Economic evaluation of colorectal cancer screening with faecal occult blood detection

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
The use of faecal occult blood (FOB) to screen for colorectal cancer (CC). This was compared with a do-nothing alternative.

Type of intervention
Screening, diagnosis and secondary prevention.

Economic study type
Cost benefit analysis, Cost-effectiveness analysis and cost-utility analysis.

Study population
The study population comprised men and women aged 50 to 70 years, who were living in Casas Ibanez Health zone in Spain in the last ten years up to 1998.

Setting
The setting was primary health and secondary care. The economic study was carried out in Albacete, Spain.

Dates to which data relate
The effectiveness evidence was derived using data from the last ten years before 1998. The resource use data related to 1994 to 1996. The price year was 1998.

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

Link between effectiveness and cost data
The prospective costing was estimated, based on the expected outcomes for the same sample of patients as that used in the effectiveness study.

Study sample
There was no mention of using power calculations to determine the sample size. No details were given of the sampling methods. A total of 4,986 participants were invited to take part in the study. Of these, 2,578 participated, 230 were excluded and 2,178 did not participate. Of the 168 who received a positive result, 10 refused to undergo further diagnostic procedures.

Study design
The study was a retrospective cohort study that was carried out in multiple centres. The study looked at patients over a 10-year period. The patients self-selected the exposure or did not participate.

**Analysis of effectiveness**
The analysis was based on all patients for whom results were available. The primary health outcomes were the number of cases and stages of CC detected.

**Effectiveness results**
Screening through FOB detected 7 stage A cancers and 2 stage C-D cancers. Also, on the basis of assumptions made for those who did not participate, there were 1.55 stage A cancers, 4.35 stage B cancer and 3.68 stage C-D cancers.

There were 23 cancers for option B (do nothing), of which 3.8 were stage A, 10.4 stage B and 8.8 stage C-D.

**Clinical conclusions**
The authors concluded that the use of FOB was effective in the detection of CC, as it detected 23 cases that would not have been identified if nothing had been done. The use of FOB had the advantage of being able to detect lesions in the initial stages.

**Measure of benefits used in the economic analysis**
The primary health outcomes were the number of cases of CC detected, and the quality of life outcomes. Quality-adjusted life-years (QALYs) were derived by multiplying each year of life by the utility value according to the state of health (i.e. years lived adjusted according to a quantitative matrix of quality developed from an evaluation of health status with Rosser and Kind's matrix). The authors also undertook a cost-benefit analysis to measure social benefit. This was defined as the difference between the costs and social benefits of CC screening by FOB detection in a given health zone.

**Direct costs**
Discounting was not reported, but it would be relevant as the economic analysis covered a 10-year period. The direct costs were derived for screening (Hemoccult tests), colonoscopies performed, surgical procedures (including hospital stay and chemotherapy where applicable), personnel (enlistment, re-enlistment and test analysis), and palliative care. It was assumed that the costs of both surgical interventions and subsequent treatments in advanced stages implied an increase of at least 100% with respect to detection in the initial stages. The costs and the quantities were reported separately. The boundary adopted was that of a payer (insurance). The costs were estimated from actual data. The resource quantity data were obtained from medical records, while the costs were derived from insurance company fees in effect at the time of the study. The quantities of resources used were based on resource use for 1994 to 1996. The price year was 1998. These costs were weighted according to different clinical categories in order to calculate an average cost.

**Statistical analysis of costs**
No statistical analysis was carried out.

**Indirect Costs**
No indirect costs were included.

**Currency**
Spanish pesetas (Pta).
Sensitivity analysis
No sensitivity analysis was carried out.

Estimated benefits used in the economic analysis
Nine cases of CC were detected in the FOB group. It was assumed that 9.58 would have been diagnosed from those who did not participate.

Twenty-three cases of CC were detected in the do-nothing group.

The number of QALYs for a 68-year-old in the FOB group was 6.91 for men and 12.84 for women.

The number of QALYs for a 68-year-old in the do-nothing group was 3.4 for men and 6.82 for women.

Cost results
No discounting was undertaken.

The cost for FOB was Pta 14,458,873 and the cost of doing nothing was Pta 16,459,940. Therefore, Pta 2,001,067 (12.75%) were saved. The authors presented these results in the form of a cost-benefit analysis.

The direct cost of the FOB programme was Pta 7,254,299.

Synthesis of costs and benefits
The estimated benefits and costs were combined by calculating the cost per QALY of a 68-year-old patient for both options. The cost of each asymptomatic cancer detected by screening was Pta 806,025.

The cost per QALY in the FOB option was Pta 1,051,185 for men and Pta 564,795 for women. The cost per QALY for those who did not participate was Pta 4,220,315 for men and Pta 2,413,834 for women.

No incremental analysis was performed.

Authors' conclusions
Screening for colorectal cancer (CC) through faecal occult blood (FOB) detection has the best cost--effectiveness ratio, and is the simplest and most practical method. The authors also concluded that, based on the scientific evidence, CC screening should be recommended in persons over 50 years. Also, that their study showed that screening through FOB detection can achieve results that are at least as effective as in other developed countries.

CRD COMMENTARY - Selection of comparators
No explicit justification was given for the choice of the comparator. It would appear to represent the current practice in the authors’ setting. You should decide if this is a widely used technology in your own setting.

Validity of estimate of measure of effectiveness
The study used a retrospective cohort design, which, although appropriate to answer the study question, has the potential to introduce bias and confounding factors. The study sample was representative of the study population. The authors did not indicate whether any statistical analysis had been carried out to take account of potential biases and confounding factors. Estimates of sensitivity and specificity for FOB testing were not provided. No sensitivity analyses were undertaken on effectiveness.

Validity of estimate of measure of benefit
The use of QALYs enhances the comparability of the results in relation to other health care programmes. The authors
clearly stated the methods used to derive the QALYs. They also expressed the benefits in terms of the cases detected and a cost-benefit analysis, which was in fact an ‘avoided costs’ approach rather than conventional cost-benefit analysis.

Validity of estimate of costs
All the categories of costs relevant to the payer perspective (insurance) appear to have been included in the analysis. Discounting was not undertaken in the analysis, although it may have been relevant as the study period was 10 years. The determination of the cost estimates was well explained as the authors provided details on how the different estimates were arrived at. Statistical and sensitivity analyses were not conducted on the quantities and prices. This may reduce the generalisability of the findings as the prices are specific to the authors’ setting. The dates to which the prices related was reported.

Other issues
The authors made appropriate comparisons of their effectiveness findings with those from other studies. However, the issue of generalisability of their findings was not addressed. The authors do not appear to have presented their findings selectively and their conclusions reflect the scope of the analysis. One of the limitations to the study was that the authors indicated that they did not report on the effectiveness of screening, but on the outcomes from an observational study.

Implications of the study
The authors made several recommendations to different bodies. For example, government bodies should develop preventive policies that include CC screening. The authors also recommended that health service managers should promote FOB testing every 2 years for persons over 50 years of age. In addition, health workers, in particular primary care workers, should promote this type of screening as a method of preventing CC in view of the considerable benefits that early detection offers their patients. The authors also highlighted the need for further research in the form of large-scale prospective studies to provide a stronger basis for developing a preventive strategy.

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