Preliminary analysis of the cost-effectiveness of the National Bowel Cancer Screening Program: demonstrating the potential value of comprehensive real world data


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
This study aimed to assess the feasibility of using real-world data from Australia's National Bowel Cancer Screening Program (NBCSP) to inform cost-effectiveness. The authors concluded that the NBCSP appeared to be cost-effective and using comprehensive data was feasible in cost-effectiveness analysis. The study was well reported, with reasonable conclusions. The model did not include repeat screening, which may have led to results that differ from those of a real-world screening programme.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study aimed to assess the feasibility of using real-world data from a case study of Australia's National Bowel Cancer Screening Program (NBCSP) to inform cost-effectiveness.

Interventions
Australia's NBCSP was compared with no screening. The screening programme consisted of an invitation to be screened, a faecal occult blood test (FOBT) for those who participated, colonoscopy for those with a positive result, resection or surveillance of any adenomas found, and treatment for any colorectal cancer. Without screening, detection of adenomas was based on colonoscopy alone with fewer colonoscopies than with screening.

Location/setting
Australia/secondary care.

Methods
Analytical approach:
A lifetime decision-analytic model, based on all NBCSP data for 2008 (681,915 people), simulated the costs and benefits of the screening programme. The authors stated that the perspective was that of Australia's national health service.

Effectiveness data:
The effectiveness of screening was defined as detecting disease at an earlier stage; identifying and monitoring adenomas with a high-risk of developing colorectal cancer or identifying and treating cancer at an earlier stage. The distribution of disease stage at detection was from the NBCSP for both screened and unscreened groups. Data on five-year survival from time of diagnosis of colorectal cancer were from BioGrid Australia (a large database). After five years, survival was assumed to revert to the normal age-specific life expectancy from Australian government statistics. Other key parameters for the model included the underlying incidence of colorectal cancer, which was assumed to be the same for screening and no screening; and the participation rates for screening and diagnostic tests. All parameters were age specific, and most of the data were from the NBCSP.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
The primary measure of benefit was life-years saved in relation to colorectal cancer. The benefits were discounted at 3% annually.

Cost data:
Costs were assigned for each part of the screening programme: initial screening and invitation, diagnostic tests, surveillance after diagnosis, and treatment for colorectal cancer. Screening costs included programme administration, FOBT kits, pathology testing and a national colorectal cancer register. These were from the NBCSP Monitoring Report and were assumed to be zero for no screening. Diagnostic costs included general practitioner visits and colonoscopies undertaken. Surveillance costs were the age-specific costs of colonoscopy. Treatment costs, for both groups, were from a published model, based on stage of cancer at presentation. Throughout the model, except for treatment, participation rates influenced the costs. All costs were reported in 2008 Australian dollars (AUD), and they were discounted at 3% annually.

Analysis of uncertainty:
Several scenarios were run. Some simulated the impact of screening older people, with different participation and incidence rates, and with proportional increases in costs based on the additional people screened. Others tested alternative FOBT participation rates (25%, 50%, 100%), alternative five-year survival data, using recommended surveillance frequencies rather than observed frequencies, increasing the proportion of colorectal cancer prevented by resection or surveillance of adenomas, and using a zero discount rate.

Results
The model found that the NBCSP resulted in an additional AUD 48.3 million in costs and 1,265 additional life-years. The incremental cost-effectiveness ratio was AUD 38,216 per life-year gained. Values below AUD 50,000 per additional life-year were considered to be cost-effective.

The scenario analyses found that introducing the cost of re-invitations for faulty FOBT kits, and alternative older stage-specific costs, raised the incremental cost-effectiveness ratios, but not over AUD 50,000 per additional life-year. Following the guidelines on the frequency of adenoma surveillance increased the ratio to over AUD 50,000 per additional life-year. All other scenarios improved cost-effectiveness, with zero discounting and 100% participation both lowering the ratio to below AUD 25,000 per additional life-year.

Authors' conclusions
The authors concluded that the analysis showed that comprehensive real-world data could be used to inform cost-effectiveness analysis, and that the NBCSP appeared to be cost-effective.

CRD commentary
Interventions:
The interventions appear to have been appropriate. The pathway for patients in each treatment group was clearly described.

Effectiveness/benefits:
The effectiveness of screening was from a large observational collection of NBCSP data. Some incidence rates were from other sources, and it was not clear why these were not from the NBCSP. The model analysed the patients invited for screening in one year (2008), but did not account for future screening of the same people. The authors acknowledged that this was an approach used in other models. By modelling only the initial wave of screening for the cohort, the model doesn’t accurately recreate how a national screening programme would run; most people would not have only one screening in their lifetime. This could affect both benefits and costs.

Costs:
The costs were from appropriate Australian sources. They were reported as broad categories, with no unit costs, but a reference for these was given. More detail in cost reporting would have been beneficial for comparison with other work and assessment of generalisability to other settings.

Analysis and results:
The analyses were clearly presented with a good variety of sensitivity analyses, but the overall uncertainty in the
decision was not analysed. To assess overall uncertainty, each parameter in the model would be assigned a probabilistic
distribution, reflecting uncertainty in the data or confidence in the data where variance data are not available. The
authors provided a good discussion of the strengths and limitations of their model.

Concluding remarks:
The study was well reported, with reasonable conclusions. The model did not include repeat screening, which may lead
to results that differ from those of a real-world screening programme.

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