participate in identifying and resolving problems. If medical audit advisory groups are to encourage effective audit in general practice audit must be based in practices and used to solve deficiencies in care that each practice agrees are problems.

Some final advice

(1) As all good research starts with a clear hypothesis so good audit starts with a clear statement of the problem.

(2) If the results of the audit cycle cannot be expressed as a percentage improvement in the problem the audit was probably badly executed. (The most obvious exception is assessment of consultations.)

(3) Practice management and the team must be allowed to decide what is and what is not a problem.

(4) Whenever possible practice staff rather than doctors should collect data.

(5) Keep projects on a small scale and easy to repeat. Use samples. (Advice on sampling can be found in *Epidemiology in General Practice*.[3])

I thank my partners and members of staff at the practice for their participation in many audits.

1 Secretaries of State for Health, Wales, Northern Ireland, and Scotland. *Working for patients*. London: HMSO, 1989. (Cmnd 555.)
2 Crombie DL, Fleming DM. *Practice activity analysis*. London: Royal College of General Practitioners, 1988. (Occasional paper 41.)
3 Morrell D, ed. *Epidemiology in general practice*. Oxford: Oxford University Press, 1988.

Defining essential hospital data

S J Nixon

The recent government white paper clearly states an intention that all doctors should be concerned with auditing the quality of patient care. No exceptions are made, and little advice is given to those who have no experience of audit. If audit is perceived as economy, efficiency, and effectiveness then the white paper emphasises the last of these three despite the view of some that the basis of government interest is that of cost cutting. The white paper's definition of audit avoids mention of cost savings but does indicate that improvements in the quality of care must be achieved within the "resources available." It clearly puts responsibility for audit within the medical profession, and this has been accepted by the royal colleges, which see a definite role for themselves as leaders in audit.

Audit is not new; the history of medicine contains many examples of people who have actively examined the quality of their practice. Collective audit, however, is a phenomenon of the twentieth century, and there are in the United Kingdom many outstanding examples of national audit of mortality such as maternal mortality, perinatal mortality, anaesthetic studies, and cardiac surgery. The confidential enquiry into peri-operative deaths represents the most ambitious and in depth study yet undertaken. It may be insufficient, however, simply to join such studies in future. Doctors must look more closely into their own day to day activities.

Nature and quality of audit data

Audit has been subdivided into structure, process, and outcome. Structure has not been included in the remit of the white paper despite protests that it is clearly inadequate to meet the needs of patients. Though outcome is the most important, it is process that has been most subject to audit in the past because of simple, practical considerations. Data are most easily acquired while patients are in hospital or consulting rooms. Benefits of treatment are usually slow to accrue and need longer term assessment. Such follow up is time consuming, expensive, and often incomplete. The importance of outcome must, however, stimulate the profession to seek better methods for analysis of longer term results. Closer cooperation between hospital doctors and general practitioners might become the key to acquiring these data. Increasing use of computer technology in the community health service may be a catalyst to audit, but experience with hospital inpatient data suggests that useful audit as a byproduct of routine data capture is unrealistic.

Audit is research whose emphasis is on the quality of medical delivery rather than the basic principles of medical science. It is designed to influence "me" rather than "you." It must not be seen as second rate research. If poorly performed, audit will neither give a clear picture nor influence medical practice. Its data must be seen as a reliable indicator of the complex interaction between disease and treatment; too simplistic an approach will be dismissed by the profession. Data must also be collected and analysed rapidly for maximal effect.

Very real constraints on the quality and quantity of audit data exist. These include problems of definition, economics, time, and individual doctors' enthusiasm. Comparison of outcome depends on setting standards, which in turn relies on accurate predictors of diagnosis and severity of disease. Many studies show a high degree of variation in doctors' analyses of the same clinical data, resulting in differing views on severity of illness and diagnosis. There have, however, been many successful attempts to predict outcome—for example, the Glasgow coma scale, injury severity score, and prognostic formulas for predicting recurrence of various cancers—all of which have found international value. Little scientific study has examined prediction of outcome in more common situations—for example, repair of inguinal hernia, in which reported recurrence rates vary 100-fold from 0·2% to 20%. General surgeons need to look little further than surgery for hernia if they wish to define their position within this range. There are published methods designed to predict major complications and death after general surgical procedures. These still require wider verification but may help in setting standards of practice in future.

Coding systems

Audit requires the ability to compare results with those of colleagues, and this demands coding systems of disease, severity, and outcome. Sadly, the history of diagnostic and operation codes suggests that in surgery we still do not have a coding system that doctors use in day to day practice. In Lothian surgeons devised their own coding of diseases and operations, which was developed specifically for audit and took five years to develop before being introduced in 1984. The coding is used by all general surgeons working in the area and has spread to other areas. It has been used to acquire data on over 175 000 operation procedures but requires annual modification to keep pace with changes in

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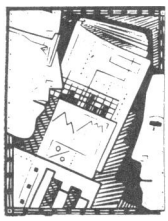
Br Med J 1990;**300**:380-1



practice. In urology so great have been the recent changes that a complete revision is now required. It does show, however, that coding systems can be made "doctor friendly" if working doctors are involved in their development.

As an indicator of outcome death remains the most studied and universally accepted; matters of definition do not arise. There are many areas of medical practice in which mortality is still relevant and in which wider variations seem to occur within the United Kingdom than can be explained by case mix alone. British reports of mortality for colonic resection vary from 0% to 33%. Interestingly, mortality in Lothian has fallen from 10% to 5% during the 1980s, when colonic surgery has been much discussed by the surgeons there, and it compares favourably with that in similar published work. The confidential enquiry into perioperative deaths confirmed large variations in the proportion of deaths considered to be "avoidable." A recent call by hospital administrators that hospital mortality be published may be premature as the analysis of such data is open to misinterpretation, but more detailed study of variations in mortality seems appropriate.

The lead taken by surgical audit is often dismissed as simply due to the relative ease of counting operations, complications, and deaths. I see little difficulty in analysing myocardial infarction, stroke, haematemesis, and many other conditions that are as clearly defined as an operation and with equally clear end points. I also see great problems in auditing some types of medical practice. Within surgery inflammatory bowel disease is representative of those conditions with a highly unpredictable course. With our present state of knowledge such conditions are simply not within the scope of audit and should be avoided.

As the momentum to audit increases there will be a temptation to overambition. Lothian surgical audit has been set as an example for others. It collects basic data from all operations and all deaths and has established a foundation of reliable data. Its data set is, however, limited and its methodology simple. It collects data from working documents and is seen as non-threatening and basically educational. It has evolved over 40 years to its present state and has proved to be a major stimulus for change in Lothian, usually towards increased specialisation; I doubt that any surgeon in Lothian has been immune to its influence. The Scottish mortality study is expanding this data set and attempting to establish the level of data collection that surgeons and anaesthetists will tolerate. The confidential enquiry into perioperative deaths is taking the alternative approach of collecting detailed data from a narrow field study. All of these studies illustrate that successful audit must have limited objectives if wide compliance is to be assured.

News and Information

No doubt most surgeons and managers would regard day case surgery as desirable, but what about its feasibility and acceptability to patients? In 58 of 100 consecutive inpatients admitted to St Thomas's Hospital, London, with conditions that should have been acceptable for day care (hernias, varicose veins, breast lump excision, lymph node biopsy, etc) this type of care was judged to be unsuitable because of too many stairs and no lifts, living alone, unsuitable companion, distance from the hospital, no transport, and anaesthetic requirements (*Journal of the Royal Society of Medicine* 1989;**82**:735-6). Initially, 51 patients said that they would have preferred to be operated on as day cases, but this figure dropped to 14 after they had experienced surgery. The average inpatient stay was 2·3 days.

Mortality from gastrointestinal bleeding remains obstinately around 10%. Can anything be done to improve this? A study from Nottingham (*Postgraduate Medical Journal* 1989;**65**:913-7) showed, as have others, that deaths were clearly related to increasing age and associated medical conditions. The proportion of people aged over 60 was greater than could be accounted for by demographic changes, and two thirds of the 91 deaths were due to unrelated causes. Only seven patients—two with pulmonary emboli and five with rebleeding—might possibly have been saved with more intensive and aggressive treatment. Greater effort towards unravelling the role of environmental factors—non-steroidal anti-inflammatory drugs, for example—in causing bleeding might be more rewarding than trying to save a few more lives.

Many pathologists bemoan the decline in the necropsy rate—currently 20-30%—but do little to reverse the trend. Applying principles of quality assurance at St James's Hospital, Dublin, to necropsy and analysing the results aroused considerable interest (*Journal of Clinical Pathology* 1989;**42**:1190-3), though it has not yet affected the number of requests for necropsy. As others have found, some four fifths of examinations confirmed the clinical diagnosis; the remainder disclosed major discrepancies, unsuspected conditions, or complications of treatment, and sometimes the findings proved helpful to the clinician in other ways. A monthly clinicopathological conference was established to discuss the findings in the remaining one fifth of examinations, allowing two or three major cases and nine or 10 minor ones to be considered at each session. Not only did necropsy standards improve but the meetings also attracted an average audience of 60, including senior clinical staff.

Data poisoning and overdose is a risk of health care information systems, claims Dr T D S Seddon, a general practitioner writing in the *New Zealand Medical Journal* (1989;**102**:644-7). He describes how improvement in health services has to rely on both quality assurance and information systems. A health service, he says, is like an organism that needs a central nervous system to cope with the complexities of modern information handling. Without a policy for information handling, data systems become patchy and idiosyncratic—an opinion that may not be unfamiliar to those trying to draw conclusions from existing data in the NHS.

A team visiting 20 genitourinary clinics in England for the Department of Health and Social Security in 1988 found, as staff have known for years, that the service was ill equipped to cope with present day demands and made no fewer than 36 recommendations (*Genitourinary Medicine* 1989;**65**:376-81). Most strongly condemned was accommodation, which was so bad that "attendance could be regarded as punitive," but medical and nursing staff were inadequate in number and their precise role often uncertain, coordination poor and training patchy and most clinics had no planning for the future. On the other hand, medical equipment, diagnostic support services, and health advisers were adequate. Some recommendations have been implemented and the government has provided more money, but whether genitourinary medicine can finally cast off its image as a Cinderella service remains to be seen.

A workshop in which four different models were used to teach trainee anaesthetists intubation by fibreoptic endoscopy improved the practice of 35% of those who attended (*British Journal of Anaesthesia* 1989;**63**:595-7). Confidential questionnaires were sent to 182 participants sometime after a two hour lecture and four hours' practical instruction, who noted their degree of success on a five point scale before and after the workshop. Despite a low response rate the results were considered encouraging. A similar programme might be suitable for supervised instruction of trainees.