Endoscopist-directed propofol administration versus anesthesiologist assistance for colorectal cancer screening: a cost-effectiveness analysis

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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 study assessed the economic benefit of endoscopist-directed administration of propofol compared with anaesthetist assistance for patients undergoing colonoscopy for colorectal cancer screening in the USA and France. The authors reported that the economic benefit of endoscopist-directed propofol administration could be substantial. Given that the quality of the study methodology was poor, a very simple costing analysis was performed, and the authors did not clearly report details of their model, the authors' conclusions should be treated with caution.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The study assessed the economic benefit of endoscopist-directed propofol administration compared with anaesthetist assistance for patients undergoing colorectal cancer screening.

Interventions
The study compared endoscopist-directed administration of propofol with anaesthetist assistance for patients undergoing colonoscopy for colorectal cancer screening.

Location/setting
USA and France/inpatient secondary care.

Methods
Analytical approach:
A decision analytic model was used to assess the costs and benefits associated with endoscopist versus anaesthetist interventions. The time horizon was 10 years. The authors stated that the perspective adopted in the US analysis was that of Medicare. The authors did not report the perspective adopted in the French analysis.

Effectiveness data:
Based on the results of a published systematic review that showed life-threatening episodes with endoscopist-directed administration of propofol were extraordinarily rare (see Other Publications of Related Interest), only the cost implications of endoscopist versus anaesthetist administration of propofol were evaluated in the base case scenario. In a sensitivity analysis, the authors assessed the cost-effectiveness of endoscopist versus anaesthetist administration of propofol assuming a mortality rate of 0.0008% with endoscopists.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
The measure of benefit was life-years gained. Future benefits were discounted using an annual rate of 3%.

Cost data:
The direct costs included: anaesthetist assistance; nursing time; and endoscopist-directed propofol administration-related training by an endoscopy nurse.
For the USA, resource use information came from a sample of 5% Medicare beneficiaries who resided in one of the Surveillance, Epidemiology and End Results (SEER) database catchment areas. To estimate the costs related to endoscopist training, the authors assumed that training would last two weeks, with this time being valued using the mean salary for an endoscopy nurse.

For France, resource use was obtained from a previously published study, and nursing costs were valued using French nursing wage rates.

The price year was 2009. All costs were reported in US dollars ($) for the US analysis and Euros (EUR) for the French analysis. As the costs of the interventions were assessed over a 10-year implementation time period, future costs were discounted using an annual rate of 3%.

Analysis of uncertainty:
The authors reported that one way sensitivity analyses were performed, with the most relevant results reported. A Monte Carlo simulation using 10,000 iterations was also performed. Sensitivity analyses were restricted to the US analysis.

Results
Assuming a 0.008% for mortality with endoscopist-directed administration of propofol for 100,000 US citizens, 4.4 life-years would be lost with the endoscopist propofol administration intervention. Over a 10-year period, the implementation of an endoscopist propofol administration policy would result in savings of $3.2 billion when compared with the anaesthetist propofol administration intervention. Results of the Monte-Carlo simulation showed that the savings could range between $2.7 billion and $16.9 billion.

When costs and benefits were combined using an incremental cost-effectiveness ratio (the additional cost per life year gained), anaesthetist-assistance with propofol administration was associated with an incremental cost-effectiveness ratio of $1.5 million per life-year saved in the USA compared with endoscopist propofol administration.

In France, the associated 10-year savings were EUR 0.8 billion when endoscopist-directed administration of propofol was adopted.

Authors' conclusions
The authors reported that the economic benefit of endoscopist-directed propofol administration could be substantial in both American and European settings.

CRD commentary
Interventions:
The interventions under study were adequately reported.

Effectiveness/benefits:
This study was mainly a costing study as a previously published literature review had reported no real increase in mortality with endoscopist-directed administration of propofol, but the authors assessed the impact on the cost-effectiveness results when a mortality rate of 0.0008% was assumed; this mortality rate was based on the results of a previous study. However, this analysis was restricted to the USA, and not undertaken in the French analysis.

Costs:
For the USA analysis, the perspective adopted was explicitly reported to be that of Medicare, but the perspective was not reported for the French analysis (although it would appear that a healthcare system perspective was adopted). A limited costing analyses was undertaken, with only the costs of the intervention (training, nurse time and anaesthesiologist time) included. The costs of complications associated with propofol administration under the two interventions were not included. The price year, currency details and discounting were adequately reported.

Analysis and results:
Cost and outcome information were synthesised using a Markov model. Details of the model structure were only given in a supplementary online appendix and not in the paper. Uncertainty was tested using one-way sensitivity analyses and
Monte Carlo simulation. However, a probabilistic sensitivity analysis could have captured the overall parameter uncertainty more thoroughly. As a main limitation to their study, the authors reported that the expected benefits of the intervention were underestimated as they projected the model output on static populations, rather than ageing populations.

Concluding remarks:
The quality of the study methodology was poor. A very simple costing analysis was performed, and the authors did not clearly report details of the model used. Therefore, the authors’ conclusions should be treated with caution.

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