

NATIONAL INSTITUTE FOR CLINICAL EXCELLENCE

Final Appraisal Determination

Guidance on the use of liquid-based cytology for cervical screening

Review of existing guidance number 5

1 Guidance

- 1.1 It is recommended that liquid-based cytology (LBC) is used as the primary means of processing samples in the cervical screening programme in England and Wales.
- 1.2 There is currently insufficient evidence to recommend one LBC product over another. The NHS Cervical Screening Programme and Cervical Screening Wales may wish to consider evaluating further the different products as the method is introduced.

2 Clinical need and practice

- 2.1 The annual incidence of cervical cancer in the UK is 9.7 per 100,000 population, with a mortality rate of 3.7 per 100,000 population. Pre-cancerous cervical cells cause no symptoms and may only be detected by population screening methods. The NHS Cervical Screening Programme (NHSCSP) began national coordination of cervical screening in 1989. The nature of a screening programme is to screen a large subsection of the population (in this case women) to identify a subpopulation that is thought to be at sufficient higher risk of developing a disease such as cervical cancer to warrant further diagnostic investigation and treatment. Diagnostic tests used in screening programmes are not 100% sensitive (some false-negative tests are reported), and there is a possibility that pre-cancerous cells will not be detected in a small number of women. Screening programmes like the NHSCSP and

Cervical Screening Wales, which screen women at regular intervals, reduce the likelihood of pre-cancerous cells and invasive cancer being missed on the basis of one false-negative result because they are picked up at subsequent cervical smear tests.

- 2.2 The NHSCSP and Cervical Screening Wales use the Papanicolaou (Pap) smear test for cytological screening. Women aged 20–64 years are screened at 3–5-yearly intervals (depending on Strategic Health Authority policy) for the early detection and treatment of pre-cancerous cells, with the aim of reducing the incidence and associated mortality of cervical cancer. Approximately 3.9 million women are tested in England each year, equating to coverage of 71.2% for 3-yearly screening and 81.6% for 5-yearly screening in 2001–02.
- 2.3 The Pap smear is usually carried out by a GP or nurse at a primary care or community clinic. Cervical cells are collected using a disposable spatula device, spread on a glass slide and fixed. The slide is then sent to a hospital laboratory where it is stained and examined by a cytologist.
- 2.4 Smear tests are evaluated according to morphological features of the cervical cells, which indicate the degree of cellular abnormality (dyskaryosis). In the UK, smears are categorised using the British Society of Clinical Cytologists (BSCC) guidelines as negative, borderline, mild, moderate, severe, ‘glandular neoplasia’ or inadequate. In the USA, the Bethesda system is used to classify cervical smears as atypical squamous cells of uncertain significance, atypical glandular cells of uncertain significance, low-grade squamous intraepithelial lesions or high-grade squamous intraepithelial lesions. Approximately 90% of cervical cancers are squamous cell carcinomas; the potential precursors of these relate to the borderline, mild, moderate and severe dyskaryosis in the BSCC guidelines or the atypical squamous cells of uncertain significance, low-grade squamous intraepithelial lesions and high-grade squamous intraepithelial lesions in the Bethesda system. Approximately 10% of cervical cancers are adenocarcinomas and are frequently undetected by screening, although potential precursors are

sometimes found and classified as ‘?glandular neoplasia’ in the BSCC guidelines or ‘atypical glandular cells of uncertain significance’ in the Bethesda system. The BSCC and Bethesda classification systems are similar but not directly comparable.

- 2.5 Patient management depends on the classification of the smear test. Women with negative tests are invited for re-screening at the standard 3–5-year interval, while those with borderline or mildly dyskaryotic smears are monitored at a reduced screening interval. Women with moderately or severely dyskaryotic smear tests, mildly dyskaryotic smears on a maximum of two tests, or persistent inadequate or borderline tests are referred for additional diagnostic testing, such as visual examination of the cervix with a binocular microscope (colposcopy), when a tissue biopsy may be taken for histological examination.
- 2.6 The principal criteria used to assess the effectiveness of the LBC method compared with the Pap smear are the sensitivity and specificity of each method, and the rate of ‘inadequate’ specimens. Sensitivity is the extent to which a test identifies true-positive samples (sensitivity decreases as the number of false-negatives rises), and specificity is the extent to which the test excludes true-negatives (specificity decreases as the number of false-positives increases). Knowledge of the prevalence of pre-cancerous disease is required in order to assess the number of false-negatives, and so surrogates of sensitivity are used, such as detection rates for high-grade and low-grade cytological abnormalities.
- 2.7 On average, approximately 10% of Pap smear tests are inadequate; that is they cannot be interpreted because of problems with sample collection or preparation (such as insufficient cervical cells), or the presence of inflammatory cells, blood or mucus, which obscure the sample. Women with inadequate test results are required to attend a repeat test, which is inconvenient and may cause anxiety.

3 The technology

3.1 LBC is a new method of cervical cell sample preparation. Samples are collected in the usual way, but using a brush-like device rather than a spatula. The head of the device is rinsed or broken off into a vial of preservative fluid so that most or all of the cervical cells are retained. Samples are transported to the laboratory where they are mixed to disperse the cells. Cellular debris, such as blood or mucus, is removed and a thin layer of cervical cells is deposited on a microscope slide, which is then stained.

3.2 Potential advantages of the LBC method include an improved means of slide preparation, producing more homogeneous samples than the Pap smear (which may make slides easier to read), increased sensitivity and specificity, and improved efficiency of handling laboratory samples, resulting in increased laboratory productivity.

3.3 Current methods that use LBC technology include:

- SurePath (formerly AutoCytePREP or CytoRich LBC)

The SurePath method requires that the collection device be retained in the proprietary SurePath collection vial, which contains transport fluid, so that all cervical cells collected are sent to the laboratory. Vials are vortexed and centrifuged by laboratory personnel; all subsequent preparation of the sample and slide is automated using the Prepstain machine, which processes 48 samples at a time.

- Cytoscreen

Cytoscreen is a manual method of sample preparation using a proprietary sample collection device (CYTOPREP) and transport fluid (CYTeasy). Samples are vortexed and a photometric reading taken to estimate the cellularity of the sample. An aliquot of the sample is centrifuged onto a glass slide that is then stained using normal laboratory procedures.

- **Labonard Easy Prep**
Labonard Easy Prep is a manual method of sample preparation that uses a proprietary sample collection device (CYTOPREP brush) and fixative (CYTOscreen). An aliquot of sample fluid is placed in a separation chamber attached to a glass slide containing absorbent paper. Cervical cells sediment onto the slide in a thin layer and slides are stained using normal laboratory procedures.
 - **ThinPrep**
ThinPrep provides a semi-automated (T2000) or fully automated (T3000) method of sample preparation. Cervical samples are rinsed with proprietary PreservCyt transport medium into a vial, which is then processed by the ThinPrep method using the T2000 or T3000 machine. The T2000 machine processes slides individually, while the T3000 machine is a fully automated device that can batch process up to 80 specimens per cycle. Subsequent staining and microscopic evaluation of the slides is conducted in a similar manner to a conventional smear test.
- 3.4 NICE first issued guidance on the use of LBC for cervical screening in June 2000 (see Section 8).

4 Evidence and interpretation

The Appraisal Committee (Appendix A) considered evidence from a number of sources (Appendix B).

All evidence reviewed relates to the ThinPrep and SurePath methods of LBC. No information relating to the Labonard Easy Prep or Cytoscreen methods was submitted by the manufacturers or identified during the course of the appraisal.

4.1 Clinical effectiveness

- 4.1.1 The Department of Health commissioned an independent report into the evaluation of LBC compared with the Pap smear test, based on the results of

a UK pilot study undertaken at three sites (Norfolk and Norwich University Hospital; Southmead Hospital, North Bristol NHS Trust; and Royal Victoria Infirmary, Newcastle upon Tyne). Since the publication of the Assessment Report for the earlier appraisal (see Section 8), evidence has also become available from the following new studies: six studies comparing LBC and Pap smears with a reference method (histology/pathologist diagnosis); eight split-sample studies; six two-cohort studies; a Scottish implementation study; a New Zealand Health Technology Assessment of LBC; and a cross sectional study by Coste et al.

- 4.1.2 A meta-analysis of 14 studies (comprising all new studies, and studies contained in the previous assessment where data were available) comparing the sensitivity of LBC and the Pap smear in the detection of abnormalities of low-grade squamous intraepithelial lesions or greater demonstrated that sensitivity may be up to 12% better with LBC compared with the Pap smear. When the results of the Coste study are included in the meta-analysis, the total sensitivity improvement for LBC is 4.9% for the ordinary population and 2.8% for the high-risk and ordinary populations combined. Split-sample studies and two-cohort studies supported increased sensitivity with LBC.
- 4.1.3 A meta-analysis of six studies that reported specificity found no difference between the specificity of LBC and Pap smear.
- 4.1.4 The UK pilot study showed a statistically significant decrease in the number of inadequate samples, from 9.1% with Pap slides to an average of 1.6% with LBC (87% reduction, $p < 0.0001$). The majority of 34 studies reporting the rate of inadequate samples noted that the rate was reduced with LBC.
- 4.1.5 The UK pilot study reported a statistically significant reduction in the detection of glandular neoplasm, from an average of 0.08% with the Pap smear to 0.04% with LBC (RR 0.496, 95% CI 0.292 to 0.807). Follow-up data from the pilot sites demonstrated that although there was a reduction in the cytological detection of glandular neoplasm during the pilot period with LBC, the number

of histologically confirmed cases of adenocarcinoma remained unchanged. Pilot study data on the performance of LBC in the post-pilot period demonstrated that the cytological detection of glandular neoplasm with the LBC test is similar to the pre-pilot rate using the Pap smear.

4.2 Cost effectiveness

- 4.2.1 A literature review identified four new economic evaluations of LBC compared with the Pap smear in the US population. These are of limited application to the UK because of differences in US incidence rates and costs, and differences in the Bethesda (US) and BSCC (UK) classification systems for cervical smears.
- 4.2.2 PathLore Limited provided a cost analysis of the SurePath test. Increased capital costs of £50,000 and consumables costs of £2.50 per test may be offset by savings from the reduction in the number of inadequate samples and a quicker diagnosis, to give a gross saving of £0.89 per LBC test compared with the Pap smear. This is consistent with the costs reported in the pilot studies.
- 4.2.3 The Assessment Group updated the economic model in the previous Assessment Report with the data from the UK pilot study and literature to estimate the incidence of, and mortality from, cervical cancer among women who had had cervical screening using LBC and Pap smear technologies. The model simulated a cohort of 100,000 15-year-old women enrolled in the cervical screening programme (screened between the ages of 21 and 64 years), who were followed throughout their lifetime using a state transition model. Key outcomes of the UK pilot study used to update the economic model were the rate of inadequate specimens, and the cost per test (incorporating capital, consumables and the amount of staff time required for smear taking, slide preparation and smear diagnosis). For LBC, the economic evaluation was based on the costs of the T3000 device, which represented the average cost across the three methods.

- 4.2.4 In the pilot study, laboratory report forms indicated a 5-minute reduction in the time required for smear taking and consultation with LBC (average of 8 minutes and 35 seconds compared with 13 minutes and 20 seconds for the Pap smear). Staff questionnaires estimating the time required for smear taking suggested that the LBC method may be 1 minute quicker than the Pap smear. The extent of the increase in slide preparation time with LBC depended on the labour requirements of different LBC methods. Slide preparation with LBC took 4 minutes and 15 seconds (ThinPrep T2000), 38 seconds (ThinPrep T3000), or 1 minute and 52 seconds (SurePath system) compared with an average of 15 seconds for the conventional Pap smear. The average aggregate cost of LBC was £22.30 (£22.99 for T3000, £23.15 for T2000, and £20.76 for PrepStain) compared with £21.68 for the conventional Pap smear. Overall, there was an increase in the throughput of slides at the screening stage with LBC compared with the Pap smear. At primary screening, 9.04 slides were read per hour with LBC compared with 8.3 slides read per hour with the Pap smear. At rapid review, 44.1 slides were read per hour with LBC compared with 46.7 slides read per hour with Pap, and at slide checking, 12.4 slides were read per hour with LBC compared with 9.5 slides read per hour with the Pap smear.
- 4.2.5 The UK pilot study estimated that a one-off transition cost of £10.27 million (see Section 6 for more detail) would be required for the national implementation of LBC. The one-off transition cost of implementing LBC was incorporated into the economic model as a cost of £0.13 per smear test (discounted over a 20-year lifetime of LBC). If the transition cost were discounted over a 10-year lifetime of the LBC technology, this would equate to £0.34 per smear test.
- 4.2.6 Assumptions of the base-case economic analysis included a laboratory processing capacity of 60,000 tests per annum, sensitivity improvements with LBC relative to Pap of 13.4% for the detection of CIN1 and CIN2 combined and 4% for the detection of CIN3, and a reduction in the rate of inadequate

samples from 9% with the Pap smear to 1.4% with LBC. The results of the base-case economic analysis demonstrated the following.

- At each screening interval LBC dominated the Pap smear as it was less costly and more effective.
- 3-yearly screening with LBC was found to be a cost-effective alternative to 5-yearly Pap screening, with an incremental cost effectiveness ratio below £8000 per life-year gained.
- The cost effectiveness of LBC screening at different intervals was compared. The incremental cost-effectiveness ratio of moving from 5-yearly to 3-yearly screening with LBC was £9621 per life-year gained.
- Conventional screening with the Pap smear at 5-yearly intervals is extremely cost effective compared with no screening, at a cost of £372 per life-year gained.

4.2.7 Sensitivity analysis for differences in the natural history of cervical cancer (cancer incidence, progression and regression), sensitivity of LBC and the Pap smear, the rate of inadequate samples and the marginal cost of LBC demonstrated that under most conditions, 5- and 3-yearly screening with LBC is a cost-effective alternative to 5-yearly screening with the Pap test.

4.2.8 The assumptions of the base-case analysis were changed to a scenario where there was decreased processing capacity for LBC of 30,000 tests per annum, a 20% increase in capital costs and 50% increase in consumable costs, and a time saving of 1 minute per test at smear taking. The resulting increase of £6.50 in the marginal cost of LBC compared with the Pap smear did not greatly affect the cost effectiveness of screening using the LBC method.

4.2.9 Another sensitivity analysis combined an increase in the unit cost of LBC to £25.88 per test that is, £4.21 more than the Pap test, with various improvements in sensitivity with LBC relative to Pap (2.8%, 4.9% and 12%). At 2.8% improved sensitivity relative to the Pap test, the cost per life-year gained of LBC compared with 5-yearly screening with the Pap test was £5500

and £38,250 for 5- and 3-yearly screening respectively. At 4.9% improved sensitivity the cost per life-year gained of LBC compared with 5-yearly screening with the Pap test was £3250 and £22,500 for 5- and 3-yearly screening respectively. At 12% improved sensitivity, the cost per life-year gained of LBC compared with 5-yearly screening with the Pap test was £1500 and £10,250 for 5- and 3-yearly screening respectively.

4.2.10 No studies were identified that compared the difference in the quality of life between women who had LBC smears and those who had Pap smears, and thus a cost per quality-adjusted life year for different screening scenarios could not be reliably determined. The Assessment Group's model incorporated the assumption that the decrease in utility associated with living with invasive cancer, undergoing a colposcopy and receiving a borderline test would have an adverse effect on a woman's quality of life because of anxiety. When quality of life is taken into consideration, LBC still dominates conventional screening if the baseline 12% improvement in sensitivity is assumed.

4.2.11 The UK pilot study report also contained an economic evaluation, which was consistent with the results of the model generated by the Assessment Group.

4.2.12 The increased capital, consumable and implementation costs of LBC may be offset by savings in the reduction of inadequate samples and time savings in sample collection and time to diagnosis. It was not possible to distinguish between specific LBC technologies on the basis of the available data.

4.3 Consideration of the evidence

4.3.1 The Committee reviewed the data available on the clinical and cost effectiveness of LBC. It carefully considered results from the pilot site studies undertaken since the original guidance was issued, and the opinions of clinical experts, and took into account the likely effect LBC would have on women taking part in the NHSCSP and Cervical Screening Wales. It was also mindful of the need to take account of the effective use of NHS resources.

4.3.2 The Committee considered evidence from cytopathologists and representatives of cervical screeners that LBC produced a more homogeneous cellular preparation that was free from exudates, and that this would be likely to decrease the number of smears classified as inadequate (that is, considered unreadable and in need of repeat smear). However, there were concerns that, with the LBC method, there are no formal criteria defining the adequacy of a slide preparation in terms of the cell numbers required. Because the LBC sample is a homogenate there is no way of verifying that a sufficient number of cervical cells have been harvested by the smear taker. The Committee considered this to be an important issue that must be addressed as part of the implementation of LBC. Poor sampling technique, resulting in the collection of too few cells, could mean that a sample might not adequately represent cells on the surface of the cervix. Consequently abnormalities may be missed, resulting in some false-negative results. However, the Committee concluded that this potential risk of false-negatives should be balanced against the likelihood of abnormalities being detected at a subsequent screen because of the regular screening frequency of the cervical screening programme, and the increased detection of high-grade lesions (severe dyskaryosis) with the LBC technique. Overall, the Committee was persuaded that LBC was likely to be an improvement over the currently used technique, and in particular that the reduction of inadequate smears would be an important benefit to women in the NHSCSP and Cervical Screening Wales because it would reduce the requirement for repeat smears.

4.3.3 Experts expressed concerns that sensitivity improvements with LBC may not be as great as 12%, and the Committee was made aware of various confounding factors that may have contributed to the perceived increase in sensitivity of LBC, such as increased training and experience of the smear screeners and the type of sampling device used by the smear takers. However, experts and the Committee agreed that the overall sensitivity of LBC was at least as good as, and may be better than, the Pap smear.

- 4.3.4 The Committee reviewed the recent paper by Coste et al. (2003) and expressed concerns regarding the robustness of the conclusions of the study, which were not in favour of LBC. In the light of the sensitivity analysis that included the results of the Coste study, the Committee concluded that LBC is likely to be a cost-effective alternative to the Pap smear test. In addition, the Committee understood that an important factor in the assessment of the increased sensitivity of LBC was its enhanced ability to detect high-grade lesions (severe dyskaryosis), which was confirmed by the results from the pilot study.
- 4.3.5 The Committee considered the difference in the detection of glandular neoplasm in the pilot study report, and the potential this may have for differences in the detection of adenocarcinoma between the LBC method and the Pap smear. The Committee reviewed in detail the results from the pilot sites on the rate of histologically proven adenocarcinoma and the evidence from the post-pilot results of detection of glandular abnormalities. They were satisfied on the basis of this evidence that LBC is at least as good at detecting these abnormalities as the Pap smear.
- 4.3.6 The Committee reviewed the report from the UK pilot study and noted a lack of consistency between the results of the pilot site using the SurePath device and two sites using the ThinPrep device. However, the Committee considered that, taking into account the advice from experts, the possible confounding factors of indirect comparisons, and the fact that the pilot studies were not designed to evaluate clinical effectiveness, there was currently insufficient evidence to suggest that one technique should be recommended over another.
- 4.3.7 The Committee heard from experts that LBC was likely to result in increased productivity in cytology laboratories because of a rise in the number of slides that can be read per hour and a reduced workload as a result of a lower incidence of inadequate samples and a reduced number of repeat smears. Although the screening of LBC thin layers is quicker because of the ease of

reading a 'cleaner' slide preparation and screening a smaller area of the slide, it was mentioned that screening LBC slides is more tiring for staff, who consequently may require more breaks. However, the experts involved with the pilot sites said that, overall, smear takers and readers favoured the LBC method above the Pap smear.

4.3.8 The Committee considered that, taking into account a number of factors – including the potential for increased sensitivity, reduction of inadequate smears and probable improvements in laboratory efficiency – the LBC method was likely to be cost effective compared with the Pap smear, despite its higher associated cost. The Committee discussed whether the use of LBC would affect the cost effectiveness of population screening at different screening intervals. However, this was considered to be beyond the remit of this review and to be the responsibility of the NHSCSP and Cervical Screening Wales.

4.3.9 The Committee was aware that a number of manufacturers have LBC-related products. Evidence received during the appraisal related only to the SurePath and ThinPrep devices – no evidence was provided by the other manufacturers.

5 Recommendations for further research

5.1 It is recommended that high-quality studies be undertaken to compare differences in performance between the ThinPrep and SurePath LBC methods.

5.2 Validation is needed of the number of cells per LBC sample that will be required to establish the adequacy of smears.

5.3 For further reviews of LBC, clinical data relating to the sensitivity, specificity and rate of inadequate smears should be provided for EasyPrep, Cytoscreen and any future devices.

- 5.4 Evaluation of automated technologies for the analysis of cervical samples is needed.

6 Implications for the NHS

- 6.1 Information in the pilot studies estimated a one-off cost of £10.1–10.3 million for the conversion from Pap smears to LBC in England, which equates to a cost of approximately £73,000 for a local laboratory processing 30,000 tests per annum. These figures only include the cost of training smear takers and laboratory staff, producing training material, sending off a backlog of samples, and structural changes to the laboratory and assume that all GPs and nurses will be trained in the use of LBC. Proportionately similar costs will be incurred in Wales. In both countries the precise costs will be a function of the number and size of laboratories undertaking LBC. The cost of the acquiring the LBC slide preparation equipment itself has not been estimated because there are a number of possible solutions that could alter the nature and timing of the cost impact. These solutions should be investigated fully, as part of implementation planning taking into full consideration the cost of consumables and maintenance, as part of a whole life cost analysis demonstrating a value for money solution to the NHS. In England, the NHS Purchasing and Supply Agency will evaluate options for the purchase of capital equipment. Procurement in Wales will be managed on an all-Wales basis by the West Wales Procurement Consortium. If sample preparation using LBC is to be centralised in regional laboratories, consideration will need to be given to the logistics and costs associated with sample transport and communication of the central processing laboratories with the local reporting laboratories.
- 6.2 The Assessment Report indicates that the running costs of Pap smears and LBC are comparable, and with LBC time savings in the diagnosis of smears may contribute to increased laboratory productivity. In addition, increases in laboratory productivity may reduce the time that patients need to wait for the results of a smear test. The use of LBC in accordance with this guidance is

likely to release resources within NHS organisations, although the nature and amounts involved will vary between local NHS communities.

- 6.3 Existing smear takers and laboratory staff will need additional training in the LBC method before implementation of the recommendation in Section 1.1. Training of new smear takers and laboratory staff in the LBC method is likely to require similar resources to those for the training of staff in Pap smears.
- 6.4 The rate at which LBC is taken up throughout the NHS in England and Wales will depend on a number of logistical factors, which should be determined by the NHSCSP and Cervical Screening Wales with the involvement of the NHS Purchasing and Supplies Agency and the West Wales Procurement Consortium. During this period, the standard cervical screening method will need to run in parallel.

7 Implementation and audit

- 7.1 The NHSCSP and Cervical Cancer Screening Wales should develop implementation plans for the adoption of LBC as the primary means of collecting and processing samples and consult with their respective national purchasing agencies on the preparation of national procurement strategies for LBC technology. NHS organisations providing should consult with NHSCSP and Cancer Screening Wales before making investments in LBC.
- 7.2 National and local guidelines, protocols or care pathways relating to the collection and processing of a cervical specimen should be changed to reflect the change in practice following adoption of this guidance.
- 7.3 The NHSCSP and Cervical Screening Wales should include measurement of the correct use of LBC as part of an ongoing quality assurance programme.
- 7.4 Local clinical audits of cervical screening could include measures of the correct use of LBC and inadequate specimens.

8 Related guidance

- 8.1 NICE issued the following guidance on the use of LBC for cervical screening in June 2000.

National Institute for Clinical Excellence (2000) Guidance on the use of liquid-based cytology for cervical screening. *NICE Technology Appraisal Guidance* No. 5. London: National Institute for Clinical Excellence. Available from: www.nice.org.uk/cat.asp?c=1121

9 Proposed date for review of guidance

- 9.1 The review date for a technology appraisal refers to the month and year in which the Guidance Executive will consider any new evidence on the technology, in the form of an updated Assessment Report, and decide whether the technology should be referred to the Appraisal Committee for review.

- 9.2 The guidance on this technology will be reviewed in August 2006.

David Barnett

Chair, Appraisal Committee

August 2003

Appendix A. Appraisal Committee members

NOTE The Appraisal Committee is a standing advisory committee of the Institute. Its members are appointed for a 3-year term. A list of the Committee members who took part in the discussions for this appraisal appears below. The Appraisal Committee meets twice a month other than in December, when there are no meetings. The Committee membership is split into two branches, with the chair, vice-chair and a number of other members attending meetings of both branches. Each branch considers its own list of technologies and ongoing topics are not moved between the branches.

Committee members are asked to declare any interests in the technology to be appraised. If it is considered there is a conflict of interest, the member is excluded from participating further in that appraisal.

The minutes of each Appraisal Committee meeting, which include the names of the members who attended and their declaration of interests, are posted on the NICE website.

Dr Jane Adam

Radiologist, St George's Hospital, London

Dr Sunil Angris

General Practitioner, Waterhouses Medical Practice, Staffordshire

Dr Darren Ashcroft

Senior Clinical Lecturer, School of Pharmacy and Pharmaceutical sciences,
University of Manchester

Professor David Barnett (Chair)

Professor of Clinical Pharmacology, University of Leicester

Professor John Brazier

Health Economist, University of Sheffield

Professor John Cairns

Professor of Health Economics, Health Economics Research Unit, University of Aberdeen

Professor Mike Campbell

Statistician, Institute of General Practice & Primary Care, Sheffield

Dr Peter I Clark

Consultant Medical Oncologist, Clatterbridge Centre for Oncology, Wirral, Merseyside

Dr Mike Davies

Consultant Physician, University Department of Medicine & Metabolism, Manchester Royal Infirmary

Dr Cam Donaldson

PPP Foundation Professor of Health Economics, School of Population and Health Sciences & Business School, Business School – Economics, University of Newcastle upon Tyne

Professor Jack Dowie

Health Economist, London School of Hygiene

Dr Paul Ewings

Statistician, Taunton & Somerset NHS Trust, Taunton

Ms Sally Gooch

Director of Nursing, Mid-Essex Hospital Services NHS Trust, Chelmsford

Professor Trisha Greenhalgh

Professor of Primary Health Care, University College London

Dr George Levvy

Lay Representative, Chief Executive, Motor Neurone Disease Association, Northampton

Professor Philip Routledge

Professor of Clinical Pharmacology, College of Medicine, University of Wales, Cardiff

Dr Stephen Saltissi

Consultant Cardiologist, Royal Liverpool University Hospital

Mr Miles Scott

Chief Executive, Harrogate Health Care NHS Trust

Professor Andrew Stevens (Vice-Chair)

Professor of Public Health, University of Birmingham

Professor Mary Watkins

Professor of Nursing, University of Plymouth

Dr Norman Waugh

Department of Public Health, University of Aberdeen

Appendix B. Sources of evidence considered by the Committee

A The assessment report for this appraisal was prepared by the School of Health and Related Research (SchARR), University of Sheffield.

- Karnon J, Peters J, Chilcott J et al. *Liquid-based cytology in cervical screening: an updated rapid and systematic review*, January 2003.

B The following organisations accepted the invitation to participate in this appraisal. They were invited to make submissions and comment on the draft scope, assessment report and the appraisal consultation document. Consultee organisations were provided with the opportunity to appeal against the FAD:

I Manufacturer/sponsors:

- Cytoc UK Limited
- Surgipath Europe Limited
- Tripath Imaging Europe/PathLore Limited

II Trade organisations:

- Association of British Health-Care Industries
- British In Vitro Diagnostics Association

III Professional/specialist and patient/carer groups:

- British Society for Clinical Cytology
- British Society of Colposcopy and Cervical Pathology
- Cancer Research UK
- Department of Health
- Institute of Biomedical Science
- Macmillan Cancer Relief
- Marie Curie Cancer Care
- Medical Women's Federation

- National Association of Cytologists
- National Cancer Alliance
- Pathological Society of Great Britain and Ireland
- Royal College of General Practitioners
- Royal College of Nursing
- Royal Society of Obstetricians and Gynaecologists
- Royal College of Pathologists
- South West Wales Cancer Network
- Welsh Assembly Government

IV Commentator organisations (without the right of appeal):

- Institute of Cancer Research
- National Cancer Research Institute
- National Collaborating Centre for Women and Children's Health
- Newcastle upon Tyne Hospitals NHS Trust
- NHS Cancer Screening Programmes
- NHS Confederation
- NHS Purchasing and Supplies Agency
- NHS Quality Improvement Scotland
- Norfolk and Norwich University Hospital NHS Trust
- North Bristol NHS Trust

C The following individuals were selected from clinical expert and patient advocate nominations from the professional/specialist and patient/carer groups. They participated in the Appraisal Committee discussions and provided evidence to inform the Appraisal Committee's deliberations. They gave their expert personal view on liquid-based cytology by attending the initial Committee discussion and/or providing written evidence to the Committee. They were also invited to comment on the ACD:

- Mrs Maggie Cooper, Cervical Screening Developments Coordinator, Marie Curie Cancer Care

- Mr Nick Dudding, Cytology Department, Royal Hallamshire Hospital
- Dr Amanda Herbert, Chair, British Society for Clinical Cytology
- Professor Henry Kitchener, Professor of Gynaecological Oncology, St Mary's Hospital, Manchester
- Dr Ray Lonsdale, Consultant Histopathologist and Clinical Director, Norfolk and Norwich University Hospital
- Dr Phillip Wilson, Consultant Pathologist, St George's Hospital, Tooting