

## **Quality control, medical audit and the general practitioner**

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**W**HEN the National Health Service was being planned there was a deep division of interest between hospital specialists and general practitioners. Indeed, it was probably this split which made possible the introduction of the Service, just as its absence in the United States has frustrated for so long the mildest form of socialised medicine there (Forsyth, 1966).

The medical profession played a prominent part in shaping the NHS and, naturally enough, the new structure reflected the profession's division. While general practitioners opted for independence on the periphery of the service, the hospital specialists chose salaried employment. The rationing of medical services had always been at the discretion of the medical profession, and the new structure accepted this principle. The profession thus achieved tremendous power resulting in a virtual takeover or professionalisation, of the new bureaucracy (Klein, 1972). Perhaps understandably those doctors inside the NHS structure have been more able to influence the allocation of resources than the general practitioners, who have therefore become progressively more isolated from both the hospital service and power.

While the NHS has a professional bureaucracy whose aim is the equitable distribution of the available resources, there is no transatlantic equivalent. To maintain high standards in the United States the authorities have deemed it necessary to institute a statutory system of hospital accreditation, which usually requires medical audit (McWhinney, 1972; Medhurst, 1972). Voluntary medical audit has only recently been introduced to this country and it was not until the publication of the 'Cogwheel' report (Ministry of Health, 1967) that it became established as a proper function for practising clinicians.

The main aim of audit is to analyse critically the methods used to define the patient's problem and the action taken to resolve it—the so-called 'process of care' (Slee, 1967)—so that the service offered to the patient can be continuously improved. A by-product is that the course of the disease process is closely observed, yielding much information which will help to identify clinical syndromes or presymptomatic states (Logan, 1969).

A further type of medical audit is really market-research inspired: that is the *critical* analysis of the availability, use and acceptability of the facilities provided. Thus medical audit can be seen as either a tool of *management*, by which the service to the patient is constantly scrutinised, or of *epidemiological research*, to achieve a greater understanding of disease. The concept of the community physician has arisen, developed and one of his more important tasks, ensuring that medical audit is professionally based and properly performed (Department of Health and Social Security, 1972).

When unification of the NHS occurs in 1974, the general practitioner will be able to use the existing machinery as only his colleagues could previously, and I believe that we shall see an increasing volume of high standard research coming from the increasing number of research-conscious practices.

### **Audit in general practice**

Each year in England and Wales, there are about 160 million patient-attendances at general-practitioner surgeries and a further 40 million house-calls (Logan, 1970). Doctors are therefore busy people (Royal College of General Practitioners, 1970) who are probably rightly chary of involving themselves in purely academic exercises. However, in all specialties, research and practice must go together if medicine is not to stagnate.

As an argument against teaching undergraduates about general practice, it is often said that the only way to learn the subject is by experience. This, of course, is nonsense, since it is by *reflection* on experience that one learns; such reflection involving self-criticism which is in itself one of the marks of intelligent behaviour (Mackenzie, 1971).

This is precisely the purpose of a medical audit: self-criticism, leading to the benefits to the patient and to the service. This is very important for the general practitioner who, being *the* common factor to all specialties, has a bird's eye view of the whole range of health and welfare (using the term in its broadest sense) service. Audit done by the general practitioner can be relevant to all specialties, or to any one of them, in a way that the hospital specialist might find difficult to understand without previous experience of medicine in the community.

It has been said that "if the environment is not right, the individual (doctor) may have difficulty in deploying his skills and the patient may suffer" (Dollery, 1971). This is the essence of all medicine, but the factors I wish to stress are summed up in the phrase 'deploying his skills.'

It is not enough for the doctor to be skilful, educated or experienced, he must be able to deploy his skills so that optimum benefit is obtained by the community he serves. In itself, this is a difficult management exercise, relying as it does on factors outside the doctor's control such as access to investigatory facilities, access to outpatient departments or to social service departments. The optimum benefit is only likely to be found by a series of trials, most of which will be failures, unless a study of the needs of his practice is made in a medical audit.

As an experience in postgraduate education, medical audit is second to none. As a means of investigating the patients' needs, and the way in which these are met, it is the most efficient technique available. As a lever to improve services, it is incontrovertible. As a tool for epidemiological research into clinical medicine, it is invaluable. No specialty, worthy of the professional ethic (Himsworth, 1953) can really afford to ignore the benefits of audit, and research clubs are the first evidence that general practice is becoming increasingly interested in this important technique.

### **The medical record**

The ways of audit are numerous and may be episodic or continuous, internal or external and voluntary or compulsory. It does not matter so long as the audit fulfills the requirement of the researcher. Whatever the procedure adopted, medical audit depends on three principles:

- (1) That medical audit can be statistically significant whatever the technique adopted.
- (2) That the data in the medical record give an accurate reflection of the process of care.
- (3) That the quality of care can be assessed by studying the descriptions in the medical record.

The medical record has been described as a repository of information concerning a patient's problems (Royal College of General Practitioners, 1969) and the actions taken to resolve them (Weed, 1969). As such it would be suitable for medical audit,

but unfortunately there is evidence that very few records have developed beyond the stage of the aide-memoir (Dawes, 1972; Cormack, 1971). As grouping of practices proceeds, it will become increasingly important that all observations are properly recorded so that communications within the practice are effective and, because of this, it has been held that good records are a pre-requisite to the maintenance of a good standard of medical care (Dawes, 1972; Collings, 1970; Central Health Services, 1963; British Medical Association, 1970).

Acheson (1972) has studied the use of records in medical audit and has classified the information that should be included for each episode of 'illness.' His requirements are:

1. The subjective data obtained from the patient,
2. The objective data obtained by examination or investigation,
3. The assessment of the data,
4. The creation of the plan which will attempt to resolve the problems (mnemonic SOAP).

The idea behind this classification is the provision of records which would be useful for any retrospective medical audit at any time. There are, however, many real problems in adopting such a system. The first is whether or not negative findings should be recorded. The importance placed on such varies from person to person, being a function of both the practitioner's education and his previous experience.

A more basic difficulty lies in deciding the depth of investigation to be adopted in a particular case. Assuming that it is not possible to perform a complete medical examination on each patient, the doctor is faced with the conflicting needs of fulfilling his service role to the patient and completing the medical record fully. Furthermore there is a group of patients who will react adversely to what they consider to be unnecessary enquiry or investigation, to the detriment of the doctor-patient relationship. Even if the patient is agreeable to such, he may resent the doctor noting every little fact. Thus, although the technique described is useful in medical audit there are severe limitations to its use. Perhaps what should be considered is the fitting of any data collected into the scheme, using the doctor's discretion as the main limiting factor.

Data are of two types: 'hard' data characterised by a quantifiable component which is expressible in terms of probability; and 'soft' data which are descriptive or subjective and thereby are not amenable to statistical manipulation. Medical audit is essentially based on 'hard' data, though not necessarily exclusively. Unfortunately for us most hard data in medicine is dependent on factors outside the researcher's control, such as laboratory efficiency, other doctor's notes, or the sensitivity of our own diagnostic equipment. Recording errors also confuse the picture, for even the most incontrovertible fact (e.g. age) can be copied down wrongly by a harrassed doctor! And what of the terminology? What is angina? "If a word means one thing to one doctor and something quite different to another, then the sum of their observations means nothing to anyone (Walford, 1955).

### **Quality control**

When performing an audit, there will be those facts which need to be accepted, since there can be no check of their reliability (e.g. results of urine cultures or blood pressure measurements). To overcome part of this problem, most laboratories have instituted a system of quality control in the same way as those industries whose profits depend on the quality of the final product (Duncan, 1965).

Unless this is done, all that the researcher can assess is the doctor's performance, given the information available to him. For most work, this is sufficient, but there is the

occasional and usually prospective research that requires the clinical measurements to be as accurate as possible. It is then possible for the doctor to perform a simple day-to-day control programme on his own clinical findings, using cumulative sum control charting (CUSUM for short). Apart from confirming the validity of a batch of results, Cusum charts can be used both to test efficiency and to improve education (Williamson and Smolski, 1972).

Although simple to use, the mathematics of Cusum charts are very complex (Lowe, 1968). Their influence depends on the facts that errors in estimated data quickly balance out and that very small changes in the quality of the result are quickly obvious as a change in the slope of the graph. To obtain a Cusum chart, the following is done:

- (1) Obtain the average for a given measurement in the unit of time under scrutiny (usually one day),
- (2) Obtain the difference between this average value and the preselected 'normal value' for the measurement in question,
- (3) Plot this difference in a cumulative fashion on the end of the graph (i.e. positive values ascending and negative values descending).

If the 'normal value' is selected or known correctly, the graph will be flat. If there is a slope, either upward or downward, then the 'normal value' is wrongly estimated for that group of patients, under or over-estimated respectively. Although normal values are taught to medical students as though they are standard facts, anyone who has worked in the field knows that this is an oversimplification.

To take blood pressures as an example, it is obvious that at best all the clinician can rely on is a range of acceptable values and one outside this range is by no means abnormal. Since we know that this parameter is affected by social or environmental factors it is obvious that the average value will vary from community to community. If we can assume that the majority of people will have a normal value for a given measurement this must be representable by the average and will therefore be similarly variable. Usually the practitioner has a clinical impression or 'guestimate,' of the normal values in his practice. The advantage of Cusum charting is that the doctor can himself test the reliability of his assumptions by seeing what the graphs do in his research.

I derived the following Cusum chart on the diastolic blood pressure at the Medical Centre (London), which has in operation an automated multi-phasic screening system. In the five months represented on the chart, over 8,000 patients' blood pressures were taken. I took as a starting point a 'normal value' of 95 mm Hg., since the patients were mainly middle-aged businessmen, a high proportion of whom were overweight. The initial finding was a graph which sloped downwards, indicating that 95 mm Hg as a 'normal' diastolic blood pressure was too high. I persisted, however, and at point A, the results of a research programme were released to me (Richardson and Robinson, 1971). This work showed that on any patient there was a discrepancy between the blood pressure measurement obtained by the nurse and that taken by the doctor. The latter tended to find a higher diastolic blood pressure. Since the Cusum chart depended on the measurement obtained by the nurses, I felt justified in starting a 'retraining' course which began at point B and lasted one week. The object of the course was to impress the importance of *technique* in obtaining blood pressure measurements.

The nurses were not told of the reason for the programme and they accepted it on its face value. Indeed there was no attempt to discuss actual levels with the nurses except to suggest that prior experience might lead to an expectation of a particular level. It was pointed out that this danger could be avoided as much as was possible by adherence to good technique.

When normal duty was resumed I watched the Cusum charts in the usual manner, not quite sure of what would happen. As can be seen, the graph flattened, indicating that the greater awareness by the nurses led to the actual average value being the same as the 'normal' value selected by me at 95 mm Hg. This flat graph continued for nearly three months before beginning to descend once more.

At point C, a further test was done to confirm a slackening of the nurse's efficiency and a second retraining programme at D resulted in a further flattening of the graph (Robinson, 1971). A retrospective survey of the average values derived for this Cusum chart failed to reveal any which was more than half a standard deviation from the 'normal value.' The use of any other form of control, or 'clinical impression,' would not have spotted the potential danger of careless sphygmomanometry as quickly or as simply.

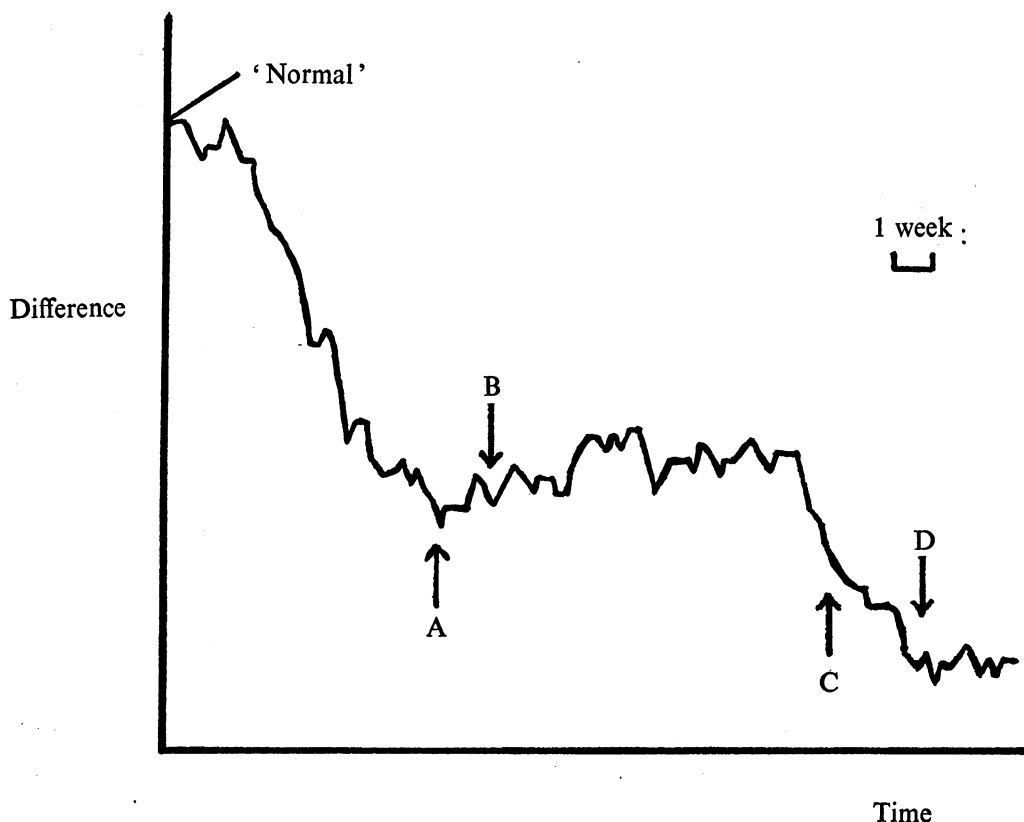


Figure 1  
Cusum chart for diastolic blood pressure

**Summary**

Medical audit can be seen as market research, epidemiological research, administrative research, clinical research, or snooping! If the aim is *always* to improve the service offered to the patient, the by-product is almost always an educational experience. The techniques used to perform a medical audit are many, but advice is available from the local community physician or a research club. All the researcher needs is a clear idea of his objectives, and proper medical records.

The value of quality control in clinical practice has been mentioned. It is not essential to medical audit, but if the researcher is interested in this form of study, it can

bring much benefit by way of helping him to learn more about the individuals who make up his practice.

Medical audit will not distinguish between how a disease was treated and a patient was managed with its statistics (Counihan, 1972). It does not attempt to do this. Its aim is to define a baseline for further analysis; in its broadest sense defining the 'normal value' upon which all medical practice is based.

Medical audit is concerned with seeing whether an episode has been resolved in the most efficient and effective manner, but we should not forget that improvements in medical care are dependent on the standards and ethical values held by the doctors offering that care. To those who seek to force change by misusing medical audit: it is well to remember the words of Norah Mackenzie who wrote:

"It is all too easy for the good organiser, often unconsciously, to regard human beings as pieces in a chess board to be moved about at his convenience. This in itself defeats its own ends, for it overlooks the importance of values in human life, and further infringes one of the most important of all human rights, that of respect due to any human being as a human being, whatever his character and personality may be like."

#### REFERENCES

- Acheson, H. W. K. (1972). *British Journal of Medical Education*, 6, 26-28.
- British Medical Association (1970). *Primary Medical Care*. Planning Unit Report No. 4. London: B.M.A.
- Central Health Services Council (1963). *The Field of Work of the Family Doctor*. London: H.M.S.O.
- Collings, J. S. (1950). *Lancet*, 1, 555-585.
- Cormack, J. J. C. (1971). *The General Practitioner's Use of Medical Records*. Edinburgh: Scottish Health Studies No. 15.
- Counihan, H. E. (1972). *World Hospitals*, 8, 184.
- Dawes, K. S. (1972). *British Medical Journal*, 3, 219-223.
- Department of Health and Social Security (1972). *Report of the Working Party on Medical Administrators*. London: H.M.S.O.
- Dollery, C. T. (1971). *The Quality of Health Care* In. *Challenges for Change*. Edit. McLachlan, G. Oxford: Oxford University Press.
- Duncan, A. J. (1965). *Quality Control and Industrial Statistics*. Richard D. Irwin Inc.
- Forsyth, G. (1966). *Doctors and State Medicine*. London: Pitman Medical.
- Himsworth, H. (1953). *Lancet*, 2, 789-791.
- Klein, R. (1972). *Public Interest*, 26, 112.
- Logan, R. (1969). *British Journal of Medical Education*, 3, 185-191.
- Logan, R. F. L., Klein, R. & Griffiths, D. A. T. (1970). *Lancet*, 2, 647-650.
- Lowe, C. W. (1968). *Industrial Statistics*. Business Books.
- Mackenzie, N. (1971). *The Professional Ethic and the Hospital Service*. English Universities Press.
- McWhinney, I. R. (1972). *British Medical Journal*, 2, 277-279.
- Medhurst, J. D. (1972). *British Medical Journal*, 3, 177.
- Ministry of Health (1967). *First Report of the Joint Working Party on the Organisation of Medical Work in Hospitals*. London: H.M.S.O.
- Richardson, J. F. & Robinson, D. (1971). *Journal of the Royal College of General Practitioners*, 21, 698-704.
- Robinson, D. (1971). Personal Communication.
- Royal College of General Practitioners (1969). *Journal of the Royal College of General Practitioners*, 18, 358-360.
- Royal College of General Practitioners (1970). *Present State and Future Needs of General Practice*. Reports from General Practice No. 13. London: *Journal of the Royal College of General Practitioners*.
- Slee, V. N. (1967). In. *The Medical Staff in the London Hospital*. Edit. Eisele, C. W. New York: McGraw Hill.
- Walford, P. A. (1955). *College of General Practitioners Research Newsletter*, 2, 53-57.
- Weed, L. L. (1969). *Medical Records, Medical Education and Patient Care*. Cleveland: Press of Case Western Reserve University.
- Williamson, J. D. & Smolski, O. R. (1972). *Proceedings of the Royal Society of Medicine*, 65, 891.
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