

TALKING POINT

Computers in primary care: where next?

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At present a typical microcomputer with keyboard, screen, two disks, and a printer costs just under £2500. This is probably the minimum that a general practitioner should expect to pay for a reliable system. A machine of this size could hold a certain amount of information about each patient, and a set of programs is available commercially for about £500. This would print out, for example, how many patients came with various diseases, how many of each type were seen by each partner over a given period, and how many were given a particular type of drug. At the other end of the scale, a share in a system such as that developed by the Exeter computer project would cost about £1 per patient per year for a four-doctor practice and less if 30 or so shared the same system. This allows the doctor to record virtually anything about his patients and retrieve it on a screen in his consulting room as well as analyse it statistically. All the information held by either system has to be typed in, and all computers require power supplies and maintenance quite apart from any development costs. It seems clear that any form of computer-held record will be more expensive than the paper envelopes used in most practices. The question we have tried to answer is, Should every doctor consider how he could move over to computer-held records, or is the computer likely to be more of a hindrance than a help to a family doctor who prides himself on the individual attention he pays to each patient?

Advantages of ordinary records

Ordinary records have several advantages which so far have not been matched by any computer system. Firstly, paper is cheap, readily available, familiar, and reliable. It can be used anywhere at any time without special equipment. Secondly, it can be sent through the post and one record folder can hold letters, charts, diagrams, reports, consent forms, and photographs without them having to be converted or typed out again in any way. Lastly, records of any length or complexity can be held without the need of outside expertise, finance, or advice.

The disadvantage of paper so far as general practitioners are concerned (apart from legibility, which could be improved with a typewriter much more easily than with a computer) is that it is laborious to cross-index the information it holds. This is one area in which computers excel to such an extent that it may be worth solving all the problems of data entry and retrieval, expansibility, reliability, confidentiality, response time, and cost.

A vision opens up in which a doctor could look back over his experience and find out what caused his patients to become ill, which did best on which treatment, or what part of his time was spent most effectively. It is this vision which has led to the upsurge of interest in computers in the medical profession. Cost may no longer be the insuperable barrier it was, and the goal may be in sight. But the advantages of paper should not be

forgotten, and it is worth seeing what steps need to be taken if the vision is to be realised.

Stages in design

There are several techniques a systems analyst can use when he is asked to advise on whether a computer would increase an organisation's efficiency. The first is to interview the staff and find out about their information requirements while they learn what a computer can or cannot do. He can go through the existing information network in the organisation and take note of how much time is spent seeking information or providing it. At the end of the day he can advise on whether a computer would be a worthwhile investment and which system would provide the best value for money. If he is an independent consultant he can also take into account the advantages and disadvantages of different computers and the reputation of their manufacturers for after-sales service. The management can then consider the proposal. Once the decision has been made to acquire a system there will be a period of training, conversion of existing records, which can be expensive, and inevitable setbacks. Once the system has been installed and accepted it can be evaluated and the various manual procedures to be used in the event of machine failure can be tested.

After a time the system is likely to have to be developed and altered to match changing requirements just as any manual record system would have to be, and it may be several years before the organisation can really judge how well the system suits them. If they decide to keep it, all may go well until the equipment reaches the end of its useful life but problems may then occur when switching to a new machine. Incompatibility between programs written for old and new computers is something many NHS installations are coping with at present, even within the range of machines supplied by one manufacturer, let alone when one is acquired from a different maker. There are various stages in the acquisition of a computer system, from the initial feasibility studies to staff consultation, consideration of proposals, design, installation, evaluation, and maintenance, and decisions must be taken at the end of each stage.

The same stages can be followed by a general practitioner. The first step is to decide what information is required, but the process by which input is to be converted into output must be specified as well. Too many of the projects we have seen have concentrated on getting all the information into the computer. If the information is not coded on input then it can be retrieved only in the same form as it was put in. For example, each antibiotic will have to be searched for by name if drugs which are antibiotics are not coded as such and a list of all patients who have taken antibiotics for a given condition is required. It is similarly much easier to add a code for severity of a given condition when the patient is seen than to try and decide which were the serious cases later by searching for all the phrases which might indicate severity. Incidentally, if a small computer is to be used for collecting data for research and statistical analysis is not to be carried out by the researcher, it may be well to check that the person who is to do the analysis can transfer the data to his computer before the project starts.

The next step is to consider precisely who will use the computer and its peripherals since some systems can be expanded for multiple users, each having their own terminals but using the same disk files; others cannot. This leads to the questions of cost and confidentiality and needs to be considered in detail.

Who will use the system?

The main applications for computers in primary care so far have been for research, practice administration, medical records, and

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producing lists of patients of one kind or another, such as age-sex registers. Relatively little attention has been paid to others with a potential interest in primary care records, particularly the nurses associated with the practice, hospital doctors, family practitioner committees, the district management team, area health authorities, and those responsible for monitoring the safety of drugs.

Nurses, in particular, care for patients in the community as home nurses, health visitors, domiciliary midwives, and psychiatric nurses, and are concerned in surveillance, prevention, education, research and development, and administration in a complementary function to the doctor in the primary care team. They may well be able to do so more effectively if they have access to clinical information such as diagnosis, critical data such as drug allergies and schedules, and hospital reports. Similarly, the doctor may learn something from the nursing record that did not come out when he saw the patient. The way in which such co-operation could come about would need to be discussed, but unlike paper records a computer system has the advantage that it can be structured, with various parts accessible only to certain people, and more than one person can use the record at one time.

Outside the practice some family practitioner committees are considering acquiring their own computer systems, and if basic patient registration details can be input into one computer it would be advantageous if they could be linked in some way to avoid the necessity for the same details to be entered again into another.

Those responsible for planning hospital and other services have little information on the level of need in the community such as, for example, the number of people who will need a hip replacement at some stage in the future. Thus many hospitals and their associated revenue and manpower consequences have to be based on norms. A survey of AHA minutes showed numerous examples of decisions which had been taken despite the lack of information which could have been obtained from primary care systems. These included decisions on the provision of hospital departments, day-care units for the elderly, health education campaigns, terminal care facilities, and the appointment of consultant staff. The Committee on Safety of Medicines could obtain more precise information on the side effects of new preparations from a computer system in the practice, and the need for special surveys such as the National Morbidity Survey could be obviated.

The common feature of all applications outside the practice is that information required should be available entirely as a byproduct of that recorded for direct patient care, rather than necessitating the completion of a special form. If the computer system is designed with this in mind it should save time rather than cause extra work, and it could provide the basis for much better co-operation between those planning services and those treating patients than could be achieved with any manual record system.

Confidentiality

There must be adequate safeguards to ensure that data remain confidential, and this has been the subject of much debate. Quite apart from the moral aspect of a doctor keeping confidential information disclosed to him, there is the pragmatic point that many patients would no longer go to their doctor if there was any chance that release of information about their condition would affect their livelihood or status in society. The bank manager would be reluctant to lend to an alcoholic, the director of a firm might not promote someone suffering from depression, and those suffering from anything which might lead to loss of a driving licence might not dare to ask their doctor for advice.

The main threat of the computer is precisely its advantage under other circumstances—namely, that it can search all the records for patients in particular categories in a way which cannot be done with manual systems. A list of patients in particular occupations who had illnesses which could make them unreliable under certain circumstances would interest several agencies and some of these might be Government agencies. A list of names and addresses of epileptic patients, for example, might help police track down any who had obtained driving licences illegally, and this could be considered almost as part of their duty. Obtaining such a list from someone with access to the computer would become easier in direct proportion to the number who had access to the computer file. Maintenance of the confidentiality of computer systems by all possible means is

therefore an essential part of the introduction of such systems, even though these precautions may be irksome in the day-to-day use of the machine. This is a factor which will have to be taken into account rather than receive lip service if computers are to become acceptable.

Which computer?

When the decision has been made as to what will go into the computer, what will come out of it, what procedures are required to convert the input to the output, and the overall work load of the machine, as well as the length of time for which records must be stored, a computer can be selected.

In the first instance the options are to go for a stand-alone computer in the doctor's premises or for several practices to have terminals of one kind or another linked to a computer which is shared by all of them, as in the Exeter project. One advantage of a shared arrangement is that staff employed to run the system could also be shared. The improvement in reliability so far as the doctors are concerned may be the deciding factor in this case, though too little experience has been gained yet for this to be known. The computer centre shared by, say, eight practices could keep spare terminals which could be taken out to an individual practice if the latter's terminal became faulty. It could perhaps keep more than one processor or disk drive in the centre so that continuity of service could be maintained at all times, and if professional systems analysts and programmers were employed the centre staff could keep up to date with changing requirements and could plan for replacement equipment, rewriting programs, and transferring files, etc, so that the system would never fail in the way in which a system bought and owned by an individual might. The cost to the general practitioner would depend on what staff were employed and how many doctors used the facilities; perhaps only a few centres would need to have a development capability.

On the other hand, general practitioners are individualists: they might prefer to have their own system and make their own arrangements with commercial firms. In the projects we have seen there are probably no more than two using the same equipment. But as experience increases some systems may be developed that gain acceptance among practitioners. There is the possibility that family practitioner committees may acquire computers and offer an increasing range of computing services to general practitioners who do not want their own systems.

Evaluation

The computer has exciting possibilities and there is an understandable desire among many practitioners to get on with acquiring access to one without planning any procedure to monitor whether the investment in time and effort has been worth while. We hope that the DHSS's research programme will show the advantages and disadvantages of different approaches. This will take time, but the present economic climate might act as a disincentive to many general practitioners who would otherwise go ahead without waiting for the results.

Much work has been and is being done in the public sector towards providing computing systems for primary care, and large and small commercial firms are also taking an increasing interest. Any general practitioner who is interested in carrying out research in primary care computing, the results of which could be used for the benefit of primary care teams generally, can get financial help from the DHSS. Evidence of originality, usefulness, and a proper scheme of evaluation will be required before support is given. Details of the information required and the format in which proposals should be submitted may be obtained from Mr M Ainslie, DHSS, Ray House, 6 St Andrew Street, London EC4A 3AD.