Cost effectiveness and projected national impact of colorectal cancer screening in France
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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.

CRD summary
The objective was to examine the cost-effectiveness of a programme to screen the population for colorectal cancer, using colonoscopy, flexible sigmoidoscopy, second-generation colon capsule endoscopy (CCE), the faecal immunochemical test (FIT), or the guaiac faecal occult blood test (FOBT). FIT every year was the most cost-effective strategy, in France, but further studies were needed. The cost-effectiveness methods were robust and key areas of uncertainty were investigated. The authors' conclusions appear to be valid.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to examine the cost-effectiveness of a programme to screen the population for colorectal cancer, using colonoscopy, flexible sigmoidoscopy, second-generation colon capsule endoscopy (CCE), the faecal immunochemical test (FIT), or the guaiac faecal occult blood test (FOBT).

Interventions
The screening strategies were colonoscopy every 10 years, flexible sigmoidoscopy every five or 10 years, second-generation CCE every five or 10 years, FIT every one or two years, and guaiac FOBT every one or two years. Screening was for individuals aged between 50 and 75 years and no screening was also considered.

Location/setting
France/primary care.

Methods
Analytical approach:
The analysis was based on a Markov model, with a lifetime horizon. The authors stated that it was carried out from the perspective of the third-party payer.

Effectiveness data:
The clinical inputs were from published studies, including a European study of FIT screening. Few randomised clinical trials were available and most of the data were from indirect comparisons. The accuracy (sensitivity and specificity) of the screening tests was a key input. Compliance and adherence were assumed to be 100%.

Monetary benefit and utility valuations:
Not considered.

Measure of benefit:
Life-years were the summary benefit measure and they were discounted at an annual rate of 3%.

Cost data:
The economic analysis included the costs of screening, surveillance, and colorectal cancer treatment. The cost of colonoscopy included the assistance of an anaesthesiologist. The costs of screening were from insurance company contracts with the French Association of Physicians. The cost of colorectal cancer was based on a recent published estimate for France. All costs were in Euros (EUR) and a 3% annual discount rate was applied.
Analysis of uncertainty:
One- and two-way sensitivity analyses were carried out on all the inputs. In an alternative scenario, productivity losses were included, using the median hourly income rate in France. A probabilistic sensitivity analysis was performed, varying all uncertain parameters, using Monte Carlo simulation. The expected value of perfect information (EVPI) was calculated.

Results
All strategies were cost-effective compared with no screening. Excluding weakly or strongly dominated strategies, which were less effective and more expensive or less cost-effective than another strategy, the incremental cost-effectiveness ratio (ICER) per life-year saved was EUR 1,139 with guaiac FOBT every two years, EUR 8,598 with FIT every two years, and EUR 48,165 with FIT every year, compared with the next best strategy.

At a cost-effectiveness threshold of EUR 50,000 per life-year saved, FIT every year had the highest net benefit. This remained the best strategy when varying the assumed adherence to screening and in most scenarios, even when including the indirect costs, unless the sensitivity of the FIT was reduced. The ICER of colonoscopy approached that of annual FIT when excluding the cost of anaesthesia, but annual FIT remained the preferred strategy.

In the probabilistic sensitivity analysis there was great uncertainty; the most cost-effective strategy was annual FIT in 20% of simulations, flexible sigmoidoscopy every five years in 40% of simulations, colonoscopy every 10 years in 26% of simulations, and FIT every two years in 14% of simulations.

The population EVPI was EUR 264 million. There was most uncertainty in parameters relating to the FIT, flexible sigmoidoscopy, and colonoscopy, as well as adherence and compliance.

Authors’ conclusions
The authors concluded that screening using the FIT every year was the most cost-effective strategy, in France. They recommended studies comparing FIT with endoscopy, due to the uncertainty in the efficacy of the FIT in preventing cancer.

CRD commentary
Interventions:
The selection of the comparators was appropriate; a wide range of screening strategies was considered, with alternative intervals, where relevant. No screening was an appropriate background comparator, to simulate the natural history of colorectal cancer.

Effectiveness/benefits:
The clinical data were from several sources, which were not fully described, making it difficult to objectively assess their validity. The authors stated that few clinical trials were available. Some assumptions on compliance were made and varying these had a big impact on the cost-effectiveness results. An extensive sensitivity analysis was conducted to assess these issues. Life-years were an appropriate benefit for capturing the impact of the disease on the patients’ health. Several other outcomes were reported to show the clinical impact of each screening strategy.

Costs:
The economic analysis was consistent with the viewpoint of the public payer, and a broader perspective was adopted in the sensitivity analysis. Few unit costs and resource quantities were provided in the paper, but more information was available in an online appendix. French sources were used for the screening strategies, but the derivation of the cancer costs was not reported. The price year was not stated, preventing reflation exercises. The costs were varied in the sensitivity analysis.

Analysis and results:
The results were extensively presented. An incremental approach was used to synthesise the costs and benefits of the screening strategies. A full description of the model was provided. The uncertainty was satisfactorily investigated, showing the variability in the findings, and the results of these analyses were extensively presented. The authors emphasised the great uncertainty in the results and the need for studies of high quality. The findings appear to be specific to the authors’ setting and might not be transferable to other locations.
Concluding remarks:
The cost-effectiveness methods were robust and key areas of uncertainty were investigated. The authors’ conclusions appear to be valid.

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