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
Screening for colorectal cancer with flexible sigmoidoscopy by non-physician endoscopists.

Type of intervention
Screening.

Economic study type
Cost-effectiveness analysis.

Study population
Asymptomatic patients, aged 50 years or older, without evidence of faecal occult blood and no personal history or family history of a first-degree relative with colorectal cancer under age 55 years.

Setting
Hospital. The study was carried out at the Harvard Vanguard Medical Associates, a staff model health maintenance organisation in Massachusetts, USA.

Dates to which data relate
Effectiveness, resource use and cost data were collected from 1995 to 1997. The price year was 1998.

Source of effectiveness data
Effectiveness data were derived from a single study.

Link between effectiveness and cost data
The costing was undertaken on the same patient sample as that used in the effectiveness analysis and was carried out prospectively alongside the effectiveness analysis.

Study sample
Screening with flexible sigmoidoscopy was performed on 3,701 patients. Of these, 1,378 examinations were performed by 1 of 15 gastroenterologists, and 2,323 by the 3 non-physicians. Patients were eligible for screening with sigmoidoscopy if they were 50 years of age or older, had no new lower gastrointestinal symptoms, had no acute cardiopulmonary disease, had negative faecal occult blood tests, and had no first-degree relative with colorectal cancer at 55 years of age or younger. No power calculations were reported.
Prospective cohort study carried out at a single centre. No patients were lost to follow-up.

Analysis of effectiveness

The analysis of the clinical study was based on intention to treat. The primary health outcomes studied included the depth of examination, the number and histology of polyps, and complications. Compared with the patients examined by non-physicians, those examined by physicians were younger, more likely to be male, and more likely to have a minor family history of colorectal cancer or a family history of polyps.

Effectiveness results

The non-physicians achieved a mean depth of examination of 52(+/-10) cm compared with 55(+/-9) cm when a physician performed the sigmoidoscopy. This difference remained statistically significant (p<0.001) after adjusting for differences in age, sex, and family history of patients.

Physicians achieved a depth of examination of at least 40 cm in 94% of examinations, compared with 92% of examinations by non-physicians (p=0.07).

Physicians achieved a depth of examination of at least 50 cm in 84% of examinations, compared with 73% of examinations by non-physicians (p<0.001).

There were no differences in the rates of detection of polyps by physicians and non-physicians.

Polyps were detected in 23% of the examinations by physicians and in 27% of the examinations by non-physicians (p=0.34).

Neoplastic polyps were detected in 6% of the examinations by non-physicians (p=0.35).

No major complications, including death, perforation, or bleeding requiring blood transfusion occurred.

Clinical conclusions

In comparison with gastroenterologists, trained non-physician endoscopists perform screening with flexible sigmoidoscopy with similar accuracy and safety.

Modelling

A multivariate linear model was used to evaluate the association of clinician type with depth of examination and the logarithm of the depth. A logistic regression model was used to evaluate categorical outcomes, including examination depth of greater than 40 cm or 50 cm, detection of polyps, and occurrence of complications.

Measure of benefits used in the economic analysis

The measures of benefits used were the number and histology of polyps, and complications. Hence, this study may be regarded as a cost-consequences analysis.

Direct costs

Direct costs were not discounted given the short time frame of the study (less than 1 year). Quantities and costs were reported separately. Direct costs included salary and benefits for the endoscopists, pathology costs, support staff, equipment and supplies. The quantity/cost boundary adopted was that of the health service. The estimation of quantities and costs was based on actual data. Direct costs for sigmoidoscopic examination were estimated by the Harvard Vanguard Medical Associates central medical specialties accounting office. The price year was 1998.

Statistical analysis of costs
Not reported.

**Indirect Costs**
Not included.

**Currency**
US dollars ($).

**Sensitivity analysis**
Not reported.

**Estimated benefits used in the economic analysis**
See Effectiveness Results section above.

**Cost results**
The total cost per examination was $283 per examination for physicians and $186 per examination for non-physicians.

**Synthesis of costs and benefits**
Benefit and cost estimates were not combined into a cost-effectiveness ratio.

**Authors' conclusions**
Appropriately trained non-physicians may be capable of performing safe and effective screening for colorectal cancer with flexible sigmoidoscopy. An increased use of non-physicians to perform sigmoidoscopy may increase the availability and reduce the cost of the procedure.

**CRD COMMENTARY - Selection of comparators**
The rationale for the choice of the comparator was clear. You, as a user of this database, should verify whether these health technologies are relevant to your own setting.

**Validity of estimate of measure of benefit**
Relevant measures of benefit were used. Non-physician endoscopists and gastroenterologists were appropriately trained and had considerable experience, which may not always be the case in routine clinical practice. Patients in this study were not randomly assigned to examination by either a physician or a non-physician. This resulted in small differences in the age and sex of the patients in the two groups, although the authors were able to adjust for these differences with multivariate modelling. Non-physicians and physicians examined different patients, thus, the proportion of patients with polyps detected by each type of endoscopist cannot be directly compared. The strengths of this study include the large sample size, prospective data collection and the fact that it was conducted as part of an institutional colorectal cancer screening programme.

**Validity of estimate of costs**
Only direct costs were considered. Indirect costs falling to the patients were not included. Costs were derived from a local source and, hence, are unlikely to be generalisable to other settings. No sensitivity analysis was performed on the cost estimates and it is, therefore, difficult to assess the robustness of the cost results.
Other issues
Adequate comparisons with other relevant studies were made and the generalisability of the results to other settings was discussed. The authors do not appear to have presented their results selectively. The study enrolled asymptomatic patients aged 50 years or older with no history of colorectal cancer and this was reflected in the authors’ conclusions.

Implications of the study
Policy initiatives that encourage training and implementation of non-physician endoscopists are likely to increase the utilisation and decrease the costs of colorectal cancer screening.

Source of funding
None stated.

Bibliographic details

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Other publications of related interest


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Subject indexing assigned by NLM

MeSH
Aged; Boston; Clinical Competence; Colorectal Neoplasms /diagnosis /economics /prevention & control; Cost Control /methods; Diagnosis, Differential; Female; Gastroenterology /economics /manpower /standards; Hospitals, Teaching /economics /manpower; Humans; Male; Mass Screening /economics /standards; Middle Aged; Odds Ratio; Sigmoidoscopy /economics /standards

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