

PRACTICE METHOD

“*Practis*”

(General) Practice Recording and Computer Terminal Information System

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THIS IS A PRELIMINARY REPORT of a simple automated system for use in general practice. The system makes use of sophisticated apparatus and, although initially intended for use in a single practice, processes information in such a way that it forms an ideal input-output terminal for a much wider general-practitioner hospital medical computer network.

The requirements of an ideal general-practitioner records system are:

1. Records should be (a) identifiable
(b) legible
(c) quickly recoverable
(d) easily updated
2. A lifetime's records should be available for each patient
3. Cross references should be available, e.g., family group relationships
4. It should yield *recoverable* information for epidemiological and research purposes
5. No extra work should be placed on the doctor and a minimum of extra work should be demanded of the secretarial staff

It is probable no general-practitioner records system at present in existence satisfies all the above criteria (Robertson 1968).

Description

The system logically falls into two main parts from a developmental point of view. *Phase I* in which only the work in the surgery is involved initially and in which later the computer is used in an 'off-line' capacity; and *Phase II* in which the link with the computer is permanently established and the system comes 'on-line'. This phase possesses great potential for development.

Phase Ia is the important part of the operation and all the criteria set out in the introduction may be fulfilled by its operation although the data manipulation is carried out by using punched paper tape and is therefore relatively slow.

There will, of necessity, be a great deal of preparatory work required to turn *existing* records into a suitable form but this need not be discussed at this point. For the moment the daily running of the system will be described in its simplest form.

Routine

On arrival at the surgery a patient will give his name and address to the receptionist who will extract the N.H.S. standard record envelope from the pull-out file. When the patient is called in to see the doctor he will take this envelope in with him. The doctor will note details of the consultation in longhand on the blank space at the end of the print-out patient's history paper (see below) which is contained in the envelope. He will write out any necessary prescription and return the print-out to the envelope after underlining the diagnosis for the secretary's use later. The receptionist will extract the edge-punched Patient Identification card "P.I.C." from the N.H.S. envelope and place this in the slot in the automatic (paper tape) typewriter.

This machine automatically types out from the P.I.C. the patient's name, address and other relevant particulars onto the roll of paper it contains. The receptionist will then type manually the details of the consultation alongside the identifying particulars and return the P.I.C. and

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print-out history to the N.H.S. envelope for filing. The consultation details will be under the headings, "Diagnosis", "Treatment" and "Disposal" in narrative form with limited coding, e.g., using the disease classification of the Royal College of General Practitioners (Working Party Report 1963). This process will be repeated for all surgery attendances and visits.

The key factor in this part of the operation is that whilst the typewriter is operating either automatically or manually, it is also generating a roll of punched paper tape which contains all the relevant information. The typescript paper is simply used at this stage to check on the accuracy of the information recorded on the punched paper tape and is then destroyed.

Thus, at the end of each day there will exist a reel of punched paper tape on which is recorded the name, address, age, diagnosis, treatment and disposal of all patients seen during that day. This reel of tape will be passed through the automatic typewriter and, under programme control, without manual intervention, it will output a tabular listing of all patients seen on that day with all recorded information for each one (see table I).

By using different programme tapes any one of the following or similar searches may be made by the machine and print-outs obtained:

1. Chronological record for a specified patient or a specified family.
2. Listing of all consultations corresponding to specified diagnoses or specified symptoms.
3. Listing of all consultations for 'chronic illnesses' in a given period

—and so on.

Phase Ib. At intervals of, say, one week or one month the punched paper tape will be dispatched to the computer and used to construct magnetic tape or magnetic disc files in which all consultations for individual patients in reference number order are stored. On demand, or annually, or at the completion of a medical episode the new additions to a patient's record would be printed out and the individual's medical history updated. This updated medical history print-out would then replace the old print-out which, together with the P.I.C. would be the only documents contained in the clean, flat N.H.S. envelope, the old print-out being destroyed.

Phase IIa and IIb. The addition of these phases would result firstly from the establishment of a G.P.O. data link with the distant computer facilitating the production of punched paper tape over a telephone line, and secondly from the replacement of the automatic typewriter by a visual display unit. It is envisaged that not only would the doctor be communicating with the computer in 'real time' (with editing facilities using the visual display unit and a light pen or keyboard) but the similar terminals in district general hospitals would permit direct exchange of information.

Discussion

The main part of this exercise involves the handling of data in the surgery using a machine which is not only easy to operate but which—almost as a by-product—converts the data into a computer acceptable form, i.e., the punched paper tape. We have seen how this is feasible without a marked increase in the work-load of either the doctor or his staff.

The concept of a complete typed computerized print-out of continuously updated personal medical history is based on the underlying principle of editing the history of episodes as they are completed and allocating them to either 'significant' or 'non-significant' categories. This is done by the doctor, although it may well be possible to programme this later on the basis of diagnostic distinctions.

We have described the simplest routine operation of the system but we have also worked out detailed plans to effect a further reduction of clerical work. For example, by using multi-part prescription forms on a roll rather than on a pad, the automatic typewriter could head the forms with the name and address of the patient and also add any 'chronic prescription' simply by using the edge punched P.I.C. In our detailed planning we also find it relatively easy to deal with hospital correspondence and laboratory reports.

Programmes may be developed to pick up certain diagnoses and, if the incidence of these is rising, to print out a list of the relevant names and addresses or weekly incidence rates. In this way the system would act as an early warning device for picking up epidemics at a very

early stage. It would also be simple routine to print-out lists of people due to attend for special purposes, e.g., antenatal attendances or immunization procedures.

Conclusion

We have seen the automatic typewriter in operation and shown that the system described above will function satisfactorily during the 'mock-up' trial runs. A full report and specification including an account of the work-study, flow-charts, computer programming requirements and costs has been submitted to the Royal College and to the Ministry of Health. A report has also been sent to the Sheffield Regional Hospital Board.

It is our intention to develop the system slowly in order to gain experience at each step and we shall do this in a busy working urban practice of almost 6,000 patients.

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CLINICAL NOTE

Autoimmune haemolytic anaemia and alpha methyl dopa

A case report and comment

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ALPHA METHYLDOPA (ALDOMET) HAS BEEN the mostly widely prescribed, moderately powerful antihypertensive for some years. The deserved popularity of this drug is on account of its effectiveness and relative absence of side actions. Also dosage is not so critical as with the more powerful antihypertensive drugs. It was estimated in 1966 that more than 100,000 patients were receiving treatment with the drug in Britain (Carstairs *et al.* 1966).

Although side effects caused by alpha methyl dopa are generally less troublesome than those of other drugs of the powerful group including guanethidine and the older ganglion blocking agents, one uncommon side action is sufficiently serious to warrant particular attention. This is autoimmune haemolytic anaemia which was first linked in 1966 with alpha methyl dopa by Worledge and her colleagues at the Royal Postgraduate Medical School. They identified about 30 cases of the anaemia in patients receiving the drug and studied 25 serologically. In 24 there was overt haemolytic anaemia and one had a 'compensated haemolytic process'. The patients had been receiving alpha methyl dopa from three months to three years before anaemia was discovered but ten had been on treatment for a year or less. The majority were receiving 1 G. or less of the drug per day. The development of the anaemia was usually insidious and the symptoms leading to the discovery of the anaemia extremely variable. In a few cases it was acute in onset. The severity of the anaemia varied and there was no relation between the amount of the drug taken and the intensity of the anaemia. The Coomb's antiglobulin reaction was positive in all cases and was entirely of the Ig. G. or 'warm antibody' type. Peripheral blood films showed spherocytosis and polychromasia and were indistinguishable from films of other cases of haemolytic anaemia of the warm antibody type (Worledge, *et al.* 1966).

Fortunately the anaemia remits rapidly on withdrawing the drug or if this is undesirable, to the administration of steroids. It is important to recognize this complication since the anaemia may produce symptoms of myocardial ischaemia, precipitate cardiac failure or both. Furthermore the presence of red-cell antibody may confuse those cross-matching blood for a patient who is taking alpha methyl dopa. This could be important if major surgery was needed and it also matters in pregnant patients.

Case. Mr A. K is a machine shop inspector at an electrical factory. Well all his life, he first came