Letters to the Editor

The economic case for faecal occult blood screening

Evidence from randomised controlled trials suggests that screening by faecal occult blood (FOB) testing can reduce mortality from colorectal cancer [1–3]. However, even if such evidence of effectiveness is taken as being completely robust, it is, in isolation, insufficient to commend FOB testing as a mass screening protocol. There is no shortage of innovative healthcare technologies available for potential adoption by healthcare systems. Many are proving as, or more, effective than FOB screening and can therefore, on effectiveness grounds alone, claim entitlement to a share in a country’s public healthcare budget. Being strictly finite, this budget is unlikely to be able to accommodate all such claims. In order to merit inclusion in the portfolio of interventions offered within public health programmes, a new technology needs to be proven not simply effective, but cost-effective. The technology must be shown to offer the prospect of yielding sufficient healthcare gains to justify the likely expenditures incurred.

Cost-effectiveness of FOB screening

Of all the randomised controlled trials of FOB screening, that conducted in Nottingham, UK, has been the largest. Approximately 150000 persons aged 50–74 years were randomised to equal-sized test and control arms. Subjects in the test arm were offered biennial FOB testing, with positives being investigated by colonoscopy. Average compliance approached 60% and a significant reduction in colorectal cancer mortality risk was reported at ~8 years follow-up [2]. Some years after the commencement of the clinical trial in Nottingham, a parallel economic evaluation was initiated. The long-term intention was to produce an estimate of the incremental cost-effectiveness of the Nottingham screening protocol, expressed as the expected additional cost per quality-adjusted life year (QALY) gained as a result of screening, relative to symptomatic presentation.

Initially, the economic research involved estimating the resource costs of the various components of the screening process, for example diagnostic investigations [4], surgical treatment and follow-up [5]. Based on subject records, the resource costs of the FOB testing programme itself were estimated [6]. These cost data informed further investigations, for example the cost per abnormality detected under alternative screening protocols [7, 8] including rehydration of FOB tests [9]. Although survival measurement was implicit within

the clinical trial, the use of QALYs as an economic outcome measure entailed obtaining additional, experimental data from trial participants on health-related quality of life [10].

The trial’s clinical data, combined with the data from the economic studies, formed the basis of a simulation model of the Nottingham screening programme [11]. This demonstrated that, even within the then-existing follow-up period, the cost per QALY gained as a result of FOB screening was superior to that of many other interventions currently being introduced into the UK healthcare system. Extrapolations beyond the trial period suggested that cost-effectiveness would improve with follow-up, as longer-term survival advantages became more prominent [12]. This conclusion appeared robust against plausible variations in compliance rates and target age ranges, because of approximately equivalent cost–outcome compensations. For example, lower compliance reduces the overall effectiveness of screening, but also reduces the costs. Screening from an earlier age increases the costs, but enhances the likelihood of additional survival advantages owing to the detection and excision of adenomas [13].

The Funen, Denmark, trial of FOB screening [3] employed a similar clinical protocol to that of Nottingham, and also encompassed a parallel economic evaluation [14]. Although the Nottingham and Funen researchers employed somewhat different economic evaluation methodologies, they came to essentially the same conclusion, namely, that in each of their countries, FOB screening for colorectal cancer would represent better value for money than did existing screening programmes for breast cancer.

Is the evidence sufficient?

To date, FOB screening has been evaluated more rigorously than any other method of screening for colorectal cancer, and appears to have successfully negotiated both the effectiveness and the cost-effectiveness hurdles. Nevertheless, the fact remains that alternative screening technologies do exist. Mathematical modellers working independently of trials have already evaluated a wide range of theoretical screening protocols, involving endoscopy, radiology and FOB testing, in various combinations, at various ages and at various screening intervals [15–18]. The confidence intervals surrounding cost per QALY estimates derived from models of theoretical protocols are invariably wider than those derived from trial data, because so much more has to be assumed, for example compliance rates and likely procedure costs. Most screening
models are Markovian and their conclusions are therefore conditioned by the specific assumptions made about the nature of stage transition across the adenoma–carcinoma sequence. Whilst appreciating that the actual evidence base of modelled protocols is considerably weaker than that for FOB, we must also concede that it would probably be infeasible, on the grounds of time and expense, to trial every possible protocol.

The limitations of models notwithstanding, it is looking increasingly likely that there will exist a number of screening protocols, over and above FOB, which are capable of offering acceptable value for money [19]. Many are likely to be more effective, given FOB’s relatively poor sensitivity, and some might even prove to be more cost-effective. The weight of experimental evidence rests largely with FOB testing at present, although the balance will change in the future, as later trials begin reporting. For example, a major trial of once-only flexible sigmoidoscopy screening is currently being conducted in the UK [20]. The economic evaluation of this trial awaits findings for changes in incidence and mortality, although a mathematical model of the protocol suggests the likelihood of acceptable cost-effectiveness eventually being established [21].

Colorectal cancer screening is, in one sense, fortunate in being able to achieve its goal through a variety of methods. In another, however, this variety may be an obstacle to implementation. At present, the only cost-effectiveness obstacle to implementing FOB screening immediately is the feeling that perhaps there might be an even better protocol just around the corner. Given the necessary duration of clinical trials, however, decision makers wishing to defer the introduction of screening until the most cost-effective protocol has been identified experimentally, may be in for a long wait. Even then, it is entirely possible that the cost-effectiveness criterion alone will not be capable of distinguishing the candidates, because more than one protocol will pass the economic test.

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References


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