Cost-effectiveness of early one-year colonoscopy surveillance after polypectomy
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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 assess the cost-effectiveness of early surveillance colonoscopy, one year after polypectomy, in the detection of colorectal cancer. The findings did not support the recommended three-year interval after advanced adenoma removal for the first surveillance colonoscopy, nor the five- to ten-year interval for non-advanced adenoma. The methods were adequate, but the results were not well reported and the effectiveness of early versus late detection was uncertain, which means that the authors’ conclusion should be treated with caution.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to assess the cost-effectiveness of early surveillance colonoscopy, one year after polypectomy, in the detection of colorectal cancer.

Interventions
Early surveillance colonoscopy, one year after polypectomy, was compared with colonoscopy three years after polypectomy. Three-year surveillance was recommended by clinical guidelines.

Location/setting
USA/in-patient secondary care.

Methods
Analytical approach:
A decision tree was used to model the probabilities of developing cancer and dying, and the associated costs and outcomes, with the intervention. The time horizon was five years and the authors reported that a societal perspective was adopted.

Effectiveness data:
To identify the cancer prevalence rates one year after polypectomy, a literature review was conducted in EMBASE and MEDLINE, plus abstracts from relevant conferences, for articles from 1990 to 2007. Only prospective studies with samples of over 1,000 patients were included and the data from these studies were pooled. The one-year colorectal cancer stage distribution was from a published study that pooled data from other relevant studies. The cancer prevalence rates and the cancer staging at one year, were the two main clinical effectiveness parameters.

Monetary benefit and utility valuations:
None.

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

Cost data:
The costs included those of colonoscopy; colorectal cancer treatment; polypectomy; and productivity lost by patients and carers when attending colonoscopy. The costs of procedures and treatment were from Medicare reimbursement rates. The authors assumed that patients lost a total of eight hours in attending colonoscopy and carers lost four hours. Productivity losses were valued using median hourly incomes. All endoscopic and treatment costs were assumed to
occur in the first year of the study. All costs were inflated to 2007 prices using the medical component of the consumer price index. They were reported in US dollars ($).

Analysis of uncertainty:
The authors reported that sensitivity analyses were undertaken, where each model parameter was fitted with a probability distribution and then selected at random, with 10,000 iterations, in a Monte-Carlo simulation. This analysis produced 90% confidence intervals for the results. A series of one-way sensitivity analyses was also performed.

Results
In a population of 100,000 patients who underwent early surveillance, 1,663 years of life were lost over a five-year period, while 3,278 years of life were lost by patients who were referred to colonoscopy at three years instead of at one year.

When early colonoscopy at one year was compared against usual colonoscopy at three years, the additional cost per life-year gained was $66,136 (90% CI 55,967 to 84,882).

Authors' conclusions
The authors concluded that their findings did not support the three-year interval recommended by guidelines for the first surveillance colonoscopy after the removal of advanced adenoma, nor the five- to ten-year interval recommended for non-advanced adenomas.

CRD commentary
Interventions:
The interventions were reported clearly and in detail and included the usual practice.

Effectiveness/benefits:
The methods of the literature review were reported in detail, including the sources searched, the search strategy, and the inclusion criteria. The main clinical parameters were the prevalence of colorectal cancer at one year and its staging. It appears that the sensitivity and specificity of colonoscopy were not analysed, probably because they were assumed to be the same for early and late surveillance, but this should have been explicitly reported.

Costs:
The authors stated that a societal perspective was used, but some costs relevant to this perspective might have been omitted. Early surveillance increased life expectancy and so productivity lost due to early death should have been included. This omission biased the results against early surveillance. The authors assumed that all the costs were incurred during the first year, but in the late surveillance strategies, cancer treatment costs should be incurred after year one. The cost outcomes of the model were not reported.

Analysis and results:
The identified evidence was synthesised using a decision tree and a probabilistic sensitivity analysis was undertaken. This type of analysis is considered to be the gold standard for evaluating the overall model uncertainty, but the authors did not report some of their methods, such as the type of distribution fitted for each model parameter. The main limitation, reported by the authors, was the uncertainty, due to the lack of randomised controlled trials, on the effect of the delayed detection of colorectal cancer on the life expectancy of patients.

Concluding remarks:
Overall the methods were adequate and, in general, they were well reported, but the results, particularly the costs, were not. Due to the uncertainty in the effectiveness of early versus late detection, and the poor reporting of the results, the authors’ conclusion should be treated with caution.

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