

# WORKING DRAFT

Stakeholder review - June 2018

## A BETTER START

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Improving the potential for all young New Zealanders

National  
**SCIENCE**  
Challenges

FUTURE  
STRATEGY  
2019 - 2024

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*Our goal is to find better ways to predict, prevent and intervene so children have a healthy weight, are successful learners and adolescents are emotionally and socially well*

## Section 1: Long-term view

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The aim of the Challenge is to improve the potential for all young New Zealanders to lead healthy and successful lives. To achieve this, the Challenge is researching improved methods and tools to predict, prevent and intervene so children have a healthy weight, are successful learners and adolescents are emotionally and socially well-adjusted.

Long-term our goals are to reduce by 15% the children who have an unhealthy weight, reduce by 15% the children not achieving the reading milestones at Year 1 and reduce by 15% the number of young people experiencing a significant mental health issue. The Challenge's approach to predict and prevent poor health and wellbeing outcomes in early childhood, to engage with communities in research co-design and bring together different disciplines and to take a holistic approach. A further enabling research theme Big Data analyses longitudinal cohort studies and the Integrated Data Infrastructure.

### Challenge Priorities

Our focus will be on three cross-Challenge priorities: equity, impact, and strengthening our three research themes through more integration. To reinforce and braid together current research the Challenge has two cross-cutting research priorities for the second period of its mission, sleep and life course. Projects will be designed to enhance existing research outcomes by creating further theme linkages within the Challenge, and collaborations with other national science challenges and New Zealand research institutes and international collaborators. Big Data remains an enabling theme across all research activity.

Our work is committed to support the achievement of the potential of Maori knowledge, resources and people through the Vision Mātauranga framework. Our He Awa Whiria (Braided Rivers model) will guide us to integrate knowledge from differing sources so they intersect in mutually inclusive domains flowing forward to progress the well-being of our tamariki and whānau. The Challenge will continue to developing a cohesive and logical progression of strategically focused research projects that will best enable us to meet our 10 year performance indicators. Extension and completion of period one research projects will lead into new period two projects, culminating in translational research to ensure that successful interventions can be scaled as well as supported and delivered by key stakeholders.

### Our Challenge priorities

- ✓ *Equity of outcomes*
- ✓ *Strengthen current themes*
- ✓ *Deliver impact*

## Section 2: Five year strategy

### Developing the 2019-2024 Strategy

To prepare for the second period, we undertook further consultation on the direction of research, how to build on it and how to translate research into impact. This consultation informed the 2019-2024 strategy. A central question the strategy has addressed is how to continue to support the aspirations of our communities and give effect to the Vision Mātauranga policy in our research and operations. The Challenge completed widespread engagement with scientists, stakeholders and communities at the end of 2017. We shared findings from Challenge research activities, discussed potential second period research priorities and sought to bring in new researchers and stakeholders to contribute to meeting A Better Start's objectives. The process involved two major coordinated activities: consultation with scientists, stakeholders and communities, and in-depth engagement with key stakeholder organisations.

#### Consultation workshops

The Directorate and science leadership team hosted seven science and stakeholder workshops around the country. The workshops included a Māori and Pasifika workshop that sought specific community and cultural perspectives to science planning and delivery. The workshops were a crucial step to ensure meaningful stakeholder engagement and participation through the building of trust and mutual understanding.

Through the workshops we sought to:

- **Work with communities and stakeholders crucial to delivering impact.** Without their involvement our important research findings are unlikely to be implemented.
- **Ensure the Challenge engaged with the country's most talented researchers in our theme areas.** Refreshing expertise is crucial to maintain research excellence. This has led to a doubling of the number of researchers involved in the Challenge and considerable expansion of disciplines within theme teams.

#### In-depth engagement

The Directorate met with key stakeholders critical to widespread delivery and impact of research to seek their input on relevance, innovation and potential for scaling. These stakeholders included the Iwi Leaders Whānau Ora group; Ngāti Whātua kī Orākei; Ngai

Tuahuriri, Ngai Tahu; the Ministry of Health Child Health Advisor, the Ministry of Education early education, school achievement, and big data leaders, the Christchurch Ministry of Education community projects leader; Plunket Chief Strategy and Performance Officer and Plunket National Advisor Policy and Advocacy, the Children's Commissioner, Kids First Kindergarten CEO; Head of Science and Principal of One Tree Hill and Tamaki Colleges, Principals in the Christchurch Linwood Community of Learning, (Kāhui Ako) and Principals of the Waitemata Kāhui Ako in Auckland; Christchurch Pasifika Advisory Group; Christchurch Child Health Community practitioners; an extensive stakeholder community in the Hawkes Bay (Ngāti Kahungunu, Decile 1-10 primary school principals, decile 1 early childhood education centres, Hawkes Bay District Health Board Child Health team, Hawkes Bay Community Fitness Board).

From the consultation process the Challenge summarised the following thematic feedback:

- **Culturally responsive:** Giving effect to Vision Mātaraunga further enhances our themes and has guided the development of research capability within the teams and the co-creation and co-design of research with stakeholders and communities. The Strategy 2019-2024 outlines a key initiative in this space.
- **Strengths-based approach:** A recurring point from stakeholders notably Māori and Pasifika is to avoid deficit thinking, labelling and framing. Using conventional health and education terminology is alienating and disengaging for these communities. We have re-titled the three major themes Healthy Weight (previously obesity), Successful Learning (previously literacy) and Resilient Teens (previously adolescent mental health) to support strength-based thinking and process throughout the Challenge.
- **A child is a member of a whānau and a community:** A common refrain at our seven consultation workshops was that child-focused research must be more inclusive. Any interventions that focus on a child may have a positive effect on the whānau and community in which they live that we should recognise and measure. While our 10-year performance indicators focus on children, the benefits of intervention may be substantively larger.
- **Better integration:** While there was evidence of integration of the themes in the first period, a discussion with an MBIE leaders group (the MBIE Science Board Chair, Deputy Chief Executive of the [Labour, Science and Enterprise group](#) of MBIE and the Prime Minister's Chief Science Advisor) in 2017 suggested that "It is important that when reporting a clear story is told around how the various research themes weave together to deliver against the mission of the Challenge." In the second period further linking of the three major themes is planned.

### Strategy 2019-2024: Building on momentum

Our stakeholders endorsed the three health, learning and well-being themes as significant and of continuing relevance. The consensus was that they should continue into the next phase (Figure 1). This was further informed by a Challenge-commissioned independent analysis of New Zealand's aligned research landscape across the three theme areas that found only a small quantum of HRC-funded research was aligned to the Challenge research focus on prediction, detection and early intervention as offering the greatest impact. The analysis of aligned research has also enabled the Challenge to have confidence that it has consulted with or interacts with, the key aligned research teams and organisations nationally. With significant momentum on a clear research pathway, changing themes or research priorities at this mid-point would prevent delivery of our performance indicators. Consultation endorsed the need for the 2019-2024 Strategy to build on the research pathway created in the first period.

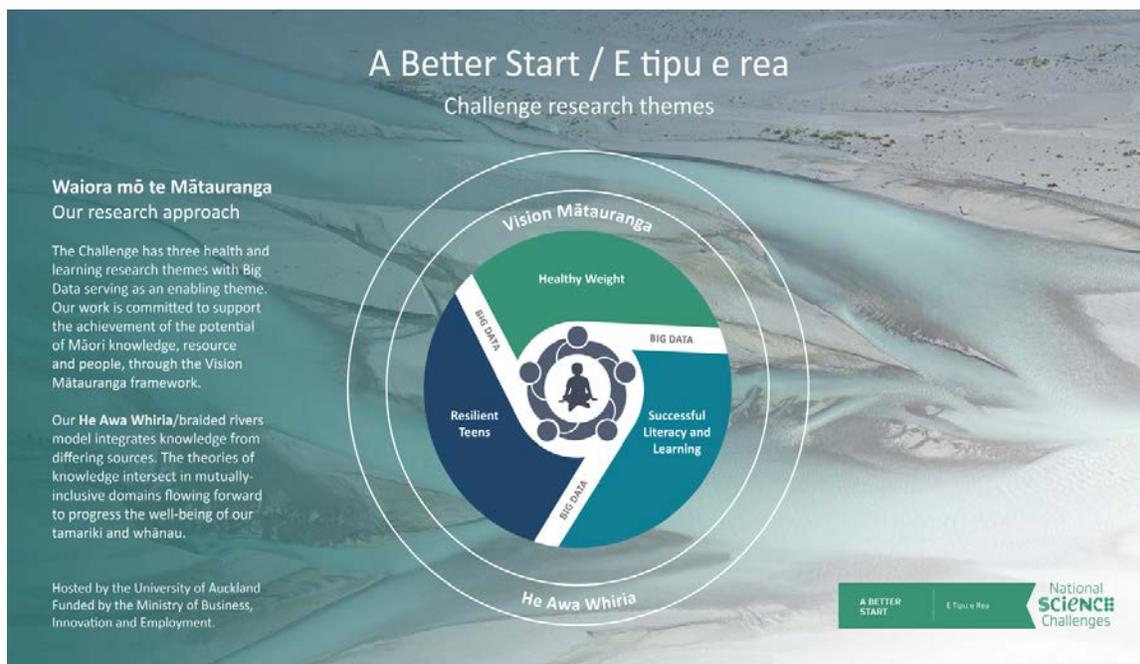


Figure 1: A Better Start Challenge Research Themes

The importance of these three themes is reflected in government initiatives and position papers in recent years and within new strategies. The Ministry of Health have recognised childhood obesity as a major health problem and have established a national referral pathway for 4 to 5 year-old children via the B4 School Check who are overweight or obese. A recent report from the Education Review Office on primary schools in New Zealand noted that raising expectations of our children's early literacy success in Years 1 and 2 at school was a critical area to be addressed. More effective assessment and interventions in Year 1 will help to meet this need. In these areas Challenge researchers have complementary research priorities that focus on early detection and prevention and early intervention.

A recent report from the Prime Minister's Chief Science Advisor entitled Improving the Transition: Reducing Social and Psychological Morbidity During Adolescence<sup>1</sup> raised concerns about mental health issues in the period when young people move from childhood to adulthood. The platform of research advanced within our Resilient Teens theme directly addresses the importance of early detection and management of youth mental health problems as highlighted in the Chief Science Advisor's report. By bringing together the outcomes of the extensive consultation and engagement, the Directorate and theme leaders reviewed the research approach and focus for research in the second period of the mission. The Challenge Science Advisory Panel, Kāhui, Pasifika advisory group and Board supported the approach to form the strategy and all endorse this strategy.

## A Better Start Strategy 2019-2024

### Challenge approach and research priorities

The iterative and rigorous consultation and engagement process ensures our Strategy 2019-2024 leverages on the learnings and outcomes from the first research period, and responds to new perspectives arising from close engagement with the research sector communities and public sector and NGO policy advisers. The process has triggered a refresh in research teams and in our Science Advisory Panel. Strategy 2019-2024 outlines three cross-Challenge approach priorities: equity, impact, and strengthening our research themes through more integration. To reinforce and braid together current research the Challenge has two cross-cutting research priorities for the second period of its mission, Sleep and Life Course. Big Data remains an important enabling theme across all research activity. Our work is committed to support the achievement of the potential of Māori knowledge, resources and people through the Vision Mātauranga framework. Our He Awa Whiria (Braided Rivers model) guides how we integrate knowledge from differing sources so they intersect in mutually-inclusive domains flowing forward to progress the well-being of our tamariki.

The evolution of our strategy includes a re-stating of our major aspirational performance indicators.

- Increasing the proportion of healthy weight and literate young children (notably Māori and Pasifika) through reduction in childhood obesity and poor literacy and mental
- health problems in those most vulnerable. Thus by June 2024: At 4-5 yrs of age a ≥15% reduction in the prevalence of overweight and obesity and at 5-6 yrs of age a ≥15% increase in attainment of age expected early literacy achievement compared to 2015-16 baseline (notably Māori, Pasifika and those from less affluent families).
- Improvement in the mental health and social functioning of vulnerable adolescents. ≥15% improvement in at least 2 of the 3 indicator areas compared to 2015-16 baseline. These are increased secondary school function (improved school retention, reduced school absences), a reduction in Emergency Department or Accident and

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<sup>1</sup> <http://www.pmcsa.org.nz/improving-the-transition/>

Emergency Clinic presentations with self-harm and a reduction in self-reported symptoms of depression and anxiety and substance abuse within communities using the intervention.

- Economic modelling of the health and income return on investment for each intervention to assist Government and next users allocate resources to childhood education and health. By June 2024: 3 interventions fully modelled and published in peer reviewed journals.

### **Strategy 2019-2024: Priorities in approach**

**Equity of outcome:** This means that Challenge research is first viewed through the lens of whether it supports the equity of outcome for all tamariki. So research should deliver more than general improvement but work towards an equity of outcome. The approach is very strongly supported, particularly by communities and stakeholders. This approach can be most effectively achieved by a higher proportion of Māori, Pasifika and less affluent children, families and communities in research design, study participation, management guidelines and impact delivery. This approach will be applied to projects across all themes. A key driver for equity is the Challenge's commitment to a strengths-based approach for how research is conceived and designed, in Challenge engagement with whānau and communities, and in the dissemination of research findings. A key initiative reflecting this is the decision by the Board to designate specific funding (\$2 million) for Māori and Pasifika led research aligned to the strategic research domains.

**Delivering impact:** The Strategy 2019-2024 acknowledges that research excellence and publication of research in quality journals rarely leads to widespread sustained positive change. The Challenge priority on delivering impact stresses strong policy-maker and community engagement, a phase of dedicated research to impact activity in Period Two and rigorous monitoring and a focus on the need to be agile to modify research to meet goals. This priority is outlined in detail in Section 3.

**Strengthening themes through better integration:** Big Data, the Vision Mātaraunga policy and He Awa Whiria (Braided Rivers model) approach underpin and integrate the three health, learning and well-being themes and have priorities that meet the Challenge performance indicators. Big Data will provide large scale and intricate analyses of associations between childhood measures and theme outcomes to help to inform intervention strategies. In addition, the Big Data researchers will establish relevant baseline measures to assess our 10-year performance indicators and explore national childhood data collection points to further inform the effectiveness of scaled interventions. Big Data will also lead a project to measure the economic benefits of early interventions.

The two new cross-cutting research priorities, Sleep and Life Course, are projects designed to enhance existing research outcomes by creating further linkages and collaborations within the Challenge, with other national science challenges and New Zealand research institutes and international collaborators. Sleep is an important component to a healthy weight, successful learning and mental resilience. A pilot sleep intervention study will inform sleep interventions across themes in period two. The consultation process has also led to research teams being strengthened by international research collaborators across the theme areas. For more detail see Section 4.

### **Vision Mātauranga**

The Challenge Directorate and theme leaders held a successful wānanga in May 2018 to consolidate the principal strategies to better embed Vision Mātauranga into Period Two. From this gathering, a position paper has been finalised to guide our researchers on how to expand on the purposeful, beneficial, and accountable engagements with Māori at a range of levels in Period Two. The position paper defines and describes two functional frameworks: He Awa Whiria/Braided Rivers and Initiative, Benefits, Representation, Legislative, Accountability (IBRLA) and a tracking tool Poutama Whakamana. He Awa Whiria guides the integration of two streams of knowledge, western science and mātauranga Māori. The IBRLA framework is a clearly marked guide to establish and sustain power-sharing relationships throughout the research process. Poutama Whakamana is designed to help researchers progress cultural awareness and understand responsivity techniques. It draws attention to the impact that the three Treaty of Waitangi principles have on the research process, the importance of Māori leadership and how it is to be made palpable throughout the entire research process. The Kāhui provides strategic guidance to the Directorate and the Board on a Te Ao Māori view.

### **Collaborating with National Science Challenges**

A collaborative mechanism has been agreed in principle with the two health and well-being National Science Challenges, Healthier Lives and Ageing Well. This initiative focuses on a life course perspective on health and well-being throughout the life span to intervene and reduce the impact of illness through early detection and prevention.

The work will capture synergies across the three Challenges to form an approach to achieve a long, healthy, well-adjusted and productive life by examining early risk factors and associations for later disease, together with prevention of major illnesses and methods to quantify the health and economic benefits of avoidance of non-communicable disease. The work will use the internationally-leading life course research expertise in New Zealand, and our near-unique integrated national-level health and social sector data, available through the Stats NZ Integrated Data Infrastructure.

The three Challenges have agreed to:

- equally fund a research investment (approximate total \$1.5 million initially)
- a jointly appointed advisory group will provide expert opinion on which research would return the most benefit for the objectives of all three Challenges and provide recommendation to each of the Challenge governance groups who must agree on the work to be supported
- a combined Challenge Life Course Conference He ora te whakapiri and follow-up strategy workshop. The conference will be led by A Better Start on behalf of the three Challenges.

Building Better Homes National Science Challenge has also signaled an interest into possibly contributing added funding and research ideas into the combined life course project.

## Challenge research themes 2019-2024

### Healthy Weight

No single approach will lift the percentage of children with a healthy weight. So the programme of work will address a number of the 34 recommendations stemming from the 2014 World Health Organisation Report on Ending Childhood Obesity. The Healthy Weight team consists of researchers from five institutions in New Zealand together with collaborators in the US, China and UK that encompass at least seven different research disciplines. The team have expanded considerably since the start of the first period with half of the team new to the Challenge adding new skills that include; a systems based approach to research, new technology (integrated camera assessment of behaviours and interventions), new biology (sleep physiology) and emerging and mid-career Māori and Pasifika researchers. By assembling a team of leading NZ researchers working in collaboration with invested stakeholders (including Plunket, Whānau Ora nurses, Ngāti Whātua ki Orākei, Moana Research, Ngāti Kahungunu, Te Taiwhenua Mananui Collective, Hawkes Bay DHB, Sport Hawkes Bay) projects will be developed that encompass different ways of working across a wide range of intervention initiatives to deliver change.

- **Equity:** We will ensure that groups subject to inequity are intricately involved at all stages of the research, working alongside researchers to identify issues and develop solutions that meet the needs and aspirations of those groups, that can then be implemented and evaluated in an appropriate manner.
- **Impact:** Evidence is mounting that comprehensive early intervention programmes to prevent childhood obesity offer the most promise for reducing the global pandemic. These include preventative approaches addressing maternal and infant health through pregnancy and beyond and all-of-community approaches designed to broaden capacity to make a real difference to the health and wellbeing of tamariki and whānau. From the start, all projects will be designed with translation and scalability in mind in order to allow implementation within a reasonable time frame. Inclusion of representatives from Well Child providers, schools, communities and relevant ministries within planned projects will ensure changes to policy have the potential to be integrated at speed.
- **Integration:** Behaviours crucial for healthy weight management – nutrition, physical activity and sleep – also have a pivotal role to play in enhancing capacity for learning and ensuring resilience, highlighting the natural integration between the three main themes of A Better Start. Proposed projects will be developed across themes and outcomes will address multiple theme areas to provide added value to all initiatives. Big data remains an important enabling platform for the Healthy Weight theme.
- **Early prevention and intervention:** Experience is limited in early childhood obesity prevention, although prevention is generally considered a more strategic approach than treatment. Our approach will focus on multifaceted obesity prevention initiatives in infancy and early childhood, while also acknowledging the need to ensure comprehensive treatment options. Our research precedes and therefore complements the B4 School Check initiative to detect overweight and obese children subsequently referred on to medical care.
- **Additionality:** Childhood obesity interventions using researcher driven single initiatives have been shown to be relatively ineffective. Increasing the number of children with healthy weight will take a whole-of-society approach involving all ‘actor’ groups including governments, civil society, communities, institutions, and parents, working in synergy towards a common goal. In period 2, we will take a multi-pronged approach and trial different

intervention approaches as they arise through co-design processes to ensure improved engagement and more successful long-term outcomes. This work will add considerably to the New Zealand health landscape given the scarcity of current research addressing intervention approaches to early childhood obesity.

- **Innovation:** Although much of the planned research will focus on low risk impact research innovative higher risk research will be included in the second period. This will include testing novel approaches to early childhood obesity that have arisen as part of our period 1 work. We have developed an obesity prediction model which identified children at high risk of later child obesity from information present at birth, or within the first year of life. Although other prediction models exist internationally, these have never been applied in a meaningful way as part of an intervention. Interventions will also target sleep, a behaviour not typically considered as part of effective weight management. However, recent NZ research has demonstrated that brief sleep interventions in infancy can reduce childhood obesity by as much as 50% in 5-year-old children.

### **Resilient Teens**

Our aim is to provide equitable access to early intervention for youth, using a wellness framework that aligns with Māori Hauora models. Twenty percent of New Zealand youth have significant psychosocial difficulties (Clark 2013). We know that health risk behaviours and poor emotional health cluster (Hallfors 2013) and that Māori youth are three times more likely, and Pasifika youth two times more likely to experience poor health and wellbeing when viewed in this way (Noel 2013). Mental and substance use disorders explain the bulk of disease burden in young people aged 12-25 years (Gore 2011) and represent a key risk factor suicide, the rates of which are highest in New Zealand for the 15 to 19 year old age group. Twenty percent of New Zealand youth have significant psychosocial difficulties (Clark 2013).

Our approach aligns with international advocacy for a youth focused model that integrates mental health with other positive health, social and cultural messages to respond to research that says up to 80% of young people are not receiving the support they need (Mariu et al 2012). We have an evidence base that gives us confidence that we can provide effective support (Weisz 2017; Ebert 2015); our strategy is to increase the reach and accessibility of these evidence-based approaches via a digital platform that integrates screening and intervention tools.

There has been some change and expansion to our team who represent a range of disciplines (psychiatry, psychology, education, computer science, Māori studies, population health, and statistics), and Universities (Auckland, Massey, Otago, Victoria). Importantly, we will maintain our relationship with Māori (Iwi, Te Rau Matatini, Nga Pae O Te Maramatanga, Voyce and Māori Advisors) and Pasifika (Le Va and Pasifika Advisors), and will expand already existing relationships with other indigenous communities in both Australia and Canada in the suicide prevention space. We have established relationships with Orygen, The National Centre of Excellence in Youth Mental Health, the Black Dog Institute and the National Health and Medical Research Council Centre of Research Excellence in Mental Health and Substance use.

- **Equity:** Our programme of work is based on strong relationships with stakeholders to ensure co-design of the research. We work with schools where there are large populations of Māori as well as Pasifika young people. In period two we will conduct kaupapa Māori research with Māori communities, and build stronger iwi relationships.

Our approach to ensuring equity of access and outcome for youth in New Zealand is to ensure the structure and processes embody He Awa Whiria by having theme leadership jointly shared by a Māori and Pākehā researcher to whom each project leadership team will be accountable. Each of the projects will have at least one Māori principal investigator in partnership with Nga Pae O Te Maramatanga (Professor Linda Nikora). We will support capacity growth through Māori Masters, PhD and Post-doc students. We actively support Indigenous Data Sovereignty (IDS)

- **Impact:** An ‘always on’ digital platform providing a broad range of evidence-based youth focused wellness interventions has the ability to supplement, extend and make available interventions, which would normally be underutilised by our most underserved youth. Available anywhere anytime, it can be used to supplement and extend existing services, and most particularly can be used as a tool to support the delivery of mental health care in primary care services and in schools, as has been the goal of recent government initiatives. The key issue for Period Two centres on implementing our digital platform in a way that engages youth sufficiently to achieve a ‘therapeutic dose’ of the evidence-based interventions. We will use an implementation science approach (Fixen 2005); including exploration of barriers and enablers to implementation using a participatory action design framework, which will facilitate stakeholder investment in the digital platform. The digital platform strategically aligns with the health information platform being developed by the Technology and Digital Services business unit in the Ministry of Health, and we will cultivate our relationship with this group, other relevant groups and individuals in the Ministry of Health and with the Ministry of Education.
- **Embedded evaluation** (including both quantitative and qualitative methods) from the outset is crucial to inform ongoing implementation activities.
- **Integration:** The programme of research within this theme is integrated via use of the digital platform, and each project will essentially represent implementation of the digital platform in different settings. The digital platform has a wider focus than mental health alone, with cross theme collaboration enabling further interventions to be developed to address, for example, literacy, learning, healthy sleep and weight. We will continue to leverage co-funded work that will allow integration of parent focused interventions. The aim is to ensure that the digital platform can incorporate interventions that address issues facing youth in New Zealand, including those developed by current and future collaborators, for example Te Rau Matitini and Le Va.
- **Additionality:** Cross discipline and cross institution collaboration facilitates integration of a very broad range of youth focused wellness interventions. This is transformative and represents a significant advance on the development of single digital interventions typically focused on a narrowly defined single issue previously. Ensuring the digital platform enables sequential and concurrent digital intervention trials will provide a pipeline of development of innovative interventions that keep pace with the issues that youth face. A significant feature of the long-term and strategic approach to this program of research, possible due to the integration of Big Data in the challenge is the ability to enable long term monitoring and tracking of outcomes.
- **Innovation:** The ‘always on’ digital platform, which provides a sustainable infrastructure enabling cost-effective delivery and monitoring of wellness interventions. Being nimble to ensure we can capitalise on the rapid pace of technology, including by using innovative methods for rapid testing (Mohr 2015) is important but will be balanced with incremental and strategic research approaches using robust methods to evaluate the effectiveness of interventions within an implementation science framework (such as stepped wedge and cluster randomised trials).

### Successful Learning

Despite the urgent need to improve NZ's early literacy achievement rates, this topic has not featured prominently on the national research agenda. In the last 15 years, there has only been one other larger scale controlled intervention study focused on improving Year 1 literacy outcomes (Arrow et al., 2018). The novelty of the approach taken by the successful learning theme from a national and international perspective also lies in its focus on multiple interacting variables that need to be addressed to ensure early reading success for all tamariki. To improve the literacy outcomes of New Zealand children the wider context of teaching practice, health and education specialist services, whānau engagement, preschool experiences and culturally responsive teaching practice need to be considered. The successful learning team consists of researchers from four institutions in New Zealand, together with international advisory experts in the UK, USA and Australia. The researchers' expertise encompass six research disciplines: education, psychology, speech-language therapy, public health, Māori kaupapa, and oral health.

Children's early reading success is a powerful predictor of their subsequent reading achievement and education outcomes, which in turn is linked to health wellbeing and more positive societal outcomes.

- **Equity:** Inequitable outcomes in literacy achievement are present for Māori learners, Pasifika learners and learners who come from less affluent backgrounds (Mullis et al., 2017). Research will be based in communities with relatively high proportions of those groups likely to experience inequity in learning outcomes. The inclusion of stakeholders as core members of the research teams, commitment to culturally responsive practices and co-construction of prevention/intervention initiatives will be key elements across the programme of research that contribute towards closing the literacy achievement gap.
- **Impact:** A clear pathway to implementation will be embedded throughout the programme of research. A larger-scale examination of the effectiveness and efficiency of early literacy intervention for children in their first year at school based on pilot will deliver impact on national outcomes in early reading achievement in Period Two. Resources within the community will continue to be utilised to support the research and ensure sustainability (e.g., Kidsfirst kindergartens, primary school teachers, the National Library of New Zealand- School Services and community nurses).
- **Integration:** Economic modelling will be utilised in collaboration with the Big Data team to gauge the potential impact of the Year 1 literacy intervention if taken up at a national level. Given the association between literacy achievement and psychosocial variables, there is also scope to collaborate with the Resilient Teens team to examine the impact of the intervention on children's self-perception as well as reading outcomes. Similarly, the association between sleep and children's learning provides a novel opportunity to evaluate the impact of sleep interventions on children's language/learning development.
- **Additionality:** There is opportunity to better understand the importance of children's cognitive flexibility and factors that may promote improved cognitive flexibility for early literacy and learning success in children at risk for learning challenges. Innovation in cognitive flexibility assessment that allows evaluation of this skill in linguistic and non-linguistic domains across languages (English, Māori and Samoan) may be possible. Novelty is also included in the development of approaches to support early literacy development across languages in children who are learning within Māori-English and Samoan-English bilingual education contexts.

**Big Data**

The Big Data theme seeks to maximize New Zealand's rich data resources and infrastructure to develop a better understanding for the three health, learning and wellbeing themes of the paths towards good outcomes for children and insight on how pathways towards poor outcomes can be disrupted. Our over-arching aim is to determine what works, for whom and under what conditions? The Big Data team is at the forefront of quantitative health and social policy research in New Zealand. We draw in new researchers within New Zealand and seek leading international experts for collaboration.

- **Equity:** A key goal for our research is to reduce disparities, so critical to this is providing a better understanding of how things can be made better for those who have benefitted the least from New Zealand's wealth and prosperity.
- **Impact:** Understanding the drivers of success, and the factors that inhibit it, is vital to making good policy decisions inform interventions with intelligent design. Critical to this, will be the health and economic modelling of Challenge interventions to assess the short and long-term value of interventions.
- **Integration:** Our team works closely with the other themes within the Better Start Challenge. They bring clinical and policy expertise and we bring intimate knowledge of the data and the analytical techniques to extract maximum value from the rich data resources available in the IDI. In addition, we are working with experts from other National Science Challenges to develop the best techniques to conduct life-course research.
- **Additionality:** We are leveraging existing data (including Well-Child/Plunket and community level data) to add important data into the IDI and working with Government agencies to determine where additional data can be systematically captured.
- **Innovation:** Our work seeks to push the forefront of data analytics – particularly as this relates to microsimulation and life course modelling. However, we believe significant value can be derived from conducting a wide range of conventional epidemiological and economic analysis on existing data.

## Section 3: Delivering impact

### *Our focus*

- ✓ *Wide reach*
- ✓ *Integrated themes*
- ✓ *Agile research*
- ✓ *Engage early*
- ✓ *Scale-able*
- ✓ *Measuring change*

A key principle for the National Science Challenges is to not just deliver excellent quality research but also to facilitate research outcomes to support positive change. In order to achieve this A Better Start has embedded a cross-Challenge focus on research reviews and stakeholder and policy engagement to map out clear paths to impact.

#### **Wide reach**

The three main themes were selected because for each of them about a third of all children are affected. When taken together, across the areas, more than 50% of all children would potentially benefit from impacts delivered from Challenge research. Our approach: prediction, early detection and responsive intervention, delivers the optimum returns for public investment in evidence-based policy change.

#### **Integrated themes**

The potential reach of Challenge research is enhanced by the considerable overlap of conditions. Big Data analyses suggest considerable overlap in the characteristics of children with poor literacy and unhealthy weight in 5 year old NZ children. The Challenge has developed quick and efficient ways of working across disciplines as well as interactions with Māori and Pasifika communities. Our team is at the forefront of analytical developments in examining big data for policy with our Big Data team already contributing as a child and family node in the Virtual Health Information Network which works across universities, the Ministry of Health and Statistics NZ.

#### **Agile research**

Across the Challenge it would be unrealistic to assume that every hypothesis proposed across all themes will be proven. While a disproven hypothesis informs future science, it does not easily translate to positive societal change. In the second period, the Directorate and theme leaders will have a strong focus on the need to be agile. Through the constant review of performance indicators, the Challenge can decide on the need to modify the direction of research to deliver a potential impact.

#### **Engaging with communities and policy makers**

Most research is ultimately published but only rarely does it lead to widespread sustained positive societal change. Impact comes from new scientific discovery translated into action by engagement with the science community, policy makers, whānau and communities.

This engagement starts early and from the beginning with the research team seeking to answer questions of importance set by the national-scale public and research sector consultation at the outset of the Challenge.

In the first period, the Challenge has confirmed the critical importance of the three theme areas with policy makers and key stakeholders and researchers have made strides to define and begin to answer the key questions facing effective prevention and intervention. Our extensive network of investigators are actively involved with policy development and recommendations in forums from North and South Island DHB alliances focused on obesity prevention and management to Ministries of Health and Education advisory groups. The Directorate will continue this important function in the second period. Our team includes active clinicians who have or do take the lead in professional societies, e.g. the previous president of the Paediatric Society of NZ, Chair of the National Australasian Paediatric Endocrine Network and the Ministry of Education cross-sector Advisory group and who are involved with undergraduate and postgraduate student teaching and supervision. The learnings from the Challenge perspective informs all of these activities and will continue to impact on future generations of scientists and teachers. We also are actively engaged with Plunket, an NGO that delivers most of NZ's well child services which leads to direct effect on day to day care of most children in NZ.

#### **Life course modelling and micro-simulation**

We have demonstrated the usefulness of “big administrative data” to describe and follow outcomes over time, and also to find previously unsuspected environmental influences that might well provide effective points of action for example, curtailing early antibiotic use to prevent obesity. Longitudinal studies have informed us about the significant long-term consequences of early poor literacy, obesity and mental health. For instance, the Christchurch longitudinal study has estimated that about 70% of adolescents with poor mental health continue to have ongoing issues in adult life with marked economic consequences (Fergusson, Boden, & Horwood, 2007). Similar data exist regarding health consequences of early unhealthy weight (Bjerregaard et al., 2018; Global, 2016).

These studies have overwhelmingly demonstrated that earlier action is ultimately the most cost-effective approach to improving outcomes. However, we do not fully understand which interventions are going to be most effective and under what circumstances. We also don't know how enduring they will be. We will address these challenges by using longitudinal, whole of government, whole of population data. We believe this will allow us to disentangle the protective and risk factors that impact everyone, from those that may have strong effects on some, but not others. A better understanding of how policies or interventions work and how scalable they are, have significant implications for policy and programme design and implementation.

The Challenge has developed expertise and proficiency in using the IDI and we are using this unique and rich data source to understand the trajectories towards good and poor outcomes. Furthermore, we are discovering how to influence these trajectories to encourage better outcomes. By developing expertise in life course modeling and the use of microsimulation models the Challenge will identify the most cost-effective way of delivering policies, interventions and programmes. There is also an emphasis in examining the life course trajectories of Māori and Pasifika communities.

## Section 4: Excellent science

### *Delivering excellent science by;*

- ✓ *Research teams*
- ✓ *Partnerships*
- ✓ *Intervention framework*
- ✓ *Embracing Vision Mātauranga*
- ✓ *Braided Rivers*

### Expanding the concept

Science excellence is multidimensional, dynamic and influenced by cultural perspectives. It is therefore important in considering how our programme of research will be of excellent quality to appreciate the complexities inherent in the concept of “science excellence.”

High ranking journal publications based on our research findings will represent excellence at one level, improving the healthy weight, early literacy success, and resilience of children and adolescents participating in our studies will provide evidence of excellence at another level. The long term, intergenerational benefits that will accrue to children, families, communities and our society through uptake of our successful interventions will also demonstrate our research excellence.

Yet for others, our delivery of research excellence may be perceived by how we engage and value their participation in our research processes, our demonstration of cultural confidence and competence in undertaking our research, particularly within Māori and Pasifika communities, or our processes for sharing our research findings back to the communities in which we are working. All of these aspects of science excellence that we have focused on during the first period of our Challenge will continue to be of central importance in our delivery of our next five year research programme.

Research quality assurance processes for our 5 year strategy include: (a) Independent governance from our Challenge Board; (b) Strategic advice from our Kāhui and Pasifika Advisory groups; (c) Input from stakeholders from around the country through planned consultation hui; and (d) Evaluation and comment from our Expert International Science Advisory group. In addition, our regular reporting framework against our Challenge objective will monitor progress towards planned objectives. Our track record of meeting or exceeding our Challenge objectives for the first period provides evidence of delivering high quality science towards the 10 year Challenge outcomes.

Three specific areas of science excellence that our five-year strategy addresses are:

- Research team and partnerships
- Contributions to science quality
- Contributions to Vision Mātauranga.

**Research team and partnerships**

Delivery of research excellence requires constructive and collaborative styles of leadership and the building of a research culture where researchers and research partners are valued, respected and enjoy being part of our Challenge. Building such a culture has been an important part of our success in the first period. The collaborative and inclusive working style of the Directorate, theme leaders, and researchers working within our project teams provides a very strong base from which to extend our team to deliver the Challenge objectives and outcomes in the next five year period.

Project leaders for the second five year period will be predominantly high profile New Zealand researchers who are world leaders in their respected fields of research with extensive national and international networks to leverage international research collaborations and partnerships with research organisations.

Our five-year strategy also develops the leadership capabilities of less experienced researchers through mentoring from senior researchers and support of expert advisors and advisory groups for their projects. In addition, most projects have the support of at least one international expert to support the science planning, implementation, and mentoring of emerging researchers within our teams. The University of Canterbury Child Well-Being Research Institute will fund at least 5 of our international experts to visit New Zealand during the second tranche (for a period of between 1- 3 months for each visit and funded through the UC Erskine Fellowship Scheme). Part of these international expert visits will include seminars for our doctoral students and public lectures.

A planned contestable funding round within the first 18 months of the Challenge will allow for the introduction of new research teams into the Challenge. (We expect this to build on the success of our co-funded round in the first tranche and be valued at approx. \$3m. We have also committed \$2m for the development of further projects led by Māori and Pasifika researchers within the Challenge themes. This will allow for new teams with Māori and Pasifika research expertise to join the Challenge. The five year strategy includes further professional learning opportunities initiated in the first period to continue to develop the skills of our researchers to deliver Challenge objectives and outcomes.

These opportunities include:

- Workshops to continue to advance researchers' cultural competencies and confidence and understanding of Vision Mātauranga from multi-disciplinary perspectives,
- Pasifika cultural workshops (building on talanoa with community Pasifika leaders initiated in the first period) to further develop researchers understanding of Pasifika aspirations for their children's wellbeing
- Challenge level symposia to allow for cross-theme collaborations and understanding of multi discipline perspectives addressing research plans
- Funding support to ensure our researchers can participate in significant national hui focused on children's well-being, or Māori or Pasifika events relevant to our Challenge themes
- The Challenge will also take advantage of our Universities' existing programmes for support and mentoring of doctoral students and emerging researchers including workshops in statistical analyses, publication support,

research ethics, presentation skills, cultural responsive research practices, and constructive styles of working across disciplines.

Science excellence within this Challenge requires strong engagement with community. We have established robust relationships with relevant stakeholders and communities in the first period and that will be further developed in the next five year research period.

### **Contributions to science quality**

The five year research plan will deliver a diverse portfolio of research to address the Challenge's objectives and outcomes. A primary focus of the Challenge is intervention research to improve the healthy weight, literacy learning and resilience of our children and youth. These interventions align to a rigorous scientific framework for intervention research discussed below.

The Intervention Research Framework. McBride (2016) discussed the scientific importance of the Intervention Research Framework for developing and testing innovative interventions to both advance research knowledge and to have an impact on individuals and community. The value of researchers building positive relationships with relevant practitioners, community, and policy makers at each stage within this framework is emphasised.

The framework has four main phases.

- Notification (descriptive and predictive studies to identify causes, risk factors and protective factors e.g., studies in the Big Data theme)
- Development (co-construction of research design and pre testing interventions e.g., community co construction of multilevel intervention in the Healthy Weight theme ),
- Assessment (Efficacy, effectiveness and efficiency studies e.g., larger scale controlled interventions in the Successful Learning Theme and Resilient Teens theme
- Dissemination (understanding translational impact of intervention e.g., a focus for all themes in the latter part of the five year strategy).

Projects planned across the five year research strategy are consistent with this framework to support intervention science excellence (See Appendix with project design summaries). Involvement of our community partners in research co-design is a key strategy in each of these phases of the research intervention framework

The diverse range of the intervention studies at each of the notification, development and assessment phases of the Research Intervention Framework will lead to research in the latter part of the five year research strategy focusing on the translational impact, policy development and evaluation of wider uptake of the intervention work. The building of strong relationships with community, Māori and Pasifika groups, our stakeholders and policy makers and the rigour of the science methodologies implemented in each of the themes will help ensure the science advanced through the science plan influences the changes necessary to improve the health education and wellbeing of our children and youth.

There are a number of international and national experts involved in our project advisory groups who will contribute to the delivery of science excellence. Project expert advisors include; world leader in reading development (Professor William Tunmer, Massey University); international expert in early home literacy practices (Professor Laura Justice Ohio State University, USA); leader in vocabulary development in children with oral language difficulties (Emeritus Professor Ilsa Schwarz, University of Tennessee, USA); experts in healthy weight and/or sleep Professor Dean Beebe (Cincinnati Children's Hospital), Professor Leann Birch (University of Georgia), Professors Ian Paul, Dr Jen Savage (Penn State), Professor Jodi Mindell (Children's Hospital of Philadelphia) and Professor Melissa Wake (University of Melbourne), Professor Harriet Hiscock (Monash). These and other experts will continue supporting our work into the second period. Our independent international Science Advisory Panel will provide feedback regarding the science quality of proposed projects and the importance of project direction within the five year strategy.

### **Contributions to Vision Mātauranga**

Delivery of research excellence in a manner that embraces Vision Mātauranga will feature strongly in the five-year research plan in several ways:

The Braided Rivers (He Awa Whiria) approach will underpin all of the science in the next five years of research. The braiding of scientific findings from previous relevant indigenous and Māori studies with other scientific works will inform the rationale and design of the science. In addition, Māori Kaupapa methodologies will be braided throughout the projects, often in novel ways such as the braiding of Māori participatory research with randomised control intervention design in the Resilient Teens theme. Well-established models of Māori well-being Te Whare Tapa Whā (Durie, 1994; Rochford, 2004) will also be utilised to frame studies within the research portfolio.

Researchers who identify as Māori (affiliate with iwi) are represented at all levels of the research plan- from Principal investigators, associate investigators, emerging researchers and doctoral students. They are supported by our Vision Mātauranga Theme Leader and Kāhui. In addition, they have strong connections and relationships within their local rūnanga to support their work within communities.

Engaging whānau in interventions that focus on children's wellbeing is of critical importance. The next five year plan will build upon the first period's investigations of effective and authentic involvement of whānau (e.g., Macfarlane, Gillon et al 2018 related to early literacy interventions) and previous work learning from whānau as to what supports their engagement in research (Hall et al 2015).

Science excellence in relation to whānau involvement will include;

- building trust and positive relationships with whānau
- valuing and respecting whānau and community contributions to our research findings and research outputs
- adopting strengths based language and approaches to discussing children's progress in studies
- ethical research processes of informed consent

- use of mana enhancing questionnaires and survey designs
- sharing research findings with whānau and community

The detailed planning of the science in the five-year plan will be informed by the tools and concepts outlined in A Better Start's Position Paper (adapted from Bishop, 1996) (Appendix 2).

*Our focus*

- ✓ *Continuity of leadership*
- ✓ *Stability*
- ✓ *Strategic advice*
- ✓ *Clear and transparent roles*

**Section 5: Challenge decision-making****Accountability and representation**

There will be no major changes to the governance, advisory and management structures. Since the commencement phase in 2015, the arrangements for decision-making and accountability have developed and evolved providing the Challenge with a solid foundation from which to operate in the first period. We will continue monitoring and refining these as needed over the next five year period.

**The Board**

Board membership has remained stable through the first period with one resignation (Professor Jane Harding, the host representative) in 2015. All other members have accepted reappointments through to the end of the first period. Our Chair, Pat Snedden, has committed to continuing his leadership role with the Challenge, has confirmed his availability for the second five year period and is aiming for continuity of Board members where practicable.

**Directorate and management**

The Challenge Directorate will remain, led by Professor Wayne Cutfield (University of Auckland) supported by Co-Directors Professor Barry Taylor (University of Otago) and Professor Gail Gillon (University of Canterbury) (Figure 2).



Figure 2. A Better Start Director and co-Directors (left to right).

The three principal Universities (Auckland, Otago, and Canterbury) are working collaboratively, sharing facilities and support to engage with and conduct community-based research. The in-kind administrative support received from the host university, the University of Auckland, has been invaluable and the Challenge operations will remain hosted by the Liggins Institute. Support is provided by Liggins Institute in the way of 0.5FTE project administrator, and host support from the Research Operations Centre including financial oversight and contracting advice and support. The operations team will remain, with an increase in the Operations Manager FTE to align with the increase in research coordination.

### **Science Leadership Team**

In 2017, the Science leadership structure was reconfigured to enable the appointment of Theme Leaders; Associate Professor Rachel Taylor (Healthy Weight), Associate Professor Brigid McNeill (Successful Learning), Associate Professor Sarah Hetrick and Dr Tania Cargo (Resilient Teens<sup>2</sup>), Dr Richard Audas (Big Data) and Vision Mātauranga (Professor Angus Macfarlane).

The Theme Leader structure provides;

- Additional science input and expertise
- Leadership opportunity for senior researchers in respective fields
- Distinct separation of the Directorate from science project-level planning to manage conflicting interests

### **Advisory Groups**

The Challenge set up a Kāhui and Pasifika Advisory Group to provide advice to the Directorate. Operationally, these groups have been providing advice both to the Directorate and the Board as the Chair has standing invitations for all members to attend Board meetings and have access to all Board Papers. This has facilitated frequent, open and robust dialogue on Māori and Pasifika perspectives as attendees are called on for individual opinions with the aim of consensus decision-making approach.

The original Science Advisory Panel membership tenure ended in January 2018. A refreshed panel was approved by the Board in early 2018 with the existing Chair, Professor Ken Ong, remaining for continuity with the addition of seven new members, each with expertise reflecting at least one of the three major theme areas and overarching themes, big data and Vision Mātauranga. The Science Advisory Panel have provided input into our science strategy, having input into the main themes and priority setting. They will continue to work alongside us providing the Directorate and Board with independent advice and recommendations on scientific rigour and fit within the funding envelope in early 2019. Early

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<sup>2</sup> Professor Sally Merry resigned from her science leadership role but continues in a support role for the Resilient Teens theme in second period.

Science Advisory Panel feedback has endorsed the direction and fit of proposed programmes of work commenting that they look ambitious, strong and relevant with a contemporary and justifiably important focus. We envisage a closer working relationship in the second period with the Science Advisory Panel meeting on a quarterly basis.

It is envisaged that Professor Ken Ong and an independent research contractor, Robin Olds will co-Chair the final assessment meeting, making recommendations to the Board for investment decision-making purposes. This creates a well-defined separation and managing the potential conflict of interests between funding decisions and the allocation of strategic science investment from the Directorate.

The planned joint Contestable Round(s) with Cure Kids will follow a similar assessment process held in 2017, with an agreed and jointly appointed independent science panel to preside over the assessment of the science proposals. It is likely that we will call on members of our Science Advisory Panel to Chair and/or participate on the committees.

### Challenge structure

The Challenge structure remains similar to the first period, with an expansion of the science leadership group as mentioned previously. Figure 3 illustrates the Challenge's child-centred approach and braiding of knowledge from differing sources reflected within the structure.

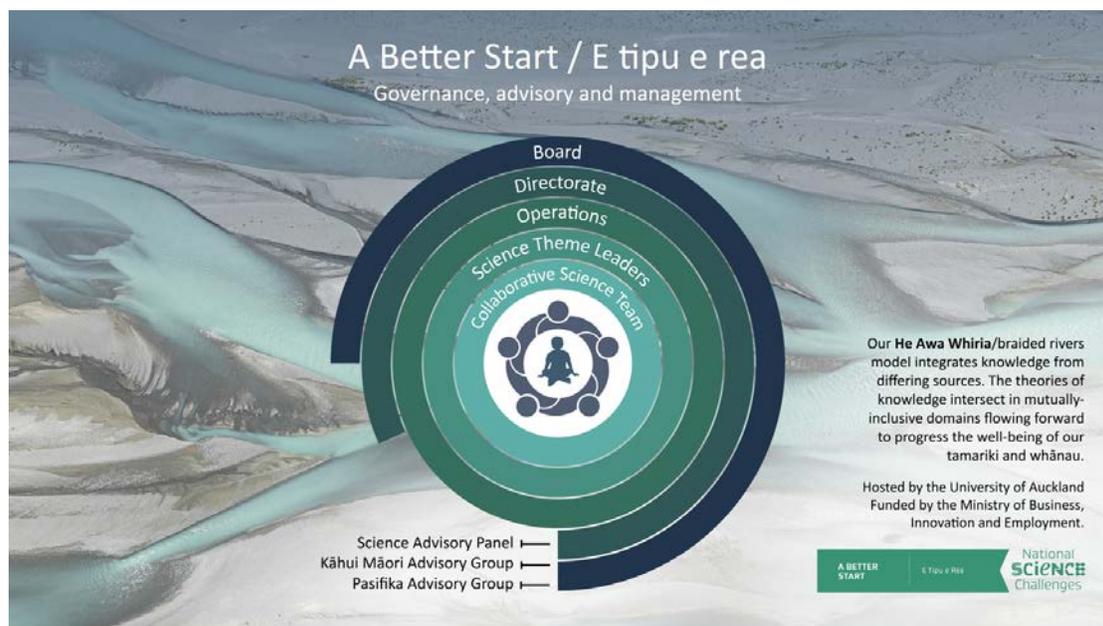


Figure 3: A Better Start governance and management structure

Section 6: Proposed investment approach

Our focus

- ✓ Clear phases
- ✓ Cohesive projects
- ✓ Paths to impact

Strategic research emphasis

In the first period the Challenge made a commitment to predominantly invest in strategically funded research (more than 85% of research investment) in the Challenge theme areas. This provided the greatest opportunity to deliver a logical sequence of integrated research that was multidisciplinary and evolved towards meeting the Challenge 10-year performance indicators. Contestable research projects were selected as closer to translation.

In period two A Better Start intends to continue to predominantly invest in strategic research rather than contestable funding. The Challenge Directorate's considered view is that a strategic funding approach is an important point of difference from traditional contestable funding in attempting to achieve a multidisciplinary cohesive sequence of research projects.

Strategic-funded research

Period two envisages three phases planned by strategic-funded research (Figure 4).

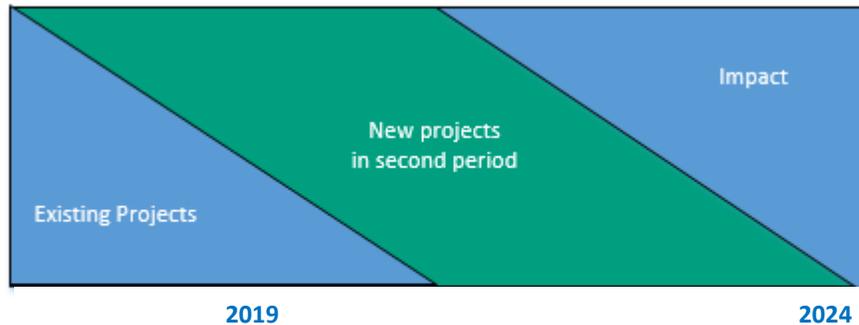


Figure 4: Three phases of strategic-funded research

There will be the completion of sequential research undertaken in period 1 that from the start of period one had been planned to extend into period two or were new observations that merited extending into period two.

If the hypotheses of projects from period one are proven, the research will further evolve to meeting the goal to ultimately build interventions that can be implemented. The second phase of research is new research initiatives that add synergy to work undertaken in phase one that will continue to deliver outcomes relevant to the ten year performance indicators. The third phase will be to work with stakeholders to translate research to impact.

### Co-funded and contestable research

The Challenge has been successful at obtaining co-funding and leveraged research income. From the beginning of 2017 until the middle of 2018 >\$3.1 million of co-funding and leveraged funding has been secured by Challenge researchers for Challenge projects. For period two we will continue to seek funding opportunities in the broad domains in which we have already been successful; other research funding organisations, businesses and philanthropy.

### Indicative five year budget

The indicative budget presented in Table 1 for the period 2019 – 2024 is based on our original submission (Appendix 1) for Tranche 1 funding (October 2015) of \$20.5 million for the second period should this be approved by the Science Board in October 2018. The allocation between research activity and non-research activity remains the same, however there have been changes within the non-research activity to reflect actual expenditure in the first period, as well as reallocation of science investments to include focus areas for Māori and Pasifika-led research and collaborations with other Challenges.

<b>NSC A Better Start</b> ALL 1 July to 30 June years* (assuming \$~4.1M pa)	<b>Yr 1</b>	<b>Yr 2</b>	<b>Yr 3</b>	<b>Yr 4</b>	<b>Yr 5</b>	<b>Total</b>
Central administration and management	170	170	170	170	170	850k
Governance and Advisory	30	30	30	30	30	150k
Science Leadership	430	430	430	430	430	2,150k
Communications and stakeholder engagement	150	150	150	150	150	750k
<b>Sub-total non-research activity</b>	<b>\$780</b>	<b>\$780</b>	<b>\$780</b>	<b>\$780</b>	<b>\$780</b>	<b>\$3,900k</b>
Research Funding						
• Strategic Investments	2,500	2,500	2,500	2,500	2,500	12,500k
• Māori and Pasifika-led research	400	400	400	400	400	2,000k
• NSC collaborations projects	100	100	100	100	100	500k
• Open Contestable Investments	240	240	240	240	240	1,200k
Contingency Funds	80	80	80	80	80	400k
<b>Sub-total research activity</b>	<b>\$3,320k</b>	<b>\$3,320k</b>	<b>\$3,320k</b>	<b>\$3,320k</b>	<b>\$3,320k</b>	<b>\$16,600k</b>
<b>Total</b>	<b>\$4,100k</b>	<b>\$4,100k</b>	<b>\$4,100k</b>	<b>\$4,100k</b>	<b>\$4,100k</b>	<b>\$20,500k</b>

Table 1: Indicative budget for A Better Start, NSC 2019 - 2024

## Section 7: Scenario planning

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### Our priorities

✓ Xxx

✓ Xxx

✓ Xxx

### Insert title here

- Still in development -

*MBIE guidance: Briefly describe in broad terms what other impacts and science achievements the Challenge may be able to achieve if more funding were available. Focus on research priorities. A list of specific research projects that might benefit from extra funding is not required.*

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Contract ID: UOAX1511

MBIE Sector Manager Lead: Hannah Walker

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Challenges

## Glossary and acronyms

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hauora	health and well-being
he awa whiria	braided rivers approach
hui	meeting
IDI	Integrated Data Infrastructure. One of Stats NZ large integrated research databases of microdata (units of a population, such as individuals, households, or businesses).
iwi	iwi form the largest social units in Māori culture
Kāhui	Māori advisory group for the Challenge
kaumatua	elder
kaupapa Māori	theory and praxis stemming from being and operating as Māori to bring about transformation through research.
mātauranga	education and learning
mātauranga Māori	the knowledge, comprehension, or understanding of everything visible and invisible existing in the universe
tamariki	children
tikanga	correct procedure, custom, habit, protocol.
Vision Mātauranga	MBIE policy. The Vision Mātauranga policy unlocks the science and innovation potential of Māori knowledge, resources and people
waiora mo te mātauranga	our research approach
whānau	family/families an extended family or community of related families who live together in the same area
whanaungatanga	process of building relationships

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**APPENDIX 1**

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Insert submission 1 budget

## **APPENDIX 2**

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Insert Position Paper here