An external quality assessment scheme in histopathology

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SUMMARY The details of an external quality assessment scheme in histopathology based on district general hospitals in south west England are described. The scheme is supplementary to internal audit carried out in individual departments.

In 1981 Whitehead and Woodford1 defined an external quality assessment scheme (EQAS) as "a system of objectively checking laboratory results by means of an external agency" and said that it included "comparison of a laboratory's results...with those of other laboratories." In this paper we report the details of a scheme which we believe to be the first working EQAS in diagnostic histopathology in the United Kingdom and present some of our results. The scheme is based on small group circulation somewhat similar to, but simpler than, that available in a few topics from the College of American Pathologists2 3 and is designed to monitor routine reporting in the histopathology laboratory.

Outline of scheme

Up to 11 consultant histopathologists from six district general hospitals in the far south west of England are taking part in this scheme. The group was already meeting twice a year as an informal slide club. One of us (AJS) is the coordinator.

For each circulation of the scheme, each hospital is asked to submit seven haematoxylin and eosin stained sections from all the blocks taken from the first two examples of a type of specimen (as selected by the coordinator) received in their laboratory after a specific date together with the clinical details as given on the original request form, the gross descriptions, and the microscopical reports as sent to the clinicians. These cases are allotted an accession number by reference to a table of random numbers in such a way that the persistently late submitters are not always the last numbers of a series and so that cases have no tendency to appear in pairs. Report forms are prepared by the coordinator and are sent, with the slides of all cases submitted, to each hospital, which is identified by a code number. Where there are two or more consultants in a laboratory the material is sent to one and he or she is asked to photocopy the forms and circulate the slides. Each consultant is expected to report the cases as if they were routine material and to return the forms to the coordinator, keeping a copy and the slides for future reference. The results are collated in such a way that one sheet of paper will show all the reports on one particular case (Figure). The order is determined in a random fashion so that consultant A's findings will not necessarily be first or, indeed, in any other specific position on the list. The coordinator also prepares summary charts (Tables 1 and 2) and calculates the degree of consensus as to whether a lesion is benign or malignant and to which category of disease it belongs. Obviously the column headings vary with the nature of the tissue under discussion. The disease classification is assessed and allotted by the coordinator from the free form written reports given by the participants. Copies of the collated report forms and summary charts are circulated to each hospital so that the consultants concerned can compare their reports with the others.

Cases in which consensus has not been reached are discussed at the slide club meetings, together with any interesting or difficult problems. If agreement has still not been reached the case may be referred to an acknowledged expert outside the group.

Results

So far we have completed seven rounds and four others are in progress. We have examined the practical aspects of the scheme and assessed its acceptability to our colleagues.

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HISTOPATHOLOGY SELF-AUDIT SCHEME (SOUTH-WEST)
COLLATED REPORTS
CASE CODE  9999

CLINICAL DETAILS  A 43 year old man with three months diarrhoea now improving.

GROSS DESCRIPTION  A mucosal biopsy 0.3 cm diameter.

HISTOLOGY
Normal rectal mucosa.
A low grade non-specific proctitis with no evidence of active ulcerative colitis.
Rectal mucosa within normal limits.
There is a mild increase in non-specific chronic inflammatory cells in the lamina propria but no specific features.
A resolving mild proctitis.
Minor chronic inflammation only with no goblet cell depletion or crypt distortion.
(There is no evidence of active disease here.)
Rectal mucosa showing no significant abnormality.
Non-specific mild mucosal inflammation with retention of goblet cells. There are no specific features.

Sample report form.

Table 1  Summary of macroscopical findings: hysterectomy specimen

<table>
<thead>
<tr>
<th>Case no</th>
<th>Size stated</th>
<th>Weight given</th>
<th>Fibroids</th>
<th>Ovaries</th>
<th>Other</th>
<th>Blocks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Present</td>
<td>Size</td>
<td>App</td>
<td>Present</td>
</tr>
<tr>
<td>1</td>
<td>Y</td>
<td>N Y Y</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>N</td>
</tr>
<tr>
<td>2</td>
<td>Y</td>
<td>Y N N</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Y Y N</td>
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<tr>
<td>3</td>
<td>Y</td>
<td>N N N</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>N</td>
</tr>
<tr>
<td>4</td>
<td>N</td>
<td>Y Y N Y N N</td>
<td>Y</td>
<td>N Y Y</td>
<td>N</td>
<td>Y N Y</td>
</tr>
<tr>
<td>5</td>
<td>Y</td>
<td>Y N N</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Y N Y</td>
</tr>
<tr>
<td>6</td>
<td>N</td>
<td>Y Y Y</td>
<td>Y</td>
<td>N</td>
<td>-</td>
<td>N</td>
</tr>
<tr>
<td>7</td>
<td>Y</td>
<td>Y N N</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>N</td>
</tr>
<tr>
<td>8</td>
<td>Y</td>
<td>N Y N</td>
<td>N</td>
<td>N</td>
<td>-</td>
<td>N</td>
</tr>
<tr>
<td>9</td>
<td>N</td>
<td>Y Y N N N N</td>
<td>Y Y N</td>
<td>N N N</td>
<td>N</td>
<td>Y N Y</td>
</tr>
<tr>
<td>10</td>
<td>N</td>
<td>Y N Y</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>N</td>
</tr>
<tr>
<td>11</td>
<td>Y</td>
<td>Y Y N</td>
<td>N</td>
<td>N</td>
<td>-</td>
<td>N</td>
</tr>
<tr>
<td>12</td>
<td>Y</td>
<td>N Y N Y Y N</td>
<td>Y Y Y</td>
<td>Y Y Y</td>
<td>N</td>
<td>Mass in fallopian tube</td>
</tr>
<tr>
<td>Total</td>
<td>8/12</td>
<td>8/12</td>
<td>6/12</td>
<td>4/6</td>
<td>1/6</td>
<td>6/12</td>
</tr>
</tbody>
</table>

Y = yes—that is, that parameter measured or feature described.
N = no—that is, not mentioned.
App = appearances.
Endo = endometrium.
Cx = cervix.
Fibr/myo = fibroids/myometrium.
Table 2  Summary of microscopical findings: prostatic curettings

<table>
<thead>
<tr>
<th>Case no</th>
<th>Malignant</th>
<th>*Border line</th>
<th>Benign</th>
<th>Nodular hyperplasia</th>
<th>Consensus</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Poor</td>
<td>Average</td>
<td>Good</td>
<td>Inflammation</td>
<td>Acute</td>
</tr>
<tr>
<td>901</td>
<td></td>
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<td></td>
</tr>
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<td>+ +</td>
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<tr>
<td>904</td>
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<tr>
<td>905</td>
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<td>906</td>
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<td>++ +</td>
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<td>907</td>
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<td>908</td>
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<tr>
<td>909</td>
<td></td>
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<td>910</td>
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<td></td>
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<tr>
<td>912</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*An entry in this column usually indicates that the pathologist was concerned about a small area in an otherwise benign biopsy.
× = main diagnosis.
+ = subsidiary diagnosis.
Ben = benign.
Mal = malignant.

Table 3  Details of material received

<table>
<thead>
<tr>
<th>Nature of tissue</th>
<th>Cases submitted</th>
<th>Blocks</th>
<th>Slides submitted</th>
<th>Reports received</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prostatic curettings</td>
<td>10</td>
<td>28</td>
<td>196</td>
<td>90</td>
</tr>
<tr>
<td>Lymph node biopsy samples</td>
<td>10</td>
<td>11</td>
<td>77</td>
<td>90</td>
</tr>
<tr>
<td>Rectal biopsy samples</td>
<td>12</td>
<td>12</td>
<td>84</td>
<td>120</td>
</tr>
<tr>
<td>Salivary glands</td>
<td>10</td>
<td>21</td>
<td>147</td>
<td>100</td>
</tr>
<tr>
<td>Thyroids</td>
<td>12</td>
<td>14</td>
<td>123</td>
<td>108</td>
</tr>
<tr>
<td>Colectomy specimens</td>
<td>6</td>
<td>6</td>
<td>28</td>
<td>48</td>
</tr>
<tr>
<td>Testicular masses</td>
<td>12</td>
<td>12</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Total</td>
<td>72</td>
<td>184</td>
<td>1,288</td>
<td>652</td>
</tr>
</tbody>
</table>

**MATERIAL SUBMITTED**

Some relevant details concerning the nature of tissues requested and the slides and reports received are summarised in Table 3. The number of consultants participating in any one round varied from eight to 10. Most tissues examined were suitable, although some difficulties were encountered with small endoscopic biopsy samples because the blocks had been largely cut through at the time of the original examination. This was particularly true of gastric biopsy samples and has resulted in an amendment to the protocol (participants are now asked to ensure that the lesion present in the original microscopical report is present in all slides submitted to the scheme).

Not all departments could provide clinical details of the type written on the request form. This seemed to be related to the practice of using separate request and report forms and discarding the former. In some types of specimen it is necessary to include the date of biopsy in order to complete the clinical details; this point was overlooked in our endometrial curettage series.

**COLLATION OF REPORTS**

**Gross descriptions**

The summary charts show how many hospitals included details such as weight, colour, and size of specimen in the gross description of a particular type of specimen. It is also possible to compare the numbers of blocks taken by different pathologists and thus...
Examine the extent of sampling. Not surprisingly, we found considerable variations in both these aspects of reporting practice among the group (Table 4). Some, but not all, of this variation was due to the differing degrees of difficulty of the specimens concerned.

Discussions at the slide club meetings indicated that participants did not consider the gross descriptions and details of sampling to be a particularly important part of the survey. Generally speaking, they thought that the appropriate blocks were taken and that the existing guidelines—such as those of Rosai4—were largely impractical for routine reporting in district general hospitals.

**Microscopical reports**

Of the 66 cases requiring a decision as to whether or not malignancy was present, full consensus was achieved in 62 (93·9%). In two cases one person disagreed with the majority, in another there were two dissenters, and in the fourth there was no clear consensus as to whether the lesion could safely be diagnosed as a malignant condition. This last case was referred to an expert outside the region and his report was then circulated to all participants. When we consider the categories of disease there is, as one might expect, a lesser degree of consensus. Table 5 shows the extent of agreement reached in the different tissues examined. As might be expected, the greatest degree of consensus was achieved with specimens such as salivary glands and the least with the rectal and lymph node biopsy samples.

A simple count of the numbers of reports varying from the diagnosis favoured by most consultants gives a rate of discrepancy of 31·6% of all reports. If, however, we consider those cases (77·3%) where only one or two consultants disagreed with their colleagues then the discrepancy rate improves and is reduced to 7·5%. This rate is probably distorted by the fact that the coordinator has to assign each free form report to an appropriate disease category, a process involving interpretation and judgment. We consider this process to be valid to some extent as it resembles the clinicians' reading of a report. Some of the distinctions between disease categories may not be important—such as the degree of differentiation of tumour in a rectal biopsy5—whereas others—such as the distinction between ulcerative colitis and Crohn's disease—are more important. Furthermore, the rate of discrepancy is a crude calculation. We hope to be able to improve the analysis in future reports when more information is available.

**RESOURCE REQUIREMENTS**

As well as the obvious requirements of slides, stationery, postage, and so on, the most expensive part of the scheme is probably the consultant, medical laboratory scientific officer, and secretarial time concerned. Each circulation requires about 1–2 h of consultant time from each participant for the selection and reporting of cases. The preparation and packaging of the slides to be submitted takes about 2 h for each hospital. The coordinator spends at least another 10 h for each circulation in administration and in telephoning colleagues to chase up reports submitted.

\[\text{Table 4 Estimate of range of sampling}\]

<table>
<thead>
<tr>
<th>Benign v malignant</th>
<th>Category of disease</th>
<th>Total cases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Blocks/cm diameter of tumour</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>Range</td>
</tr>
<tr>
<td>---------------------</td>
<td>------</td>
<td>-------</td>
</tr>
<tr>
<td>Prostatic curettings</td>
<td>5</td>
<td>0·6 –10</td>
</tr>
<tr>
<td>Thyroids</td>
<td>0·6</td>
<td>0·15–2</td>
</tr>
<tr>
<td>Colectomy specimens</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Testicular masses</td>
<td>NA</td>
<td></td>
</tr>
</tbody>
</table>

NA = Not applicable.
This calculation could not be performed on all specimens either through lack of information or because it was unsuitable.

**Table 5 Consensus of histological opinion**

<table>
<thead>
<tr>
<th>Benign v malignant</th>
<th>Category of disease</th>
<th>Total cases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Blocks/cm diameter of tumour</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>Range</td>
</tr>
<tr>
<td>---------------------</td>
<td>------</td>
<td>-------</td>
</tr>
<tr>
<td>Prostatic curettings</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Lymph node biopsy samples</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rectal biopsy samples</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>Salivary glands</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Thyroidectomy specimens</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>Testicular masses</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Total (%)</td>
<td>62</td>
<td>93·9%</td>
</tr>
</tbody>
</table>

Diss = dissenter.
late. In addition, the secretarial and technical staff in
the coordinator's department contribute another 12 h
for each circulation. We intend to reduce this 22 h of
coordinating time considerably by using a micro-
computer to perform the routine clerical work and the
random allocations.

**Acceptability**

This has been assessed during the course of dis-
cussions at slide meetings and by telephone con-
versations. The fact that a consensus can be achieved
seems to have made the scheme more acceptable and
to have reduced the initial consumer resistance. Some
participators have difficulty in finding enough time to
report a complete series of slides in one session. As a
result they give them less time than would be devoted
to routine material. Because one set of all slides sub-
mitted is sent to each participant, however, they
receive their own material for reporting. When we
have accumulated sufficient data we hope to assess
whether reporting for the scheme is significantly
different from routine reporting.

The lack of special stains provoked some consul-
tants into making appropriate comments in their re-
ports such as "Would do special stains and immuno-histology." This may provide others with
cause for thought and certainly leads to discussions at
slide club meetings.

We have found that the momentum of the scheme
and the level of interest are best maintained if the
coordinator rings the participants regularly when
reports are outstanding. Some delays were due to
the requirement for the slide to be circulated among the
pathologists in any one hospital. We are therefore
now sending one set to each consultant in order to
reduce delays.

**Discussion**

In the United Kingdom there has been much reluc-
tance on the part of histopathologists to accept any
form of "quality control" of professional opinion. Even if anonymity is preserved, many histo-
pathologists think that periodical testing of their
knowledge with sets of spot slides which would in-
clude unusual or difficult cases is unrealistic. As a col-
league said, "It would be like retaking the MRCPath
practical every month." Schemes for the circulation of
sets of test spot slides have been proposed. The most
notable example is the Australian study.2 This does
not use consensus diagnosis but "correct" answers
made by acknowledged experts. The participants'
reports are compared with the correct diagnosis. We
chose not to adopt such a scheme because it was in
some respects not a true EQAS as defined by White-
head and Woodford1 and because it would impose
many practical difficulties in providing a continuous
supply of new material and of generally acceptable
expert diagnoses, particularly if it were to be adopted
on a national basis.

The circulation of such spot slides is little different
from the participation of the pathologist in seminars
and slide clubs. In 1983 the Histopathology Advisory
Committee of the Royal College of Pathologists rec-
ommended to the membership of the college that slide
clubs should be set up as a means of encouraging
quality assurance and medical audit in histo-
pathology.6 This proposal has already been criticised
for being somewhat limited in its outlook.7 The EQAS
outlined in this paper involves a slide club of the type
recommended by the college. Such slide clubs could
run an individual similar scheme or, preferably, each
could operate as a cell within a regional or national
system. It is a relatively simple EQAS and could be
run by someone lacking specialist knowledge. It could
be entirely independent of slide clubs, which would be
advantageous in that regular changes in the mem-
bership of the individual groups would be possible,
although there would be less opportunity for informal
discussion. The scheme allows a pathologist to com-
pare his histological reporting style and diagnoses
with those of his colleagues. The variability and the
extent of usage of grading systems, subdivisions, and
qualifications of main diagnoses can also be exam-
ined. It is therefore similar to, but simpler than, the
early College of American Pathologists peer group
EQAS. The American scheme now entails the com-
puter marking of fill in questionnaires and a complex
central data bank. Having shown that consensus diag-
noses by peer groups of routine pathologists are sim-
ilar to diagnoses made by groups of experts in that
particular field, as well as having built up a consid-
erable store of submitted material, the College of
American Pathologists intends to expand its scheme
to a "dual track educational and quality assurance
program."

Our more modest scheme does have some advan-
tages. Because the original gross descriptions of the
relevant specimens are submitted, their complexity
and the extent of tissue sampling can be compared by
the participating consultants and differences in meth-
ods brought to their attention. Similarly laboratory
staff can compare standards of technical preparation.
The numbers involved are smaller than the larger
studies concerning mastectomy specimens or report-
ing practice in large bowel cancer,9 but, nevertheless,
our scheme does serve to indicate to individuals the
ways in which their methods and findings differ from
those of their colleagues. The differences found are
similar to those shown in the large single organ stud-
ies. So far we have chosen to use a different tissue for
each circulation. We shall repeat some of these, partly
to see if reporting practice has changed and partly to increase the data base.

In considering external assessment in histopathology, Langley stated "... In practice, the slides are examined with unusual care and with the use of books." We hope to be able to assess this when we have amassed sufficient data to be able to compare the original microscopical reports with those written for the scheme. So far discussions indicate that the reverse is true and that the slides for the scheme tend to be reported in the odd few minutes in a hurried fashion. This probably reflects the fact that each of the pathologists concerned works at a rate above that recommended by the Royal College of Pathologists and provides further support for the hypothesis that there would have to be a change in the profession's attitudes for EQAS to be generally acceptable.

Some of the ways in which we would like to develop the scheme have already been mentioned and will be described in future reports. We anticipate that EQAS in histopathology will supplement both internal (intra-departmental) audit, whether informal or the more formal schemes already described by others, and the educational programmes, with their slide seminars, as sponsored by the various learned societies. Our scheme could be adapted by using questionnaires rather than free form reports as a tool for the formal statistical analysis of the repeatability of histological grading systems and of interobserver variability in the fashion recommended by Silcock. It would then be similar to studies performed by others which amply show that pathologists differ, but would no longer be an EQAS testing the free form reports as the clinician actually receives them. Such an adaptation would therefore negate the purpose of the scheme, which is to provide the histopathologist with an outside agency by which he can assess his own performance in his routine duties.

We thank all those consultants who have taken part in the scheme for their support. We are most grateful to all the laboratory and secretarial personnel concerned, particularly to Mrs PM Skene for all her assistance, not least in the typing of this manuscript.

References


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