Computer-based medical record systems—have they come of age?

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At the College conference (December 1986) on ‘Computers for Physicians’ accounts of four computer-based medical record (CBMR) systems were given. These systems are able to hold all the information which comprises the usual patient record. They are used mainly for out-patients, and run on computers dedicated to one function rather than on large multipurpose machines. The presentations and the subsequent replies to questions from the audience answered many of the common questions asked about such systems.

Why are CBMR systems needed?
These systems are needed mainly because of the deficiencies in the existing medical records that impair patient care. These records are occasionally not available when required; up to 10 per cent of patient records may be missing from an out-patient clinic. They are often incomplete with expected data absent. The use of a computerised system for diabetics reduced the percentage of records with no comment on fundal changes from 35 per cent to nil.

The frequently poor organisation of records prevents a true appreciation of the patient’s condition.

Types of patients that benefit most from CBMRs
1. Patients with many problems which may interact with each other.
2. Chronic conditions which require long-term follow-up, either because they are progressive, ie end stage renal disease, or because serious complications may occur, ie colonic polyps, or when constant monitoring of treatment is required, ie diabetes.
3. Simple single problems can be well handled with traditional records. However, a CBMR system is a great advantage when identifying groups of patients with the same diagnosis or other common characteristics.

Areas of medicine that can benefit most from CBMRs
1. Clinics dedicated to one or a limited number of diseases, ie diabetes or inflammatory bowel disease.
2. Where a lot of data is generated, ie chronic renal disease or leukaemia.
3. Busy clinics, ie diabetic clinics.

4. When there is a high penalty for missing changes in the patients’ condition, ie cancer follow-up or chronic renal disease.

Responsibility for the system
The person responsible has to decide who can put data into the system and who can get information from it. He decides the types of outputs in terms of what information and how often it should be produced. He also agrees changes, enhancements and linkages to other computers, and is responsible for the financing of the system.

This person has to ensure that the system is used as intended, and that all appropriate staff use it. He should see that all the day-to-day problems are attended to.

CBMR systems come to occupy a central role in any department. The enhanced facilities make a CBMR even more important than the traditional record. For all these reasons the individual taking final responsibility should be the head of department or the consultant responsible for the service.

The use of CBMRs
The main functions of CBMRs are to assist in patient care, facilitate medical audit, encourage research and help in the more economical use of resources.

Care is helped by having a record which is legible, constructed so that specific items of information can be found, and organised so that the proper relationship of different aspects of the patient’s condition can be appreciated. These functions are rarely satisfied by a paper record.

The systems ensure that indicated steps in care are taken; these might be laboratory tests or out-patient review after a set interval. An important example of this type is the tracking of protocols to ensure that patient care has undergone the required series of stages. For example, the renal system keeps a record of what has been done in considering a patient for transplantation. The administration of complex treatment protocols in leukaemia or cancer therapy is another example.

The excellent graphical displays of the renal system allow changes in renal function to be identified quickly and by the observation of trends, to predict the occurrence of events such as transplant rejection.
Medical audit, research, and assessment of resource usage are all helped by the ability to identify single or groups of patients with specified characters, perhaps age, sex, diagnosis, drugs administered etc. All the systems described have this facility, usually mediated by specially developed query languages.

The dissemination of patient data is helped. Print-outs in special formats such as letters to GPs or reports can be produced. Care involving different disciplines is made easier by having a record that can be readily distributed.

Which staff members use these systems?
Doctors, nurses, technicians and clerical staff all use CBMR systems and their wide use should be encouraged to build up interest, encourage responsibility and, hence, accuracy in the record. Widespread knowledge of the system helps to solve problems and ensures that it is available even when key members of the department are away.

Can CBMR do more than conventional records?
Yes. The record is almost always available. Multiple copies mean that the same record can be used in more than one place at the same time. The organisation of the record facilitates the care of chronic problems and complex problems. Outputs can be in the form of summaries to aid easy appreciation of a patient's condition or as flow-charts for particular problems. Graphical displays aid the detection of trends or sudden changes.

There is great flexibility in the manipulation of the data. Records can be selected for further use. Data items may be sorted or ordered. Outputs can be specified for particular purposes.

Are the systems costly?
The inability of any of the four speakers on CBMR systems to give an exact answer on cost caused some surprise. The answer varies according to exact requirement, the number of terminals, the number of patients dealt with, the interconnections with other computers, and whether specialist computer staff are employed.

Costs not only include the hardware and software but also installation charges, training of staff, the modification of rooms and buildings to take the machine and its connections, the provision of desks, filing cabinets and associated office equipment.

There will be revenue implications covering maintenance, software updates, consumables and, possibly, extra staff.

All the systems described can be run on minicomputers, and three of them on a microprocessor which if it can be stood on a desk and used immediately will have a starting cost of £5-6000. Extremely complex installations will cost hundreds of thousands of pounds.

Are the systems cost effective?
All these systems are used for more than just simple storage of data. To produce the graphs and other outputs by hand would certainly cost more than through the computer.

The major stimulus for employing these systems is not to produce a cheaper service but to correct deficiencies in the records and to do things that were almost impossible with the traditional arrangements.

The desirable features of a CBMR system
The CBMR system should be easy to use. This means such things as easily read screen layouts and text, using a mixture of upper and lower case, different colour letters, emphasis by flashing text etc. There should be keys with specified functions; the ability to move backwards and forwards through a sequence of screens; an indication on the screen of how to get from one part of the system to another; and the ability to correct or change data already entered.

The system should be capable of amendment, meeting local needs without reprogramming, of changing such things as the names of the users, or the clinic where the system is used. It should be easy to alter the normal and acceptable ranges for laboratory tests, to introduce new names for tests, drugs, diagnoses and operations, and redesign input screens and output documents.

It is desirable for the systems to have an ability to link with other computers. This is likely to require both hardware changes to allow machines to physically link, with the provision of cables or telephone lines, and software alteration to promote the exchange of information.

A good example of this is the transfer of information from renal systems to the European Dialysis and Transplant Association, which is used to match donors and recipients.

The system must be robust so that if there is machine failure of the computer, its storage facilities or the terminals, data are not lost. Recovery of the system should be straightforward.

Confidentiality is a prime consideration. Passwords and identity codes should be used to restrict access to authorised staff. The staff codes should indicate which parts of the system are accessible. Frequently, clerical staff are not allowed access to the clinical record, and doctors cannot register patients.

Any particular system will be helped by a user group that helps to identify and solve problems, assists in the dissemination of developments, and allows pleasant social occasions.

Final impressions
The renal CBMR system is used in 36 of the 50 renal and transplant units in the UK. The COSTAR system, when last counted, was used in 80 or more centres across the world, including seven in UK. The conference presentations gave an overwhelming feeling that at last the technology had come of age. CBMRs are now considered as working tools to be used anywhere and not just the arcane interest of a few eccentrics.
The presenters seemed to suggest that more patient-related activity occurred. The doctors and others were more involved because they could do more, attend to more features, and see that a patient was getting the intended care. Because of this, better patient care was given. Whether this produces better outcomes was not shown, but it seems a very likely consequence of the use of these systems.

Speakers on CBMR systems

A. J. Headly University of Glasgow. A management system for diabetes.

E. J. Will St James’ University Hospital, Leeds. A management system for renal medicine.

C. B. Williams St Mark’s Hospital, London. Experience with METABASE/PEDRO in gastroenterology.

D. W. Young St Chad’s Hospital, Birmingham. COSTAR medical records system.

Book Review

An Aid to the MRCP Short Cases by R. E. J. Ryder, M. A. Mir and E. A. Freeman. Blackwell Scientific Publications, 1986, 393 pages. Price £12.95.

Books, courses and even less worthy procedures which aim to help candidates to pass particular examinations tend, inevitably, to be slightly suspect in the eyes of the examiners. But, on reflection, this is wrong. If every question now stored in the MRCP(UK) Part I bank were to be published together with the correct answers, then the quality of the answers in subsequent examinations would rise because there would be an increase in the number of candidates with wide knowledge. Which is the underlying object of education and therefore of examinations.

In this book the authors have attempted, and to a large extent have succeeded in teaching, would-be candidates to become efficient, experienced and skilful doctors. They give good advice in their short introductory sections; in Preparation is found ‘examiners may take note of . . . your approach to the patient, your examination technique . . . the pursuit of relevant clinical signs . . . your giving a coherent account of all the findings and conclusions . . .’ and ‘these good habits should be adopted into your everyday clinical approach.’

The second section deals with Examination Routines, with 19 different subjects, each introduced by question or introduction from the examiner. Each of these is derived from an analysis of 150 questionnaires returned by 150 past candidates. Each is accompanied by a list of variants to the question or instruction and the percentage of candidates who met this in the examination. Thus, 97 per cent of candidates were told to ‘examine this patient’s heart’ (or equivalent), 20 per cent to ‘examine this patient’s face’, 4 per cent to ‘examine this patient’s gait’. Each example is followed by an excellent routine that the candidates are advised to exercise and memorise so that these routines can be followed almost automatically in the stress of the examination.

The third section, forming the bulk of the book, is entitled Short Case Records. There are 150 of them, all derived from answers to the questionnaires sent to past candidates. They are listed in order of frequency and begin with diabetic retinopathy (34 per cent of candidates encountered this) and end with pyoderma gangrenosum (0.1 per cent encounter). Each example is accompanied by a brief resumé of causes and associated diseases, investigations and complications, with illustrations.

There follows 78 brief accounts, anecdotes, experiences and opinions of the 150 candidates. They have the ring of truth and are amusing, leaving the reader to guess, until the end, whether success or failure resulted.

There are appendices, to summarise the check lists in Section 2, the cases selected in Section 3, and to list the clinical courses for the MRCP(UK), and an excellent selection of 61 colour photographs, provided through the generosity of a pharmaceutical company.

There is one error in the introduction, ‘The failure rate for the short cases examination is about 70% . . . and there is no compensation’. A bare failure in the short cases can result in a bare failure in the whole clinical section (if a good mark is acquired in the long case) and this in turn can result in success in the examination if good marks are obtained in the Written and Oral sections.

It would be wrong to think that Appendix 4 was a complete list of clinical MRCP courses. It is not. The one that I organised for many years and which is still a ‘going concern’ is not listed.

Nonetheless, I think that this is an excellent book, giving good advice on how to become a skilled, thoughtful and knowledgeable physician and hence how to become a MRCP(UK).

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