Cost effectiveness of colonoscopy, based on the appropriateness of an indication

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 determine the clinical and cost-effectiveness of detecting colorectal cancer according to published guidelines for selecting patients for colonoscopy. The authors concluded that the guidelines for appropriate indications for colonoscopy were inefficient in excluding a clinically meaningful risk of colorectal cancer in patients with inappropriate indications. This conclusion appears to be reasonable.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to determine the clinical and cost-effectiveness of detecting colorectal cancer according to guidelines for selecting patients for colonoscopy, published by the American Society for Gastrointestinal Endoscopy (ASGE) and the European Panel on the Appropriateness of Gastrointestinal Endoscopy (EPAGE).

Interventions
Colonoscopy at age 60 years, for the detection of colorectal cancer, with either appropriate or inappropriate indications, according to guidelines defined by the ASGE and the EPAGE, was compared with no screening.

Location/setting
USA/secondary care.

Methods
Analytical approach:
The authors used a decision-tree model to compare the consequences, of the alternative strategies for referring to colonoscopy a patient with appropriate or inappropriate indications, in terms of the eventual detection rates for colorectal cancer. The model evaluated a lifetime horizon and the authors stated that the perspective was societal.

Effectiveness data:
The evidence came from a number of studies, which were pooled after being identified through a systematic review of published studies and conference abstracts. The data included the rates of inappropriate colonoscopy, cancer in appropriate colonoscopies, and cancer in inappropriate colonoscopies. The main clinical parameters were the prevalence of cancer in colonoscopies, the distribution of the stage of cancer, and survival.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
The measure of benefit was the number of life-years gained.

Cost data:
The direct costs of endoscopy and subsequent treatment costs for colorectal cancer were based on Medicare reimbursement costs and converted to 2007 US dollars ($) using the medical component of the consumer price index. No discounting was applied as the costs were assumed to be incurred in the year of testing. The productivity costs were based on a median hourly income rate.
Analysis of uncertainty:
A univariate sensitivity analysis was performed to assess the impact of varying the key parameters of the model. A probabilistic sensitivity analysis was performed to assess the simultaneous impact on the results of variations in the model parameters.

Results
A policy of referring patients with an inappropriate indication for colonoscopy resulted in 93 colonoscopies per cancer detected and 617 colonoscopies per cancer death prevented.

A policy of referring patients with an appropriate indication for colonoscopy resulted in 18 colonoscopies per cancer detected and 115 colonoscopies per cancer death prevented.

Compared with no screening, the incremental cost-effectiveness ratio (ICER) of referring patients with appropriate indications for colonoscopy was $6,154 per life-year gained, and the ICER of screening inappropriately indicated patients was $31,807 per life-year gained.

In the sensitivity analysis, the factor that most influenced these results was the prevalence of cancer; a reduction from 1.1% (base case) to 0.23% increased the ICER for inappropriate indications from $31,807 to $150,000.

Authors' conclusions
The authors concluded that guidelines for appropriate indications for colonoscopy in the detection of colorectal cancer were inefficient in excluding a clinically meaningful risk of colorectal cancer in patients with inappropriate indications.

CRD commentary
Interventions:
The intervention (colonoscopy) was well described and the comparison of the guidelines for appropriate indications for the procedure with no screening was appropriate. The details of the two sets of guidelines (ASGE and EPAGE) were not provided, but the references were given.

Effectiveness/benefits:
The effectiveness data were pooled estimates from a number of studies identified in a systematic literature review and the methodology of this review was reported in sufficient detail. Stage distribution, five-year stage-specific survival, and cancer or colorectal cancer upstaging were taken from the Surveillance, Epidemiology, and End Results database. The model parameter inputs, and their appropriate references, were reported.

Costs:
The authors reported that the perspective was societal. The direct costs were appropriate for the study population and setting. They were appropriately adjusted to a base year, and the use of the health care component of the consumer price index to do this was appropriate. Productivity costs were estimated at a median hourly income rate, but, given the age of the population, the inclusion of productivity costs may not have been appropriate. The authors acknowledged some limitations of their study and compared their findings with those of other similar analyses.

Analysis and results:
The analytical approach was satisfactorily reported. The structure of the model was well described and supplemented with a diagram. The source of information for the key parameters was comprehensively described. The results were described adequately and reported in full. Appropriate sensitivity analyses were performed and the impact on the results was reported.

Concluding remarks:
Overall, the methodology and reporting of the study were satisfactory and the conclusion appears to be reasonable.

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