the child born deaf to be able to enjoy the gifts of hearing and speech deserve our fullest support. One small electronic device is unlikely to be able to replicate all the functions of a sensitive organ that has evolved over aeons of time, but a little success in improving the quality of a life may always grow into greater successes. We must enter motherese into the dictionaries.

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