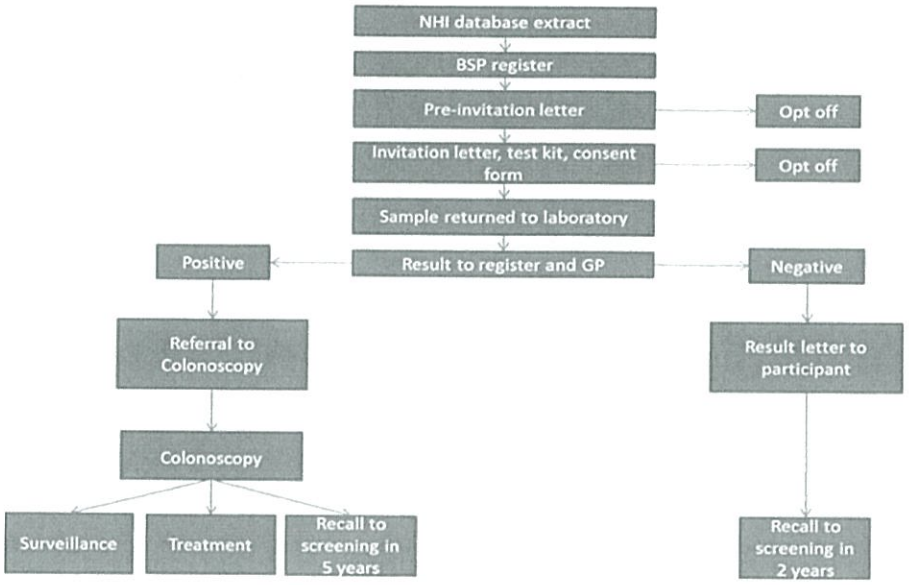
Appendix 1: Initial Findings - Bowel Screening Pilot

The Bowel Screening Pilot (BSP) commenced in late 2011 with the invitation of the 'first 500'. These 500 participants (from a single Primary Health Organisation (PHO) in Waitemata) were invited prior to the BSP officially commencing. Lessons learnt from the 'first 500' were incorporated into the service delivery model for Round 1, which commenced in January 2012. The overview of the screening pathway is shown below.



The first screening Round (lasting two calendar years) invited almost 122,000 people identified from the National Health Index (NHI) database as being eligible. The population register used in the BSP is a first for screening in New Zealand. Other screening programmes use an 'opt on' model, asking potential participants to enrol themselves in the screening programme. The BSP uses an 'opt off' model: identifying and inviting the cohort of people living in Waitemata DHB region who would be aged between 50 and 74 years during the pilot timeframe. These potential participants could opt off at any point along the bowel screening pathway if they chose.

The population register is kept as up to date as possible (via linkages with the NHI database, via manual update by the team at the Waitemata co-ordination centre and through data uploads from the New Zealand Cancer Registry) which ensures demographic information is as reliable as possible.

The first screening round (known as the prevalent round) saw a participation rate of 56.8 percent (Ministry of Health, 2015) for the eligible population (50-74 years), with almost 70,000 people returning a correctly completed iFOBT kit to the laboratory. International guidelines suggest a participation rate of at least 45 percent is acceptable.

Whether an iFOBT kit is positive depends on the amount of Haemoglobin found in the kit's buffer solution. Upon analysis, the average Round 1 positivity rate was found to be 7.5 percent (Ministry, 2015) which was at the higher range of what is found internationally. This equated to 217 people being found to be positive per month.

Participants with a positive iFOBT were then informed (via their GP or through the co-ordination centre) that they may be eligible for a colonoscopy, dependant on eligibility criteria. Approximately 95 percent of all those with a positive screening test went on to have a colonoscopy (or a CT colonography if appropriate).

More than two thirds of people receiving a colonoscopy required bowel polyps to be removed during the procedure. This is a higher proportion than that reported from other population based screening programmes using iFOBT[55].

4.3 percent of all colonoscopies led to a finding of bowel cancer in Round 1. More than 60 percent of these cancers were identified as being at stage I or stage II, meaning that the cancer had yet to spread to other organs. A recent New Zealand study (Health Research Council and Ministry of Health, 2015) showed that for the unscreened population, approximately 40 percent of bowel cancer patients had a stage at diagnosis of stage I or stage II.

Stage at diagnosis is an important indicator of the success of any screening programme, as finding a cancer at an early stage has a huge impact on the cost-effectiveness of the programme, both in terms of financial benefits to the health system, and in terms of survival and quality of life of affected people.

The numbers of cancers found per colonoscopy in the BSP was at the lower end of the range expected internationally. However, the threshold for positivity of the BSP iFOBT analysis was set at a low level when compared to threshold now being used in other countries with population screening programmes using iFOBT. The threshold for positivity for the pilot was set at this low level (as had been the situation for other pilot studies internationally) to ensure the maximum amount of data was available to make a robust decision regarding the most appropriate and feasible bowel screening options for NZ.

The pilot data demonstrated that If the threshold for positivity of the iFOBT kit was increased to similar levels used in other OECD countries, it would result in both 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.

The pilot data has been analysed, at a variety of different age ranges, to determine the threshold for positivity that maximises the detection of cancer while minimising the number of colonoscopies performed in individuals at a lower risk of having cancer or significant polyps. Elevating the threshold for positivity also substantially reduces the burden on the colonoscopy and pathology workforce and thereby increases the cost effectiveness of the entire programme.

In addition to finding cancers, within the BSP during the first screening round, almost 50 percent of individuals proceeding to colonoscopy were identified to have non-cancerous polyps known as adenomas. Almost half of those with adenomas in the first screening round were reported on histology to have 'advanced' adenomas, which have an increased likelihood of developing into bowel cancer in the future. Consequently the success of the BSP is not confined to detecting cancer because removal of advanced adenomas will reduce colorectal cancer incidence in the long term.

As seen in all international screening programmes, participation reduces in Round 2, and this has also been seen in the New Zealand context. Removal of participants from the population pool due to them testing as positive in Round 1, means that subsequent screening populations slowly move to being, on average, less likely to produce a positive result – i.e. the population pool slowly shifts to a more healthy state.

Round 1 (consisting of all those invited from 1 January 2012 to 31 December 2013) showed results that were anticipated from other OECD bowel screening programmes. Round 2 (all those invited from 1 January 2014 to 31 December 2015) cannot be evaluated fully until all those invited have returned their kit (if they intend to) and have moved through the entire screening pathway. The draft analysis including Round 2 is expected to be available in mid-2016. Indications are that Round 2 is proceeding as expected, with results comparable to those seen in other international programmes.

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[55] European guidelines for quality assurance in colorectal cancer screening and diagnosis (2010).

Three issues identified in the first round of the New Zealand pilot are risks for a national rollout: workforce resource implications for colonoscopy, for pathology and inequitable participation in the programme with respect to ethnicity and deprivation.

Workforce implications for colonoscopy

The positivity rate for the Bowel Screening Pilot was towards the upper end of the expected range of six to eight percent and consequently the number of colonoscopies required was at the upper end of the anticipated range The pilot demonstrated that it took several months to build up to the required steady state of colonoscopy.

Once the BSP moved in to Round 2, and the test positivity rate for the population naturally became lower, there was a resultant reduction in the numbers of colonoscopies.

Lessons from the BSP, with respect to colonoscopy volumes, would be factored into planning for a national service and advice to DHBs regarding monitoring and planning colonoscopy services for the NBSP.

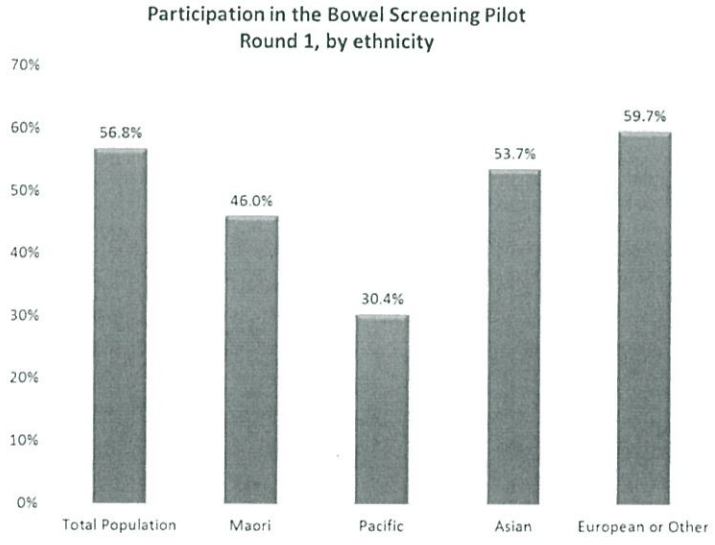
Workforce implications for pathology

The test positivity rate experienced in Round 1 of the Pilot resulted in the need for colonoscopy requirements at the upper end of the anticipated range. In addition, more than two thirds of all those people receiving a colonoscopy required bowel polyps to be removed during the procedure (a higher proportion than that reported from other population based screening programmes using immunochemical faecal occult blood tests). The high number of polyps requiring histological investigation put pressure on the pathological workforce at the contracted laboratory.

The findings from the BSP would be factored into planning for a national service and advice to DHBs around monitoring and planning pathology services for the NBSP.

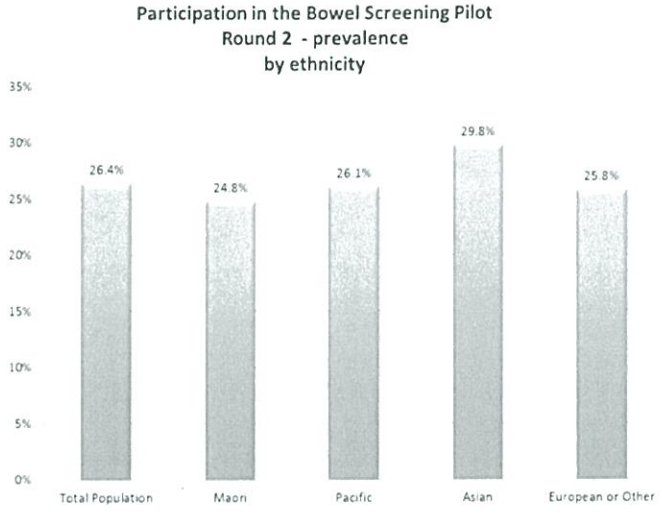
Inequitable participation

Results from Round 1 of the BSP showed a large disparity in the participation rate of different ethnic groups. The chart below shows that the lowest participation in Round 1 was seen for Pasifica, with a rate of 30.4 percent, followed by a rate of 46.0 percent for Māori.



Source: Ministry of Health 2015

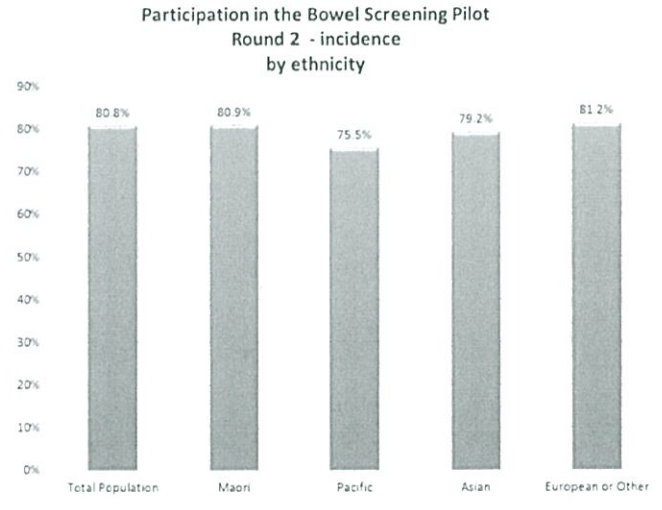
Considerable work has been undertaken since these inequalities were noted in Round 1. A number of initiatives to encourage participation, managed by the Waitemata co-ordination centre, targeted the Māori and Pasifica priority populations. Results from the first year of Round 2 showed no real disparity between ethnic groups for those taking part for the first time (prevalence screen). This can be seen in the following chart.



Source: Ministry of Health 2015

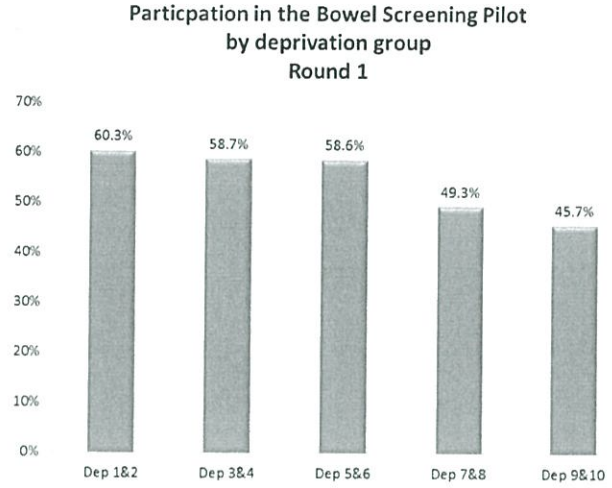
Although participation for those taking part for the first time (prevalence) in the second round is low because the majority of these people had aged in to the screening cohort. Participation is notably lower in the youngest age group (50-55) and this is also seen internationally.

For those who had taken part in Round 1, and had been invited for a second time in Round 2 (participants entering their incident round) the participation was both high and equitable – this was a welcome finding.



Source: Ministry of Health 2015

When analysed by deprivation group, participation decreases as deprivation increases. Work is now also being undertaken to encourage participation in high deprivation groups.



Source: Ministry of Health 2015

Once on the bowel screening pathway, initial investigations show that disparities between population groups do not exist.

The PIPER study showed that 36 percent of symptomatic colorectal cancers were found in the right side of the colon, and 38 percent were on the left and 25 percent were in the rectum (less than 1 percent had sidedness not stated)[56]. The BSP shows a different site distribution, with 28 percent of colon cancers being found on the right side of the colon, 50 percent on the left side of the colon and 19 percent in the rectum (3 percent had sidedness not stated). This suggests, as previously recognised, that the immunochemical faecal occult blood tests are less sensitive for the detection of right sided cancer. However, this is also true for other bowel screening approaches and there are a number of reasons for this.

[56] Health Research Council and Ministry of Health (2015) *PIPER study.* Wellington: HRC and MoH; MoH (2-15, September 3) *Bowel Screening Pilot Results.* Retrieved September 22 2015 from MoH: Health.govt.nz

Appendix 2: Pilot Evaluation Report Executive Summary

The Ministry of Health funded Waitemata District Health Board (WDHB) to run a Bowel Screening Pilot (BSP) over four years from 2012–15. An evaluation of the BSP was undertaken by Litmus, the Centre for Public Health Research Massey University, and Sapere Research Group. The goal of the evaluation is to determine whether organised bowel screening could be introduced in New Zealand in a way that is effective, safe and acceptable for participants, equitable and economically efficient.

This report is the final evaluation report of the BSP following the completion of the invite distribution for screening Rounds 1 and 2 (January 2012 – December 2015) Note the epidemiological analysis is only for the first 36 months of invites with over eight months allowed for completion of the pathway. . The report draws from a range of data and information sources and is structured to address the goal and four aims of the pilot as relevant at the completion of screening Round 2.

The New Zealand Health and Disability Multi-region Ethics Committee granted ethical approval for the suite of BSP evaluation activities (reference MEC/11/EXP/119; MEC/11/EXP/119/AM06).

Effectiveness: Is a national bowel screening programme likely to achieve the mortality reduction from bowel cancer for all population groups seen in international randomised controlled trials?

It is probable that the BSP will achieve a reduction in mortality from bowel cancer. However, the magnitude of any reduction cannot be assessed in a five-year evaluation. The full two years of the second round was not analysed due to the timing of data extraction, so the available staging information was insufficient to indicate whether there has been a shift or not towards detection of less advanced cancers as a result of the programme.

Economic efficiency: Can a national bowel screening programme be delivered in an economically efficient manner?

A national bowel cancer screening programme could be delivered in an economically efficient manner. Sapere Research Group (Sapere) modelled thirteen different screening scenarios all of which were highly cost-effective both for the whole population and for Māori, and in some cases were delivering direct cost savings.

While bowel cancer screening results in significant cost-savings from reduced treatment of bowel cancer, there also are significant resource requirements, particularly in the capacity to provide colonoscopy. These requirements may pose a constraint on how a national programme may be delivered. Sapere modelled colonoscopy requirements for three potential configurations, showing the estimated number of colonoscopies for a national programme over a decade from implementation.

Equity: Can a national bowel screening programme be delivered in a manner that eliminates (or does not increase) current inequalities between population groups?

There are a number of challenges in delivering an equitable national bowel screening programme. Asians, Māori and Pacific people were all less likely to participate than European/Other people in both rounds. Participation in Round 2 was also lower than in Round 1. Within Round 2, participation varied depending on the screening history of the invited population with the highest participation among those who had completed Round 1.

European/Other and Asian participation decreased from Round 1, and was unchanged among Māori. Whilst participation increased for Pacific people in Round 2, it was still low (36.7%). Participation also declined with increasing deprivation in both rounds.

A national bowel screening programme must lead with an equity focus. The BSP has demonstrated that, without appropriate systematic and structural approaches together with focused governance and leadership, inequities in bowel cancer outcomes will increase for Māori and Pacific people, and those living in areas of high deprivation.

Safety and acceptability: Can a national bowel screening programme be delivered in a manner that is safe and acceptable?

Safety is defined as the extent to which harm is kept to a minimum, and incorporates multi-dimensional perspectives such as cultural, environmental, and clinical safety (National Screening Unit 2005 p.15). Within the scope of the evaluation, no substantial environmental or clinical safety issues were identified. In Round 2, greater focus has been placed on cultural safety with a more systematic and structural focus on seeking to achieve equity of participation for Māori and Pacific people. If the learnings from the BSP are adopted, in particular leading with an equity focus, a national bowel screening programme can be delivered in a manner that is safe.

The evaluation of the BSP has demonstrated that bowel screening can be delivered in a way that is acceptable to most eligible participants provided a systematic focus is applied to addressing barriers to participation for Māori and Pacific people. Acceptability of the BSP and a national screening programme continues to be very high amongst national and regional stakeholders, and providers along the screening pathway.

The overall goal is to determine whether organised bowel screening could be introduced in New Zealand in a way that is effective, safe and acceptable for participants; equitable and economically efficient.

The BSP has demonstrated that, maintaining fidelity to and drawing on the learnings from the pilot, an organised quality bowel screening programme could be safely introduced into New Zealand. Bowel screening is cost effective and will save lives.

Bowel screening is cost saving in absolute terms, while bringing health benefits. This result is driven by the savings from avoided costs of treating cancer being large enough to outweigh the costs of screening. This makes bowel screening an exceptionally cost-effective health intervention, given that it both reduces health costs and produces benefits for the population. Bowel screening is a highly cost-effective intervention for Māori.

To have a safe, equitable and acceptable bowel screening programme requires the national programme to be equity-led to ensure acceptance and safety for Māori, Pacific and those living in areas of high deprivation. To be safe, a national bowel screening programme requires the involvement of the National Screening Unit, a review of the Register's operational functionality, resolution on the location and funding of the endoscopy governance group, and the quality standards to be finalised. The impact of a national screening programme on the colonoscopy and histopathology workforces need to be managed to retain equity between symptomatic and screening services, and ensure surveillance colonoscopies are timely and align with guidelines (New Zealand Guidelines Group 2004).

Appendix 3: Key Themes from Engagement with the Health Sector

The Ministry of Health hosted one national and five regional meetings during August and September 2015. More than 360 clinicians, managers, private providers and NGO representatives attended the meetings.

There was support for:

- The national coordination of screening invitations and iFOBT screening testing.
- Regional coordination of quality across the bowel screening pathway, in accordance with nationally developed quality standards.
- Local delivery of colonoscopy and health promotion.
- A strong focus on improving equitable participation.
- Involving primary care within the programme.

Other key themes included:

- A keen interest in the model, based on BSP data, used to predict the colonoscopy requirements of a national bowel screening programme followed by requests to access these tools and resources.
- Continuing the existing momentum to improve colonoscopy quality, capacity and wait times - an essential requirement to ensure readiness for a national bowel screening programme.
- Workforce concerns, primarily within endoscopy, pathology and nursing.
- The importance of quality data capture and a robust national bowel screening IT solution to support a national programme.

In June 2016 the Ministry of Health sent all DHBs information about the NBSP, and asked them to complete a high-level impact analysis questionnaire. The themes emerging from this analysis are summarised in Table 51.

Table 51: Key Themes from Engagement with the Sector

Key themes	Next steps
All 20 DHB CEOs sign an agreement in principle to the proposed go live date for a national bowel screening service in their DHBs	• Detailed impact analysis carried out with each DHB, by tranche, with an aim to determine actual roll-out order
All 20 DHBs responded to the impact analysis showing commitment and positive engagement for the programme.	• Capitalise on this by continuing regular communication and engagement activities to unpack challenges and issues for DHBs
The 100% response from DHBs on the impact analysis indicates a there is an understanding of the requirements on DHBs for planning and delivery of a national bowel screening service.	• Continue engagement activities to further explore DHB challenges and issues identified for implementation.
Improvements in Colonoscopy Wait Time Indicators showing a commitment to improving service delivery in readiness for national bowel screening service.	• Continue to work and fund DHBs to meet targets
Challenges for DHBs in recruiting the necessary resources for NBSP, in particular Gastroenterologists, Endoscopy Nurses, Radiologists and Pathologists.	• Work with DHBs and Health Workforce New Zealand to develop recruitment strategies. • Explore regional approach through planned regional meetings and relationship management activities.
Some DHBs in the smaller centres have further challenges around recruitment as screening	• Work with DHBs and Health Workforce New Zealand to develop recruitment strategies.

Key themes	Next steps
volumes are lower than the larger centres and indicate a portion of FTEs which are harder to recruit and retain	• Explore regional approach through the programmes planned regional meetings and relationship management activities.
Additional capital required by some DHBs for endoscopy, CTC and cancer services as a result of increases in volumes due to screening	• Explore regional approach in managing demand through the programmes planned regional meetings and other relationship management activities. • Manage DHB expectations in regards to capital funding and ensure there is an understanding that usual business planning approach will be required for capital funding.
DHBs ability to absorb treatment costs during the initial treatment hump due to an increase in bowel cancers being detected as a result of screening	• Determine through the detailed analysis carried out at the Implementation Business Case stage likely treatment costs for DHBs using the model developed by Ministry of Health.
The challenge of balancing the out-sourcing and managing colonoscopies locally with minimum capacity and resources available	• Determine through the detailed analysis carried out at the Implementation Business Case stage the regional approach for management of screening volumes. • Explore regional approach through the programmes planned regional meetings and relationship management activities.
Further clarity needed for DHBs on the breakdown of funding for implementation and ongoing costs	• Carry out workshops and discussions with DHBs at the programmes planned regional meetings and relationship management activities.

Appendix 4: NBSP Alignment with NSU Core Principles of Screening

The NBSP will align with the National Screening Unit (NSU) **core set of six principles**. These principles provide a foundation for achieving NSU's strategic vision for achieving high quality, equitable and accessible screening programmes.

1. The overall benefits of screening must outweigh the harm

- There should be regular review of the evidence which programmes are based on.
- There is transparency around significant decisions, major changes to screening programmes and serious adverse events.

2. National screening programmes are people centred

- The screening pathway should be acceptable to individuals, whānau and the populations concerned
- Advisory groups seek appropriate consumer representatives with experience of the condition(s) screened for and the health system
- Screening programmes are delivered in an ethically and culturally competent manner in the New Zealand setting.

3. National screening programmes will work towards achieving equitable access to the screening pathway and equitable outcomes for all population groups

- Screening programmes should incorporate the principles of The Treaty of Waitangi
- Solutions to access are focused on improving processes and adapting systems to meet the needs of individuals and under-screened populations.

4. Informed consent is a priority throughout the screening pathway

- Screening programmes should provide full information to people; this includes detail on benefits and harms of screening
- Screening programmes must ensure that cultural and health literacy differences are addressed when providing information to support informed consent.

5. Screening programmes are monitored and evaluated on a regular basis

- Information systems should be set up to enable timely monitoring, audit and evaluation of screening programmes and providers.

6. National screening programmes are committed to continuous quality improvement in programme management and clinical service delivery

- Policy makers, providers and all those involved in screening programmes are accountable and responsible for maintaining capacity and capability in delivering screening programmes / services of the highest possible quality

The NBSP will align with the **five essential components of organised screening systems** identified as essential to the safe and effective practice of organised screening (adapted from Hale 2012)

- A central agency to lead and coordinate the screening pathway
- Clinical governance
- Infrastructure and systems to manage a screening programme
- Monitoring and evaluation
- Quality Cycle

Appendix 5: Key Programme Risks and Issues

(High/very high only)

In the event that... (RISK CAUSE)	There is a risk that...(RISK EVENT)	Which may result in...(RISK EFFECT)	Category	Likelihood	Consequence	Current Risk Rating	Risk Containment / Mitigation Plan
The Phase 1 IT solution (BSP+) not available or cannot be integrated by the DHBs.	Delay in roll- out of the first three DHBs	- NBSP implementation won't meet expected timelines - Potential delay in benefits realisation for the first 3 DHBs	Implementation	Possible	Severe	22 Very High	- Good governance and oversight of Programme, strong project management - Rigorous management of scope and schedule - Broad stakeholder consultation; detailed, clear IT requirements documented. Robust exception reporting - Close engagement with the three DHBs to ensure IT integration requirements fully understood and robust planning is in place.
The Phase 2 IT (NBSP IT system) solution is delayed or has insufficient functionality	DHBs roll-out onto the NBSP will be delayed	The timeframe for delivering the NBSP to all regions will be delayed.	Implementation	Possible	Severe	22 Very High	- Robust Change/Relationship management with DHBs to agree on expectations regarding roll-out scope and costs with each DHB depending on the state of their IT systems that need to be integrated - A high level impact analysis of all DHBs has been completed, including IT "stock-take"; a detailed impact analysis will be undertaken as part of Tranche 2 and 3 planning - Broad stakeholder consultation; detailed, clear IT requirements documented. Robust exception reporting. - Good governance and oversight of Programme, strong project management. Rigorous management of scope and schedule. Clear scope control - Ensure adequate resourcing and funding to deliver the Programme and that the business case recommends adequate CAPEX.
The Infrastructure partner and hosting environment is not decided within project timeframes then there will be a delay to the project delivery	Where the infrastructure will be hosted and supplied is yet to be confirmed and will result in delays if it is not in place at the start of the IT development. A delay in agreement on hosting location/arrangements will have a knock on effect in finalising/signing the Infrastructure Supplier contract.	The infrastructure required will not be in place and cause a delay to T1 delivery as the infrastructure decision and contract is a prerequisite for T1 delivery timeline. It will also delay delivery of the NBSP IT system delivery	Implementation	Possible	Severe	22 Very High	Governance Board approval at the start of the programme for the Infrastructure hosting strategy. The chosen infrastructure supplier has the necessary resources and capability to deliver to the project delivery timeframes. The infrastructure requirements are clear and available as soon as the Governance Board approval has been given. Work within existing contracts and preferred suppliers. Work closely with the programme procurement.
The NBSP has inequitable participation rates	Maori, Pacifica, High Deprivation and/or other populations have lower participation rates than the general population.	If participation rates vary along the pathway between ethnicities, deprivation indexes and/or other populations, then the NBSP has not achieved equity	Programme	Likely	Major	21 High	KPIs for participation along the pathways, Participation rates for different groups monitored. The Programme Business Case lists strategies for driving equal participation. Strong governance and leadership to ensure inequalities are addressed in programme planning and implementation. Awareness raising campaigns, nominate NBSP "Champions" for priority groups, work closely with primary care. DHBs expected to have high level of engagement with Maori & Pacific organisations
Limited Programme resources to deliver the significant amount of work due by September 2016.	Unable to recruit new staff for the programme team until September 2016. The funding cannot be drawn down for the NBSP implementation until the restated Programme Business case goes to Cabinet for approval (22 August 2016)	Inadequate resource could cause a delay to all delivery dates, compromise the quality of work produced and limit the scope of stakeholder engagement.	Implementation	Likely	Major	21 High	The MoH has approved the memo to recruit staff to the programme team. Programme Director working with HR to develop a recruitment timeline. Key positions will be prioritised.

In the event that_ (RISK CAUSE)	There is a risk that_(RISK EVENT)	Which may result in_(RISK EFFECT)	Category	Likelihood	Consequence	Current Risk Rating	Risk Containment / Mitigation Plan
An appropriate supplier to deliver the National Coordination Centre (NCC) services cannot be identified and/or there is a legal challenge to the supplier of choice	Delivery of Tranches 2-3 is contingent on a NCC being in place	Delay in roll-out of the NBSP	Implementation	Unlikely	Severe	19 High	Robust RFP process and procurement planning.
A delay in set up of Bowel Screening Regional Centres	Detailed set-up plans for the DHBs rely on the BSRCs being in place	Delay in NBSP roll-out	Implementation	Unlikely	Severe	19 High	Ongoing relationship management with DHBs, regional meetings August 2016 to discuss service model expectations with DHBs and obtain their feedback. Provide data and assistance to help DBs model correctly
The screening provider does not meet quality requirements	An increased risk of adverse events for participants and decreased consistency of participant experience across NZ	Programme benefits are not fully realised as harms are not minimised/benefits maximised	Programme	Possible	Major	18 High	There is a quality manual for the Pilot which can be built on using learnings from the Plot. Option to use GRS as basis for a colonoscopy accreditation tool. Ensure sufficient staffing levels to support quality
Insufficient funding for the NBSP released in Budget 2017 to continue the roll-out of the NBSP.	Budget 2017 If sufficient funding is not able to be drawn down, the NBSP implementation scope and milestones will be compromised.	The roll-out of the NBSP will be delayed. If funds promised to DHBs to deliver the NBSP and Surveillance colonoscopies, DHBs will lose confidence in the Programme and may resist/delay/limit their uptake of the NBSP.	Implementation	Possible	Major	18 High	Ensure a strong budget bid is put forward
The initiation of a NBSP results in a larger than anticipated Round 1 peak in the number of bowel cancers diagnosed	- There will be an increased treatment burden on DHBs - DHBs consider funding insufficient for the brought forward treatment costs	- DHB resistance to a NBSP - DHBs seek additional funding from the crown	Programme	Possible	Major	18 High	- Ongoing relationship management with DHBs, regional meetings August 2016 to discuss service model expectations with DHBs and obtain their feedback - Provide data and assistance to help DHBs model correctly - DHBs utilise their annual uplift and electives funding

In the event that... (RISK CAUSE)	There is a risk that...(RISK EVENT)	Which may result in...(RISK EFFECT)	Category	Likelihood	Consequence	Current Risk Rating	Risk Containment / Mitigation Plan
Delays in Cabinet approval of the restated PBC and/or the ImpBCs for Tranches 1-3	Delays in approvals will result in subsequent delays in NBSP implementation	There will be time slippage for the first key deliverables which will have a knock-on impact on the timeframes for delivering the NBSP by 2020	Implementation	Possible	Major	18 High	Planning for writing the Business Case allows sufficient time for the approvals process. Work to streamline approvals process.
The business operational model for the national (Phase 2) IT solution is not clearly defined	If the business operating model is not defined, documented, then the high level requirements (Vision and Scope) will be unstable leading to IT rework and programme delays	The IT solution developed may not be fit for purpose.	Implementation	Possible	Major	18 High	Ensure that the business operational model is clearly defined and agreed in principle with the Programme Governance Board. The business operating model is refined working a single appropriate DHB designated as the first tranche 2 go-live DHB in January 2018. The business operating model is based on the existing Waitemata pilot with minimal changes as required to support multiple locations. Ensure effective use of iterative development methods.
Change management is not effectively undertaken for Tranche 1 and Tranche 2 DHB Integration Requirements	- IT and business communications to, and engagement with, DHBs may not be consistent; engagement and confidence with the Sector will be significantly compromised - DHB's could become confused about the programme leading to frustration and lack of confidence from DHBs in supporting the NBSP	Sector requirements will be difficult to gather and progress will be constrained	Implementation	Possible	Major	18 High	Ensure engagement and commitment across the Sector to achieve the programme objectives. Work closely with the communications team to ensure alignment between business and IT communications.
Insufficient workforce capacity e.g. Colonoscopy, Pathology, Endoscopy, Nursing, Radiology	Insufficient colonoscopy, pathology, radiology endoscopy and nursing workforce may impact on the ability of DHBs to deliver the NBSP to their population	Some DHB areas will have increased waiting times, poor quality service and not meet their performance indicators. Symptomatic services may be neagtively impacted.	Programme	Possible	Major	18 High	Health Workforce NZ initiatives to increase name of Gastroenterologists and Surgeons. HWNZ work on nurse endoscopy Ensure NBSP options take into consideration workforce limitations. Detailed impact analysis of DHBs prior to confirmation of roll-out order to identify potential workforce issues and implement plans to address this before go live.

Appendix 6: Summary Programme Long-list Options Assessment

	Scale & Scope							Implementation (Timing & staging)		Service Solution (How)														Service Delivery (Who)						Funding			
										IT	Invitation		Return (FOBT only)		Result Manage		Testing							Coord & Testing		Screening Centre		Histo					
Description	Do nothing	Do Minimum - retain WDHB pilot but do not extend to a national screening programme	Age range 60-74 years (Threshold 200)	Age range 55-74 years (Threshold 200)	Age range 50-74 years (Threshold 200)	Age range 50-74 years (Threshold 75) (BSP scope)	Age range Māori/Pacific 55-74, Other 60-74, threshold 200	Big Bang - 2017	Phased by Tranche, including Coordination Centre in Tranche 1 (2-4 years)		Mail only	Mail and community targeted distribution	Mail	Mail plus potential future lab drop off	Endoscopy Unit only	GP + Endoscopy Unit	GFOBT (Quaiac) + Colonoscopy	iFOBT (immunochemical) + Colonoscopy	Flexi sig	Colonoscopy	Pillcams	Colorguard	CTC	One	More than one	Regional	Local	National	Local/Regional	DHB fully fund - screening, colonoscopy, subequent treatment, surveillance	Centrally funded - screening, colonoscopy, subequent treatment, surveillance	DHB part fund - subsequent treatment, surveillance	DHB part fund - subsequent treatment, some surveillance (some surveillance centrally funded)
Reference	SCO1	SCO2	SCO3	SCO4	SCO5	SCO6	SCO7	IMP1	IMP2		I1	I2	R1	R2	RES1	RES2	TEST1	TEST2	TEST3	TEST4	TEST5	TEST6	TEST7	CT1	CT2	SC1	SC2	H1	H2	FUN1	FUN2	FUN3	FUN4
Investment Objectives																																	
To achieve a greater mortality reduction from bowel cancer	N	P	Y	Y	Y	Y	Y	Y	Y	See separate options analysis	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	P	P	P	Y	Y	Y	Y	Y	Y	P	Y	P	Y
To deliver bowel screening in a manner that is acceptable and encourages participation		Y	Y	Y	Y	Y	Y	N	Y		P	Y	P	Y	P	Y	N	Y	P	N	P	P	P	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
To promote equity between population groups	P	N	P	P	P	P	P	Y	N		P	Y	P	Y	Y	Y	N	P	P	P	P	P	P	Y	Y	Y	Y	Y	Y	N	Y	P	Y
To minimise risk of adverse events, maximising benefits vs harm	N	N	Y	Y	Y	P	Y	N	Y		Y	Y	Y	Y	Y	Y	Y	P	P	N	P	P	P	Y	Y	Y	Y	Y	Y	N	Y	P	Y
To deliver a safe, high quality programme which is consistent nationally	N	N	Y	Y	Y	Y	Y	N	Y		Y	P	Y	P	Y	Y	Y	Y	Y	Y	N	P	N	Y	Y	Y	P	Y	P	N	Y	P	Y
Critical Success Factors																																	
Strategic Fit & business needs	N	N	Y	Y	Y	Y	N	P	Y		Y	Y	P	Y	P	Y	N	Y	P	P	N	N	N	Y	Y	Y	N	N	Y	N	Y	N	Y
Value for Money	N	N	Y	Y	Y	Y	P	Y	Y		Y	Y	Y	Y	Y	Y	P	Y	Y	N	N	N	N	Y	P	Y	P	P	P				
Supplier capacity and capability, within timeframe 2-4 years	Y	Y	Y	N	N	N	?	N	Y		Y	P	Y	Y	Y	Y	N	Y	N	N	N	N	N	Y	Y	Y	P	P	P				
Affordability	Y	Y	?	?	?	?	?	?	?		Y	Y	Y	Y	Y	P	P	Y	Y	N	N	N	N	Y	P	Y	P	?	?	N	N	Y	P
Achievability, within timeframe 2-4 years	Y	Y	Y	Y	Y	Y	Y	N	Y		Y	P	Y	Y	Y	P	N	Y	N	N	N	N	N	Y	P	Y	N	Y	Y				
Summary	N	N	P	N	N	N	N	N	Y		P	P	P	P	P	P	N	P	N	N	N	N	N	Y	P	Y	N	N	P	N	N	P	P
Shortlisted Options *As all CDFs are crucial (not desirable) any option that has a CDF scoring a 'no' is discounted*																																	
Option Title																																	
Option 1: Do nothing	SCO1 Do Nothing																																
Option 2: Basic	Age range: 60-74 years (Threshold 200)							Phased by Tranche 2-4 years			Mail only		Mail, potential future Lab		Endoscopy unit only		iFOBT							Coord/testing approach TBC through RFP Regional screening, local/regional histo						DHB part fund - subsequent treatment surveillance			
Option 3: Integrated	Age range: 60-74 years (Threshold 200)							Phased by Tranche 2-4 years			Mail only		Mail, potential future Lab		GP & Endoscopy unit		iFOBT							Coord/testing approach TBC through RFP Regional screening, local/regional histo						DHB part fund - subsequent treatment surveillance			
Option 4: Complete	Age range: 60-74 years (Threshold 200)							Phased by Tranche 2-4 years			Mail only		Mail, potential future Lab		GP & Endoscopy unit		iFOBT							Coord/testing approach TBC through RFP Regional screening, local/regional histo						DHB part fund - subsequent treatment, some surveillance (some surveillance centrally funded)			

Option	Comment	Outcome
Scale and Scope		
	• **Do nothing:** This is not a favoured option as it does not address the problems identified and does not support the realisation of the desired benefits.	Carried forward as benchmark
	• **Do minimum:** This would achieve a greater mortality reduction for Waitemata DHB residents only. This option failed to achieve a range of IOs and CSFs. It would not be a national programme and would perpetuate inequity between residents of WDHB and other DHBs. The lack of national rollout would result in ongoing adverse events for the population not diagnosed/treated. It does not meet the business needs and would not be value for money, as the age range and specificity threshold are not optimal.	Rejected
	• **Age 60-74, threshold 200ng haemoglobin/ml buffer:** This option fully meets all of the CSF, and IOs with the exception of 'promoting equity'. This has been assessed as 'partial', as the Bowel Screening Pilot identified that there was inequity in participation and outcomes between Māori and Other.	Preferred - only viable option
	• **Age 50 & 55-74, threshold 200ng haemoglobin/ml buffer:** Both of these options met all of the IOs except 'promoting equity', as above. Both options were assessed as failing the 'supplier capacity and capability' CSF. The volume of colonoscopies required from the extended age range would not be achievable by the majority of DHBs, within existing resources and the proposed timeline for implementation.	Rejected
	• **Age 50-74, threshold 75ng haemoglobin/ml buffer:** This option reflects the Bowel Screening Pilot Criteria. It was assessed as failing the 'supplier capacity and capability' CSF, as the volume of colonoscopies required from the extended age range and lower threshold for positivity would not be achievable by the majority of DHBs, within existing resources and the proposed timeline for implementation.	Rejected
	• **Age 55-74 (Māori), 60-74 (other), threshold 200ng haemoglobin/ml buffer:** Whilst this option may contribute to reducing inequity between Māori and Other, this is estimated to be a very marginal contribution as the extended age-range would capture very low numbers of cancers. It would not be a nationally equitable service and therefore this option was rejected. Instead the programme would focus on increasing equity by driving equitable participation in the screening programme.	Rejected

Implementation		
	• **'Big-bang':** This option was assessed as failing to meet the 'achievability' and 'supplier capacity and capability' CSFs. Achieving a full rollout across 19 DHBs on the same date would not be possible as it would place too much demand on colonoscopy services and the existing IT solution. Some DHBs require more time to create sufficient colonoscopy capacity to manage the impact of the increased activity arising from the bowel screening programme, and therefore either all DHBs would need to wait until the slowest was ready, or the rollout would compromise patient care in the DHBs with insufficient capacity. The replacement IT solution needs to be developed and implemented progressively to ensure that it is robust. Developing full implementation plans for safe concurrent implementations would require significantly higher programme team staffing.	Rejected
	• **Phased by Tranche:** This option was assessed as meeting all of the CSFs, and all IOs with the exception of 'promoting equity', for which it was assessed as 'partial'. The extended timeline for implementation would result in some parts of the population being tested/treated before others, resulting in higher mortality in the later adopters.	Preferred
Service Solution		
IT	• See Appendix 7.	
Invitation	• **Mail only:** This approach has been used successfully in the Bowel Screening Pilot. Whilst it may not be as effective at 'promoting equity' and 'encouraging participation' as mail in conjunction with community targeted distribution, it is a feasible approach. It is based on international best practice and could be implemented immediately, with extension (to community targeted distribution) implemented at a later date if desired.	Preferred
	• **Mail and community targeted distribution:** Feedback from the Pilot indicates that there could be greater uptake in some populations, in particular Māori, if alternative approaches (e.g. distribution on a marae) were added. Whilst this option would therefore be preferable for promoting equity, it was assessed as potentially not meeting 'national consistency' and it would create a potential risk to the programme. It would require barcode scanning of all kits and rigorous monitoring of expiry dates to ensure safety. The option was also 'partial' for 'supplier capacity' and 'achievability', as it would require significantly more investment of time/resource to ensure that it was undertaken effectively. This option was summarised as 'possible', as although it was not taken forward to the shortlist at this stage it could be implemented by the programme at a later date.	Possible
Return	• **Mail only:** This option was assessed as meeting most IOs and CSFs. It was assessed as 'partial' for 'promoting equity' and 'encouraging participation', as findings from the Bowel Screening Pilot indicate that some Māori would be more likely to participate if alternative routes were available for returning samples. Findings may be available from the pilot trial early in 2016. It was also assessed as 'partial' for 'strategic fit/business need', as any reduction in returns would lessen the degree of effectiveness.	Possible
	• **Mail with possible future contingency for drop off at laboratories:** This option met all of the criteria except 'national consistency', as this would be less viable in some communities, e.g. rural areas. The overall benefits of reaching more Māori/Pacific were assessed as outweighing the potential loss of national consistency and therefore this option was identified as being preferable to mail only. This option also provides a contingency plan should there be any unforeseen (at this time) changes to the postal service. The programme would commence with mail only, with this approach being reviewed throughout implementation (and subsequently through business as usual).	Preferred

Results management	• **Endoscopy Unit only:** This option would provide an effective service but was assessed as only partially meeting the 'encourages participation' IO. By not directly engaging with primary care, it is possible that some of the eligible population, particularly those at high risk of not participating, would not be prompted/encouraged to participate. • **GP plus endoscopy unit:** The Bowel Screening Pilot has identified that primary care involvement in the management of results can promote uptake and can result in a more positive care experience for participants. Involvement has been strongly supported by primary care practitioners and pilot clinicians in the Pilot area. Although this option scores partial for 'affordability' and 'achievability' (as additional costs would be incurred in training primary care and paying for their results management activities, and the training component could make it less achievable), the evidence from the Bowel Screening Pilot indicates that it is likely to have a significant positive outcome on participation. This option has therefore been identified as the preferred option, to be tested further through Multi Criteria Analysis.	Possible Preferred
Testing nb this refers to the screening test (for whole population) not the diagnostic test undertaken as a result of a positive screen	• **Guaiac faecal occult blood test (GFOBT):** GFOBT is currently used in the UK where the programme has been in place for over 10 years. This option was rejected as it is now perceived as an outdated test. Although relatively cheap and has good sample stability, this test requires a workforce to 'read' results and there is no ability to change the threshold. It is also subject to dietary interference requiring participants to modify their diet prior to undertaking the test. • **Immunochemical faecal occult blood test (iFOBT):** This option was assessed as the preferred option. It is a new generation test which is being used internationally by recently established programmes e.g. Ireland and Holland. The vast majority of countries with organised screening programmes use faecal occult blood tests. This test requires no dietary restrictions, has proven better compliance and is more specific to lower gastro intestinal bleeding. The superiority of iFOBT over gFOBT is now widely recognised and the European Quality Assurance Guideline on Bowel Cancer Screening (2011) recommended iFOBT in preference to gFOBT (Phalguni, Seaman & Routh et al, 2015). Research has also indicated that people are more likely to participate in screening when offered this test than other tests such as gFOBT, screening colonoscopy and flexible sigmoidoscopy. New Zealand is already well advanced in planning for iFOBT screening, and has tested acceptability for the New Zealand population in the pilot. In round one of the pilot 66 percent of 60-74 year olds participated in bowel screening using the iFOBT, indicating a high level of acceptability of the test. • **Flexible Sigmoidoscopy (Flexisig):** The option was rejected as it would require a significant change in direction i.e. planning/workforce development/evaluation and modelling in the current NZ environment. Flexisig is being considered internationally as a sole modality screening test or as an adjunct to already established iFOBT screening programmes. However, in organised screening programmes it is only currently used in areas of the USA, Italy, Puerto Rico and in six sites in the United Kingdom. Internationally there is no agreement that flexible sigmoidoscopy is the screening test of choice. *Likely reduced participation*: A Cochrane Database systematic review in 2013 reports an intention to screen mortality reduction of 28 percent, which is greater than for iFOBT, with a reduction in CRC incidence of 18 percent. However, this reduction is dependent on people choosing to participate in flexisig-based screening, and participation rates in flexisig are generally lower than for iFOBT. In the UK participation in flexisig screening was recently reported to be 43.1 percent (compared with 66 percent for iFOBT in round one of the Waitemata pilot, for the subset of 60-74 year olds). Over time, more cancers are likely to be detected using iFOBT due to the higher participation rate and the fact that the iFOBT is offered every two years, giving repeated opportunities to detect bowel cancer. *Insufficient workforce and endoscopy suite/theatre resource*: Flexible Sigmoidoscopy is in itself an invasive endoscopic test and even if not	Rejected Preferred Rejected

	performed by specialists still requires endoscopic resource. Modelling by the Ministry of a one-off flexible sigmoidoscopy in NZ for those aged 56 years, even with a participation rate of 40 percent, reveals that this requires more endoscopy lists to perform both flexible sigmoidscopy and the follow on colonoscopy than does the colonoscopy associated with the proposed national bowel screening programme using iFOBT. Consequently, the Ministry believes that at this stage there is no indication to change the screening test to flexisig or to introduce this as a complement to iFOBT. However adopting an iFOBT policy at this stage will not necessarily exclude other options in future should the evidence support these. Flexisig could be a valuable additional modality for screening and it is important that New Zealand regularly reviews any new evidence in relation to this or other screening modalities.	
	• **Colonoscopy:** The option was rejected. There would not be enough capacity to offer the population a colonoscopy as a screening test. In addition, there are possible harms associated with colonoscopy and it is a very expensive option as the primary screening test, There is no high-level evidence to support its use in population screening.	Rejected
	• **Colon Pillcam:** This option was rejected as it is expensive, is less accurate than colonoscopy and is currently not used in any population based screening programme.	Rejected
	• **Faecal DNA testing:** This option was rejected as Faecal DNA testing has not yet been trialled in population screening pilots or programmes and is expensive. There is also concern about the stability of the test and the false positive rate.	Rejected
	• **Computed tomography colonography (CTC):** This option was rejected as there would not be enough capacity to offer CTC to a population. The test is also associated with radiation exposure and is an expensive option. CTC may be used as an adjunct to the screening programme where people may not be suitable for colonoscopy e.g. co-morbidities, or inability to tolerate standard bowel preparation.	Rejected
Service Delivery		
Coordination & testing	• **One Centre/More than one centre:** Both options were assessed as being viable, although the option of more than one centre was assessed as only partially meeting a number of criteria. At this stage, no preference has been confirmed and it is planned that the approach will be determined based on the outcomes of the proposed RFP process. International comparisons show that one co-ordination centre would be sufficient to undertake the processing of iFOBT kits. One centre only would lead to improved efficiencies and would likely cost less.	Not concluded
Screening Centre	• **Regional:** This is the preferred option. It was supported by the stakeholder consultation. A regional approach includes awareness raising, health promotion activities, colonoscopy service provision and monitoring quality indicators for the programme and performance of colonoscopy. It allows for strong clinical leadership and more consistency of approach. Having a regional approach to quality systems also allows for improved consistency in monitoring the pathway.	Preferred
	• **Local:** This was rejected as the provision of awareness raising, health promotion activities and colonoscopy service provision at a local level with no regional approach is highly likely to lead to significant variation in service provision, unacceptable variations in the screening pathway and compromised quality. One of the key tenants of a population based screening programme is ensuring adherence to quality standards and consistency of approach.	Rejected

Histopathology	• **National:** This was rejected. The relationships between clinicians and service providers are less likely to develop at a distance. In the face of pathology shortages, having all pathology read centrally would put a significant burden on one laboratory. Transporting diagnostic histology samples in the context of a screening programme would generate an unacceptable risk. • **Local/Regional:** This was the preferred option. There was strong support during stakeholder consultation that histopathology should be provided in the context of usual care. Hospital specialists and services already have well developed pathways for histology processing, including multi-disciplinary meetings. This provides a safer option.	Rejected Preferred
Funding		
	• **DHB funded testing, colonoscopy, treatment, surveillance:** The option was assessed as not meeting two CSFs; 'strategic fit/business need' and 'affordability'. The DHBs are not currently funded for this activity and would not afford it within current allocation. The option is not aligned with the approach to other screening programmes, which have been centrally funded. • **Centrally funded testing, colonoscopy, treatment, surveillance:** The option was assessed as also not meeting the 'strategic fit/business need' and 'affordability' CSFs. There is no precedent for central funding of all elements arising from a screening programme and overall it would be less affordable for Government as the DHBs are already receiving funding for treatment/surveillance. • **Centrally funded testing, colonoscopy, DHB funded treatment, surveillance:** This option was assessed as meeting the CSFs and is therefore a viable option. • **Centrally funded testing, colonoscopy, some surveillance, and DHB funded treatment, some surveillance:** This option was assessed as a viable option. This option provides more support to DHBs for ongoing surveillance. Over time, the surveillance burden arising from this programme will grow and there is a significant risk that the symptomatic population would suffer as a result of increased proportion of resources being directed to ongoing surveillance. By centrally funding a proportion of surveillance, this would enable DHBs to maintain service levels for the symptomatic population whilst providing effective surveillance activity. This option has therefore been identified as the preferred option.	Rejected Rejected Possible Preferred

Appendix 7: NBSP IT Solution Assessment

Entire appendix - (29 Pages) withheld under S9(2)(j)

Appendix 8: CBAx Summary of Cost Benefit Analysis and Assumptions

Option 1 – 4 summaries of cost benefit analysis, using CBAX (4 pages) withheld under S9(2)(f)(iv)

Costing the options using CBAx

Option 1 – Do nothing (the counterfactual)

The pilot would discontinue and people would only have access to colonoscopy if they had symptoms or are at increased risk of bowel cancer.

Assumptions:

1.1 The CRC incidence rate would remain stable, unchanged from current values. Currently it is unknown whether CRC rates will increase or decrease. The current incidence rate is decreasing slightly year on year, however the obesity epidemic could well reverse this trend at any time. It is difficult to accurately predict CRC rates for the next 20 years without detailed modelling. For simplicity, with regards to this options analysis, the assumption has been made that the CRC incidence *rate* will remain stable over the next 20 years if there is no screening programme introduced. This model therefore assumes that *numbers* of cancers will increase, but this would only be a factor of population growth.

1.2 There would be no implementation costs or ongoing costs of a programme.

1.3 Savings in superannuation based on difference between average life expectancy of 81 years with the average age of CRC deaths of 68 years

1.4 People aged 60-74 currently work and pay taxes and also provides a contribution to society. Around 36 percent volunteer (DIA Quarterly Volunteering and Donating Indicator Sep 2014), support their families by being caregiver enabling parents to work or remain in work reducing benefits or providing home support while younger adults work. Children who are well are more likely to attend school, learn and develop in line with their peers, and participate in social activities. The annual loss relating to contribution to society from reduced life expectancy has been estimated at 30 percent of the value of a statistical life divided by the life expectancy.

Option 2 – Basic

The Pilot would continue and all DHBs would come online in 3 tranches. Screening would be offered to people aged 60-74. There would be no primary care involvement in results management.

Assumptions:

2.1 The CRC mortality rate would decrease due to more cancers being found earlier, which would impact on survival. This would start to impact mortality rates approximately 8-10 years after the commencement of screening.

2.2 The CRC incidence rate would decrease due to pre-cancerous lesions being removed from the population during screening colonoscopies. The decrease in incidence would occur approximately 10 years following the commencement of screening.

2.3 Cancer that would have been found without screening would have been found *earlier.* This would result in a stage shift and the corresponding savings in treatment costs. The average first year and remission cost for cancer patient treatment of $54,018 had been used.

2.4 The stage shift is expected to create a short term increase in treatment cost during the first and second round of screening. This has been estimated based on the numbers of cancers identified from screening at 33% of the average first year and remission cost for cancer patient treatment.

2.5 As there would be no GP involvement in positive results management, a small reduction in participation in the programme is assumed, compared to Options where there *is* GP involvement. This is assumed as a percent reduction in participation. This would mean 5 percent fewer colonoscopies being required, 5 percent fewer cancers being found and fewer referrals to

colonoscopy. It would be logical to assume that the reduced participation would be biased towards Māori and Pacific, which would negatively impact on equity.

2.6 Mortality rate assumed to increase by 2 percent as a result of the 5 percent reduction in participation.

2.7 QALY gain based on Waitemata pilot study of 0.0607 had been assumed with a 5 percent reduction reflecting the impact of the reduced participation.

2.8 Increase superannuation cost based on difference between average life expectancy of 81 years with the average age of CRC deaths of 68 years for the projected reduction in mortality.

Option 3 – Integrated

The Pilot would continue and all DHBs would come online in 3 tranches. Screening would be offered to people aged 60-74. Primary care would be involved in results management with DHBs funding surveillance colonoscopies.

Assumptions:

3.1 The CRC mortality rate would decrease due to more cancers being found earlier, which would impact on survival. This would start to impact mortality rates approximately 8-10 years after the commencement of screening.

3.2 Mortality rate will be 2 percent higher with the 2 percent reduction in participation.

3.3 The CRC incidence rate would decrease due to pre-cancerous lesions being removed from the population during screening colonoscopies. The decrease in incidence would occur approximately 10 years following the commencement of screening. Cancer that would have been found without screening would have been found earlier. This would result in a stage shift and the corresponding savings in treatment costs. The average first year and remission cost for cancer patient treatment of $54,018 had been used.

3.4 The stage shift is expected to create a short term increase in treatment cost during the first and second round of screening. This has been estimated based on the numbers of cancers identified from screening at 33% of the average first year and remission cost for cancer patient treatment.

3.5 OPEX costs would be higher (than the counterfactual) to take into account the increased costs to involve GPs in positive results management.

3.6 Costs to the Crown for surveillance colonoscopy will be the same as option 4, with funding by DHBs.

3.7 QALY gain based on Waitemata pilot study of 0.0607 had been assumed with a 2 percent reduction reflecting the impact of the higher mortality.

3.8 Increase superannuation cost based on difference between average life expectancy of 81 years with the average age of CRC deaths of 68 years for the projected reduction in mortality.

Option 4 – Complete (preferred option)

The Pilot would continue and all DHBs would come online in three tranches. Screening would be offered to people aged 60-74. Primary care would be involved in results management and there would be new funding for surveillance colonoscopies.

Assumptions:

4.1 The CRC mortality rate would decrease due to more cancers being found earlier, which would impact on survival. This would start to impact mortality rates approximately 8-10 years after the commencement of screening

4.2 The CRC incidence rate would decrease due to pre-cancerous lesions being removed from the population during screening colonoscopies. The decrease in incidence would occur approximately 10 years following the commencement of screening.

4.3 Participation rate assumed at 62%.

4.4 Cancer that would have been found without screening would have been found earlier. This would result in a stage shift and the corresponding savings in treatment costs. The average first year and remission cost for cancer patient treatment of $54,018 had been used.

4.5 The stage shift is expected to create a short term increase in treatment cost during the first and second round of screening. This has been estimated based on the numbers of cancers identified from screening at 33% of the average first year and remission cost for cancer patient treatment.

4.6 OPEX costs would be higher (than the counterfactual) to take into account the increased costs to involve GPs in positive results management.

4.7 Costs to the Ministry, regarding surveillance colonoscopy, will increase. Costs to the Crown, however, remain the same.

4.8 QALY gain based on Waitemata pilot study of 0.0607 had been assumed.

4.9 Increase superannuation cost based on difference between average life expectancy of 81 years with the average age of CRC deaths of 68 years for the projected reduction in mortality.

Appendix 9: HWNZ Support for NBSP

No. 1 The Terrace
PO Box 5013
Wellington 6145
New Zealand
T+64 4 496 2000

18 April 2016

The Investment Ministers
C/- The Treasury
No. 1 The Terrace
Wellington

Dear Ministers

2016/17 Budget Bid – National Bowel Screening Programme, Workforce Development

Health Workforce New Zealand (HWNZ) and the Ministry of Health Bowel Cancer team have been working closely since the establishment of the bowel screening pilot in 2011.

Since the results of the first screening round became available in late 2014, both teams have developed a comprehensive model showing the impact of various screening variables on workforce. These variables include age range, participation rates and positivity of the screening test.

Modelling is comprehensive and incorporates current symptomatic service provision, use of Computed Tomographic Colonography (CTC), and an increase in symptomatic referrals as a result of increased awareness of bowel cancer.

Dr Susan Parry, Clinical Director, Ministry of Health Bowel Cancer Programme, presented the latest modelling predictions at the HWNZ Board meeting on 3 March 2016. This presentation included the impact of a national bowel screening programme on both colonoscopy and laboratory service provision.

A workforce plan has been developed to ensure the delivery of the screening programme will have sufficient workforce capability. Aspects of this plan have already commenced, as follows:

1. increasing the number of gastroenterology trainees
2. the establishment of a training programme for nurse endoscopists that in the future could potentially be adapted for other non–specialist endoscopists
3. discussions with 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.

The HWNZ Board was very pleased at the progress described, both in terms of workforce developments and the modelling undertaken. The service demand modelling showed that with a restricted age range and higher cut off of the screening test the programme is achievable given workforce projections and the associated training investment. The modelling appears to be rigorous and well considered.

I note that the financial sustainability of the training initiatives referred to above is dependent upon the acceptance of this business case.

Based on the current modelling, HWNZ supports the implementation of a national bowel screening programme.

Yours sincerely

Professor Des Gorman
Executive Chair
Health Workforce New Zealand Board

MINISTRY OF HEALTH
MANATŪ HAUORA

Appendix 10: Tranche Identification

This table summarises the indicative allocation of DHBs to Tranches. This would be tested as part of the Tranche business case development.

DHB	Tranche	Eligible population	Cancer mortality, age specific rate 60-70	Capital/facility	Col'py Urgent	Col'py non Urgent	Col'py Surveillance	IT	Additional comment
Hutt Valley	Tranche 1b March 2017	20,480	72	S9(2)(f)(iv)					
Wairarapa		8,370	94						
Waitemata		78,660	57						
Auckland	Tranche 2 2018	54,580	60						
Canterbury		82,670	73						
Capital and Coast		37,690	64						
Hawke's Bay		26,300	87						
Southern		49,000	103						
Taranaki		18,460	81						
Waikato		56,900	88						
West Coast		6,150	95						
Whanganui		11,040	81						
Bay of Plenty	Tranche 3 2019	38,350	86						
Counties Manukau		64,650	56						
Lakes		16,150	70						
MidCentral		26,880	71						
Nelson Marlborough		27,230	77						
Northland		29,910	91						
South Canterbury		11,120	107						
Tairawhiti		7,085	86						