Cost-effectiveness analysis of diagnosis and management of cervical squamous intraepithelial lesions

Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
Colposcopy and fluorescence spectroscopy in the diagnosis and management of cervical squamous intraepithelial lesions (SILs).

Type of intervention
Diagnosis and treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Patients referred with an abnormal Papanicolaou smear.

Setting
Hospital. The economic study was conducted in the USA.

Dates to which data relate
Studies used to derive effectiveness data were published between 1973 and 1996. Price data refer to 1995.

Source of effectiveness data
Previously published studies and expert opinion provided effectiveness information.

Modelling
A decision tree was designed to identify the possible outcomes of the diagnosis and management of SILs using five strategies.

Outcomes assessed in the review
Outcomes retrieved from the literature were: prevalence of cervical SILs in a referral population and proportion of patients with high-grade SILs. Additionally, the operating characteristics of colposcopy (sensitivity and specificity of SILs, and high-grade versus low-grade SILs) were based on data from a published meta-analysis of previously published studies.

Study designs and other criteria for inclusion in the review
Only studies analysing the accuracy of colposcopy in patients with an abnormal Papanicolaou smear in which all
Patients had both colposcopy and biopsy, with biopsy being considered the criterion for diagnosis, were included in the review.

Sources searched to identify primary studies
Not stated.

Criteria used to ensure the validity of primary studies
Not stated.

Methods used to judge relevance and validity, and for extracting data
Not stated.

Number of primary studies included
Nine studies were included.

Methods of combining primary studies
The authors estimated the weighted average of the prevalence values reported in the studies and the proportion of patients with high grade SILs.

Investigation of differences between primary studies
Not stated.

Results of the review
The prevalence of patients with SILs was 72% of those referred. Of all patients with SILs, 68% had high-grade SILs. The sensitivity and specificity of colposcopy reported in the meta-analysis were 0.94, and 0.48 respectively. High-grade versus low-grade sensitivity was 0.79 and specificity for colposcopy was 0.76.

Methods used to derive estimates of effectiveness
A consensus panel of four pathologists produced further estimates.

Estimates of effectiveness and key assumptions
The assumed operating characteristics of fluorescence spectroscopy were: sensitivity 0.82, specificity 0.68. High-grade versus low-grade sensitivity and specificity were 0.79, and 0.78 respectively. The operating characteristics of biopsy were assumed to be 100%.

Measure of benefits used in the economic analysis
Benefits were measured in terms of the number of cases of high-grade SILs correctly diagnosed and the number of cases detected.

Direct costs
The perspective of the analysis was that of a health care provider. Cost/quantities were reported separately. Only direct medical costs were included (medical and professional components) Papanicolaou smear, chlamydia, gonorrhoea, viral smear, ECC, pregnancy test, and clinic visits. Costs were estimated using hospital charges obtained from the hospital’s billing information system and multiplying those charges by the 1995 hospital cost-to-charge ratio. The cost of
professional encounters with physicians was calculated using 1995 Medicare Resource-Based Relative Value Scale amounts. The study horizon was two years. Costs occurring 1 and 2 years after the initial visit were discounted at 3% in accordance with the Panel on Cost-effectiveness in Health and Medicine.

**Statistical analysis of costs**
Not carried out.

**Indirect Costs**
Not considered.

**Currency**

**Sensitivity analysis**
One way sensitivity analysis was performed on the prevalence of SILs in the referral population, the proportion of high-grade SILs, discount rate, and the sensitivity of fluorescence spectroscopy.

**Estimated benefits used in the economic analysis**
The number of cases of high-grade SILs found were: see-and-treat spectroscopy (31.55), see-and-treat colposcopy (36.16), spectroscopy (39.93), colposcopy (45.78), and see-and-treat spectroscopy and colposcopy (46.05).

**Cost results**
Total estimated costs were: see-and-treat spectroscopy ($160,479), see-and-treat colposcopy ($210,962), spectroscopy ($246,381), colposcopy ($311,808) and see-and-treat spectroscopy and colposcopy ($285,133).

**Synthesis of costs and benefits**
Incremental cost-effectiveness ratios of all strategies versus see-and-treat spectroscopy were reported. After excluding from consideration those strategies that were dominated (see-and-treat colposcopy, colposcopy, and spectroscopy), the estimated lowest incremental cost-effectiveness ratio was $8,596 per case of cervical pre-cancer detected, in which see-and-treat spectroscopy and colposcopy versus see-and-treat spectroscopy were compared. When incremental cost-effectiveness ratios of $/case of high-grade SILs found were compared the "see-and-treat spectroscopy and colposcopy" was the most cost-effective strategy. Sensitivity analysis revealed that the results pattern only changed when a lower sensitivity or an early diffusion of spectroscopy were assumed. In this case colposcopy was the most cost-effective strategy.

**Authors' conclusions**
Fluorescence spectroscopy should be considered as a cost-effective adjunct to, or replacement for, colposcopy in the diagnosis of cervical pre-cancer.

**CRD COMMENTARY - Selection of comparators**
The selection of the comparator was clearly justified.

**Validity of estimate of measure of effectiveness**
As there was no evidence of a systematic search of the literature, the extent to which all relevant studies were included cannot be assessed. The authors acknowledged that a cost-utility approach could be more appropriate for the analysis.
Validity of estimate of costs
The data were based on charge data from the institution in which the study was performed and adjusted by the 1995 hospital cost-to-charge ratios; any attempt to generalise from the results should take this into account. Only direct medical costs were considered and, as the authors noted, costs to others in society such as patients could have been included in the analysis.

Implications of the study
Further research assessing the cost-effectiveness of spectroscopy in the treatment of cervical cancer is needed.

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