PRACTICE OBSERVED

Practice Research

Simple computerised disease register

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Since the pioneering work by Elmer¹ and others general practitioners have been able to monitor their work load and recall groups of patients according to either age or disease. Age/sex registers have been widely used, but disease registers, particularly ones that register all diseases and all patients seen, have presented formidable problems of collecting and analysing data. The introduction of relatively cheap computers, however, has made it practical to have a simple system for recording and analysing information about diseases.²⁻⁴

General practitioners in routine teaching practices have been able to examine the overall work load of trainees using a manual system. But because of the difficulties of examining and sifting data, it has not been practical to monitor continuously the distribution of patients seen by trainees by age and sex and by disease. Although small computers can be bought for under £1000 they do not have adequate memories to store all the information required for an age/sex register and a disease index.⁵

To get around this problem I developed a combination of a manual age/sex index and a computerised disease register.

Method

We used the manual age and sex register to assign patient code numbers: YY for year of birth, S for sex, and NN for serial number. This coding was used because it has the information needed to analyse data by age, sex, and patient. Using only two digits for age may cause slight confusion between youngsters and centenarians, but the remote chance of this happening did not warrant typing in an extra number. The patient code numbers generated from the age/sex register were transferred to the front of the notes for each patient in a conspicuous place in distinctive lettering. Although we thought that these numbers might be confused with the date, this has not happened. By transposing the position of the year of birth and making the date

number 1 or 2 for sex (for very large practices it could be odd for male and even for female) it is obvious in the majority of cases that the code number is not a date. It took the practice staff about three months to mark the notes of the 5000 patients when an opportunity arose, and no extra staff were employed.

RECORDING INFORMATION

The receptionist writes the patient code number beside the patient's name on simple, duplicated encounter forms (fig 1). This probably adds marginally to the time it takes the receptionist to get out a morning's notes, but the time is not quantifiable—and it is small. At the end of each consultation the doctor writes the Royal College of General Practitioners code number (copyrighted by the RCGP) in the notes and on the encounter sheet using the RCGP plastic sheet or the Omsis problem code book.⁶ Though there are disadvantages in doctors doing the coding, the advantage is that the notes are released for filing after every surgery and the doctor decides the code when the diagnosis is difficult. After doing this for six months the two partners and the trainee remembered many of the code numbers, although some slight preference occurred. The doctor seems to spend only a few seconds coding for each consultation. Only diseases actually dealt with at the consultation are coded. If the patient has two diseases then two code numbers are entered by the patient's name.

At the end of each week all the encounter forms are collected by a typist who enters patient numbers and diagnostic code numbers into the computer. A simple routine check for errors on the computer ensures that the patient and diagnostic codes are entered in the right form and that they are in the right range; if they are not, the entries are rejected. As the typist enters the codes the last 20 entries are displayed on the screen so that each form can be checked quickly. Typing in the entries takes about one hour a week. The typist had no special training but has helped when needed.

HARDWARE AND PROGRAMING

The computer we use is the Commodore PET with 32 K RAM. It costs £695 plus VAT. We have had no problems with it in the year or so it has been in use. The printer was provided by Oki and cost £365 plus VAT, and produced the figures in this article.

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with diabetes and hypertension. Fig 7 shows part of our record of diabetic contacts with the code numbers of the patients that each doctor has seen each month (the patients' names have been removed). We hope that defaulters will be obvious and that we will be able to follow them up.

FIG 5—A section of the chronic disease register for diabetic patients (names have been removed).

ANALYSIS OF TRAINEE WORK LOAD

A fuller account of the distribution of disease in patients by age and sex seen by the trainee is prepared. It is interesting that over three months the trainee saw no diabetic patients about diabetes, despite the trainee being aware of this problem and looking out for diabetes to send to the trainee.

Discussion

The system we use is a combination of a manual age/sex register, a computerised disease index, and a manual chronic disease register. It is essential that the age/sex register is kept accurately and up to date. We have found that for our practice with 5000 patients a half an hour a week is all that is needed to keep the age/sex register accurate so that it tallies with the family practitioner committee numbers. We found that it was easy to store data on the computer, and that typing takes about an hour a week. Each month's data are stored on a cassette tape, which takes roughly 10 minutes to do. Furthermore it is not necessary for a secretary to stand over a machine while it records data. The data are recorded twice on separate tapes (cost 60p each) to safeguard against damage to one tape. It takes a few minutes to analyse and print the results, but this is another task during which the machine can be left to its own devices. The system has minimal requirements, and the coding was made as simple as possible to make recording easy for the doctor and the typist. We think that the information we have retrieved has made efforts well worth while.

Other practices are starting to use the system, and other groups of trainees and trainees may also use it. We will then have more varied consultation patterns by disease to analyse. The system was started in October 1979 with 5000 patients; it is now being extended to 11 000 patients. Information on these patients will be recorded on cassette tapes, but the system has now been written to work on discs, which will give quicker access to the information and allow information about larger numbers of patient contacts to be stored.

Audit

We now have a record of all patient contacts classified by disease, and this has enabled us to recall the notes of groups of patients we are interested in. For a training project vertigo was analysed and the notes of all the patients who presented with vertigo were called up for three months. The computer gives code numbers for any disease listed by age and sex (fig 6), and using the code it took very little time to extract the notes needed. (The age/sex register is arranged with one page for each year.)

REGISTER OF CHRONIC DISEASES

Since we can recall all the patients who have contacted us with any disease, we keep a register of some chronic diseases. We have started

REPEAT PRESCRIPTION PROGRAM

A simple repeat prescription program has been written that links the code number described above to a much fuller file on

All programs were written in BASIC computer language. It may take months to develop efficient programming, and the programs described here took many hours of programming time.

ANALYSIS

At first the data were analysed and any information of interest was copied from the screen. But when we acquired the printer we could make permanent records. The analyses that we have made each month are as follows. (a) A complete breakdown of patient contact by disease, showing the number of patients seen by each partner and by the trainee, and the percentage of the work load represented by each disease (fig 2). These data are used mainly to give an accurate picture of the spectrum of disease seen by the partners and trainee. (b) The age and sex distribution of patient contacts between partners and trainee each month (fig 3). (c) A printout of the "top 30" diseases listed by frequency (fig 4). (d) Diseases analysed by age group.

FIG 1—The encounter slip that is used at each surgery.

FIG 2—A section of the patient contacts listed by disease. (Dr C is the trainee.)

FIG 3—A printout of the age and sex distribution of patient contacts for one month.

FIG 4—The "top 30" disease contacts, listed by frequency.

Health visitors are given a printout of all the diseases seen the previous month in infants and children aged 0 to 5 years, with code numbers that allow them to follow up the diseases they are particularly interested in (fig 5).

Accuracy

TYPING

The accuracy of the results depends on feeding correct figures into the computer. From the start we realised that careful handwriting was essential. We thought that it was inevitable that the typist would make some errors in transcribing data and attempted to find out how many errors were occurring. A check over 50 notes showed all the diagnoses to be correct and, although we do not have an accurate error rate, examining 97 contacts with diabetes showed one error and a check of 364 contacts with hypertension showed two errors. This error rate is probably an underestimate, for we would not have picked up diabetic patients who were coded to another disease, but overall it appears acceptable.

CODING

Doctors do the coding and use their own diagnostic criteria. Our figures show interesting differences, but these are inherent in any system of doctor coding, or, indeed, doctor diagnosis. In one of the first months one of the partners had a very high incidence of patients with coronary-type illnesses and the trainee had coded very few coronary illnesses but a large number of cases of acute bronchitis. At one of our regular meetings we discussed whether the diagnosis of acute bronchitis might have been an excuse for prescribing antibiotics to patients

each patient who is entitled to repeat prescriptions. When that code number is entered into the machine, a patient's age, name, and address, and a list of the drugs to which he or she is entitled appears on the screen along with the number of months for which the repeat prescription has been authorised against each drug. Pressing the appropriate key causes the computer to print out a prescription, and at the same time it ticks off in the computer's memory that one month's prescription has been issued. When only one month's prescription remains in the memory a reminder comes up to read: "Must see doctor next time." If no further authorisation has been entered, then further prescriptions will not be printed. Although this program has been written and works on cassette tapes, it can't be fully implemented unless the Department of Health authorises us to use computer-compatible prescription forms, and we purchase disc storage for the data files.

CONFIDENTIALITY

The machine is completely under our control. The secretary is a member of the practice staff and is used to dealing with confidential data. The data in the machine are numerically coded so they cannot be related to patients without referring to our age/sex register. The data on cassette tapes are also in a code from which patients and doctors cannot be directly identified. If the method of recording on cassette tapes was standardised, then it would seem possible to analyse these data centrally for epidemiological and other information without compromising patient confidentiality. In an expanded system with the patients' names and addresses recorded on the machine, in addition to the physical security of the machine being under our control, a password would be needed to gain access to any information.

Pitfalls in Practice

Any complaints?

III: Medical service committee procedure

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Complaints that a general practitioner has breached his terms of service are made to the family practitioner committee (FPC) under the Statutory Instrument No 455, National Health Service (Service Committees and Tribunal) Regulations 1974. These regulations also define the investigation procedure. A vocational trainee cannot become an expert on these regulations, but he should be aware of their existence and have some idea how they work.

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Conclusions

I have developed a combined manual age and sex index and a computerised disease register that we use in our practice of 5000 patients. After six months' use we found that the system was easy to operate within limited objectives. It has simplified two things particularly: monitoring the work load of trainees, and calling up groups of patients by disease.

I thank my partner Dr Joan Woodley, and my trainee, Dr Jane Pavitt, without whose enthusiasm and help this project would not have been possible. I also thank Professor David Metcalfe for his advice in preparing this paper.

Addendum

Since this article was prepared the data files have been transferred to floppy discs on a Commodore 340 disc drive (price £695 plus VAT). This has greatly reduced the time taken to store and recall information and has enabled registers of chronic diseases, as in fig 7, to be produced by the machine.

References

1. Elmer TS, Laidlaw AJ. *Handbook for research in general practice*. London: Royal College of General Practitioners, 1969.
2. Royal College of General Practitioners. *Computer Working Party. Computers in primary care*. Occasional Paper 13. London: Royal College of General Practitioners, 1980.
3. Palmer P, Rens C. *Computing in general practice*. A report for the General Medical Services Committee of the British Medical Association. Section Consultancy International Ltd, 1980.
4. Perry J, ed. *Omsis problem codes*. Oxford: Oxford Community Health Project, 1978.

Several FPCs also allow an informal exchange of letters between the parties in the hope that the complainant will withdraw his complaint if he receives a reasoned and sym-