# 5 The Economic Case

## 5.1 Critical Success Factors

Critical Success Factors (CSF) are attributes essential to successful delivery of the proposal, against which the long-list options are assessed. Each CSF is crucial, not desirable, i.e. any potential option which fails to meet any of the CSFs, is rejected.

The critical success factors for the Programme are summarised in Table 17.

**Table 17: National Bowel Screening Programme - Critical Success Factors**

| Critical Success Factors<br>Broad Description | Proposal-Specific Clarification |
|---|---|
| **Strategic fit and business needs:**<br>How well the option meets the agreed investment objectives, related business needs and service requirements, and integrates with other strategies, programmes and projects. | • Ability to meet the constraint timeline of mid-2017 for the first implementation of the NBSP.<br>• Testing approach supported by national/international evidence.<br>• Consistent with the principles of the New Zealand Health Strategy, He Korowai Oranga (the Māori health strategy) and 'Ala Mo'ui (Pathways to Pacific Health and Wellbeing). |
| **Potential Value for Money:**<br>How well the option optimises value for money (i.e. the optimal mix of potential benefits, costs and risks). | No programme specific criteria. |
| **Supplier capacity and capability within timeframe:**<br>How well the option matches the ability of potential suppliers to deliver the required services, and is likely to result in a sustainable arrangement that optimises value for money. | • Capacity: Endoscopist, Histopathologist, histopathology nurses, endoscopy suite/theatre (DHB or private).<br>• Timeframe: to deliver option within agreed timeframe (2-4 years). |
| **Potential affordability:**<br>How well the option can be met from likely available funding, and matches other funding constraints. | • Affordability of the Programme as per Budget 2016 and Budget 2017 appropriations.<br>• Affordability to the DHBs of the implementation, in light of the Programme funding as above. |
| **Potential achievability:**<br>How well the option is likely to be delivered given the organisations ability to respond to the changes required, and matches the level of available skills required for successful delivery. | • Feasibility of the Programme team to manage the implementation of the option.<br>• Timeframe: to deliver option within agreed timeframe of 2-4 years. |

## 5.2 Programme Long-List Options and Initial Options Assessment

### Programme Options identification

A wide range of potential options was generated at a series of workshops by the Bowel Cancer and IT teams during October 2015. The long-list of options reflects:

- Options considered for the establishment of the Bowel Screening Pilot.
- Findings from the Pilot.
- Feedback gathered from stakeholders at the national meeting and regional meetings held during August and September 2015, to explore how a national bowel screening programme could be delivered.
- Findings from international Bowel Screening Pilots and programmes.

The options generated under the five dimensions of scale and scope; implementation (timing); service solution; service delivery; and funding are summarised in Table 18.

**Table 18: Programme Longlist Options by Dimension**

| Option | Option Description |
|---|---|
| (1) Scale and Scope | • Do nothing.<br>• Retain Waitemata DHB pilot, no national programme.<br>• Age range 60-74 years, 55-74 years, 50-74 years, Māori/Pacific 55-74 & other 60-74.<br>• Threshold 200 or 75ng haemoglobin/ml buffer. |
| (2) Implementation | • 'Big Bang' of all DHBs at once.<br>• Staged implementation of DHBs over a number of years. |
| (3) Service Solution | • IT: Tranche 1 DHBs - Do Nothing, BSP current system, BSP Clones of current system, BSP+ using the pilot system with enhancements. All DHBs - Do nothing, BSP++ use BSP system with enhancements, NBSP integration of a new system, Purchase a new system and Build a Population Health Platform (PHP).<br>• Invitation: mail only OR mail and community targeted distribution.<br>• Return of test kits: via mail only OR via mail with possible future contingency for drop off at laboratories.<br>• Result management: Endoscopy unit only, OR endoscopy unit and primary care.<br>• Testing: GFOBT, iFOBT, Flexisig, colonoscopy, colon pillcam, Cologuard, CTC. |
| (4) Service Delivery | • Coordination and testing: one or more than one provider/site.<br>• Screening centre: local OR regional.<br>• Histopathology: local/regional OR national. |
| (5) Funding | • Either DHB OR centrally fully funded testing, treatment and surveillance.<br>• Centrally funded screening, DHB funded treatment and subsequent surveillance.<br>• Centrally funded screening and some surveillance, DHB funded treatment and some subsequent surveillance. |

### Evaluation of Long-list Options

The potential long-list of programme options was assessed against the Investment Objectives and Critical Success Factors. The options were assessed as fully meeting, partially meeting, or not meeting each Investment Objective and Critical Success Factor. Any option that failed to meet any of the Critical Success Factors was not carried forward to the shortlist.

Due to the specific requirements of the IT solution, the options analysis for this area utilised IT-specific Investment Objectives. A synopsis of the evaluation of the long-list programme options is attached as Appendix 6 and a summary of the IT options analysis is attached as Appendix 7. The key areas are summarised below.

- **Screening Test:** Potential tests considered for the programme were GFOBT, iFOBT, flexible sigmoidoscopy, colonoscopy, colon pillcam, Cologuard and CTC. In determining the preferred approach, the tests were assessed to see whether:

  a) The test is current (i.e. not outdated, being used in national programmes in other similar OECD countries);

  b) There is international evidence supporting its use for a national screening programme;

  c) There is sufficient capacity (i.e. workforce and facilities) to implement nationally;

  d) It is likely to be acceptable to the New Zealand population.

  Based on the evaluation, only iFOBT was identified as being current, evidence-based and achievable nationally. The iFOBT is considered to be an acceptable test for the New Zealand population, as it is undertaken once and is non-invasive. A significant recognised advantage of the iFOBT is that the threshold for positivity can be adjusted, to optimise detection of cancer, minimise harm from over treatment and be within the estimated maximum available colonoscopy resource. Most countries establishing population bowel screening programmes have constrained colonoscopy resources that impact on the chosen thresholds for positivity. For example, Ireland increased their threshold for positivity from 100 to 225ng haemoglobin/ml buffer in February 2014 and the Netherlands increased their threshold from 75 to 275ng haemoglobin/ml buffer in July 2014.

  The proposed approach of using iFOBT is based on the best evidence available at the time of developing the programme. The bowel cancer team has strong links with international expert groups. The model of care has been reviewed and validated by the Bowel Screening Advisory Group, the Bowel Screening Steering Group, and clinical directors from screening programmes in other countries (including Ireland and the Netherlands). The sector was consulted on the potential of expanding the Bowel Screening Pilot approach for the national programme, and this was supported by the DHBs at the national and regional consultation meetings undertaken in August/September 2015. If strong evidence emerges to indicate that a more cost-effective and achievable alternative test is available, the programme would re-evaluate the preferred approach and, if required, would amend the programme accordingly

- **IT Solution:** The Programme roll out would deliver the IT solution in two stages. Initially the current pilot system would be extended to accommodate another two DHBs (Hutt Valley and Wairarapa) in July 2017. A new National Bowel Screening IT solution would be designed and built, to be available from January 2018 for the rollout to the remaining DHBs. No obvious candidates of commercial off-the-shelf products were identified from a preliminary assessment of the market for a buy vs development option. Other countries, including Australia, the UK and the Netherlands are building their own bowel screening IT solutions. The approach for the National Bowel Screening IT Solution is to develop a system which aligns with the Ministry's IT Strategic Vision, reusing existing technology components where appropriate and leveraging and extending existing integration patterns. Work on the NBSP IT solution (requirements and design) would start in parallel to work on extending the Pilot system for Tranche 1 DHBs.

- **Chosen age range:** The proposed age range was selected following careful consideration of international findings, results of available cost-effectiveness analyses, the age-profile of colorectal cancer incidence and the colonoscopy resources available to the country. As additional data becomes available once the NBSP is implemented, further evidence-based consideration can be given to the age

range. If and when national colonoscopy capacity increases, subject to appropriate evidence, it may be possible to widen the eligible age range and screen a larger proportion of the population.

## 5.3 Programme Options

A shortlist of four Programme Options, including a do-nothing option, was developed from the evaluation of the initial long-list. These are summarised in Table 19.

**Table 19: Summary of Programme Options**

| Option | Option Description | |
|---|---|---|
| (1) Do nothing | • The Bowel Screening Pilot ceases.<br>• No national programme for bowel screening is established. | |
| (2) Basic | • Results are managed by endoscopy unit only.<br>• DHBs fund subsequent treatment and surveillance. | • National bowel screening programme using iFOBT, for eligible people aged 60-74.<br>• Implementation over 2-4 years.<br>• BSP+, National Bowel Screening IT solution<br>• iFOBT kit return is via mail, with possible future contingency for drop off at laboratories.<br>• National Coordination Centre (NCC), with Bowel Screening Regional Centres and local/regional histopathology. |
| (3) Integrated | • Results are managed by primary care and endoscopy unit.<br>• DHBs fund subsequent treatment and surveillance. | |
| (4) Complete | • Results are managed by primary care and endoscopy unit.<br>• Central funding for surveillance colonoscopies resulting from the screening programme. DHB funding of treatment and symptomatic surveillance colonoscopies. | |

## 5.4 Economic Assessment of Programme Options

### Approach

The nature and scope of the analysis required was agreed with the Treasury through the scoping meetings at the commencement of the project to develop this Programme business case[47]. The agreed evaluation approach is multi-criteria analysis, to enable consideration of both financial and non-financial criteria.

The economic assessment encompasses a high-level assessment of key costs and benefits associated with the programme, including capital costs, implementation and post go-live resource costs (including the IT solution to support the programme), as well as an estimation of tangible and quantifiable benefits.

The indicative costs and benefits for each option were derived from findings from the Waitemata Bowel Screening Pilot, as well as consultation with DHBs, and other key DHB and programme personnel.

Multi-criteria analysis was undertaken by the bowel cancer project team. The outcome of the analysis was reviewed and the preferred option ratified at the Cross-Ministry Bowel Screening Steering Group in December 2015.

[47] Scoping Document: 9th September 2015, discussed at Scoping Meetings with Treasury 10th and 24th September 2015

## Assumptions

For the purposes of the cost benefit analysis, the following assumptions have been made:

- Implementation timeframes and sequencing as described in Section 5.5.
- Indicative capital and operational costs are a reasonable estimate of the final implementation costs.
- Cashflow timings are a reasonable representation of actual cash movement.
- The start date for valuation purposes is assumed to be 2016.
- The costs and benefits are assessed over a period of 20 years from the start date.
- The Public Sector Discount Rate specified by the Treasury for projects of this type is 7 percent per annum. As this is a real discount rate, all costs and benefits are expressed in today's dollar terms.
- All dollar figures are expressed in GST exclusive terms.

## Quantitative Risk Analysis

No Quantitative Risk Analysis was undertaken for this programme, as agreed with the Treasury.

## Economic Evaluation

- **Financial criteria:** It is difficult to derive precise costs and benefits at this stage due to a number of factors. For example, the implementation timeframe for some DHBs is some years away and the costs may be impacted by other factors in the intervening period.

  Whilst the business case figures are as robust as possible at this stage, they would be refined over time as the Tranche business cases are developed. Based on the above caveats, a 'best estimate' Economic Case evaluation for each of the Programme Options is described in Table 20.

- **Non-financial criteria:** It is essential to take a multi-criteria analysis approach to determine the preferred option, i.e. to take into account other key factors. These were identified and weighted by stakeholders and endorsed by the Cross-Ministry Bowel Screening Steering Group on 9 December 2015. The four key criteria identified for the multi-criteria analysis were:
  - Criteria 1: Investment Objectives:
    - to achieve a greater mortality reduction from bowel cancer (than would be achieved with a 'do nothing' option);
    - to deliver bowel screening in a manner than is acceptable and encourages participation;
    - to promote equity between population groups;
    - to minimise risk of adverse events (i.e. to maximise the number of cancers found for the number of colonoscopies undertaken, thereby reducing the risk of complication due to unnecessary colonoscopies);
    - to deliver a safe, high quality programme which is consistent nationally.
  - Criteria 2: Net present value.
  - Criteria 3: Alignment with the whole of health system perspective in the New Zealand Health Strategy.
  - Criteria 4: Reduced cost burden to DHBs of additional surveillance colonoscopy, resulting from bowel screening.

The fourth criteria, reduced DHB additional surveillance colonoscopy burden, resulting from bowel screening, reflects the importance of maintaining existing symptomatic services. To optimise the mortality benefit of screening, it is crucial to facilitate colonoscopy surveillance for people who are identified at colonoscopy, following a positive iFOBT, to have advanced adenomas and future increased risk of developing bowel cancer. Surveillance is funded as part of other national bowel screening programmes, for example, in the U.K.

The multi-criteria analysis for the shortlisted programme options is shown in Table 20. Further supporting information, including the Summary of Cost-Benefit Analysis using CBAx and the assumptions used for each Option, is attached as Appendix 8.

**Table 20: Programme Options Multi Criteria Analysis Summary**

| | Option 1: Do Nothing | Option 2: Basic | Option 3: Integrated | Option 4: Complete |
|---|---|---|---|---|
| Appraisal Period (years) | 20 | 20 | 20 | 20 |
| | $m | $m | $m | $m |
| Whole of Life Capital Costs (discounted) | S9(2)(f)(iv) | | | |
| Whole of life Operating Costs (discounted) | | | | |
| Total Whole of life Costs (discounted) | | | | |
| **Cost-benefit analysis of monetary costs and benefits:** | | | | |
| Present Value of monetary benefits | S9(2)(f)(iv) | | | |
| Present Value of non-project costs | | | | |
| Net present value | | | | |
| **NPV Rank (out of 4)** | 4 | 3 | 2 | 1 |
| **Multi-criteria analysis of non-monetary benefits:** | | | | |
| Criteria 1: Investment Objectives (weighting 45%) | 0.4 | 7.1 | 7.9 | 9.0 |
| Criteria 2: Net Present Value (weighting 35%) | 0.00 | 9.67 | 9.97 | 10.00 |
| Criteria 3: Alignment with whole of health system perspective in NZ Health Strategy (weighting 10%) | 1.0 | 5.0 | 9.0 | 9.0 |
| Crieria 4: Reduced DHB surveillance colonscopy burden (weighting 10%) | 10.0 | 2.0 | 2.0 | 9.0 |
| **Overall Weighted Score (out of 10)** | 1.3 | 7.3 | 8.1 | 9.4 |
| **Preferred option** | | | | ✓ |

**MCA Scoring**

- Likelihood that crieria will be achieved

| 0 | 5 | 10 |
|---|---|---|
| Not achievable | Likely to be achieved | Certain to be achieved |

The Net Present Value (NPV) analysis indicates that all options except the 'Do Nothing' yield a positive return at 7 percent cost of capital. Option 4 has the most positive NPV with a score of 10 and is the preferred option based on the financial analysis. Option 3 is a close second, with an NPV score of 9.97.

The raw scores in the Multi-Criteria Assessment are high-level indications of the relativity between the Base Case (Do Nothing) and the other 3 options, i.e. they are not scientific measurements. Based on the Multi-Criteria assessment, the weighted overall scores for Options 2, 3 and 4 are significantly greater than the Do Nothing option. Whilst the NPV is very similar for Options 3 and 4, Option 4 better supports the achievement of the investment objectives, and scores significantly better for reducing the cost burden to DHBs of additional surveillance colonoscopy resulting from bowel screening. The MCA score for Option 4 is significantly higher that the score for the next highest option.

## 5.5 Preferred Way Forward

On the basis of the analysis described above, **Option 4: Complete** has been identified as the preferred way forward. The preferred way forward is described further below.

### Programme establishment

A dedicated bowel screening team at the Ministry of Health would lead the implementation. A full team would be in place by October 2016, in preparation for commencement of the first screening site in mid-2017. The proposed governance and management arrangements for the national programme are described further in Section 8.1.

During 2016, preparations would include tendering for the national laboratory/coordination centre, and negotiating and agreeing the first 'go-live' site. Planning would commence in 2016 in readiness for the first Tranche to commence in 2017. Establishment funding would be made available to services one year prior to commencement, mirroring the process for establishing the Bowel Screening Pilot, and the national Breast Screening Programme implementation.

### Programme description

The programme would have an eligible population of around 700,000 men and women aged 60-74, who would be invited for free screening for bowel cancer, over a two-year period (a screening round). The first year at full capacity would result in approximately:

- 380,000 people invited.
- 236,000 people returning an iFOBT kit (based on 62 percent participation).
- 9,000 people having a colonoscopy.
- 500-700 cancers detected annually during early rounds.

The national bowel screening programme would be based on, but would not precisely replicate, the Bowel Screening Pilot.

The key elements of the proposed national bowel screening programme are described below.

- **Screening test:** The primary test for bowel screening would be the iFOBT. The iFOBT detects microscopic blood within a faecal sample. International studies[48] indicate that the iFOBT is successful in reducing bowel cancer mortality, and is cost-effective. The United Kingdom National Screening Committee has recently made a recommendation that the UK change from the older manually read guaiac FOBT to an iFOBT. One of the major advantages of using a quantitative iFOBT as a screening test for colorectal cancer is that, after analysis of pilot study results, it allows an optimal cut off concentration of blood i.e. the threshold amount required to trigger a positive result, to be selected for the population and country in which it is being used.

  The threshold for positivity (the amount of blood required to trigger a positive result) for the iFOBT would be changed from 75ng haemoglobin/ml buffer (in the pilot) to 200. This would result in more cancers being found per colonoscopy undertaken, and a reduction in the unnecessary risk of colonoscopy for people who had a low level of haemoglobin in their sample and therefore a lower risk of being identified to have cancer or significant polyps.

[48] Sharp et al. Cost-effectiveness of population-based screening for colorectal cancer: a comparison of guaiac-based faecal immunochemical testing and flexisigmoidoscopy. British Journal of Cancer (2012) 106, 805-816

Maintaining the pilot threshold for positivity would increase harm associated with over treatment and require an unachievable number of colonoscopies, given the existing colonoscopy capacity. By changing the threshold for positivity from 75 to 200ng of haemoglobin/ml buffer, it is possible to reduce the number of colonoscopies required by approximately 50 percent. A threshold for positivity of 200ng haemoglobin/ml buffer is consistent with the approach and thresholds for positivity that have been adopted by other international bowel screening programmes. As part of implementation, consideration will need to be given to how iFOBT results are reported to GPs and participants. The National Screening Advisory Committee has recommended the actual iFOBT measurement is provided to GPs rather than a result of screen positive or negative so that the GP can discuss what a result may mean with participants where relevant.

- **Age range:** The eligible population would be those aged between 60 and 74 years, which aligns with the approach used in other countries when establishing a national bowel screening programme. This is a smaller age range than the pilot, which had an eligible population of 50-74 years.

  Analysis of the pilot data shows that an age-range of 60-74 years, with an increased threshold for positivity (similar to levels used in other OECD countries), would:

  - Be the most cost-effective age-range. Most bowel cancers (82 percent of those identified in the Bowel Screening Pilot) are found in those aged 60 and over. This age range is supported by the findings of the evaluation of the pilot. The proposed age range targets those with high bowel cancer incidence and balances this against the number of quality life years that could be saved, with the colonoscopy resources currently available. Each colonoscopy undertaken would be more likely to find a cancer (as cancer incidence is much higher in the 60-74 year age group, compared to the 50-69 year age group).
  - Result in more than 700,000 people being eligible to participate in bowel screening every two years once the programme is fully implemented.

  The combination of age range and positivity threshold parameters will result in a national bowel screening programme that:

  - Brings the number of cancers found per 100 colonoscopies undertaken (also known as the positive predictor value for cancer) in line with international experience[49].
  - Detect the greatest number of cancers possible within an achievable number of colonoscopies (up to 500-700 cancers each year during the early rounds, assuming expected uptake levels).

- **Screening pathway:** The screening pathway for a national bowel screening programme would mirror the successful model trialled in the pilot. The pathway is shown in Figure 14 and described further below.

[49] The PPV for cancer produced by the Bowel Screening Pilot was at the very lowest end of what has been expected internationally. Altering the age range and positivity threshold increases the PPV, meaning more cancers are found per colonoscopy, and reducing the percentage of colonoscopies that don't find an abnormality.

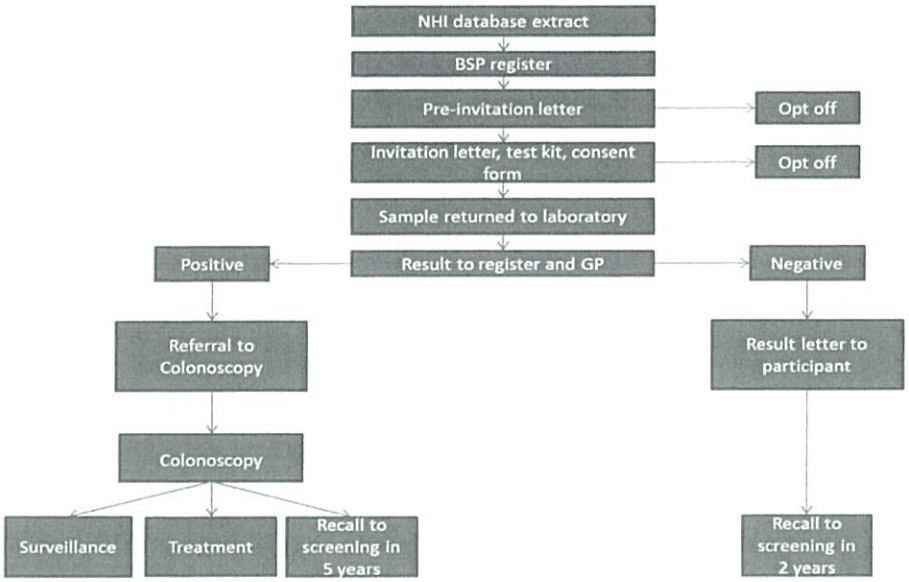


**Figure 14: Bowel Screening Pathway**

People in the eligible population would be invited to participate every two years. The eligible population would be identified through a database populated by the National Health Index (NHI) or possibly through the new National Enrolment Service. The iFOBT test kit would accompany each invitation, and would require participants to take a small faecal sample at home and return it to the testing laboratory by post.

- **Primary care engagement:** In the pilot, primary care has played a key role in notifying participants if they have positive results, responding to any queries or concerns, referring them within 10 days for a screening colonoscopy and in promoting the programme and participation of non-responders in their practice. The involvement of primary care in results management during the pilot has been well received by clinicians and participants and deemed critical to general practitioner support and promotion of participation in the pilot by the Bowel Screening Pilot team. The preferred approach for the national programme includes primary care participation. As a safeguard, if a referral has not been generated by primary care within 10 days of a positive result notification, the endoscopy unit would assume responsibility for notifying the participant and arranging the colonoscopy. The duty of care would continue to sit with the Bowel Screening Programme, whilst the patient is on the NBSP screening pathway, not with the GP.
- **Screening colonoscopy, treatment and surveillance:** Participants with a positive result would be referred for a colonoscopy, at which time biopsies would be obtained and polyps would be removed, with these samples being sent to pathology for histological reporting. Surgical and other cancer treatment, follow-up and ongoing colonoscopy surveillance for high risk polyps would be arranged by the DHB.
- **Final service delivery model[50]:**
    - A central laboratory/coordination centre would be established to manage the distribution of invitations as well as processing of iFOBT kits and results notification. The service would be overseen in partnership by a manager and a clinical lead.
    - Four Bowel Screening Regional Centres would be established to oversee participants who require a colonoscopy. Regional centres would allow for more rigorous monitoring of quality at a local level, than could be achieved by the Ministry alone. A key aspect of the regional coordination is to ensure oversight of quality and monitoring and consistency of the quality standards in the region. Each regional centre would be overseen in partnership by a manager

[50] The interim service delivery model to be in place during Tranche 1 is described in Section 11.3

and a clinical lead. The location of the regional centres has not been determined. For example, it may be in a DHB, shared service, or a cancer network. This would be concluded as a result of engagement with the sector during 2016.

- DHBs would undertake colonoscopies for their populations and report through to a regional centre. Leadership would be through mandated positions of a nurse lead and an endoscopy lead.
- The programme would be established following national (and international) best practice guidelines. Quality indicators would be monitored and published regularly at a national level by the Ministry of Health. There would be strong clinical leadership at all levels.

- **Workforce:** HWNZ has undertaken extensive workforce modelling and projections of the gastroenterology, general surgery and pathology workforce and determined that New Zealand will have the workforce capacity to implement the NBSP (see Appendix 9).

  Because iFOBT analysis would be undertaken at a central laboratory and histopathology would be undertaken in DHBs under usual processes, HWNZ's workforce modelling shows that the need for the requirements for the pathology workforce would be manageable. However, investment would be required to increase the endoscopy workforce to meet the demand for colonoscopies.

  Both gastroenterologists and general surgeons perform endoscopies in New Zealand, but gastroenterologists will be the primary workforce that performs the majority of screening (and non-screening) colonoscopies. Since 2013, the Royal Australasian College of Physicians and the New Zealand Society of Gastroenterology has increased the number of trainees in gastroenterology. As a result, HWNZ projects that the gastroenterology workforce will increase during the four-year implementation period of the NBSP.

  HWNZ will ensure the NBSP has the workforce to meet colonoscopy demand by:

  - supporting the Royal Australasian College of Physicians and the New Zealand Society of Gastroenterology to train sufficient numbers of gastroenterology registrars every year between 2017 and 2020;
  - supporting the relevant surgical bodies to consider the increased role that surgical endoscopists may play in the future and the projected impact this would have on the required number of surgical trainees;
  - encouraging shared service agencies to work with DHBs to take a regional and coordinated approach to the placement of newly qualified gastroenterologists during the sequential roll out of the NBSP;
  - supporting the Nurses Performing Endoscopies Training Programme. Having trained nurses available to perform gastro-endoscopic procedures will enable gastroenterologists and general surgeons to focus on providing screening colonoscopies for the target population group.

- **Roles within a National Bowel Screening Programme:** Table 21 shows the roles that would be carried out within a national bowel screening programme, at local, regional and national level.

**Table 21: Roles within a National Bowel Screening Programme**

| Level | Roles |
|---|---|
| Ministry of Health | • Central leadership and coordination of all aspects of the screening programme, including funding.<br>• Monitoring and evaluating the quality, equity and effectiveness of the programme.<br>• Clinical leadership and governance.<br>• Oversight of infrastructure and systems, including national IT solution for bowel screening and its integration with individual related DHB systems.<br>• Alignment of approach with the New Zealand Health Strategy and other key strategies.<br>• Oversight and development of consumer information. |
| National Coordination Centre | • National coordination and sending of screening invitations, and national awareness raising.<br>• Analysis of all iFOBT tests.<br>• Monitoring and management of results, including sending letters following a negative result and advising GPs electronically of both positive and negative results.<br>• Providing Bowel Screening Regional Centres with test results.<br>• Targeted actions for equitable participation. |
| Bowel Screening Regional Centres | • Monitoring of quality standards.<br>• Regional coordination of reporting.<br>• Clinical leadership, equity and quality management.<br>• Management of awareness raising activities.<br>• Where required, notifying GPs and eligible participants of positive results and arranging colonoscopy (regional and/or local).<br>• Fund screening colonoscopy service provision. |
| Local (DHBs and PHOs) | • Colonoscopy delivery.<br>• Colonoscopy histology.<br>• Local coordination of awareness raising activities and targeted actions for equitable participation. |

- **Information Technology to support a National Bowel Screening Programme:** There would be a single national IT solution to support the National Bowel Screening Programme, fully integrated across all DHBs. This system would be the primary administrative system and clinical decision support tool for the successful operation of the national bowel screening programme. The IT solution (or some components thereof) would therefore be required to be available 24 hours x 7 days x 365 days a year and highly resilient.

  The National Bowel Screening IT solution would be delivered in alignment with the Ministry's IT Strategic Vision. This would reuse existing technology components where appropriate and leverage and extend existing integration patterns, for example Ministry of Health investments in common services, such as the National Health Index (NHI), Address Services (eSAM) and Enrolment and Eligibility Services. The proposed system would integrate with the relevant operational systems at DHBs, such as 'ProVation' and pathology reporting platforms, to allow the end-to-end bowel screening programme processes to be implemented. The high level system context for the Bowel Screening IT Solution is shown in Figure 15.

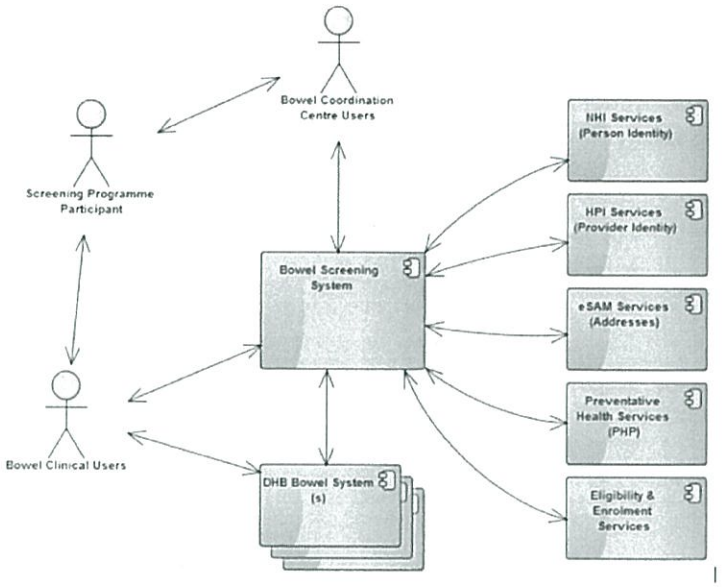


**Figure 15: Bowel Screening IT Solution Context and Information Flows**

- **Quality management:** Quality standards would be established across the entire screening pathway, similar to other screening programmes in New Zealand. Quality and clinical leads would be mandated positions at all levels of the programme. Very strong monitoring of the programme would be required during the implementation, to ensure the safety of the programme and maintain public confidence in the programme. Quality would be monitored at every level of the programme and monitoring indicators (e.g. positivity, participation rates, adverse events) would be published regularly. Rigorous quality standards have been developed for the pilot and would form the basis of national standards. In addition, it is expected that the Global Rating Scale tool (a quality monitoring tool) would form the basis of monitoring endoscopy unit standards for the programme, with information from the electronic reporting system (informed by lead endoscopists) allowing monitoring of quality standards for the performance of colonoscopy. A quality framework, aligned to the National Screening Unit principles, would be established to allow rigorous monitoring of quality at a local, regional and national level.
- **Addressing inequalities:** The Programme would seek to address and minimise inequalities. Ensuring that activities that promote and maximise Māori and Pasifica participation would be critical in mitigating inequalities in outcome. A national bowel screening programme would build on the work of the pilot to increase participation for Māori and Pasifica. Current evidence does not support having a younger age range or lower threshold for Māori and Pasifica.

  Actions to ensure equitable participation in bowel screening will include:

  - targeted actions to increase participation in bowel screening for Māori, Pacific and high deprivation populations groups (active follow up on invitations, targeted health promotion, engagement with community groups such as marae and churches)
  - each DHB will have an equity plan to implement locally appropriate actions to increase equity
  - national monitoring of participation and outcomes by ethnicity through the bowel screening IT solution to inform and drive actions to improve equity
  - primary care involvement in promoting participation and managing positive results
  - a public health campaign about the signs and symptoms of bowel cancer, targeted at Māori and Pasifica
  - national governance to have a strong focus on equity.

- **Managing the transition for Waitemata DHB**: Changes to the delivery of bowel screening at Waitemata DHB would occur over a number of phases, and would need to be reflected as a variation to their current contract with the Ministry of Health:
    - From July 2017 (or at the commencement of Tranche 1, if the timing changes):
        - Change the threshold for positivity of the iFOBT to 200ng haemoglobin/ml buffer.
        - Scale up the pilot coordination centre and pilot laboratory function to incorporate the Tranche 1 DHBs. As the Tranche 1 DHBs would begin screening before the national infrastructure is in place, the pilot systems would need to be scaled up to temporarily manage the invitations and iFOBT laboratory work of the Tranche 1 DHBs.
        - Continue to invite new 50-59 year olds in Waitemata DHB until the end of round three of the pilot (December 2017)[51].
    - From January 2018:
        - Amend the age range to align with the Programme age (i.e. 60-74).
        - All those aged 50-59 years who have been invited, prior to this date, as part of the pilot, would continue to be invited and screened using the changed threshold for positivity of 200ng of haemoglobin/ml buffer. Although this grand-parented service increases the length of time that the Waitemata population receive a bowel screening service for the 50-59 age range compared with the rest of the country, a duty of care is owed to those participants who have already started the screening programme and there is an ethical obligation to continue.
        - No new invites would be sent to people in the 50-59 age range. Communications would need to be clear to manage participant expectations.
    - When the national infrastructure (i.e. the national IT solution, Bowel Screening Regional Centres and National Coordination Centre) is in place:
        - Transition the coordination of invitations and laboratory functions over to the National Coordination Centre and laboratory.
        - Transition all other elements of the bowel screening pathway to the same contractual arrangement as the other DHBs.

The transition arrangements for Waitemata DHB are shown in Figure 16.

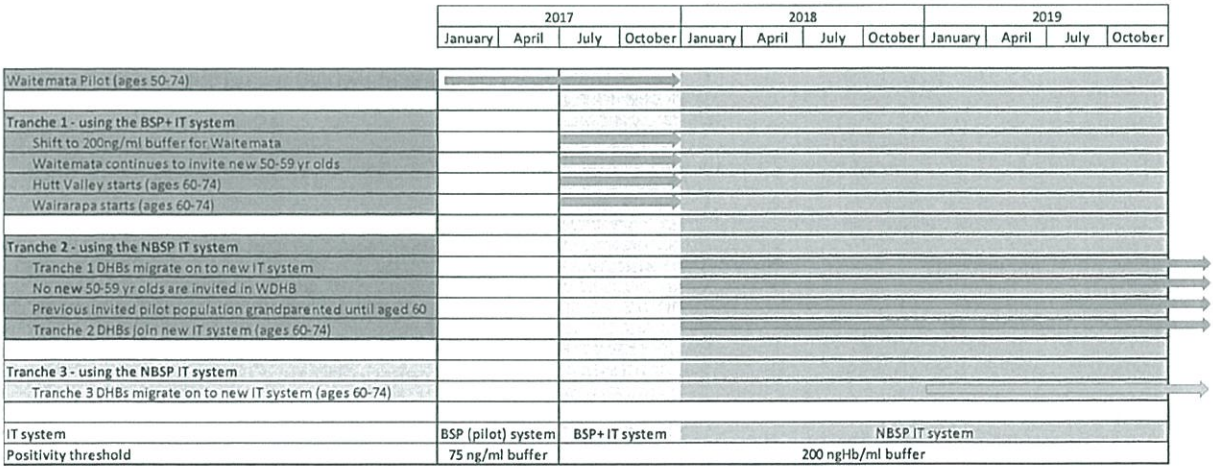


**Figure 16: Waitemata DHB Transition Arrangements**

[51] This is primarily to ensure that all potential invitees get the invite, as per the Pilot parameters.

## Programme sequencing and proposed timeline

The Programme has identified a preferred phasing to enable a controlled, phased rollout over three calendar years, with two additional DHBs commencing bowel screening in mid-2017. This would enable learning from the earlier rollouts to be applied to later rollouts, and contribute to minimising Programme risk. The provisional DHB sequencing was determined following an initial DHB survey in October 2015.

The criteria used to determine the preferred sequencing approach are summarised in Table 22.

**Table 22: Criteria for Proposed Phasing**

| Criteria | | Description |
|---|---|---|
| 1 | DHB readiness to deliver a safe programme and preference | • All DHB CEOs, with the support of the Board Chair, have agreed in principle that delivery of the bowel screening services according to the national bowel screening pathway and standards, from the proposed DHB start date, is achievable for that DHB, subject to the availability of operational funding, which will be included in the Ministry's Budget 2017 bid.<br>• The need to ensure regional equity has been factored in to the proposed allocation of DHBs to Tranches. |
| 2 | Bowel cancer incidence and mortality rates | • Those DHBs with higher bowel cancer incidence and mortality rates are higher priority than those with low incidence/mortality rates. DHBs show incidence rates ranging from 34.6 per 100,000 population per year to 57.0 per 100,000 population per year. Corresponding rates for bowel cancer death range from 13.7 to 25.3. |
| 3 | Distribution of priority populations groups | • Those DHBs with higher percentage of the national distribution of priority population groups (Māori, Pacifica and deprivation 9/10) would be prioritised where possible. |
| 4 | Capital requirements | • Rollout is expected to be earlier in those DHBs which have indicated no requirement for capital investment. |
| 5 | IT capacity | • DHBs assessed as more ready to integrate with the NBSP IT solution are those that:<br>o Use national identifiers;<br>o Use IT solutions for histopathology results;<br>o Use ProVation for colonoscopy;<br>o Have a manageable work programme in the next 3 years.<br>• Have adequate IT change management governance. |
| 6 | Management of symptomatic colonoscopy demand | • Those DHBs with shorter colonoscopy waiting times would be prioritised over those with longer waiting times, as the impact of screening would exacerbate waiting times for symptomatic people. |
| 7 | Ministry of Health capacity | • The Ministry's capacity to safely manage a rollout to a limited number of DHBs each year. |

Following the Budget 2016 announcement, the Ministry asked DHB CEOs to agree in principle that their DHB would be ready to commence bowel screening at the proposed start date (expressed as a 6-month window). In June 2016, DHBs provided answers to an impact analysis questionnaire that was used to further assess readiness to commence screening. All DHBs agreed to their timeframe however, the order in which the DHBs will join the roll-out will be finalised in August 2016 based on the DHB responses, confirmation of readiness and further discussions with DHBs. Before a DHB commences screening, they would need to meet strict criteria to ensure they can deliver a quality programme that is safe and equitable.

The desire to rollout the programme nationally as quickly as possible is countered by the need for the IT solutions, coordination centres and endoscopy units to be established and be able to accommodate the volumes, and for the programme to manage risk effectively as size of the screened population increases. The proposed approach would enable a phased rollout to be achieved within three calendar years, which is the minimum time possible due to constraints on the existing and planned IT support systems and workforce. All DHBs would be required to go through a rigorous readiness assessment prior to rollout. The proposed phased rollout is similar to the approach taken in New Zealand for other national screening programmes (e.g. breast screening) and is consistent with the approach taken internationally.

The rationale for the allocation of DHBs to Tranches is summarised in Appendix 10. The proposed approach, recommended sequencing and indicative timing as each Tranche is completed is shown in Table 23. The final order is dependent on a number of factors. Further detailed discussions with DHBs may change the initial assessment. The order includes the requirement to have an even spread of DHBs across the four regions, as well as interdependencies between the DHBs. There has been no consideration of mitigations which may impact on the DHB's ability to commence screening.

The proposed DHB rollout by Tranche is summarised in Table 24. DHB CEOs have agreed in principle to the proposed sequencing (see Appendix 11 for copies of the CEO agreements). At this stage, the start dates for DHBs in Tranche 2 and 3 are in 6-month blocks (e.g. June to December 2017). More accurate start month for each DHB would be provided in the relevant Tranche business cases.

The DHB allocation to Tranches would be revisited as part of planning for the Programme rollout. Detailed capital requirements, workforce needs (for the screening programme, and any associated flow-on treatment and surveillance monitoring), change management capability, and IT implementation capacity need to be further assessed.

The Programme is currently progressing engagement across the sector, and working towards agreement of detailed implementation needs for each DHB. Outcomes of this activity will inform the final phasing for DHB implementation, complemented with advice from an internal Ministry Implementation Advisory Group with representation from across IT, capital, workforce, National Screening Unit, DHB financial performance, elective surgery and radiology teams.

The earlier DHB implementations provide the opportunity to learn from the rollout in new DHB environs, and these findings would be utilised in subsequent implementations.

**Table 23: Programme Sequencing and Indicative Timing**

| | Jul-16 | Aug-16 | Sep-16 | Oct-16 | Nov-16 | Dec-16 | Jan-17 | Feb-17 | Mar-17 | Apr-17 | May-17 | Jun-17 | Jul-17 | Aug-17 | Sep-17 | Oct-17 | Nov-17 | Dec-17 | Jan-18 | Feb-18 | Mar-18 | Apr-18 | May-18 | Jun-18 | Jul-18 | Aug-18 | Sep-18 | Oct-18 | Nov-18 | Dec-18 | Jan-19 | Feb-19 | Mar-19 | Apr-19 | May-19 | Jun-19 | Jul-19 | Aug-19 | Sep-19 | Oct-19 | Nov-19 | Dec-19 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Tranche 1 Projects** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BSP+ (extended Pilot IT System) | | | Design and development | | | | | | | | | | Operational | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NCC | | | | Procure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BSRC | | | Procure | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DHB 1-3 | | | | | Planning | | | | | | | | DHB Go-lives | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NBSP IT Solution | | | | | Design | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Tranche 2 Projects** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NCC | | | | | | | | | | | Implementation Planning | | | | | | | | | | | | | | Operational | | | | | | | | | | | | | | | |
| BSRC | | | | | | | | | | | Implementation Planning | | | | | | | | | | | | | | Operational | | | | | | | | | | | | | | | |
| DHB 4-12 | | | | | | | | | | | | | Planning | | | | | | | | | | | | | | DHB Go-lives | | | | | | | | | | | | | | |
| NBSP IT Solution | | | | | | | | | | | | | Development | | | | | | | | | | | | | | Release 1 Operational | | | | | | | | | | | | | | |
| **Tranche 3 Projects** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NCC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Operational | |
| BSRC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Operational | |
| DHB13-20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | DHB Go-lives | |
| NBSP IT Solution - Release 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NBSP IT Solution - Release 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Release 2 Operational |

**Table 24: DHB Rollout Indicative Timing**

| Tranche | Implementation | Estimated 'go live' date |
|---|---|---|
| 1 | DHB 1: Waitemata (transition from pilot to NBSP)<br>DHB 2: Hutt Valley<br>DHB 3: Wairarapa | Jul-17 |
| 2 | Tranche 2 DHBs (final order and exact start month to be confirmed in the Tranche 2 Implementation business case).<br>DHBs 4-12 in alphabetical order:<br>- Auckland<br>- Canterbury<br>- Capital and Coast<br>- Hawke's Bay<br>- Southern<br>- Taranaki<br>- Waikato<br>- West Coast<br>- Whanganui | Feb – Dec 2018 |
| 3 | Tranche 3 DHBs (final order and exact start month to be confirmed in the Tranche 3 Implementation business case).<br>DHBs 13-20 in alphabetical order:<br>- Bay of Plenty<br>- Counties Manukau<br>- Lakes<br>- Mid Central<br>- Nelson Marlborough<br>- Northland<br>- South Canterbury<br>- Tairawhiti | Jan – Dec 2019 |