locally or nationally, the finding that within the sample a call system was associated with improved performance replicates other studies, which found that unstructured case finding failed to produce high rates.^{11 12} Because of the issues of method discussed earlier the estimate of practices reaching the target of 80% coverage (28%) is crude. However, this result from highly motivated practices suggests that to be effective the target will have to be seen as an inducement to higher performance rather than a reward for achieving it. Further studies on representative practices are needed to predict whether the target will act as a positive or negative incentive.

In future, outside agencies will provide general practitioners with data about their performance, including that on rates of cervical cytology. Such unsolicited feedback has not proved to be effective in changing behaviour,¹³ although it may be necessary in terms of accountability or for contractual reasons¹⁴; there will remain a place for the type of voluntary, locally organised exercise described here.

This study would not have been possible without the cooperation and help of Janet Bailey, administrative secretary for the Vale of Trent faculty.

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Audit in person

Problem solving with audit in general practice

Richard Baker

Introduction

The purpose of medical audit is to improve the quality of care. If badly executed or used for any other purpose audit may waste time and resources that should be used in caring for patients. Whatever we may think of the other proposals in the white paper¹ the new arrangements for audit in general practice offer the profession an opportunity to introduce effective audit that will substantially improve the quality of care. The difficulty is to ensure that audit in practices or organised by medical audit advisory groups is effective in improving care and not wasteful of resources or demoralising to the participants. Audit should therefore be subjected to the same degree of critical evaluation as any other innovations in medicine, such as new treatments or forms of investigation; it has the same potential as these more traditional medical activities to cause harm as well as benefit. I will draw on the experience of some of the successful and unsuccessful audits carried out in my own practice to show why some audits lead to improvements in care and others do not.

Problem solving with audit

The most common reason for failure of audit to improve the quality of care is that the findings do not cause changes in day to day clinical practice. Deficiencies are ignored, either because they are seen as unimportant or because the changes required seem so considerable as to be impracticable. Using audit to solve problems is one way to avoid this difficulty; it is undertaken only when a problem is suspected, which the practice wishes to correct. If audit is to be effective the participants should be the practice team or some of its members—it is the practice that has the problem, and its members are usually the only people who can put it right.

Problems in providing care may be identified in

various ways. There cannot be many general practitioners who are not aware of most of the strengths and weaknesses of the practices in which they work. For example, patients may complain about how difficult it is to speak to their doctor on the telephone or to arrange for repeat prescriptions. The receptionists or practice nurses may more often be the recipients of this type of complaint than the doctors themselves. There are other ways to spot problems. A potentially avoidable important event such as the late diagnosis of appendicitis may indicate a problem of practice management or medical skill that needs investigating; the information from prescribing analysis and cost data may show excessive prescribing of antibiotics; or a training practice inspection may disclose disorganised records. If the practice examines the evidence from such sources and concludes that a problem exists then audit provides one solution. Some types of audit can disclose deficiencies in care, but categorising those deficiencies as problems and then dealing with them demands a different approach. Problems can be thought of as deficiencies that those in the practice think are so important that corrective action must be taken. Some examples may help explain the difference.

Successful audits

Audit 1—The problem: doctors and staff reported to the practice meeting that patients complained how long they had to wait for routine appointments (urgent appointments are available on the same day). At the first data collection the receptionists kept a record of the waiting interval in days regularly over three months. The average wait for an appointment with the patient's chosen doctor was 3.7 days. The solution: we agreed to aim at around three days as a target and introduced a new system offering more and longer appointments. At the second data collection the

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average waiting time after introduction of the new system fell to 2.7 days during the three months of collecting data. Regular monitoring of waiting time continued subsequently; the percentage improvement in the problem was 27%.

Lessons: longstanding problems can be solved by a methodical approach; staff collected the data and the use of doctors' time was minimal.

Audit 2—The problem: during 1982 a large proportion of cervical smears were reported to the practice as inadequate, showing no endocervical cells. At the first data collection the practice nurse kept a record of the results. The proportion of adequate smears varied among the doctors from half (myself) to 78%. The solution: try harder, change fixative regularly, and buy better spatulas. At the second data collection, by 1983, my score had improved to 74% and is presently 87%, above the practice average of 83%. Percentage improvement in the first year was for myself 56% and overall 74%.

Lessons: audit may be embarrassing, but embarrassment is preferable to ignorance or lack of interest; audit works.

Audit 3—The problem: the district nurses asked during a team meeting whether giving hydroxycobalamin injections every month to patients with vitamin B-12 deficiency was an appropriate use of their time. At the first data collection a list of patients receiving hydroxycobalamin treatment was compiled from repeat prescriptions, the disease index, and the recall of team members. Records were reviewed, and all 32 patients receiving monthly injections were asked to change to three monthly injections. The second data collection was superfluous as the problem, according to the nurses, had been resolved. In terms of improvement 25 (78%) patients changed to the less frequent regimen.

Lessons: audit may help other members of the practice team not just the doctors. If the method that first disclosed the problem subsequently shows that the problem has been resolved repeating the audit cycle may be unnecessary.

Audit 4—The problem: achieving targets for preventive health measures for specific patient groups may be viewed as a problem, and many doctors have carried out problem solving audits of this type. Over several years our practice has tried to reduce the incidence of cardiovascular disease in our patients, one measure being a five yearly check on blood pressure for all adults aged under 65. At the first data collection in 1980, 52% of patients aged between 41 and 69 had their blood pressure recorded in their notes. We decided to rely on opportunistic screening. At the second data collection by 1983 the proportion had fallen to 38%. We reminded ourselves to check patients during consultations. The first two sets of data were collected with a practice activity analysis method,² but thereafter we used our own method with larger samples of records. At the third data collection, in 1985, 60% of notes for the age group 35 to 65 had a record of blood pressure in the previous five years. A blood pressure check was routinely incorporated into the well woman screening scheme. At the fourth data collection by 1986 the proportion whose blood pressure was checked in the 35 to 65 age group was 60% for men and 65% for women. We decided to offer men health checks as well as continuing opportunistic screening and well woman checks. At the fifth data collection by 1989, 83% of men and 82% of women in the 35 to 65 age range had had their blood pressure recorded within the preceding five years.

Lesson: achieving a screening target may be treated as a problem to be tackled in a systematic way using audit combined with a concerted approach from the practice team.

Less successful audits

Audit 5—A study of referral to physiotherapy was carried out by an audit group of which I was a member. The group wanted to ascertain whether referrals were appropriate. At the first data collection over a two month period all members of the group kept a record of physiotherapy referrals. The doctor with the lowest number of referrals sent only one patient for treatment, the highest number of referrals was 11. No further data were collected. Percentage improvement was none.

Lessons: the senior physiotherapist told us that none of the referrals had been inappropriate. If we had asked her beforehand what proportion of referrals were inappropriate we would have realised that there was not a problem to audit.

Audit 6—The problem: participation in a trainer's course required me to perform a practice activity analysis study on workload. At the first data collection I learnt that I was doing more home visits but fewer surgery consultations than other participants on the course. No further data were collected and percentage improvement was none.

Lessons: this is an example of peer review. It might be thought of as educational, showing deviations from the average, but deviations are not always problems and no changes in my practice were brought about.

Audit 7—The problem: there was no specific problem but a general interest to perform a traditional audit of the care of patients with hypertension. At the first data collection in 1986 the records of a sample of patients with hypertension were reviewed; in 83% this hypertension was classified as being well controlled, while 4% had not been reviewed in the previous 12 months. We were reasonably happy with the findings but had not set any criteria or standards beforehand. At the second data collection in 1989 records were reviewed again; in 8% of patients in this sample hypertension had not been checked in the previous 12 months. We agreed to set a criterion that all patients should be seen at least annually. Percentage improvement was none.

Lessons: again this audit started out of curiosity rather than because of a specific problem. By finally agreeing a criterion, however, we defined a problem and set a target to encourage its resolution.

Differences between successful and unsuccessful audits

Successful audit leads to improvements in the quality of care. The audits described above show different degrees of success, those that resulted in improved care being initiated to deal with acknowledged problems. When set up for other reasons, such as compulsion or curiosity, they did not improve care. Peer review and audit for purely educational purposes are ineffective because they almost always tackle subjects most participants do not accept as problems, and even if they do their practices may not. Any deficiencies that are disclosed will not be corrected unless the practice agrees that they represent an important problem that must be corrected. There is a difference between deficiencies and problems. Deficiencies disclosed by chance or formal evaluations of care are deviations from standards that may or may not have been agreed beforehand. Problems are deficiencies that have been categorised by the members of the practice as needing action. The way in which a practice handles deficiencies and recognises them as problems will depend on the style of practice management, which needs an ordered way of considering problems and allotting a priority to each. In the multidisciplinary practice teams of today practice management must allow all professional groups to

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)

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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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