Obtaining Information from Medical Records

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Medical records may be consulted for a number of different purposes (Table 1). Most commonly they are used as an aide-memoire by doctors unable to remember all the information they need for the management of each patient. When more than one doctor is involved in looking after a patient the record also serves as a form of communication between them. Records are used less often for the other purposes listed. When litigation is threatened the medical record becomes a particularly important document and is recognised as such by everybody. Few, however, would give much thought to the use of the record as an educational instrument, while the suggestion that it might be used for the purpose of audit would be greeted with horror by the majority of practitioners.

Table 1. Uses of medical records

1. Detailed reminder of clinical and laboratory information and therapy
2. Source of information about past illnesses and treatment
3. Facilitate continuity of care when several doctors involved
4. Assist evaluation and planning of health care system
5. Clinical research
6. Medical education
7. Audit of medical care
8. Litigation

Medical records are potentially of great value in relation to patient care. I used the word 'potentially' because the general standard of medical records is poor and their usefulness is correspondingly limited. Neither in hospital nor in general practice do they present a clear picture of illness or of clinical management. Indeed, some hospital in-patient records do not even reveal why the patient was admitted. Criticism of medical records is commonplace and rarely refuted, either by hospital staff or by general practitioners. We are all aware of the chaos and are reminded of it whenever we pick up the bulging folder of a problem patient.
As a profession we have paid little or no attention to the quality of our records. Instead, we rely heavily on our memories (despite recurring evidence of their inadequacy) and when we make notes we do so casually, without concern for their information content or for their value as a form of communication with other doctors. We write letters but, although these may be excellent, they tend to concentrate on the more obvious aspects of an illness and lack the detail that may subsequently be required. It is a consequence of our complacency that we pay little attention to the subject of medical records in the medical school curriculum. The student is taught a standard history and physical examination, the structure of which is similar in almost all medical schools. This structure has much to recommend it but it has serious limitations; while it may be appropriate to the clinical needs of an academic medical unit it is not altogether suitable for the surgeon, obstetrician, or general practitioner. Unfortunately, our students do not learn how to modify this history and physical examination in the face of changing circumstances. When, as doctors, they find the traditional approach impractical they discard it; their records then lack structure because they do not decide what type of information they ought to be collecting. But it is not only the initial collection of clinical information that is poorly documented. Progress notes are even worse. They consist usually of vague and ill-considered statements that are useless for the purposes of communication and are of limited value even to the person who wrote them.

If we are to improve our medical records we must decide what sort of a record we need. Table 2 lists some of the principles that should govern the design of a medical records system. All are violated in our conventional records. The first of them might seem absurd to the layman, but those of us

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**Table 2. Principles of information retrieval from medical records**

1. Record must be available
2. Its information must be
   (i) Understandable (legibility, language)
   (ii) Correct and in context
   (iii) Adequate
3. To be able to find and assimilate this information quickly we must
   (i) Use a standard structure
   (ii) Emphasise key points
   (iii) Reduce bulk by
      (a) Avoiding unnecessary entries
      (b) Condensing without loss of information (laboratory records, précis of notes)
who are hospital clinicians suffer daily the frustrations of lost notes. It is also stating the obvious to say that notes should be legible and that their information should be correct and adequate; such qualities are rare, and to achieve them we must concentrate on promoting them while our students are in training.

In considering the structure of an ideal record, one factor is of particular importance. In a busy general practice (or in out-patients) only minutes may be allocated to each consultation and only a part of this time would be available for review of the notes. The doctor must therefore be able to locate relevant information quickly. This means standardisation of structure and emphasis of key points by large print, coloured inks or by underlining, or by extraction and presentation on a separate sheet of paper. Excessive bulk increases the time taken to look through notes; unnecessary entries must therefore be avoided, and notes should be condensed when this can be done without loss of information. Numerical data can be transferred from laboratory report forms to a cumulative laboratory record and a précis made of individual clinical problems.

In designing a new clinical record some account should be taken of its compatibility for computerisation. It seems certain that the computer will play an increasingly important role in the storage of clinical data and it would be wasteful to design a system that was difficult to computerise.

I have painted a gloomy picture of the state of medical records but recently there has been a major advance with the introduction by Professor Lawrence Weed (1969) of the system of Problem Orientated Medical Records. This system cannot ensure that records will always be available and legible but it can help to promote some of the other principles that have been discussed.

A problem orientated medical record is a structured record made up of four major components (Fig. 1). The most important one is the problem list, which forms an index or table of contents to the notes. It appears on the cover or front page and allows a rapid review of the patient’s clinical condition (Fig. 2). Each problem list should include all of a patient’s problems whether these are precise diagnoses, pathophysiological states (such as a hemiplegia, or cardiac or respiratory failure) or symptoms, abnormal physical signs and laboratory investigations not explicable by a disease or syndrome that is already on the list. Psychiatric and social problems are also noted as well as relevant past illnesses and any other factors that may influence patient care. Entries are subdivided into active and inactive problems. A problem list should not include guesses; instead it should state problems at a level consistent with the doctor’s true understanding of the case, even though the terms may be elementary (e.g. epigastric pain should be written as such and not ? duodenal ulcer, ? gallstones).
Fig. 1. The structure of the problem orientated record.

| PROBLEM LIST | Hospital No. | 1G 40432 |
|--------------|--------------|----------|
| Surname      | SMITH        | M/F     |
| First Names  | Frederick John | M/F     |
| D. of B.     | 7.5.1922    | Age 51  |

| PROBLEM NUMBER | I.C.D. No. | ACTIVE PROBLEMS                                                                 | DATE ENTERED | INACTIVE PROBLEMS                                                                 | DATE ENTERED |
|----------------|------------|--------------------------------------------------------------------------------|-------------|-----------------------------------------------------------------------------------|-------------|
| 1              |            | Epigastric Pain → Duodenal Ulcer                                                | 4.4.73      | Myocardial Infarction                                                              | 4.4.73      |
| 2              |            | Chronic Bronchitis → Longstanding                                               | 4.4.73      | Eczema - Intermittent                                                             | 4.4.73      |
| 3              |            | Smoked 300 Cigars/Day                                                           | 4.4.73      | Penicillin Sensitive                                                              | 4.4.73      |
| 4              |            | Deaf L. Ear → Anterior Perforation                                             | 4.4.73      |                                                                                  |             |

Fig. 2. The problem list.
The problem list is a permanent record and the same list should remain at the front of the notes regardless of the number of entries to hospital or visits to the surgery. As new problems arise they are simply added to the problem list. Entries can, if necessary, be changed. If an existing problem is clarified (as in Fig. 2 where epigastric pain was subsequently attributed to duodenal ulcer), or if it is discovered that an entry has been made in error, the list is modified and the change dated. The problem list is thus a dynamic statement of the patient’s medical history allowing rapid assessment of the situation existing at any given moment.

The problem list is formulated from a collection of clinical information that Weed has called the data base. I must be cautious in describing the data base as my comments on it are frequently misinterpreted. People assume that the data base is a rigid structure, whereas the concept of the data base is a very flexible one. A complete data base for any individual doctor would contain information that he considers necessary to enable him to care for his patients efficiently and effectively. It contains information of two types—that relating to the particular incident for which the patient has presented, and background information that might be helpful in a large number of clinical situations. The size and content of the data base would vary with the needs of each individual or group of individuals. An academic medical unit might collect a large and exhaustive data base while that of a surgeon, or gynaecologist or general practitioner might be smaller and more selective in its content.

The data base is similar in some ways to a conventional history and physical examination but there are several important differences. It is not essential to complete the data base at a patient’s first visit (indeed it may be quite impracticable) but it can be completed on subsequent visits. The data base can thus be built up over a period of time and with contributions from many doctors. A data base used in this way avoids the rewriting of large parts of a patient’s history on every admission or whenever a new doctor is seen. The information already present in the data base could be confirmed but only new information or corrections would need to be entered.

When a data base is first collected there may be several problems requiring attention. For each of these it is necessary to decide on a plan of action and in the problem orientated system these plans are called initial plans. Each initial plan has a substructure, which is presented in Table 3. The first step is to decide what further information is required in handling that particular problem. Such information may be used for diagnostic purposes or for the purposes of management. It may be gleaned from many sources: it may be sought from relatives or friends or by going back to ask the patient more detailed questions; previous notes may be consulted or information obtained
Table 3. Structure of an initial plan

| Number and title of problem |
|-----------------------------|
| 1. More information         |
| (a) For diagnosis           |
| (b) For management          |
| 2. Therapy (not forgetting physiotherapy, occupational therapy, etc.) |
| 3. Patient education        |
| (If no activity planned give a brief statement of the goal) |

by laboratory investigations or by further clinical observation. Entries to the problem list must be statements of fact but in the initial plans diagnostic 'guessing' can be encouraged; appropriate investigations should be listed with each guess and the logic pathways of clinical action will then be preserved. An example of this approach is presented in Fig. 3.

1. EPIGASTRIC PAIN
   ? D.U.—Ba swallow and meal
   ? Endoscopy if Ba negative
   ? Pancreatitis—Serum amylase
   ? Gallbladder disease—Cholecystogram if Ba meal and endoscopy negative
   R—Bed rest
   Mist. Mag. Trisil—between meals and with pain
   Pt. Education—told probably D.U. but investigations needed to confirm. No intention of surgery at moment.

2. CHRONIC BRONCHITIS
   Monitor peak flow rates
   Blood gases for basal levels
   Sputum microscopy and culture
   R—Physiotherapy
   No other treatment at moment
   Pt. Education—see 3

3. CIGARETTE SMOKING
   Sputum cytology
   Pt. Education—must stop! for sake of problems 1, 2 and 5.

4. DEAF IN L. EAR
   Get ENT opinion

Fig. 3. Initial plans (F.J.S. 4.4.73)

The second entry in the initial plan covers therapy. Each drug or treatment given is listed under a problem heading and thus it is easy to see the reason for each prescription. The benefits of this approach are self-evident.

The third subheading is entitled patient education. By incorporating this entry into the structure of each initial plan Weed has ensured that the doctor will at least think about communicating with his patients. This covers a major deficiency in our present system of care as it is a frequent complaint of patients
Table 4. Structure of a progress note

| Number and title of problem |
|-----------------------------|
| 1. Subjective (Account of change in patient’s symptoms) |
| 2. Objective (Changes in physical signs and results of previously requested investigations) |
| 3. Interpretation* |
| 4. Therapy* (Including physiotherapy, occupational therapy etc.) |
| 5. Further plans* |

Self-explanatory subheadings such as ‘patient education’ may also be added

* Some combine these three subheadings into ‘assessment’ and ‘plans’, i.e. ‘S.O.A.P.’

that they receive inadequate information about their illnesses. Such lack of communication is not defensible but I am sure that it is not due to callous indifference on the part of doctors. It happens because it may not occur to us to spend a few minutes putting our patients’ minds at rest. The inclusion of ‘patient education’ in the initial plan protects against such oversight and it allows other doctors to find out what the patient has been told.

After the construction of initial plans, further entries into the record are made as progress notes. They are headed by the number and title of the relevant problem and are entered in chronological order. They are substructured as illustrated in Table 4. An example of a progress note is presented in Fig. 4.

1. EPIGASTRIC PAIN (→ D.U.)
   S—Pain better with alkalis and bed rest
   O—Ba meal—deformed cap and ulcer crater
   Amylase and LFTs normal. Hb 11 g Film looks iron deficient.
   Interpretation—D.U. responding to treatment
   ? Bleeding
   R Mobilise gradually. Continue Mist. Mag. Trisil
   Add Fe gluconate 1 tab t.d.s.
   Plan Occult bloods daily
   51Cr study to assess stool loss

2. CHRONIC BRONCHITIS
   O—Peak flow 1901/min.
   Sputum not purulent, no pathogens
   Interpretation—reasonably quiescent

4. DEAF L. EAR (→ ANTERIOR PERFORATION)
   O—ENT department say small perforation anterior part of L drum. No evidence of infection.
   R—nil

Fig. 4. Progress notes (F.J.S. 9.4.73).
Certain principles should govern the writing of progress notes.

1. They should preserve the logic of clinical activity. When, for example, an investigation is requested it should be possible to discern the reason for the request. Subsequently the result should be entered and its significance assessed with respect to diagnosis, therapy or future plans.

2. The progress notes should be as brief as possible but without loss of important clinical information. They need not be made at every visit to the bedside, nor, whenever a note is written, is it necessary to make an entry for each active problem or for each subheading of each problem. Occasionally it may be better not to make narrative progress notes; in an emergency situation, for example, it would be better to record relevant clinical details on a ‘flow chart’ as there is rarely time to write adequate notes and less time to read them.

In addition to recording laboratory results in progress notes it is valuable to enter them into a cumulative laboratory record. This enables one to visualise changes over any particular time period and it may help to clarify the mode of development of an illness or the response to treatment. Again the benefits are self-evident. Displays of this kind have, of course, been widely used for many years and are not unique to users of problem orientated records.

Many will appreciate the benefits that can result from the use of POMR. The system satisfies most of the principles listed in Table 2. It would, however, be misleading to pretend that its widespread introduction is a simple matter. Several factors combine to limit its application. Many doctors resist any innovation, particularly if it entails change in old habits. Furthermore, while the potential benefits of the problem orientated record may appear obvious, it is sometimes introduced by individuals who lack adequate appreciation of the principles involved. The system is then misused and may be discredited. It is often modified ‘to make it practical’ but as such modifications are rarely improvements they may prove unattractive and delay local acceptance of the system. Finally, preservation of the problem orientated structure of the record depends on the willingness and ability of the medical records staff, used to dealing with notes of a different format, to preserve it. Too often the notes are dismembered and the resulting chaos can be dispiriting to the doctor who is just beginning to ‘problem orientate’ his records. Educational effort is needed at all levels to ensure the success of the problem orientated system.

One of the most exciting aspects of the problem orientated medical record is of direct concern to computer experts. There have been many attempts to computerise medical records and, in general, the results have been discouraging. Failure has resulted largely from the lack of structure in conventional clinical notes. The introduction of the problem orientated approach has made good this deficiency and there are now a number of developments.
in this field. At least three commercial companies in the USA market a computerised record system based on problem orientated medical records. Weed himself is developing a more ambitious project at the University of Vermont, and the implications of his system for clinical medicine are enormous. The complete record is stored and linked not only with the paramedical departments of the hospital, such as the laboratory, dispensary and finance office, but also with a general practice clinic. In addition, the computer is used to store reference information which can be recalled for diagnostic purposes or to provide detailed pharmacological and therapeutic information. Such a system would guarantee the immediate and constant availability of medical records and would revolutionise linkage between hospitals and general practitioners (and between different hospitals). The practitioner with his own video screen would have immediate access to information whether his patient was still in hospital, just discharged or attending outpatients. The summary and the letter would be things of the past.

The potential is clearly enormous. While development costs would be great it seems probable that such a system would, in the long run, save money; it would certainly help to improve patient care. The technology is already with us; the major impediment to progress is that as a profession we are not yet ready to grasp the opportunities that present themselves.

This article is based on a paper read at the Conference on Information in Medicine held at the Royal College of Physicians in October 1973.

Reference
Weed, L. L. (1969) Medical Records, Medical Education and Patient Care. Case Western Reserve University Press distributed by Year Book Medical Publishers, Chicago, U.S.A.