dence of the pathologist in immunohistochemistry and, therefore, it allows him or her to decisively integrate the results of the immunohistochemical techniques in the diagnosis.

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External quality assessment of immunocytochemistry: The experience of the UK National External Quality Assessment Scheme

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Introduction

The UK National External Quality Assessment Scheme (UK NEQAS) for Immunocytochemistry has been established since the mid-1980s. Besides monitoring and reporting on standards, the Scheme also has an educational and supportive role. The activity, while subscription funded, is nonprofit making.

Today the Scheme offers assessment of immunocytochemistry employed in five diagnostic areas: general histopathology, neuropathology, hematopathology, breast cancer and non-gynae cytology.

Operating Procedure

Participating laboratories are asked to submit immunostains for specified antigens on sections provided by the Scheme and on 'in-house" control sections together with a completed questionnaire on the methodology employed. All slides are coded to ensure anonymity.

Assessment is carried out by four independent assessors using a multihead microscope. The assessment panel usually includes one histopathologist and three biomedical scientists. Each assessor scores up to 5 points and the scores are then totalled. Scores of less than 10 indicate poor quality immunocytochemistry; 10-12 points (inclusive) are given to slides with suboptimal immunostaining where a little improvement is required. Scores greater than 12 indicate that the immunostaining is of the expected standard. Participants receive reports on the scores they have achieved together with some comments from the assessors.

All participating laboratories also receive assessment review booklets that include the following information: an outline of the assessment criteria employed for the antigens in question; photographs of best examples of immunostaining; examples of methods achieving scores in the region of 18-20/20; and graphical illustrations comparing scores achieved with reagents/methods and instruments employed.

ExamDle of assessment run for estrogen recePtor protein in breast cancer

Estrogen receptor immunostaining in breast cancer has gained clinical importance in recent years and as a result, external assessment of this protein now occurs on a regular basis. During 1998, UK NEQAS provided participants with sections from a composite block comprising three different breast cancers. The levels of estrogen receptor protein in each tumor was confirmed by immunostaining in several different laboratories and was as follows: high expressor, medium expressor or low expressor.

Assessment criteria

In summary, the scores were awarded as follows:

i) The demonstration of expected levels of estrogen receptor in all three cases attracted scores of 13/20 or more (passed).

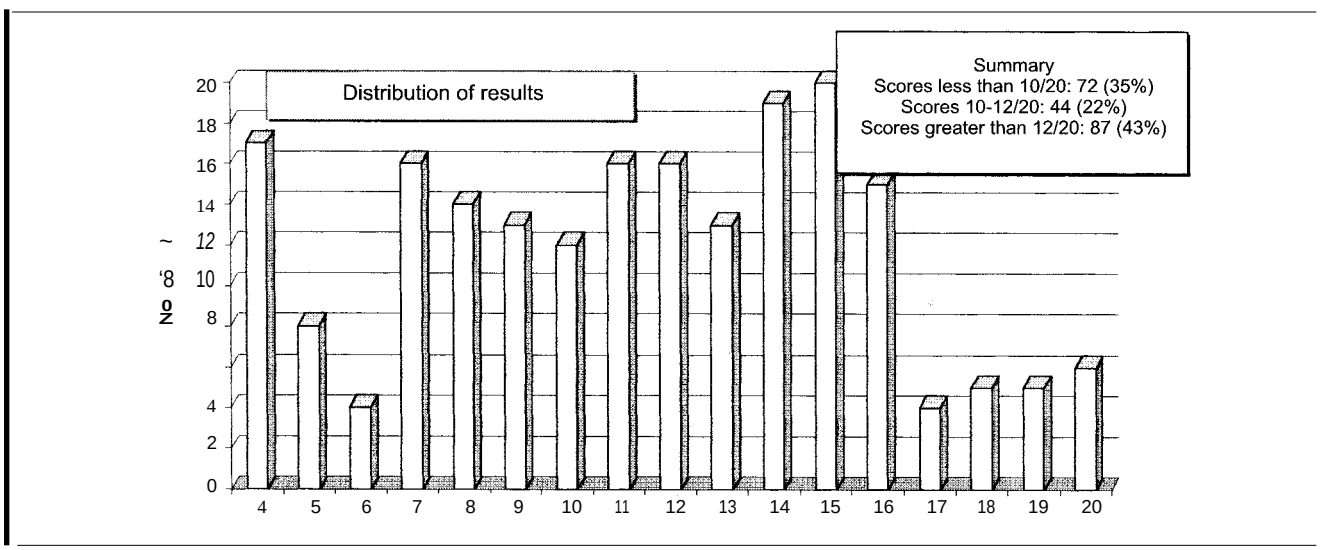

Figure 1. Assessment run 42E estrogen receptors (UK NEQAS sections).

ii) The demonstration of expected levels of estrogen receptor protein in the high expressor and adequate, though suboptimal, demonstration of the medium expressor were given scores in the 10/20-12/20 range (borderline).
iii) The demonstration of the expected levels of estrogen receptor protein only in the high expressor case was deemed to be unsatisfactory and scores of less than 10/20 were given (failed).

Results

Figure 1 shows the distribution **of** results achieved by nearly 200 laboratories when asked to immunostain for estrogen receptor on the UK NEQAS slides. It is somewhat surprising to see that only 43% of laboratories achieved an outright pass, *i.e.,* obtained scores greater than 12/20. Forty-four percent were borderline and the remainder failed.

Discussion

The poor level of performance is difficult to explain. Suggestions that the medium and low expressor cases were very heterogeneous and therefore showing much lower levels of estrogen receptor expression within different parts of the tissue blocks can to a large extent be rejected on two counts: I) sections at various levels within the blocks were successfully tested beforehand; and ii) the 43% of laboratories that passed at assessment did so often on sections that were adjacent to those who either failed or achieved a borderline score.

Poor performance is therefore likely to be due to an inadequate technique. The NEQAS data analysis often shows that pretreatment with pressure cooking in citrate for estrogen receptor protein is more efficient than microwave oven heating. This is probably due to laboratories not recognizing the fact that microwave oven heating times need to be extended for estrogen receptor protein. Other areas for concern must also include whether adequate primary antibody dilutions were being employed and whether the labelling system was being used efficiently.

Conclusion

While more details will be discussed during the presentation, it is quite clear that information provided by a comprehensive EQA scheme can alert the immunocytochemistry staff to problems that they were not aware of. Provided the immunocytochemists respond to the information, it is likely that the diagnostic pathologist, and subsequently the patient, will benefit.

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