Occasional articles

Locally organised medical audit in histopathology

A D Ramsay

Background

Medical audit is now widely supported by both the government^{1,2} and the medical profession.³⁻⁵ Cost consciousness in both the National Health Service and the private sector⁶ mean that competition for resources will depend to a great extent on the quality of the service offered, and one of the means of demonstrating this quality is by the adoption of an evaluation or audit system. Proposed laboratory accreditation schemes^{6,7} will investigate the level of quality assurance in all pathology disciplines, and it is clear that all NHS consultants will be expected to participate in such audit, with the aim of maximising the benefit to patients from the available resources.^{1,2,8}

Diagnostic histopathology, relying heavily on the opinion of experienced personnel, is a difficult area in which to establish audit mechanisms, a fact recognised in the 1989 report of the Management Advisory Service to the NHS,⁹ which stated that:

"Health authorities have little assurance of the quality and timeliness of the analytical services provided. At present both internal and external quality control mechanisms operate, but these are not mandatory and may be difficult to establish effectively, particularly in histopathology."

Despite this observation, National External Quality Assurance Schemes (NEQUAS) in the pathology disciplines were considered as long ago as 1981,¹⁰ and an external quality assessment (EQA) of the technical aspects of histopathology was described in 1982.¹² Several schemes assessing diagnostic accuracy were set up in various parts of the country in the 1980s,^{12,13} and the Department of Health now operates the United Kingdom External Quality Assessment Schemes for Clinical Laboratories¹⁴ which examines several aspects of histopathology.^{15,16}

External audit, or quality assurance (EQA) schemes are largely diagnosis based, circulating cases to pathologists and correlating their diagnoses.^{12,13,15} This approach can generate valuable data regarding the relative diagnostic ability of the pathologists involved, but will be of limited value as far as many departments of pathology are concerned. Examining selected cases and producing a diagnosis for external assessment is quite different from day to day diagnostic work within a busy histopathology department. In this

situation technical quality, speed of reporting, overall "mass" accuracy, the efficiency of relaying important diagnoses to clinicians, and many other factors are important. Such factors are outside the scope of EQA schemes and can only be assessed by a local audit system. Local audit does not replace external audit, and ideally the two forms of audit should be run in parallel, the local audit scheme operating within a department to evaluate efficiency and to detect problems with working practices, the external system assessing the pathologists' competence within a wider framework.¹⁷

What to audit?

Local audit systems are predominantly concerned with aspects of everyday work in a department and are essentially aimed at providing feedback about departmental performance. Accordingly, such systems should come from within a department, rather than be imposed from outside, and each institute should decide which factors need to be assessed in its own local scheme. Obvious areas to examine are given in table 1.

As well as these more routine aspects of diagnostic pathology, some departments may well wish to include other variables in their audit. The distribution of workload may be examined, either assessing the numbers of various specimen types received, or assessing the overall caseload or the numbers of specific specimens reported by each pathologist. Some departments may wish to produce personal performance figures for their pathologists, particularly in teaching hospitals where an assess-

Table 1 Some factors that may be examined as part of a local audit system

Aspect of work	Suggested basis for assessment
Description of whole specimen	Accurate description? Does it make sense? Does it correspond with the slides and clinical details?
Microscopic report	Diagnostic accuracy, message conveyed by report
Speed of report production (turnaround time)	Any delays in producing report? At what stage are these delays?
Laboratory performance	Quality of sections; routine and special stains; delays in production of slides?
Secretarial performance	Any typing delays; accuracy of typing (transcription and typographic errors)
SNOMED ¹⁸ coding	Correct code applied? How easily can the case be retrieved?

Department of
Histopathology, Level
E, South Academic
Block, Southampton
General Hospital,
Tremona Road,
Southampton
SO9 4XY
A D Ramsay

Correspondence to:
Dr A D Ramsay

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ment of the performance of junior staff may be of value.¹⁹ Local audit evaluating the accuracy of frozen section diagnosis has been performed in the USA,²⁰ and schemes which examine necropsy work, rather than being restricted to surgical histopathology, may also be considered.^{21 22} An interesting alternative form of audit compares diagnostic patterns in different laboratories,²³ and it may be possible to use patterns of diagnoses in a comparison of individual pathologists.

The more adventurous departments may wish to evaluate more complex aspects of histopathology. In the face of severe financial restriction it may be of value to assess resource usage, looking at numbers of blocks taken and special stains or levels requested. Another important aspect, although difficult to assess, is the fate of reports once they have left the department. Are they distributed quickly, and are they received (and read) by the correct person?

Strategies for audit

After having decided what to examine in a local audit scheme, a department must determine how to carry out the audit. Most histopathological audit strategies are based on peer review,^{12 13 19 21 24} and given the fact that much of our work is based on what is essentially a personal opinion, this is one of the more convenient methods available. Audit based on peer review is relatively straightforward in departments with a large complement of senior staff, but is more difficult in hospitals with only two or three consultant pathologists. One solution is to use pathologists from other hospitals within the region, adding an element of external assessment, perhaps establishing a regional histopathology audit system.

Raw numerical data can be used for the objective variables assessed—workload distribution, resource use, and, to a certain extent, delays in the process of report production (although it must be recognised that there are sound reasons why certain reports may be delayed), but is impossible to apply it to the more subjective aspects of reporting. In the latter area more complex statistical audit can be used and diagnoses may be compared using κ statistics (the NEQUAS system operates along these lines¹⁵), but this introduces a further level of complexity, needs several opinions for comparison, and often requires the services of a competent statistician.

The other main consideration in the development of a local audit system concerns the extra work entailed. Who will be responsible for organising the system (retrieving and distributing cases, storing and collating data, etc), and how will it be funded? It is unreasonable to expect an already stretched department to cope with the additional workload of an audit system unaided. Regional funds have now been made available for medical audit, and pathology departments should make a strong bid for these resources. There is a need to establish funding at an

early stage, and liaison with management is recommended before setting up any form of audit system.

Practical aspects of audit—the Southampton experience

At Southampton General Hospital a local quality evaluation system was established (and copyrighted) in June 1988, and information has been collected on a monthly basis since that date. Many other departments in the United Kingdom are now using modifications of this system as a basis for their local audit. As a university department of pathology, Southampton has a workload of 24 000 surgical specimens every year, with six consultant level staff reporting cases on a weekly rota and two others reporting on an intermittent basis. About 40% of all cases are reported solely by the consultants; the remainder are seen initially by junior staff at senior house officer, registrar, or senior registrar/lecturer level. All senior house officers and registrars are supervised and do not report cases unaided, whereas senior registrars and lecturers with sufficient experience, and those that have passed the MRCPATH examination, are permitted to report cases on their own.

The system consists of a retrospective survey, based on peer review, of a random 2% of each month's surgical input. A random number generating computer program is used to select the cases for assessment, and the original request form, final report, and all the slides from each selected case are distributed to two senior pathologists for examination. To avoid individual bias both these pathologists assess the cases separately, and one of the pathologists differs each month. (External assessors from other hospitals have also been used.) Both evaluate a set of nine variables on each case, assigning each into a "satisfactory", "borderline", or "unsatisfactory" category. In

Southampton histopathology quality audit			
CASE NO: _____	SATIS- FACTORY	BORDER- LINE	UNSATIS- FACTORY
MACROSCOPIC DESCRIPTION			
MICROSCOPIC DESCRIPTION			
QUALITY OF SECTION			
TECHNICAL DELAY			
REPORTING DELAY			
TYPING DELAY			
SIGNING DELAY			
PRESENTATION OF REPORT			
ACCURACY OF CODING			

Figure 1 Southampton Quality Audit Proforma

Figure 2 Graphical expression of QA results for the month of September 1989. The abbreviations along the horizontal axis represent the nine parameters assessed, and the chart shows the percentage cases deemed "satisfactory", "borderline" and "unsatisfactory" for each parameter.

practice the pathologists complete a proforma on each selected case (fig 1).

Guidelines on assessing the variables are given to all pathologists, detailing, for example, how individual reporting style is allowed, but emphasising the importance of conveying a meaningful message to the clinician. Evaluation of delay is based around a series of date stamps performed at various stages of the reporting process, although many departments may be able to obtain this information direct from their computer. Actual times taken to carry out each stage could also be used, but the flexibility of the satisfactory-borderline-unsatisfactory scale allows the assessor to take into account the nature of the specimen and the difficulty of the case.

Both pathologists' assessments are then combined (with discussion if necessary) to give a "consensus" set of results for each case. The categories are converted to a numerical score (satisfactory scores 3, borderline 2, and unsatisfactory 1), and the case details, reporting pathologist(s) and all the scores are stored in a database on a personal computer.

The monthly results are extracted from the database and expressed in tabular form on a spreadsheet (table 2), where the percentage of cases scored as satisfactory, borderline, and unsatisfactory are calculated for each variable. These figures (shaded areas, table 2) are then expressed as a graph (fig 2). These graphs are the basis of the regular audit, and are presented at monthly departmental meetings highlighting areas of everyday work in which the departmental performance falls below standard.

Scores of less than 80% satisfactory, or over 10% unsatisfactory, are considered to be unacceptable, and are investigated further.

As the data accumulate, the monthly results are combined to produce charts that show the long term variation in departmental performance. An example of this type of chart is shown in fig 3, which illustrates the monthly scores for microscopic description for the year July 1988 to June 1989.

For many histopathology departments this level of audit may well be sufficient. It enables the production of monthly results, either as figures in a table, or in the form of a graph, and allows the long term changes in performance to be monitored. The stored data, however, are open to more sophisticated analyses. For example, one of the effects of training junior staff is shown in fig 4 which shows the reporting delay scores for the year July 1988–June 1989, dividing the cases up into those reported by senior pathologists alone and those where a junior was involved in producing the report. The cases reported by senior staff alone show a higher percentage with a satisfactory delay than cases reported by both juniors and seniors, which show a concomitant increase in unsatisfactory and borderline scores.

In a similar way the scores for any single variable or combination of variables can be extracted for individual pathologists. Figure 5 is a graph grouping pathologists according to status, and showing the average score and range for the year July 1988 to July 1989 for three variables: macroscopic description, microscopic descriptions, and speed of reporting. The relatively slow reporting speed of the cases involving registrar/SHO staff is shown again here, together with the observation that the senior registrars' macroscopic description scores exceed those of the consultant staff. (It should perhaps be pointed out that the significance of this difference has not been computed.)

These figures illustrate some of the methods in which the data collected by an internal audit system can be displayed. Individual departments are able to decide which aspects of their work they wish to examine, and can extract the figures relevant to their requirements.

Value of local audit

The results generated by a local audit scheme can be used in a variety of ways, depending on the specific areas of interest in a department.

Table 2 Monthly scores expressed in tabular form on a spreadsheet

QA Results Jan 89					Total case no: 27	
	Satisfactory	Borderline	Unsatisfactory	% Satisfactory	% Borderline	% Unsatisfactory
Macro description	22	5	0	81	19	0
Micro description	23	3	1	85	11	4
Quality of section	20	6	1	74	22	4
Technical delay	21	5	1	78	19	4
Reporting delay	22	4	1	81	15	4
Typing delay	25	2	0	93	7	0
Signing delay	26	1	0	96	4	0
Report presentation	23	4	0	85	15	0
Accuracy of coding	25	1	1	93	4	4
Overall score	208	30	5	85	13	2

Figure 3 Southampton QA results for microscopic description between July 1988—June 1989.

Precise identification of the source of delays enables corrective measures to be taken, usually by reorganisation of working practices. Substandard technical work from the laboratory, uneven workload distribution, and individual shortcomings among pathologists can be identified, and the reasons behind them investigated. As precise timings are kept on all cases (not just those sampled for assessment), should a clinician draw attention to a particularly slow report, the stage at which the delay occurred can be identified and the cause investigated. In teaching departments assessment of junior staff performance, either as groups or as individuals, is valuable, enabling the restructuring of training in response to detected areas of difficulty, such as poor macroscopic description or inadequate microscopic description.

One of the more controversial aspects of audit concerns the interaction of pathology staff with those in management. On the positive side audit results showing an area of poor performance in a department could provide valuable support for a bid for more resources, so that, for example, repeated typing delays could be used to justify the appointment of a new secretary. On the negative side management may wish to see individual performance figures or to compare results from one department with another, and may use the results out of context. Such problems are inherent in the use of medical audit and departments should be aware of this.

Figure 4 Reporting delay, July 1988—June 1989, cases divided according to role of junior staff.

Problems with local audit

There is no doubt that running an audit system is time consuming. In Southampton, where all the data entry and extraction is performed by a consultant pathologist, the system requires an input of between 12 and 15 hours each month by the controlling pathologist, and around three to five hours each month by the second assessing pathologist. The latter rotates, so that any one pathologist will only assess twice a year. It is important that the workload generated by the audit system is spread as loss of enthusiasm and a lack of will in assessing the cases would reduce the effectiveness of the audit. A partial answer lies in the employment of an audit assistant; this can substantially decrease pathologist time consumed, but requires an extra salary, albeit only part-time. The time commitment to audit should be an important consideration in any request made for funding before establishing any system.

Tied in with the time required for audit is the difficulty of achieving "immediacy". If individual or group deficiencies are detected the sooner this is brought to their attention the better. If the audit findings related to events several months or more in the past then their impact is lessened. It is therefore important to keep performance evaluations up to date and to let departmental members know the findings as soon as possible. Departments with sufficient staff and time may be able to manage a fortnightly or even weekly assessment.

The funding for audit is likely to present a major problem. This is exemplified by the experience at Southampton, where despite numerous approaches to both region and district, the system described above has received no support whatsoever, and the department is presently having difficulty in maintaining the audit. Members of management were contacted at various stages in the development of the system, and throughout the course of its operation, but all requests for finance have been unsuccessful. Major grant awarding bodies have also been approached with regard to research projects based around the audit scheme, but again without success. Any department that embarks on a local audit system would therefore be unwise to start until they have a definite commitment from local management to provide concrete support for audit, both in terms of the extra time required by staff members and for the purchase of the relevant information technology.

Running an audit system requires a high degree of cooperation among all departmental staff. It is not possible for a single individual to "opt out" of the scheme without negating its value. Pathologists need to be prepared to have their work assessed by others, and to assess others' work in an unbiased manner. The system design should be acceptable to all participants, and any problems detected need to be discussed in an open manner.

Manipulation of dates and times (cheating) is possible in a local audit system although less likely if a sample of cases are examined retrospectively. The manipulator would have to alter all the cases personally reported in the

Figure 5 Range and average (arithmetic mean) score for the year July 1988–June 1989 grouped according to grade of pathologist. Cons—Consultants; SR—Senior Registrars; Reg—Registrars. Macro—macroscopic description; Micro—microscopic description; Rep del—reporting delay.

attempt to cover the few that might fall into the sampled group. Individual results that greatly exceed the mean scores, however, should perhaps be viewed with suspicion.

Anonymity of results may also produce a dilemma. Maintaining complete anonymity, as at Southampton, where only the system organiser is able to access named individual data, means that the audit system is not seen as “victimising” any of the departmental members, and so encourages universal participation. This makes it harder to deal with individual shortcomings however, and some of the Southampton medical staff would prefer to see scores for named pathologists to enable them to make a relative assessment of their own performance.

One of the greatest problems associated with a local audit system is that of “closing the circle”. The system will provide feedback as to problem areas within a department, but it is up to the department to find a solution. Finding and implementing such solutions may be particularly difficult. At Southampton the audit results showed unacceptable delays in typing reports, yet despite changes in office organisation, the introduction of word processors, and a changeover of many of the staff, these delays remain. On the positive side, although finding a deficiency and correcting that deficiency do not necessarily go together, if a solution is found, the successful outcome should be reflected in the audit figures.

Summary

The principles behind medical audit are straightforward,²⁵ and histopathology departments are not exempt from the increasing requirement for audit in hospitals throughout the United Kingdom. Participation in a local audit scheme can offer more direct benefits than those which may be achieved by participation

in a diagnosis based external quality assurance system, but the two are not incompatible. Histopathology Departments should establish their own system, developing an audit strategy for their particular laboratory and obtaining funding in advance. The experience gained from Southampton would suggest that such local systems are best kept fairly straightforward, so that they can be managed readily and do not become too onerous. Individual departments should institute a forum for presenting the results of their audit, and should consider how they might go about correcting any inadequacies detected by their system. It is also important for a department to decide on the extent to which their findings are to be disseminated more widely, in particular to the administration and managerial staff of their institute.

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