Prescribing costs when computers are used to issue all prescriptions

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Abstract

The aim of the study was to see whether the use of a computer to issue prescriptions in conjunction with a computerised, customised drug formulary affects prescribing costs. Data on prescribing costs were obtained from the Scottish Prescription Pricing Bureau for 1978-87. A microcomputer system was introduced into the practice in 1983 and used initially to issue repeat prescriptions, but from 1985 onwards a new system was added to issue all prescriptions; a personal computerised drug formulary was developed in 1983. Personal prescribing costs before and after computerisation were compared with those of the other partners and those of the Lothian Health Board and Scotland combined. The prescribing costs of the partners and Lothian Health Board and Scotland combined increased almost linearly in line with inflation from 1978 to 1987. Personal prescribing costs increased steadily until 1983, when repeat prescriptions were issued by computer, and remained static for a year. Thereafter they increased steadily until 1985, when all precriptions were issued by computer, and then showed a steady and sustained fall. Personal prescribing costs were 21·5% lower than those of the partners in 1986 and 29·5% lower in 1987.

Prescribing costs were reduced when a computer was used to issue all prescriptions in conjunction with a personal, computerised formulary.

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Introduction

Computers have been used to issue repeat prescriptions for several years. It is only recently, however, that they have gained widespread use in issuing all prescriptions; consequently there have been no reports to suggest that the cost of prescribing may be reduced if all prescribing is done using a computer. Difford reported a reduction of 2·7% in the cost of prescriptions with computerised repeat prescribing, but his study compared data collected over only a month.[1] Beardon *et al* found that prescribing costs were reduced by 10% when a non-computerised formulary of drugs was introduced into their practice.[2]

Providing feedback to doctors about their prescribing costs has been shown to influence prescribing and to reduce costs,[3-6] but maintaining any initial change is difficult.[7] Certainly when my partners and I developed a partial formulary for our practice in 1982 we found no sustained decrease in our prescribing costs as a result of using it. We later abandoned it because it was difficult to remember which drugs were in the formulary and because it was not customised for each individual doctor and therefore entailed prescribing unfamiliar drugs. To overcome these difficulties I constructed a computerised formulary that was customised for my own use and could be accessed by easily remembered mnemonics through a standard computer keyboard.[8] The purpose of this study was to see whether the introduction of the computerised formulary to issue all prescriptions influenced my prescribing costs.

Methods

In 1983 our practice installed a computer system that had been obtained under the "Micros for GPs" scheme.[9] The software allowed only repeat prescriptions to be produced, and therefore in 1985 I developed a computer system for use in the consulting room that could be used in conjunction with the original system to produce short term and repeat prescriptions. The system was based on the computerised formulary described above.[8]

I had been collecting statistics of prescribing costs from the Scottish Prescription Pricing Bureau since 1978 and so could compare costs from 1978 to 1983 (before computerisation) with those from 1983 to 1987 (after computerisation). An example of my prescribing statistics are shown in figure 1. The Scottish Prescription Pricing Bureau produces printouts of the figures for one month in every four, and cumulative results for the year are obtained by adding the columns. The figures for yourself and partnership are the same because at that time I worked as a single-handed general practitioner within a group practice of seven doctors. The sizes of our lists are below the Scottish average of 1800 because we each hold an appointment as a hospital practitioner for five sessions weekly. Our personal lists are similar in terms of the age-sex distribution of the patients and their social characteristics, but as we practise in a new town our patients tend to be young.

My six partners gave me their printouts for the years 1980, 1984, 1986, and 1987. From these I calculated

Month	Total number of prescriptions dispensed		Total value of ingredients (£)		Average ingredient cost per prescription (pence)			
	Yourself	Partnership	Yourself	Partnership	Yourself	Partnership	Health Board	Scotland
JAN 86	318	318	1126	1126	354	354	455	420
MAY 86	326	326	1179	1179	362	362	473	443
SEP 86	295	295	844	844	286	286	481	449
JAN 87	294	294	920	920	313	313	485	452

Month	Total number of patients on the list at latest available date	Average number of prescriptions per 100 patients Health Board/Scotland			Average ingredient cost per patient (pence)		
	Partnership	Partnership	Health Board	Scotland	Partnership	Health Board	Scotland
JAN 86	1366	23	50	59	107	229	252
MAY 86	1366	24	50	58	87	237	260
SEP 86	1366	22	49	57	62	235	260
JAN 87	1325	22	49	58	71	239	265

FIG 1—*An example of my prescribing statistics as given by Scottish Prescription Pricing Bureau*

their average prescribing costs and compared them with mine, those of our health board, and those of Scotland as a whole. The average prescribing costs of the health board and of Scotland were not significantly different and so I used a combined value when analysing the data.

My computer formulary was designed so that each drug had a cost field built into it, which allowed me to obtain the cumulative costs of repeat and short term prescribing at any time. I compared the figures calculated with the practice computer with corresponding figures supplied by the Scottish Prescription Pricing Bureau and found that they differed only by a maximum of 10%. There were several reasons for this difference: some patients might not have collected their prescriptions, pharmacists might have got their supplies of drugs from a different source, or the prices of drugs might have changed.

Results

Figure 2 shows the changes in prescribing costs from 1978 to 1987 for me, my six partners, and the local health board and Scotland combined. Prescribing costs increased almost linearly in line with inflation for my partners and for the health board and Scotland. My prescribing costs also increased until 1983, when computerised repeat prescribing was introduced into the practice and then remained static for a year, increasing again in 1985. My prescribing costs fell substantially, however, in 1986 and 1987 after I introduced a computer in the consulting room to issue all prescriptions. They were 21·5% lower than those of my partners in 1986 and 29·5% lower in 1987.

Discussion

The indicator of cost used in figure 2 is the average cost of ingredients per prescription, but certain factors need to be controlled or known to make this a valid measurement.

Comparison of prescribing costs may be misleading because they depend not only on the cost of each drug prescribed but also on the size of the prescribing doctor's list, the distribution of age and sex in the population studied,[10] and the number of prescriptions issued. If the size of a doctor's list increases the number of prescriptions issued will probably rise and therefore the total net cost of ingredients will increase. If, however, large numbers of low cost prescriptions are issued the average cost of ingredients per prescription will fall, which would create a false impression of falling costs when in fact the fall is due to an increase in the number of prescriptions. In our practice any changes in the size of our lists or in the age and sex distribution of our patients have been small and equal for all of us. For example, from 1979 to 1987 my list size rose by only 6% (from 1250 to 1330 patients), which was similar to an average increase of 6·6% in the list sizes of my partners. Similarly, the number of prescriptions issued by my partners and me has also remained remarkably constant. From 1983 to 1987 I issued an average of 312 prescriptions a month with a maximum variation of only 8% and my partners collectively an average of 470 prescriptions a month with a maximum variation of only 5%. The average number of prescriptions issued per 100 patients also remained fairly constant, being 24 for me, 50 for the health board and Scotland combined, and 35 for my partners.

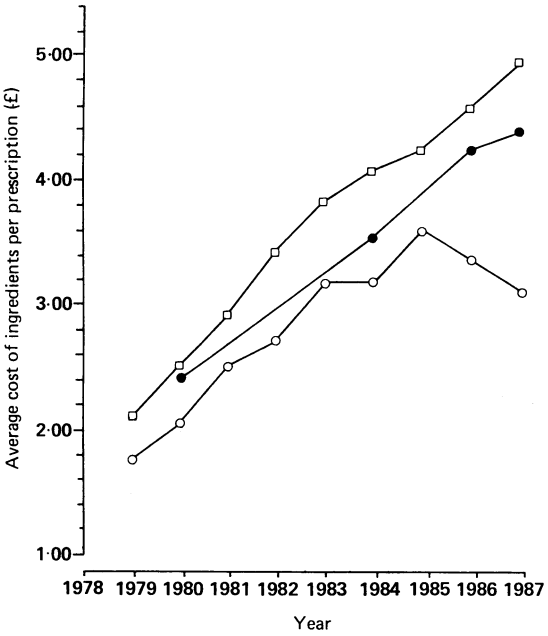

FIG 2—*Average cost of ingredients per prescription (indicator of prescribing cost for me (○—○) my six partners (●—●), and the Lothian Health Board and Scotland combined (□—□) from 1979 to 1987. My partners and I started to use computers for repeat prescribing in 1983; from 1985 onwards I issued all prescriptions by computer*

Figure 2 shows that there was no reduction in the prescribing costs of my partners after the computer was introduced into the practice and that the initial reduction in my prescribing costs was not maintained in 1985 as might have been expected. The use of a computer for repeat prescribing therefore seems to have little effect on prescribing costs, which has also been shown in other studies[1 11]; one possible explanation of this finding is that general practitioners have much less control over repeat prescribing than over short term prescribing because a considerable proportion of their repeat prescribing is initiated by hospital doctors. When the computer was installed in 1983 I spent time auditing my prescribing, optimising the quantities of drugs supplied, and substituting generic drugs when possible. As a result my prescribing costs were static between 1983 and 1984, but, having made these initial changes, I was not able to make further improvements and so my prescribing costs once more increased for the reason already discussed. I would, however, recommend that doctors when changing to computers for prescribing take the opportunity to audit and rationalise their prescribing and to prescribe generically when possible.[12]

Figure 2 also shows that my prescribing costs fell after 1985, when I used the computer to issue all prescriptions. Several factors helped to produce and maintain this fall. Firstly, 70% of my prescribing was of drugs to treat acute illnesses. Secondly, the formulary of such drugs was carefully optimised for efficacy, cost, and quantity and a feedback of the costs and prescribing patterns could be readily obtained, thus allowing continuous modification and revision of the formulary. Finally, my compliance with the computerised formulary of drugs to treat acute illness was greater than 95%, with fewer than 10 prescriptions a month being issued for drugs not included in this formulary.

It is an advantage to get immediate feedback about prescribing costs and patterns so that the formulary can be altered at any time. This makes the system flexible and thus improves the compliance of people using it. Currently, the figures obtained from the Scottish Prescription Pricing Bureau are about a year out of date and give no indication of prescribing patterns. Even the recently introduced prescription analysis and cost (PACT) figures refer to prescribing patterns for the previous four to six months.

Most general practitioners work from a formulary of about 300 drugs, but this is a personalised list and any attempts to make doctors use an unfamiliar formulary

simply leads to non-compliance. The computer program should incorporate a comprehensive list of drugs based on the *British National Formulary*, but, in addition, doctors using the computer should each develop their own list of 300-400 drugs on separate computer files. The name, strength, dose regimen, price, and quantity of each drug may be predetermined but easily altered if necessary, which would enable doctors to optimise their prescribing costs. Only a small number of keystrokes would be needed, thus facilitating quick and easy prescribing, which is essential during a consultation.

Obtaining the price of drugs is not easy and requires references to several sources of information such as the *British National Formulary*, *Monthly Index of Medical Specialties (MIMS)*, *Drug Tariff*, and *Chemist and Druggist*. Unless this is done, however, the formulary loses its educational impetus because doctors are notoriously bad at familiarising themselves with the cost of drugs.[13] Prices change frequently, but I have found that when the formulary is kept to a manageable size (my drug formularies for short term and repeat prescribing contain 210 and 245 drugs respectively) prices need to be updated only once a year to keep total costs within 10% of the actual costs given by the Scottish Prescription Pricing Bureau.

The use of computers in general practice may lead to an improvement in the care of patients and a reduction in prescribing costs. Computerised repeat prescribing with a large computerised drug dictionary will not in itself produce a fall in prescribing costs. Savings will be made only if all prescribing is done with a computer in conjunction with a personal, computerised formulary. This will become more common in the future as general practitioners become used to computer systems in their consulting rooms and as better software is developed.

I thank my partners for giving me their prescribing statistics and Anne King, computer information officer at Howden Health Centre, for help in collecting my prescribing statistics and costs.

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