A cost-effectiveness analysis of colorectal screening of hereditary nonpolyposis colorectal carcinoma gene carriers


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
Colorectal screening of hereditary nonpolyposis colorectal carcinoma (CRC) gene carriers.

Type of intervention
Screening.

Economic study type
Cost-effectiveness analysis.

Study population
A hypothetical male gene carrier aged 25.

Setting
Hospital. The economic study was carried out in the Netherlands.

Dates to which data relate
Effectiveness data were based on studies published in 1995-1996. Cost data were based on studies published in 1995 and 1996.

Source of effectiveness data
The estimate for final outcomes was based on a review of previously completed studies.

Modelling
A decision model was used to estimate the potential health effects (life expectancy) and health care costs of the two strategies.

Outcomes assessed in the review
The following outcomes were assessed: the lifetime risk of developing CRC, the stage distribution of CRC for symptomatic patients, CRC stage specific relative survival rates and the effectiveness of surveillance in preventing or detecting cancer early.

Study designs and other criteria for inclusion in the review
Not stated.
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
Four studies were included. Estimates of the lifetime risk of developing CRC and the stage distribution of CRC for symptomatic patients were derived from the Dutch hereditary nonpolyposis colorectal carcinoma (HNPCC) registry. The CRC stage specific relative survival rates and the effectiveness of surveillance in preventing or detecting cancer early were based on Finnish studies.

Methods of combining primary studies
Not stated.

Investigation of differences between primary studies
Not stated.

Results of the review
The relative 10-year survival rates for patients with early and advanced stage HNPCC are 80% and 30%, respectively. In the Finnish surveillance study, 4.5% of the patients (including the cases detected during the first round of screening) developed CRC despite the intensive screening programme. Because the family members under surveillance were first-degree relatives, the risk would have been twice as high (9%) if they had been gene carriers.

Measure of benefits used in the economic analysis
Life expectancy was the outcome measure used in the economic analysis. A decision model was used to estimate the potential health effects (life expectancy) and health care costs of the two strategies.

Direct costs
The lifetime costs of surveillance, including colonoscopy and polypectomy, were derived from a published US study. The lifetime costs of treating CRC were based on estimates in the published literature. The estimation of the costs of genetic testing was based on the current costs in the Netherlands, which amount to $1,000 for mutation analysis and $880 for genetic counselling. Costs were reported separately from quantities. A 5% discounting rate was used. Costs were also reported without discounting.

Indirect Costs
Not included.

Currency
US dollars ($).
Sensitivity analysis
A sensitivity analysis was performed on the effectiveness parameters to assess the possible impact of various uncertainties.

Estimated benefits used in the economic analysis
The life expectancy of a male gene carrier aged 25 with no surveillance was 40.9 years; with surveillance at an interval of 1 year was 49 years; and with surveillance at an interval of 2.5 years, 47.8 years. The option of surveillance would lead to an increase in life expectancy of 6.9 years.

Cost results
The costs of the no surveillance strategy were $31,760 ($12,577 at 5% discount rate); of the surveillance at one year interval, $23,153 ($9,906); and of surveillance at 2.5 year intervals, $23,204 ($9,859).

Synthesis of costs and benefits
A synthesis was not performed as surveillance lead to an increase in life expectancy and lower costs (with or without discounting). Sensitivity analysis showed that the risk of developing CRC under surveillance was a critical variable. If the risk were to be half of the assumed risk, the life expectancy would be almost normal and the costs of surveillance would be decreased by $3,000.

Authors' conclusions
Surveillance of carriers of a mutated MMR gene would lead to an increase in life expectancy of approximately seven years. In addition, the costs of surveillance were much less than the costs of the no-surveillance strategy. These outcomes might be used to convince governmental organisations of the importance of establishing large-scale screening programmes as well as the need for national or regional registries to co-ordinate such efforts.

CRD COMMENTARY - Selection of comparators
The reason for the choice of comparator is clear

Validity of estimate of measure of benefit
It was unclear how systematic the search for relevant studies concerning the effectiveness of HNPCC screening was and, therefore, whether the data used in the model represents all that is available.

Validity of estimate of costs
Resource quantities were reported separately from prices and were derived from two published studies and current costs in the Netherlands. Only direct medical costs were determined in the analysis, and costs to others in society, such as patients, could usefully have been included in the analysis.

Other issues
Results may not be generalisable to other countries, although appropriate comparisons were made with other studies.

Source of funding
None stated.

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