Computer compatible records in general practice

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How can the general practitioner modify his methods of record keeping to ensure that the maximum help can be obtained from the computer? This is the central question which I have tried to answer by finding out what are the snags of recording information in computer compatible form.

Every general practitioner is aware of the difficulty of recording on the present medical record. In our practice many of the bulky, out-of-date folders are kept under control only by a rigorous policy of filleting out irrelevant letters and noting items from relevant ones on the 'important notes' page. Retrieval of information from these records is not easy and usually involves many hours of hand searching.

In order to consider what effect the computer may have on the medical record one needs to consider its purpose. Its application to administration and to clinical care must be defined and related to the idea of a general practice as an information system. Different ways of recording this information will be discussed and a plea made for further experiment.

The introduction of computers into medicine is viewed by many doctors with distrust. New methods are unsettling, and may seem threatening to people happy with their present methods of recording. This fear is best removed by understanding how the computer works and what benefits it may bring to records. Education in data processing methods must include all the staff who are going to be affected, so that anyone who collects information for the record system can see that the information he collects is used, and that the system is worthwhile.

The benefits that one does expect from a computerized record are the production by automatic means of a readily accessible and legible account of the important items of information about all the patients in a practice. The record is accessible to persons working at different places who may need it at the same time. The drudgery associated with the present manual system is eliminated by the automatic searching and printing out, and the present limitation on searches by the very bulk of the data will disappear.

Another benefit seen in industry and in the hospital service is the use of the computer for accountancy and payroll. If the executive councils were computer minded, and paid general practitioners by computer, we would all be interested in the working of the computer, if only to check the accuracy of our pay. The preparation of these accounts would involve listing patients ages, mileage, services given, and would form a basic data file of each practice. We might benefit also by the replacement of present executive council forms by a series of forms specially designed for the purpose. A properly designed form is easy to complete; the present ones are not.

The present medical record can be made computer compatible, if certain guide lines are followed. It is already the habit of many practitioners to keep the continuation cards in the records linked in chronological order, with a summary card of immunizations and allergies at the front with 'important notes' on its reverse. The current continuation card is unlinked for ease of extraction. Every new diagnosis is ringed or underlined and a code number from the classification of morbidity produced by the Royal College of General Practitioners inserted in the date margin. The attendances...
under each diagnosis are numbered (see figure 1). Any investigations ordered are noted in contrast ink, so that the necessity for inserting the result is obvious at the next consultation. A treatment plan showing exact doses of drugs is shown in block letters. Each episode is ruled off when a fresh episode begins. The aim is to show enough information so that any doctor in the practice can take over the illness.

It will never be possible to store all the information in the case record on computer media. We have to decide what is to be stored, and what value it has. If we can decide what items of information are of interest to most doctors, it is then possible to draw up a questionnaire to ensure that the minimum data base is always recorded. This has been done by some practitioners for the newly-registered patient.

This minimum data base can be recorded in the main by non-medical personnel. Weed\textsuperscript{11} has used in hospital practice a structured record which is based on the problems the patient presents at the time of consultation. This problem-oriented record consists of a list of the patient's problems, labelled and dated. Clinical policy, treatment, and persons responsible for this treatment, together with progress notes, are all related to these numbered problems, so that anyone reading the notes can follow the logical line of reasoning underlying the patient’s care. Weed’s students have carried this method into general practice.

Patient and record identification is the next biggest problem after data collection. The medical card is rarely carried and the National Health Service number is confused with the insurance number. For the medical record to be used in administration the identification must be more accurate. In practice identification is done on name and address. Most confusion arises between patients of similar name whose address is

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\includegraphics[width=\textwidth]{figure1.png}
\caption{Medical record showing ringed diagnoses.}
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\begin{figure}[h]
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\includegraphics[width=\textwidth]{figure2.png}
\caption{The flow of information in general practice.}
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out of date. The addition of a unique number, and the date of birth to the name, makes identification more precise. This name, number, and date of birth should be ideally in a form that is mechanically reproducible on to medical papers, so that the high errors of transcription are eliminated.

The opportunity to provide an identity card, similar to plastic credit cards, was missed when exemption certificates were produced for chronic users of drugs. It would still be possible to consider this method of identification if the general practitioner were insistent enough. This type of card is produced as a routine for the students of an American university, and is used in English factories to identify operators, operations performed, and location. A system of this sort would need very little modification to record medical services.

The medical record becomes valuable over a wide area only if identification methods are standardized and accurate. In some areas, like north-east Scotland, the hospital number may become the main identification number, and will serve to link any records generated in the hospital region, whether in hospital or health centre. The Oxford Record Linkage Study has shown that it is possible to use computer methods to link records made in different areas about the same person and that their value is increased by this linkage.\(^1\)

The facts recorded are used for administration as well as for clinical management. With the increase in the number of group practices, and the enlargement of the general-practice team, the problems of allocation of medical care have increased in size. The objective of general practice is early diagnosis leading to the care of the patient.\(^2\) Only the computer can deal with the mass of information which has to be processed to provide a basis for the management decisions leading to this objective.

The management information which can be provided by computer is of two main sorts, work load figures and information about groups. Delegation of work load cannot be done without recent figures. The computer can analyse and display the rates of services needed by different age groups in the practice, so that an estimate can be made of the different skills which will be required in the general-practice team. Information about groups vulnerable to certain risks can also be extracted. For example, lists of women who have had cervical smears can be used to form programmes for recall and for offering smears to those not already done.

The information flow in a general practice is shown in figure 2. To feed information into a computer system it must be converted into a form suitable for the computer to assimilate. Punch cards and paper tape are two forms which are in general use. Highly developed computer systems may skip this stage and accept input direct from a teletype or from a cathode-ray tube display where items are selected by pointing to them with a light pen. Although something of this nature may be the commonplace in the near future, we have to concentrate in the present on ensuring that clinical details are completely recorded in some simple form every time the patient receives a service.

Typing is a universally available method of legibly recording information. Anything which can be typed can be converted to punch card or to paper tape as a by-product of the typing. In the Queen Elizabeth Hospital's registration procedure a punch card is thus produced while the registration particulars are being typed out. This card is reproduced mechanically without error to become the basic document for requests and reports on laboratory tests.\(^4\)

Punch cards and paper tape each have their advantages and disadvantages. Because punch cards have their information clearly legible in a heading, they can be used for manually sorted filing apart from their use as input to a computer system. Cards can be replaced or corrected singly whereas errors on paper tape are not easy to identify or amend.
A special variety of the punch card which can be used in the field away from punch-card machines is the mark sense card (figure 3). Information is marked on this with a soft, lead pencil. Punching can be done at a later date at a central depot when the pencil marks act as electrical contacts to guide the punch.

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<th>REFERENCE NUMBER</th>
<th>DATE</th>
<th>CONS NP</th>
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Figure 3. Mark sense card as used in Exeter survey.

The main advantage of paper tape is the small bulk in comparison with card. It is this which has led to it being used as the basis of a record system in a New York hospital* and of a system in general practice in England*.

The information handled by the computer is so great that it must be reduced in volume if it is to be displayed in a manner that we can understand. Graphs and histograms have been used in some computer systems to make the output intelligible. The information required by the clinician is in three groups which all need different levels and speeds of access.

Group one is index information: Matching new patient information to see if records already exist, for example, needs immediate access to small amounts of information about each patient. A diagnostic index needs similar small amounts of information but does not call for such immediate service.

Group two information concerns the population currently under treatment. Here immediate access to all the information held about the current service is needed.

Group three is the archive of information about the rest of the population not currently under treatment. This does not need to be immediately accessible but can be brought into fast access store when a person becomes a member of the current treatment group.

These three groups of information have been displayed in various ways in hospital systems. For general practice the index is one of the most useful tools. A recent computer print-out of a list of the total population of the practice either by name, number, age or diagnosis can be manually searched quite speedily. New or additional information can be noted on the list and used for punching in amendments.

Records for patients under treatment must contain certain essentials. Provisional diagnosis with treatment plan showing exact dosage of drugs, suggested investigations and certification are all needed at the time of consultation. The most practical output
for this purpose is paper which can be used for notes during the consultation and destroyed after the record has been amended.

The archive will consist of the edited highlights of the current treatment records. The current record will be pruned down to a date, a diagnosis, and any note of sequelae or follow-up.

When a network of computers is used in the country for medical purposes it will be possible to produce these forms of print-out at places other than where the data was recorded. It will then be possible to ask for, and receive the same record that would have been received by the patient’s previous doctor, with corresponding improvement of continuity of treatment.

There is no blueprint for the perfect computer compatible record. The adaptation of our present method can only be done by trial and error. The immediate need is for quick easy access to simple computer facilities, so that we may theorize less and experiment more.

Acknowledgements

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REFERENCES