Bowel cancer screening in Australia

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BACKGROUND
Modern screening tools have the potential to decrease mortality and morbidity from bowel cancer, the second commonest cause of cancer death. The evaluation of the recent National Bowel Cancer Screening Pilot Program (NBCSPP) in Australia has prompted the commonwealth government to fund the first phase of the National Bowel Cancer Screening Program in May 2006.

OBJECTIVE
This article discusses the evidence for bowel cancer screening and the outcomes of the NBCSPP.

DISCUSSION
Inexpensive tests are available to detect bleeding from the large bowel, a stronger indicator of early bowel cancer than symptoms, and pilot projects confirm their feasibility and acceptability in Australia. A doctor's recommendation strongly influences individual participation in screening. The medical profession are more likely to support an organised screening program if they are informed on the evidence on which the screening program is based.

Screening is a useful tool when there is a defined population at risk, a test that has both high specificity and sensitivity to minimise wrong and missed diagnoses respectively, and an intervention that can reduce the years of life lost from the disease. The effectiveness of screening as a tool depends on other variables, including availability, promotion, cost, attitudes and knowledge. Coordinated promotion and planning of a screening program should improve uptake resulting in better population outcomes.[1]

The case for bowel cancer screening

Australia has one of the highest rates of bowel cancer in the world with 90 deaths each week, the second most common cancer related death after lung cancer.[2] Successful treatment is more likely if the cancer is diagnosed early, but clinical symptoms of bowel cancer often appear only when the disease is advanced.[2] At present, only 40% of bowel cancers are detected early.[3,4] This suggests that many early cancers will only be found if an asymptomatic population is tested. Many international trials have validated faecal occult blood tests (FOBT) as a useful screening tool to indicate whether a person needs further investigation.[5] A positive FOBT does not diagnose bowel cancer, but gives a positive predictive value (likelihood of disease) for colorectal cancer of 7%, compared with the positive predictive value of less than 2.5% for symptoms such as change of bowel habit and abdominal pain.[6] The average positive predictive value of rectal bleeding for colorectal cancer is also 7%, but varies with age being lower in the younger age group.[7] Immunochemical testing, which is the basis of the newer FOBT, has a relatively low sensitivity for colorectal neoplasia if only one faeces specimen is tested, 27% for neoplasia, and 66% for invasive cancer respectively. Sensitivity can vary with the tumour location.[8] Studies show that the sensitivity (the proportion with cancer who correctly test positive) can be increased to as much as 90% if two or more specimens are tested over 2–3 days, but specificity (the proportion without cancer who correctly test negative) is reduced with each repeat from 97 to 92%.[9,10] Repeating FOBT on separate occasions, as in a regular screening program, can reduce the relative risk of dying from bowel cancer to less than 0.7 (where 1.0 is the normal risk) after seven rounds of screening at 2 year intervals.[11] The actual incidence of bowel

cancer may also be reduced by as much as 20%, but only after 18 years of 2 yearly screening.[12]

The role of the GP

The general practitioner has an important role to play in the effective rollout of any screening program by linking the population with the process so that individuals are informed. They can facilitate uptake using the one-to-one consultation as a conduit to promote public health policy. A doctor's recommendation is a powerful motivator for screening.[13] Education of providers and well designed pathways for follow up and referral can improve screening implementation.[14] As the initial point of contact for the patient, the GP has a key role, influenced by knowledge, attitudes and beliefs.[15]

Screening tests

Current screening tests for colorectal cancer include FOBT, colonoscopy and micro-camera colonoscopy. Barium enema and 'virtual colonoscopy' using a special computerised tomography scan are not considered routine screening tools as both methods result in recurrent exposure to radiation and are poor at detecting small lesions.

Faecal occult blood tests

The tool generally accepted for population screening is the FOBT, a user friendly, low cost test that does not burden health resources.[1] This test can also reduce the need for colonoscopy during surveillance of individuals who have additional risk factors other than age for colorectal cancer.[16] Immunochemical FOBT do not require dietary restrictions, have improved sensitivity and specificity and, following simple instructions, can be performed at home. After a bowel motion is deposited in the toilet, a specimen is obtained by poking the stool with the test stick or swirling the test brush around in the toilet water. The test kit is designed for postal delivery and return for analysis after use and is available at a cost of less than $40.00 (including testing).[17]

Colonoscopy

Colonoscopy for bowel cancer screening could be considered the gold standard due to its high specificity and sensitivity. However, cost, invasiveness, and the possibility of harm restrict its use as a population screening tool.[18] It can be useful for screening at risk groups with a strong family history, or as a once in a lifetime screening procedure.[19]

The more recent development of 'virtual' colonoscopy using a micro-camera that is swallowed in a capsule may be useful as a method of surveillance for those at above average risk of bowel cancer, but the expense would restrict its usefulness for population screening. This tool minimises the risk of harm associated with routine colonoscopy, but removes the possibility of biopsy or treatment as part of the procedure.[20]

Successful screening

Screening should target an at risk age group for whom early detection would be of most benefit. Routine screening is suitable for people at average risk for bowel cancer whose only risk factor is age. Surveillance is the term used for monitoring a population with more than average risk, where testing may need to be more frequent or carried out at a younger age. Surveillance may be indicated because of family history or where there is pre-existing bowel disease. The American Cancer Society guidelines indicate: a person with a first degree relative with bowel cancer over the age of 50 years has an intermediate risk of bowel cancer; a single first degree relative with bowel cancer under the age of 50 years; or more than one first degree relative with bowel cancer at any age, should consider themselves high risk. Other factors that increase risk include previous adenomatous polyps and inflammatory bowel disease.

There are barriers to screening relating to both people and systems. Addressing these barriers can greatly increase participation rates. There is a universal reluctance to examine one's faeces, and this will only be overcome with time and education about the benefits. Coordinated promotion and support by the medical profession is essential for a consistent screening pathway. Evaluation of the NBCSPP has assessed the acceptability of bowel cancer screening in three different sites that broadly represent the diversity of the Australian population.[24] A national screening program should apply the findings of this program to improve participation, knowing that worldwide, bowel cancer screening still has a poor uptake despite the proven benefits.[21]

Targeting a population to screen

The formulae used to select at risk populations are based on the age group in which the problem being screened is most prevalent. Factors such as quality of life, productivity, or the social impact of the disease may be more important at a younger age but are more difficult to quantify, resulting in a usual focus on years of life saved. Screening the 55–69 years age group in Australia could avert 250 deaths per annum, and extending the screening to the 70–74 years age group produces a cheaper and higher health gain than including those aged 50–54 years.[22] A once in a lifetime screen by colonoscopy between 65 and 70 years of age would give the highest yield in life years saved by preventing death.[19] The peak years of life lost from colorectal cancer are between 65 and 69 years and screening for early disease should precede this by 5–10 years.[23] When planning a screening program,

the cost of screening a specific age group together with the cost of follow up of the positive results is balanced against the years of life saved and the potential savings of early diagnosis and treatment.[22]

The NBCSPP

The Australian government funded the National Bowel Cancer Screening Pilot Program (NBCSPP) in response to the high incidence of death from bowel cancer in Australia and implemented the results of international trials showing FOBT reduced death from bowel cancer by 15–33%.[24] The project was conducted between 2002–2003 in three sites: Melbourne (Victoria), Adelaide (South Australia), and Mackay (Queensland) to represent the ethnic, cultural and geographical diversity of Australian life. Approximately 56 907 people in selected postcodes were invited to participate in order to assess the acceptability, feasibility and cost effectiveness of home testing in people aged 55–74 years of age. Invitations to participate were posted with the immunological FOBT to the pilot populations, with a 45% response rate. Ninety-eight precent of participants said they would do the test again if it was posted out, but possibly more importantly, 84% of those who failed to participate said they would do the test in the future, especially if the GP recommended it. Participants nominated a GP to whom results could be sent, who also provided support, advice, follow up and referral if needed. Of those who responded to the invitation to participate, there was a 9% positive FOBT result with 19% positive predictive value (the proportion of positive FOBT who had disease) for suspected cancers or advanced adenoma on colonoscopy. At the time of the evaluation (October 2004) 25 840 people had participated by returning their FOBT kits with 2308 positive results (9%). Of the 1273 participants who proceeded to colonoscopy, 67 cases of bowel cancer were identified and 217 people had precancerous lesions. The project also asked about family history and symptoms, allowing referral for colonoscopy where indicated, even in the presence of a negative FOBT. Although there was a perception that the NBCSPP might generate unmanageable increases in workload for both GPs and hospital staff, this did not eventuate due to support and education for GPs, as well as planning and funding for dedicated hospital services that resulted in waiting times for colonoscopy averaging 30 days.

The multicultural diversity of the Australian population presents challenges to any health program, particularly in groups with a history of poor uptake of health services, the culturally and linguistically diverse, and Aboriginal and Torres Strait Islander communities. In these groups, the response to postal invitations was reduced, despite targeted liaison and educational programs, with wrong address, literacy, and language problems identified as barriers. Women are more familiar with health screening, and the program reflected this, with 47% female and 43% male participation. Awareness of the FOBT before the program was 43%, rising to 85% after the program.

Results suggest that a bowel cancer screening program using FOBT has the potential to save three lives from death from bowel cancer in 1 year per 1000 people tested.[25] This is better than existing cancer screening programs; with one life saved from breast cancer per year for 1000 women undergoing breast screening,[26] and one life saved from cervical cancer per 1000 women screened by Pap testing over 35 years.[27,28]

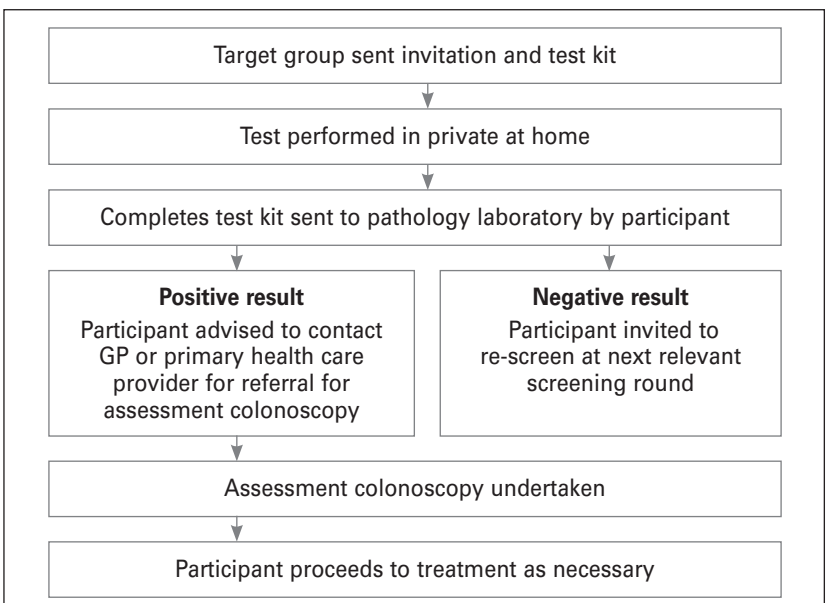

Figure 1. Proposed bowel cancer screening pathway

The National Bowel Cancer Screening Program

Apart from cervical cancer screening, Medicare does not fund screening tests. Until a national screening program is in place, the onus is on either the individual or the GP to initiate screening and follow up appropriately, with the cost of screening borne by the patient.[29] The pilot program has demonstrated the practicality and value of FOBT as a screening tool for bowel cancer, prompting the Australian government to commence the National Bowel Cancer Screening Program in 2006. Government organisations are heavily involved in planning the national rollout, with control at state and territory levels for local staged implementation. Continuing consultation should result in a screening pathway that has a sustainable infrastructure and is accessible to the population.

Between May 2006 and April 2008 people turning 55 and 65 years of age will be invited to participate, together

with participants from the NBCSPP who will be invited to re-screen. The program will provide a central register, identify and issue invitations to eligible participants, track participants through the screening pathway, and collect and maintain data. Participants with positive FOBT will need to contact their GP or primary health care provider for referral for colonoscopy or other tests (*Figure 1*). The Australian government will fund GP visits that may result from the program, possibly by allowing Medicare claims to be made for this 'health check'. State health organisations have been funded to support the program through promotion, education and services. However, the central role of the GP – which was so effective in the pilot program – has not been a focus of planning or funding for the national program. The follow up pathway for positive FOBT is colonoscopy, a service that is not readily available in some areas of Australia and current workforce shortages may accentuate this problem. The planning stages have concentrated on the mechanisms of screening that include establishing a screening register, planning a staged rollout, and creating a manageable screening pathway. General practitioners will no doubt be notified of their role as planning progresses and their support is likely to enhance participation.

Conclusion

The NBCSPP demonstrated that FOBT is an acceptable screening tool for use in Australia and could be more cost effective in reducing years lost from cancer than current breast and cervical cancer screening programs. The GP's recommendation of FOBT could greatly increase participation in the National Bowel Cancer Screening Program. The success of this screening will require attention to reducing the barriers to screening identified in the pilot program, and the availability of sufficient resources for adequate follow up. Promotion of the evidence on which this new screening program is based should encourage the medical profession to provide sustained, widespread support.

Conflict of interest: none declared.

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