Flexible sigmoidoscopy is the best approach for a national bowel screening programme

Brian Cox

The people of New Zealand rightly expect that the bowel screening method chosen will provide the greatest reduction in the risk of developing or dying of bowel cancer with minimal harm.

When the evidence suggests that one-off flexible sigmoidoscopy (FS) screening produces a greater reduction in bowel cancer incidence and mortality than faecal occult blood test (FOBT) screening, then the risks, benefits and resource requirements of a screening programme based on FS must be assessed. Despite calls for this, and although New Zealand has the highest incidence of bowel cancer in the world, this has not happened. Opposition to one-off FS screening appears to have been based on a particular interpretation of the research results.

In 2009, the first randomised controlled trial (RCT) of FS screening suggested that bowel cancer mortality may be reduced by the 7th year of follow-up. The publication in May, 2010, of the results of the second RCT of one-off FS screening radically changed the health service options for bowel screening. Participants in the trial who underwent one-off FS screening had a 43% reduction in the risk of dying of bowel cancer and a 33% reduction in future risk of developing bowel cancer. The results of these two studies were confirmed by two further RCTs of FS screening in 2011 and 2012. These studies confirmed the magnitude of benefit from FS screening previously found in the well-designed observational studies used to support options for colorectal cancer control in New Zealand. Countries such as the UK that developed bowel screening programmes based on FOBT have been shifting to the more effective FS screening and initial participation in FS screening has been 43.1%.

Instead of FS screening, general practitioners and DHBs are being asked to support a bowel screening programme based on 2-yearly immunohistochemical FOBT (iFOBT) and restricted to 60–69 years of age, a much narrower age range than the RCTs of guaiac FOBT (gFOBT) from which the effectiveness of iFOBT is imputed. This proposed ‘slimmed-down’ iFOBT programme can be expected to have lower effectiveness than the gFOBT trials that underpin it.

FS with an enema one hour beforehand takes about 15–20 minutes to complete and many family physicians in the US now provide FS screening. A one-off FS screening programme can be delivered by primary care organisations with appropriate gastroenterological or surgical support for the assessment of abnormalities detected. Surgical services already have experience in the provision of such support for the breast screening programme.

What are the workforce requirements of a one-off flexible sigmoidoscopy programme?

There are currently an estimated 54,000 people who turn 60 years of age and 476,000 people 60–69 years of age annually in New Zealand. The results of the RCTs of FOBT and FS screening provide estimates of the
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Table 1: The expected screening, workload and effects on bowel cancer incidence and mortality for 4 bowel screening programmes.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>FOBT Age range (years)</th>
<th>FOBT Frequency</th>
<th>FOBT Annual eligible pop</th>
<th>FOBT Participation</th>
<th>FOBT Number screened annually</th>
<th>FOBT Screens/week</th>
<th>FOBT Colonoscopy (%)</th>
<th>FOBT Colonoscopies with 30% surveillance</th>
<th>FOBT Annual number of cancers prevented</th>
<th>FOBT Annual number of cancer deaths prevented</th>
<th>Flex-sig Age range (years)</th>
<th>Flex-sig Frequency</th>
<th>Flex-sig Annual eligible pop</th>
<th>Flex-sig Participation</th>
<th>Flex-sig Number screened annually</th>
<th>Flex-sig Screens/week</th>
<th>Flex-sig Colonoscopy (%)</th>
<th>Flex-sig Colonoscopies with 30% surveillance</th>
<th>Flex-sig Annual number of cancers prevented</th>
<th>Flex-sig Annual number of cancer deaths prevented</th>
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<tbody>
<tr>
<td>Age range (years)</td>
<td>55-74</td>
<td>60-69</td>
<td>237,940</td>
<td>60%</td>
<td>142,764</td>
<td>2,974</td>
<td>5%</td>
<td>1,506</td>
<td>309</td>
<td>102</td>
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<tr>
<td>Frequency</td>
<td>2</td>
<td>2-yearly</td>
<td>464,185</td>
<td>43%</td>
<td>255,302</td>
<td>481</td>
<td>5%</td>
<td>1,747</td>
<td>222</td>
<td>142</td>
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<td>Annual eligible pop</td>
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<td>Number screened annually</td>
<td>255,302</td>
<td>142,764</td>
<td>23,110</td>
<td>50%</td>
<td>26,873</td>
<td>560</td>
<td>5%</td>
<td>1,747</td>
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<td>Screens/week</td>
<td>5,319</td>
<td>2,974</td>
<td>481</td>
<td>5%</td>
<td>481</td>
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<td>142</td>
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<td>Colonoscopy (%)</td>
<td>5%</td>
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<td>5%</td>
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<td>5%</td>
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<td>Colonoscopies with 30% surveillance</td>
<td>16,595</td>
<td>9,280</td>
<td>1,506</td>
<td>5%</td>
<td>1,506</td>
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<td>Annual number of cancers prevented</td>
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<td>Annual number of cancer deaths prevented</td>
<td>79</td>
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initial workload and long-term average annual number of bowel cancer cases and deaths prevented. Using this information, estimates for four screening scenarios are given in Table 1.

Assuming 50% participation, a full national FS screening programme would require 560 flexible sigmoidoscopies per week. In all, only about 20 flexible sigmoidoscopists, each performing an average of 28 flexible sigmoidoscopies each a week, would be required. Both screening modalities result in about 5% of participants being referred for colonoscopy. With the addition of the likely surveillance colonoscopies required, the proportion requiring colonoscopy would initially be about 1,747 nationally per year (36 per week). The one-off nature of FS screening has major advantages, with greater impact on the bowel cancer burden, and a much more manageable increase in the colonoscopy workload. The proposed FOBT programme provided the poorest return of the four scenarios and a considerably greater requirement for colonoscopy.

These results suggest that for the Canterbury DHB for example, a region with an almost identical proportion of the national population 60–69 years of age as the Waitemata DHB (11.6%), a one-off FS screening programme would require about 200 extra colonoscopies per year (an average of just over 4 per week), and 69 flexible sigmoidoscopies per week. These resource requirements would appear manageable with appropriate organisation and a small increase in the support for existing gastroenterology or surgical services.

Staff to carry out FS screening would need to be trained and then perform a minimum number of tests per month to retain the skills and expertise to meet quality standards. Nurses and medical technicians were trained to conduct the FS screening of the UK randomised controlled trial. Training at modest cost is available in several centres worldwide, such as the JETS programme of the RACP(UK) (www.jets.nhs.uk/CompareCourses.aspx?CourseCode=JAG_FDP2&CentreId=6&View=c).

Some supervision and follow-up of a number of video-reviewed FS procedures would be needed. With airfares and accommodation costs, an initial 20 flexible sigmoidoscopists could probably receive basic training in the UK and follow-up supervision back in New Zealand for less than $350,000. As the programme becomes established, ongoing quality assessment and video review might be managed by screening flexible sigmoidoscopists rather than endoscopists.

A FS screening programme could be based in, and run by, general practice organisations. A team of 2–4 trained flexible sigmoidoscopists in a region, with the appropriate sterilisation and video recording equipment, and a receptionist, visiting general practices 6-monthly, could provide a high quality FS screening service to the population. If suitable space or infection control facilities were not available, screening could be provided by suitably equipped mobile units such as has been done for other screening programmes.
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So what would such a national bowel screening service cost?

Several studies have suggested that one-off FS may be cost-neutral for the health service within 5-10 years because of the savings from the prevention of a large number of cases of bowel cancer, which iFOBT screening does not attain (Table 1). Some studies suggest FS screening would produce net savings. This will be more likely in populations with high incidence, such as New Zealand. It should be possible to fund the salaries, equipment and mobile facilities nationally for less than about $15 million a year. The cost would be offset within five years by the considerable savings from the treatment averted due to the reduced number of people developing bowel cancer.

Before DHBs agree to support the proposed ‘slimmed-down’ FOBT screening programme, they should consider the more effective and more cost-effective option that a one-off FS screening programme in their region would provide.

How would such a programme work?

The general practice population lists could be used to identify individuals who had just had their 60th birthday. About 54,000 people turn 60 years of age each year in New Zealand. If each general practitioner serves about 5,000 people, a group practice of five general practitioners could expect, on average, to invite about 27 eligible people to screening in a 6-month period. If half accept the invitation, two flexible sigmoidoscopists could provide the screening required in a day. As a particular day may be unsuitable for some this might be carried out over two days. A two-day period may also cope with some of the variation in these estimates. The availability of FS screening in the evening or weekends increases participation and facilities may be more likely to be available at these times.

What is the participation in one-off flexible sigmoidoscopy screening likely to be?

The only study of participation of the offer of FS in New Zealand was conducted through gastroenterological services in 1995. This small study involved an invitation for screening sigmoidoscopy to a relative of someone who had recently undergone a colonoscopy. The subjects who were a relative nominated by a person who had a normal colonoscopy and no family history of adenoma or bowel cancer most represent the screening situation—where most people will know someone who has had a FS with whom to discuss their invitation. This small Dunedin study obtained 62% participation for the invitation for screening sigmoidoscopy.

Provision of FS screening through general practice would be expected to enhance participation.

Conclusion

The failure to appropriately use all the available research evidence to develop a national bowel screening programme in New Zealand is of major concern. The one-off nature of the FS screening makes it ideal for introduction as a national programme without the necessity for a regional pilot study, but it would initially require monthly monitoring of progress and quality. The availability of FS screening training programmes overseas, and the small increased demand on current gastroenterological services, suggest that a national programme could be organised and begin within 12 months. The ‘slimmed-down’ iFOBT screening programme currently proposed by the Ministry of Health can not be expected to achieve the reduction in bowel cancer incidence and mortality of the RCTs. One-off FS is, on current evidence, the best practice of public health medicine for bowel cancer screening.
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Competing interests: Nil

Acknowledgements:
Associate Professor Brian Cox is supported by the Director’s Cancer Research Trust.

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