

# Computers and audit

M.J. FITTER, BSc, PhD

A.R. EVANS, MB, MRCP

J.R. GARBER, BSc, MSc

**SUMMARY.** *A computerized information system was installed in a large group practice. This paper describes how the computer system was used for the systematic auditing of clinical activities, and also demonstrates how it acted as a catalyst for the review and changes of administrative and management procedures. An analysis of the issues that arose in an audit group is used to identify how the objectives and activities of the group evolved with experience. It is demonstrated that a computer system and audit can complement and enhance each other to the benefit of clinical and managerial decision making.*

## Introduction

THE use of audit in general practice generally aims to improve the quality and effectiveness of the service provided. Yet many general practitioners appear reluctant to use audit in their practice. Drury has given a clear indication of why this is the case:

'Most of us face some difficulty with the word "audit" and its implication of outside supervision and loss of "independence". The status of "independent contractor" has in general practice become such an article of faith that audit is seen to be sacrilegious. This is compounded by the professional isolation of most general practitioners, who, in the main unsupported by colleagues or young doctors in training, live in the small world of their consulting rooms. Unused to either mutual support or scrutiny, we become more and more paranoid about outside interference.'<sup>1</sup>

It is also the case that audit generally involves the doctor in extra work. Most reported audit studies have required a substantial amount of additional information to be collected for the analysis — for example, by placing carbon sheets in prescription pads. This has the disadvantage of an increased workload which deters a practice from undertaking audit in the first place and makes repetition of the exercise unlikely. Such methods of data collection also remind participants that the data is being collected, which is often methodologically undesirable. In contrast a computer offers the benefit of relatively easy analysis of the information that is recorded on a routine basis, primarily for other purposes. For example, Difford reports an analysis of computer-produced repeat prescriptions and their use for assessing and improving drug management.<sup>2</sup>

Many general practices have recently acquired a computer system though it is unlikely that more than a few have done so specifically to aid practice audit. The practice described in this case study is therefore representative of the majority as prior to the project it had not demonstrated any specific interest in

systematic audit or related research activities. Thus it is of interest to examine the process by which, as a consequence of acquiring a computer, this practice developed an interest in audit to the extent that at the end of the project the need for audit was the main justification for the decision to purchase another computer.

## Method

A practice with six full-time partners, operating from two sites, and serving about 20 000 patients, agreed to take part in a computer project over a three-year period. The project was a joint one between the IBM UK Scientific Centre and the University of Sheffield Medical School. A team from the MRC/ESRC Social and Applied Psychology Unit of the University of Sheffield was engaged to carry out an evaluation of the project, focussing on the impact of the computer system on the doctors, staff and patients and on the practice as an organization.<sup>3</sup>

The IBM Sheffield Primary Care System was an experimental computer system with facilities which included maintenance of an age-sex register, repeat prescribing, encounter notes, summaries of history, current medication, and analysis of practice statistics.<sup>4</sup> Its installation was spread over a 12-month period, with a further 12 months of use and evaluation.

The audit group consisted of all the partners and was set up in August 1982. From then until the end of the evaluation, 12 months later, the group met on a total of 10 occasions. These meetings were not originally part of the project but stemmed from the doctors' need for a more systematic approach to the analysis of information as the project developed. A member of the evaluation team attended all except one of the meetings and, although not taking an active role, took notes and produced minutes of each meeting. This paper is a result of that role. The meetings were well attended with at least five partners present at each.

## Results

### *Initial meetings and the information available*

At the early meetings specific audit goals had not been set and a wide range of information was presented to, and discussed by the group. The information was extracted from indices of the patients registered with the practice, and from repeat medication authorized and prescribed.

Each of the indices was available as a histogram for the whole practice population divided into age groups, and also subdivided into male/female and individual doctors.<sup>5</sup> From this information the practice produced various analyses; prescribing patterns and costs was one of the first to be discussed.

### *Audit and individual clinical judgement*

The analysis of prescribing costs showed that some of the commonly prescribed brand name drugs were seven or eight times more expensive than equivalent alternatives. Prescribing costs were seen as important by the group but not the sole criterion when deciding which drug should be prescribed. They stressed the importance of a doctor's clinical judgement. They felt that there was an important distinction between sharing information on which individuals could make decisions, and accountability to partners. Thus if there was to be a practice policy the group felt that it should evolve slowly and only by consensus. The group decided to change some of the commonly prescribed expensive drugs, some by brand substitution and others by generic equivalents.

M.J. Fitter, Senior Research Officer and J.R. Garber, Research Officer, MRC/ESRC Social and Applied Psychology Unit, University of Sheffield; A.R. Evans, Associate Lecturer, Department of Community Medicine, University of Sheffield Medical School.

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The computer made it possible to change all the occurrences of a particular drug name in the current medication file to an alternative name. However, considerable caution was expressed about doing this. Although alternatives were clinically equivalent they were likely to differ in presentation and therefore a change might cause concern to patients unless they were individually informed by their doctor. It was agreed that no tranquillizers would be batch changed because of the important psychological component in their use.

Four drugs were batch changed. The number of prescriptions issued in a month in August 1982, December 1983 and April 1985 for each of these drugs is shown in Table 1. It can be seen that the ratio of the substitute to the original brand increased following the decision by the audit group in February 1983 and that for three of the four drugs this ratio had increased further two years after the decision. Although prescribing practices had been discussed before the arrival of the computer prescribing patterns had not been monitored. The computer made these patterns available for discussion, thus making the debate about practice policy versus individual clinical judgement more necessary.

### *Evolving objectives*

The focus of the early meetings was the computer printed analyses. However, it was felt that discussion of these analyses would be more useful if time were devoted in the meetings to updating knowledge of the drugs being discussed. Thus the later meetings included tutorial sessions in which one of the partners would present a topic that he had prepared. For example, one meeting dealt with prescribing oral contraceptives. An analysis of all oral contraceptives appearing in the *Monthly index of medical specialities* was presented together with a computer analysis of the numbers prescribed by the practice and their unit costs. Again there were examples of clinically equivalent brands differing substantially in price where the more expensive brand was prescribed more frequently by the practice.

The pharmacological differences between oral contraceptives and the associated clinical indications were discussed at length. The patient's social, as well as clinical, circumstances were agreed

to be of importance in choosing the most appropriate brand. However, it was felt that there were only a small number of essentially different clinical or social circumstances, and within each of these the cheapest brand could be prescribed. It was agreed that the partner who had presented the tutorial would prepare a protocol (in the form of a flow-chart) outlining the necessary decisions and outcomes. Again it was stressed that what was being agreed was only to act as guidance for the doctor. With this proviso a prescribing protocol of only seven oral contraceptives, plus the possible outcome of no prescription was agreed.

### *Reviewing procedures*

The repeat prescription system had been installed for nine months when the audit group was formed, but was still undergoing teething troubles. The group allowed the doctors to overcome some of the operational difficulties. From a discussion of repeat prescribing patterns the group realized that any comparison of the prescribing profiles of the individual doctors would be strongly influenced by each doctor's criterion for deciding whether a patient should have a computerized repeat prescription rather than a handwritten one.

The group wished to compare the frequency of repeat prescribing of each doctor in relation to the age and sex of patients. For this reason they felt it was important to agree standards of clinical terminology and procedures for the issue of repeat prescriptions. Without such agreement it was recognized that the data analysis would not be entirely valid and the value of audit would be reduced.

The consequences of the doctors' commitment, or lack of it, were also revealed. The data indicated inconsistent use of the system, which reduced the value of the data. This was seen by the group as letting down other partners who had made a greater commitment. The group agreed to a procedure where the doctors recorded the issue and update of repeat prescriptions when they were reviewed (usually during a consultation).

A subsequent meeting revealed other difficulties with the operation of the repeat prescribing system. In addition to the problem of defining eligibility for a computerized repeat prescription, the appropriateness of the parameters that con-

**Table 1.** The number of repeat prescriptions issued in the months August 1982, December 1983 and April 1985 for brand medication and its substitute as agreed by the audit group in February 1983.

Date	Original brand	Number of prescriptions in month	Substituted generic	Number of prescriptions in month	Ratio of substitute to original
August 1982	Aprinox (Boots)	30	Bendrofluazide	147	4.9:1
December 1983		7		95	13.6:1
April 1985		8		160	20.0:1
August 1982	Aldomet (Merck Sharp and Dohme)	6	Methyldopa	121	20.2:1
December 1983		1		48	48.0:1
April 1985		0		80	
August 1982	Indocid (Morson)	27	Indomethacin	66	2.4:1
December 1983		5		40	8.0:1
April 1985		1		70	70.0:1
August 1982	Lasix (Hoechst) and Burinex K (Leo)	94	Frusemide	67	0.7:1
December 1983		9		52	5.8:1
April 1985		24		88	3.7:1

strained the issue of repeat prescriptions was questioned. As a consequence the group agreed to review the setting of these parameters.<sup>6,7</sup> Thus what started as an examination of repeat prescribing patterns became identification and revision of the important aspects of the procedure for the effective issue of repeat prescriptions.

### Management planning

Prior to the setting up of the audit group the practice had run a Friday lunchtime group for more than 12 months. This had involved partners, attached nurses and health visitors. Its purpose was to review practice activities and agree changes where necessary. For example, the workload of nurses and the need for a well-woman clinic had been examined. After formation of the audit group it made some of the decisions which would have been made by the Friday group. For example, they also examined the need for a well-woman clinic, but their discussion was based on a computer analysis of the practice population. An age profile of the female practice population indicated that there was likely to be an increasing demand for such a clinic. This approach resulted in a more systematic decision making process in which evidence based on a computer analysis was presented, decisions were agreed and minuted, and action was monitored. Although recently some of these discussions have reverted to the Friday group, it being a wider forum, the audit group has taken over a large part of the responsibility for decision making. This is reflected in the amount of time that the group devotes to these issues. Reviewing and revising the way that the computer system was being used in the practice was important in these discussions.

### Discussion

In the early meetings of the audit group information was provided on each doctor's behaviour. This enabled the group members to compare their activities with those of their colleagues. This had two results:

1. Discussion of the data was a constructive experience for the partners, who observed that they learned from the data, but more importantly from each other. This led to policy changes and an agreement to change prescribing behaviour in some areas. These changes were then put into practice.
2. The examination of the computer data revealed inconsistencies in the use of terminology and in the recording of activities. Discussion of these inconsistencies resulted in a better understanding of the practical requirements for an effective computer system and in the modification of procedures for operating the system.

The audit involved peer review in a closed group. Previous research has suggested that audit may be threatening to doctors in a way that inhibits change.<sup>8</sup> However, although the audit sessions were clearly challenging, the focus on operational procedures and practice policy enabled changes to be agreed and implemented without undue personal discomfort. The group recognized the dilemma between the desirability of a collective policy and the need for individuals to be free to make their own judgement. In particular, there was pressure for a consistent and standard method of information recording. Although to some extent this represented a departure from previous practice, the audit activities led to an appreciation of the importance of consistent information recording if the computer were to be used effectively. Thus the combination of computer and audit led to a more consensual form of decision making but at the same time the partners stressed that their primary responsibility was to their patients and that this was dependent on retaining their right to make individual clinical judgements.

The sessions were regarded as a success by the partners who unanimously agreed to continue the audit group after the termination of the computer project. In fact the major justification given for the partners' decision to purchase a new computer was the importance of the audit group to the practice.

The computer was the catalyst which brought the audit group into existence. It also made audit a practical proposition and enabled the audit process to be more effective. The meetings of the audit group provided the structure within which management decisions could be effectively tackled, in particular decisions about the computer. Both computer and audit would have been less effective without the other.

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### Address for correspondence

Dr M.J. Fitter, MRC/ESRC Social and Applied Psychology Unit, Department of Psychology, University of Sheffield, Sheffield S10 2TN.

## Stress and herpes labialis

The model of recurrent herpes labialis was selected to evaluate the role played by stress in increasing susceptibility to illness. Initially, 35 volunteers with recurrent herpes were enrolled in the project. Compared with 35 age- and sex-matched controls, this group demonstrated a familial predisposition to recurrent herpes labialis.

Eighteen subjects without confounding variables known to precipitate recurrent herpes infections completed a pretested 'stress' questionnaire during a dormant and again during an active stage of infection. In the week prior to the appearance of a recurrence, this group experienced (1) increased daily hassles, (2) increased stressful life events, and (3) higher state anxiety. These findings are discussed in the broader context of stress-associated disease with some speculations concerning a possible biologic mechanism, which involves modulations of T-lymphocyte function.

Source: Schmidt DD, Zyzanski S, Ellner J, *et al.* Stress as a precipitating factor in subjects with recurrent herpes labialis. *J Fam Pract* 1985; 20: 359-366.