

# The planning of cancer screening programmes

Brian Cox, Gil Barbezat, Murray Pfeifer, Alice Macklow, Dave MacKay, Melissa Vining, Phil Bagshaw

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## ABSTRACT

Positive screening tests require investigation, usually by specialists. Specialist services are known to be limited. The planning of screening programmes must first include a model of existing diagnostic and follow-up services of symptomatic patients so that the added impact of the extra referrals required for screening can be estimated. This is fundamental to the planning of screening programmes; inevitable diagnostic delay, impeded access to services for symptomatic patients, and resulting harm or increased mortality from disease can thus be avoided.

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For a cancer screening programme to be a major advance in the control of cancer in the population, it must be properly organised and resourced. New Zealand has three important national cancer screening programmes, but unfortunately each has had troubled beginnings.

The cervical screening programme arose from the recommendation of a national inquiry into the inappropriate management of detected abnormalities.<sup>1</sup> This was followed by an inquiry into the under-reporting of significant pre-invasive disease detected by screening.<sup>2</sup> Colposcopy services, vital for the timely assessment of positive screening programme tests, have also experienced intermittent difficulties meeting their requirements.<sup>3</sup> The initial years of the breast screening programme included sending several hundred women to Australia for treatment,<sup>4</sup> as the services in New Zealand could not cope with the amount of breast cancer detected by the screening programme. In 2011, it was considered that delayed breast screening may have harmed some women.<sup>5,6</sup> More recently, major concerns have been raised about the capacity of colonoscopy services to manage both symptomatic and screen-detected colorectal disease.<sup>7,8</sup> The potential harm to women of unwarranted delays in breast screening has also been raised again.<sup>9</sup>

The principles for screening programmes were established over 50 years ago.<sup>10</sup> The magnitude of the additional demands on health services created by screening are clearly predictable. Unless additional trained staff and physical resources are provided, they get diverted from the management of symptomatic patients.

Screening protocols, including the age range of those to be invited to screening and the frequency and type of test to be used, can be usefully assessed by computer simulation models.<sup>11-16</sup> These can be used to predict the potential impact and additional service demands of a cancer screening programme. However, among several well described problems,<sup>17</sup> they have the fundamental limitation of assuming that unlimited resources can be brought in, or purchased, to cope with the increased demand. This is not the acceptable situation for any health service operating with restrictions of staff and resources, as found in New Zealand. Modelling the impact of cancer screening programmes requires preemptive modelling of the current services, especially the diagnosis, treatment, and follow-up resources available.<sup>18</sup> Then, the effect of the predictable increased demand on the health service can be estimated. When introduced to a system with effectively fixed resources, particularly essential clinical staff, facilities, and laboratory processing capacity, the increased demand will inevitably result in some shifting of work from symptomatic patients to the assessment of people who have a positive screening test.

Simulation models, or fully funded pilot programmes, used to plan the introduction of screening programmes that do not include existing services for symptomatic patients are not models of the future needs of a screening service. They are therefore very limited in their use for planning screening programmes.<sup>18</sup> The required simulation models of the available services for symptomatic patients also need to be regionally specific when considerable regional variations in

the health service exist. The current commonly used models of screening policy are inadequate for this purpose. In addition, any monitoring or evaluation of screening programmes needs to assess services for symptomatic patients and the impact of screening services on them. This should be an ethical requirement of the public health medicine practice of screening and is an example of how public health often relies on the support of clinical services. The National Screening Unit is responsible for the safety, effectiveness, and quality of organised screening programmes, and has recently been incorporated into the Population Health and Prevention directorate within Te Whatu Ora – Health New Zealand. How that may alter the effectiveness of the screening programmes is yet to be determined.

In New Zealand, the failure to appropriately include the existing treatment resources in planning models for screening has repeatedly resulted in the inadequate planning of the introduction of screening programmes. This is currently evident in the introduction of the country-wide national bowel screening programme, rolled out since 2017. For 2018, national gastroenterology services were declining 21.9% of all referrals.<sup>19</sup> It is unlikely that this was due to inappropriate referrals from general practitioners or surgeons. It was more likely due to an incapacity to meet the requirements for the assessment of symptomatic patients. It is also likely that this effect varied considerably between regions.

It was clear from preliminary assessments and the pilot study of the New Zealand bowel screening programme<sup>20</sup> that considerably more colonoscopy staff and facilities would be needed.<sup>21–24</sup> However, the political imperative for Manatū Hauora – Ministry of Health to produce a bowel screening programme, with the support of several cancer organisations, appeared to become paramount. Any resulting shift of staff and resources away from symptomatic patients and their follow-up can be expected to have produced delays in diagnosis and the declining of necessary fundamental investigations, particularly colonoscopy, for symptomatic patients. Whether a subsequent increase in mortality is greater or less than the possible reduction in bowel cancer mortality achieved by the screening programme is yet to be ascertained. If it occurred, it would raise a number of ethical issues and be an avoidable failure of the practice of public health medicine.

When the extent of the increase in clinical load became evident after the pilot study,<sup>25</sup> the concentration of haemoglobin in faeces used to trigger a colonoscopy was increased and the eligible age range was restricted to 60–74 years for the national programme.<sup>23,26</sup> This was a clear recognition that the years between the planning of the pilot study and the start of the national bowel screening programme were not judiciously used to ensure that the programme had the necessary staff and resources to maintain appropriate services for symptomatic patients. Requests to expand training programmes for colonoscopists were ignored in 2013 and subsequently. The desire for nurses to perform colonoscopy was determined in 2017,<sup>27</sup> but by September 2021, there were only seven nurse endoscopists,<sup>28</sup> suggesting inadequate resourcing for the training of nurse endoscopists. The suggested efficacy of the screening programme by the pilot study has been reduced significantly.

During the period of reduced gastroenterology services in response to the COVID-19 pandemic in 2020, the Cancer Control Agency requested that people with positive bowel screening tests should have priority for colonoscopy over many symptomatic patients.<sup>29</sup> This was the result of an inaccurate estimate of the risk of bowel cancer in symptomatic patients because the age of patients was not considered.<sup>30</sup>

While the private sector may be keen to be paid to cover any shortfall in resources, this can be expected to increase the cost of the programme. Because of the relatively fixed and low numbers of gastroenterologists in New Zealand<sup>24</sup> and the time commitments of surgeon colonoscopists in public hospitals, this potentially results in a transfer of staff from the public to the private sector, further reducing the capacity of the already overloaded public endoscopy services.

The effect on the services for symptomatic patients is not mere speculation. Three independent inquiries in the Southern region have shown that many patients have been seriously disadvantaged by being declined a colonoscopy.<sup>8,31–35</sup> The adequate provision of assessment services for people who test positive at screening is a fundamental requirement of a screening programme. However, this must not be met by preventing symptomatic patients from receiving timely and adequate investigation.

Physicians, other health professionals, and the public may not fully appreciate the appropriate assessment of a successful screening

programme.<sup>36</sup> Therefore, as was ascertained for the breast screening programme,<sup>37</sup> further ongoing independent monitoring of screening programmes has been shown to be essential to safeguard against serious failures of such programmes and their associated health services. However, an organisation with the capacity and

authority to ensure appropriate and lasting action is undertaken where necessary is also essential. With among the highest risk of developing bowel cancer in the world, New Zealand certainly merits an adequately funded, high quality, and carefully monitored screening programme, as well as expert care for symptomatic patients.

**COMPETING INTERESTS**

Nil.

**AUTHOR INFORMATION**

Res Ass Prof Brian Cox: Hugh Adam Cancer Epidemiology Unit, Department of Preventive and Social Medicine, Dunedin School of Medicine, New Zealand.

Prof Gilbert Olivier Barbezat: Medicine, Dunedin School of Medicine, New Zealand.

Mr Murray V Pfeifer: General Surgeon – Retired, New Zealand.

Ms Alice Nancy Macklow: Independent Research, Independent Research Agency, New Zealand.

Dr Dave McKay: General Practitioner and Palliative Care doctor, Helensburgh Medical Centre and Otago Community Hospice, New Zealand.

Mrs Melissa Vining: Cancer Care Advocate, New Zealand.

Mr Philip Bagshaw: General Surgery, Canterbury Charity Hospital Trust, New Zealand.

**CORRESPONDING AUTHOR**

Dr Brian Cox: Hugh Adam Cancer Epidemiology Unit, Department of Preventive and Social Medicine, Dunedin School of Medicine, New Zealand.  
E: brian.cox@otago.ac.nz

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