General Practice Observed

A computer record-keeping system for general practice

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In 1970 Preece[1] showed the feasibility of keeping general practice records on a computer. In August 1975 the Ottery St Mary practice started using a "real time" computer-maintained clinical record to replace the NHS envelope. The record was designed by the Ottery St Mary doctors in conjunction with the senior systems analyst of the Exeter Community Health Services Computer Project. This paper describes the record and the way we use it.

Systems requirement

For practical use we require that: (a) every record is immediately available to the doctor in the surgery, in branch surgeries, and on home visits without extra secretarial work; (b) we can make entries to the record at the time of consultation; (c) we do not have to squeeze problems into diagnostic labels and have unlimited space; (d) it is a structured record but with no rigid restrictions about its use; (e) we can edit out-of-date trivia; (f) it should be as confidential as the usual system; (g) there is a back-up system in the case of breakdown, so that the records can be used and no new information is lost.

The more cluttered the record, the less it is looked at. By providing editing and structuring, we maintain clarity and brevity, and the details needed are retained. The easier a record is to use the more it will be used. The more it is used the greater its accuracy, and the more justification there is for its further use for analysis and research as well as for day-to-day consultations.

Patient record

The records are displayed on a visual display unit (VDU) beside the doctor's desk. This has a typewriter keyboard for input and a screen for display. The VDUs are connected via exclusive lines to the computer centre at the Royal Devon and Exeter Hospital.

The secretary starts the record when a patient registers. The patient has a health centre number with which the record can be recalled at will. This number links the screens—display summary, display medication, and display extension—that form the record. These screens are filled by the doctor (or summariser) when the new record arrives and maintained by the doctor during the surgery.

DISPLAY SUMMARY

The display summary provides the main working record (fig 1) and has four sections.

Priority—This is a list of facts which should be taken into account every time the patient is seen. It includes allergies to drugs and diagnoses that warrant inclusion.

Summary history includes all episodes in the medical history thought worth retaining by the doctor. Any diagnosis, symptom complex, type

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FIG 1—Display screen showing basic summary of patient's record.

of operation, problem, or question mark and the year in which it occurred can be entered. There is a section for further notes about what happened. The final column of each line of this section refers to further information which may be held so that it acts as an index. A number entered here refers to an archive on the computer (this might be an x-ray report or a consultant's letter). "ECG" in this column shows, for instance, that an electrocardiogram is available.

Medication shows drugs currently being prescribed and repeated.

Current Episode holds the currently running note made by the doctor.

When the doctor chooses a summary of the episode can be promoted into the summary history section and the notes edited from the display. Changes made to the record are stored on magnetic tape and can be retrieved on paper if needed—for example, for medicolegal purposes.

If the episode includes something such as a neurological examination that the doctor wishes to retain in detail it can be copied into an archive and referred to in the summary history section. An @ mark followed by a date can be used to indicate when a reassessment is due. If this date passes without the patient being seen the doctor is alerted.

A character entered in the last column of this section denotes that the entry was made at a surgery attendance, consultation, or a visit (as on the current FP EC 8). These figures are displayed as statistical information on the display extension screen.

DISPLAY MEDICATION

The display medication screen, which is divided into two sections, is called up to see details of medication past and present (fig 2).

Spectrum contains the names and details of drugs previously prescribed. This listing of past prescribing is easy to examine compared with the traditional record.

Drug name and notes contains details of the drugs currently being prescribed and repeated. It bears the name, form, amount, and dosage instructions on it, and there are also automatically maintained statistics about prescribing. Markers can be put in to stop represcription after
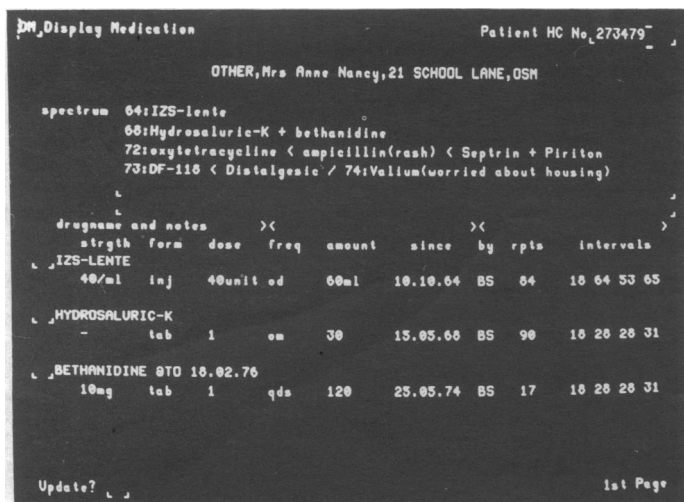
FIG 2—Display medication screen showing spectrum of drugs given in the past and drugs currently being represcribed, with details of dosage and relevant statistics about represcription. Next to bethanidine is a date after which represcribing will be queried.
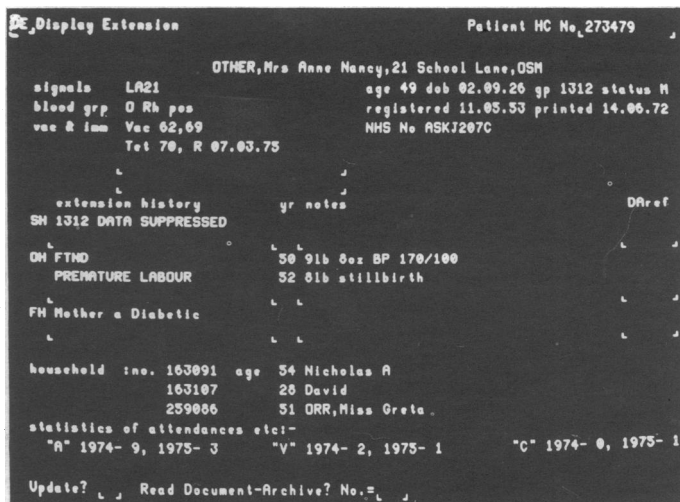

FIG 4—Display extension screen showing information that is less often needed during a consultation. Notice data suppressed in social history section. Under "statistics of attendances etc" A = attendances; V = visits; and C = consultations.

the number of repeats or time interval thought advisable. Requests for repeat prescriptions coming sooner or later than expected are queried, and the patient's apparent overdosage or defaulting can be investigated.

The repeat prescriptions requested on display medication are printed out automatically on to FP EC 10 forms (fig 3), which are then signed by the doctor. The advantages of this system in time saved and accuracy of drug control can be appreciated.

FIG 5—Document archive screen showing letter from registrar displayed as archive.
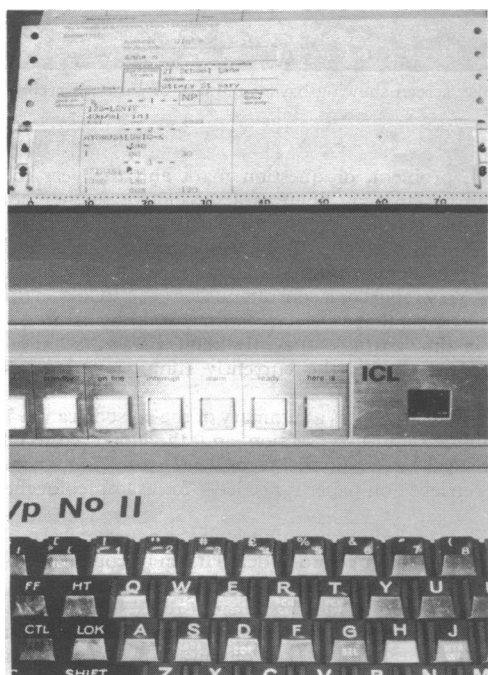

FIG 3—Prescriptions from medication screen being printed out on Termiprinter in receptionists' office. The statistics are automatically maintained.

DISPLAY EXTENSION

The display extension screen gives details of lesser clinical importance (fig 4). It includes blood group, immunisation details, and sections for family history, social history, and (for women) obstetric history. Instructions to allow the nurse access to the record can be given here. When the nurses sign on they will then be notified that there are records for them to see.

There is a statistical section showing how many times the patient attended in the current and previous year and how many visits have been
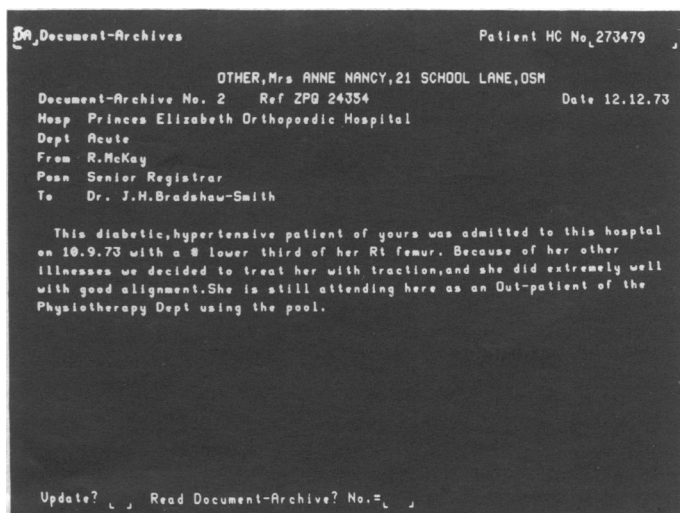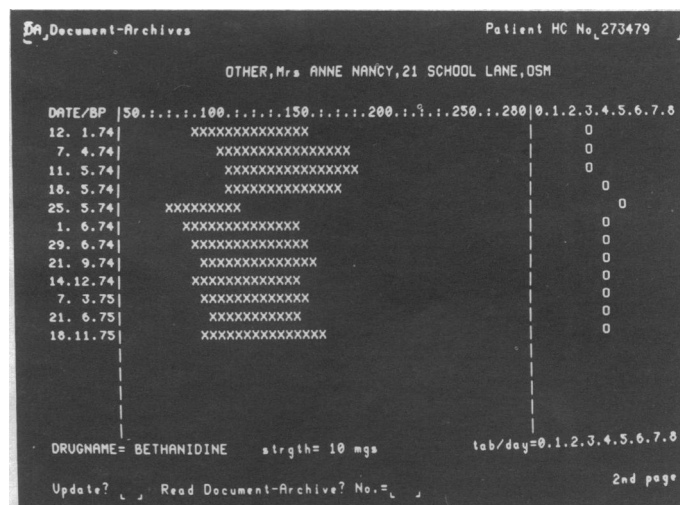

FIG 6—Document archive screen showing archive being used for graphical display of patient's blood pressure plotted against drug dosage.

made to the patient. These figures are automatically maintained from the current episode dates.

DOCUMENT ARCHIVES

Document archives are indexed in the summary history and can be used for consultants' letters (fig 5), x-ray reports, etc. (We hope that the VDU will be used directly by local hospitals for this purpose in the future.)

We can write our own archives about problems for which a record in depth is required. We use designed screens for a control list of facts and graphical recording (plotting drug dosage and performance on the same screen) (fig 6) in controlling hypertensive treatment.

Back-up

A print of a patient's summarised record is sent with the referral letter to consultants and is put into the medical envelope when the patient leaves the practice.

Our main back-up consists of microfilm of the computer record produced automatically under tight security and made up into microfiche. Two hundred cards contain the 11 000 patients' records and archives. With a battery-operated reader (the size of an ophthalmoscope) each partner has all the records for branch surgeries, night calls, and weekend visits. The microfiche is reproducible whenever we want, works out cheaper than paper print-outs, and does not need filing.

Confidentiality

Security is extremely tight and we have no fears of outside agencies reading the records. Patients' screens can be looked at only when the doctor has signed in with his individual password. A further level of confidentiality is provided so that only the doctor who has entered a particularly sensitive fact can subsequently have access to it, and this fact will never be printed out or put on to the microfiche (see fig 4).

Advantages of the system

As we see it we have designed a record that is clear, can be kept up to date immediately, and has an editing facility. Its clarity saves time when reading and searching through the record. The record is flexible in that it may be used in a traditional style of diagnosis or symptoms or as a problem-orientated record. This flexibility enables each doctor to design his own method of use, and the record can be used easily by a newcomer. With the microfiche copy of the record we have a back-up record that is also portable and a great help for emergency calls.

The control screens and graphical records make the management of maintenance treatment much easier, and the printing out of repeat prescriptions and summarised records helps in the ease and efficiency of the day-to-day running of the practice.

Advantages of a different kind come about from the unique ability of the computer to search for and marshal information. Much research using the records has been done. For example, following articles about the increased incidence of carcinoma of the breast in those who had been taking alseroxylon, the names and addresses of all patients recorded as having taken the drug were found, which enabled us to contact them. In general practice Grene and Henderson[2] have proved the efficiency of an automatic recall system (using a hospital computer); they selected groups of patients needing life-long surveillance for recall. A register of patients "at risk" can also easily be prepared by searching for any specified criteria. We can identify, for example, anyone over 40 years old who has not had their blood pressure recorded.

The list is endless, but once the records are summarised and on the computer then they can be maintained easily and these facilities enjoyed.

Costs

The advantages listed improve patient care and are analagous to the introduction of new clinical processes. It is on these grounds that the system should be evaluated. The set-up costs of the system are 86p per patient, and the net annual running costs for 11 000 patients (including capital write-off) are £3000 per year. Improvements in patient care using this sytsem are not hard to obtain, and thus these costs are justified.

References

[1] Preece, J F, et al, International Journal of Biomedical Computing, 1970, 1, 329.
[2] Grene, J D, and Henderson, J M, Journal of the Royal College of General Practitioners, 1971, 21, 352.

Is activated charcoal of any value in preventing "tourists' tummy," which is so common on trips abroad?

Traveller's diarrhoea may be caused by any one of several factors, not necessarily infectious. Absorbents, particularly kaolin or chalk, are often used and seem to relieve the unpleasant symptoms of colic and diarrhoea. There is no evidence that this is due to their ability to absorb toxic substances, and they may act simply by absorbing the increased volume of small intestinal fluid, thereby normalising colonic transit time. Charcoal might have a similar effect but there is no documented evidence of this.

What antibiotic treatment is advisable in a 2-year-old child with bilateral hydronephrosis (caused by pelvi-ureteric obstruction)? A unilateral pyeloplasty has been carried out.

Resistant strains may emerge in such a case when anatomical abnormality has not yet been corrected. Antibiotic treatment requires proper bacteriological monitoring and dip slides may be convenient for this.[1] Parental collaboration must be enlisted to achieve good urine flows—which are, if anything, more important than antibiotics.[2] Blind rotation of antibiotics in full doses has been replaced nowadays by low dose maintenance treatment with a sulphonamide—cotrimoxazole (Septrin or Bactrim), nitrofurantoin, or hexamine mandelate (Mandelamine). Septrin Paedriatic suspension, 2·5 ml nightly, would be suitable for a 2-year-old. Nalidixic acid could be used for breakthrough infections but would be inappropriate when good tissue levels are required as in acute pyelonephritis.[3] Special considerations apply if renal failure, either overall or unilateral, is present.[1 3]

[1] Wing, A J, and Morrell, D C, Medicine, 1974, 22, 1333.
[2] Johnston, H H, British Journal of Hospital Medicine, 1975, 14, 488.
[3] British Medical Journal, 1976, 1, 4.

What are the hazards of working for 30-minute periods in a freezer room with an average temperature of −18°C; protective clothing is worn but no headgear.

If the following precautions are heeded, there should be no hazard: (a) people regularly engaged in such work should be free from chronic pulmonary disease, evidence of significant cardiovascular disease, peripheral vascular disease, hypothyroidism, arthritis, diabetes, and a history of frostbite; (b) at least two people must work in the room at all times. They must keep a close watch on themselves for signs of overexposure (numbness, skin stiffness, or the appearance of white patches on the skin) and must leave the cold room immediately any of these appear; and (c) the maximum safe times for work under these conditions is one hour, with a break of at least one hour before re-entry. If the temperature in the cold room is achieved by "air blast," the equivalent temperature (according to the Windchill Index)[1] may be appreciably lowered, and safety precautions (clothing requirements, exposure times) would have to be considerably more stringent.

[1] National Safety News, 1969, 100 (6), 94.