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MINISTRY OF HEALTH

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28 February 2023

s 9(2)(a)

By email: s 9(2)(a)
Ref: H2023019707

Tēnā koe s 9(2)(a)

Response to your request for official information

Thank you for your request under the Official Information Act 1982 (the Act) to Manatū Hauora (the Ministry of Health) on 30 January 2023. You requested:

> *"An unredacted copy of the document Cost benefit Analysis Template Oct 2015 available at the following link. As this is from a previous government and now 7 years past I am asking for the unredacted document. www.treasury.govt.nz/sites/default/files/2017-11/b16-3609514.pdf."*

The document you have requested is attached to this letter as Document 1 and is released to you in full. Please note, the actual funding increased to $24 million per annum as part of Budget 2016.

I trust this information fulfils your request. Under section 28(3) of the Act, you have the right to ask the Ombudsman to review any decisions made under this request. The Ombudsman may be contacted by email at: info@ombudsman.parliament.nz or by calling 0800 802 602.

Please note that this response, with your personal details removed, may be published on the Manatū Hauora website at: www.health.govt.nz/about-ministry/information-releases/responses-official-information-act-requests.

Nāku noa, nā

PP

Robyn Shearer
Deputy Chief Executive
Deputy Director-General,
Te Pou Mahi Pūnaha | System Performance and Monitoring

Cost Benefit Analysis Template

Section A Descriptive Information

Vote	Health
Responsible Minister	Hon Dr Jonathan Coleman
Initiative title	Electives Health Target

Funding Sought ($m)	2015/16	2016/17	2017/18	2018/19	2019/20 & outyears	TOTAL
Operating	-	$12m	$12m	$12m	$12m	$48m through to 2019/20-
Capital	-	-	-	-	-	-

Problem Definition

Context

In response to growing surgical waiting lists arising elective surgery discharges failing to keep pace with population increases, Cabinet approved funding to increase elective surgery in 2006 and introduced the Elective Surgery Health Target in 2007/08. Successive Budgets have continued to invest in elective surgery. The Elective Surgery Health Target has evolved over the years, but currently aims to increase the level of elective surgery being delivered by around 4,000 discharges a year. The intention is that this will enable elective treatment to keep pace with population growth.

The Electives Health Target applies to all planned surgery (i.e., non-acute). Elective treatment can help to address a range of conditions, from cancer and heart failure, through to loss of sight or functional movement, and includes:

- Palliative surgery – minimising pain and discomfort for those living with incurable conditions. For example, surgery to ease pain, disability or other complications that come with advanced disease including cancer. Surgery may improve quality of life, but not cure the condition.
- Curative surgery – surgical treatment that will / can 'cure' a condition. For example, surgery that eliminates a malignant tumour, or bariatric surgery that reverses diabetes.
- Life enhancing surgery – treatment that improves a person's function, enabling better quality of life and personal contribution. For example, plastic surgery following a serious burn or hip replacement for debilitating osteoarthritis.

The funding model for elective surgery is split between a centrally-held, Ministry-funded component (representing around 25% of the annual total expenditure on elective services, approximately $300m per annum in 2015/16) and a base, DHB-funded component. Centrally held funding is paid for activity delivered over and above DHB base volumes (i.e. a payment-for-performance approach). Centrally-held funding allows the Ministry of Health to set targets and actively monitor DHB performance and is effective in ensuring DHBs continue to prioritise access to elective services. The initiative has proven effective, with the health target being consistently exceeded. There has been an increase in the amount of elective surgery being delivered of more than 41 percent since 2007/08, or an average increase of more than 7000 elective discharges a year. To quantify this in cost terms: in 2014/15, DHBs were expected to deliver 156,490 elective surgical discharges. As at the end of June 2015, DHBs had delivered 10,614 elective surgical discharges more than this. With an average case-weighted discharge value in 2014/15 of 1.21CWD, this means that DHBs were delivering approximately $60 million a year worth of elective surgery, over and above initiative requirements. An additional driver for extra surgery has been in place since 2011, with quality initiatives to reduce the length of time patients wait for elective treatment. DHBs have given priority to meeting milestone waiting time goals, with achievement often requiring additional surgery to be scheduled to ensure timeframes are met. Since January 2015, DHBs have been maintaining a maximum four-month waiting time, therefore since this time there is less of a 'backlog reduction' driving extra delivery. It may be that the current level of 'over delivery' reduces slightly over the next four years.

Elective surgery delivery since 2007/08 has grown at a greater rate than population growth over the same period. Despite this, we know that there was some 'catch up' required to recover some of the shortfall that was apparent in earlier years. While we may be keeping ahead of overall population growth, this is a relatively simplistic stance. We know that New Zealand's population is living longer, with more complex health conditions throughout their life. There still remains significant public concern around the level of 'unmet need', with many professionals advising that the level of need is still outweighing current publicly-funded resourcing allocations.

The recently refreshed draft New Zealand Health Strategy has a focus on prevention, early intervention and community-based health management models. These should impact favourably on demand for elective surgery in the long term, particularly for the younger or future health populations, but given the health status of the current population it is unlikely that we will see meaningful impact on elective demand in the short term to medium term, as treatment focuses on those who already have emerging, existing or chronic health conditions.

Problem definition

New Zealand's population is growing and ageing, with more and more people living with complex long-term health conditions. This initiative aims to address the problem of life-enhancing elective surgery falling behind population growth, resulting in a reduction in wellness amongst the New Zealand population. Funding additional elective surgery also presents an opportunity to leverage Government's investment by utilising the split funding model to require and incentivise further elective provision by DHBs.

Counterfactual

If the provision of elective surgery did not continue to grow proportionally to population need the results would include:

- An increase in the number of people living with complex or debilitating health conditions which impacts on their ability to lead a normal life, with pain and disability limiting their contribution as employees, as family members, or within our society
- An increase in acute presentations and potential growth in complexity and morbidity
- An increase in the average cost of each procedure, reflecting this increased complexity
- An increase in the number of primary care visits and pharmaceutical prescribing costs
- Increased demand for other social services including welfare and aged care services
- Economic impacts and poorer personal outcomes arising from reduced participation in employment and education.

Initiative Description

This initiative supports DHBs to increase the level of elective surgery being delivered by around 4,000 discharges a year. This is measured through the Electives health target. In 2015/16, the health Target is 186,223 elective surgical discharges. It seeks funding of an additional $12m year-on-year to directly fund annual increases of 2,000 additional elective surgery discharges. Because DHBs are expected to match the centrally funded discharge volumes 1:1 in order to access this funding, the investment will in effect provide annual increases of 4,000 additional elective surgery discharges. As discussed above, historically DHBs have exceeded this volume and central funding of 2000 additional discharges has achieved over 7,000 additional discharges per annum.

The strategic intent of the Initiative is to continue growing elective surgery, year on year. Based on this, the supporting CBAx modelling and analysis has been undertaken based on a rising four-year growth profile (i.e. 4000 extra discharges, through to 16,000 in 2019/20). It is acknowledged however, that support for the Initiative needs to be re-confirmed annually, with corresponding Budget Bids. Therefore, the modelling reflects year on year growth, but the Bid is for $12m flat across a four year period.

Alternative Options Considered

1. Marginal pricing has been considered. This option has been discarded because:
   - DHBs are likely to prioritise fully funded activity ahead of marginally funded activity, reducing any incentive to increase elective throughput
   - Electives funded activity is not identified separately in national collections, so determining which activity to apply a marginal price to is not possible

2. Disestablish the Initiative, and instead of holding funding centrally, devolve funding to DHBs via the usual PBFF mechanism, and rely on DHBs to effectively prioritise and deliver to targets, with performance management support from the Ministry. This option has been discarded as past trends have shown that without an effective performance lever in place, DHBs will prioritise access to services based on immediate demand and resource availability. This may mean acute demand takes priority over elective services, and inequities may increase, with DHBs delivering more services where specialist workforce and capacity availability exists, rather than based on local population need. There is also risk that local DHB financial pressures may impact on delivery.

3. Requiring DHBs to self-fund the full 4,000 discharge increase each year; or reducing the health target to an increase of 2,000 discharges each year, fully funded by DHBs. As above, these options have been discarded because of the risk they would present to achievement of the Electives health target. These options would limit the Ministry's ability to leverage increased investment in electives, or improved performance where local financial or other pressures impact on delivery. It would also increase the financial burden on DHBs.

Section B Impact Analysis

Impact Analysis

There are a range of impacts from elective surgery. In addition to health benefits, wider social and economic impacts of surgical interventions have been considered. Past trends on the proportion of people aged under 65, and their average age, has been used to consider the length of impact.

Health: Clear health benefits exist, from a cost-savings point of view, and in terms of individual health outcomes. If people can have their health condition cured or improved through elective surgery, flow on effects include reduced GP visits, less pharmaceutical prescribing costs, a reduction in acute presentations with associated emergency department, radiology, laboratory, hospital bed-day and outpatient costs. It can improve people's day to day living, reducing the need for home help, nursing support, caregiver assistance, Reduced pain and anxiety can relieve depression, and reduce reliance on medication (or other substances). Restoring independence can mean people defer their entry into aged residential care, or need for other support infrastructure. Elective surgery can save people's lives, or can allow them to live longer in good health.

Other: Children who are healthy are more likely to participate effectively in learning and educational environments. Surgery may relieve children of, or lessen the burden of, image related anxiety due to physical deformities. Adults who are well are more likely to be employed, take less time off work, and rely less on social welfare benefits including jobseekers benefit, disability allowances, and unemployment benefits. Older people who are well are more likely to be able to remain employed (and contributing to their personal superannuation savings), support their families by being caregivers, or providing home support while younger adults work. Regardless of age, those who are physically well are more likely to have the income and the inclination to travel, participate in the community, volunteer, visit tourist facilities, and spend at retail outlets. There is significant cost to society for people over 65 who have not saved for their retirement, and rely solely on National Superannuation. If more people had to pay privately for elective surgery, this would undermine personal savings, retirement savings, and impact on people's ability to afford adequate housing and day to day living needs.

According to the Health Funds Association of New Zealand, health insurance coverage as at March 2013 was approximately 30 percent of the New Zealand population. This is 4 percent less than at December 2008. There will be a proportion of patients who, if they could not access publicly-funded elective surgery, would still receive the care they need through their private insurance provisions. We are not currently able to determine how many public patients had private health insurance,

so cannot quantify this as a potential displacement, however it is worth noting as an ongoing contributor to the overall context.

Specific surgery examples:

The cost and benefits of each surgical procedure is hard to quantify, as it depends on the impact that a health condition is having on an individual patient, and what the treatment may enable them to do. The precise mix of surgical treatments offered will also vary from year to year and across DHBs according the population's level of need and ability to benefit. To demonstrate some of the benefits, we have provided examples of typical patient stories, and how elective surgery may improve their outcomes. We have also provided information on how this Initiative supports other health priorities, or relieves pressures on other parts of the social system. Quality Adjusted Life Years (QALYs) are one internationally recognised way of identifying health impacts of certain interventions. Many of the benefits that make up QALYs are non-financial, and instead are linked to the overall impact on someone's life. These have been noted in the impact assessment where appropriate.

General Surgery – approximately 18% of elective surgery

General surgery treats conditions affecting the oesophagus, stomach, small bowel, colon, liver, pancreas, gallbladder, bile ducts, the thyroid gland, and the breasts. An example of a procedure is cholecystectomy surgery (approx. 2% of elective surgery in 2014/15), removing the gall bladder for people with cholecystitis. Cholecystitis is an inflammatory disease, with very painful acute episodes often flaring up on a regular basis. When left untreated, cholecystitis can lead to serious, sometimes life-threatening complications, such as gallbladder rupture. Removal of the gallbladder removes the cause and cures the condition. Aside from the personal impacts for affected people, repeat presentation with cholecystitis has financial impacts due to an increase in acute workload. A recent project undertaken by Hawke's Bay DHB suggests that undertaking a cholecystectomy sooner (electively or acutely) will reduce emergency department presentations and admissions, at a cost of over $1,000 per presentation (assuming one overnight surgical bed = $510, one ED presentation = $334 and one Outpatient Clinic visit = $250).

Hernia repair is another common general surgery procedure (approx. 4% of elective surgery in 2014/15).

There is need to continue growing investment in general surgery delivery. Approximately 25%-30% of all elective surgery is cancer related. The increasing prevalence and complexity of cancer related surgery means that proportionally less 'other' general surgery will be done unless services continue to grow.

Surgery is a vital treatment option and the principal treatment choice for people with cancer. Ministry of Health data shows that in the 12-month period to September 2015, surgery is the first treatment in the majority of cancer cases (54%). Surgery for cancer has a range of benefits, spanning return to work, mental health, and mortality.

Orthopaedics – approximately 15% of elective surgery

Orthopaedic surgery includes hip and knee replacements, shoulder, foot, ankle, hand and spinal surgery. Orthopaedic conditions tend to be painful and limit a person's ability to carry out usual day to day activities. Depending on the nature of the condition, this may result in restricting a person's ability to walk, or participate in exercise, or carry out minimal employment obligations. These restrictions frequently result in extended sick leave, disability allowances, and a reduction in independence for older people requiring earlier entry to aged residential care. For those who do not, or cannot access publicly-funded treatment, patient stories include increased drug dependency for management of pain, or the need to re-mortgage (or sell) property to pay for private treatment. Hip and knee replacement surgery is a common procedure (approx. 6% of elective surgery in 2014/15).

Orthopaedic surgery can assist children born with disabling conditions such as scoliosis, cerebral palsy or club foot, enabling them to ambulate or move physically in ways that were not possible without surgical intervention.

Ophthalmology – approximately 13% of elective surgery

Ophthalmology surgery supports people with eye conditions. For many, their condition means their sight is impaired, or for some, lost entirely. This may mean that their ability to work is limited, they require home help or family support to complete regular daily tasks (e.g. driving, shopping), and their risk of falling is much higher. Cataract surgery is a common procedure (approx. 9% of elective surgery in 2014/15), which can help to restore failing sight. A 2012 New Zealand study notes that

"Expedited first eye cataract surgery reduces falls by 34 percent compared with remaining on the waiting list"1. The same study compared falls of patients who received first eye cataract surgery (within one month of surgery) with those that were still waiting, and determined a fall cost of $11,901 per fall at NZ 2008 prices. There are other elective interventions, such as intraocular eye injections (approx. 3% of electives health target in 2014/15) which are used to manage and reduce the impact of macular degeneration on vision, often retaining enough sight to remain independent.

Plastic surgery & Burns – approximately 6% of elective surgery

Evidence clearly links body image with general function, mental health and wellness. Plastic surgery can assist children born with a cleft palate or 'prominent ears'. It can help people of any age who are impacted by deformities or disfigurement, from burns, congenital defects, or as a result of cancer related trauma, e.g. a breast reconstruction following mastectomy or head and neck surgery reconstruction after cancer surgery. Examples of impacts that have been linked to these conditions include bullying, depression, marital relations breakdown. These have flow on effects on productivity and family strength and impacts negatively on use of social services.

Cardiothoracic – approximately 1% of elective surgery

While cardiac surgery makes up a smaller proportion of the Initiative, past experience in New Zealand's health system shows that if access to surgery does not keep up with demand, then there will be direct impact on people's mortality. Mortality is a 'gross measure' and many patients are severely impacted with chest pain, shortness of breath, poor effort tolerance which may be relieved by surgery even if the 'total length of life' might not be increased. Cardiac surgery is closely managed and monitored as a sub-set within the electives portfolio, and remains a priority area for ongoing investment and focus.

Ear, Nose and Throat – approximately 12% of elective surgery

Better hearing, breathing and swallowing are just a few examples of outcomes that can be achieved through ENT surgery. Ongoing middle ear infections, or throat infections in children have been linked to poorer educational outcomes, and even IQ loss. Some studies have gone further to link these educational outcomes to later behavioural issues and increased risk of obesity, hypertension, cancer and mental health issues. Grommets (approx. 3% of elective surgery in 2014/15) and removal of Tonsils and Adenoids (approx. 4% of elective surgery in 2014/15) can help relieve these infections.

The CBAx modelling has been done on four types of elective surgery. These have not been selected because they show a greater benefit return that other types of surgery. Instead, they have been used as examples to show the different types of benefits that may result from an elective procedure.

The mix of procedures that are delivered each year will change depending on population needs. Electives policy is that access to publicly-funded treatment is provided to those people who have the greatest level of need, and the most ability to benefit. Clinical prioritisation of patients is used to help determine who gets access. For this reason, the Ministry does not look to directly control the mix of procedures, even if the NPVs are different. The principle of 'fairness' should apply, whereby New Zealanders can be confident that they are being treated equitably with others, rather than based on their condition.

Financial and Opportunity Cost to the sector

While the initiative funds 50% of each year's expected increase in delivery, DHBs are expected to deliver the remaining 50% through maximising overheads, capacity and resources; or making improvements in productivity and efficiency, streamlining care models, or through prioritising funding from their baseline PBFF funding envelope. Efficiencies may save the sector costs but it is hard to quantify at a total level. We have assumed that the increased rate of delivery being achieved through DHB's base (PBFF) funding has a real cost to the sector that is equivalent to the cost of delivery being achieved through centrally-held funding. This has been acknowledged explicitly as a line item in the CBAx model, recognising the cost impact to the sector. Efficiency gains have been modelled as a 25% cost saving reflecting that fixed and overheads represents about 50% of the fully absorbed procedure cost and that the DHB is able to avoid half of that amount.

[1] Robertson MC, Campbell AJ. Falling costs: the case for investment. Report to Health Quality & Safety Commission. University of Otago: Dunedin, New Zealand, December 2012.

Constraints and downstream impacts: Continued growth in elective surgery delivery will change the level of resources and capacity required in the secondary and tertiary hospital systems.

- Theatre capacity - most DHBs currently provide elective surgery using a mixed model of internal workforce and physical capacity, and outsourcing to private hospital providers. In 2014/15, 9% of publicly-funded elective surgery was provided in a private hospital facility. This proportion has remained relatively consistent over past years, in an environment of increasing delivery. The Ministry believes that there is currently sufficient capacity in New Zealand to support an increase in surgery over the next four years, though the specific impact will vary by DHB and region.
- Workforce - there are already a number of surgical specialties where availability of specialist workforce is a constraint. National and local initiatives are underway to support vulnerable workforce groups, however additional elective surgical growth may exacerbate existing constraints.
- National Bowel Screening Programme – there will be downstream impacts on elective surgery demand should there be a roll-out of a National Bowel Screening Programme. Earlier identification of bowel-related disease or cancer will have a flow on effect, increasing the number of people being referred for general surgery. The benefit however, is that early identification through the screening programme may result in less complex surgical interventions, with conditions treated at a less advanced stage.
- Private insurance market – as New Zealanders reduce coverage or uptake of private insurance the health costs are likely to transfer to the public system.
- ACC – there are interactions between the work of the Ministry of Health and that of ACC. ACC initiatives, such as their current 'falls' programme, will help support a reduction in acute hospital presentations, support those with musculoskeletal conditions, and ultimately reduce costs. Conversely, decisions by ACC about the types of condition that they will cover will impact on other public health demand. For example, ACC recently updated advice on shoulder conditions with most now not being covered as they are considered by ACC to be degenerative in nature. Declined ACC cases are generally referred for consideration for public funding as an alternative.

Impact Summary Table

For each example elective procedure there are two options – option one includes benefits linked to Quality Adjusted Life Years (QALYs). Option two excludes QALYs from the modelling.

With the exception of tax income and employment income benefits, all benefits have been assumed at three years. This is on the basis that people may deteriorate over that period to a point sufficient to qualify for publicly-funded surgery. This is a conservative length of impact, because if no additional funding were allocated the level of access may reduce. Because of some of the long term benefits of the Initiative, a 50-year NPV has been used in the summary table.

As mentioned above, the strategic intent of the Initiative is to continue growing elective surgery, year on year. Based on this, the supporting CBAx modelling and analysis has been undertaken based on a rising four-year growth profile (i.e. 4000 extra discharges, through to 16,000 in 2019/20). It is acknowledged however, that support for the Initiative needs to be re-confirmed annually, with corresponding Budget Bids on an annual basis. Therefore, the modelling reflects year on year growth, but the Bid is for $12m flat across a four year period.

Impact Summary Table – Elective hip and knee replacement surgery

Impacts - Identify and list $m present value, for monetised impacts	Option/scenario		Assumptions and evidence (quantify if possible, and use ranges where appropriate)	Certainty[2]
	1	2		
Cost of the Initiative				

[2] Rate your level of confidence in the assumptions and evidence as high (green) if based on significant research and evaluations that is applicable, medium (amber) if based on reasonable evidence and data, or low (red) if there is little relevant evidence. Colour the rating box for each impact.

Increase in the level of elective hip and knee surgery delivered annually for 4 years	($33M)	($33M)	Assuming growth of 240 additional hip and knee replacement surgeries, year on year, from 2016/17 to 2019/20, at a cost of $18,000 each. Past performance indicates that DHBs will deliver 4,000 extra elective surgeries per annum under this Initiative. Hip and knee replacement surgery currently makes up 6% of elective surgery. Rates of achievement are realistic.	High
Estimated impact on key outcomes & Government Benefits/(Costs)				
Efficiency gains through maximised overheads, fixed costs, capacity and resources	$8M	$8M	DHBs have delivered, on average, well in excess of what is required under the Initiative. Additional delivery may not result in increase in overheads and fixed costs. DHBs have ongoing service improvement initiatives underway to improve and streamline processes/care models to create system efficiencies. Assumed 25% of full absorbed cost in procedure not incurred.	Med
Reduce need for disability allowance for three years	$1M	$1K	10% of patients requiring hip/knee replacement surgery would quality for disability allowance for 3 years.	Med
Reduce need for disability allowance for two years	$1M	$1M	10% of patients requiring hip/knee replacement surgery would not qualify initially, but would qualify by the end of the second year waiting for surgery.	Med
Extra tax income generated (adjusted to 25%)	$7M	$7M	Assumes 10% of patients are not in paid employment due to the effects of their condition. 75% of those patients (7.5% of all patients) who were out of paid employment due to their condition return to paid employment after two months recovery from surgery. Reduced to 25% of this value to allow for displacement and opportunity cost of labour. Length of impact calculated based on proportion of elective orthopaedics patients who are under 65 (54% in 2014/15), and the average age of those under 65 (42 years old)	Med
Reduce number of people entering rest homes	$11M	$11M	5% of patients requiring this surgery would experience a deterioration of health status, injury, mental health issues over a 3 year wait, which would lead to moving into a rest home where they would spend an average of 10 years. Assumption that if the patient receives the surgery they need it would cut this rate in half (i.e. 2.5% move into a rest home).	Med
Reduce number of GP visits	$0M	$0M	Over 3 years waiting for surgery, 50% of patients would visit their GP once per year due to this condition.	Med
Reduce number of GP visits	$1M	$1M	Over 3 years waiting for surgery, 50% of patients would visit their GP twice per year due to this condition.	Med
Reduce number of community nurse (or similar) visits required	$1M	$1M	Assumes that 10% of patients who are do not receive the hip and knee replacement surgery they need would receive services from a community services nurse or similar, on average ½ hour per week for a three year period while they wait for surgery. If they received surgery, those patients (10%) would get eight weeks of ½ hour visits while they recovered from surgery.	Med
Reduce the number of falls	$1M	$1M	Assumes that in each year that patients wait for surgery with this condition, 2% would experience a fall and the effects of a fall. Modelling based on 2% falling in first year, 2% in second year, 2% in third year. If surgery is received, in the first year after surgery there is still a risk of falling but it is ¼ of what it was before surgery. In subsequent years, the risk is insignificant. Reference for costs: Falling Costs – The Case for Investment.	Med
Wider Societal Benefits/(Costs)				
Extra personal income generated (after tax, and adjusted to 25%)	$40M	$40M	Assumes 10% of patients are not in paid employment due to the effects of their condition. 75% of those patients (7.5% of all patients) who were out of paid employment due to their condition return to paid employment after two months recovery from surgery. Reduced to 25% of this value to allow for displacement and opportunity cost of labour. Length of impact calculated based on proportion of elective	Med

			orthopaedics patients who are under 65 (54% in 2014/15), and the average age of those under 65 (42 years old)	
Incremental quality adjusted life years gained	$113M	$0	For 90% of patients: 0.16 per year for 3 years (based on total of 0.8 QALYs per patient over 5 years). Option One includes QALY, Option Two excludes QALY.	Med
Net Present Value of Total Quantified Societal Impacts	**$151M**	**$38M**		Medium

Impact Summary Table – Elective cataract surgery

Impacts - Identify and list $m present value, for monetised impacts	**Option/scenario** 1	2	**Assumptions and evidence (quantify if possible, and use ranges where appropriate)**	**Certainty**[3]
Cost of the Initiative				
Increase in the level of elective cataract surgery delivered annually	($11M)	($11M)	Assuming growth of 360 additional cataract replacement surgeries, year on year, from 2016/17 to 2019/20, at a cost of $3,000 each. Past performance indicates that DHBs will deliver 4,000 extra elective surgeries per annum under this Initiative. Cataract surgery currently makes up 9% of elective surgery. Rates of achievement are realistic.	High
Estimated impact on key outcomes & Government Benefits/(Costs)				
Efficiency gains through maximised overheads, capacity and resources	$3M	$3M	DHBs have delivered, on average, well in excess of what is required under the Initiative. Additional delivery gives opportunity to maximise overheads, capacity and resources. DHBs have ongoing service improvement initiatives underway to improve and streamline processes/care models to create system savings. Assumed 25% of full absorbed cost in procedure not incurred.	Med
Reduce need for disability allowance	$3M	$3M	10% of patients requiring cataract surgery would qualify for a disability allowance for three years.	Med
Extra tax income generated (adjusted to 25%)	$7M	$7M	Assumes 10% of patients are not in paid employment due to the effects of their condition. Assume 80% of these would resume paid employment after surgery. Reduced to 25% of this value to allow for displacement and opportunity cost of labour. Length of impact calculated based on proportion of elective ophthalmology patients who are under 65 (31% in 2014/15), and the average age of those under 65 (43 years old)	Med
Reduce number of people entering rest homes	$21M	$21M	Due to the effect of falls or other effects of vision impairment, 5% of patients requiring cataract surgery will go into a rest home, on average by the end of the second year of waiting. They will remain in a rest home for an average of 10 years. The risk of going into a rest home would be halved following cataract surgery.	Med
Reduce number of GP visits	$1M	$1M	Assumes 90% of patients will visit their GP (or optometrist) due to issues related to cataracts/worsening vision once per year.	Med
Reduce number of community nurse (or similar) visits required	$2M	$2M	Assumes that 10% of patients who are do not receive the cataract surgery they need would receive services from a community services nurse or similar, on average ½ hour per week for a three year period while they wait for surgery.	Med
Reduce the number of falls	$30M	$30M	34% of patients requiring cataract surgery would fall on average once per year (assumed across three years). For that 34% of patients, the risk of falling reduces following cataract surgery to 30% of what it was previously.	Med
Wider Societal Benefits/(Costs)				

[3] Rate your level of confidence in the assumptions and evidence as high (green) if based on significant research and evaluations that is applicable, medium (amber) if based on reasonable evidence and data, or low (red) if there is little relevant evidence. Colour the rating box for each impact.

Extra personal income generated (after tax, and adjusted to 25%)	$40M	$40M	Assumes 10% of patients are not in paid employment due to the effects of their condition. Assume 80% of these would resume paid employment after surgery. Reduced to 25% of this value to allow for displacement and opportunity cost of labour. Length of impact calculated based on proportion of elective ophthalmology patients who are under 65 (31% in 2014/15), and the average age of those under 65 (43 years old)	Med
Incremental quality adjusted life years gained	$46M	$0	For 90% of patients: 0.165 per year for 3 years (based on total of 3.3 QALYs per patient over 20 years). Option One includes QALY, Option Two excludes QALY.	Med
Reduce the number of road accidents	$0	$0	1% of patients with vision impairment caused by cataracts have an accident each year (Assumed vision impairment makes road accidents 5 times more likely than for the general population). Discounted fully due to not using "Value of a Statistical Life"	Low
Net Present Value of Total Quantified Societal Impacts	**$142M**	**$96M**		Medium

Impact Summary Table – Elective cholecystectomy surgery

Impacts - Identify and list $m present value, for monetised impacts	**Option/scenario** 1	2	**Assumptions and evidence (quantify if possible, and use ranges where appropriate)**	**Certainty**[4]
Cost of the Initiative				
Increase in the level of elective cholecystectomy surgery delivered annually	($5M)	($5M)	Assuming growth of 80 additional cataract replacement surgeries, year on year, from 2016/17 to 2019/20, at a cost of $8,000 each. Past performance indicates that DHBs will deliver 4,000 extra elective surgeries per annum under this Initiative. Cholecystectomy surgery currently makes up 2% of elective surgery. Rates of achievement are realistic.	High
Estimated impact on key outcomes & Government Benefits/(Costs)				
Efficiency gains through maximised overheads, capacity and resources	$1M	$1M	DHBs have delivered, on average, well in excess of what is required under the Initiative. Additional delivery gives opportunity to maximise overheads, capacity and resources. DHBs have ongoing service improvement initiatives underway to improve and streamline processes/care models to create system savings. Assumed 25% of full absorbed cost in procedure not incurred.	Med
Extra tax income generated (adjusted to 25%)	$3M	$3M	Assumes 10% of patients are not in paid employment due to the effects of their condition. Assume 75% of these (7.5% of all) would resume paid employment after two months recovery after surgery. Reduced to 25% of this value to allow for displacement and opportunity cost of labour. Length of impact calculated based on proportion of elective general surgery patients who are under 65 (62% in 2014/15), and the average age of those under 65 (45 years old)	Med
Reduce emergency department presentations	$0M	$0M	33% of patients waiting for this surgery will present to the ED twice in the first and second years with acute cholecystitis or other related condition.	Med
Reduce inpatient hospital visits	$4M	$4M	The same 33% would be admitted to hospital after presenting at the ED.	Med
Reduce outpatient hospital appointments	$0M	$0M	53% of patients waiting for surgery will have an outpatient attendance each year (assessment, follow up).	Med

[4] Rate your level of confidence in the assumptions and evidence as high (green) if based on significant research and evaluations that is applicable, medium (amber) if based on reasonable evidence and data, or low (red) if there is little relevant evidence. Colour the rating box for each impact.

Reduce ambulance call out	$0M	$0M	Assumed 20% of patients with an acute bout of cholecystitis will call an ambulance, once in the first year, and once in the second year	Med
Reduce number of people entering rest homes	$2M	$2M	Assumed that after waiting three years for surgery, 2% would have experienced declining health status, mental health issues, premature ageing that would result in a move into a rest home.	Med
Pharmaceutical costs – cholecystitis	$0M	$0M	Assumed that 90% of patients would require drugs worth approximately $100 per year while waiting for surgery (assumed over 3 years)	Med
Wider Societal Benefits/(Costs)				
Extra personal income generated (after tax, and adjusted to 25%)	$17M	$17M	Assumes 10% of patients are not in paid employment due to the effects of their condition. Assume 75% of these (7.5% of all) would resume paid employment after two months recovery after surgery. Reduced to 25% of this value to allow for displacement and opportunity cost of labour. Length of impact calculated based on proportion of elective general surgery patients who are under 65 (62% in 2014/15), and the average age of those under 65 (45 years old)	Med
Incremental quality adjusted life years gained	$52M	$0	For 90% of patients: 0.84 per year for 3 years (based on total of 4.18 over a 5 year horizon). Option One includes QALY, Option Two excludes QALY.	Med
Net Present Value of Total Quantified Societal Impacts	**$74M**	**$22M**		Medium

Impact Summary Table – Elective cancer-related surgery

Impacts - Identify and list $m present value, for monetised impacts	**Option/scenario** 1	2	**Assumptions and evidence (quantify if possible, and use ranges where appropriate)**	**Certainty**[5]
Cost of the Initiative				
Increase in the level of elective cancer-related surgery delivered annually	($55M)	($55M)	Assuming growth of 1200 additional cancer-related surgeries, year on year, from 2016/17 to 2019/20, at a cost of $6,000 each. Past performance indicates that DHBs will deliver 4,000 extra elective surgeries per annum under this Initiative. Cancer-related surgery currently makes up approximately 30% of elective surgery. Rates of achievement are realistic.	High
Estimated impact on key outcomes & Government Benefits/(Costs)				
Efficiency gains through maximised overheads, capacity and resources	$14M	$14M	DHBs have delivered, on average, well in excess of what is required under the Initiative. Additional delivery gives opportunity to maximise overheads, capacity and resources. DHBs have ongoing service improvement initiatives underway to improve and streamline processes/care models to create system savings. Assumed 25% of full absorbed cost in procedure not incurred.	Med
Extra tax income generated (adjusted to 25%)	$43M	$43M	Assumes 30% of patients are not in paid employment due to the effects of their condition. Length of impact calculated based on proportion of all elective surgery patients who are under 65 (58% in 2014/15), and the average age of those under 65 (45 years old)	Med
Reduce outpatient hospital appointments	$17M	$17M	Assumes all patients waiting for cancer-related surgery have two outpatient hospital visits per year	Med
Reduce ambulance call out	$0M	$0M	Assumed 2% of patients waiting for cancer-related surgery will experience health effects that lead to an ambulance call out	Med
Reduce emergency department presentations	$0M	$0M	Assumed 2% of patients waiting for cancer-related surgery will experience health effects that lead to an ED presentation	Med

[5] Rate your level of confidence in the assumptions and evidence as high (green) if based on significant research and evaluations that is applicable, medium (amber) if based on reasonable evidence and data, or low (red) if there is little relevant evidence. Colour the rating box for each impact.

Reduce inpatient hospital visits	$3M	$3M	Assumed 2% of patients waiting for cancer-related surgery will experience health effects that lead to hospital admission	Med
Reduce number of GP visits	$2M	$2M	Assumes 100% of patients waiting for cancer-related surgery see their GP once a year regarding their condition	Med
Reduce number of community nurse (or similar) visits required	$6M	$6M	Assumes that 10% of patients who are do not receive the cancer-related surgery they need would receive services from a community services nurse or similar, on average ½ hour per week	Med
Reduce hospice care support	$1M	$1M	Assumes that 2% of patients waiting for cancer-related surgery have two days of hospice care (conservative).	Med
Reduce number of people entering rest homes	$17M	$17M	Assumed that each year, 1% of patients waiting for cancer-related surgery will experience a decline in health status, mental health or premature ageing that would result in a move into a rest home, where they will stay for 10 years	Med
Wider Societal Benefits/(Costs)				
Extra personal income generated (after tax, and adjusted to 25%)	$238M	$238M	Assumes 30% of patients are not in paid employment due to the effects of their condition. Length of impact calculated based on proportion of all elective surgery patients who are under 65 (58% in 2014/15), and the average age of those under 65 (45 years old)	Med
Incremental quality adjusted life years gained	$568M	$0	Assumed conservative value based on mastectomy QALYs gained (0.615 per year over 5 years). This is conservative because other elective cancer surgeries can have far higher QALYs gained, e.g. lung cancer surgery is associated with 11.66 over 7 years. QALYs assumed to be gained for 90% of patients. Option One includes QALY, Option Two excludes QALY.	Med
Net Present Value of Total Quantified Societal Impacts	**$854M**	**$286M**		Medium

Section C Conclusions

Conclusions

The analysis shows the Initiative proposed has substantial financial and non-financial net benefits.

Clear health benefits exist, from a cost-savings point of view, and in terms of individual health and social outcomes. If people can have their health condition cured or improved through elective surgery, flow on effects include reduced GP visits, less pharmaceutical prescribing costs, a reduction in acute presentations with associated emergency department, radiology, laboratory, hospital bed-day and outpatient costs. Adults who are well are more likely to be employed, take less time off work, and rely less on social welfare benefits including jobseekers benefit, disability allowances, and unemployment benefits. Older people who are well are more likely to be able to remain employed (and contributing to their personal superannuation savings), support their families by being caregivers, 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.

Summary of monetised results

Use ranges for values where appropriate	Discount Rate	
	8% real (default)	4% real (sensitivity)
Net Present Value (NPV)[6]	$2,154M / $782M	$3,087M / $1,400M
Benefit Cost Ratio (BCR)[7]	12.71 / 5.25	14.74 / 6.68
Return on Investment (ROI) – Societal Total [8]	12.71 / 5.25	14.74 / 6.68
Return on Investment (ROI) – Government [9]	1.79 / 1.79	2.12 / 2.12

Supporting Evidence

For all procedures, data on 2014/15 elective surgery delivery was used to form assumptions on proportions of surgery, and age groups. This information was sourced from the National Minimum Dataset, extracted in August 2015.

Hip and Knee assumptions:

Dall TM, Gallo P, Koenig L, Gu Q, Ruiz D. Modeling the indirect economic implications of musculoskeletal disorders and treatment. Cost Eff Resour Alloc. 2013 Mar 15;11(1):5 (p1-14)

Robertson MC, Campbell AJ. Falling costs: the case for investment. Report to Health Quality & Safety Commission. University of Otago: Dunedin, New Zealand, December 2012.

Employment characteristics and job loss in patients awaiting surgery on the hip or knee: http://www.ncbi.nlm.nih.gov/pubmed/15613609

[6] **Net Present Value (NPV)** - The NPV is the sum of the discounted benefits, less the sum of the discounted costs (relative to the counterfactual). This gives a dollar value representing the marginal impact on the collective living standards of all New Zealanders of the initiative, in today's dollar terms.

[7] **Benefit Cost Ratio (BCR)** - The BCR is the ratio of total discounted benefits to the total discounted costs. A proposal with a BCR greater than 1.0 has a positive impact, because the benefits exceed the costs. The BCR is the same as the Return on Investment Societal Total, unless there are negative impacts in addition to the fiscal cost of the initiative. All negative impacts are included in the denominator for the BCR measure. For example, the BCR measure would reduce if the private cost to people of attending was monetised for the illustrative example and therefore included in the denominator for the BCR calculation.

[8] **Return on Investment (ROI) - Societal Total** - Calculate the ROI by dividing the discounted net change in wider societal impact, including benefits to government, by the discounted cost of the initiative. This can be interpreted as the impact on New Zealanders per dollar the government spends on the initiative, as an example for every $1 the government spends on this programme, New Zealanders receive benefits of $3.

[9] **Return on Investment (ROI) – Government** – Calculate the ROI by dividing the discounted net change in impact for the government by the discounted cost of the initiative. This measures the discounted net marginal (fiscal) benefits to the government.

Patients with osteoarthritic joints are more likely to fall: http://www.sportsarthritisresearchuk.org/seoa/news/osteoarthritis-affected-joints-can-increase-a-persons-fall-risk.aspx

The Effect of Total Hip Replacement on the Employment Status of Patients Under the Age of 60 Years: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1964053/

QALY: Fordham R. et al: The Economic Benefit of Hip Replacement: A 5 year follow-up of costs and outcomes in the Exeter Primary Outcomes Study. BMJ. 2012

Feedback from Mr Allan Panting, former Director, Surgical Affairs, Royal Australasian College of Surgeons, and retired Orthopaedic Surgeon

Feedback from Mr John Cullen, Director, Elective Surgery Centre, Waitemata DHB, and retired Orthopaedic Surgeon

Cataract assumptions:

Robertson MC, Campbell AJ. Falling costs: the case for investment. Report to Health Quality & Safety Commission. University of Otago: Dunedin, New Zealand, December 2012.

Additional material related to falls / hip fracture: http://www.hqsc.govt.nz/assets/Falls/10-Topics/topic6-why-hip-fracture-prevention-and-care-matters-Nov-2013.pdf

Road accidents: General population risk of 0.2% of being involved in a crash causing injury or death from transport.govt.nz (Reported injury crashes 2014 section 1 Historical Excel file). 3% of road accidents are fatal, 1.1 fatality per fatal accident (transport.govt.nz: Motor Vehicle Crashes in New Zealand 2014). 1%x3% = 0.003% risk of fatal car accident in which 1.1 statistical lives are lost. Surgery reduces risk of road accidents (assumed all types of road accidents) by 13% (from Karmel, M. New Data Focus on Safety, QOL and Cost Benefits of Cataract Surgery. www.aao.org). 13% reduction in 0.003% risk means post intervention risk of 0.00261%.

QALY: Reference: Brown, M. 2014.

Cholecystecomy assumptions:

Timely cholecystectomy for acute gallstone disease: an ongoing challenge in a New Zealand provincial centre: https://www.nzma.org.nz/journal/read-the-journal/all-issues/2010-2019/2014/vol-126-no-1392/article-welch

The Cost of Ignoring Acute Cholecystectomy: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2752241/

Assumptions on number of presentations & pharmacy: http://www.qualitasconsortium.com/index.cfm/reference-material/delivering-value-quality/focus-on-cholecystectomy-commissioners-guide/
http://www.gponline.com/acute-cholecystitis/gi-tract/article/897919

Likely medical treatment: http://www.gponline.com/acute-cholecystitis/gi-tract/article/897919
High level assumptions on work impacts: http://www.biomedcentral.com/1471-2458/7/164

Impact on social activities: http://www.biomedcentral.com/1471-2458/7/164

QALY: https://tspace.library.utoronto.ca/bitstream/1807/43545/6/de%20Mestral_Charles_W_A_201311_PhD_thesis.pdf.

Cancer-related surgery assumptions:

Rejecting cancer treatment – what are the consequences: https://www.sciencebasedmedicine.org/rejecting-cancer-treatment-what-are-the-consequences/

QALYs:

Lung cancer: http://www.sciencedirect.com/science/article/pii/S0169500214003481)

Mastectomy: (http://jco.ascopubs.org/content/21/6/1139.full)