

Under 5 Energize: Improving child nutrition and physical activity through  
early childhood centres

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## Abstract

Rising obesity rates among young children and disproportionate effects on Māori, Pacific and socioeconomically deprived children require preventative action that is equitable and effective. As most children in NZ attend some form of early childhood care (96%) (kindergarten, Playcentre, Te Kōhanga Reo, Punanga Reo, Pacific language nests or education and care) for an average of 22 hours each week, there is huge potential to create a favourable food and physical activity environment for young children that supports good health outcomes and reaches those children most in need. Research showing effective translation of evidence-based approaches into public health practice for obesity prevention is scarce, especially for young children. The aim of this body of work was to determine if and how the Project Energize model, tailored for the early childhood setting (Under 5 Energize [U5E]), was effective at improving the nutrition and physical activity environments of early childhood centres (ECC) for young children in the Waikato region. The reach, effectiveness, adoption; implementation and maintenance (RE-AIM) of U5E were measured using a mixed method approach over a three-year period, August 2013–July 2016. U5E uses change agents, or Energizers, working with approximately 30 ECC each, delivering nutrition and fundamental skills workshops, resources, and policy and practice development support, tailored to each centre. Data collection involved a pre- and post-audit of food and physical activity environment factors in 2013 and 2015 (implementation), a parent awareness survey in 2016 (effectiveness) and focus groups (U5E programme staff) and interviews (ECC managers or educators) at two time points (10 months apart) added to the understanding of information (Reach and Adoption, Effectiveness and Maintenance). ECC U5E action plan topics were counted and compared at six and 12 months post-programme initiation (implementation). Reach and adoption were assessed by a count of participating centres and comparisons with national and regional Ministry of Education statistics for numbers, equity, ethnicity and type of centre and geographical mapping of the rurality, socioeconomic status and ethnicity of the children at each centre. The reach and adoption of the identified target population was (93%, n = 133) and the equity, ethnicity and type of centres participating matched Ministry of Health contract targets of intervening for priority groups. Programme staff reported developing and moulding U5E to ensure programme alignment and building relationships with centres. Centres became involved in U5E because the programme ‘fitted’ centre philosophies, policies

and practices, complemented their way of working, contributed health benefits for children and provided a positive reason to connect with their communities. The Energizers 'way of working' with centres, skills and knowledge appeared to greatly enhance programme engagement while the barriers to engagement in U5E were few. Between 2013 and 2015 the educator reported frequency of consumption (serves per day) of everyday foods increased significantly ( $p < 0.05$ ) [vegetables (+0.203), fruit (+0.134), sandwiches (+0.116), and reduced fat milk (+0.106)] and occasional foods and beverages decreased significantly [flavoured noodles (-0.149), sweetened drinks (-0.080), potato chips (-0.206), cakes (-0.166), fruit juice (-0.064), flavoured milk (-0.084), muesli bars (-0.130), muffins (-0.121), chocolate and sweets(-0.070)]. At follow-up, 25 of 87 centres had shifted from having either no or non-written expectations about physical activity to a written physical activity guideline or policy at follow-up and about 15 centres reported a similar shift in documentation of food and nutrition policy. In the first six months, the 121 enrolled centres set, on average, eight goals per centre in action plans, four nutrition and four physical activity goals reducing to five in the second six months. One-third of the nutrition and physical activity goals were achieved in the first six months of U5E, with a further 50% of the goals recorded by the Under 5 Energizers as initiated and being actioned in an ongoing way. Professional development for the educators was the most frequent goal in ECC action plans for both nutrition and physical activity. Just over half (45 of 78) the parents surveyed in 10 centres had heard of U5E and of these 33 recalled the main aims of U5E accurately. The length of time of U5E delivery and awareness of the programme were positively associated ( $\chi^2 = 4.7151$ ,  $p = 0.0299$ ). The main healthy eating and physical activity messages parents had heard or seen in the centre were 'less sugary drinks' and 'healthy lunchboxes', with 40 parents reporting these messages, and 34 said that they had made changes to food at home or to food provided to children at the centre based on the U5E kaupapa. In contrast, changes to physical activity at home were reported by only a third of parents ( $n = 14$ ). By the end of 2015, U5E appeared embedded in participating centres' planning, budgeting and teaching programmes or activities/actions, with educators describing this as 'part of what we do now'. Educators felt U5E assisted centres with achieving child development goals (through fundamental movement skills training) and aligned with the Te Whāriki curriculum strands. U5E seemed to also provide accountability in nutrition and physical activity for the centres.

Reduced reliance on Energizer support indicated U5E appeared to be progressing over time towards programme maintenance.

In conclusion, U5E achieved high reach and adoption and was well implemented and effective at changing food and physical activity policies and routines within ECCs in a sustainable way. Tailoring, by the Energizers, of U5E in diverse geographical, delivery style and ethnic environments of ECCs was a key reason for the programme's high reach, effectiveness, adoption, implementation and maintenance. Parental awareness and use of U5E nutrition and physical activity messages could be improved although the sample size was limited. Raising parental awareness and use of U5E nutrition and physical activity messages should be a future focus to increase the reach to families of children enrolled in participating ECC. Small changes over time have the potential to influence policy and practice norms within early childhood centres to those that encourage healthy food and physical activity behaviours of enrolled children.

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## **Attestation of Authorship**

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

Signed:

Date:

## Co-Authored Works

Young, L., Rush, E., Vandal, A. C., Cutfield, W. (October, 2014). Under 5 Energize Programme: Using the RE-AIM Framework to Evaluate Reach, Adoption and Implementation. Poster presented at the annual scientific meeting of the Australian and New Zealand Obesity Society, Sydney, Australia.

Young, L., McLennan, S., Kirk, K., Munro, J., Rush, E. (May, 2015). Connecting: Under 5 Energize and the Healthy Heart Award. Paper presented at the conference of Agencies for Nutrition Action, Auckland, New Zealand.

Young, L., McLennan, S., Kirk, M., Vandal, A. C., Dickinson, A., Parmar, P., Rush, E. (May, 2016). Dissemination of an early childhood centre nutrition and physical activity programme Under 5 Energize: Using RE-AIM to evaluate Reach and Adoption. Poster presented at the conference of the International Congress of Obesity, Vancouver, Canada.

Young, L., McLennan, S., Kirk, M., Rush, E. (2016). Residential mobility: Diluting the potential of public health programmes. *New Zealand Medical Journal*. 129;1140, 133-134.

Rush, E., Obolonkin, V., Parmar, P., Young, L., Kirk, M., Tseng, M. (2017). Under 5 Energize: tracking progress of a preschool nutrition and physical activity programme with regional measures of body size and dental health at age of four years. *Nutrients*. 9(5), 456. doi:10.3390/nu9050456

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Healthy living is everyone's business - we all benefit when we get it right

Agencies for Nutrition Action Sector Vision, 2014

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## Abbreviations

AUTEC	Auckland University of Technology Ethics Committee
BMI	Body Mass Index
CDC	Centres for Disease Control and Prevention
CI	Confidence interval
DHB	District Health Board
DOHaD	Developmental origins of health and disease
ECC	Early childhood centre
ECE	Early childhood education
ERO	Education Review Office (Ministry of Education)
FG	Focus group
FMS	Fundamental movement skills
IP	Interview participant
max	maximum
min	minimum
MoE	Ministry of Education
MoH	Ministry of Health
MoU	Memorandum of Understanding
NZ	New Zealand
NZQA	New Zealand Qualifications Authority
PE	Physical education
PIS	Participant information sheet
RE-AIM	Reach, effectiveness, adoption, implementation and maintenance
RFP	Request for proposal
SD	Standard deviation
SW	Sport Waikato
WHO	World Health Organization
U5E	Under 5 Energize
UNICEF	United Nations Children's Fund

UK United Kingdom

US United States

## Preface

This section outlines my contribution to the research process for this study. I was supported for this work by a Gravida centre of research excellence (2014–2016) PhD grant which provided a stipend and research expenses. Figure 1 provides the structure of the chapters in this thesis.

Chapter 1 provides a brief introduction to the problem of childhood obesity and New Zealand's diverse early childhood sector a feature of which is weak and unmonitored regulation of food and physical activity for young children. The issue of limited translation of research into effective health services especially for early childhood care is identified and the evaluation of a potential solution, Under 5 Energize, is described.

Chapter 2 is a review of the literature concerning the importance of healthy environments for the prevention of obesity and studies in non-parental childcare are compared and contrasted. I was responsible for the literature search, write up and evaluation of the literature as described in this chapter. Following the literature review, the overall research questions were formulated: Can the Project Energize programme, tailored for early childhood centres, be effective in the early childhood setting at improving the nutrition and physical activity environment of an early childhood centre for young children? What works, what doesn't, what next?

Chapters 3 and 4 describe the approach and process of investigation to provide some answers to the research questions. I was entirely responsible for these chapters and the research rationale. From the beginning, the research questions and study design were guided by the RE-AIM framework (Glasgow, Vogt, & Boles, 1999).

### Chapter 5

I started my PhD in 2013. Sport Waikato applied for and received funding for maternal and child health from the Ministry of Health in 2013 to support the development and delivery of Under 5 Energize. Sport Waikato identified geographically the centres that would be invited and from commencement kept electronic records and a database of all activities associated with Under 5 Energize. The Energize team update this weekly. These records were accessed to provide participation figures for my research for comparison with regional and national statistics from the Ministry of Education. The geographical mapping was undertaken by Janet Pearson from AUT using a database

developed by the researcher with centre details from Sport Waikato, ethnicity data sourced from the Ministry of Education and longitude and latitude points determined from Google maps. The focus group and interviews with U5E staff and educators from participating centres were organised with assistance from U5E and undertaken by the researcher.

## Chapter 6

The audit tool questions were determined by the Energizer staff and the researcher. The Energizers, with a representative from each centre, completed the questionnaire which was used to inform the centre-specific needs analysis and action plan with each centre. The data were entered into a database by the U5E programme administrators and the researcher. This database was then used for the analysis of the audit data.

The researcher was given access to the main U5E database for the action plan data. It was collated into a database developed by the researcher who then analysed and interpreted the data.

## Chapter 7

The researcher obtained ethical approval for and undertook a face-to-face parent survey. Assistance with enlisting participant centres was provided by the U5E programme staff.

The focus group and interviews with U5E staff and educators from participating centres were organised with assistance from U5E programme staff and undertaken by the researcher. Dr Margaret Hinepo Williams provided support for Māori tikanga and approaches to Kōhanga Reo.

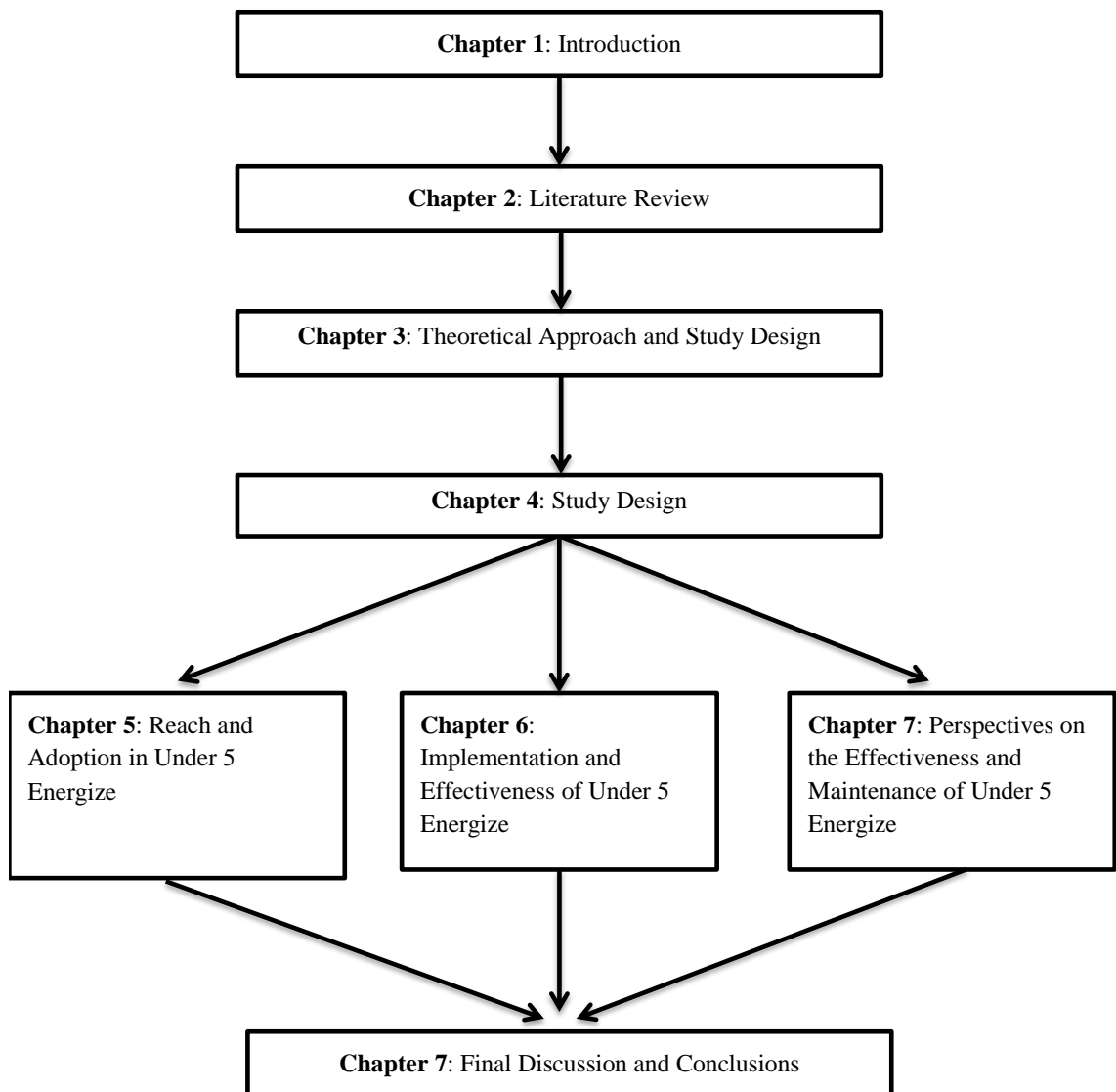


Figure 1. Structure of thesis

## Chapter 1. Introduction

Developing healthy eating and activity behaviours from an early age enhances growth and development, promotes life-long health and prevents obesity. In Aotearoa New Zealand (NZ), the pae ora (healthy futures) of children are jeopardised by high and rising obesity prevalence, with Māori, Pacific and socioeconomically deprived children disproportionately affected. Most young children in NZ (96% of 4 year olds) (Ministry of Education [MoE], 2015) participate in early education, increasingly for longer periods from an early age; making early childhood centres (ECC) an important environment for promoting health and obesity prevention. However, evidence from international studies indicates that children in non-parental childcare have higher body weights later in childhood compared to those in parental care (Alberdi et al., 2016; Scully et al., 2017). Some NZ early childhood centres have less than ideal food and physical activity policies and practices (Gerritsen, Morton, & Wall, 2016). Furthermore, NZ early childhood education (ECE) regulations lack physical activity guidance and although stipulate provision of healthy food (supplied by the centre and from home) there is little or no monitoring of adherence. This signals that policies and actions to encourage early education centres to provide healthy food and physical activity environments for all young children, especially centres located in areas of high need are warranted. Despite this, limited proof exists about how to translate what works in the research setting into an effective health service that the Ministry of Health or District Health Boards (DHBs) will fund and deliver. New Zealand's diverse and unique early education setting adds to this challenge. The work in this thesis involves the evaluation of the first three years of delivery of Under 5 Energize (U5E), a preschool health service funded by the Ministry of Health, initiated in 2013 in the Waikato region of New Zealand, in four main ECE delivery options including those in areas of high deprivation.

This chapter provides the context to this research and profiles the gap in knowledge of how to translate evidence into effective health services. It begins by outlining the problem of suboptimal growth of children and describes the context of this project, the early childhood sector. This is followed by a discussion of the importance of healthy food and physical activity environments within early childhood centres and justification is provided for the need to evaluate interventions in real-life, rather than research settings.

## 1.1 Optimal growth of young children in Aotearoa New Zealand

Optimal growth and development in childhood relies on a “positive energy and nutrient balance” and monitoring growth is used as a way to assess a child’s health from birth (MoH, 2008, p. 61). Growth is measured in NZ using weight and height (length for infants) against growth charts for specific ages and gender and normal growth is indicated when height and weight are on the same percentiles. However, over-consumption of energy-dense food together with low energy expenditure, can possibly lead to a greater speed of growth and consequent excess body size of children (MoH, 2012a). In the absence of a more rigorous method of assessment of excess weight gain for height in children, including different ethnic groups, body mass index (BMI) is used in conjunction with reference population growth charts. NZ uses an adaptation of the World Health Organization (WHO) growth references since 2010 for 2–5 year olds (MoH, 2012a). Overweight is defined by the Ministry of Health as between the 91<sup>st</sup> and 98<sup>th</sup> BMI percentile, and extremely overweight or obese as over the 98<sup>th</sup> percentile (MoH, 2016b). Measurement of BMI over time can detect accelerated growth at a population level from over-consumption of energy and insufficient physical activity, resulting in excess body size, a strong indicator of impaired future health. Setting children on a growth trajectory favouring good health outcomes is more cost effective than trying to improve a poor pattern that is entrenched; therefore good nutrition and sufficient quality and quantity of physical activity are imperative for optimal growth and development trajectories for children.

Childhood obesity (classified as a projected adult BMI over 30 kg/m<sup>2</sup> in population surveys) is a global problem, described by the WHO as one of the ‘most serious public health challenges of the 21st century’ (WHO, n.d., p. 1). It is estimated that 43 million (7%) preschool children in the world experience either obesity or overweight but this will surge to 60 million (9%) by 2020 (De Onis, Blössner, & Borghi, 2010). Childhood was described by Maziak, Ward, and Stockton (2008) as both a time when obesity can start and an opportunity to prevent or intercede, as food and activity behaviours are being acquired. Also, Osei-Assibey et al. (2014) note that it is more problematic to reduce excess body weight in adolescence and adulthood therefore childhood was an opportune time for interventions. Responding to this challenge, the WHO established the Commission for Ending Childhood Obesity which produced the report *Ending Childhood Obesity* (ECHO) (WHO, 2016). It aims to prompt governments to consider preventative action to reverse the trend in this debilitating health condition and as a

“primary prevention strategy for non-communicable disease” (WHO, 2016, p. 6).

Following this, an action plan is currently under development. Addressing obesity in childhood has global prominence and is the ideal life stage to intervene to reduce the prevalence of non-communicable diseases (NCDs) in adulthood.

New Zealand is not immune to the escalating global trend in obesity prevalence. It is as an increasing health problem among NZ children and impacts on sub-groups of the population differently. One third of New Zealand children aged 2–14 years is overweight (21%) or obese (11 %) with Māori, Pacific and socioeconomically deprived children disproportionately affected (MoH, 2016c). The Ministry of Health (2016c) reports higher obesity prevalence for Māori (15%) and Pacific (30%) children. Children living in the most disadvantaged regions (20%) who experience higher rates of obesity compared to children from the least disadvantaged (4%). Although, preschool children (2–4 years) experience lower obesity prevalence (7.3%) compared to the 2–14 years old age group overall; however, this is still estimated to be 13,000 children or 1 in 12. While prevalence rose among 2 to 14 year olds between surveys in 2006/2007 and 2011/12, there has been little increase since then but it is unknown if this indicates a slowing of the incidence (MoH, 2014). Action on obesity requires an equitable approach to address the needs of subgroups most affected by obesity.

Waikato, the region in NZ of interest for this research, has more overweight children compared to the national prevalence. For Waikato children, NZ health survey data documents the prevalence of overweight children to be 27% compared to the national prevalence of 22%, third highest out of the 21 DHBs, though obesity prevalence is similar to NZ as a whole (10% compared to 11%) (MoH, 2014). In the Waikato, Māori children experience a higher prevalence of obesity compared to national prevalence, where they have three times the obesity prevalence of non-Māori, compared to the national prevalence of twice as likely to be obese. Furthermore, adult rates of chronic disease in the Waikato region exceed the national rates. The excess body size of children will only exacerbate these rates over time, especially for Māori and Pacific people. Excess body weight is an issue affecting children, especially Māori, in the Waikato region, with the potential to exacerbate high regional chronic disease incidence in the future.

Obesity negatively influences children’s quality of life. This occurs through poor health in the immediate and long term; it also reduces educational achievement and leads to

lower participation in physical activity (WHO, 2016). Direct health effects include physical complications with bones and joints, early physiological indicators of risk factors for diabetes and heart disease and social and psychological issues such as low self-esteem and depression ( Reilly & Kelly, 2011). Rising adolescent prevalence of diabetes shown in NZ is thought to be directly related to childhood obesity (Hotu, Carter, Watson, Cutfield, & Cundy, 2004). In contrast, healthier children have been shown to progress better academically, have fewer sick days and better behaviour and display higher self-esteem (Quigley & Watts, 2005). Preventing obesity has huge implications for children's health, education and overall wellbeing.

Overweight preschoolers beget overweight adolescents and in turn overweight adults increasing the likelihood of long-term poor health. Singh, Mulder, Twisk, van Mechelen, and Chinapaw (2008), in a systematic review, reported that overweight children had at least double the risk of being overweight as an adult compared to normal weight children. Even children that were overweight as young as 3 years had an increased likelihood of being overweight at 5 years old and a higher BMI exacerbated the risk (Griffiths, Hawkins, Cole, & Dezaux, 2010). This puts overweight children at greater risk of having NCD risk factors, including higher blood lipids, at a younger age predisposing them to early development of NCDs including heart disease, type 2 diabetes and some cancers.

Malnutrition, in the form of obesity, is a modifiable risk factor influenced by excess food intake and reduced energy expenditure over time and while the causes are many and complex, environments have been identified as key areas to target interventions. The cause of obesity has been described as “a complex web of social, cultural, environmental, biological and psychological influences” (Rutter, 2012, p. 657). The multiple causes and the complexity of the relationships between these influences, including “feedback loops”, were first shown in the Obesity System Map from the UK government's *Foresight Report* (Jebb, Kopelman, & Butland, 2007). More recently, Swinburn et al. (2011, p. 804) described obesity as “being shaped by global drivers and moderated by local environments”, also noting “reciprocal interactions” between the environment and individuals. This can be described as the environment manipulating food choices towards unhealthy options and if the individuals within environments continue to consume this type of food, it thereby creates a “vicious cycle” of supply and high demand for energy-dense foods, contributing to increasing body size (Roberto, 2015, p. 2404). This vicious cycle can be disrupted by supporting both the development

of healthier environments and habits of healthy eating and physical activity. However, there was acknowledgement by Swinburn et al. (2011, p. 807) that environmental interventions may not concentrate on the “obesogenic drivers” of obesity, namely the global food system increasing the availability of energy-dense, nutrient-poor foods. Therefore, government policy and regulation are required, together with interventions shown to be effective, to control burgeoning global body weight statistics (Swinburn et al., 2011).

Due to its complexity, obesity prevention and health promotion requires a comprehensive range of strategies at multiple levels. The ECHO Commission report (WHO, 2016) outlined a multi-layered range of prevention strategies. It recognised the importance of the early childhood setting, the focus of this thesis, by specifying actions in this setting. These included mandating only healthy food and beverages are served at ECCs, addition of nutrition and physical activity to the early childhood curriculum, support for caregivers to encourage a healthy lifestyle for children and breastfeeding promotion. The New Zealand government has also recognised childhood obesity as an area for action by with the release of the *Child Obesity Plan* in 2015 to prevent and treat obesity (MoH, 2015a). Similarly, this plan was a multi-level approach with strategies of relevance to young children including the development of physical activity guidelines for under 5’s and an Education Review Office assessment of nutrition and physical activity within ECCs (Education Review Office, 2016).

## **1.2 The early childhood education sector in New Zealand**

Prior to starting school, more young children, including Māori and Pacific, are spending increasing amounts of time in the variety of ECE options available in New Zealand. Participation in ECE has risen steadily since 2000 with 96% of children attending some form before starting school (MoE, 2014c). Also increasingly participating in ECE are Māori (94% from 83% in 2000), Pacific (91% from 76% in 2000) and very young (2 years and under) children although two-thirds of the ECE population are three and four year olds (MoE, 2014c). NZ’s ECE participation rates of three and four year olds are higher (91%) than the OECD average (76%) (MoE, 2014c). The number of hours children are enrolled in ECCs each week is, on average, 22 hours. Participation rates in NZ are higher compared to the USA estimated to be only around 60% although children participate for a greater number of hours per week at 30 (Alkon et al., 2014). The NZ early childhood setting is characterised by a diverse range of types of ECE including parent-led services such as Playcentre; sessional or school day services provided by

kindergartens, privately or community run education and care centres (also includes Māori and Pacific immersion centres); parent-led Te Kōhanga Reo provided totally in Te Reo and Tikanga Māori and tribally affiliated and home based options (MoE, 2014b). Education and care has the largest proportion of early childhood centre attendances at 63%, followed by kindergarten 16%, organised home-based care 10%, Playcentre 6% and Te Kōhanga Reo 5% (the total number of licensed centres in 2015 was 4385) (MoE, 2015). Children aged three and four years make up most of the children participating in ECE. Early childhood centres in NZ provide an opportunistic environment for health interventions due to high participation rates of young children and have the potential to reach Māori, Pacific and low-income families.

Children are increasingly being placed in non-parental childcare. The main reasons are more mothers in the workforce (participation of women in workforce rose from 55% in 1994 to 63% in 2014) (Flynn & Harris, 2015) and government policy supportive of ECE participation (by funding 20 free hours for all 3–5 year old children and establishment of a target of 98% participation by 2016) (Child Health Forum, 2014). Participation of Māori, Pacific and socioeconomically deprived children is also supported by government policy with a dedicated target and funding. Additionally, welfare reform is requiring single parents to re-enter the workforce when children are three years old (<http://theconversation.com/new-welfare-reforms-put-extra-pressure-on-single-parents-to-enter-paid-work-74969>). Increasing participation is shown by rising numbers of ECCs over the last 10 years, in the 2013-2014 year alone 126 new centres opened (MoE, 2015). Centre types, home based and education and care centres offering full-time care, showed the largest gain in numbers although home based care options also closed the largest number of sites. The Ministry of Education (2015) reported that the growth of these types of ECE was indicative of the rising number of children attending ECC and attendance for longer hours. Roblin (2007) noted that as time in childcare increased, childcare providers became significant role models influencing children's food and activity behaviours. As food and activity behaviours are set early in life childcare presents a “window of opportunity” to support the development of healthy behaviours (Scully et al., 2017, p. 7).

Early childhood centres are required by regulations and licensing requirements to provide or encourage provision of food that meets the nutritional needs of children. The early childhood regulations, Education [Early Childhood Services] Regulations 2008 (ECR, 2008) , under the *Education Act 1989*, state that every licensed service provider

should promote the good health of children and provide facilities for food preparation and eating that take into account the age and number of enrolled children. Within the Ministry of Education's licensing requirements, health and safety criterion (Education [Early Childhood Services] Regulations, 2008), it states that:

HS19: Food is served at appropriate times to meet the nutritional needs of each child while they are attending. Where food is provided by the service, it is of sufficient variety, quantity, and quality to meet these needs. Where food is provided by parents, the service encourages and promotes healthy eating guidelines.

Centres need to keep records of the food provided for three months to show adherence to the criterion. For support, the ECC licensing criteria refer users to relevant national resources including the *Food & Nutrition Guidelines* (for Infants and Toddlers [0–2 years] and Healthy Children and Young People [aged 2–18 years]) (Ministry of Health, 2012a) and the Heart Foundation Healthy Heart Award (HHA) programme. Furthermore, the provision of healthy and ethnically appropriate food for pre-schoolers is consistent with the principles, strands and goals of *Te Whāriki: Early Childhood Curriculum* (MoE, 2017).

However, in contrast to nutrition, there are no stipulations on physical activity in either the early childhood regulations or in the licensing criteria for ECCs. This is despite the existence of national fundamental movement skill guidelines and activities recommended for preschool children, Active Movement, from Sport New Zealand (<http://www.sportnz.org.nz/managing-sport/search-for-a-resource/guides/active-movement-activity-guides-for-children-0-5-years->). These were recently updated by the Ministry of Health after a decade in use (<http://www.health.govt.nz/publication/review-physical-activity-guidance-and-resources-under-fives>), but are not referred to in the regulations as a supporting document. Although not directly related to physical activity, the ECE regulations require that ECCs provide 2.5m<sup>2</sup> of indoor space and 5m<sup>2</sup> of outdoor space for each child (Education [Early Childhood Services] Regulations, 2008).

The Ministry of Education provides limited direction and support for early childhood centres around nutrition and fundamental movement skill development within the ECE sector. Nutrition and fundamental movement skills development feature minimally in undergraduate educator training (Gerritsen, 2016; McLachlan, 2013). Nutrition training for educators and cooks is offered by the Heart Foundation but it is not regularly available to all regions. Fundamental movement skills training may be sourced

regionally as is the case in the Waikato, a service provided by Sport Waikato, or the Active Movement resources can be accessed online. The mana atua (well-being) strand of the early childhood curriculum, Te Whāriki, of which the first goal is that “children experience an environment where their health is promoted” (MoE, 2017, p. 27), appears to lack centre-specific support for educators to achieve this with respect to nutrition and physical activity. Furthermore, Te Whariki also states that every child has “the right to have their health and wellbeing promoted”, which also adds to the obligation for ECCs to deliver healthy food and regular physical activity (MoE, 2017, p. 27). While the ECE curriculum, guidelines and recommendations encourage the supply of healthy food choices and age appropriate physical activity, there appears to be limited active support or review of their implementation in the ECE sector.

Children consume a range of meals and snacks while in ECE depending on the hours in care. This could be from one snack in sessional (3 hours) care (mid-morning or mid-afternoon snack) but up to 2 meals and 3 snacks if in full time care (7.00am - 6pm) (breakfast, lunch and mid-morning, mid-afternoon and late afternoon snacks). The American Dietetic Association (2011) states that food and beverages served in all-day care should provide one half to two-thirds of a child’s daily nutrient intake while part-time care should provide up to one third of daily intake. While there is no such benchmarking in New Zealand it is reasonable to assume that similar proportions apply.

### **1.3 Healthy food and physical activity environments for young children**

Food and physical activity environments are recognised as having a strong effect on eating and activity behaviours (Osei-Assibey et al., 2014) and hence obesity (Swinburn et al., 2011). The environments in which children live have been described as obesogenic, predisposing children to weight gain from overconsumption of energy and inadequate levels of physical activity and potentially a lifetime of excess bodyweight (Swinburn, Egger, & Raza, 1999). While obesity treatment options need to be available, priority needs to be on “reversing the obesogenic nature of these environments” (Swinburn et al., 2011, p. 804) to prevent obesity through sustainable behaviour change (Swinburn et al., 1999). In fact, it is very difficult for someone to make the desired changes to behaviour in an environment where unhealthy food choices and low physical activity are the norm (Osei-Assibey et al., 2014). This situation is considerably worse for young children who, compared to adults, have little or no control over their environments (Waikato District Health Board, 2009), relying on adults for food

provision and support to develop healthy food and physical activity behaviours. Furthermore, Story et al. (2009, p. S183) environmental and policy features are important because they regulate the “access, availability, quality, and consumption of food and beverages and level of physical activity”. Also, changes to food and physical activity environments, along with policy, have been described as “key to initiating and sustaining systematic change” and responsible for reductions in chronic disease prevalence (Brownson, Haire-Joshu, & Luke, 2006, p. 360). Ideally, environments in which children grow should promote healthy food and regular physical activity as the preferred choices; however, many of the current environments endorse the opposite.

Healthy behaviours are more likely to be developed if the environment and policies are supportive. Food environment factors shown to have evidence of effectiveness with respect to improving food intake or reducing body weight in young children were reduced promotion of unhealthy (high-fat, high-sugar) foods, offering alternatives to sugary beverages and smaller portion sizes (Osei-Assibey et al., 2014). However, this systematic review included studies (35 studies) in a range of settings and included children 8 years and younger with many of the studies addressing food catering located in the school setting. Environmental factors influencing physical activity amongst pre-schoolers were found to be the quality of the ECC, more portable (balls and bicycles) and less fixed playground equipment (slides and jungle gyms), lower use of screen devices, and greater playground area in 22 ECCs in the US (Dowda et al., 2009). These factors were also associated with less sedentary time. This study was cross-sectional therefore the long-term effects of these factors are unknown. Dowda et al. (2009) highlighted an important role for educators to encourage physical activity by creating a variety of activities using the portable equipment and controlling screen time.

There is a paucity of published literature assessing nutrition and physical activity environments in the NZ early childhood setting. The ECHO report identified the development of healthy food and physical activity environments within the ECE sector as a vital setting for action (WHO, 2016). The NZ Ministry of Health undertook a three year study of factors in food and nutrition environments, including food availability and supply and nutrition policy in primary, secondary and ECE services in 2007 and 2009 to monitor the effect of the Healthy Eating Healthy Action (HEHA) initiatives (McLean et al., 2009) in this setting (Pledger, Black, Cumming, & McDonald, 2010). It showed improvements between surveys, where the provision of “occasional” foods (<http://www.health.govt.nz/our-work/preventative-health-wellness/nutrition/food-and->

beverage-classification-system) and fundraising with unhealthy food (pizza, pies or sausages), declined. Most centres participated in a nutrition related programme (HHA and/or 5+ A DAY) and reported that these programmes increased the availability of healthy foods within centres. However, provision of “everyday” foods did not change significantly, nor was there an increase in the number of centres with a policy but most centres reported a policy at baseline (over 80%) (Pledger et al., 2010). The HEHA strategy was disestablished soon after the 2009 survey and further surveys of the ECE nutrition environment had not been repeated before the start of this body of work.

Educators, caregivers and parents have a role in shaping food and physical activity behaviours of children (Natale, Messiah, et al., 2014; WHO, 2016). This is because young children are fully dependent on their parents and if they attend childcare; educators are also involved in influencing behaviour development as caregivers determine the food supplied for this age group (Natale, Messiah, et al., 2014) and how physical active they are. The socioecological model outlines the multiple influences on behaviours of individuals and this needs to be considered when evaluating the nature of environments where young children live and play (Stokols, 1992).

#### **1.4 Translation of research into effective health services**

Translation is described as the “adoption of novel ideas from basic science for use in the design of interventions to modify behaviour and reduce risk for disease” (K. D. Reynolds & Spruijt-Metz, 2006, p. 220). It also includes testing the feasibility and dissemination of programmes known to be effective at changing behaviour. A framework outlining five phases of translation have been proposed, where Phase 1 is basic research that updates intervention development, Phase 2 refers to development of methods, Phase 3 involves efficacy trials, Phase 4 are effectiveness trials (this is where the U5E fits in the model) and finally Phase 5 is the evaluation of factors thought to enhance or obstruct the dissemination of the intervention (K. D. Reynolds & Spruijt-Metz, 2006). Progressing from translation of a new idea, (Phase 1) to an intervention that works, (Phase 5), is reported to be hardly ever fully achieved due to cost, time and a lack of collaboration with other sectors, such as between science and prevention experts, and barriers can operate at many points, including the individual, health professional or organisation level.

Some of the barriers to translation in childhood obesity outlined by K. D. Reynolds and Spruijt-Metz (2006) were a lack of fit between efficacy studies and what suits health

promoters disseminating the programme in ‘real-world’ settings, such as early childhood centres, together with lack of time and incentive to deliver health prevention programmes. Added to this was the desire by health researchers to design interventions to deliver large effects which can shift study outcomes towards efficacy and internal validity rather than effectiveness and external validity.

There is a paucity of interventions in phase 4 and 5 of the translation framework. K. D. Reynolds and Spruijt-Metz (2006) reviewed the studies included in a 2005 review of childhood obesity interventions against the translation framework and reported that the majority were Phase 3 efficacy studies and only six of 26 studies were Phase 4 and there were no Phase 5 studies. This thesis proposes a phase 4 effectiveness evaluation of the Under 5 Energize programme therefore adding to the gap in knowledge of phase 4 trials.

A framework that stipulates a method to evaluate the “translational potential” (K. D. Reynolds & Spruijt-Metz, 2006, p. 239) and has application to measurement of the impact of childhood obesity prevention trials is the RE-AIM framework. It was developed to address an imbalance between controlled environment studies or randomised controlled trials, and the implementation of interventions in more complex settings, of real communities and environments (Gaglio, Shoup, & Glasgow, 2013). Also, RE-AIM can provide an assessment of the sustainability and generalisability of public health interventions (Glasgow et al., 1999). This body of work uses the RE-AIM framework to evaluate the effectiveness of the U5E programme.

## **1.5 Under 5 Energize**

Under 5 Energize (U5E) was developed to address a Ministry of Health request for regional initiatives from DHBs, non-government organisations or other providers to promote maternal and child health. The Ministry develops national policy for health treatment and prevention. DHBs, health providers and Sports Trusts are responsible for the delivery of regional health programmes in accordance with Ministry of Health policy and priorities. While evaluation is a core requirement of such contracts, and of other programmes and interventions conducted in the health sector, few appear to be longitudinal in nature or to be published in the peer-reviewed scientific literature.

Ethnicity, age structure, population spread and socioeconomic status of the Waikato DHB population contribute to this region experiencing high rates of chronic disease and

consequential high health needs. The Waikato DHB prioritised action on child health as a long term strategy to address poor health in the region and after a randomised controlled trial of Project Energize in primary schools from 2004 to 2006, the Waikato DHB committed to funding Sport Waikato to deliver Project Energize in every primary school across the Waikato DHB in 2009 (Waikato District Health Board, 2013). It was developed to increase health outcomes of primary school aged children by promoting healthy eating and increasing physical activity levels. Subsequently, participation in the Energize programme has been shown to be associated with lower body size and increased fitness (Rush, McLennan, et al., 2014). More recently Sport Waikato developed U5E for early childhood centres in August 2013. Modelled on Project Energize, U5E aimed to improve nutrition and physical activity levels among Waikato DHB preschoolers and prevent obesity. It targets 30% of the regions enrolled children (approximately 4500) and includes a higher than the national and regional proportion of Māori children.

The study proposed in this thesis is a response to the opportunity to monitor, evaluate and research the process of delivery of Under 5 Energize, a preschool health service, operating in the four main ECE delivery options including those in areas of high deprivation, from its inception over a two year period using the reach, effectiveness, adoption, implementation and maintenance (RE-AIM) framework for population health initiatives (Glasgow et al., 1999). While evaluation was part of the U5E contract with the Ministry of Health, this body of research aimed to add value and depth and extend the existing evaluation of the programme by including both qualitative and quantitative measures of the programme reach, effectiveness, adoption, implementation and maintenance. The plan for this research was begun in the early stages of delivery of U5E, after the contract was signed with the Ministry of Health. It is the only integrated service delivery programme and research initiative of its kind in NZ. It will add new evidence of how to translate research findings into effective health services for DHBs to enhance the nutrition and physical activity policies and practices of early childhood centres.

There is also a gap in knowledge about how to promote health and prevent obesity across the diverse nature of ECE options available in NZ especially those ECC located in areas of high need. Many of the interventions have targeted school aged children using the school as the setting (Birch & Ventura, 2009; Waters et al., 2005). Despite increasing ECE participation rates, very little is known about how evidence-based

health interventions can be translated into an early childhood centre environment that promotes health through good nutrition and regular physical activity and ultimately contributes to improved health outcomes for children. Hence, the overall research question for this thesis was could the Project Energize model, tailored for early childhood centres, be effective in the early childhood setting at improving the nutrition and physical activity environments for young children? What works, what doesn't, what next?

## **1.6 Summary**

Healthy children beget healthy adults. Setting children on a growth trajectory favouring good health outcomes is more cost effective than trying to turn around a poor trajectory. Unfortunately, in New Zealand, young children, especially Māori, Pacific and socio-economically deprived children, are gaining weight too fast (MoH, 2014). Excess weight gained in childhood is likely to continue into adulthood, increasing risk of earlier poor health from non-communicable diseases and a consequentially larger health cost burden. The environment that a child grows up in, from conception to birth and beyond, strongly influences the risk of developing obesity. Environments that support the development of healthy eating and regular physical activity behaviours of young children are more likely to prevent ill health associated with overweight later in life.

Government policy in New Zealand supports increasing numbers of young children to attend some form of early childhood education, with a target to increase numbers of Māori and Pacific and socially deprived children. There is a diverse range of ECE options in New Zealand, including four main types of kindergarten, Playcentre, Te Kōhanga Reo and education and care centres. This creates huge potential for favourable food and physical activity environments for young children within early childhood centres that support good health and reaches those children most in need.

The Under 5 Energize health service, modelled on the successful Project Energize programme, is a nutrition and physical activity programme operating in 121 of 450 early childhood centres in the Waikato since August 2013. It has the potential to change the behaviour of early childhood centres to support health and prevent obesity. This body of work seeks to add new knowledge about *How can this be done?*

## **Chapter 2. Literature Review**

This literature review critically appraises the effect of healthy eating and physical activity interventions on the ECC environment for young children. This section begins by connecting long-term health with a favourable growth trajectory set early in life and a summary of the nutritional status of young children. Following this, a background of the early childhood sector in NZ and the evidence review of interventions to improve the body size outcomes of young children are provided. The review concludes with a summary of the evidence, identification of the gaps in knowledge and the reasoning for the need for this research.

### **2.1 Accountability for children's health**

Healthy children who subsequently grow up to be healthy adults make a favourable contribution to society and the economy (The Public Health Advisory Committee, 2010). Early childhood has been described as a “critical time for growth and development” (Vanderloo, Tucker, Johnson, Burke, & Irwin, 2015, p. 361). A socially, educationally and economically deprived childhood places extra burden on the country from loss of productivity and extra costs for treatment services (The Public Health Advisory Committee, 2010). While child health has improved over time in New Zealand, a comparison with other Organisation for Economic Cooperation and Development (OECD) countries showed New Zealand's ranking for child health was poor (Organisation for Economic Cooperation and Development, 2009). This poor ranking has been linked to the widening gaps in health between different groups of the population, namely Māori and Pacific children, who show a health status that is two to three times worse than a non-Māori, non-Pacific child (The Public Health Advisory Committee, 2010). A higher level of investment in preschool aged children was likely to create favourable outcomes and be equitable for socially deprived children according to the OECD report (Organisation for Economic Cooperation and Development, 2009). Similarly, the WHO report on social determinants of health states that spending on young children has the largest potential to reduce health inequities (WHO, 2008). Furthermore, Goodman et al. (1994, p. 1118) state that quality childcare is good for not only the children and families but also the community and investing in the early years is “societal investment in resources”, in addition to parental support. Despite this, NZ government spending on young children was lower than the OECD average and considerably less compared to older children (Organisation for Economic Cooperation and Development, 2009).

Increasing levels of poverty in NZ have been linked to poor health of children, setting them on a path to poor health in adulthood from cardiovascular disease, obesity, diabetes, dental decay and a reduced lifespan (Child Poverty Action Group, 2014). Twenty-seven percent of children (285,000) are under the poverty line, according to the Ministry of Social Development guidelines (Child Poverty Action Group, 2014). One of the effects of poverty is cutting back on nutritious foods required for health and growth during pregnancy and childhood. Children living in poverty consume less fruit and vegetables (MoH, 2003). Lack of food security or food insecurity, a measure of inadequate access to nutritious food, occurs in around 20% of households, with higher rates experienced by Māori and Pacific families (MoH, 2003). Similar findings were reported in a more recent investigation among low-income households living in highly deprived areas (Carter, Lanumata, Kruse, & Gorton, 2010; MoH, 2011). Poverty, an issue affecting many children in NZ, negatively impacts on the food intake and health of children.

For all children to have an equal opportunity for a successful education, children need to be encouraged and supported to be physically active and make healthy food choices. Nutrition programme research in the school setting has shown that schools have an important role in improving children's food choices and resulting nutritional status (Waters et al., 2005). Most of the literature linking nutritional status and academic performance is from school-aged children; however, it is reasonable that this association also exists for preschool children (Quigley & Watts, 2005). Children living in low income areas are less likely to consume a healthy diet (MoH, 2003), therefore early childhood centres with a high proportion of children from deprived areas or backgrounds, may have a concentration of enrolled children with inadequate food intake and consequently low nutritional status (Quigley & Watts, 2005). Targeting nutrition and physical activity programmes in ECCs located in low income areas have the potential to improve educational outcomes for these children.

The challenge for governments investing tax payer money in a health service, rather than research, is how the funders will know that they are getting value for money. It is well established that optimal nutrition and physical activity improve health at any age. It is known that supportive environments promote health. What is not known is how to measure the effectiveness of a health service.

## **2.1.1 Developmental origins of health and disease**

### **1.1 Intervening early in life**

Intervening early in life to ensure children achieve pae ora (healthy futures) makes sense for health, quality of life and economic benefits. An increasing body of research shows that the health trajectory of a child is set very early in life, even before conception, by the health of both parents (Hanson & Gluckman, 2011). The cost of a poor trajectory includes higher health costs for treatment and loss of productivity in adulthood (The Public Health Advisory Committee, 2010). For example, there are large projected costs for the health treatment of obesity. Lal, Moodie, Ashton, Siahpush, and Swinburn (2012) estimate obesity in NZ costs in excess of \$624 million. Furthermore, poor health from obesity can affect socioeconomic status through lower educational achievement and lower income. If prevention interventions begin in the early years of life, there are potential economic benefits for the health system (Gluckman & Hanson, 2008) and increased productivity in the long term.

The early life environment influences long-term health, and in particular, early life stages have been identified as influential and opportune for intervention and given rise to recognition of the importance of the “developmental origins of health and disease”, DOHaD (Godfrey, Gluckman, & Hanson, 2010, p. 15). Key factors influencing chronic disease in adulthood are the mother’s body composition and diet both before conception and during pregnancy. Additionally, the nutrition of the child from conception, if compromised, impacts negatively on the risk of experiencing chronic disease earlier in life. Particular time points during the life-course have been recognised as ideal intervention periods. De Onis et al. (2010) stated that intrauterine, infant and preschool as likely important stages for setting energy balance. In the ECHO report (WHO, 2016) highlights pre-pregnancy, infancy and early adolescence as critical stages of growth and development. Despite the differing time points for intervention, the emphasis is on early intervention when metabolic systems and behavioural patterns are being developed. Therefore, even though increasing physical activity levels and improving nutrition should be key strategies for preventing weight gain and improving health outcomes across the life-course in all population groups (WHO, 2004) intervening early in life should be prioritised.

### **2.1.2 The diverse challenges for the development of healthy eating and physical activity behaviours**

Many eating and physical activity behaviours that can predispose children to obesity are formed by 5 years of age (Birch & Ventura, 2009). As children age and eating and physical activity habits become more entrenched, improvement is more problematic, in contrast to young children where behaviours are more amenable to change, and parental influence is greater (MoH, 2005). Young children rely on parents and caregivers to provide their entire food intake and for promoting and role modelling healthy eating patterns (Natale, Messiah, et al., 2014). There are many benefits to preschoolers from healthy eating and regular physical activity habits.

It is commonly thought that preschoolers are naturally very active however many studies shows that physical activity levels of preschoolers are not as high as believed and preschoolers within childcare are highly sedentary. There is a need to understand how the environment within childcare can be altered to increase the quality and quantity of physical activity by children enrolled regularly in ECE. Despite evidence linking factors such as professional development, amount of indoor and outdoor space, and moveable equipment to support play, it is not known which factors are more important in promoting physical activity compared to others, and how important these factors are in different types of ECE (Vanderloo et al., 2015). This study showed low levels of moderately vigorous activities in three types of centres – education and care, home-based and kindergarten although the latter was found to be significantly higher than the other two types. Also centres offering more sedentary activities resulted in children being less active. More research is needed to fully understand factors in the environment influencing physical activity levels in order in increase physical activity levels and change educator and parent perceptions about physical activity levels among pre-schoolers in childcare.

Māori experience disparities in health, including non-communicable diseases and obesity, despite obligations under the Treaty of Waitangi requiring that Māori experience the same level of care. To avoid increased inequalities for Māori and Pacific children, two strategies have been suggested suggest to address NZ's high childhood obesity rates; these were community based interventions that target priority population groups and policy or regulatory measures (Vandevijvere & Swinburn, 2014). Furthermore, controls on the availability of poor nutritional quality food in early childhood settings was one of the strategies posited by Vandevijvere and Swinburn

(2014) as having the potential to reduce obesity among lower socio economic groups. The early childhood setting appears to be a potential site for reaching Māori and Pacific children and policy measures within this setting should be prioritised for action.

## **2.2 Nutritional status and physical activity levels of young children**

### **2.2.1 Nutritional status**

The Ministry of Health's only national Children's Nutrition Survey of schoolchildren 5–14 years old (MoH, 2003) showed that while many aspects of children's diets were in line with national nutrition recommendations, there were nutrient intakes that required improvement. The survey also showed that socioeconomic deprivation; diet and eating patterns were related. Children from high deprivation areas consumed a higher proportion of energy from fat in the diet and were more frequent consumers of sugary drinks (MoH, 2003). Overall, only 60% of children ate the recommended three or more servings of vegetables, 40% ate the recommended two or more servings of fruit each day, and 17% did not eat breakfast at home. However, the report did show younger children reported better nutrient intakes compared to older children (MoH, 2003).

This survey highlighted that certain groups of the population, including Māori and Pacific children, were at far greater risk of inadequate nutrient intakes than others. For example, one in two children had a mild iodine deficiency and small proportions of Māori and Pacific children showed suboptimal levels of minerals, iron and calcium. An Auckland-based survey of young children (6-23 months) also identified iron deficiency in 14% (95%CI 9,17%) of children and higher among Māori and Pacific children compared with European (C. C. Grant, Wall, Brunt, Crengle, & Scragg, 2007).

Although the Ministry of Health's Children's Nutrition Survey of schoolchildren is the most accurate and up-to-date dietary intake data in NZ, the research is over 10 years old and the food and economic environment has changed considerably. More recent research on selected eating behaviours from the 2013/2014 NZ Health Survey, of children aged 2–14 years old showed that 9.3% of 2–4 year old children drank fizzy drink and 7% ate fast food more than three times in the past week, with higher intakes recorded for Māori, Pacific and children from deprived areas (MoH, 2012b). Cost of food may restrict the ability of low income families to access a healthy diet (Hopgood et al., 2010). Overall, NZ research has demonstrated that most children consumed adequate nutrients but there were subgroups of the population, in particular, children from socioeconomically deprived areas, may not be receiving an adequate diet.

### 2.2.2 Physical activity levels

Physical activity is important for the health and development of young children. In the short term it supports motor skill development (Fisher et al., 2005), skeletal health (Specker & Binkley, 2003) and in the long term it reduces the risk of heart disease and obesity (Timmons et al., 2012). For these reasons regular and adequate amounts of physical activity are advised.

According to Gunner, Atkinson, Nichols, and Eissa (2005) young children are less active than they were two to three decades ago and there has been a concomitant rise in childhood obesity prevalence. There is limited literature available on the activity levels of preschool children in New Zealand. One small study of 3-5 year-olds in childcare showed that three-quarters of their time was spent in sedentary activities (Lucas & Schofield, 2010). A longitudinal study of 242 children, followed from 3-7 years of age, showed a reduction in physical activity (both moderate to vigorous intensity and low intensity physical activity declined, with greater reductions in the low intensity physical activity) and concurrent increase in sedentary activity from 4 to 5.5 years, after which it increased but not to the levels at 3 years old (Taylor, Williams, Farmer, & Taylor, 2013). The study authors postulated that the decline in activity occurred at an age when children may be attending more hours of childcare although data on childcare attendance was not collected. In contrast, international studies have reported increased physical activity levels at this age, but were limited by small sample sizes, higher sample drop out numbers and shorter follow up compared to the NZ study (Taylor et al., 2013).

Indirect measures of physical activity, such as the number of sedentary hours watching TV, are often used as an indicator of activity in the absence of objective measurement of physical activity. This was used in the New Zealand Health Survey and showed that half the 2-4 year olds surveyed (50.7%) watched two or more hours of TV each day (other screen types not included) with longer watching hours for Māori and Pacific and children from the most deprived areas (MoH, 2014). Screen time from TV and other screen types (DVDs and technology) for two year old children in the *Growing Up in New Zealand* longitudinal study was 1.6 hours (Morton et al., 2014). There is a lack of research measuring physical activity among pre-schoolers in NZ; however, default measures, such as hours of screen time, are concerning.

Children have been shown to have low levels of PA and associated high levels of sedentary activities while in ECE. The first review Reilly (2010), to assess studies of objectively measurement of physical activity among pre-schoolers, reported that overall the recommended amount of 60 minutes of moderate to vigorous intensity physical activity per day was not being met. It included 12 studies in child care (over 1900 children) and concluded that children were very inactive, failing to meet the minimum recommendation for physical activity for this age group in Britain (Department of Health Physical Activity Health Improvement and Protection, 2011) and the US (United States Department of Health and Human Services, 2008) while Australia recommends three hours of active play each day (The Department of Health, 2010). However, the authors noted that low physical activity may be a feature of all preschool children, not only those in childcare. Future research should focus on investigating strategies to increase physical activity levels of young children both within childcare and at home.

## **2.3 Obesity and healthy environments**

### **2.3.1 Does the early childcare environment increase body size of children?**

There has been mixed results from longitudinal studies investigating the association between time spent in childcare and obesity amongst young children. However, overall, childcare appears to be an obesity promoting environment. A Canadian longitudinal cohort study of more than 1,500 children (10-year follow-up) (Geoffroy et al., 2013) showed children who attended childcare centres from 18 months to 4 years were 1.65 times more likely to be obese in childhood (between four and 10 years old), higher than children cared for by relatives (1.5 times), compared to parental care, irrespective of socio-economic status, maternal weight, breastfeeding and mother's work status. Geoffroy et al. (2013) noted that mixed results from previous research were due to a number of factors including limited study length (3 years or less), inadequate recording of childcare attendance and weight and height data, and variable nature of physical activity and nutrition standards for ECCs between countries although the majority of studies showed an association between childcare and raised BMI compared to children cared for by parents. In a UK study, non-parental care by relatives, mainly grandparents, between the ages of 9 months and three years, was found to increase the risk of obesity but no relationship was found with formal childcare although this study sample was from high socioeconomic families (Pearce et al., 2010). There are no published studies of this kind in Australia (Wolfenden, Hardy, et al., 2011) or NZ, although one is underway in NZ using the *Growing Up in New Zealand* birth cohort. The variable

nature of childcare in terms of nutrition and physical activity has been postulated as a reason for mixed results (Geoffroy et al., 2013).

Early education environments have been linked with poor dietary intakes among young children and practices unsupportive of healthy food behaviour development. A study of 50 children in child care showed poor intakes; three year olds met the recommendations for only two of five food groups, fruit and meat and alternatives, while four and five year olds met only one, dairy, with grains and vegetables lacking (Padget & Briley, 2005). Food intake in this study was collected both from meals and snacks eaten both in and out of care and found that food eaten at home only partly supplied the food groups found lacking from the food provided in care. Parental reporting of a child's intake was a limitation of this study. A US study of over 100 children from 20 childcare centres also found sub-optimal intakes; children were not eating sufficient wholegrain foods, vegetable or fruits and consuming foods high in saturated fat and sugar (S. C. Ball, Benjamin, & Ward, 2008). Energy intake, while not exceeding recommendations, was at the upper end of the range of recommended energy intake in a study of 135 children at childcare (Gubbels et al., 2010). However, saturated fat and fibre intake were within the recommended ranges. This study also showed associations between environmental factors and nutrient intakes, for example, staff talking about healthy foods with children increased fibre intakes although the sample size was small (n = 135). Interventions to support ECC to follow recommended health promoting practices including healthy food provision are needed to improve food intake, develop healthy food behaviours and prevent obesity.

### **2.3.2 Early childhood centres as a setting for nutrition and physical activity promotion**

Childcare centres are identified, along with other educational and health institutions, as sites for creating nutrition and physical activity promoting environments and delivery of quality physical education in the WHO Global Action Plan for the prevention and control of NCDs (WHO, 2013). Gupta, Shuman, Taveras, Kulldorff, and Finkelstein (2005, p. 499) describe early childhood centres as having “a captive audience of children, parents and providers” and is therefore a potential venue for health promotion. Goodman et al. (1994) and Story, Kaphingst, Robinson-O'Brien, and Glanz (2008) corroborate that child care is a site for preventative health that has not been realised to date. In fact, Story et al. Story et al. (2008) called for stronger regulations on the nutritional quality of food provided and training of ECE staff because of the amount of

time children spend in care and the differences in regulation across states in the US. Respondents to a survey of education providers (n = 137) and parents (n = 97) thought health education had a role in raising health knowledge and influencing health behaviours of enrolled children and their families within the child care sector (Gupta et al., 2005). Presence of a structured environment within ECE (similar to the school setting) is likely to facilitate implementation of complex health promotion interventions compared to the informal home-setting (Hesketh & Campbell, 2010). Therefore, the childcare setting should be prioritised by governments and health services as an extremely important setting for health promotion and obesity prevention policy and action.

## **2.4 Nutrition and physical activity interventions in the early childhood environment**

### **2.4.1 Early childhood centre nutrition and physical activity environments in New Zealand**

Nutrition and physical activity environments in early childhood education and care in NZ has been shown to be variable in their alignment with NZ early childhood education regulations (Education [Early Childhood Services] Regulations, 2008) and international recommendations (Larson, Ward, Neelon, & Story, 2011). Cross-sectional survey data showed menu choices within ECC were not consistent with Ministry of Education regulations (Gerritsen, Dean, Morton, & Wall, 2017), many nutrition policies, although prevalent (Pledger et al., 2010), required strengthening in breadth and content, use of unhealthy food practices (for example, fundraising with unhealthy foods) (Gerritsen, Wall, & Morton, 2015), and only half the centres had a policy in physical activity (Gerritsen et al., 2016). These findings are similar to international population survey findings (Sisson et al., 2012; Wolfenden, Neve, et al., 2011) which strongly indicate there is significant opportunity to improve the nutritional quality of food, food practices and the quality and quantity of physical activity within early childhood care centres (Larson et al., 2011; Wolfenden, Hardy, et al., 2011).

### **2.4.2 Evidence from nutrition and physical activity interventions in early childhood centres**

Childcare is an increasingly researched setting for obesity prevention in young children. The growing number of interventions and systematic reviews of interventions in early childhood care in recent years (Table 2.1) reflects greater attention to the significance of early prevention of obesity and high rates of ECE participation (average of 22 hours per

week in NZ) yet inconsistent support for the development of healthy food and physical activity behaviours in childcare (Hesketh & Campbell, 2010; Sisson, Krampe, Anundson, & Castle, 2016). Variation in systematic reviews of study design, range and size makes overall conclusions and recommendations for researchers and practitioners somewhat problematic (Table 2.1). Many of the interventions included in reviews consist of strategies aligning with the multiple levels of the socio-ecological model that recognise that obesity prevention as complex in nature (Hesketh & Campbell, 2010; Larson et al., 2011). However, the recent publication of the first review of reviews in this setting (Stacey et al., 2017) combines and strengthens evidence for policy and practice.

The systematic review of reviews of nutrition and physical activity interventions in early childhood care reported that there is a greater quantity and stronger evidence for physical activity compared to nutrition for obesity prevention in the childcare setting. Stacey et al. (2017) reviewed 17 reviews (8 physical activity-only, one nutrition-only and 8 nutrition and physical activity) that had an effectiveness outcome, reporting that three of 16 reviews investigating physical activity were largely effective at increasing physical activity but only one review of nutrition interventions was effective at improving dietary intake. Furthermore, two of the 16 physical activity reviews were meta-analyses and showed a ‘small-to-moderate’ effect on physical activity (Finch, Jones, Yoong, Wiggers, & Wolfenden, 2016; Gordon, Tucker, Burke, & Carron, 2013). There have been no meta-analyses of nutrition outcomes although most of the reviews (8 of 9) were judged as of ‘moderate quality’ (Stacey et al., 2017). No New Zealand-based studies were included in these reviews with the majority of research located in the US, Europe and Australia (Stacey et al., 2017). Future research should focus on how to enhance the effectiveness of interventions in the childcare setting to maximise potential benefits for children and NZ-based research is needed.

Promising strategies to improve physical activity and nutrition in childcare, identified in a high quality evidence review, will provide direction for practitioners, researchers and policy makers. The promising nature of parental involvement to improve both food intake and physical activity levels of children was found in the review by Stacey et al. (2017) and previous reviews (Sisson, Krampe, et al., 2016; Summerbell et al., 2012). Specific aspects of interventions shown to have the most potential for physical activity were educator training, a focus on the physical environment (rearrangement of play spaces and addition of playground markings) and improvement of organisational

practice to include physical activity policy, structured active lessons, and additional outdoor playtime (Stacey et al., 2017). Nutrition interventions should include strategies targeting food availability, menu modification and positive peer modelling although as already noted, the strength of evidence is not as robust compared to physical activity (Stacey et al., 2017). It was also documented by Stacey et al. (2017) that these strategies aligned with current childcare diet and physical activity recommendations and regulations in the US (Kaphingst & Story, 2009), UK (Department of Health Physical Activity Health Improvement and Protection, 2011) and Australia (Commonwealth of Australia, 2012) and implementation of these promising strategies should invoke action to improve the diet and physical activity levels among young children.

### **Implementation**

A focus on how to improve the effective implementation of interventions is gaining attention because demonstration of accountability of investment in interventions and programmes is difficult without practical evaluation of implementation in the real world. In addition, lack of implementation of current recommended practices (Gerritsen et al., 2015) affirms that more effective implementation of change strategies is needed. Implementation is defined as the use of strategies to alter, adopt and embed best practice within a setting (Glasgow et al., 2012; Wolfenden et al., 2015). Determining effective implementation strategies was the focus of a Cochrane review (Wolfenden et al., 2016) which investigated strategies compared to no intervention, normal practice or an alternative strategy. Strategies used in the ten trials in the systematic review included written educational materials, educational sessions, audit and feedback (of professional practice), engagement of opinion leaders as well as small grants among others. Firm conclusions from the review were difficult due to the variability of measures used for implementation and weak design of some of the studies included however; the review did conclude overall that implementation strategies were having a positive effect Wolfenden et al. (2016). However, more good quality evidence is needed on how to effectively support the implementation of nutrition and physical activity interventions in early childhood centres.

Implementation success can be influenced by multiple factors (enhancers and barriers) and at different levels (for example, external policy, internal organisational readiness to change), yet implementation research in the early childhood setting is scarce (Wolfenden et al., 2016). Factors including parental engagement, support from ECC management and external support mechanisms (staff training, resources for teaching

children and families, policy guidance and links to health professionals) were found to enhance implementation in the childcare setting from a recent survey of managers of ECCs (Wolfenden et al., 2015). In fact, it was recommended that external support included provision of adequate resources to support a range of strategies to address the multiple barriers to implementation (Rohrbach, Grana, Sussman, & Valente, 2006). Use of the Consolidated Framework for Implementation Research in the study by Wolfenden et al. (2015) increased the understanding of implementation in the ECE setting but further research was recommended, especially the development of validated implementation assessment tools specific to the ECE setting. Wolfenden et al. (2015) emphasised the need for the development of simple interventions (low complexity) using evidence-based methods that matched staff skills and the capacity of ECCs as a good approach to implementation success.

### **Delivery method**

A feature of the majority of interventions reported in the peer reviewed literature, which is given little attention, is the delivery method of the intervention. Delivery is primarily by research staff (Finch et al., 2012), and sometimes trained educators within ECC (Fitzgibbon et al., 2005) or existing health service staff (Ward, Benjamin, et al., 2008). For example, *Hip Hop to Junior Health*, a randomised controlled trial in centres with large numbers of minority group children was delivered by specially trained educators external to the centres (Fitzgibbon et al., 2005). This study found that the increase in body weight after one and two years post-intervention was less in the intervention group compared to the control group, however the intervention was short (14 weeks) and intense (3 lessons per week of 20 minutes physical activity and 20 minutes of nutrition delivered to children). Ward, Benjamin, et al. (2008) used existing health staff, known as childcare health consultants (with a mandate for child health, development and safety) who were trained to deliver the Nutrition and Physical Activity Self-Assessment for Childcare (NAP SACC) intervention. Use of staff external to the centre yet part of the 'existing community infrastructure' produced positive findings, although statistically non-significant. Use of a health professional with an existing role, without inclusion in the job description, may limit the amount of their time devoted to the intervention and therefore the effectiveness of the intervention but over time could be more sustainable and repeatable compared to interventions that employ research staff short-term to deliver the intervention (Ward, Benjamin, et al., 2008).

### **Indigenous and socioeconomically disadvantaged populations**

There has been limited investigation of ECC with a high proportion of indigenous children yet they are warranted given the higher prevalence of obesity among this population group. Indigenous children in NZ and Australia have a higher prevalence of overweight and obesity (Ministry of Health, 2016a; Wake, Hardy, Canterford, Sawyer, & Carlin, 2006). A cross-sectional study of tribally affiliated centres in the US by (Sisson, Li, et al., 2016) using the environment and policy assessment and observation (EPAO) tool showed reduced odds for overweight in centres with a higher and healthier environmental score. Tribally affiliated centres in the US enrol predominantly children of American Indian descent although this is not a requirement, and appear similar to Kōhanga Reo in NZ.

There is a paucity of intervention research for indigenous populations. A Cochrane review of obesity prevention interventions for children noted that most of the studies in the review targeting the 0-18 year age group (n = 55) included children from lower socioeconomic populations concluding that there were ‘significant positive outcomes’ and some evidence provided on successful implementation strategies for these groups (Waters et al., 2011, p. 34). A systematic review of interventions specifically targeting indigenous and socioeconomically disadvantaged families found only two studies involved indigenous peoples (US and Canada) of the 32 studies included in the review but they were located in the home setting rather than the ECE setting. Only seven of the studies (five in the US and two in Europe) in the review were located in the early childhood setting and indicated that preschool interventions may need to be tailored to the population group (Laws et al., 2014). The *Hip Hop to Junior Health* programme which successfully reduced the BMI of African American children at two years (-0.54 kg/m<sup>2</sup>, 95%CI, -0.98,-0.10) (Fitzgibbon et al., 2005) but not Latino children (Fitzgibbon et al., 2006). A subsequently developed tailored programme for Latino children, including a more intensive parental component, also did not reduce BMI possibly due to poor attendance by parents at the planned education sessions. It was concluded that a culturally tailored parent approach was needed in interventions developed for socioeconomically disadvantaged groups but more research was required to make definite conclusions about indigenous populations although a parental component was significant (Laws et al., 2014). There are no studies in the peer reviewed literature of NZ interventions in Kōhanga Reo. There was some inclusion of different ethnic groups

and lower socioeconomic populations, in the studies indicating that obesity prevention can be equitable.

### **Successful features of nutrition and physical activity interventions**

Nutrition and physical activity interventions in early childhood centres have shown a positive impact on body weight of preschool children. Fourteen of 29 interventions in ECCs with obesity as an outcome in a recent review (Sisson, Krampe, et al., 2016) reported a beneficial result although the studies used a variety of measures including BMI, waist circumference, percent body fat among others. More favourable effects on BMI may have been found had interventions been of longer duration as shown by Céspedes et al. (2013) where the intervention demonstrated an effect at 3 years but not in the early stages (after one year) of the intervention. Other features common to effective interventions were use of a behavioural change theory, good quality study design and included a parental component (Sisson, Krampe, et al., 2016).

There are few large and longer than one year duration interventions delivered in ‘real time’ in the childcare setting. However, *Romp and Chomp*, was a large (target group of 12,000 children in a designated community in Australia) and likely the first community-based, multi strategy (targeting environmental change including political, sociocultural and physical) and community capacity building programme to be trialled. It was also delivered in multiple settings, health and education and care. The intervention was a partnership between the local health service, ECE organisation, government education department and the dental health agency. It showed, after four years (2004-2008), reduced intakes of unhealthy foods (packaged snacks, fruit juice and cordial) and improved intakes of vegetables in the intervention group compared to the comparison group (de Silva-Sanigorski et al., 2010). Screen time (TV and DVD) was lower at follow-up but there was no difference in opportunities for physical activity. This intervention reduced the prevalence of obesity among two and three and a half year old children demonstrating the potential gains for investment in large integrated community-based interventions. *Romp and Chomp* is somewhat comparable to U5E in that the intervention was being delivered by local health services (‘real time’) in partnership with other agencies in an ongoing way rather than a controlled research intervention with a defined endpoint. The intervention had a focus on capacity building through professional development of early childhood care staff and promotion of simple nutrition and physical activity messages. For example, daily water and fewer sweet drinks and daily active play, similar to U5E messages (Table 6.9).

The only published (Messiah et al., 2017) nutrition and physical activity intervention that utilised the RE-AIM framework was in a low income multi-ethnic area in the US. The intervention, *Healthy Caregivers, Healthy Children Phase 2* (n = 24), was a scaled up version of *Healthy Caregivers, Healthy Children Phase 1* (n = 12) which had shown a desirable effect on BMI (lower increase in percentile BMI) and increased fruit or vegetable consumption among preschool children receiving the intervention compared to the control group after two years (Natale et al., 2017). The *Healthy Caregivers, Healthy Children Phase 2* consisted of encouraging ECCS to adopt specific policy areas (snacks, beverages, physical activity and screen time) (new addition following Phase 1 finding that centres lacked physical activity and nutrition policy), curricula for teachers, parents and children based on role modelling, healthy behaviours using a train the trainer model and menu modification support. This study is unique in that it is embedding nutrition and physical activity policy in an existing ECC quality rating system and using RE-AIM dimensions (reach, effectiveness, adoption, implementation and maintenance) to assess and report the outcomes. It is a three year RCT with the results yet to be published.

Nutrition interventions appear to have a favourable effect on dietary outcomes but their effect on body weight is less clear. A systematic review to evaluate the effectiveness of healthy eating strategies has shown healthy eating interventions in preschools (n = 15) and kindergartens (n = 10) and one other facility (n = 1) where children were cared for reported that only two interventions reduced body weight significantly yet found that strategies to increase vegetable consumption and nutrition-related knowledge were successful (Mikkelsen, Husby, Skov, & Perez-Cueto, 2014). These findings were similar to findings from another systematic review (Sisson, Krampe, et al., 2016) which reported that most nutrition interventions (87%, n = 39/45) had a positive effect on at least one dietary outcome. Effective interventions included strategies targeting the environment, technical nutrition support and staff training. However, consequent improvement in child dietary behaviours was not regularly reported. Inclusion of a parental component, although not routine, was recommended to maintain dietary outcome improvements (Sisson, Krampe, et al., 2016).

Similar to nutrition, physical activity interventions have reported improvement in activity outcomes. Environmental focussed interventions, inclusion of regular, planned physical activity, staff training and a parental component were found to be promising intervention strategies (Sisson, Krampe, et al., 2016). Despite these positive findings,

physical activity strategies in ECCs did not reliably translate to increased child physical activity levels.

A range of strategies have been used in interventions to encourage physical activity among preschoolers indicating that centre policies and practices are responsive to improvement. A small review (n = 7 studies) (Trost, Ward, & Senso, 2010) of the effect of childcare policy and environmental factors on physical activity levels showed that educator training and behaviour, low playground density and physical attributes of the playground (open play spaces, vegetation and availability and quality of portable play equipment) were influential. An educator training programme in FMS increased child fundamental movement skill development, in particular gross motor skills, in a small six-month RCT (n = 6) (Adamo et al., 2016). Adequate intervention length and intensity was shown to be important by Finch et al. (2012) in a three month intervention to encourage adoption of eight physical activity strategies. This quasi-experimental study in 228 ECCs resulted in more intervention centres with four of the eight favourable policies and practices; staff training, daily inclusion of FMS education sessions with children, a physical activity policy and the policy includes a screen time restriction. There is growing evidence that physical activity policy, educator training, regular education sessions with children and playground attributes are strategies ECCs are able to favourably change to improve physical activity outcomes for children.

Table 2.1 Summary of reviews of obesity prevention interventions in preschool children

Type of review, authors, year, number and type of studies included	Aim	Outcomes
<p>Systematic review Bluford, Sherry, and Scanlon 2007 7 studies – 5 prevention studies (3 N and PA, one N and one PA), 2 treatment studies (N and PA) 4 RCT, one controlled study, 2 pre-/post-test cohort studies 4 studies had a sample size of &gt;200 Studies limited to one ethnicity each</p>	<p>To identify effective programmes to prevent or treat overweight or obesity Inclusion criteria - prevent and treat obesity in preschool children, 2-6 years, &gt; 3 months duration, measured outcome of obesity (BMI, body fat, weight status)</p>	<p>4 (2 prevention and 2 treatment studies) of 7 showed a significant reduction in body weight or fat status, 2 no change and one had mixed findings depending on ethnicity. 3 of 5 multi-component studies achieved reductions in BMI Other significant changes were energy intake or percentage of calories from saturated fat, TV viewing time, maternal restriction of child feeding, and blood cholesterol 4 of 7 named a theoretical framework for the intervention Study follow-up of 7.5 months to 2 years Sustainability addressed in two studies at 2 years and no effect found More study follow-up and maintenance recommended</p>
<p>Cochrane systematic review Waters et al., 2011 55 studies (added 36 new to this review compared to previous review Summerbell et al., 2005), 8 studies in 0–5 year age group (5 N &amp; PA and 3 PA) 6 studies had intervention period of &lt;24 weeks, one &lt; one year and one had a 2-year study period Most studies delivered by research personnel (only one administered by educators trained by research personnel)</p>	<p>To determine effectiveness of evaluated interventions to prevent obesity in children. Primary outcomes – BMI, skinfold thickness, percent fat content, prevalence of overweight and obesity Secondary outcomes – programme characteristics and strategies including activity levels, dietary intake, knowledge, environmental change, stakeholder views, harm associated with the intervention, health status and cost effectiveness Inclusion criteria - &gt;12 weeks duration, obesity prevention, 0–18 years, diet, PA, lifestyle and social support, community, school and out of school care, home, childcare Exclusion criteria - Treatment of obesity or eating disorders</p>	<p>37 studies in meta-analysis, intervention group mean difference in adiposity of -0.15kg/m<sup>2</sup> (CI -0.21 to -0.09) however, majority of studies in 6–12 years For 0–5 years, 8 studies, intervention group mean difference in adiposity of -0.26 kg/m<sup>2</sup> (CI -0.53 to 0.00) although not statistically significant but indicates a trend of the intervention reducing bodyweight Other significant changes were reduced TV viewing, higher performance in movement skills tests, lower saturated fat (after 1 year not 2 years), lower energy intake and percentage protein intake Sustainability, measured in 4 studies, showed limited additional impact after the intervention finished Limited ability to assess reduction of health inequity, however most interventions targeted high need population groups. Only three studies addressed disadvantage or diversity Only one study described a theoretical framework</p>

Type of review, authors, year, number and type of studies included	Aim	Outcomes
<p>Review Larson, Ward, Benjamin Neelon and Story, 2011 18 US intervention studies and a review of State regulations 4 nutrition, 7 PA or SB, most included curriculum component, 7 had a parental component, only 5 addressed environmental components</p>	<p>To review studies of US preschool children and state regulations relating to nutrition and PA, childcare practices and policies with the potential to influence preschoolers' dietary intake and physical activity, and the perceptions and practices of parents with implications for obesity prevention in childcare settings.</p> <p>Inclusion criteria – address at least one of review objectives, target 2–5 year old children enrolled at childcare centres or family care homes, evaluation complete Exclusion criteria – outside US, intervention completed</p>	<p>State regulations Head Start subject to federal performance standards, but childcare is state regulated and each state sets own regulations and review criteria. Most lacked strong regulation for HE and PA. Regulations stronger for formal care compared to home-based care. There is considerable variation in regulations for HE.</p> <p>Interventions 7/10 influenced PA or SB 2/5 reduced weight status – and these were multi-component (N, PA, SB) 4/4 found some evidence of positive effect on childcare environments</p>
<p>Systematic review Campbell &amp; Hesketh, 2012 23 studies, (added 14 new studies to previous review [Campbell and Hesketh, 2007]) 12 studies located in low SES areas 14 multifaceted 9 studies in preschool setting, of those 5 measured anthropometry, 2 studies diet and PA, one study diet only, 7 studies PA only, two studies included sedentary behaviour and study size was 32 to 1000 children</p>	<p>To update evidence of obesity prevention in childcare and assess quality of studies Preschool/childcare setting – study length 2 days to 2 years Inclusion criteria – interventions aiming to positively impact on obesity through reduced bodyweight or behaviour changes Exclusion criteria – breastfeeding, eating disorders, obesity treatment, malnutrition and school based interventions</p>	<p>Preschool setting 3 out of 9 studies achieved outcomes (reduced fat intake [n = 1], increased PA [n = 1], reduced sedentary behaviour [n = 1]) 3 out of 9 studies achieved moderate success of outcomes The variable nature of childcare (e.g. sessional versus long day) made generalisability problematic. None of the added studies in the preschool setting showed an effect on body weight. All 9 interventions had outcomes categorised as 'unclear' or 'no' outcome. Studies were deemed of good methodological quality.</p>

Type of review, authors, year, number and type of studies included	Aim	Outcomes
Summerbell et al., 2012 22 studies, 19 pre-school based 10 studies > 1 year, 6 of 10 were multi-component 12 studies < 1 year	To determine the effectiveness of interventions of diet and PA designed to prevent obesity	Of ten long-term studies only one had an effect on bodyweight (girls only) 4 of 12 short-term studies focused on PA and showed small reductions in overweight status, 8 of 12 combined N and PA and had no effect on BMI
Zhou, Emerson, Levine, Kihlberg and Hull., 2014 15 studies	To systematically review controlled trials to prevent obesity in childcare settings Inclusion criteria – childhood obesity prevention interventions, report on adiposity and behaviour outcomes Exclusion criteria – non-intervention, non-childcare located, treatment programmes, non-English	7 of 15 reported reductions in adiposity and there were all multi-component (6 studies had lower BMI or zBMI scores and 6 studies had a lower body fat percentage or waist circumference) 6 of 13 nutrition based interventions showed improved intake or behaviour 8 of 12 PA reported improved PA levels or fitness Nutrition component interventions (6 of 13) showed improvement to dietary intake, in particular reduced saturated fat (n = 1), greater intake of fruit and vegetables (n = 4 13), fewer unhealthy lunch foods (n = 2) and increased consumption of breakfast (n = 1) Physical activity component interventions (n = 12), 8 of 12 increased PA Only four of five studies addressed sustainability
Mikkelsen, Husby, Skov and Perez-Cuerto, 2014 26 studies 3 days to 4 years Mean sample size 78 – 1031 8 single, 11 educational and 7 multi-component studies (more than one strategy to change eating behaviour)	To review published healthy eating studies in childcare and analyse the effectiveness of different strategies on children’s food choice. Inclusion criteria – interventions to prevent or treat obesity by changing eating habits in childcare Exclusion criteria – weight loss of obese children, studies in school, interventions targeting parents or physical activity	Two studies reduced adiposity Increased fruit and vegetable consumption 16 of 26 included a theoretical framework Educational strategies – only one reduced BMI significantly, increased knowledge but no significant behaviour changes Multi-component interventions – six of seven significantly increased fruit and vegetable intake but only one study found this change was sustainable (after one year), no effect on BMI

*Note.* BMI = body mass index; zBMI = age standardised BMI; HE = healthy eating; N = nutrition; PA = physical activity; SB = Sedentary behaviour, SES = socioeconomic status; US = United States.

### **2.4.3 NZ interventions in early childhood centres**

There are no published studies of NZ early childhood nutrition and physical activity health promotion interventions in, and although there have been initiatives in this sector, funding has limited longevity and scope. During the Healthy Eating Healthy Action (HEHA) national strategy from 2008–2010 (McLean et al., 2009), the Ministry of Health initiated action in this setting by producing national nutrition resources for early childhood centres and schools including the Food and Beverage Classification system for categorising foods (everyday, sometime and occasional foods), a catering guide, recipes, professional development workshops, nutrition fund to establish sustainable local initiatives, face-to-face support from a District Coordinator and support from a website and 0800 number (MoH, 2004). The Ministry of Health undertook a three year study of food and nutrition environments in primary, secondary and ECE services between 2007 and 2009 to monitor the effect of HEHA initiatives in this setting (Pledger et al., 2010). This study identified three key outcome areas in relation to improving healthy food and nutrition environments in schools and ECE services. These were firstly, access to healthy and/or no access to unhealthy foods; secondly, nutrition policies and procedures to improve availability of healthy food including role modelling of healthy behaviours; and thirdly, the teaching and learning in nutrition that gives children the opportunity to improve their knowledge, skills and practice of healthy eating, a strategy that could potentially reach parents. The HEHA strategy funding and resources was discontinued from 2010, apart from the Food and Beverage Classification system, now renamed Fuelled for Life (<http://www.fuelled4life.org.nz/about>).

There is only one national health promotion programme focused on improving nutrition and physical activity in ECC in NZ, one resource-based social marketing campaign and an on-line food guide for the ECE sector. The Heart Foundation developed the nationally available Healthy Heart Award for ECE: Tohu Manawa Ora – Kōhungahunga (HHA) programme for early childhood centres in which centres can gain an award for achieving a range of pre-determined healthy eating and physical activity criteria (Heart Foundation, 2014). The award has three levels of criteria relating to policy, nutrition education, food provision, physical activity, and professional development for staff – Rito, Whānau and Pā-Harakeke. HHAs are being promoted and delivered as part of the U5E programme. Supporting HHAs, Fuelled for Life, another Heart Foundation web-based initiative, approves pre-prepared and packaged foods. There are criteria for categories ‘every day and sometimes’ foods and an approved list

of foods from participating food companies that ECCs can include on menus. Other initiatives are mainly resource-based such as the Auckland Regional Public Health Services' resource, – *Food for Under 5's: A practical guide to food and nutrition for parents and caregivers* in 2009, which is online and distributed to interested groups (Auckland Regional Public Health Service, 2009). The 5+ A DAY campaign distributes teaching resources to ECEs based on the principles of the curriculum, Te Whāriki, to promote fruit and vegetable consumption on a yearly basis (5+ A DAY).

One recently developed, regional initiative by a DHB is the Building Blocks for Under 5s in the Lakes and Bay of Plenty region. This initiative aims to “improve, promote and protect the health and wellbeing of staff, children and community” (Toi Te Ora Public Health Service Bay of Plenty District Health Board, 2014). It consists mainly of a toolkit made up of information on a range of health areas, for example, ‘Breastfeeding friendly’, ‘Keep the Bugs at Bay’ and ‘Smokefree, 1, 2, 3’. DHB staff are responsible for the programme delivery which involves initial engagement with ECC and signing of a ‘commitment agreement’, providing an information workshop, a centre needs analysis and planning stage. Centres receive one hour of contact time (face-to-face, email or phone) per month with a DHB ‘Under 5s advisor’. The aforementioned sub-sections of the toolkit (n = 3) were pilot tested over six months (2013–2014) in eight ECCs and found to be well received, met centre needs across the different centre types and encouraged early childhood centres to make healthy changes. However, ongoing support in the form of face-to-face contact and sustainability of the programme are unclear. Recommendations from the pilot included the development and addition of five new sections to the toolkit, expansion to 12 new centres and investigation of co-design opportunities for a similar initiative with Te Kōhanga Reo. Initial evaluation results were promising; however, ongoing support for ECCs to participate in Building Blocks and make positive change is still to be determined.

Research investigating the effectiveness of programmes and campaigns to change behaviour in NZ ECEs has been limited; however, the Heart Foundation externally evaluated the HHA programme in 2014. This qualitative evaluation showed that survey participants (ECE staff and whānau) usually knew their centre had a HHA although were often unaware of the level of HHA that the ECE had attained (Malatest International, 2014). Also, ECCs reported changing nutrition and physical activity policies and practices towards healthier options as a result of HHA involvement. Additionally, ECCs were more likely to plan daily physical activity, increase physical

activity levels among children, were engaging children and their families in learning about food and staff attended professional development in nutrition. Face-to-face engagement between the ECC and the local Health Promotion Coordinator from the Heart Foundation was appreciated by ECCs, with more regular contact requested to strengthen the programme. Other barriers were the limited availability of programme resources in languages including Māori, some Pacific languages, and Asian, parental perceptions that healthy food was expensive and lack of support to address unhealthy food practices with parents. This evaluation used a mix of online and face-to-face interviews. However, quantitative results in a national survey of ECC showed participation in HHAs, was 46% , lower than 5 + A DAY (67%) yet three-quarters of participating centres claimed these programmes increased the availability of healthy food and beverages and 50% said they reduced the availability of unhealthy food or beverages within ECCs (Pledger et al., 2010). NZ effectiveness research, although limited, is showing that the HHA programme is improving food and physical activity environments within ECCs, but participation is limited to around 50% of ECCs nationally and findings less generalisable as behaviour change was self-reported by ECC staff rather than measured.

‘Active movement’ is an initiative of Sport New Zealand and promoted by Regional Sports Trusts to get infants, toddlers and young children learning fundamental skills and active. It is a series of booklets on the variety of movement types to assist parents to encourage children to be active from birth (Sport New Zealand). Examples include, walking, running and jumping, and tummy time, rolling and crawling. These national resources have been reviewed and national physical activity guidelines for 0-5 year old children have been developed by the Ministry of Health which focus on active play, limiting sedentary time and sufficient sleep (Ministry of Health, 2017). Sport Waikato also has a series of manuals, known as Kiwi Manuals distributed to new parents, since 1990, – KiwiBaby, KiwiToddler and KiwiPreschooler (Sport Waikato, 1990), although only accessible online since 2016. Use of these resources by the ECE sector is unknown.

## **2.5 Project Energize**

Increasing concern in the Waikato DHB region about poor child health statistics, including rising obesity rates, initiated the development of Project Energize, a primary school-based nutrition and physical activity promotion programme. The strategic direction of the Waikato DHB outlines a strong commitment to improve health

outcomes for Māori, work with Māori on planning and delivery of health services and deliver culturally appropriate health services (Waikato District Health Board, 2013). Project Energize aimed to reduce childhood obesity rates and cardiovascular risk factors through healthy eating and regular physical activity and was designed to meet the needs of Waikato primary school children, which as a group, have a higher than national proportion of Māori children (34% compared to 28%), are 64% rural and 36% are from low (1-3) decile schools. There is also a cluster of Pacific children in Tokoroa. Energize started as a 2 year randomised controlled trial between 2004 and 2006 in 124 schools (Graham et al., 2008). Researchers found that children in the intervention schools, compared with children in the control schools, had less accumulation of body fat in younger children and a reduced rate of rise in systolic blood pressure in older children (Rush et al., 2012b). These positive outcomes led to the programme being extended across the region.

Following the randomised controlled trial, all Waikato DHB schools joined the project, 244 schools and 44,000 children were involved by 2013 making it the largest programme of its type in New Zealand. Further evaluation of the project in 2011, involving 5110 children aged 6 to 11 years (including 36% Māori children), found Energize children ran a 550m course 13% faster than that of a comparison group of NZ children and had smaller waist circumferences (2.3cm less for 6-8year olds and 4.7cm less for 9-11 year old children) compared to children in the Waikato in 2006 (Rush, McLennan, et al., 2014). The study also reported that Energize children had good knowledge and attitudes about healthy eating and activity.

### **2.5.1 Success factors of Project Energize**

There are a number of factors that contribute to the success of Project Energize (Rush, Graham, McLennan, & Latimer, 2011). These are outlined below;

- Partnerships and collaborations with other organisations including Māori and Pacific health providers to strengthen the delivery of the programme
- Based on the Ottawa Charter
- Follow the principles of the Treaty of Waitangi
- Each early childhood centre has an Energizer assigned to work alongside them as a ‘one stop shop’ for nutrition and physical activity
- Careful selection of Energizers (selected based on background, qualifications and the way they work)

- Training and sharing of practice between Energizers
- Relationship building with the ECC is prioritised and there is recognition that this takes time
- Start small and celebrate success, ‘evolution not revolution’
- Five stage engagement procedure (Figure 4.1)

Project Energize, was a region wide response to poor child health and follows best practice principles of collaboration, the Treaty of Waitangi principles of protection, partnership and participation, Ottawa Charter, community-owned and responsive to local needs (Rush et al., 2011). Additionally, it has been found to be cost-effective (Rush, Obolonkin, et al., 2014). These principles and systems, shown to be effective, were used to develop U5E.

## **2.6 Summary of the literature**

Rising obesity rates among young children and disproportionate effects on Māori, Pacific and socioeconomically deprived children requires preventative action that is equitable and cost effective. The environment that a child is in from conception, gestation and beyond birth influences their risk of becoming overweight or obese. Obesity increases risk of non-communicable disease and predisposes a child to a wide range of health consequences which can persist into adulthood. Developing healthy eating habits and physical activity patterns from an early age is essential for the long term health and productivity of children. Increasing numbers of preschoolers, including Māori and Pacific children, are entering some form of early childhood education for an average of 20 hours each week. Evidence for effective obesity interventions is growing, particularly for young children, but variability of study design and measures make recommendations problematic. Furthermore, many interventions are of insufficient duration to understand sustainability and possibly limited in their ability to show outcomes for body weight. However, some general principles that can be applied include focusing on nutrition and physical activity (including sedentary time), parental involvement, especially for interventions targeting indigenous and low socioeconomic populations; focus on policy and practice change and include educator training in nutrition and physical activity. There is a gap in determining the effectiveness of environmental interventions in ‘real world’ settings, specifically policy and infrastructure change. Interventions that become embedded in ECC practices and policies are more likely to be sustainable. Greater understanding of the barriers and

enhancers to the implementation of interventions in the ECE setting is needed, especially for interventions targeting indigenous and low socioeconomic populations. Such interventions are strongly warranted to address this gap in provision to protect children against excess weight gain. There is huge potential to create a favourable food and physical environment within early childhood centres for young children, which support good health outcomes and reach children most in need in the Waikato DHB region. The Under 5 Energize project, modelled on the successful Project Energize programme, has the potential to change the behaviour of early childhood centres and provide a better understanding of how to implement change. This research aims to determine if and how the Under 5 Energize programme is successful at improving the food and physical activity environment within early childhood centres.

## **Chapter 3. Theoretical approach**

This chapter discusses the research paradigms and theories that underpin the choice of research methods. The research paradigms underpinning this thesis are critical theory (B. M. Grant & Giddings, 2002) and the socioecological model. Action research methods were used to obtain the data and the RE-AIM framework was used to structure the study questions.

### **3.1 Overarching theoretical approach**

This section begins by defining the research paradigms; of radical and social ecology, on which this body of work is based. The assumptions of each paradigm are described, followed by how they are related to each other and to this research. The last section provides an explanation of the methodology for this study, action research and how this relates to critical theory and the socioecological model.

#### **3.1.1 Critical theory**

The radical paradigm, postulated by Grant and Giddings in their paradigm framework, was described as a way to not only make sense of ‘social reality’ but to affect it (B. M. Grant & Giddings, 2002, p. 18). It is underpinned by critical social theory, a way of understanding a social issue by extensive analysis in the wider social, cultural and political context. It has its origins in the 1930s in response to extreme social conditions, events and injustices including World War 1. The Frankfurt Institute of Social Research, led by Max Horkheimer, where the term critical theory originated, challenged established ideas and traditional approaches introducing an alternative to the traditional theories of positivism and phenomenology (Bronner, 2002). While critical theory originated in the social sciences, over time it has become widely used in other disciplines including anthropology, feminism, linguistics and political science (Bronner, 2002).

Critical study, by its nature, champions the section of society that is oppressed by an authoritarian group, organisation or philosophy and advocates for change to reduce and ideally eliminate disparities suffered by this group (Grant & Giddings 2002, Alvesson & Ashcraft, 2009). However, Alvesson and Ashcraft (2009) note that issues under critique may be more complex than a “neat dichotomy of dominating and the dominated” (Alvesson & Ashcraft, 2009, p. 61). The welfare of all groups in society, irrespective of individual factors such as gender, ethnicity, education or age, is important and should be

acknowledged according to critical theory (Dant, 2003). Original power struggles supported by critical theorists were between the worker and the capitalist, whereas more recently the purpose is about power within sectors such as education, health, communication and political organisations (Edwards & Willis, 2014). While the environments where critical theory has been used have changed over time, the focus on improving the situation for oppressed groups has remained the same.

Critical theory analysis of the ideology behind factors in the environment can be used effectively to unearth potential power imbalances which may be affecting health and in particular, could be applied to obesity (Opalinski, 2006). It is well known that obesity prevalence in NZ is characterised by higher rates among Māori, Pacific and low-income population groups, highlighting the need for action to address this disparity (Ministry of Health, 2016c). Also, children and families are vulnerable to the policies and practices of the ECC that they attend, despite established regulations from the Ministry of Education (Education [Early Childhood Services] Regulations, 2008). It may be less well known that around half the ECCs in NZ is privately owned. Private ownership may reflect a focus on profit rather than service. Other imbalances include low governmental investment in the health and education of young children (Organisation Economic Cooperation Development, 2013; M. A. Reynolds, Jackson Cotwright, Polhamus, Gertel-Rosenberg, & Chang, 2013) and, pertinent to this body of work, lack of inclusion of nutrition and FMS in ECE undergraduate training (McLachlan, 2013). Critical theory questions rather than accepts knowledge and is particularly concerned with the practical application of the knowledge in daily life, described as an “engaged form of knowledge” by Dant (2003, p. 103). The change that critical theory strives for is not structural or revolutionary change but it encourages reflection on society, recognition and critique of cultural norms and rejection rather than acceptance of these norms as unchangeable (Dant, 2003). Critical analysis of health issues, such as obesity, in settings such as ECE, will help to identify power imbalances and barriers and enablers to overturn these for disparate and powerless population groups including children (Schroeder, Kulage, & Lucero, 2015).

Using critical theory to understand issues in health such as reducing the rate of weight gain in children facilitates consideration of the wider societal influences on unhealthy weight gain and thereby provides insight on population prevention strategies. This approach is in preference to directing the responsibility onto the individual and the family (Schroeder et al., 2015), which has shown limited success at reversing rising

obesity, especially for Māori, Pacific and low-income groups (Opalinski, 2006). Furthermore, it undermines the health of the population, in particular children, by failing to address the wider drivers of obesity. These complexities are congruous with obesity prevention theory which describes social environments, where individuals live, work and play, as ‘obesogenic’, limiting the ability of individuals to reach and maintain a healthy weight (Swinburn et al., 1999). Additionally, a critical analysis may also identify barriers and potential strategies to make social change, thereby addressing the wider causes of obesity (Schroeder et al., 2015). Opalinski (2006, p. 236) suggested that an understanding of the “historical, economic and political context” of contracts for sugar sweetened beverages in US schools was an example of critique of a factor contributing to obesogenic environments within schools. A critical theory analysis of obesity can provide a more complete view of the problem because it considers “contextual factors” at multiple levels and can be used to develop prevention strategies (Schroeder et al., 2015).

Factors in social environments like education settings, where children spend a considerable amount of time, need urgent investigation to aid understanding of influential factors in complex health issues such as obesity. An example of a power imbalance between groups within the school environment exposed by critical analysis was the case of pouring rights contracts (agreement between soft drink companies and schools allowing the sale of soft drinks) in schools in the US. In this setting the food industry held the power over schools by providing funding, which schools used to enhance education for students, in exchange for product availability and marketing of sugary drinks to students (Opalinski, 2006). Furthermore, the oppression may be so ingrained that it is rarely questioned and a focus on individual rather than social responsibility propagates this (Opalinski, 2006). Critical analysis is a more comprehensive approach to tackling obesity because it takes the individual, family, community and wider societal factors into account by analysing the ideology behind factors in the environment (Schroeder et al., 2015).

Use of critical theory suits the topic of this research which was to determine if U5E can identify, challenge and change the current norms around food and physical activity in early childhood centres towards health promoting policies and practices for young children especially centres in low-income areas, prevalent in the U5E sample, as well as profit-model centres. The environmental factors include the quality and quantity of opportunities for physical activity, nutritional quality of food provided either by the

centre or supplied by parents, and ‘water only’ policies or practices. As young children spend increasing amounts of time in child care from an early age and childhood is a time where food and physical activity preferences are developed, application of critical theory to this setting has the potential to provide a more comprehensive analysis thus enhancing the usefulness of research outcomes.

### **Assumptions of critical theory**

The first assumption of critical theory research to be discussed is that society is not equitable and researchers should focus on the opinions of minority and marginalised groups. It believes that disadvantaged groups exist in society on the basis of factors such as socio-economic status, gender, ethnicity, geographical location and age and as a result power is not equally shared. The target group of this research is families in lower income areas in the Waikato region and the U5E programme seeks to improve food and physical environments of the most vulnerable in society, young children. The radical paradigm assumes that researchers can improve the position of disadvantaged groups in society by empowering them with knowledge and ‘collective action’ to positively change their situation and reduce the effect of dominant groups (B. M. Grant & Giddings, 2002, p. 18). Researchers can also use critical theory to recognise and improve societal obstacles for these marginalised groups (Schroeder et al., 2015).

The second assumption of critical theory is that theory and reality are uniquely linked. Within this paradigm, the relationship between theory and reality is extended beyond interpreting the happenings of everyday life to postulating that people are influenced by ideologies unknown to them, such as those of influential groups in society (e.g., anti-fluoride or anti-immunisation campaigners). This has ramifications for the interpretation of research, as the researcher may or may not agree with the responses from the participants due to their “false consciousness” (B. M. Grant & Giddings, 2002, p. 19). This can lead to a break-down in the relationship between the researcher and the participants and problems with data analysis (B. M. Grant & Giddings, 2002).

The researcher and the participants in critical theory research have the roles of “co-researchers”, although this can be method-dependent (B. M. Grant & Giddings, 2002, p. 19). This is in contrast with the interpretivist paradigm where the researcher has a dominant role. The critical researcher is described as aiming to change the norms of the researched, using self-knowledge of beneficial social change, to reduce inequalities. While the views of participants and the researcher are not always shared, values such as

reciprocity, participation and power-sharing can be maintained during the research process despite this (B. M. Grant & Giddings, 2002). The researcher needs to be aware of these possible competing issues during the research and maintain the aim of critical research as collecting the opinions and practices of the oppressed social groups within society and working together to improve conditions.

The societal norms this research brings into question are the policies, guidelines and practices operating within the educational domain of an ECC. These include what constitutes a healthy food and physical activity environment within ECCs, what healthy food and physical activity opportunities are provided within this and what roles the ECCs have in the provision of a healthy food and physical activity environment. An ECC also has a responsibility to the wider community it services and hence community beliefs, or the ECC interpretation of those beliefs, need to be considered. External to this is the funding agency of core ECC services, the Ministry of Education. Licensing requirements state that ECCs must either provide healthy food or encourage parental provision of healthy food choices, but from a search of the Ministry of Education website and ERO reports, in 2014 there is no evidence of regular review of this policy. Surrounding these aspects are also the societal and political beliefs about the causes of obesity which may be centred on individual responsibility rather than the wider social and environmental determinants that this research focuses on.

### **3.1.2 Socio-ecological model**

The socio-ecological model (SEM) originates from a merging of theories and research from ecology and sociology. The model postulates that there are multiple levels of influence on health behaviours surrounding individuals, groups and populations (Townsend & Foster, 2011). Ecology describes the relationships between plants and animals and their physical environment. This ecological perspective is used by a range of specialities including sociology, psychology and public health, broadening the scope to include social, institutional and cultural contexts of people interacting with their environment (Stokols, 1992). Bronfenbrenner put forward an ecological model for human development in the 1970s which proposed that behaviours of individuals cannot be explained without consideration of the influences from multiple levels around individuals, such as families, schools and neighbourhoods throughout life (Bronfenbrenner, 1994). His model emerged from the field of psychology where human behaviour research was originally conducted under experimental conditions far removed from everyday contexts. He proposed that the environment was made up of a series of

wider systems around a central “microsystem” like a “set of Russian dolls” (Bronfenbrenner, 1994, p. 39). As well as an individual’s behaviour being influenced by their environment, the individual also interacts with and influences the environment, describing it as a dynamic relationship (Atkins, Rusch, Mehta, & Lakind, 2016).

Social ecology was introduced to health promotion in the 1980s but prior to that it was evident in public health as early as 1854, when the environmental cause of cholera was identified as the Broad Street pump handle, which was removed to great effect. However, early health promotion programmes focused on developing healthy lifestyles by individual behaviour change strategies, such as weight reduction and smoking cessation. Similarly early socioecological models concentrated on explaining behaviour change rather than environmental effects and only included one or two rather than multiple levels (Sallis, Owen, & Fisher, 2008). Over time though, research showed limitations in solely relying on behaviour change strategies, as barriers, cost, cultural and social factors were limiting the ability of individuals to make health promoting behaviour changes (Stokols, 1996). These early models also affected the ability of programmes to reach populations identified as suffering from health disparities (McLeroy, Bibeau, Steckler, & Glanz, 1988). More recent socioecological models recognised that behaviour was influenced at multiple levels therefore effective interventions needed to operate at multiple levels (Sallis & Glanz, 2009). Establishment of the Ottawa Charter in 1986 further supported a broad view of influences on health behaviours, including policy, environmental and community factors. As a result, health promotion programmes expanded their scope to include environmental determinants of health, including policy (e.g., nutrition policy within a childcare centre) and social marketing (e.g., media campaigns), in addition to individual education strategies to ‘make the healthy choices the easy choices’ (Sallis & Glanz, 2009). In fact, the SEM is based on having a combination of both individual and environmental approaches. Incorporation of social ecology into health promotion broadened the scope, design and evaluation of health promotion programmes, incorporating both individual behaviour and environmental change.

The benefits of the socioecological model have been realised over time and have evolved to include issue-specific and ethnic-specific models. Evidence of the decline in tobacco use has been attributed to use of a combination of multilevel strategies including environmental, policy, social and individual (Sallis & Glanz, 2009). Using this model has the advantage of potentially reaching and influencing everyone within

the environment or affected by a policy; therefore, it is well matched to assist with environmental and policy research and intervention planning (Story et al., 2009). Sallis and Glanz (2009) described the ability of the SEM to be used across multiple health behaviours (e.g., physical activity, smoking cessation), illustrating the robustness of the model. However, within behaviours, specific areas may require a more detailed and descriptive model. For example, within the broad physical activity model, the ecology and detail of the activity of ‘walking to school’ may require a more in-depth model to understand specific behaviours. Similarly, different minority groups within the population may also require exploration of influences specific to each ethnic group. Recognition of the need for customisation of the SEM to health issues and different population groups will add to the effectiveness of interventions using the SEM.

While the SEM has expanded understanding of the multiple effects on health issues, it is not without limitations and more research is needed to enhance its use. Lack of definition of an ‘environment’ and behaviour-specific models together with measurement issues are the main disadvantages of the SEM (K. Ball, Timpero, & Crawford, 2006; Sallis et al., 2008; Story et al., 2009). Broadening the scope of behavioural change interventions using the SEM has enhanced understanding but there has been a lack of definition of variables, little information on how to use the SEM to enhance interventions (Sallis et al., 2008), and therefore measurement of effectiveness has been problematic. Difficulty also arose when determining the relative importance of personal, social or environmental variables influencing behaviours (Sallis et al., 2008). In addition to investigating factors within each level, understanding the interactions across and between the multiple levels within the SEM will further support effective intervention development, although it increases the complexity of the evaluation (Story et al., 2009). Despite these barriers, further development of behaviour-specific models and ways to measure environments are essential to understanding how and why people engage in their environments, and to progress healthy environments for everyone to achieve good health.

The SEM is a model integral to health promotion and public health. Obesity strategies from most health agencies are based on it, including those from the WHO (WHO, 2016). Story et al. (2009) emphasised that the multi-level approach in the SEM, provided best-practice guidance to environmental and policy research and intervention development. Use of the SEM to understand obesity was proposed by Opalinski (2006) because of the failure and oversimplification of strategies targeted only at individuals

and that society needed to take responsibility for the nature of environments that children were exposed to. The SEM can be used to explain to parents, children and the wider population that children are part of multiple environments, such as schools or ECCs, and these can influence choices that affect health. For example, a child attending full-time care should receive around half to two-thirds of their food intake while in childcare (American Dietetic Association, 2011), however, if the ECC serves minimal servings of fruit and vegetables on the menu, this child may not be consuming the recommended amounts of fruit and vegetables each week. Many of the environments children live and play in are described as amenable to change; however, currently they are placing children's health at risk. The SEM applies to this study by providing a framework to identify the multiple influences on childhood obesity in the ECE setting and, while not all influences are addressed in this study, it is useful to view the broad picture to identify future opportunities for action (Figure 3.1).

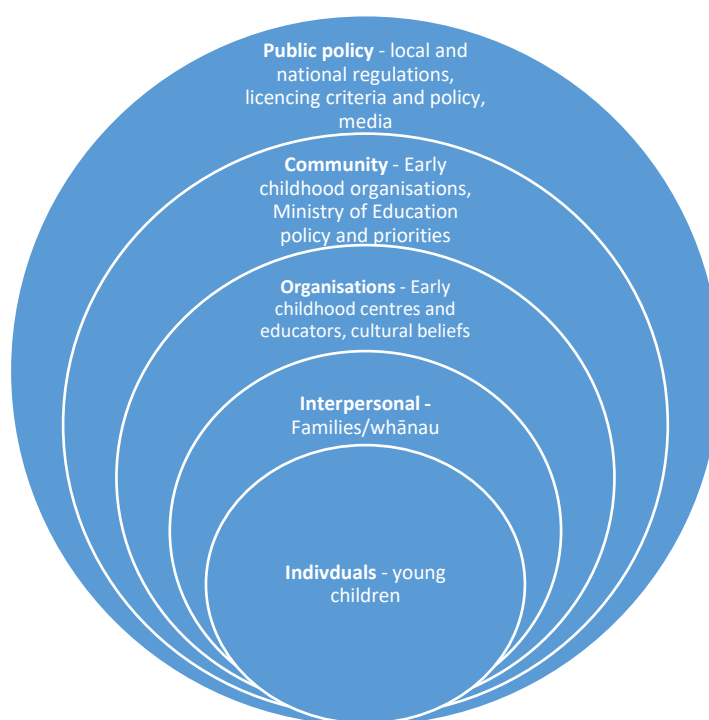


Figure 3.1. Socioecological model for Under 5 Energize (Adapted from McLeroy, 1988)

### **Assumptions of the socioecological approach**

The first assumption of the SEM is that health is a multifaceted state, made up of physical, emotional and social aspects (Stokols, 1992), and is influenced by multiple factors within the physical and social environment, as well as individual factors. All of these factors need to be taken into account in the planning and evaluation of health promotion programmes.

Secondly, there is a “dynamic interplay” between the individual and environments in which they live and any analysis should incorporate this variability in preference to focussing only on specific factors within the environment (Atkins et al., 2016; Stokols, 1992, p. 7).

Thirdly, people within environments are also variable and complex. For example, individuals within environments can be grouped in various ways including families, social groups and organisations. Consequently, these can be studied at different levels (Figure 3.1). Due to the complexity of the environments people operate in, research is required at different levels and utilising a range of methodologies. The SEM assumes that environments are able to be improved and hence interaction and coordination of individuals and groups can advantage the outcomes of a health promotion programme, for example, a manager of a workplace can develop organisational health policy for employees (Stokols, 1992).

The fourth assumption of this model is that environments are complex systems made up of multiple interactions between individuals and the environment, and are part of larger systems governed by national and global policy (Stokols, 1992). Interactions between individuals and the environment are constantly occurring, can have a healthy or unhealthy effect on individuals and can be organised by individuals or as a group. Environments can be local or remote to participants but both need to be considered. An example of a more remote environment for participant ECCs in USE would be Ministry of Health regulations for ECCs around food and nutrition. Additionally, for the socio-ecological approach to be effective, Stokols (1992) notes that it draws on the disciplines of public health, including both preventative and individual health strategies, and social-behavioural science programme development and evaluation. Environments are inherently complex, reflecting the multiple interplays between individuals and their environments, which can be influenced to produce healthier environments and hence improve population health.

### **3.1.3 Relationship between critical theory and the socioecological model**

Critical theory and the SEM both champion the consideration of the wider societal influences on issues, including health. These include the effects of political, social and economic conditions on the population. The importance of context is stressed in both critical theory and the socioecological model, in contrast to the positivism paradigm, where contextual factors such as socio economic status are excluded (Schroeder et al.,

2015). Consideration of the wider societal influences in both models unearths inequalities experienced by socioeconomically deprived and culturally diverse groups of the population. Critical theory and the SEM therefore provide a more complete understanding of the problem.

Critical theory and the SEM can both be applied to the complexity of obesity prevention. High and rising prevalence of obesity has prompted the use of both critical theory and a socioecological approach to analyse the drivers of childhood obesity because they encourage practitioners to consider a wide range of influences on health and “societal barriers” therefore suiting the complexity of obesity (Ministry of Health, 2015b; Schroeder et al., 2015, p. 260). Schroeder et al. (2015) and Stokols (1992) additionally state that both models provide insight on how to address obesity.

### **3.2 Action research as a methodology**

Action research implements cycles of research, with each cycle having four steps; plan, act, observe and reflect (Figure 3.2). Ongoing cycles of research lead to continued improvement, each one building on the outcome of the previous cycle to reach tailored solutions within settings including schools and ECE (Edwards & Willis, 2014).

Participants are an integral part of the action research process as is collaboration. Action research has been used as a methodology for this study as it was thought to be well-suited to the developmental, collaborative and participatory character of both U5E and this research, together with the aim to build capacity and inspire ECC educators to make change (Koshy, Koshy, & Waterman, 2010).

Action research as a methodology was originally recorded by Kurt Lewin, a social psychologist, in the 1940s (Savin-Baden & Howell Major, 2013). Lewin’s original assumptions about action research were that social change was a group rather than an individual process and it was collaborative, therefore settings such as schools, and even school classrooms, were ideal sites for action research (Edwards & Willis, 2014). He applied it mainly in ‘real world’ settings such as organisations, however action research has subsequently been extensively used in the education field to improve teaching practice (Savin-Baden & Howell Major, 2013). As a result action research was thought to be well positioned to assist with researching “real world” practical problems (Savin-Baden & Howell Major, 2013, p. 245), and is often described as “messier” and contravening traditional research rules (Edwards & Willis, 2014, p. 58). Therefore,

action research as a methodology suits the preschool education setting of the U5E health service and also that it is delivered in ‘real time’.

A range of action research approaches have emerged over time because there was no established definition, but most commentators agree with the principles of iterative cycles of planning, action, self-reflection and change. Differing opinions on the amount of participation by the target group and who controls the research have caused the varying interpretations, as well as different paradigms underpinning action research (Reason & Bradbury, 2008) and the reality that action research seldom occurs in a straightforward way in practice (Edwards & Willis, 2014). However, Savin-Baden and Howell Major (2013, p. 245) recently defined it as:

*To engage in problem solving through a cyclical process of thinking, acting, data gathering and reflection.*

It was described by Lewin as a “spiral of steps”, rather than just a one-off cycle, organised in a systematic way (Figure 3.2) (Edwards & Willis, 2014, p. 15). In real world situations, this cycle will not always be as organised because plans can quickly become outdated as actions provide new information (Koshy et al., 2010).

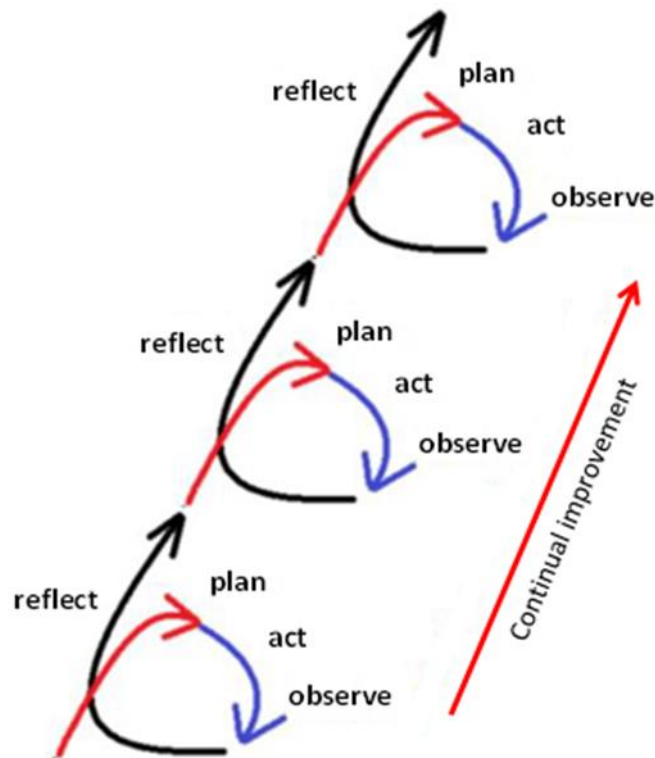


Figure 3.2. Action research cycles of ongoing improvement (Adapted from O’Leary, 2004)

Action research can be used to report complex issues, including those within health and marginalised groups. Early action research focused on issues affecting marginalised groups, aiming to improve relationships between these groups and the wider population (Edwards & Willis, 2014). Often, the solution was not apparent as the issues were complex; however, Lewin used this opportunity to develop his action research framework to test possible solutions through the ongoing cyclical process, with the aim of improving the situation over time. Raising awareness of the issue was followed by the development of steps to address the inequality (Edwards & Willis, 2014). Action research appeared to be more relevant when the solution was unknown and difficult, not accepting the status quo. Health issues, especially obesity, are also complex problems lacking solutions from the scientific literature, suggesting that action research has applicability to addressing health issues. Action research may also be relevant for enhancing options for marginalised groups, who also often experience health disparities. Use of action research methodology within health has relevance due to the complexity and presence of health disparities of specific population groups.

Action research uses qualitative and quantitative methods of data collection which are complementary. Talking with people and recording their opinions and experience provides insights into a problem, while quantitative methods count and quantify the magnitude of opinions, experience and behaviours, and usually involves more participants. Both have subjective and objective qualities.

Action research utilises group strengths and local knowledge to effect change with positive benefits for participants. Lewin's approach postulated that problems or issues were easily identifiable by the target group, although the resulting actions may not work unless there was some modification of the action to "fit" the surroundings and local knowledge, informed delivery and good communication also facilitated this process (Edwards & Willis, 2014, p. 14). Project Energize and subsequently U5E have been founded on this approach with the Energizer as the agent of change moulding the health service to the centre's needs. This model also values contribution from the educators as experts in their field and knowledge of their ECC community. Educators were enabled by working in partnership with the Energizer, also living locally, to customise the service to the ECC. The outcome is ongoing capacity building and empowerment of the educators.

As previously stated, action research has evolved over time and is interpreted in different ways. Four typologies have been established with relevant characteristics; experimental, organisational, professionalising, and empowering (E. Hart & Bond, 1995). The typology used in this thesis is experimental where the researcher and the research are more dominant compared to action suiting the developmental stage of U5E. This is in contrast to other typologies, for example, empowering, where the power is shared and the problem comes from the participants. However, this body of work and the U5E intervention does borrow some features from other typologies. For example, within the organisational type, management has the dominant role compared to participants and decide on the research. Participants, programme staff and educators, the key roles driving change in U5E, were selected by the researcher to test a hypothesis developed in collaboration with programme management.

Interpretation of the awareness-raising step of action research for this study was undertaken with caution and action focused on achievable change. In U5E and this research, focusing on the underlying issue, obesity, was avoided because of the potential negative connotations of obesity, possible stigmatisation of children, because best practice directs the focus to be on optimal growth for children under five rather than body weight. Instead, the focus and consciousness raising were on the positive benefits of healthy food and beverage choices and physical activity, purposeful yet fun. The awareness-raising stage was followed by joint development of action plans with centres every six months to continually act, plan and review progress towards improving environments within the ECC. Small achievable changes rather than radical change were the focus, seen as more realistic for centres to achieve as health is not their core business.

### **3.2.1 Relationship between action research and critical theory**

Action research is a methodology commonly used within the critical theory paradigm, from which this study draws (B. M. Grant & Giddings, 2002), and there are many commonalities. In its most engaged form, critical researchers advocate for “radical reform of cultures, organisations and individual perspectives” with the study participants as “full partners” in the research (Edwards & Willis, 2014, p. 35). Critical theory within action research strongly encourages participants to be critical of existing interpretations and viewpoints in order to alter things for the better (Reason & Bradbury, 2008). Action research is also about effecting change and functions with a high degree of participation from the target group (Edwards & Willis, 2014). There is

also a strong link between theory and practice in both action research and critical theory (B. M. Grant & Giddings, 2002).

Critical theory and action research both challenge the status quo with the aim of change and improvement especially for marginalised groups (Dant, 2003; Edwards & Willis, 2014). Critical theory within action research encourages participants to be critical of existing structures and perspectives in order to alter things for the better (Reason & Bradbury, 2008). Championing the side of oppressed groups of society was a focus of critical theorists (B. M. Grant & Giddings, 2002) as was early work by Lewin, developing the action research framework to improve options for these groups of the population (Edwards & Willis, 2014). Action research, similar to critical theory, achieves change by “conscientising” (B. M. Grant & Giddings, 2002, p. 18), in other words, raising awareness about oppressive or social issues. Raised awareness is followed by working in partnership to improve the situation through cycles of joint planning, acting and critical reflection (B. M. Grant & Giddings, 2002; Savin-Baden & Howell Major, 2013).

‘Emancipatory’ is the term often used to describe action research located in the critical paradigm; also similarly used is participatory action research (Edwards & Willis, 2014). In this form, the researcher and study participants can be considered as having equal roles (B. M. Grant & Giddings, 2002). This study was a less extreme form of emancipatory action research where participants gained knowledge and skills around their local issues and were supported to make change (Boog, as cited in Edwards & Willis, 2014). Also, the researcher in this study had a stronger influence on the research reflecting the use of an experimental action research typology (E. Hart & Bond, 1995).

In summary, action research is a common methodology within the radical paradigm. Critical theory and action research have many similarities. These included respondent participation, power sharing, collaboration, challenging social norms and cycles of planning, acting and change to improve conditions for groups experiencing some form of prejudice or inequity. Critical theory underpinnings were drawn on to guide this study’s methodology, action research.

### **3.2.2 Relationship between action research and the socioecological model**

The socioecological model, another underlying theory of this study, also has assumptions in common with to action research, further supporting its use as a methodology. The SEM considers a person surrounded by multiple layers of influence,

highlighting the complexity of human health and social problems (Townsend & Foster, 2011). Action research acknowledges the complexity of issues by its multiple iterative cycles of testing solutions, which recognises that solutions are unknown and will take time to solve (Edwards & Willis, 2014). They also both draw on a multidisciplinary range of knowledge. The SEM and action research similarly highlight the importance of settings and group change. Both support group rather than individual change, yet acknowledge that individuals are part of systems. Action research is a suitable methodology for research with the SEM as a theory because it takes the complexity demonstrated by the SEM, and in the case of this research, the complexity of the prevention of obesity, into account.

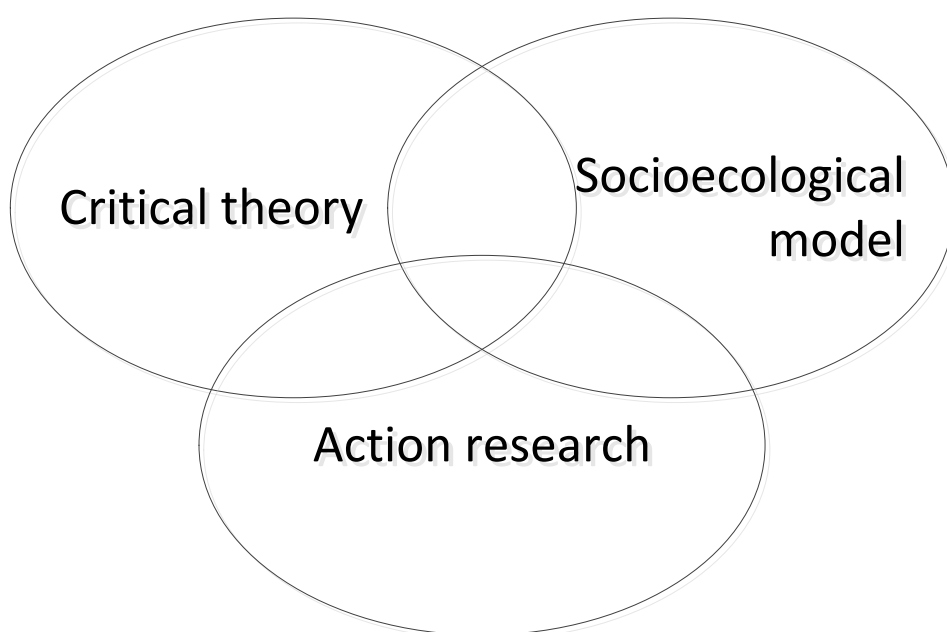


Figure 3.3. Model of the theoretical approach for this research

### **3.3 Summary of theoretical approach**

This research draws on principles of critical social theory and the SEM and used the action research methodology (Figure 3.3). The underpinnings of both critical social theory and the SEM have supported the choice of action research as a methodology to address the complexity of obesity and the power imbalances for children, in particularly Māori and children from low socioeconomic areas, in accessing a healthy food and physical activity environment while in childcare. The researcher's role in this research was not in the action part of the action research cycle; instead, the researcher used an experimental typology of action research supporting programme staff and ECC teachers with critical review of their practice, in a collaborative way (Koshy et al., 2010).

## Chapter 4. Study Design and Methods

This chapter outlines the design of this study which uses the RE-AIM framework as the overarching framework to develop the research questions. It follows a mixed methods approach to evaluate the U5E programme. Firstly, the RE-AIM model is defined; the advantages and barriers are outlined, as well as a description of how it is used to develop the questions for this body of work. A table detailing the outcomes and methods of each of the three stages of the thesis is provided. The mixed methods approach is justified and outlined, together with detail on the qualitative and quantitative methods, including validity measures. This is followed by sections on ethical approval and consultation with Māori undertaken prior to the data collection. Specific detail on the method of each of the three stages within this body of work is provided within Chapters 5–7, together with the results, discussion and conclusions.

### 4.1 “RE-AIM” framework

Demonstrating the effect of a health promotion programme on population health is problematic due to the time lag between an intervention and the effect on population health and the difficulty associating effects with a specific programme. It is also exacerbated by a funding environment of short time periods (between one and three years), no guarantee of sustained funding (McKenzie, 2007) and changing governmental priorities. This aside, agencies funding health promotion programmes, such as the Ministry of Health and DHB, are entitled to know the outcomes, together with how and why change was attained and how sustainable the change and the programme are. The RE-AIM framework provides evaluators with measures of effectiveness, simultaneous with other factors that funders may consider important when making decisions about the future of a programme. These include how representative the population engaging in the programme is of the target population; consideration of individual, organisational and setting level indicators; and adoption, implementation and maintenance (McKenzie, 2007).

The RE-AIM criteria measures five key dimensions, namely reach, effectiveness, adoption, implementation and maintenance that together determine the methodological success of an intervention (Glasgow et al., 1999). RE-AIM was originally developed to facilitate the translation of research into practice and policy and overcome the limitations of randomised controlled trials which were restricted in their ability to evaluate interventions with diverse target groups, multi-layered methods, settings and

outcomes necessary for prevention (Kessler & Glasgow, 2011; Kessler, Peyton Purcell, Klesges, Benkeser, & Peek, 2012). The emphasis on internal validity in most clinical trials to the exclusion of external validity, results in non-representative samples and settings and therefore does not evaluate “the public health significance of interventions” (Glasgow et al., 1999, p. 1322). In contrast, RE-AIM includes both the reach and representativeness of sample participants and settings to determine if the sample reflects the ‘real world’, not only highly motivated participants who want to change. Glasgow et al. (1999) note that interventions shown to be effective among non-representative samples will be further disadvantaged when rolled out to ‘real world’ settings, in particular to ‘hard to reach’ groups of the population. Greater influence on a larger proportion of the population may come from interventions that are of a lower intensity rather than high intensity to smaller samples such in randomised controlled trials (Glasgow et al., 1999). By including the five afore-mentioned dimensions within RE-AIM, the authors postulate that these will ‘more completely characterise the public health impact of an intervention’ and determine interventions worthy of funding (Glasgow et al., 1999, p. 1323).

RE-AIM has shown considerable versatility of use but some limitations exist. RE-AIM has been successfully used to plan, implement, evaluate and review health promotion interventions and has demonstrated good reliability (Kessler & Glasgow, 2011; McKenzie, 2007). It has been shown to be useful for both quantitative and qualitative studies, policy development and allocating funding based on effectiveness. However, there are limitations to use of this model. Firstly, one issue not explicit in the framework is cost effectiveness. Although Glasgow et al. (1999) note that cost is often integrally part of the model within the adoption, implementation and maintenance of a programme, it does need to be more reliably defined, tested and included within RE-AIM. A systematic review of RE-AIM use over 1999–2010 showed that cost was often missing from published papers along with representativeness and maintenance (Gaglio et al., 2013). Secondly, the contribution of each of the five dimensions to the overall public health impact was also not clear nor is the time required for each stage (Glasgow et al., 1999; McKenzie, 2007). Subjective time periods have been proposed, which are six months to one year for implementation and two or more years for maintenance (Glasgow et al., 1999). While RE-AIM has been shown to be versatile, more in depth research is needed to clarify the limitations of inclusion and measurement of cost, overall public health impact and objective time periods for each stage.

A key advantage of RE-AIM is its applicability in a wide range of settings including behaviour change, policy and environmental change and for both planning and evaluation (King, Glasgow, & Leeman-Castillo, 2010). However, the conceptual nature of RE-AIM makes identification of what to measure, and how to measure exposure to the intervention or policy over time difficult, as this is not provided in the model (King et al., 2010). Collecting data on all five dimensions also makes it challenging to use and it has been suggested that some groups, for example, small community groups, may be unable to complete this due to restricted access to staff and expertise.

The RE-AIM framework has been used for over a decade as an effective multipurpose evaluative tool in health promotion but ideally must be used in its entirety. In a review of 42 grant applications submitted to the National Institutes of Health in the US, Kessler et al. (2012) stated concern over selective use of RE-AIM constructs (less than 10% of grants completely measured all domains of RE-AIM), and warned that this limits the effectiveness of RE-AIM and negatively affects systematic review of RE-AIM. These findings were similar to a systematic review of 71 RE-AIM studies (Gaglio et al., 2013), although not as low (44 of 71 employed all five domains of RE-AIM). Authors, from both reviews, documented the need for researchers to clearly outline and justify the dimensions used in studies when fewer than the five domains were employed, instead of claiming complete model use. As well as using fewer than the five domains, studies can leave out “key components” within a domain, such as not including the ‘representative’ part of the ‘reach’ domain. This has been described as “insufficient and inaccurate use of the model” (Kessler et al., 2012, p. 46). Selective use of RE-AIM was probably due to limited resources, time and statistical expertise to produce all the required information. Kessler et al. (2012) used a set of criteria for evaluations to report from the five dimensions, which they suggested would improve consistency of application of the framework. Use of RE-AIM at the beginning of programme planning was also recommended. Full and early use of RE-AIM was advocated, along with the consideration of adaptability to the context of use.

Use of both qualitative and quantitative methods is outlined in RE-AIM and was included in criteria used in recent reviews of RE-AIM use (Gaglio et al., 2013; Kessler et al., 2012). Addition of use of mixed methods and qualitative methods to criteria to assess RE-AIM use were described by Kessler et al. (2012) as new, and the result of RE-AIM constantly evolving over time. However, Gaglio et al. (2013) noted low use of qualitative methods to assess any of the five domains in the aforementioned 2013

systematic review (between 3.5% and 16% of 71 studies used a qualitative method across all domains). In contrast, according to Kessler et al. (2012), there was more use of qualitative methods (between 36% and 82% of 42 grant applications) with implementation (78%) and maintenance (82%) the domains more likely to employ these methods. Qualitative methods can provide some of the “detail and context” to facilitate understanding of the quantitative investigations (Gaglio et al., 2013, p. 90). Although new, mixed methods can add depth to the evaluative ability of the RE-AIM model (Kessler et al., 2012).

RE-AIM is consistent with critical theory and the socio ecological model underpinnings of this study, particularly within the reach dimension. An important part of RE-AIM is the reach and representativeness of an intervention to ensure an intervention reaches the intended population. Glasgow et al. (1999) state that within a population, the people who participate in health promotion interventions may not be representative of the population. With increasing disparities in health based on socioeconomic status, the ability of an intervention to demonstrate it has reached groups who would benefit the most is essential. This is consistent with critical theory, which advocates for underprivileged groups and consideration of the wider societal influences on health issues, similar to the SEM. The multiple levels identified in the SEM can be taken into account by the RE-AIM model which can measure individual, organisational and community change (King et al., 2010).

#### **4.1.1 Dimensions of RE-AIM**

The reach dimension of the RE-AIM criteria is concerned with participation of the study subjects. It measures the proportion of participants exposed to the intervention and how representative the sample is of the target population. Effectiveness is the extent to which the intervention meets its desired outcomes or impact without adverse consequences. Adoption operates more at a system or setting level and investigates the proportions of organisations that will take part in the intervention. Implementation is the degree to which the planned activities of the intervention take place as intended, including investigation of possible barriers to implementation, such as cost and acceptability of activities. Finally, maintenance refers to the long-term effects of the programme and sustainability factors including length of follow-up, ongoing funding and attrition rates.

### ***Reach***

Measurement of reach is usually at the level of the individual and is a ratio of the ‘number of people actually exposed’ over the ‘number of people ideally exposed’ (Glasgow et al., 1999). A comparison of the features of both of these groups with the entire population is also part of assessing reach, to find out if the people who chose not to participate had similar characteristics. In this study though, the measurement of reach was at the ECC level rather than individual children attending ECCs. An effectiveness trial draws the sample from a wide yet defined population (Glasgow, Lichtenstein, & Marcus, 2003). In contrast, reach is narrowed in efficacy trials by selection of healthy, engaged and equal groups (Glasgow et al., 2003), which are therefore potentially less representative of the actual population. This does not mean that randomised controlled trials should be discarded in preference to effectiveness trials but that there are benefits to having both efficacy and effectiveness trials (Mitchell, Prochazka M. D., & Glasgow, 2016).

Reach describes the results of the initial stages of a programme though is important for the entire programme. A programme with low reach has a limited effect on the intended population; therefore it is essential that engagement of participants is well planned and executed. McKenzie (2007) report that high reach contributes to the achievement of overall programme goals as well as facilitating adoption, implementation and effectiveness.

### ***Effectiveness***

Effectiveness reports what the programme has achieved in terms of outcomes with respect to the programme goals. It also includes what are considered to be unanticipated outcomes (King et al., 2010). Unlike traditional programme evaluations where effectiveness was commonly the only outcome measure, RE-AIM is designed to include effectiveness alongside the four other dimensions to provide a more comprehensive evaluation (McKenzie, 2007).

### ***Adoption***

Adoption, a domain integral to the overall effectiveness of a programme, is similar to reach. Adoption is important at the setting level, as organisations or groups need to devote resources such as staff time to the intervention (McKenzie, 2007) and they “expect the intervention to fit with existing procedures” (Glasgow et al., 2003, p. 1263). Other factors affecting adoption are fit with the cultural and political climate in the

organisation, cost, resourcing of funding and expertise. Common methods used to measure adoption include observations, structured interviews or surveys (Glasgow et al., 1999).

### ***Implementation***

This dimension aims to determine what parts of the programme have been delivered as planned and if there were any barriers or enablers to the strategies or resources, at what level and with what group of participants (Glasgow et al., 2003; McKenzie, 2007). As it shows what strategies were successful it therefore implies their potential success in alternative settings (Glasgow et al., 1999). Implementation also adds to the reliability and validity of the outcome findings (McKenzie, 2007). It can be assessed at the individual level through participant measures of adherence to a prescribed protocol and at a setting level by measuring whether activities are delivered as designed (Glasgow et al., 1999). Additionally, King et al. (2010) states that implementation includes the cost of delivering the intervention.

### ***Maintenance***

Funders are particularly interested in the sustainability of programmes, making this an important domain. One of the key questions is around the extent to which the strategies and behaviours have been institutionalised at an individual level (such as the extent to which a behaviour change is maintained), as well as at the organisational and community levels (Glasgow et al., 2003; McKenzie, 2007). A minimum of two years' evidence of maintenance was proposed by Glasgow et al. (1999).

Use of RE-AIM as an evaluative tool in New Zealand is limited. Only one known application in NZ was an unpublished systematic review (Finn, Clinton, & Mahoney, 2006). This was a systematic review of literature on interventions in schools and early childhood settings to improve nutrition and physical activity among children. RE-AIM was used to determine the strengths and weaknesses of the methodology of the interventions and summarise the evidence for effectiveness.

#### **4.1.2 Application of RE-AIM in this body of work**

As U5E was a health service operating in 'real time', a rigid study design with an efficacy outcome, such as a randomised controlled trial, was not feasible. This body of work had to be cognisant of the U5E programme delivery which was based on action cycles of progression by Sport Waikato, contract and reporting to the Ministry of Health, as well as considering what was doable in the three year time frame. Research

studies that describe a range of indicators of internal and external validity, together with their pooled results, as outlined in the RE-AIM framework, can add valuable evidence of the impact of interventions.

RE-AIM was applied in the planning stages of U5E by others (Sport Waikato, 2013a) in keeping with the recommendations of RE-AIM use (Gaglio et al., 2013). This body of work began when U5E was in the pre-implementation phase (Table 6.1) and utilises the first four dimensions of RE-AIM, (reach, effectiveness, adoption and implementation), as it was envisaged that the maintenance domain would not be able to be assessed due to timing. However, some attention will be given to maintenance in Stage 3 (Table 4.1).

Use of the RE-AIM framework in the proposed series of studies for this thesis will provide a NZ example of applying the model to an active translational programme in the early childhood sector.

### **Description of research stages**

There were three parts to this body of work using the RE-AIM framework. The outcomes and methods of how each RE-AIM dimension was measured are outlined in three stages in Table 4.1. Stage 1 assessed reach and adoption (Chapter 5. ), Stage 2 investigated implementation and effectiveness (Chapter 6. ) and Stage 3 measured effectiveness and maintenance (Chapter 7. ). Stages 1 and 3 both employed qualitative and quantitative methods of assessment, whereas Stage 2 used only quantitative methods of assessment.

Table 4.1 Plan of the RE-AIM assessment of Under 5 Energize with timing, outcome measures and methods for each dimension

<b>Component</b>	<b>Definition</b>	<b>Outcome measure(s)</b>	<b>Method(s)</b>
<b>Stage 1</b>			
Reach and adoption (2013-2015)	Participation of the target population (all centres identified in sample)	Proportion of centres participating in U5E, Waikato region and nationally	Comparison with national and regional ECC population provided by the Ministry of Education
		Proportion of centres participating out of those invited	Comparison with Ministry of Health contracted outputs Number of families and educators from participating centres
	Reasons for participation	Qualitative responses on reasons for participation	<sup>a</sup> Qualitative interviews with educators and focus group with programme staff after recruitment (early 2015)
	Representativeness of the participating population and setting	Characteristics of participating population compared to regional and national population - ethnicity of children in participating centres, Equity Index, type of centre and social deprivation of participating centres Characteristics of participating centres compared with non-participating centres	Comparison with national and regional ECC ethnicity Equity Index and type of centre provided by the Ministry of Education Comparison with Ministry of Health contracted outputs Geographical mapping of location, social deprivation and ethnicity of participating centres Comparison of characteristics of (centre type, ethnicity, cluster) participating centres compared with non-participating centres
	Time to transition through the five stages of engagement	Number of days to complete engagement process	Calculation of the number of days for each stage
<b>Stage 2</b>			
Implementation (2013-2015)	Co-design of activities	Activities meet centre's needs	Energizer and centre reports of co-design of activities from the Energize model to suit individual centres
	Extent to which participating centres implemented the different activities of the programme	Proportion of action plan goals achieved	Proportion of nutrition and physical activity goals achieved and not achieved overall and for each programme goal
	Frequency of consumption of key lunch-box foods	Proportions of frequency of consumption of key lunch-box foods	Comparison of repeated survey questions at baseline (2013) and two years (2015)

<b>Component</b>	<b>Definition</b>	<b>Outcome measure(s)</b>	<b>Method(s)</b>
	Change from no/non-written to written policy or guidelines on food and physical activity	Increase/no change in proportion of centres with written policy in key policy categories e.g. sweet drinks, energy dense snack foods, birthdays, centre events Decrease/no change in proportion of centres with no/unwritten policy in key policy categories	Repeated survey questions at baseline (2013) and two years (2015)
<b>Stage 3</b>			
Effectiveness (2015-2016)	What changed within centres as a result of U5E participation	Qualitative responses to questions about what has changed within the centre and how and why it has changed	<sup>a</sup> Qualitative interviews with educators and focus group with programme staff after Year 2 (late 2015)
	Parents awareness, understanding and use of U5E programme and messages	Percentage of parents aware, understanding and using U5E programme and messages	Voluntary parent questionnaire administered to parents on entry/leaving centre
Maintenance (2015)	Degree to which changes have become institutionalised or become the norm	Qualitative responses on sustainability	<sup>a</sup> Qualitative interviews with educators and focus group with programme staff after Year 2 (late 2015)

*Note.* ECC = early childhood centre; U5E = Under 5 Energize; <sup>a</sup> denotes the qualitative sections of this body of work.

## **4.2 Methods**

### **4.2.1 Under 5 Energize programme**

#### **Background**

In July 2011, around 16,000 children were enrolled in Waikato early childhood centres which is 9.2% of the enrolled children nationally (Ministry of Education, 2014c). From July 2013, child and maternal health funding from the Ministry of Health enabled Project Energize to be adapted as an Under 5 Energize programme and trialled in early childhood centres in four Waikato DHB locations – North Waikato, South Waikato, Thames-Hauraki and Hamilton (Waikato kindergartens only). The proposed reach of the Under 5 Energize programme is to 25% of Waikato region children aged 0-4 and 40% of four year olds. Under Five Energize will use a similar model as Energize to engage early childhood centres with the overall aim to improve health and well-being through better nutrition and regular physical activity of preschool children to reduce the rate of weight gain (obesity). This model translates into employment of programme staff, called Energizers, who work alongside the ECC to provide support, professional development teaching sessions on nutrition and fundamental movement skills, deliver the Healthy Heart Award programme as well as resources to enhance the nutrition and physical environment of the ECC. Each Energizer works with approximately 28 centres in each cluster (four clusters). Sport Waikato has a culture of selecting staff with a skill base related to teaching, sport and or nutrition and who live and work in the area (including speaking Te Reo where possible), high standards of professional development and training, team sharing of expertise, evaluation and accountability all of which enhance the delivery of the project.

Sport Waikato have a mandate in their strategic plan to “proactively engage and support the aspirations of all Māori and iwi” (Sport Waikato, 2013b). This is supported by strategies for both the Energize and U5E programmes ensuring that inequity and inequality are addressed. Strategies include sub-contracting service delivery with Māori and Pacific providers (two of the four clusters); placing extra resource in schools that have high Māori and Pacific populations; including families/whānau and the wider community in the programme; and the collaborative and flexible nature of the programme. As obesity prevalence rates among children increase with disproportionate effects on Māori and Pacific children and children from areas of high need, finding ways to make healthy eating and physical activity participation messages more effective is increasingly important and relevant.

## **Programme sample and recruitment**

The early childhood centres identified for inclusion in U5E were sourced from the Ministry of Education's Education Counts: Early Childhood Centre Lead Excel database (Ministry of Education, 2014a) in four designated, geographically-related clusters. Four areas were chosen, based on their rural and urban locations, percentages of Māori and Pacific populations, social deprivation, and for two clusters existing partnerships with Māori and Pacific providers for Project Energize (Thames-Hauraki and South Waikato) (Sport Waikato, 2013a). It was calculated that approximately 30 centres in each cluster could each be managed by one locally resident Energizer if centres were within reasonable car travelling distances (no more than one hour's car journey from the major town). For example, the staff member in the South Waikato cluster lived in Tokoroa and travelled no more than one hour to reach any one of the centres located in the surrounding towns of Tokoroa, Tirau and Putaruru. All of the centres within a cluster that met the inclusion criteria were invited to participate.

Centres signed up to U5E in a five stage process (Figure 4.1). The initial visit was held between the Energizer and a centre representative at which time the programme was explained including the benefits of involvement. This was followed by joint signing of a memorandum of understanding outlining the commitments of both parties (centre and U5E). An audit of nutrition and physical activity of each centre was the next stage to provide baseline measures against which the programme effectiveness could be evaluated. The next stage was a needs analysis which encouraged centres to reflect on what they were doing well in nutrition and physical activity within the centre and where improvements could be initiated. The process finishes with co-design of centre-specific action plans for the delivery of U5E activities. It is signed and agreed by the centre and the Energizer. Action plans were valid for six monthly intervals for the first 2 years after which it becomes yearly renewal.

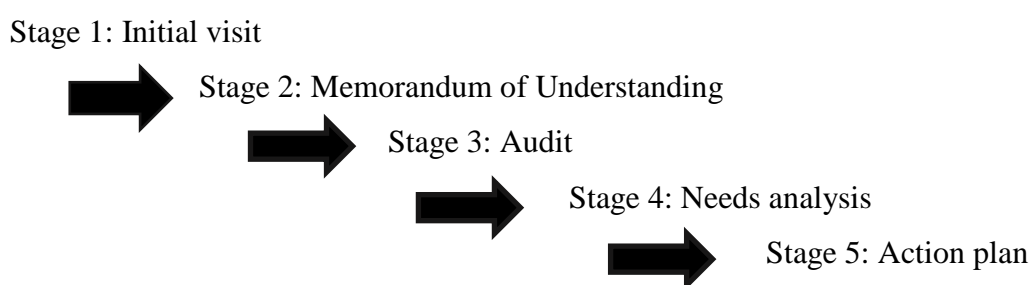


Figure 4.1 Five stages of early childhood centre recruitment in Under 5 Energize

### **Key players in the Under 5 Energize process**

In addition to the 5-stage recruitment process (Figure 4.1), some pre-engagement processes were required, depending on the governance and management of the centre. The additional processes involved community hui presentation of U5E and consultation and obtaining agreement to proceed with U5E, from centre regional or centre-based or management or parent-led groups (organisational groups, such as the Te Kōhanga Reo National Trust Tainui Rohe or ECC (Figure 4.2). These steps occurred both before and after the initial visit leading up to the signing of the MoU. Compared to the other three centre types Te Kōhanga Reo required additional interactions to achieve the five stages of engagement. This reflected the tribal and whānau-led structure of Te Kōhanga Reo and the cultural competence of the Energizers.

During the engagement process and beyond, the programme manager and the Energizers liaised with a variety of different contact points, groups and positions, within each centre, depending on the centre type (Figure 4.3). After engagement was complete and the programme moved to the implementation phase, the contact point commonly shifted from a management to a teacher/parent role. In the parent-led centre types, there were more contact points, especially for Te Kōhanga Reo.

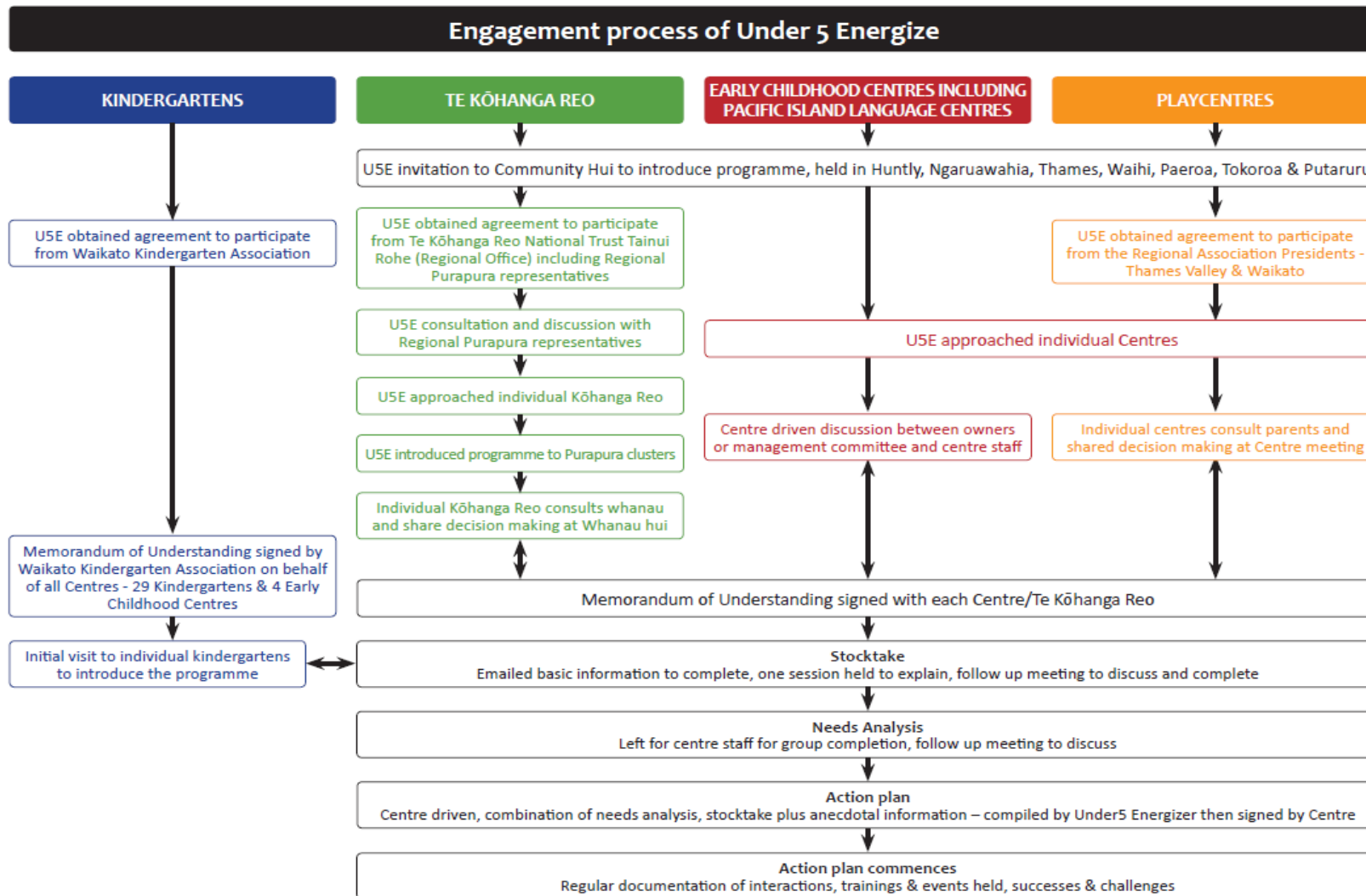


Figure 4.2 Engagement process of Under 5 Energize

## Engagement contact points for U5E

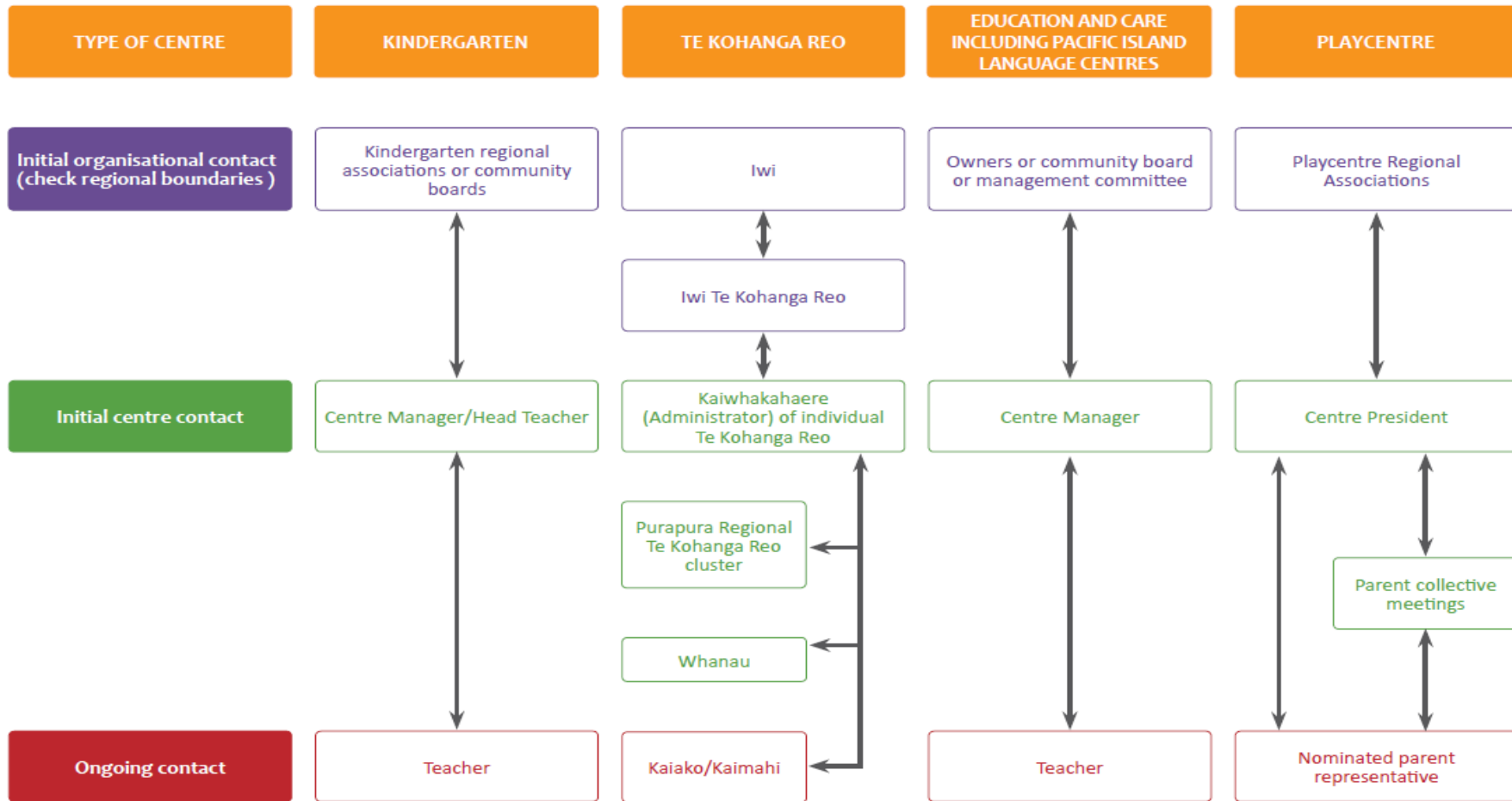


Figure 4.3 Engagement contact points for Under 5 Energize

## **U5E programme activities and resources**

### ***Professional development of Energizers in nutrition and fundamental movement skills development***

The Energizers are provided with professional development in preschool nutrition and FMS by Sport Waikato and by attending external conferences and training days. Monthly team meetings provide the opportunity to share learning, resources and successes.

### ***Nutrition and fundamental movement skills workshops***

Workshops were developed based on the nutrition and physical activity goals of U5E Table 24. Nutrition topics include ‘sugary drinks’, ‘healthy lunchboxes’ and ‘how to read a food label’. These are delivered to educators, kaiako, and parents as practical group learning sessions with food ideas, food product nutritional information and resources. A relevant ‘tip sheet’ resource is provided to families following a workshop (Appendix D: Tip sheet). Fundamental movement skills workshops were initially provided by Gym Sports NZ (one year) and topics included ‘locomotion’, ‘balance’, and ‘landing and statics’. In 2014 a FMS advisor was appointed by Sport Waikato to provide FMS expertise and advice for U5E. A new workshop series was launched named FAB (Fun activities with benefits) and included topics, ‘crossing the midline’, ‘spatial awareness’ and the ‘vestibular system-balance & coordination’.

### ***Modelling sessions***

Fundamental movement skills are also delivered as modelling sessions where the Energizer demonstrates to educators/ kaiako/parents ways to incorporate FMS into daily physical activities with the children. The Energizer is the ‘change agent’ with a train-the-trainer mandate rather than an additional teacher (Graham et al., 2008, p. 1079), or a teacher/facilitator brought in to the ECC to regularly deliver sessions, for example, dance or movement to music classes.

### ***Resources***

A range of printed resources included tip sheets (Appendix D: Tip sheet) and posters are provided to centres for display and distribution to whānau.

### ***Interactive displays***

The Energizers provide displays in ECCs at pick-up and drop-off time to discuss healthy messages directly with families.

### ***Messaging to the ECC community***

Centres are provided with monthly newsletters via email. Where possible, U5E staff promoted inclusion of centre activities in local newspapers.

### ***He Pi Ka Rere***

He Pi Ka Rere is a “kaupapa Māori physical activity approach to nurture and develop the whole being of a tamaiti in Kōhanga Reo” (Toi Tangata, n.d.). Translated it means ‘learning to fly’ and is based on the Māori belief that with the right environment every child has the potential to grow and develop. Within this environment having the appropriate conditions for children to achieve this is paramount and He Pi Ka Rere uses indigenous knowledge to provide this through movement. It combines the traditional movement skills of Māori ancestors with the skills required for organised sport and was developed specifically for Te Kōhanga Reo. He Pi Ka Rere was primarily delivered in Auckland however roll out as part of U5E began in July 2015. It involved Toi Tangata training U5E staff to deliver the programme in Te Reo. Each Kōhanga Reo received two training sessions. It is supported within Te Kōhanga Reo with written resources for the kaiko. U5E Energizers support the delivery of He Pi Ka Rere in participating ECCs.

### ***Healthy Heart Award***

The Energizers received training from the Heart Foundation on how to deliver the HHA programme. ECC are supported to achieve an Award by the Energizers when centres agree to participate.

### ***Centre-specific nutrition and physical activity policy and practice support***

The Energizers work with ECC to support the development of healthy nutrition and physical activity policy and practices. This support is variable and can include working with the centre to develop a nutrition policy, providing healthy food ideas, attending centre events that support healthy eating and physical activity and directing centres to other organisations such as [vegetables.co.nz](http://vegetables.co.nz) for further information.

### **Timeline**

Details of the development and delivery of U5E activities over time are documented in Figure 4.4. The programme aimed to recruit centres at a similar time after the Energizers had been employed, however, appointment of all four Energizers took seven months (between August 2013 [n = 1] and February 2014 [n = 3]) due to an initial lack of candidates with the specific job specifications skills. This resulted in centres in one cluster being recruited approximately 4 months ahead of the other three clusters.

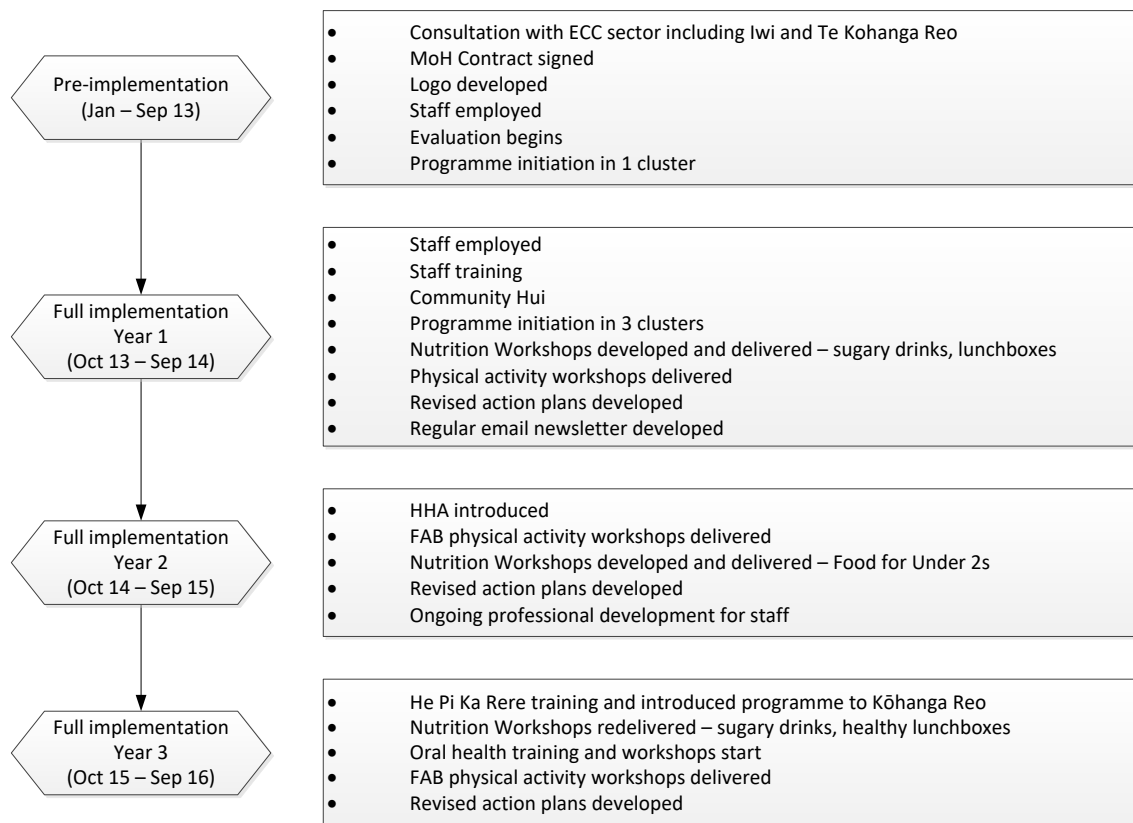


Figure 4.4 Timeline of Under 5 Energize programme development and delivery  
 ECC = early childhood centre, MoH = Ministry of Health, HHA = Healthy Heart Award, FAB = Fun activities with benefits (fundamental skills workshops)

#### 4.2.2 Mixed methods

This thesis follows a mixed methods approach to answering the research questions developed from application of the RE-AIM framework to the evaluation of U5E. A mixed methods design was chosen to more effectively understand and describe the complex nature and layers of interaction required in changing the behaviour of the treatment unit in this study, namely early childhood centres, and to reflect the theories underpinning the research, critical theory and the SEM (Creswell, 2014). Mixed methods benefit from the strength of both qualitative and quantitative methods, while overcoming the drawbacks of each type (Creswell, 2014; B. M. Grant & Giddings, 2006). Developed in the late 1980s, mixed methods draw from a range of fields including education, management, sociology and health (Creswell, 2014). While many mixed methods commonly use a pragmatic world view, there is increasing use of mixed methods in critical theory based research as well as other paradigms; in fact, a review in 2010 found 13 mixed methods studies using a transformative stance (Creswell & Plano Clark, 2011; B. M. Grant & Giddings, 2006; Sweetman, Badiee, & Creswell, 2010). Furthermore, mixed methods are increasingly being used within RE-AIM to provide a comprehensive evaluation of each dimension (Gaglio et al., 2013; Kessler et al., 2012).

Mixed methods suit the theoretical underpinnings and evaluation framework of this body of work.

Conflict exists between purist quantitative and qualitative researchers about the value of mixed methods. Purists contend that quantitative and qualitative methods are based on different paradigms which cannot be joined. This view is incongruous with research trends that show research is becoming increasingly 'complex, interdisciplinary and dynamic' (R. B. Johnson & Onwuegbuzie, 2004, p. 15). The adaptability of a mixed methods approach can address these issues. Ideally, researchers should have an understanding of both quantitative and qualitative research to facilitate combining these methods in an ideal way. Collaboration between qualitative and quantitative researchers is needed to answer the research questions in the best way possible (R. B. Johnson & Onwuegbuzie, 2004). When findings are supported by multiple methods, it not only increases the confidence in the overall result, but also increases overall comprehension, whether the methods corroborate each other's findings or not (R. B. Johnson & Onwuegbuzie, 2004).

Mixed methods design can be described as the use of a combination of qualitative and quantitative research and data in one study. A formal definition is provided by R. B. Johnson and Onwuegbuzie (2004, p. 16):

The class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study.

Gathering both qualitative and quantitative data to answer research questions adds greater depth to the findings. Both types need sound data collection techniques and the analysis requires both forms of data to be combined in one of three ways; by merging (combining), connecting (analysis of one guides the analysis of the next) or embedding the data (data are part of a larger design) (Creswell, 2014). Conversely, a mixed methods approach is time consuming, requires the researcher to be familiar with both types and designs can be complicated by multiple data gathering sequences. Other disadvantages of mixed methods research are issues of representation, integration (joining of data) and legitimation (validity) (Onwuegbuzie & Johnson, 2006). The use of a mixed methods typology and a flow diagram can assist with clarifying how the steps of qualitative and quantitative data collection fit together to achieve the study aim (Figure 4.5).

There are three main types of mixed methods. The designs vary in the timing of data collection and how the results are combined. The first is the convergent parallel mixed methods design, where qualitative and quantitative is collected and analysed separately using the same basic question. Data can be interpreted ‘side by side’, transformed (qualitative converted into quantitative) or presented together. Divergent results can be a weakness (Creswell, 2014) and strength of this design (B. M. Grant & Giddings, 2006). If a researcher has a background in quantitative research yet wants to include qualitative, the second mixed method design, explanatory sequential design, may suit. Qualitative research follows a quantitative study in this method, to enhance the understanding of the quantitative analysis. The third basic design is exploratory sequential mixed methods design, which is the reverse of the explanatory where qualitative methods, precede quantitative. Similar to the explanatory approach, the first round of data collection builds on the second, aiming to determine if the data can be generalised to a larger population. In this model, factors found in the qualitative wave can be translated into variables in the quantitative investigation. Each of the three types of mixed methods has a different sequence of data collection to suit different settings and research questions.

Three advanced methods of mixed method design: embedded, transformative and multiphase mixed methods can also be employed. The multi-phase mixed method was selected for this body of work because it uses simultaneous or successive rounds of data collection together over the programme lifecycle to explore the achievement of a programme or intervention aim. This method can employ sequential or convergent designs (as explained above) (this body of work used a sequential design) and are routinely employed in programme interventions (Creswell, 2014). A transformative approach was not chosen despite the underpinning of this thesis being critical theory, but a “call to action” was not the expected outcome of this work (Creswell, 2014, p. 228). An embedded design, where qualitative or quantitative designs, or both, are used for a smaller study within a larger evaluation like an experiment, can suit the testing of an intervention in a practical setting like schools or ECCs, but also did not match the aim of this body of work, which was to monitor U5E over time (three years). Multi-phase designs provide outcomes as the programme progresses, similar to a process evaluation. This matched the desired outcomes of this research where each stage informed the next for continued action and adaption of U5E.

The choice of mixed methods design is influenced by a variety of factors. These include consideration of the expected results, how to combine the data (merging, connecting or embedded), timing of data collection (concurrent or sequential), weighting of data from each type (equal or unequal) and matching the method to the study subject (Creswell, 2014). Additionally, the decision can be influenced by the number of researchers, for example if there was a lone researcher, sequential would be more suitable than concurrent data collection because of the workload demands of concurrent collection. Multiple factors need to be explored when deciding the mixed methods design to suit the research question and study domain.

The validity or legitimisation of mixed methods designs is concerned with both the validity of the qualitative and quantitative data itself, as well as when the data are combined (Creswell, 2014; Onwuegbuzie & Johnson, 2006). Legitimation is defined by Onwuegbuzie and Johnson (2006, p. 52) as the “difficulty in obtaining findings and/or making inferences that are credible, trustworthy, dependable, transferrable, and/or confirmable” and is problematic in mixed methods research due to the combined validity issues from quantitative and qualitative research. Qualitative validity strategies need to be planned and outlined by the researcher. In addition, the quantitative methods require validity to be planned and addressed in collection of the numerical data including adequate sample size estimations and use of a validated tool. When quantitative informs the qualitative investigation, in sequential mixed methods design, the researcher must address equally all of the findings from the quantitative component to prevent narrowing the focus of the qualitative component (Creswell, 2014). Low sample sizes within both methods can invalidate the overall results. Validity needs to be considered within both the quantitative and qualitative methods, as well as when the overall findings are combined, to ensure the results are not compromised, which require adequate planning on the part of the researcher.

Nine factors influencing legitimisation of mixed research have been outlined by Onwuegbuzie and Johnson (2006). These are outlined in Table 4.2 together with a summary of how relevant legitimisation factors were addressed in this body of work.

Table 4.2 Forms of legitimisation of mixed method research and how relevant forms were addressed in this body of work

<b>Legitimation type</b>	<b>Explanation</b>	<b>Relationship to this body of work</b>
Sample integration	Population generalisations are difficult especially when samples from the qualitative and quantitative studies do not come from the same population, samples are small or non-random. Consistency of findings between qualitative and quantitative improves the quality of the interpretation.	Samples in the qualitative and quantitative studies were from the same sample population of ECCs although different subgroups (kaiako/educators/parents)
Inside-outside	Accurate representation of ‘insider’ (researcher or can represent the qualitative study) and ‘observer’ (external to research or can represent the quantitative) views. Mixed methods aim to represent both views equally.	Member checking Peer review by supervisors
Weakness minimisation	The weaknesses of one method are overcome by the strengths of another method. Suggested to be optimal in mixed methods although careful planning to maximise this effect is required.	Weakness of quantitative (low sample size) partly overcome by qualitative interviews at two time points
Conversion	How well data, obtained by converting from qualitative to quantitative or vice versa, represents the actual data	Not applicable
Paradigmatic mixing	Combining paradigms from qualitative and quantitative	Paradigms identified and compatible Methods selected to fit paradigms
Commensurability	Moving beyond a solely quantitative or qualitative interpretation to a combined opinion	Not applicable
Multiple validities	Validity within each component is considered as well as integration validity	Validity addressed within both types
Political	Conflict between researchers within a study or conflicting results. Overcome by promoting multiplicity of perspectives and aiming to achieve valuable results	Strong concordance of results

*Note.* ECC = early childhood centre (Adapted from Onwuegbuzie & Johnson, 2006)

The design of this body of work has multiple data collection phases, and different methods of data collection and analysis will be used in the three stages of the research (Figure 4.5). Details of the data collection and analysis of each stage are provided in each chapter (Chapters 4–6). Stage 1 and 3 contain a qualitative and quantitative component while Stage 2 was purely quantitative. The quantitative findings informed

the qualitative in Stage 1. The data were collected sequentially and considered equally although separately. This was because each component had different research questions, in line with RE-AIM dimensions, but all were contributing to the overall research aim.

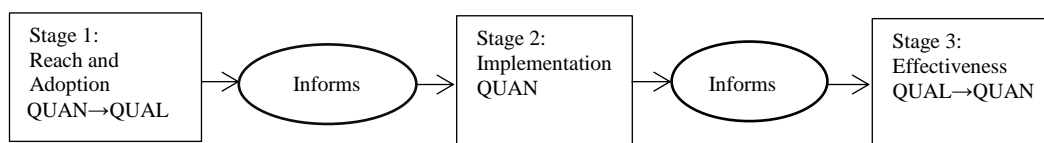


Figure 4.5. Multiphase mixed methods approach of this body of work (Adapted from Creswell, 2014) QUAL = Qualitative methods, QUAN = Quantitative methods, → = Sequential methods

The validity of the qualitative and quantitative methods used in this body of work is outlined later in this chapter. The process of combining the findings was also addressed.

Use of mixed methods in the RE-AIM evaluation for this body of work matches the ‘real world’ nature of RE-AIM and of U5E. Mixed methods can be applied in a variety of approaches, demonstrating adaptability to the complexity of health and social issues. Findings from mixed methods are comprehensive despite being time consuming to gather, analyse and interpret.

### 4.2.3 Qualitative approach

This section outlines the qualitative approach, qualitative descriptive including thematic analysis, and sampling methods used in this body of work.

Qualitative research has been described as obtaining meaning from words, whereas quantitative approaches use numbers as the information source (Braun & Clarke, 2013). Savin-Baden and Howell Major (2013, p. 11) describe it as “aiming to investigate the way in which people make sense of their ideas and experiences”. As well as being about the way data are collected, qualitative inquiry has a paradigm or overarching framework in which the research is conducted and this influences the research process. This study uses critical theory and the socioecological model as paradigms, which were described previously (Chapter 3.1). Another important assumption of qualitative inquiry is that there are “multiple versions of reality” relevant to the circumstances of the participants, thus limiting the generalisability of the research to wider population environments, beyond the setting of the data collection (Braun & Clarke, 2013, p. 6). Furthermore, a qualitative approach allows the participants to construct experiences rather than the researchers controlling this, incorporates multiple and often opposite sides of opinion

and provides a more complete understanding of an event or issue. Additionally, it can unearth things the researcher was unaware of, thus providing a comprehensive understanding of an event, arguably more than a quantitative investigation. This form of qualitative research is commonly known as experiential (Braun & Clarke, 2013). Furthermore, the researcher needs to consider themselves part of the research process and influencing it, rather than a bystander. These multiple facets of qualitative research were used to provide knowledge from the meaning of responses from participants experiencing the U5E health service in ECCs.

The qualitative section of this study used a qualitative descriptive methodology which is documented by Sandelowski (2000, p. 336) as a “comprehensive summary of events” and has “accurate accounting of the meanings participants attributed to those events”. Neergaard, Olesen, Andersen, and Sondergaard (2009, p. 2) describes this method as a “rich, straight description of an experience or an event”. It aims to look for “patterns” across the data and is not associated with an underlying theory such as grounded theory but rather draws on the principles of “naturalistic inquiry” (Braun & Clarke, 2013, p. 13). This method suits the purpose of this research which was to investigate the “why”, “how” and “what” questions (Neergaard et al., 2009) to evaluate the Under 5 Energize initiative in early childhood centres. Critics of qualitative description have described it as simplistic and unscientific however used correctly it provides useful insights in mixed methods research (Neergaard et al., 2009). The aim of the thematic analysis was to explore why and how ECCs engaged in the programme and what were the enhancers and barriers to engagement in U5E.

As this is a mixed methods study, consideration was given to the samples used in the quantitative sections (Sandelowski, 1995) which mainly collected data from the entire sample. The sampling technique used for the qualitative aspect was purposeful sampling and similar to maximum variation sampling using demographics as the variation, this study had ECCs as its subjects and used the variation of early childhood centre type (Sandelowski, 1995). Therefore, the sampling strategy for the interviews in this research was to have each centre type represented relative to the proportions of centre types in the total sample (Table 4.3). The researcher was also cognisant of the priority groups for U5E, one of which was Māori, signifying the importance of inclusion of Te Kōhanga Reo in the sample. However, sampling for the focus group required minimal consideration as there was only four U5E programme staff.

Table 4.3 Percentage of centre types participating in Under 5 Energize and the proposed number of centres in the interview sample

Centre Type	Percentage of centres by centre type participating in U5E	Proposed number of centres in the sample
Education and Care	30	3
Kindergarten	40	4
Playcentre	10	2
Te Kōhanga Reo	20	4
Total	100	13

*Note.* U5E = Under 5 Energize

### **Subjectivity of the researcher**

Subjectivity is an important part of qualitative research and refers to the “histories, values, assumptions, perspectives, politics and mannerisms” that the researcher brings to the research (Braun & Clarke, 2013, p. 37). It is acknowledged that it influences data collection and interpretation to some extent. Similarly, the participants will come with their own values, assumptions and perspectives. The way that subjectivity is taken into account in qualitative research is by reflexivity which is a process of thoroughly reflecting on the research process, the data and the position of the researcher collecting the data. Personal reflexivity involves reflecting on the researcher’s role while functional reflectivity involves consideration of whether the methods influenced the gathering of the data. Both are recommended to ensure the quality of qualitative research (Braun & Clarke, 2013).

As part of the personal reflexivity for this study, the background of the researcher was outlined. The researcher is a NZ registered dietitian with a background in public health nutrition programme development and evaluation. She is also a mother of two children and has experienced both education and care centres and Playcentre with her own children. Early childhood training within Playcentre was undertaken by the researcher over a three years to the level required for supervision of sessions (voluntary role). The researcher then held a supervisory role for three, 4-hour sessions of 10-15 children per week at Playcentre for two years. This provided the researcher with personal experiences of two ECE care types and of the potential to improve nutrition and physical activity environments for children within childcare. Therefore, she wanted U5E to be successful. This perspective was countered by the researcher knowing that for the programme to be successful, it must meet the needs of participants (centres), an important public health principle. While the researcher had valuable background

knowledge useful for conducting this research, pre-existing knowledge, perspectives and beliefs of the researcher were also potentially influencing the interpretation of the qualitative section of this thesis.

Additionally, the researcher's background training in nutrition may have influenced participants to report what the researcher wanted to hear, for example, inclusion of healthier lunch-box foods, rather than the actual events. However, while some of the participants, the U5E programme staff (n = 5), knew of the researchers' nutrition background, the ECC representatives (n = 13) were unaware of this and were introduced to the researcher as a 'PhD student from Auckland University of Technology', reducing the effect of this as an issue for the majority of the interview participants. Despite this, centre participants may have been wary of making negative responses about the programme even though the participant information sheet stated researcher independence from Sport Waikato, participant confidentiality and requested both positive and negative comments on the engagement process for centres. Participants were also reassured that the data would be aggregated and centre names would not be identified. While these were potential influencers on the research process, steps were put in place by the researcher to reduce their possible effect. Personal reflexivity provided critical insight into the role of the researcher in creating the information collected.

Functional reflexivity was part of the quality control for this qualitative study. It involved reviewing the methods of data collection and whether these affected the data gathered. Interviews were chosen as the method for ECC staff because centres were located across the Waikato region which was an important consideration, and a barrier to running focus groups for centre staff. However, a focus group may have enabled centre staff to compare and discuss experiences in a group away from their busy centre environments. Focus groups held with the four programme staff (Energizers) enabled discussion in a timely way as they met regularly, facilitating scheduling of the focus group. Reflection on this method over individual interviews suggested that interviews may have provided more detailed information from each Energizer about experiences specific to their area. Focus group discussion can limit participation from participants, particularly if there is a dominant respondent and if a participant has a differing perspective (McLafferty, 2004). But the group members were well known to each other with respect for each other's opinions and the responses generally provided a similar view of U5E. An interview with the programme manager was the most appropriate

method for collecting data from this respondent separate from the four programme staff. Reflecting on the choice of data collection methods was helpful to consider if these had influenced the information produced.

### **Positionality statement**

I have a strong belief in public health and the potential to improve people's health by not only focusing on personal health but also on the many other ways health is influenced, in particular, by the environments around us. As part of this, I feel that environments children experience from an early age should be as healthy as they can be: however, I acknowledge that this is often not the case. Education environments where children spend considerable amounts of time in childhood should promote health but current legislation is weak with respect to nutrition and physical activity, and there is little if any review of adherence. Additionally, I have a strong desire for Māori to reach their own health aspirations, having lived my child and teenage years in a rural area of Northland where I observed friends, neighbours and members of the community suffering from poor yet preventable health issues. In the absence of by Māori for Māori programmes, mainstream programmes should be developed in partnership with Māori, reflecting the principles of the Treaty of Waitangi, to deliver strategies to improve Māori health. I wanted to find out from this research if the Energizer model for schools could be modified to influence ECE environments, including Kōhanga Reo, to improve policies and practices that promote nutrition and physical activity.

### **Data collection methods**

#### ***Interviews***

Interviews are the most frequently used qualitative data collection method. They comprise questionnaires or interview guides containing open-ended questions to gain detailed responses about peoples' experiences, perceptions, opinions and feelings (Braun & Clarke, 2013; Patton, 2002). Braun and Clarke (2013) note three main types, structured, semi-structured and unstructured, of which semi-structured is the most common and the type employed in this thesis. While semi-structured interviews have a pre-prepared interview guide, there is scope to let the participant discuss topics of interest, including those that the researcher may not have predicted, and to respond with questions to explore issues more completely (Braun & Clarke, 2013; Patton, 2002). In other words, the researcher needs to be flexible to respond to multiple aspects of the interview process including the participant, interview setting, research question and methodology.

The limitations of this method of data collection are the time-consuming nature of this method both for the researcher and the participants: the face-to-face nature, which precludes anonymity of participants; and that sample sizes are usually small. Interviews take time to organise, conduct and analyse, and participants need to accommodate around one hour of time in order to participate. Lack of anonymity may make interviews less accessible to participants who are difficult to recruit to research and small sample sizes reduce the scope of the study, compared to a survey. However, they can provide “rich and detailed data about individual experiences and perspectives” (Braun & Clarke, 2013, p. 80) in a way that a survey with pre-set, fixed responses options cannot.

The “interview guide” semi-structured interview method was used for data collection from centre staff and the programme manager in this study to make the data gathering more “systematic and comprehensive”, by controlling the topics to be investigated while still allowing unanticipated topics to be incorporated, and to utilise the limited time of an interview in an effective way (Braun & Clarke, 2013; Patton, 2002, p. 343). Probes were added to questions for further depth of responses (Patton, 2002). An example of use of probes was in the question “how useful was each stage of the engagement process?”, the probes for this question included, how useful was the signing of the MoU, what did completing the ‘stocktake’ stage add to your understanding and adoption of U5E? In this particular question the probes were also used alongside a simple diagram of the engagement process (Figure 4.1). As the engagement process was made up of five stages, probes enabled more detail to be collected on each of the stages if the detail was not volunteered by the participant.

### ***Focus groups***

Focus groups have been described as ‘group interviews’ that take advantage of the discussion and interactions between participants and can encourage more detailed exploration of issues by participants, in comparison with individual interviews (Kitzinger, 1995). Patton (2002, p. 386) described the aim of a focus group was to obtain “high quality data in a social situation where people can consider their own views in the context of the views of others”. Despite these clear definitions, there is considerable variability in arrangement, delivery and content of focus groups (McLafferty, 2004).

Use of focus groups to investigate individual's experiences of health programmes is common especially where there is variable use of health services by some population groups (Kitzinger, 1995). Focus groups in this research were used to collect, from the Energizer's perspective, the opinions, attitudes and experiences of the engagement process of early childhood centres in the Under 5 Energize health service. Additionally, and of use in this study, is the positive evidence supporting the use of focus groups with different ethnic groups, although not all the Energizer staff in the focus group were of one ethnic group (McLafferty, 2004).

Focus groups collect discussed responses to a topic in a 'relatively unstructured' way, however a guide is usually employed, not to control the discussion, but to ensure all topics are covered (Braun & Clarke, 2013, p. 108) (McLafferty, 2004). Rather than the organiser of the group taking the role as the 'facilitator', some researchers prefer to describe their role as a 'moderator' of the discussion (Braun & Clarke, 2013; Patton, 2002) or taking a 'back seat at first' while the participants take the discussion in their own directions (Kitzinger, 1995, p. 301). McLafferty (2004) states that this does depend on the group dynamics, where a moderator may have to be more involved if participants avoid engaging as a group. The desired balance has been described as "low control and high process" (McLafferty, 2004). Later in the group discussion, Kitzinger (1995) recommends that the facilitator initiates more of a leadership role extending the discussion to examine any differences arising earlier in the discussion, encouraging more in-depth discussion and therefore promoting participants to critique their own experiences and ensuring all relevant topics are covered (McLafferty, 2004). Good relationships between participants and an effectively moderated group result in fuller data collection (McLafferty, 2004).

Focus groups work well with participants of a similar background; however, this has advantages and disadvantages and is not a view shared by all commentators. In this study, the focus group included all four of the Under 5 Energizers as the identified sample, who were well known to each other and to the researcher. Particular thought and skill on the part of the researcher was required to mitigate issues to do with the 'insider researcher' factors including reminders to participants at the start of the focus group that although they might assume the researcher would know the detail of the topic, for example U5E programme progression after attending regular team meetings, for the purposes of the recording, those details should be included. Also, the researcher needed to ensure all participants had opportunities to contribute, rather than one or two

exerting dominance over others (McLafferty, 2004). Kitzinger (1995, p. 300) states that when participants know each other, this may promote colleagues to “challenge each other on contradictions” between their beliefs and actions, adding to the breadth of the information gathered. McLafferty (2004) also supports the idea of including participants in focus groups that having pre-existing relationships because of previous evidence supporting augmented data collection. This view is not shared by Patton (2002, p. 387) who advocates participants ideally should be unknown to each other although ‘share similar backgrounds’. This research took advantage of the former view to create a relaxed research environment because participants knew each other. This was conducive to fluent group discussion including questioning each other; however, care was taken to ensure all participants had a chance to share views by intervening at appropriate times to ask for more opinions or directing probes to a specific person if they had not had a chance to contribute on a particular topic area.

Focus groups are very useful for collecting new information, they provide freedom to collect unplanned data and can empower participants (Braun & Clarke, 2013). Yet they are disadvantaged by being difficult to control, can lack depth and are time consuming.

### **Validity**

Validity determines if the study results find what they set out to find. Creswell (2014, p. 201) describes it as examining “the accuracy of the findings” using certain techniques. Researchers describe different types of qualitative validity. Sandelowski (2000) refers to two types, descriptive and interpretive, while Braun and Clarke (2013) discuss four key types: construct, internal, external and ecological. “Multiple approaches” to validity are recommended by Creswell (2014, p. 201) and are considered within the qualitative section of this thesis. Each type will be defined and an example provided of how this study reflected each type.

#### ***Descriptive validity***

Sandelowski (2000) explains descriptive validity as the accurate summary of an event or the correct order of activities that would be reported similarly by both the participants and the researcher. In this study, the interviews were audio-recorded and transcribed verbatim. From this accurate account of responses, codes were assigned to ensure all responses were considered in the way that they were recorded. Respondents who requested to review the recordings were sent verbatim transcripts to check accuracy and to provide any additional thoughts.

### ***Interpretive validity***

Interpretive validity is similar to descriptive validity in that it checks that both the participants and the researcher would have the same account, however, it refers to the actual “meanings” that interviewees gave to the described event or activity in the data (Sandelowski, 2000, p. 336). During this research, meanings were checked by the researcher several times by reading and rereading at different times while becoming familiar with the data as a whole and subsequently coding. During theme development, discussions were held with one of the research supervisors to check coding and themes from the data using the researcher’s notes and coding. This was done twice for each set of interviews.

### ***Construct validity***

Construct validity is about whether a method of collecting data actually measures what it was set up to measure and if data from this method can be generalised to a wider concept (Braun & Clarke, 2013). Responses from the initial interviews were checked against the research questions to determine if the responses were answering the research questions and were found to be achieving the aims of this body of work.

### ***Internal validity***

This type of validity refers to whether the responses gathered are linked to the relevant variable being investigated, (in this thesis it was the U5E programme), and not due to something else which is thus confounding the results (Braun & Clarke, 2013). The participant information sheet (Appendix A: Ethics approval and approved forms) and the researcher clarified for participants at the beginning of the focus group and interviews that the research was aiming to examine the effect of U5E service on ECCs. When potentially unrelated issues surfaced, interviewees were asked to clarify these further and these were not pursued if divergence was established. With related issues, it was difficult, for example, to extricate obesity and its link to nutrition and physical activity, a focus in the media at various times during U5E delivery, for example, in 2015 the government released the Childhood Obesity Plan (Ministry of Health, 2015a) which was when the interviews were held. However, the researcher referred participants to the topic of research, the U5E programme, regularly in the questions during the interviews and focus groups and childhood obesity has surfaced in the media at various times in the past five years therefore was not entirely new at the time of the interviews.

### ***External validity***

External validity is similar to the generalisability aspect of construct validity but broader; this type of validity refers to the generalisability of the findings of a study from a small sample to the wider population (Braun & Clarke, 2013). The diverse nature of the ECC setting makes generalisability difficult. The decision to include a variety of centre types in the sample was cognisant of increasing the external validity of the study.

### ***Ecological validity***

Ecological validity refers to how representative the data is of the 'real world' and is most often used in qualitative research. Braun and Clarke (2013) consider that this type of validity has the most meaning for qualitative research as data are usually collected in everyday situations, but some refute this, stating that being interviewed does not constitute a normal situation. U5E was a 'real life' health service delivered by Sport Waikato and this study interviewed participants in their environment, for example, in their centres and place of work. They were asked to provide responses to their experiences of U5E, both positive and negative. Focus groups have high ecological validity as a data collection method because they encourage participants to discuss their lived experiences (Braun & Clarke, 2013).

### ***Triangulation***

This study used triangulation of data and methods as quality control methods and to improve the reliability of the results (Fusch & Ness, 2015). It was achieved by collecting responses to similar questions from three different types of groups, called data triangulation, involved in U5E, namely ECC staff, U5E programme staff and the U5E manager. Triangulation of methods was also employed in this study to collate findings from different methods (interviews and focus groups). This aimed to not only validate the themes from the responses but contribute to data saturation (Fusch & Ness, 2015).

### ***Trustworthiness***

This study was designed to ensure that the methods used to collect and analyse the data produced the best quality information possible within the constraints of having one researcher and limited time and funding. Five criteria, useful in determining whether a study has the necessary rigour, have been described, although not all are relevant to every study; credibility, dependability, confirmability, authenticity and transferability (Guba and Lincoln, as cited in Connelly, 2016). This study employed credibility and

authenticity. Credibility was achieved by following established procedures for the chosen method of qualitative research, qualitative description as outlined by Braun and Clarke (2013), (Sandelowski, 2010) and McLafferty (2004). Additionally, use of recommended strategies to facilitate trustworthiness; sustained engagement with participants (14 interviews and one focus group at each time point), member checking, and peer debriefing (discussion and presentation of themes to health professional groups, the U5E team and research supervisors) (Connelly, 2016). Careful selection of the target group and a comprehensive description of the data aimed to obtain authentic results (Connelly, 2016).

#### **4.2.4 Quantitative approach**

This body of work follows a repeated measure survey design (Creswell, 2014) and the outcome measures were for the early childhood centres (n=121) not the individual children. This design was chosen to investigate change over time (three years), minimise respondent burden and align with Sport Waikato's contracted evaluation plan. This has been described as a weak design but it does deliver an indication of change and is commonly employed to pilot interventions (Bauman & Nutbeam, 2014). A controlled trial design, although applicable for measuring the efficacy of an intervention over time and U5E was being delivered for the first time, did not suit the research question of this thesis due to the high potential for cross-contamination (Bauman & Nutbeam, 2014) in the education setting from teachers relocating often and sharing of information between centres within an ECE organisation, for example, within the kindergarten association. Choice of a control group external to the Waikato or a cluster randomised control trial could have been considered, however this may have sourced an ethnically dissimilar population and been costly and more problematic to administer. Furthermore, there was no funding allocation to provide the programme to the control group after the intervention as was the case for Project Energize (Graham et al., 2008) and other research trials (Bélanger et al., 2016). This may have negatively affecting recruitment of ECCs and ethical approval particularly as young children were the recipients of the intervention. A cross-sectional design was not considered for this thesis as the aim was to determine if there was change over time in ECC environments as a result of U5E involvement, rather than at one point in time.

#### **Questionnaire administration accuracy**

The questionnaires, sourced from Project Energize (minor changes were made to reflect the early childhood setting, for example, addition of administrative questions about type

of centre and fulltime or sessional care), were piloted (changes and additions were made, for example, addition of a question about types of electronic devices and screens used) administered by the Energizers and entered into a Microsoft Excel™ (2010) database. Data cleaning of the Microsoft Excel™ (2010) database was conducted by the researcher to ensure the data were correctly entered and were feasible before transfer to IBM SPSS statistics version 23 (IBM, www.IBM.com) for analysis.

### **Type of statistics**

Quantitative measurement in this thesis employed the calculation of proportions, percentages and comparisons using the Chi squared statistic and paired t tests. Basic calculation of proportions and percentages of ethnicity, equity index and centre type were compared with Ministry of Education statistics (regional and national) to assess the reach of RE-AIM (participation and representativeness of U5E centres) (Chapter 5) (Glasgow et al., 1999). These simple statistics were also used to represent the actions within ECC action plans are in Chapter 6 (Implementation and Effectiveness of U5E) and to summarise parent awareness, understanding and use of the U5E programme and messages in Chapter 7 (Perspectives on Effectiveness and Maintenance). Additional questions introduced to the repeated survey at follow up on transience, attendance at nutrition and physical activity training and the changes made since attending the training are also presented using proportions and percentages. Repeated survey questions for the food and beverage consumption frequency (16 foods and beverages) of 87 centres (reduced number of centres compared to the original sample due to time constraints to complete this thesis) used paired t-tests (two-tailed) to determine differences between the two time periods as a measure of programme implementation and effectiveness (Chapter 6.1). Change in the proportions of centres with unwritten and written physical activity and nutrition policy categories used a chi-squared test to determine if there was a difference between baseline and follow-up surveys. Effect size and statistical significance where applicable were examined by 95% confidence intervals and p values with statistical significance set at 5%.

### **4.3 Ethical approval**

Ethical approval to involve the Under 5 Energize staff and early childhood centre staff(lead teacher or kaiako for the U5E programme) at two time points and parents at U5E centres was obtained from the Auckland University of Technology Ethics Committee (AUTEK) (AUTEK 15/17 – Appendix A: Ethics approval and approved

forms). A subsequent addition to the ethical approval was sought to interview the U5E programme manager.

Access to the U5E staff and data from the U5E database was obtained via email from the programme manager of the U5E programme at Sport Waikato. Documents approved included the consent forms (3), participant information sheets (3), interview schedules (2) and the parent survey questionnaire (1). Consent forms and audio files (on an external disk) were stored in a locked cabinet at AUT South Campus.

#### **4.4 Consultation with Māori**

This section outlines both the planned and actual consultation with Māori undertaken for this study. It was necessary for the consultation for this study to align with the connections U5E had established with Māori during programme design.

##### **4.4.1 Process of engagement with Te Kōhanga Reo and Punanga Reo**

Sport Waikato has a mandate in their strategic plan to “proactively engage and support the aspirations of all Māori and iwi” (Sport Waikato, 2013b). This is supported by strategies for both the Energize and U5E programmes to ensure that inequity and inequality are addressed. Strategies include sub-contracting with Māori and Pacific providers; placing extra resource in schools that have high Māori and Pacific populations; including families/whānau and the wider community in the programme; and the collaborative nature of the programme. As obesity prevalence rates among children increase with disproportionate effects on Māori and Pacific children and children from areas of high need, finding ways to make healthy eating and physical activity participation messages more effective is increasingly important and relevant.

For this research design to collect data in a way that was respectful and ethical (Hudson, Milne, Reynolds, Russell, & Smith, 2010), establishing and sustaining consultation with Tainui iwi and the Te Kōhanga Reo National Trust Tainui Rohe (Regional Office) was necessary. The early childhood centres selected for the U5E programme contained a high proportion (n = 23) of Kōhanga Reo and a high enrolled population of Māori children (36%) compared to the national figures (Figure 5.2)(MoE, 2014c).

The overall aim of understanding how Kōhanga Reo in particular became engaged with U5E was to inform and strengthen the inclusion of Māori views and values into policy making decisions for the U5E. The engagement undertaken with Te Kōhanga Reo for this body of work needed to take into consideration the consultation with Māori

undertaken by U5E during programme development and delivery. Table 4.4 outlines the planned and actual engagement with Te Kōhanga Reo before, during and after the study.

Table 4.4 Planned and actual steps taken to ensure study meets Māori ethical framework

Stage	Consultation Planned	Actual
1	Initiate, engage and maintain regular consultation with a small reference group including the Kaiwhakahaere o Waikato from Sport Waikato, Māori health representative from the Waikato DHB and two independent Māori researchers using existing networks.	Regular consultation with the Kaiwhakahaere o Waikato from Sport Waikato and an independent Māori researcher (representatives from the Waikato DHB and an independent Māori researcher were unavailable due to heavy workloads).
2	<p>Consultation with Te Kōhanga Reo National Trust Tainui Rohe (Regional Office) together with the Under 5 Energize manager, the Kaiwhakahaere o Waikato and independent Māori research officer (who will be assisting some of the interviews with Te Kōhanga Reo) to</p> <ul style="list-style-type: none"> <li>• introduce researcher and research topic</li> <li>• consult on the proposed methods</li> <li>• provide information on how the research will be relevant and benefit participants</li> <li>• request that this research be added to the existing relationship and agreement Sport Waikato has to engage and deliver the Under 5 Energize project to Kōhanga Reo</li> <li>• request direction on how to proceed with the engagement of individual Kōhanga Reo (if agreement was obtained) and whether approval from the Kōhanga Reo National Trust head office was required</li> <li>• assess need for a letter of introduction from the Te Kōhanga Reo National Trust Tainui Rohe (Regional Office) to be used during engagement with individual Te Kōhanga Reo and translation of documents or translator</li> </ul>	<p>This meeting was not able to be scheduled due to unavailability of the Te Kōhanga Reo National Trust (Tainui) representatives.</p> <p>Advice on how to proceed was done in consultation with the Kaiwhakahaere o Waikato from Sport Waikato, U5E manager and the Energizers.</p>
3	Consultation with the Under 5 Energizers who had an established working relationship with the individual Kōhanga Reo to arrange introductions and ensure protocols were followed.	Energizers delivered Participant Information sheet to individual Kōhanga. Regular consultation with the Under 5 Energizers (includes 2 Māori Energizers) to support contact and introductions with Te Kōhanga Reo.

<b>Stage</b>	<b>Consultation Planned</b>	<b>Actual</b>
4	Undertake interviews with Te Kōhanga Reo or Punanga Reo with support from the Māori research officer.	Interviews undertaken with kaiako from Te Kōhanga Reo with support from the Māori research officer. Discuss and confirm main responses from participants after each interview with the Māori research officer.
5	Other consultation as advised.	Preparation and use of mihi for introduction of researcher to Te Kōhanga Reo in culturally appropriate way.
6	Communicate and disseminate results in a way that takes ethical principles into account and is aligned with Sport Waikato dissemination processes.	Research report prepared and sent to individual Te Kōhanga Reo interviewed for the research. Formal report prepared for the Te Kōhanga Reo National Trust Tainui Rohe (Regional Office) to be presented at a time to suit, together with the U5E manager and Kaiwhakahaere o Waikato from Sport Waikato (or emailed).

*Note.* DHB = District Health Board; U5E = Under 5 Energize

## **4.5 Summary of study design and research methods**

This study used a mixed methods study design within the RE-AIM framework to determine the influence of U5E on ECC food and physical activity environments. This thesis has three distinct stages: Reach and adoption, implementation, and effectiveness and maintenance. The quantitative approach used a repeated measurement survey and simple counting and comparisons of proportions. The qualitative phases employed a qualitative descriptive method to interpret data collected by semi-structured interviews and focus groups. Detailed methods, results and discussion are presented in the following three chapters: Reach and Adoption (Chapter 5), Implementation and Effectiveness (Chapter 6), and Perspectives on the Effectiveness and Maintenance of Under 5 Energize (Chapter 7).

## **Chapter 5. Reach and adoption in Under 5 Energize**

This chapter focuses on the measurement of the reach and engagement of the U5E programme, the first stage and one dimension of this systematic investigation of public health impact of the U5E programme. How the qualitative and quantitative data were collected and analysed is presented followed by discussion and interpretation of what was found.

The reach and adoption dimensions of the RE-AIM criteria in this research describe the participation of the centres in the intervention, and the representativeness of the centres as proportions of the regional and national population of centres. According to Glasgow et al. (1999), adoption operates at a system or setting level and investigates the proportions and representativeness of organisations that adopt the intervention. Reach and adoption were measured by comparing the numbers of centres participating in the intervention with the number of centres targeted, and how characteristic the sample population was of the target and priority populations. The target population for U5E was children of preschool age with a priority for Māori, Pacific and economically disadvantaged children as outlined by the Ministry of Health in the contract Request For Proposal ([MoH], 2012c). In addition to the quantitative assessment of reach, qualitative techniques were employed to understand why centres agreed to participate in the programme, especially considering the recruitment of centres into U5E exceeded programme management estimations. The broad aim was to determine if U5E was equitably reaching high need centres while the qualitative part of this investigation was to understand why early childhood centres signed up to U5E. This understanding was queried from the perspective of the Energize programme staff and the early childhood centre educators/kaiako including Te Kōhanga Reo. Additionally, the success factors and barriers to engagement in U5E were explored. Firstly, the quantitative measures of the reach of the U5E programme will be presented, followed by the qualitative insights and then the synthesis and implications of this new knowledge concerning implementation of the U5E programme are discussed.

## **5.1 Participation and representativeness of the participating centres**

### **5.1.1 Comparison with Ministry of Education statistics**

#### **Sample**

The areas where U5E was delivered were selected based on percentages of Māori and Pacific populations, social deprivation, and for two areas existing partnerships with Māori and Pacific providers for Project Energize (Thames-Hauraki and South Waikato) which were logically extended to include Under 5 Energize. Funding restrictions limited the scope of the project to four clusters where it was calculated that one locally-resident Energizer could service approximately 30 centres. The four clusters were Thames-Hauraki [Waihi, Paeroa, Thames and Ngatea], North Waikato [Huntly, Ngaruawahia and Raglan], Hamilton [Hamilton and Cambridge] and South Waikato [Tokoroa and Putaruru].

#### **Participation**

##### ***Number of ECCs and enrolled children in U5E***

Ninety-two percent of the early childhood centres (n = 121 of the 132 centres), identified in the Ministry of Health's contracted outputs and budgeted to be serviced by four staff (30 centres/staff member), agreed to participate in the programme by signing the Memorandum of Understanding (MoU) (Figure 4.1). Each identified geographical cluster contained between 30 and 34 centres but this was reduced in the actual sample because of the following exclusion criteria:

- home-based childcare network
- hospital-based services
- casual education and care
- centres located more than approximately an hour's car journey from the major town in the cluster area where the Energizer would live and use as a base (the towns were Tokoroa, Huntly, Waihi and Hamilton)
- centres with very small numbers of enrolled children (< 5 children) (these were mainly parent-led centres with low sustainability if families left the centre)
- Hamilton cluster only - all types of centres were excluded apart from Waikato Kindergarten Association kindergartens (due to a partnership with the association).

The denominator used for the calculation of reach in each of the four clusters was the total number of centres meeting inclusion criteria applied by Sport Waikato. In three of

the four clusters (Thames-Hauraki, North Waikato and South Waikato), the number of centres was selected from the four main types of centres within the cluster area. The four main types included were Kōhanga Reo, Playcentre, kindergarten, and education and care centres.

Compared to the total number of centres and the roll of centres in the Waikato region, U5E was signed up to by just under a third of the centres and enrolled children in Waikato ECCs (Table 5.1).

Table 5.1 Number of early childhood centres and enrolled children in Under 5 Energize identified and actual sample by area and as a percentage of total numbers in the Waikato in 2013

	Identified sample		Actual sample	
	Number of centres	Roll	Number of centres	Roll
Thames-Hauraki	30	981	30	1110
North Waikato	32	1019	29	915
South Waikato	32	1093	28	886
Hamilton	34	1865	34	1927
Total Under 5 Energize	132	4958	121	4838
<sup>a</sup> Total in Waikato region	425	16601		
Under 5 Energize as a percentage of Waikato	31%	30%	28%	29%

<sup>a</sup>Data sourced from the Ministry of Education Early Childhood Education database <http://www.educationcounts.govt.nz/statistics>

### Number of educators, families and children in U5E

There were 779 educators working within the 120 centres in U5E when the programme began in 2013. The educators within Playcentre (124 parent educators at 11 Playcentres) were mainly unpaid voluntary roles. This is in contrast to the other educators who had paid positions, however it is unknown whether these were full or part-time roles. The majority of educators were female (93%). The number of educators rose to 842 educators by December 2015 with, in 2013, most centres employing between three and six educators (Figure 5.1). The mean number of teachers per centre was six and the median was three.

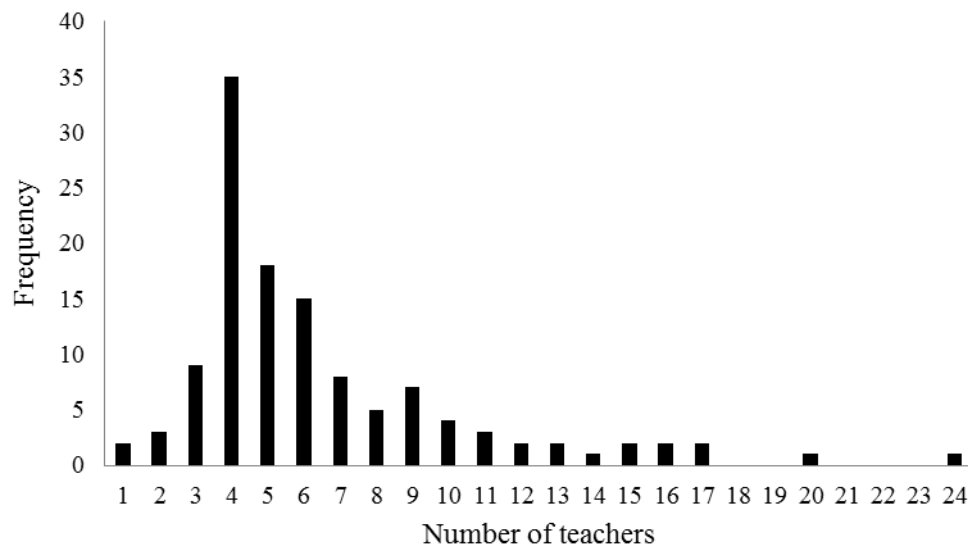


Figure 5.1. Frequency of the number of teachers in each early childhood centre in Under 5 Energize

The mean number of children at participating centres was 41 (median 44) with a range of 5 to 92. Almost two-thirds of centres had a roll size of 49 or below and there were 70 or more children in 13% of centres.

Table 5.2 Number and percentage of centre roll size

Centre roll size	n	Percentage
1–29	43	36
30–49	34	28
50–69	28	23
>70	15	13
Total	120	100

The total number of families was 3212 in 96 of the 120 centres, seven centres did not respond to this question and 17 centres were not asked this question as an earlier version of the stocktake questionnaire, used at the beginning of data collection, did not contain this question. The total increased to 4870 families in 121 centres by December 2015. The number of children enrolled in U5E centres was 4838 at baseline and had risen 7% to 5186 by December 2015 with the majority of children (80%) between 3 and 5 years old.

### Number and characteristics of non-participating centres

Only 12 out of 132 centres declined to be involved in U5E (Table 5.3). These centres were spread evenly between the centre types and Equity Index but not cluster. More

centres declined in the North Waikato cluster (n = 8) compared to the other two clusters (n = 3 and n = 1). Non-participating centres had a slightly higher percentage of Māori children (44%) when compared to participating centres (38%). Time constraints, workload or other priorities such as an Education Review Office (ERO) visit were the reasons for non-participation. Three identified centres, although listed on the Ministry of Education national Early Childhood Centre database where the identified centres were sourced, could not be contacted and were presumed closed. Seven centres declined to be involved at the initial visit and another one signed up and then declined after a change in centre management. One centre was identified in the original sample then not approached as programme management deemed the travel distance for the Energizer exceeded guidelines (> one hour).

Table 5.3 Early childhood centres that declined to be involved in Under 5 Energize by type of centre, Equity Index and reasons

<b>Geographical cluster</b>	<b>Type of centre</b>	<b><sup>a</sup>Equity Index</b>	<b>Reason</b>
1 North Waikato	Education & Care	4	Declined to be involved
2 North Waikato	Education & Care	1	Initially signed up then following a change of management declined to be involved
3 North Waikato	Kindergarten	5	Declined to be involved
4 South Waikato	Kindergarten	5	Declined to be involved
5 South Waikato	Kindergarten	3	Declined to be involved
6 South Waikato	Te Kōhanga Reo	1	Declined to be involved
7 Thames-Hauraki	Playcentre	5	Declined to be involved
8 North Waikato	Playcentre	3	Not approached due to travel distance
9 North Waikato	Playcentre	Unknown	ECC closed
10 North Waikato	Te Kōhanga Reo	Unknown	Declined to be involved
11 North Waikato	Education & Care	Unknown	ECC closed
12 North Waikato	Playcentre	Unknown	ECC closed

*Note.* ECC = early childhood centre

<sup>a</sup>Equity Index 1 is the most deprived, 5 and 5+ are the least deprived.

### **Ethnicity**

The ethnicity identified by the parent at enrolment, of children in participating centres in U5E was 49% European, 38% Māori, 5% Pacific and 8% other (all other ethnic groups) (Figure 5.2). There were more (~16%) Māori children in centres who were part of U5E compared to the distribution of children in the non-U5E centres in the Waikato region and 8% more than the national distribution.

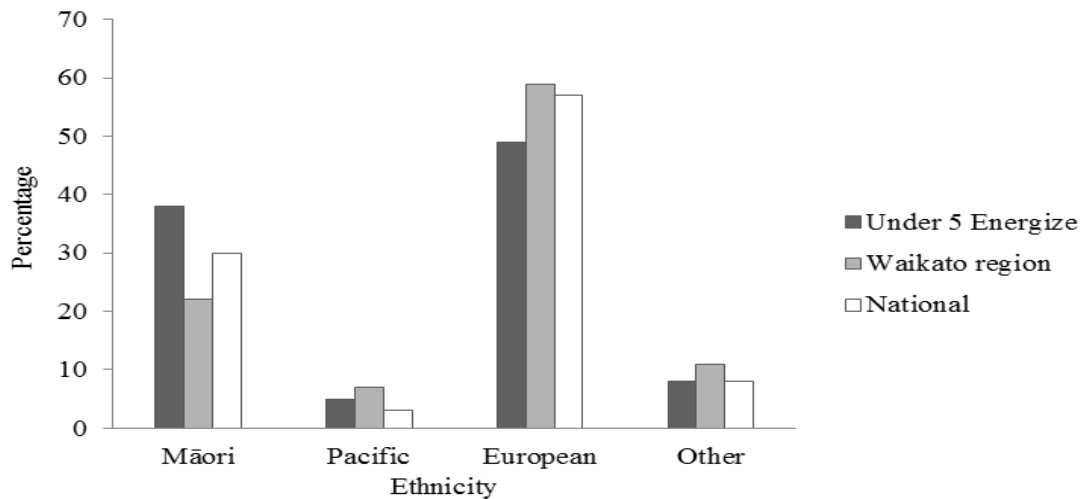


Figure 5.2. Comparison of the percentage of enrolments by ethnicity in Under 5 Energize centres with Waikato region and national enrolments  
 Data sourced from the Ministry of Education Annual ECE Census: Report 2013  
<http://www.educationcounts.govt.nz/statistics>

### Type of centre and sessions offered for children

There were approximately 20% more Te Kōhanga Reo and kindergartens in the U5E sample compared to nationally distributed service types (Figure 5.3). Greater numbers of Te Kōhanga Reo in the sample was due to the purposeful selection of geographical areas to include this centre type. The higher proportion of kindergartens recruited compared to the Waikato region and nationally was due to the partnership agreement with WKA.

Four types of sessions were available for children at centres. These include sessional (n = 24, 20%), school day (n = 32, 27%), full-time care (n = 45, 37%) and some centres offered a combination of both sessional and school day options (n = 19, 16%). Short sessions of care were offered by only one-fifth of the centres with the majority of centres offering care for longer hours indicating the predominance of education and care centres in the ECE sector.

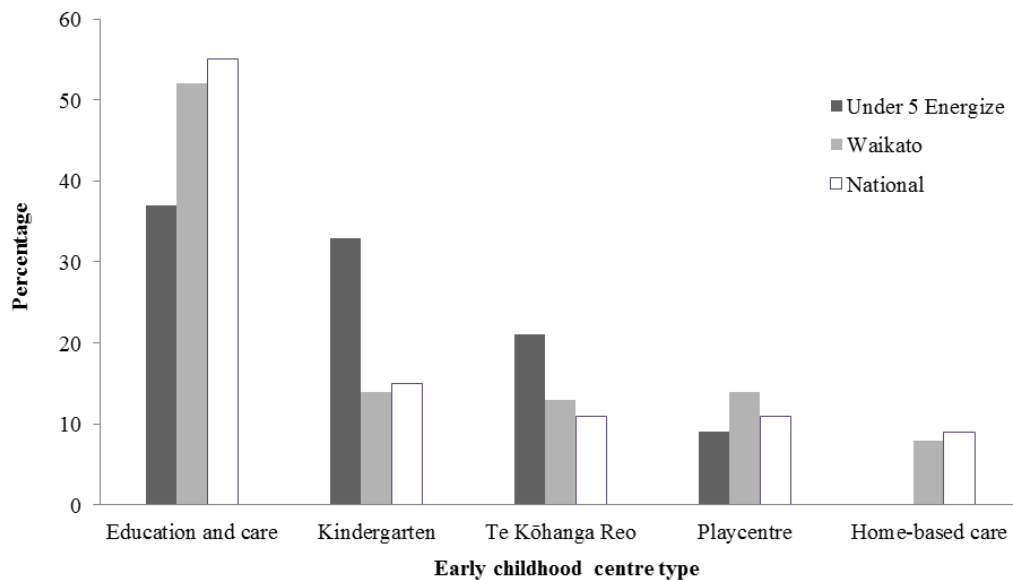


Figure 5.3. Comparison of the percentage of enrolments by early childhood centre type in Under 5 Energize with Waikato region and national enrolments  
 Data sourced from the Ministry of Education Annual ECE Census: Report 2013  
<http://www.educationcounts.govt.nz/statistics>

### Equity Index

The Equity Index measures the extent to which an early childhood service roll is comprised of children from low socio-economic communities. The Ministry of Education assesses the Equity Index of a centre from the child’s home address and information from the most recent population census. An Equity Index of 1 indicates a centre from a socioeconomically deprived community while Equity Index 5 is the least deprived. Equity Index is used to determine eligibility for equity funding which is a government initiative to reduce educational barriers for disadvantaged groups or socioeconomic areas. The Equity Index data used in this study were derived from the 2011 population census. Centres are required to apply to the Ministry of Education for an EQI and consequently some centres had either failed to apply or were new and yet to apply.

U5E reached more centres with a lower Equity Index compared to national and Waikato numbers of centres (Figure 5.4). This was shown by a lower percentage of centres with Equity Index 5 and a higher percentage of centres with Equity Index 3 and 4; however, the percentage of Equity Index 1 and 2 were similar in U5E, Waikato and national samples.

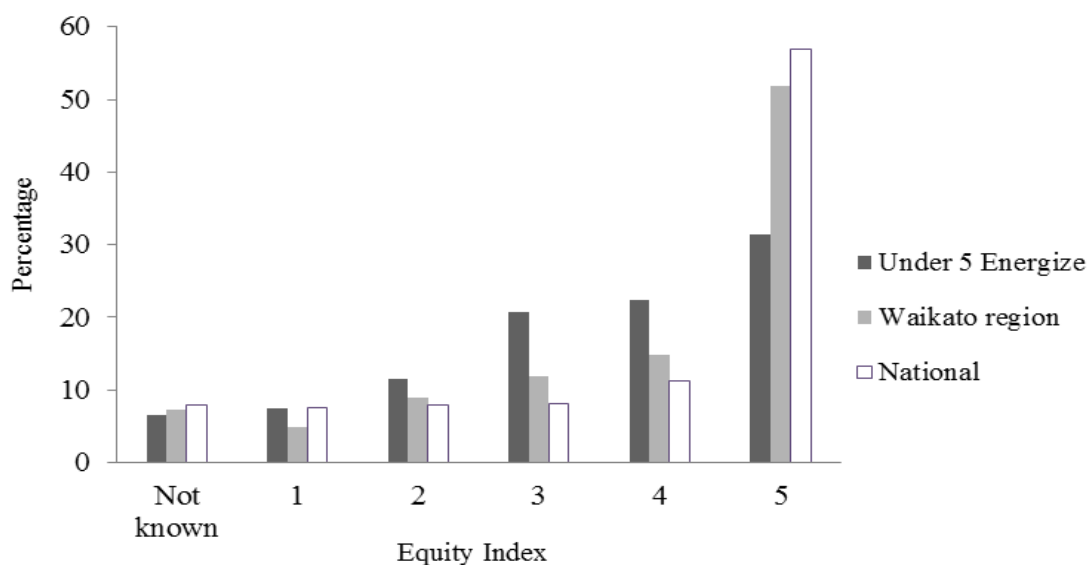


Figure 5.4. Comparison of the percentage distribution of the Equity Index of early childhood centres in Under 5 Energize with Waikato region and national percentage distribution  
 Data sourced from the Ministry of Education Annual ECE Census: Report 2013  
<http://www.educationcounts.govt.nz/statistics>  
 Equity Index 1 is the most deprived, 5 and 5+ are the least deprived

### Private and community funded ECCs

The ECCs participating in U5E were 77% (n = 92) community funded and 23% (n = 28) privately funded. U5E has a higher percentage of community funded centres compared to both the Waikato region (60%, n = 281) and national (54%, n = 2446) data.

### Representativeness

The representativeness of the participating centres was assessed in two ways. The first was a comparison of the number of centres and children participating in U5E with the number of centres invited to participate and numbers in the Waikato region. A range of U5E centre characteristics was compared to the Waikato region and national characteristics reported by the Ministry of Education in 2014. Characteristics of interest were:

- number of centres
- four main ECC types
- ethnicity of the enrolled children
- Equity Index of the centre
- authority of the centre (community or privately owned).

The Ministry of Health's contracted programme objectives (to target areas of high need and education service types - Te Kōhanga Reo) were used as criteria to measure representativeness of the sample. The characteristics of the centres that declined to participate in U5E were also recorded by:

- centre type
- Equity Index
- reason for declining participation.

### **5.1.2 Geographical mapping of U5E centres**

The second method of assessing the representativeness of the participating centres used geographical mapping of the participating centres by deprivation, ethnicity and resident population. An Excel spreadsheet of the name of the ECCs, their latitude and longitude, total roll, and number of children by ethnic group (Māori, European, Pasifika, Asian, Other) was provided to Janet Pearson, statistician, Auckland University of Technology. The ethnicity data were checked for consistency against the total roll, and corrections were made as appropriate. Geographic Information Software (GIS) was used to create two base maps of the Waikato area. The first used the following layers: road networks; NZ Deprivation 2013 (NZDep2013 uses nine variables to calculate a socioeconomic deprivation score of between 1 and 10, with 1 being the least deprived and 10 being the most deprived), by mesh block; rivers and lakes; and also urban centres, for easy reference (Figure 5.5). ECC information was imported into the GIS, and pie charts of ethnicity for each ECC were overlaid onto the map according to the ECC's latitude and longitude, with the size of each pie chart relative to the total roll for that ECC. The second map was based on the 2013 Census Usually Resident Population and the areas of the mesh block to which the location of each ECC in U5E was added (Figure 5.6).

These maps (Figure 5.5 and Figure 5.6) demonstrate that the location of U5E centres in three of the four clusters (Hamilton cluster excluded because it is less deprived and travel distances are shorter) is predominantly in areas that are deprived, geographically isolated and have a high proportion (more than a third) of Māori. Overall, U5E shows high reach of the targeted population specified in the Ministry of Health contract.

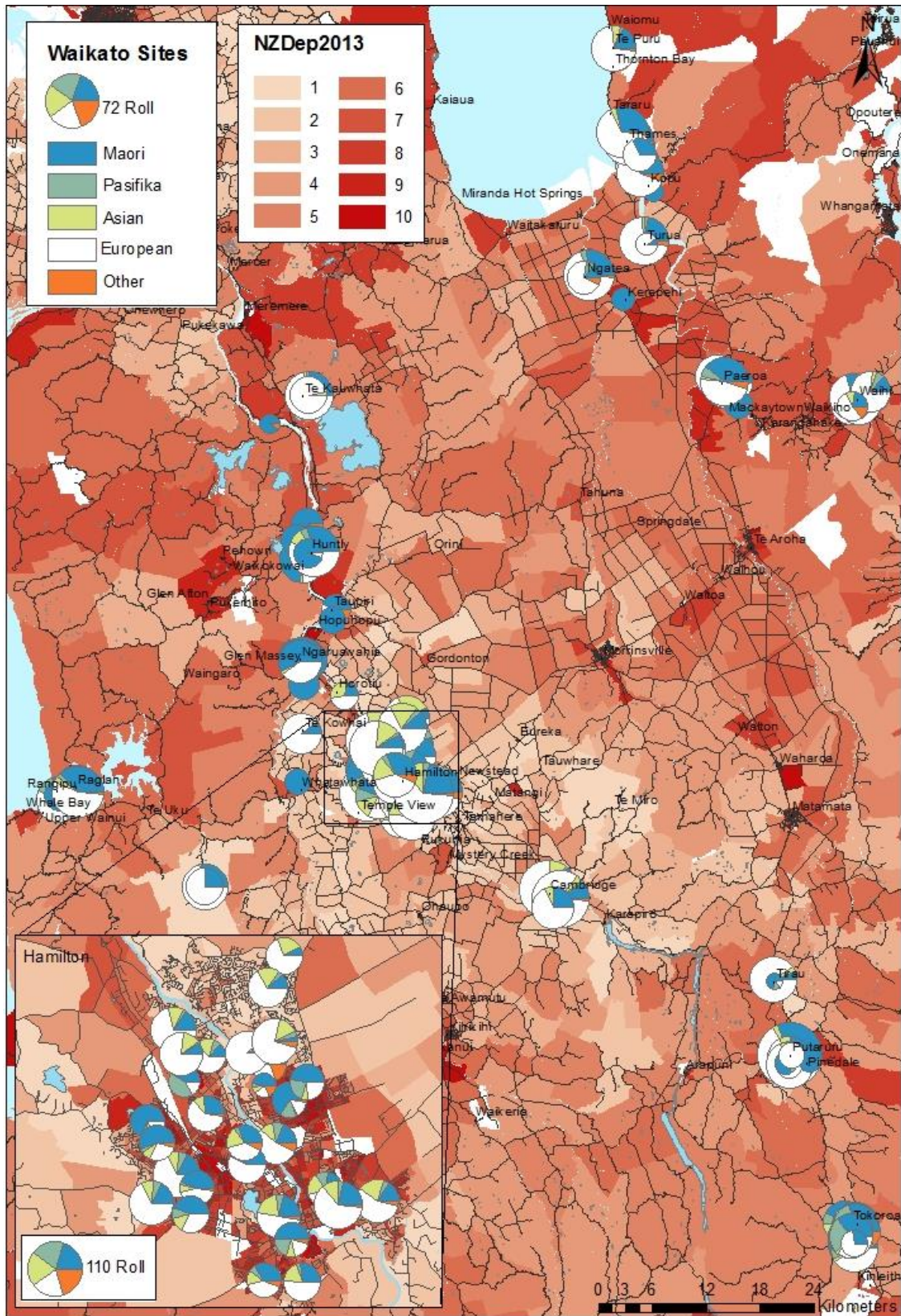


Figure 5.5. The location, ethnicity and social deprivation of early childhood centres participating in Under 5 Energize

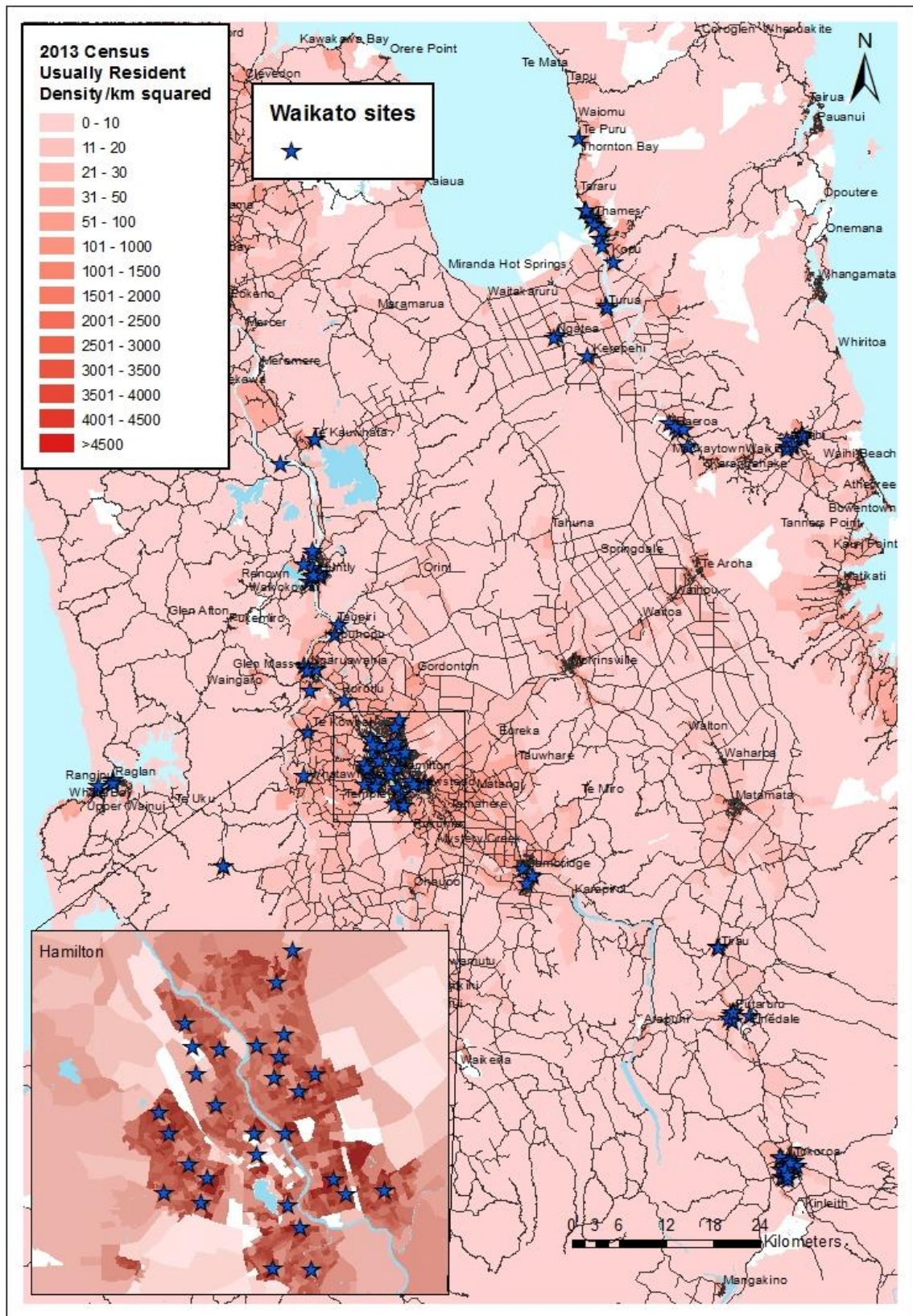


Figure 5.6. Density of people per square kilometre and the location of Under 5 Energize early childhood centre sites  
 km = kilometres

## **5.2 Time taken to engage centres in Under 5 Energize**

To further understand the reach of U5E and to inform possible future replication of the programme the rate at which centres progressed through the five-stage engagement process was of interest. This was measured by calculation of the time taken for participating centres to transition through the five-stage engagement process. The engagement process is described schematically in Figure 4.1 as unidirectional transitions between five stages. The Energizers recorded the dates each stage was achieved in the U5E database. The number of centres at each stage of engagement by date was determined to show the progression of engagement with the programme over time (Figure 4.1). The number of days between each stage was totalled to assess the time to complete each stage and the overall time to progress through the engagement process. The mean, median and standard deviations of the number of days between stages were determined overall and by the four main types of centres.

Between July 2013 (programme initiation phase) and December 2014, the first four stages of engagement (initial visit, MoU, stock take and needs analysis) were progressively achieved in 92% of the original target of 132 preschools and 100% of the 121 participating centres (Figure 5.7). The final stage of engagement (action plan, agreed for a six-month period) was in place in 98% of centres by November 2015. Centres who signed up in the early stages of programme dissemination (July 2013-July 2014) progressed to the adoption and implementation phase (revised action plan or second six-month action plan). By November, 2015 92% of the 121 participating centres had signed their revised action plan (second six-month action plan) and 69% had progressed to a revised action plan 1 (third action plan, agreed for one year).

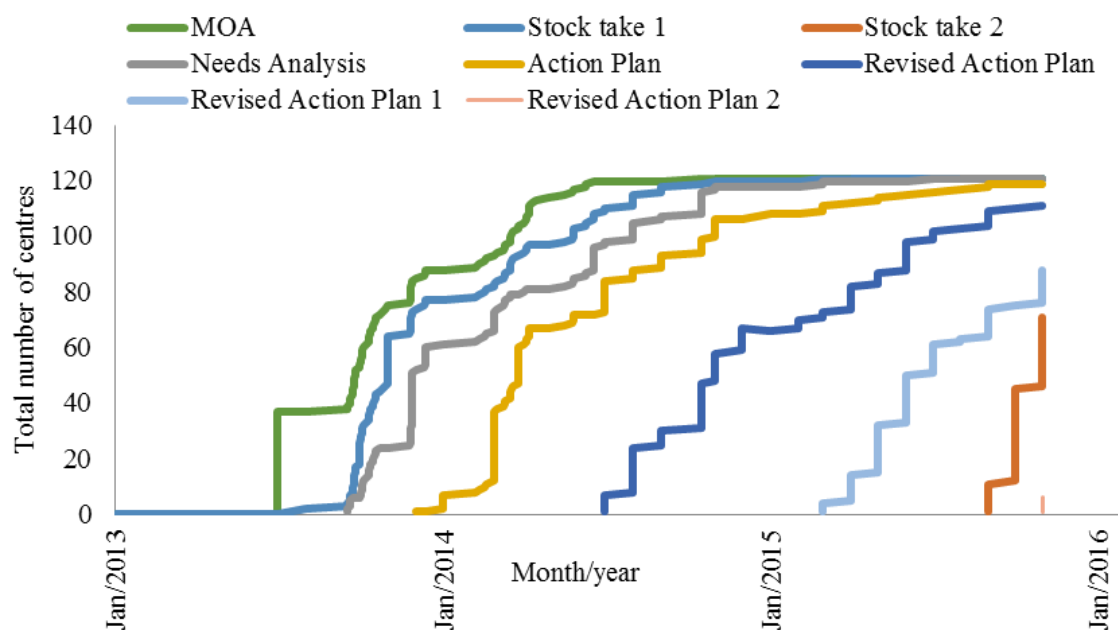


Figure 5.7. Progression of stages of engagement over time with Under 5 Energize

Centres transitioned the five stages of the engagement process (Figure 4.1), from an initial visit to signing of a negotiated action plan, in an average of 248 days or eight months. Education and care centres ( $n = 44$ ) transitioned in 222 days (seven months), the shortest compared to the other types. Playcentres ( $n = 10$ ) transitioned in 238 days, kindergartens ( $n = 39$ ) in 263 days while Te Kōhanga Reo ( $n = 23$ ) required the longest time of 274 days, almost 9 months. Despite 34 of the kindergartens signing the MoU as a group, this appears not to expedite the transition time for kindergartens overall. Reasons for variation in transition times were explored by other factors, including Equity Index, but no consistent pattern was seen. Centres took an average of a month from initial visit to MoU, two months between the MoU and the stocktake, two months between the stocktake and the needs analysis and around three months to achieve an action plan from the needs analysis (Table 5.4).

Table 5.4 Mean and median number of days between stages of engagement

	Median	[min-max] <sup>a</sup>	Mean	(SD) <sup>b</sup>
Days from initial visit to Memorandum of Understanding	0	[0–579]	32.60	(89.51)
Days from Memorandum of Understanding to Stocktake	31	[0–553]	59.52	(72.11)
Days from Stocktake to Needs Analysis	38.5	[0–629]	60.58	(80.30)
Days from Needs Analysis to Action Plan	109	[9–463]	113.89	(76.41)
Days from Action Plan to Revised Action Plan	231.5	[136–475]	240.79	(69.37)

<sup>a</sup>Minimum-maximum, <sup>b</sup>standard deviation

By December 2016, all 121 centres continued to be involved in U5E, none having left the programme.

### **5.3 Why centres engaged in Under 5 Energize**

This qualitative section (focus group and interviews) of the research process reports the opinions and experiences of the engagement process of early childhood centres into the U5E programme from the perspective of the staff employed by Sport Waikato (Energizers) to deliver the U5E programme and from the ECC staff from participating centres. The focus group and interviews were conducted early in 2015 when all centres had been recruited into U5E (Table 4.1). Another round of qualitative (focus group and interviews) was planned late 2015 to assess effectiveness and maintenance domains of RE-AIM and participants (programme and ECC staff) were recruited to participate in both rounds of qualitative research (Table 4.1). Two sets of qualitative data were planned to add depth to this RE-AIM investigation to further understand the process of recruitment and effectiveness of U5E.

#### **5.3.1 Under 5 Energize programme staff focus group 1**

##### **Ethical approval and recruitment**

The participants selected and invited to participate in a focus group were the four Energizers, the U5E staff delivering the programme to the early childhood centres. There were no exclusion criteria. The participant information sheet (PIS) invited participants to be involved in two focus groups, one early in 2015 and another in the latter part of 2015. Two hours was allocated for the focus group, as part of the regularly scheduled day-long team meeting at the Sport Waikato head office in Hamilton, with approval obtained from the U5E manager. Two weeks prior to the focus group, the U5E manager distributed the PIS and consent forms to the Energizers (Appendix A: Ethics approval and approved forms). The PIS invited participants to be involved in two focus groups, one early in 2015 and another in the latter part of 2015. A face-to-face explanation of the research was provided by the researcher and consent forms signed before the start of the focus group. A reminder note was sent to all participants in the draft meeting agenda one week prior to the scheduled date of the focus group.

##### **Data collection**

Four main discussion areas and prompts were pre-planned (Table 5.5). The setting and the ambience (round table, private room) for the focused discussion aimed to generate interaction and to encourage participants share experiences related to the engagement

process in a comfortable environment. The researcher conducted the focus group and a research assistant was employed to record notes during the discussion. The research assistant signed a confidentiality agreement prior to the focus group. At the beginning of the focus group, participants were reminded of the purpose of the research, their privacy, confidentiality and rights and asked to agree to the following points for conduct during the focus group:

- to respect each other's opinions
- to let everyone have an opportunity to speak
- to have one person talking at a time.

Participants were then asked if they had any questions about what was expected and these were answered before the discussion began.

With participants permission, the focus group interviews were audio recorded by two devices (Device 1: Endeavour EN625 Digital Voice Recorder 2014; Device 2: Apple iPhone 5, 2015) and the time taken for the focus group was noted. The recordings were checked for completeness and professionally transcribed verbatim (Academic Consulting, Auckland, <http://www.academic-consulting.co.nz/>, after signing a confidentiality agreement). Notes taken during the discussion by the research assistant and researcher were added to the transcription.

Table 5.5 Discussion areas and prompts in the Under 5 Energize programme staff focus group

Discussion areas	Prompts
Pre-engagement	<p>When you first started your roles what was already in place that assisted the engagement process?</p> <p>Thinking back about this early stage of the programme, what particular skills or knowledge were required? How were your roles supported?</p> <p>How would you describe the ECC reaction to the idea of the Under 5 Energize programme?</p>
Engagement process	<p>How did you engage the centres into U5E?</p> <p>What strategies, tools or approaches did you use during engagement that you think have worked well/were less successful? Why?</p> <p>What did centres have to do to before/when they engaged?</p> <p>What is your overall opinion of how the engagement process went?</p>
Programme engagement enablers and barriers	<p>Why do you think centres signed up to the programme?</p> <p>What aspects of the programme attracted them to U5E?</p> <p>What do you think were the success factors to the engagement process?</p> <p>What were the barriers you encountered to the engagement process? How were they overcome?</p> <p>What are the learnings for the future about the engagement of ECC into U5E?</p>
Future of Under 5 Energize programme	<p>What are you most excited about in terms of the potential that U5E has?</p> <p>What do you think (in your opinion) will be required to sustain the start that U5E has made with the centres?</p> <p>What, if any, are your concerns about the future of the programme?</p>

*Note.* ECC = early childhood centre; U5E = Under 5 Energize

### Data analysis

Interview transcripts and field notes were de-identified, read repeatedly and reviewed by the researcher. Thematic analysis, using a ‘realist’ underpinning, which ‘reports experiences, meanings and the reality of participants’ (Braun & Clarke, 2006, p. 81) was the method of analysis. Key themes were identified and coded by how closely they were related and contributed to answering the research question using a reflective, inductive approach. This approach is described as “searching across the data for patterns of meaning” and being “data-driven” rather than using a theory-driven approach or predictions on the part of the researcher (Braun & Clarke, 2006, p. 83). Using patterns as the basis for analysis requires searching for repeating patterns although the emphasis is not on counting responses but deciding which patterns answer the research question in the ‘most meaningful’ way (Braun & Clarke, 2013, p. 223). During analysis, data move from “description” in which data is initially arranged into patterns of meaning to

“interpretation” where patterns are hypothesised in terms of importance and the broader implications (Braun & Clarke, 2006, p. 84).

Analysis followed the six phases of thematic analysis outlined by Braun and Clarke (2006, p. 87). The phases were as follows:

1. Familiarising yourself with the data
2. Generating initial codes
3. Searching for themes
4. Reviewing themes
5. Defining and naming themes
6. Producing the report

Firstly, the data were read thoroughly and initial notes written on topics of interest from the data and possible coding. The second phase involved the development of codes for the data (Table 5.6).

Table 5.6 Segment of the data with assigned codes

Data segment	Codes
We're here to fit into your philosophy. I think that was a really key word. We're not actually...every centre has a slightly different philosophy. We're not here to bring another philosophy. We're here to work with you, within your philosophy.	<ol style="list-style-type: none"> <li>1. Each centre different</li> <li>2. Here to work with you</li> <li>3. U5E can fit within existing philosophy</li> </ol>

Codes included the main areas of research interest; namely, reasons for joining the programme, how centres signed up, barriers and enhancers to programme engagement and recommendations for the future. The next step was organising the codes into potential themes following rereading of the data and codes. Braun and Clarke (2006, p. 86) describe this as a “recursive” process, “moving back and forth” between the steps. These themes were reviewed at two levels. The first level was the coded data and included development of mind maps (Figure 5.8). The second level was to review the possible themes in relation to all the data. This involved reading the data again and checking the themes against the data to identify if any data have been missed. At this stage, the data, codes and possible themes were also discussed with a research supervisor to further clarify themes and subthemes. The next phase was to define and put a name to the themes that captured the true meaning of the theme. This process led the researcher to identify four major themes in the data and to describe them by

verbatim quotes from the programme and ECC staff interviewed for this study.

Following this, the writing up of the findings was undertaken and final clarification of the analysis and inferences occurred.

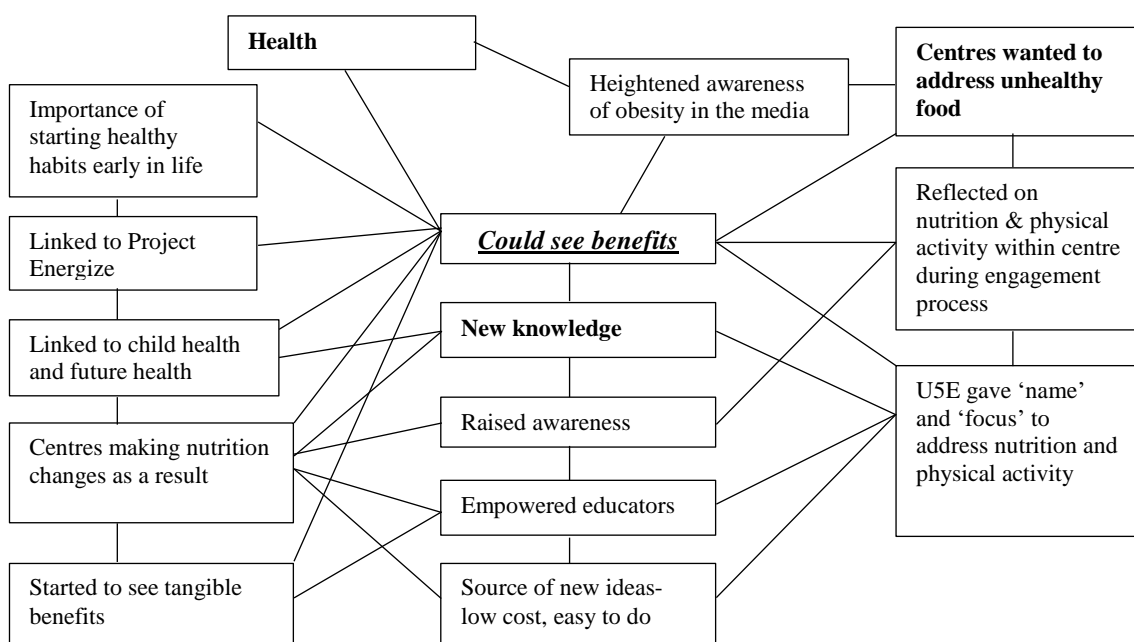


Figure 5.8. Mind map of 'could see benefits' theme

### Integration of the researcher

The researcher had attended regular team meetings of the programme staff to observe and learn how the programme operated since the programme began in July 2013 and, as a result, was known to the manager and focus group participants. At the beginning of the focus group and interview with the programme manager, participants were advised to discuss topics as if the researcher had little knowledge of the programme.

### 5.3.2 Interviews with early childhood centre staff 1

#### Recruitment

The participants were a self-selected sample, using a stratification strategy (Braun & Clarke, 2006), of U5E programme liaison representatives from the four main early childhood centre types and the U5E programme manager. Centre liaison representatives were invited to participate in two interviews and provided with the PIS (Appendix A: Ethics approval and approved forms), an explanation and consent forms by a variety of methods depending on their centre type (Table 5.7). The first interview was held in February/March 2015 and the second interview in October/November 2015.

Table 5.7 Recruitment method for each centre type

<b>Centre type</b>	<b>Recruitment method</b>
Education and Care	PIS delivered by the Energizer
Kindergarten	Agreement to invite participants obtained from Waikato Kindergarten Association PIS delivered by the Energizer
Playcentre	PIS delivered by the Energizer
Te Kōhanga Reo	Energizer delivered the PIS, participation discussed at whānau hui, if Te Kōhanga Reo agreed to participate they either contacted the researcher directly or the Energizer advised the researcher to make contact with Te Kōhanga Reo

*Note.* PIS = Participant information sheet.

Participants were required to be the lead liaison representatives for the U5E programme in their centre and have been employed at the participating centre for at least six months. Inclusion criteria for the centres included that the Memorandum of Understanding was signed at least six months before the interview and the centre represented one of the four identified types of early childhood education centres – education and care, kindergarten, Playcentre or Te Kōhanga Reo. The first three or four participants who responded from each centre type were selected.

After eligibility to participate was confirmed, an interview date at a time to suit the participant and any support people was arranged. When insufficient responses were received Sport Waikato sent out a reminder by email and the Energizers promoted participation in the research as part of their routine visits to the centres. The researcher followed up interested centres as advised by the Energizer.

### **Data collection**

A semi-structured interview guide was developed for the data collection (Table 5.8). The interviews were structured around the question topics, including exploration of the reasons why the centre signed up for the programme and the perceived advantages and disadvantages. Other question topics aimed to generate responses that concerned experiences of the engagement process, how they engaged, success factors, barriers, and any learning for the future if the programme was replicated elsewhere.

The researcher conducted all interviews. The interviews with Te Kōhanga Reo were supported by attendance of a Māori Research Officer (Table 4.4) to enhance the cultural sensitivity of the research and to ensure understanding of the questions and responses. The Māori Research Officer signed a confidentiality agreement prior to the interviews.

Interviews were audio recorded (Device 1: Endeavour EN625 Digital Voice Recorder 2014; Device 2: Apple iPhone 5, 2015) with permission and professionally transcribed verbatim (by Academic Consulting, Auckland, <http://www.academic-consulting.co.nz/>, after signing of a confidentiality agreement). All centres were provided with a koha of a \$50 grocery voucher following the interview. The researcher had estimated that 13 interviews at each of the two time points would be realistic to allow data saturation and complete within the time and funding constraints. This number was confirmed by (Guest, Bunce, & Johnson, 2006, p. 79) who state that around 12 interviews are likely to be sufficient to achieve data saturation with a homogeneous sample and when the goal is based around ‘common perceptions and experiences’. Despite the sample being sourced from four different childcare types it was homogeneous in terms of the role within the ECCs.

Table 5.8 Interview guide discussion areas and prompts for the early childhood centre educators

<b>Discussion areas</b>	<b>Prompts</b>
Initial engagement	<p>How did you first hear of the U5E programme?</p> <p>Thinking back to the beginning of your involvement with U5E, what were your initial thoughts and opinions of the U5E programme?</p> <p>Why do you think your centre or organisation signed up to the programme?</p> <p>What aspects of the U5E programme do you believe attracted your centre to take part in the programme?</p>
Engagement process	<p>How did your centre engage with the U5E programme – explain the steps you followed?</p> <p>How useful was each stage of the engagement process was and why (Show engagement process diagram with examples)?</p> <p>What do you think were the success factors to the engagement process (not the programme itself)?</p> <p>What were the barriers you encountered to the engagement process? How were they overcome?</p> <p>Thinking about the engagement process what would you add/remove/change?</p>
Communication about the programme	<p>How did your centre communicate participation in U5E to parents and the community? What did you say about the programme?</p> <p>What were the initial reactions from your parents and the wider community?</p> <p>Are there any other comments you would like to make about any other aspect that we have not covered already?</p>

*Note.* U5E = Under 5 Energize

### **Data analysis**

The analysis followed the same procedure described for the focus groups (Chapter 5.3.1)

### 5.3.3 Interview with the programme manager

#### Recruitment

The programme manager was contacted via email with the PIS attached (Appendix A: Ethics approval and approved forms) and followed up by a phone call to answer any questions about the research and to arrange a suitable interview time and venue.

#### Data collection

A semi-structured interview guide was developed for the data collection (Table 5.9). The interview was structured around the questions, which were similar to those for the ECE educators. The interview was recorded and the recording transcribed, as completed for the ECE staff interviews (Chapter 5.3.2).

Table 5.9 Interview guide discussion areas and prompts for the programme manager

Discussion areas	Prompts
Pre-engagement	During the programme planning stages what was put in place to encourage centres to participate in U5E? How did you plan to engage the centres? What aspects of the Under 5 Energize programme do you believe attracted centres to take part in the programme?
Engagement process	How did centres engage with the U5E programme? Why did you use these steps? What were the strategies, tools, or approaches that you or the Energizers used during that engagement process that you think worked well?
Programme engagement enablers and barriers	What do you think were the success factors to the engagement process? What were the barriers to the engagement process? How were they overcome? What skills do you think the Energizers needed or bring to their roles that were important during engagement? What is your overall opinion of how the engagement process went? Is there anything you would change?
Future	What are you most excited about in terms of the potential that U5E has? What if any are your concerns about the future of U5E? Are there any learnings for the future about the engagement process that we have not covered already? What would you change, if anything, if you rolled out U5E again? Are there any other comments you would like to make about any other aspect that we have not covered already?

*Note.* U5E = Under 5 Energize

#### Data analysis

The analysis followed the same procedure described for the focus groups and interviews with ECE staff (Chapter 5.3.2).

### **5.3.4 Focus group and interview 1 findings**

The focus group included all four Energizers, three in the assigned room and one by teleconference due to a health issue. All of the Energizers were female, two identified as Māori and two were NZ European. At the time of the focus group, the Energizers had been employed for between 12 and 18 months. All of the Energizers were new to employment at Sport Waikato or their health provider subcontractors and came from backgrounds including health, education and Māori health promotion. The focus group interview time was 97 minutes. The participants had known each other and the researcher since the programme began and communicated freely throughout the interview, rarely talking over each other but rather encouraging each other to contribute through use of questions, for example, “(name), what was your experience of that issue in your area?” Achievement of data saturation with one focus group in this study was problematic as there were only four Energizers. This may have been overcome by the use of data triangulation as this is one way of ensuring data saturation (Fusch & Ness, 2015).

The number and types of centres and number of interviewees in the interview sample is detailed in Table 5.10. Thirteen interviews were conducted after which the researcher concluded and confirmed with the supervision team that similar responses were being repeated and no new or different information was received therefore data saturation had been reached (Guest et al., 2006). The interviewees were the centre manager or lead teacher at the kindergartens and education and care centres, the president of each individual Playcentre and the lead kaiako from Te Kōhanga Reo. Although not planned or known prior to the interview, the interviewees at one Te Kōhanga Reo included four whānau members (three female and one male) in addition to the lead kaiako, and at another Te Kōhanga Reo, two kaiako (one female and one male) were interviewed. Interviews lasted between 30 and 45 minutes.

The programme manager was a female and an existing employee of Sport Waikato in the area of physical activity promotion and delivery in the Under 5 sector prior to taking up the role of U5E programme manager. She was involved in the planning, development and establishment of the U5E programme. The interview with the programme manager was 84 minutes.

Table 5.10 Interview 1 sample numbers by early childhood centre type and number of centre interviewees

<b>Centre type</b>	<b>Number of centres and interviews</b>	<b>Number of interviewees</b>
Education and Care	5	5
Kindergarten	2	2
Playcentre	2	2
Te Kōhanga Reo	4	9
<b>Total</b>	<b>13</b>	<b>18</b>

There were four main themes identified from the focus group and interviews. Each theme provided insight into the research questions of how and why centres engaged in U5E including barriers and enablers and suggestions for the future. As the themes between the different participants were similar, the analysis was written up without separation by participant type. There was significant overlap between all four themes. The themes were ‘programme fit’, ‘Energizer factor’, ‘could see benefits’ and ‘reason to connect’. Each theme is discussed in turn with illustrative quotes to represent the responses from the participants.

### **Theme 1: Programme fit**

Programme ‘fit’ was one of the main themes identified by all participants and enabled the high engagement of ECCs with U5E (Chapter 5.1.1). The fit was very evident at the beginning during programme design and when the programme was being initiated in centres. Although its prominence reduced as the programme progressed, it was an ongoing theme from all participants. The two major subthemes elucidated within this theme were ‘alignment with the centre’ and the importance of ‘building relationships’ with centres. Firstly, programme fit will be defined and secondly each subtheme will be explained using illustrative quotes.

The ‘fit’ of the programme was the suitability of the U5E programme to the ECCs. U5E had to meet the ECC needs, provide benefits and build on what centres were already initiating in nutrition and physical activity before centres would sign up. This theme encompassed the way the U5E programme was designed by the manager and moulded by the Energizers and ECC teachers to meet the needs and enhance the aims of the ECCs. Programme flexibility was essential to reflect the variable nature of New Zealand’s early childhood sector and centre communities. The Energizers developed relationships and worked with centres to match U5E programme aims and objectives

with those of the ECCs. This approach was well supported by the programme manager. Aligning U5E with the centre aims and processes, and building relationships with the centre staff were identified as the key features of the programme ‘fit’ process, and necessary before the programme could start making positive change in the food and physical activity environment. Emphasis on ensuring programme fit appeared to be a factor leading to the high number of centres joining the programme.

### ***Align with the centre***

The first subtheme within the theme of programme ‘fit’ was lining up the U5E programme with the philosophy, policy and practices of individual centres. The manager and Energizers identified a wide range of factors in the planning, design and delivery of the programme that contributed to achieving alignment and these are described with participant quotes. Programme staff placed a huge emphasis on addressing the factors influencing programme alignment and delivered solutions at all stages of the programme roll-out to ensure engagement of as many centres as possible.

Reviewing the scientific literature on international models of obesity prevention for young children, developing a programme vision and ECE sector consultation were the early steps of programme development performed to align the programme with the ECCs. While time was limited, leading up to the Ministry of Health contract submission deadline, the manager spoke of the importance of exploring overseas models in the early childhood setting and developing a written vision to guide programme development. Additionally, early childhood sector consultation with regional early childhood organisations and child health providers was undertaken to facilitate programme alignment and evaluation. The manager described this as happening well before any contact with the individual ECCs.

*By the time we got to the centres we'd done a lot of dialogue with a lot of different organisations and we had a lot of thoughts about what we thought the process should be and how we would evaluate it as well.  
(IP)*

These steps provided valuable information to ensure U5E aligned with ECCs.

The U5E programme alignment with ECCs appeared to benefit from the manager’s previous experience in delivering services within the early childhood sector and Sport Waikato’s experience developing and delivering Project Energize in primary schools. Delivering fundamental movement skills workshops gave the manager valuable

knowledge of how and what worked in the sector. Utilisation of the successful Project Energize principles, systems and resources, including the five stage engagement process, developed over 10 years, gave the programme a starting point from which it was adapted for the early childhood sector (Chapter 2.5).

*Under 5 Energize has evolved from the Energize programme, which is now in schools and has been in primary schools and been there for ten years. And they had success with a particular engagement process, which was what they used. So I was advised that that would be a good place for us to start. (IP)*

However, it was acknowledged that U5E would need to be adapted during delivery to meet the needs of the ECE sector. This process reflects the action research cycle of plan, act, observe and reflect for ongoing improvement, detailed in the evaluation section of the Sport Waikato contract proposal for U5E (Sport Waikato, 2013a). Prior experience working successfully with early childhood groups and learnings from the achievements of Project Energize provided valuable initial guidance that increased initial programme alignment although modifications were needed to suit ECCs rather than schools.

Careful staff selection demonstrated that the programme was committed to aligning U5E with local communities. One of the aspects of the success of the Energize process was getting the right person for the Energizer role. Staff selection criteria developed by Project Energize and adopted by U5E was a strategy strongly supported by both the manager and Energizers as important for successful programme alignment. Specific selection criteria were applied including that the Energizers reside in their area of work, as they were more likely to resonate with the community, know what worked for their community and have local networks with organisations, for example, with Te Kōhanga Reo. The manager expressed that Energizers living and working in the local community was a deliberate strategy to ensure alignment of the programme with community needs.

*Employing four staff members, who would live in their communities, 'cause that is important, I think, for engaging and showing that, and demonstrating to the community that this person knows the community, rather than having them all based in Hamilton. So based out where they need to be. (IP)*

The Energizers supported the manager's choices of staff as being suitable for the positions in their respective areas. Additionally, the manager noted that selection of the right people for the Energizer roles had been successfully achieved. Aligning with the

centre was enabled by selecting Energizers with the right skills and local knowledge from targeted communities.

The Energizers spent considerable time and effort aligning U5E to facilitate the ‘fit’ of the programme. The Energizers reported that the way centres engaged with U5E varied between centre types and adapting the programme was a priority to align with how the centre operated. The variable nature of the engagement in U5E was related to the different management structures and hence decision-making processes within the different types of centres as reported by the manager and Energizers. Centres also appeared to be at different stages of readiness to sign up.

*So they might have an initial meeting, leave a brochure with them, and the response could be anything from, “Where do I sign, I’m ready to go now.” To, “We need to go to our committee.” “We need to go to the parents.” “We need to have a hui.” “We need to approach the owners of this organisation,” because it may have just been the manager. So there were a lot of varied responses. No one said no initially. (IP)*

An example of this was in one instance an Energizer demonstrated a shortened version of a nutrition session as an example of what centres would receive from U5E despite this not being the established approach, although prior approval to deliver this alternate method had been obtained.

*I had two Kōhanga Reo at the same time and I did a taster test so this is the type of education that we think our parents and educators should have and I did a taster sugary drinks workshop at this Hui and it just ...it grabbed everybody and ... I got signed up straightaway. (FGP)*

This evidence supports that U5E was being adapted to meet centre needs, and that an innovative approach by the Energizer could motivate centres to join U5E, which increased management trust that the Energizer would know what would work in her community. Moulding U5E to align with the variety of centres types was prioritised and enabled by programme staff.

The centre engagement process and the way the programme was planned to be delivered within centres were described as having to acknowledge and respect the philosophy and workloads of each centre. Energizers reported having to clarify with centres that U5E could work across the different early education and development philosophies and types of centres and was not going to interfere with the centre philosophy, as this was

identified by some centres as a potential barrier. In contrast, other centres commented that the U5E was another tool to help them achieve the health goals of their philosophy. Programme staff stated that there were a number of other agencies going into ECCs, including ERO, and centres had to be assured that U5E was not going to involve a huge amount of extra work.

*So was definitely some very sensitive social marketing going in there...because...because a lot of the centres already have massive workloads, ERO and all sorts of other things so was definitely ...coming in with a sales pitch. (FGP)*

The Energizers were very conscious of the need to develop and use processes that minimised increases to centres workloads. For example, processes included simplifying documentation, providing professionally produced resources for centres to use and sharing the engagement process tasks among centre staff. One specific example of this was when the Energizers requested a reduction in the size of the seven-page Memorandum of Understanding document to a simple one-page brochure size for use at initial meetings with centres. Workload was an issue for the centres signed up as a group by their regional association as some centres felt that they were already good examples of healthy food and physical activity environments. They also reported needing time to find out more about what the programme entailed. Energizers provided innovative ways to align U5E with centre systems, overcoming potential barriers and consequently facilitating programme fit.

Early and clear communication of the goals and activities of U5E was essential to ensure centre expectations of the programme were realistic. During the engagement process, the Energizers identified the importance of clarity of the purpose of the U5E programme for centre staff. This was especially relevant when what U5E was offering appeared incongruous with what the community expected Sport Waikato to deliver due to past experience. Energizers found that in these situations having clarity early on in the engagement process around what the programme could and could not provide was essential. The manager noted a signed MoU as important to clarify responsibilities from the beginning. Additionally, the other steps of the engagement process and knowing what was coming next also contributed to clearly establishing what the U5E could provide centres. Energizers reported that they explained to centres they had a 'train the trainer' approach to nutrition and physical activity, with a focus on long-term behaviour

change rather than a ‘quick fix’ approach (FGP). Inconsistent centre expectations appeared to be mainly around physical activity delivery options.

*I basically had to tell them upfront that I am not here to ...come here once a week...to facilitate any physical activity. I am here to share and give you the education around physical activity. (FGP)*

*We were very clear about the kaupapa of what we were doing that we weren't in there to replace the teachers. We were there to work alongside and enhance what the educators and the kaiako know from, rather than taking over. (FGP)*

The reason for the mismatch appeared to stem from the needs analysis step of the engagement process in which centres were asked, using an open-ended question, to document what they wanted to improve in nutrition and physical activity at their centre. Some centres appeared to want U5E to run regular physical activity sessions for the children. Energizers described it as a ‘learning process’ in terms of how to manage centre requests together with clear programme aims and activities and what was realistic to deliver, by one Energizer, to approximately 30 centres (FGP). Due to the newness of the programme and the unexpectedly high numbers of centres signing up in each area, it took time to establish the details of what could be realistically delivered.

*You go (to the centre) with your needs analysis...what are you doing well and what do you want to improve on and what do you want from us. So we were asking them what they were wanting from us and they were telling us but it was stuff that we couldn't deliver...it's definitely a work in progress. It's definitely taken a lot of discussion and meeting. (FGP)*

Clear communication of the goals and activities of U5E in the early stages of the engagement process to centre staff was found to be important.

Energizers had to adjust to the centres’ ‘time and pace’ although the programme is structured, so the engagement process and flexibility supported this alignment. Centres needed time to find out about the programme and consult within the centre structure to decide whether to participate in U5E (also linked to the ‘reason to connect’ theme). “Meeting centre needs at their time and pace” was highlighted by the manager as a factor in alignment of U5E to centre operations (IP). Kaiako reported that the five stage engagement process gave them time to find out more about the programme, reflect on what they were currently doing and set goals for improvement in the last step, the action

plan. The stocktake appeared to initiate consideration of the nutritional value of the centre's current food and physical activity practices.

*I think for some centres they did find that, "Oh, gosh, is that what we're doing?" "To answer that correctly I need to say, oh no, we don't actually plan our physical activity, or we haven't really thought about that aspect of nutrition," or, but what it did, other than giving us a starting point, was raise consciousness. (IP)*

*I happened to be there, just sitting in (at a centre) to see how it was going out in the field. Had morning tea. When we came back in, she said, "Oh look, just before we start, I just want to say that we are immediately going to change what we're doing around our morning teas." She said "We're really good at monitoring them when they sit down at their lunchboxes," she said, "but we don't really monitor what they bring in," and said, "and I know what I've seen, I know the wrappers I'm seeing." So just asking the question (stocktake), she was reflecting. (IP)*

Goal setting for the action plan was a process centre staff were very familiar with, commenting that, because of the huge number of parallel activities going on within centres, goal setting was essential, U5E gave centres the flexibility to decide on how many goals and how these were to be achieved. The stepped engagement process of U5E (Figure 4.1) allowed centres time to consult, reflect and fully engage in U5E. The slow pace of sign-up by some centres was a barrier at the start for the Energizers who reported wanting to begin delivery of the programme, as some centres were ready to start immediately. However, at this stage of the programme the manager stressed the importance of having the five stage engagement process in place to ensure centres were fully aware of what the programme entailed, detailed in the MoU.

*What we recognised is we had to work at their pace...whilst it was frustrating for us, we really would have liked them to have come on board because we are ready, we needed to allow everybody the time that suited them best. (IP)*

The Energize team had to adjust to each centres 'time and pace' and this alignment was supported by the programme's stepped engagement process and flexibility.

### ***Building relationships***

The second subtheme within programme fit was the central importance of building relationships with the ECC. This included particular effort to consult and build relationships with Te Kōhanga Reo through consultation and kanohi-ki-te-kanohi (face-to-face) contacts with centres, growing trust and enhancing what was already there.

Skilled staff, especially in communication, was essential. Energizers had phones and computer access provided and attended regular team meetings and professional development sessions to improve within-team communication and sharing of experience. It also refers to how the U5E manager and staff put a conscious, determined and comprehensive effort in place to build relationships effectively both with centres and as a team to further support programme 'fit'.

A formal organisational partnership with an ECE organisation was an effective way to build relationships with a large group of centres. Sport Waikato's partnership with the Waikato Kindergarten Association (WKA), developed as a result of sector consultation during the contracting process, aided programme engagement in one cluster where 34 centres were signed up as a group (which also met the criteria for external partnerships in the Ministry of Health contract). The ECC association was described by the manager as motivated to be involved in U5E and also had representation on the U5E advisory group. Formalising a relationship with the WKA demonstrated that they perceived U5E was a good 'fit' for their organisation and hence aligned with centres, prior to programme delivery. A kindergarten centre manager from this cluster endorsed this, stating that U5E fitted with the ethos of their organisation. The manager and Energizer for this area reported that this step reduced the time required for individual centre engagement in this cluster. Other Energizers reported that alliances with regional ECE associations including public and private ECC group organisations might have enhanced engagement in all the clusters. Not having this partnership, in place in the other three clusters was shown to be barrier to engagement, as each individual centre had to be approached, in contrast to the WKA cluster approach. The Energizers reported that relationships with regional associations might have expedited engagement.

*I would have found it helpful to meet with like the (name) (type of centre) association person before I went out to the (type of centre) because...um...I think that would have been very helpful to have that relationship with her first. (FGP)*

Additionally they commented that it might have also influenced ECC associations to adopt appropriate nutrition and physical activity policy where it was not in place across a group of centres, thereby facilitating U5E fit and healthy change, rather than leaving the decision to individual centres.

During the development phase of U5E, a process of early childhood sector consultation was undertaken, including with Te Kōhanga Reo, to build relationships and facilitate

programme fit. This was described by the manager as important, as Kōhanga Reo were numerous across three of the target areas (n = 24). Discussions were initiated with Te Kōhanga Reo National Trust Tainui Rohe (Regional Office) (Table 4.4). Subsequent presentations to purapura in the target areas at the Trust's instigation were organised, although a disadvantage of this process was that not all Kōhanga within the purapura were within the designated target areas for U5E. The Energize manager also stated that Waikato Tainui was contacted with the purpose of informing the iwi about the U5E initiative.

*We did go and meet with Waikato-Tainui as well, not just the kōhanga. We went and had a meeting with Waikato-Tainui before we started out to explain what we were planning on doing. So the more people that knew and it wasn't a surprise the better, what the project was about, they're better informed. (IP)*

Employment of two of the Energizers within well-respected Māori and Pacific health providers as sub-contractors for U5E seemed to facilitate relationships with centres in these cluster areas, particularly for Māori- and Pacific-led centres. The manager reported that utilising local health providers as subcontractors facilitated involvement of centres by providing local insights on how to enlist their involvement.

*We knew that if we had them on board that they would be able to assist us with local knowledge of what might be a preferred way of engaging those centres. (IP)*

This was a strategy used successfully by Project Energize and appeared to be a good approach for U5E.

*We've been fortunate in being able to see what's worked for them and see what their top winners were and adapt those for the under-five age group. So there have been some huge pluses from being in this position. (IP)*

One Energizer reported that health provider involvement in her cluster was interpreted by some centres as endorsing the programme.

*They all said at that initial hui, yep we really just signed up because (name of subcontractor) have endorsed this programme. We don't even know what it is. We don't know what we gonna do. But we know it's gonna be good because (name of subcontractor) has endorsed it. (FGP)*

This demonstrated the health provider was well respected by the centres and initiated relationships for the Energizers.

Initial contact with centres using a community hui had little success, whereas kanohi-ki-te-kanohi (face-to-face) was the Energizers' preferred method. For most centres, the first point of contact with U5E was an email invitation to a community hui, which only seven of the 133 centres attended, none of which were Te Kōhanga Reo or Playcentres. The community hui were attended mainly by local organisations working with young children, such as Plunket and Well Child service providers, district council representatives and other key community people. However, after initial visits with the individual centres following the hui, Energizers felt it was the kanohi-ki-te-kanohi with the centres that promoted the programme more directly and successfully with the centres. One Energizer reported embarking on kanohi-ki-te-kanohi meetings with centres prior to the community hui to introduce the programme because she felt this was the best way to engage the centres in her region. Although not planned, this showed how the Energizer used local community knowledge and networks, a benefit of the staff selection strategy referred to earlier, to build relationships with the centres.

*I felt it more appropriate for me to do the face-to-face first and that way for me was more successful than going straight into a hui so I did a little bit of ground work in (town) for my first initial hui.... I find that it's always better to connect with the community face-to-face first and then um....um...work in that way. (FGP)*

Centres commented that they liked face-to-face contact with a person and it gave them an opportunity to “question it a bit more”, particularly parent-led centres as they needed to also communicate this to whānau at a whānau hui or centre meeting in order to gain agreement for participation (IP). In some cases, the Energizer was invited to whānau hui and purapura to speak kanohi-ki-te-kanohi with whānau. Centre staff reported questions from whānau/parents including how different U5E was to what they were already doing, how sustainable the programme was and whether it was “going to benefit our Kōhanga, our children for the future” (IP). After completing the engagement process, Energizers concluded that they favoured kanohi-ki-te-kanohi to be the first contact point with centres, possibly followed by a community hui to answer additional questions. Low attendance by parent-led centres at the community hui resulted in these centres being unaware that the programme was launched in their areas and consequently they required more input in the early stages. Despite the overall low attendance by centres at the community hui, Energizers described the few centres that did attend the hui as being a

“good starting point” for them to build confidence with the engagement process and relationships with the centres (FGP). Kanohi-ki-te-kanohi communication with centres was preferred over community hui to lay the foundations for a good relationship with all centre types.

The Energizers recognised early in the engagement process that building relationships with the ECCs was important, requiring time, cultural protocols particularly for Kōhanga Reo, visibility of the relationship and trust. They stated that the programme would not have worked if relationships had not been established and acknowledged that this needed time to develop. This appeared to be particularly important for Kōhanga Reo.

*...it was about that...building that relationship with them and if we didn't have the time to build that relationship it... wouldn't have worked...so um...you can just about see how long it took the Kōhanga in particular to sign up as compared to some of the other centres. ...where they needed to see that relationship being built between us and them. (FGP)*

The Energizers noted that Kōhanga Reo engaged at a slower pace and this was shown in Chapter 5.2 as on average one month longer, compared to the average time for all centre types. Before programme engagement could start in one area, cultural processes needed to precede engagement because the Energizer was from outside the region. This involved the initiation of a whakatau or welcome ceremony for her to the area. It was reported as a necessary process before relationships could be built with Te Kōhanga Reo in the cluster.

*Um...whereas for Kōhanga ...um...being a Māori from (name of area) who is not even from this area, um...I had to be very careful about how to approach the Kōhanga so that was a little bit of a process as well...I wanted to talk to (the manager) about ...um...about how to do that down here so I needed to be sort of introduced to the Kōhanga, through a whakatau. I needed to be sort of welcomed into the area and then we, we could talk about the programme and then the process. (FGP)*

This was not the case for another Energizer who had tribal affiliations in her cluster, enabling her to begin engagement without the need for these steps. She was well known by centre staff, particularly Te Kōhanga Reo, and displayed knowledge of what worked well in her community.

*I went around to the centres .Um...majority because I know them. Um and got them to come (to the hui) that way. (FGP)*

The Energizers used their skills, cultural knowledge and networks to build trust with centres. The importance of building trust with centres was also supported by the programme manager who linked it to taking time and having skilled staff delivering promised activities.

*It took a while for services to trust exactly what we were going to do...So having the right people to approach them was important...and definitely delivering what we say we're going to do. If we say we're going to follow-up with something, following up. (IP)*

Flexibility and sensitivity to centre's needs, together with positively acknowledging what centres were already doing was paramount to building relationships. Energizers reported positioning U5E as a support mechanism, working alongside and enhancing what the centre was already doing. They felt it was important to acknowledge previous efforts and appeared to smooth the way to offering new ideas. This appeared to be a vital part of the approach used by all the Energizers.

*It's about our language that we use and making them feel awesome about the job that they are already doing and it's...it's always going back to...look...we're only here, if you need support, we are here." (FGP)*

*It's the ongoing approach that we have to say "look, I know that you already know this stuff". Um "you're awesome at what you do" but um...here's some other ideas...just...it's the whole way, it's our approach, it's our language that we use, it's....it's...everything you just have to be really sensitive about our approach all the time...not half the time...all the time. (FGP)*

The programme also needed to be adaptable to fit the varying needs of the centres.

*I took some balls and some fly swats in and just did some manipulative skills with a couple of the Kōhanga Reo ... just to give them a visual rather than just documentation. And I think that was effective in those Kōhanga and I think we just had to...um...modify our approach depending on the centre. (FGP)*

The Energizers needed a range of approaches to fit the different centre types while being as non-judgemental as possible to build a good relationship with the centres.

## **Theme 2: Energizer factor**

This theme, ‘Energizer factor’, describes the skills, knowledge and the way that the Energizers worked with centres during the engagement and early delivery phases of the programme. This was an enabling factor strongly contributing to the reach of the programme and is linked to the first theme ‘programme fit’, especially the sub-theme of building relationships. The two sub themes within this theme are ‘what they bring’ and their ‘way of working’ with the centres. Each subtheme will be discussed with example quotes from participants.

### ***‘What they bring’***

This subtheme, ‘what they bring’, describes the knowledge and skills that the Energizers brought to the programme, which enabled the ‘Energizer factor’ and consequent high number of centres engaging in the programme. A centre commented that when a programme was new, “*you really need support from people who know what they’re doing and what they’re talking about*” (IP). This quote encapsulates the overall response from centres about the Energizers being knowledgeable and skilled communicators. While the Energizers came to their roles with knowledge and skills, U5E provided additional professional development to supplement this as part of their train the trainer approach for ECCs.

The skills of the Energizers were recognised and valued by centre participants and the Energizers themselves thought these positively influenced the reach of the programme. Centre participants described Energizers having a range of skills including presentation communication and problem solving, and they were a source of practical, inexpensive ideas to support developing FMS and healthy food choices. As well as the centres recognising the Energizer skills, the Energizers themselves also thought they possessed the communication skills enabling them to deal with the varying needs of centres during the sign-up process.

*I think we’ve all got personalities that um...we got employed for the jobs ...so that we, because of the personalities in the way we...kind of deal with people and we have those you know, communication skills that can sort of...you know...umm...you know...be positive about the programme and make it work. (FGP)*

The Energizers used their problem-solving skills to negotiate issues that arose during the sign-up phase. This included questions from centres about where the stocktake data were going as some centres were very “*protective*” about data collected from their

centre (FGP). Energizers were prepared to take calculated risks, shown by the comment, “*we really had to put our necks on the line*” (FGP). They reassured participants by reminding them that the data was being collated and individual centres would not be identified and this was received positively.

Being a visible role model in the community, particularly for smaller communities, was described by the Energizers as a success factor both initially and in an ongoing way. The Energizers considered themselves well positioned in the community to initiate and deliver the programme.

*They see me with my own children being active and I think they actually... when you're working in small communities ...that holds a lot of weight and a lot of ...um...respect I think...and and ..I think it's a flow on effect to the success of...of the under 5. (FGP)*

Familiarity with different centre philosophies from previous roles or experiences with preschools were enabling factors for two Energizers. An example of this was in one cluster where the Energizer had been a Playcentre parent and therefore knew how Playcentre operated, and felt comfortable building relationships with this centre type, all of which facilitated programme sign-up. She was also able to share her experience with the other Energizers at team meetings. Although the programme was delivered predominantly in English, the centres spoke favourably of the effort Energizers (including Energizers identifying as Māori and NZ European) made to increase the ‘fit’ for Te Kōhanga Reo by using Te Reo and linking programme elements to atua.

*Well she's gone and changed her thing in to fit Te Ao Māori, ... so some of the movements she's linked to the Atuas, like water, Tangaroa. Tane-Mahuta. ... so she's really catering for our needs as well as ECE centres. (IP)*

The centres appeared to recognise that the programme had to meet the needs of a range of centre types and Energizers were well placed in their respective communities to adapt the programme to meet these needs.

The manager and centres identified early that the knowledge of the Energizers was a strength of the programme. According to the manager, when the Energizers’ were employed they had varied levels of knowledge of young children’s physical activity and nutrition. She recognised that a greater knowledge base would increase the Energizers’ ability to meet centres’ needs.

*They're passionate, they're keen and eager to make a difference in the centres that they work with, but their knowledge levels were not complete. So we would need to continue to feed them with the appropriate training and professional development to increase their knowledge so that they could pass that on. (IP)*

To address this, regular team training and opportunities to attend external professional development sessions were provided and well received by the Energizers. Centre participants described Energizers as having a “*wealth of knowledge that we can tap into*” (IP) and more specifically described the Energizers as providing “*the why*” (IP), particularly for fundamental movement skills. Centres appeared to view Energizers as “*experts*” in the fields of nutrition and physical activity (IP). The Energizers acquired and transferred their knowledge to benefit centres.

### ***Way of working***

The second subtheme summarises the way the Energizers worked with centres to meet their needs and made engagement in the programme as easy as possible. This theme encompasses personal traits of the Energizers, how they communicated with centres and their flexible style of working. The combination of these factors resulted in the reach of the programme exceeding expectations and was acknowledged by both the manager and the centres.

The centres were very complimentary in their opinions of the Energizers during programme engagement. Traits such as “personable”, “enthusiastic”, and “friendly” were common descriptions of the Energizers by centres. After hearing the Energizers promote the programme, centres reported being motivated to join to see what the programme could provide for the centre and the children, and commented they would recommend the programme to other centres.

The Energizers’ flexible way of working with centres was appreciated by centre participants. Centres indicated this by participants describing it as accommodating, helpful, supportive and culturally sensitive. A reported example of flexibility displayed by an Energizer was when a centre requested a different workshop format to suit evening sessions for their families. The Energizer modified the workshops from two hours down to one and a half hours, enabling the centre to offer two workshops on one night rather than just one workshop, and thereby facilitating message delivery to parents. The supportive nature of working with centres appeared to facilitate

incorporation of the programme into the centre's way of working, illustrated by this quote.

*We've just had a lot of support from name (Energizer).... she's made it easy for us to, for it (USE) to become quite fluent in the programme. (IP)*

The Energizers displayed sensitivity to not only the ethnicity of children attending the centre but to different ways of working within centres. Centres witnessed Energizers actively supporting their initiatives within centres by coming and participating in centre events and described this as “*whatever it is they're there...because she is not just a face*” and as a result the programme “*would have the backing of our (name of centre) and (name of group of centres)*” (IP). Centres valued the flexibility, sensitivity and support of centres shown by the Energizers during engagement.

The Energizers described their initial work with centres as “*ambitious for the programme to hurry up and get on its feet*” yet were overwhelmed with the numbers of centres positively responding to the programme (FGP). As a result, they reported having to “*park*” centres that were early adopters until all centres in the cluster had completed the necessary stages and documentation (FGP). The manager described a tension between Energizers wanting to start delivering the programme to the early adopters before programme procedures were in place.

*It was just frustrating for the team 'cause they would be, “Oh but I really, they're really keen and they really want to get going.” “Yeah, but we haven't got an MoU.” I had to hold the team back. (IP)*

The Energizers acknowledged that these administrative and evaluative processes were necessary but favoured a staggered sign-up approach as the preferred option for future delivery in new areas.

The way Energizers communicated with the centres appeared to be well received and meet centre needs. Energizers were described by centres as being “*easy to communicate with*”, readily accessible and provided regular contact and follow-up (FGP).

*It's easy to have (Energizer name) to just pop in on the odd occasion and call up, because we're so frantic most of the time that that, knowing that I can email her. (IP)*

Energizers were confident that they had the communication skills to “*be positive about the programme and make it work*” and described their initial role in the programme as

“*social marketing*” for the programme (FGP). Centre participants described follow-up by the Energizers as “prompt” and “regular”. In particular, follow-up for the Healthy Heart Award (HHA) programme was appreciated by centres as they spoke of having limited time to complete tasks and that the regular phone calls to check progress supported their advancement towards an award. Effective communication skills were a strong feature of ‘Energizer factor’.

Building on what the centre was already achieving in the first stage of the needs analysis was reported by the Energizers to work well. The framing of the programme by the Energizers as “*we are here to support you in what you are trying to achieve with nutrition and physical activity*”, rather than dictating what centres should do, was a successful approach used by all the Energizers (FGP). It also set the tone for the programme of going at the centre’s pace of work instead of imposing time frames (as discussed in the programme fit theme).

Energizers brought skills and knowledge to the centres, some previous and some supplemented by programme professional development, promoted the programme well and combined this with a flexible way of working with centres. This encouraged centres to sign up as they could see the potential of the programme enhanced by friendly and supportive staff who accommodated their needs. Energizers viewed their individual roles as each having an important part to play in the U5E programme and part of an overall path/goal, including Project Energize, to good health for children. They were “*excited about the potential*” of the programme for the region and for expansion elsewhere in the future (FGP).

### **Theme 3: Could see benefits**

This theme ‘could see benefits’ describes the advantages that the U5E programme offered centres and this appeared to have aided engagement. All participants, the Energizers, manager and centre representatives, perceived benefits to centres from involvement in U5E. The benefits that centres reported were for the whole community including the children, educators, cooks and whānau, met a range of centre needs, and included both short and long-term outcomes. The importance of this theme increased over time as participants began to experience programme delivery and centres started to receive tangible benefits from the programme.

The Energizers and centre representatives reported that U5E had benefits for the health of young children and families in the centres and some reported positive links with

Project Energize. Energizers spoke of the importance of starting healthy habits early through U5E. Some made the connection with Project Energize in primary schools, saying it would help prevent adolescents being “*set up to like the junk food or to not participate in physical activity*” but rather “*eventually...the health of all these tamariki coming through are gonna be massively improved*” (FGP). Centre participants also described the relationships between the Energize programmes and other programmes such as Fruit in Schools as “*growing that culture*” of healthy eating and physical activity, and “*passing from generation to generation*” over time, with each setting reinforcing it (IP). Previous positive experience of Project Energize appeared to “*smooth the path*” for some centres joining U5E (IP). One centre commented that even though it was potentially going to be more work, they were “*happy to do whatever is good for our kids and whānau*” (IP).

One of the main ways centres wanted to improve the health of children was by improving the food choices. The Energizers stated that on initial contact some centres had identified nutrition, in particular poor food choices coming in lunchboxes, as an issue to address but faced barriers of not knowing how, a perceived lack of expertise in nutrition and wanting to avoid undermining parents’ efforts to adequately feed their children. The timing of the introduction of U5E for some centres appeared to be ideal.

*We are just so concerned about lunchboxes and we didn’t know how to attack it or how to...we just didn’t feel like we had the expertise to be able to ...or didn’t know the right way or didn’t have the resources ... you’ve come just at the right time. (IP)*

*They were feeling a little bit unsure of how to approach parents without pointing a finger and saying, “your child’s got a very unhealthy lunch-box”. (IP)*

Additionally, during the 5-stage engagement process centres were prompted to reflect on nutrition and physical activity factors within the centre through the stocktake, needs analysis and action plan, which increased awareness of the importance of the role of the centre in healthy eating and fundamental skill development. In some cases, it prompted immediate changes in the food and physical activity environment and centres sent notes to all centre parents reminding them of the preferred food choices for children while at centre. The manager noted that increased media attention on nutrition might be influencing centres to think about their role in making changes to improve nutrition and

felt that U5E was “*piggybacking a little bit on that*” too (IP). U5E seemed to either meet a need for this type of service or prompt centre attention to the issue.

U5E provided a framework and support for centres to address good nutrition and physical activity, aimed specifically at young children. Centres reported that the programme had given the area a “*name*” and a “*focus*” for the centre, and commented that the action plan was time-saving as nutrition and physical activity goals were in one place and could easily be referred to (IP). Even though centres had been promoting nutrition through existing activities such as a vegetable garden, U5E provided them with a more structured approach.

*It's something that's already in our programme, this just makes it a little bit more, a little bit more focused and you have a goal and an aim, as such. You know where you are at with the Energize Under 5, rather than something that you're just doing on a whim. (IP)*

Centres described wanting to focus on healthy eating but not knowing how to, and stated that U5E has “*helped us a lot with promoting healthy eating and food*” (IP). They liked the fact that it was specifically “*tailored*” to children under five, especially those educators who had experienced Project Energize for primary school children. “*Huge potential that we are lined up side by side*” was the way centres viewed the benefits of the supportive working relationship with U5E (IP). The structured, goal focused, partnership approach to improving nutrition and physical activity of young children was of benefit and valued by centres.

Provision of knowledge about healthy eating and physical activity to centre communities was extremely well received and beneficial. The benefits varied depending on the educators’ or parents’ existing knowledge and practice. Benefits included raised awareness, new or increased knowledge, reaffirmed existing knowledge and practice and, for some, it provided the background knowledge to support existing practice particularly for physical activity. An example of this was a centre commenting, “*we're actually doing something not just twirling them for the sake of it*” (IP). Energizers felt that, while nutrition and physical activity appeared a priority for most centres, their understanding of healthy eating, fundamental movement skills and how to implement good practice was superficial and failed to meet U5E programme expectations. Energizers demonstrated this by reporting comments and responses from centres such as “*our children are active, they run*” but further investigation about specific movement skills revealed that these skills did not appear to be known or taught to children in a

regular or planned way (IP). As a consequence of involvement in the programme Energizers described an increase in teacher awareness and knowledge of nutrition and physical activity, associated with environmental improvements within centres such as increased movement literacy concerning the importance of balancing skills and the introduction of a fruit platter for morning tea.

*I think physical activity and nutrition is really high on their priority list but the definition of it or their understanding of it is becoming more comprehensive. So even like, you have a lunch-box and there is an apple in it and a sandwich. Well there is a packet of chippies and a muesli bar as well, but they used to look at that and say “oh that’s quite healthy” but since doing the lunch-box workshop, and realising actually junk food displaces nutritious food they are actually realising that ‘oh actually...um...a healthy lunch-box would be food from all four food groups...not ...not a supplemented lunch-box. (FGP)*

Provision of “*the why*” behind fundamental movement skills empowered educators and parents (in parent-led centres) with new knowledge and motivated educators/parents to engage in physical activity with children. They were motivated by the knowledge of the link between particular movement skills and educational outcomes for life. Educators appreciated the “*specific information*” at workshops, such as number of teaspoons of sugar in various drinks and different ways to use a ball in the playground, like bounce, catch, throw and kick (IP). It empowered them to confidently engage with parents about improving food choices and physical activity in a positive way, using the knowledge and backing from U5E. The fact that the knowledge provision was from an external source appeared to be important to ‘back up’ changes educators were either trying to make or wanted to. In contrast, one centre commented that the benefits were small for their centre because they were already committed to health, having attended Sport Waikato FMS workshops and achieved a Pa Harakeke (gold level) HHA prior to U5E involvement. Despite this, the participant could envisage benefits for other centres and it had given her centre staff reassurance that their practice aligned with U5E nutrition and physical activity messages.

As programme delivery began, additional benefits from U5E involvement became apparent and reaffirmed centre’s decisions to sign up to U5E. Centres reported that they were starting to see positive benefits such as parents were more aware of “*what they are feeding their kids and how it could affect them*” (IP), healthier food choices in lunchboxes, teachers’ role modelling healthy food choices, policy change and, in one

centre, a reduced number of dental visits. Centre participants reported positive change to the food provided by parents to children while at centre.

*Good outcomes have come from it too. Like parents have stopped sending children in with those lunch packs and stuff, just, yeah. After the knowledge was given to them they've made better choices. (IP)*

A healthy food and beverage policy has supported teachers to reinforce healthy choices to parents.

*It just makes it easier for us as teachers when there's a policy. Then you can say, "Actually, yeah, we can only just have water." And water is best and that's what we want the children to be drinking while they're here at kindergarten. (IP)*

The programme manager believed that centres were listening and making positive changes in response to programme messages and that this had many benefits.

Alongside knowledge delivery, U5E was a source of new ideas for centres. Centres appreciated new ideas to reinvigorate practice. Ideas provided in the nutrition and physical activity workshops were thought to be positive, low cost and easy to implement by centres. Positive messaging was particularly important in nutrition, centres liked the ideas that the messaging was “*not so much, stay away from all of this stuff*” but showed how to make the healthier choice by comparing choices based on the sugar, fat and protein content (IP). Cost was a factor for the smaller parent-led centres meaning low cost ideas enabled them to achieve U5E goals.

*The session we had last week...brought in a whole new range of activities, with one item, just one item just brought a whole range of activities and that was really helpful to us. (IP)*

The new ideas had applicability both at centre and within the home. They were viewed as “*it's stuff you do every day and its minimal change to your routine*” and staff reported that parents were reacting positively to the messages (IP).

U5E was reported to provide a range of benefits to centres. Enhancing the health of children, providing a focus for nutrition and physical activity actions and the provision of knowledge were the overarching benefits gained by centres. As the programme progressed from initiation to the delivery phase, the perceived benefits changed to tangible outcomes for the centres and Energizers.

#### Theme 4: Reason to connect

The ‘reason to connect’ theme outlines the purpose, mechanism and endorsement that the U5E programme provided centres to connect. It enabled centres to engage with their communities about food and physical activity in a positive way. While most ECCs had a well-developed relationship with their communities, U5E appeared to enhance the connection by providing another reason to connect and a variety of ways to communicate, including participatory workshops, professionally produced resources, messages for incorporation into centre publications and displays within the centres. Connections were made between different groups within the centre community and also external to the centre (Figure 5.9).

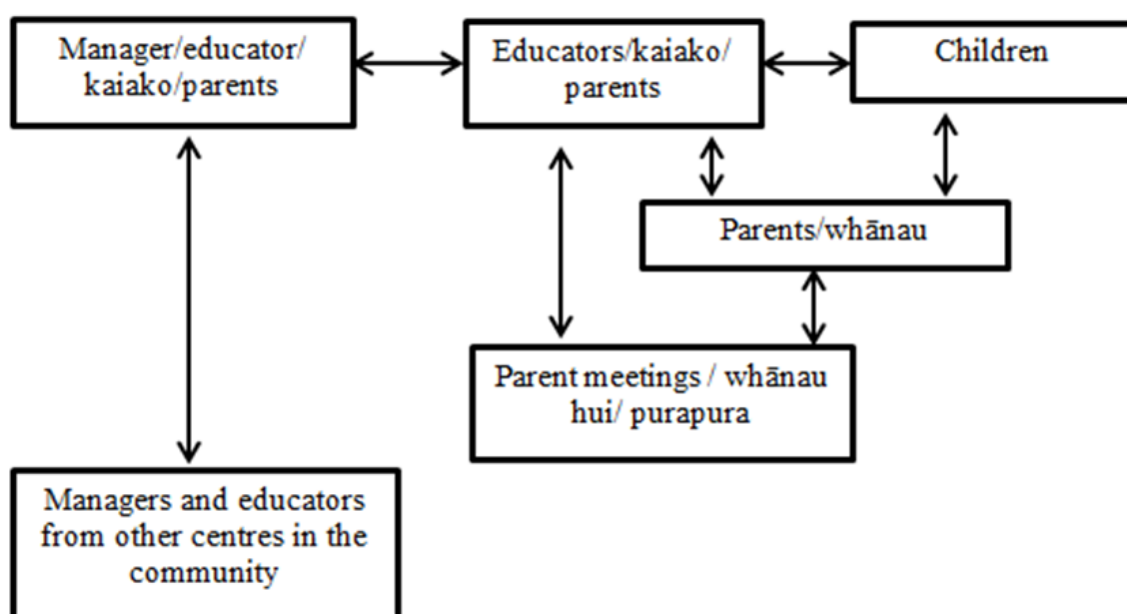


Figure 5.9. Internal and external connections between groups within the ECC community

The association with U5E provided “backing” to kaiako to engage with parents about improving food choices for children. U5E was providing a reason and a vehicle for the ECC communities to engage about developing healthy food and physical activity environments, which had advantages for the centre and ultimately the health of the children.

Educators and parents in parent- or whānau-led centres were connecting as a community with the purpose of effectively delivering U5E messages to their communities. Firstly, they were meeting to make a decision to join U5E and progress the various tasks in the engagement process, including the needs analysis and action plan. Secondly, they were accessing programme resources such as attending nutrition and physical activity

workshops, which were new ways of connecting. Attendance as a group or as a whānau hui for some was described by one centre as “*the first time we have done that and it was fun*” (IP). Thirdly, encouraged by what they had learnt, educators worked together to engage their parent/whānau community, utilising a variety of methods to encourage healthier choices for children. In one centre, the educators worked with their parents prior to a U5E nutrition workshop to develop ideas to visually present new healthy lunch-box ideas as they said “*we often hear, “Oh yes, I’m stumped with ideas.” Or, “how do you present something a little bit different”*” from parents about lunch-box foods (IP). New food ideas were developed and shared using examples of healthy lunchboxes and by the food served at the workshop described as “*mini sandwiches or mini rolled up tuna things*” by the educator (IP). Kaiako at two Kōhanga Reo reported initiating discussions with their whānau to check the cultural practices of poi use in the U5E movement sessions. Consultation resolved the issue by identifying a separate type of poi for U5E physical activity, different from traditional poi, rather than undermining cultural practices and excluding the activity.

Centres valued the connection with the U5E programme and brand as a mechanism for initiating healthy changes within the centres and to promote the centre in the community. The relationship produced rewards for centres, children and programme reach. Energizers commented on the strength of the U5E brand within centres, contributed to by the professional appearance of the Energizers themselves and the professionally produced resources. Centres valued the printed resources because they promoted messages that centres wanted to deliver to families and it saved them a job producing their own, according to the Energizers. One centre commented that they “*wouldn’t have been as proactive*” had they not had the resources to promote the U5E messages, claiming the resources had made it easy for them (IP). As the programme progressed, involvement in U5E was a feature centres used to promote themselves to prospective parents in community newspaper advertisements, in the centre enrolment packs and during prospective parent visits.

As well as providing a mechanism for change, U5E provided the validation that centres needed to initiate change with their communities. Energizers stated that centres used the association with U5E as “*leverage*” for improving health by making changes in the nutrition and physical activity environment within centres (FGP).

*... I think the Under 5 Energize programme gives the centres leverage to be able to adjust their guidelines and to be able to say ...hey ..we*

*actually really wanna get a bit more healthy here or we are gonna work towards the Healthy Heart Award so we do need to make some changes and we're doing this because we are an Under 5 Energize programme. (FGP)*

These matched responses from educators who appreciated having the external endorsement of U5E to support healthy change by stating, “*it’s just a good support system for us as teachers to promote healthy lifestyle for this age children*” (IP).

The early childhood centre setting was described as having more potential to reach parents with healthy eating and activity messages. Energizers felt that parents were still closely engaged with their children in ECC, compared to school where parents were less connected, perhaps due to returning to the workforce. This was even described by one Energizer as a “*really privileged position*” (FGP). Centres were taking the opportunity to connect with parents using U5E messages in the centre newsletter, learning stories, workshops, noticeboards, photos of children doing healthy activities, pamphlets and posters. However, educators noted that communication with whānau needed to be regular, as families change often. Alternative ways of delivering information to parents, such as Energizer-delivered displays at child drop-off times, were also welcomed by educators to accommodate parents unable to attend evening workshops. The centre communities responded well to the positive framing of the nutrition workshops.

*You make it fun and interactive and relaxed and non-threatening and we can have a giggle about some things ... and then we learn something and we take little messages away. (IP)*

Another centre commented that the workshops generated an opportunity for linkages between staff and parents as a group, rather than the usual one-on-one parent and teacher interactions. There was evidence messages were being taken home by children because parents commented to educators that children were requesting healthier food choices in their lunchboxes, some even requested the exact foods shown on the tip sheet. U5E appeared to provide centres with opportunities to positively engage with their communities about healthy eating and physical activity.

Centres appreciated the opportunities U5E offered to connect with other centres in their area. Events held with other centres, both as workshops or physical activity event days for the children were welcomed by educators and kaiako. This opportunity was new for some kaiako. They were viewed as a way to meet other educators and share ideas to strengthen U5E delivery. One centre commented that linkages with other centres

correlated with one of their centre objectives, which was “*to go out and let our children know there are other things out there*” (IP). Connections with other centres were a positive, experience, new for some centres, and while enhancing U5E delivery, it fulfilled centre objectives to interact with the wider community.

U5E reinforced within-centre connections by providing an additional reason and mechanisms to connect, combined with external organisational backing from U5E to initiate change in food and activity environments within centres. Opportunities to make contact with other centres in the area appeared valuable to some centres to share experiences of U5E and meet community engagement goals from Te Whāriki. The connections were positive and the centre community appeared to be responding to the messages by making changes.

### **Summary**

The U5E programme achieved high reach of the target group for four key reasons. Firstly, the programme was designed and moulded to fit with the diverse range of centre philosophies, policies and practices and priority was given to building good relationships with the centres. Secondly, the Energizers combined sound knowledge and skills with a ‘way of working’ that met the centre’s needs. Thirdly, centres perceived benefits from joining U5E, which became tangible as the programme progressed. Finally, U5E offered centres a reason to connect with their communities in a positive way about food and activity.

Factors contributing to the high reach of the programme are summarised in Table 5.11. These were staff selection criteria, knowledgeable and skilled staff, programme flexibility, consultation and responsiveness to Māori, professional appearance of the programme resources and the positive framing of food and activity messages. A *kanohi-ki-te-kanohi* approach with centres was an enabling factor, particularly for Te Kōhanga Reo. The timing of the programme also seemed to coincide with centres wanting support to address unhealthy food environments within the centres. Most centres noted the complementary nature of U5E to some or all of the following aspects of their centre: philosophy, policies, existing programmes (e.g. EnviroSchools) and ECC community aspirations, and the “ease of access” to the programme as motivation to engage.

Table 5.11 Summary of enablers and barriers to the reach and adoption of Under 5 Energize

<b>RE-AIM domain</b>	<b>Enablers</b>	<b>Barriers</b>
<b>Reach and Adoption</b>	Design of programme cognisant of good fit Use of Project Energize structure and systems – database and recording processes, engagement process, Energizer delivery model Staff selection criteria Project Energize relationships with Māori and Pacific providers Tribally affiliated Energizers or Energizers identifying as Māori Kanohi-ki-te-kanohi (face-to-face) contact Flexible programme implementation Good programme fit Regular Energizer support Five-stage programme engagement process (centres) <sup>a</sup> Relevant Energizer training	Educator/centre workload Lack of resources in Te Reo initially (centres) <sup>a</sup> Lack of support from umbrella organisations Five-stage programme engagement process (Energizers) <sup>a</sup>

<sup>a</sup> Group reporting the enabler or barrier

Barriers to the programme were few and often overcome as the programme progressed and centres reaped the benefits of involvement. The first barrier was that the programme was perceived to add to an already large staff workload at centres, although this concern appeared to diminish over time, due to the ongoing support from the Energizer and positive community feedback. Some centres joined despite this but others went through a phase of internally assessing the advantages and disadvantages of the programme before engaging. Others joined without hesitation as they recognised the need for the programme. Secondly, Kōhanga Reo faced the barrier of introducing a programme that was not developed from a Māori model of health and therefore not delivered in Te Reo. These centres had the additional tasks of translating principles, activities and resources to fit their philosophy and language. This barrier appeared to be compensated somewhat by the other features of the programme, including Te Reo speaking Energizers and the ability of the Energizer and centre staff to adapt mainstream programme ideas for their use. Additionally, attendance at training workshops out of centre hours was a financial barrier for Kōhanga Reo staff. Strategies were undertaken to ensure the programme met the needs of tribally associated centres (Table 4.4). Subsequently, printed resources have been translated, resources supporting the celebration of Matariki produced, physical activity modules on Māori traditional games implemented and a Māori physical activity programme, developed from a Māori model by Toi Tangata for

Kōhanga Reo He Pi Ka Rere, has been introduced. The third barrier was a perceived lack of commitment from umbrella ECC organisations such as Kindergarten or Playcentre Associations for the programme, which was thought to slow engagement in some centres. A few centres that had been signed up by their umbrella organisation, in addition to the barrier of a large workload, felt they already had healthy food and physical activity environments and that therefore the programme would be of minimal benefits for the centre.

## **5.4 Discussion**

In this section, evidence is presented that the U5E programme reached the intended recipients, including centres with a high proportion of Māori children and located in high need areas, and that engagement of the centres with the programme was demonstrably achieved through active participation and changes in behaviour and environment. Unlike randomised controlled trials this investigation explored, using an action research paradigm, the process of participation of the targeted ECCs, the representativeness of those involved, and why centres committed to working with the programme. This evaluation also aimed to present the success factors and barriers to reach in this ECE setting. Evidence for the reach of U5E and engagement of ECCs with U5E are discussed, in turn, in the context of the existing literature:

- Reach - participation (including numbers of children, families and teachers reached) and representativeness of participating centres
- Participation of Te Kōhanga Reo
- Importance of kanohi-ki-te-kanohi (face-to-face) to the success of U5E reach
- Time taken to engage in U5E
- Non-participation of centres in U5E
- Reasons for elevated reach
- Barriers to reach and engagement
- Little use of RE-AIM to evaluate nutrition interventions and interventions in the ECE setting.

This is followed by a discussion of the strengths and limitations of this research and the U5E programme in relation to the reach dimension of RE-AIM.

An extensive search of the literature found no other intervention that was directly comparable with the Under 5 Energize programme. Compared to other programmes

using RE-AIM as an evaluative framework, the participation rate of U5E was high (93%). In contrast, participation in a preschool nutrition education intervention, Building a Healthy Me, offered to all kindergartens and funded by the Dairy Council of California, was only 30% of the kindergartens ( $n = 7500$ ) and 40% of kindergarteners (5–6 years) ( $n = 210,000$ ) in California (Larsen et al., 2017). This programme was a free nutrition education resource-based programme targeting teachers, parents and students. Participation was assessed using the number of kindergarten classrooms that requested the programme materials compared to the total number of kindergarten classrooms in the state invited to participate. Similarly low, a primary school nutrition education intervention ‘Nutrition Pathfinders’, also in California, achieved dissemination to 25% of schools ( $n = 47$ ) and 33% of fourth grade students ( $n = 1700$ ) in the state (Larsen, Robertson, & Dunton, 2015). Low dissemination of both of these studies may have been due to the recruitment method, requiring the school or kindergarten to respond to a mailed request, with no face-to-face support to understand or deliver the programme. Additionally, both projects had a short time frame, 5 and 3 months respectively, and no follow-up of attrition. Participation in U5E was well above the rates achieved by other similar RE-AIM analyses in the school and kindergarten setting, probably facilitated by face-to-face contact at sign-up.

Participation is more frequently reported than representativeness in RE-AIM evaluations. In the late 1990s, reporting of participation in health behaviour change interventions using RE-AIM was high, (69%); yet details on representativeness were less often reported (28%); according to a review of interventions over a five-year period, 1996 to 2000, in the main health behaviour journals (Glasgow, Bull, Gillette, Klesges, & Dzewaltowski, 2002). This was confirmed in a subsequent review in the following 10 years, 1999 to 2010 (Gaglio et al., 2013). In contrast, a recent nutrition and physical activity intervention study in the early childhood setting by Larsen et al. (2017) reported representation, although only in the evaluation sub-sample ( $n = 25$ ) rather than the larger dissemination group ( $n = 82$ ). However, similar to the 2002 and 2013 reviews (Gaglio et al., 2013; Glasgow et al., 2002), a recent RE-AIM review (McGoey, Root, Bruner, & Law, 2016) of 78 solely physical activity interventions among 5–11 year old children reported that participation was well reported overall, but many studies (70 of 78) continued to omit details on the representativeness of samples. While there was some evidence that this was starting to improve in some of the more recent papers, it was still an evidence gap overall (McGoey et al., 2016). Absence of this aspect of reach

limits the generalisability of the study findings to other populations and impedes the design of interventions to meet the needs of population subgroups with the greatest hardship and incidence of health issues (McGoey et al., 2016). All three reviews also showed that representativeness was not the only RE-AIM dimension absent in published papers and more consistent reporting of all RE-AIM dimensions was called for.

In 2013, U5E was reaching 30% of Waikato preschool children and 3% of preschool children nationally. Funding limits the current size of the programme to one-third of the Waikato preschools, although the recruitment area aimed to include centres from areas of high need. Centres outside the geographical area have been denied enrolment in U5E due to these funding restrictions. Despite the number of centres remaining constant between 2013 and 2015, the number of children and families participating in the programme increased by 300 children and 1000 families. This increase may be due in part to omission of relevant questions from the initial stocktake of 17 centres but could also be part of a nationwide increase of numbers in childcare (MoE, 2014c). Some larger, new centres recruited into U5E increased their rolls dramatically since 2013; for example, one centre increased from 75 at the start of U5E to its capacity of 105 children by 2015. U5E is reaching an increasingly large number of children, families and educators in the Waikato region due to increasing number of births in the Waikato region – over 50% in the highest deprivation quintiles 4 and 5 (<https://www.waikatodhb.health.nz/assets/directory-of-our-services/womens-health/Maternity-Annual-Report-2015.pdf>), although it is small regionally and nationally. U5E also involved 2.5% of paid teachers nationally (534 of 21,426 full-time and part-time teachers in education and care and kindergarten only) ([https://www.educationcounts.govt.nz/\\_data/assets/pdf\\_file/0013/54202/Teachers-in-early-childhood-education-20140314.pdf](https://www.educationcounts.govt.nz/_data/assets/pdf_file/0013/54202/Teachers-in-early-childhood-education-20140314.pdf)), more if parent-led educators were included. Numbers of teachers in U5E also rose by 60 in the two-year time frame.

The representativeness of the U5E sample was characterised by an over representation of Māori (38% compared to 22% in the Waikato region and 30% nationally) and tribally affiliated centres, Te Kōhanga Reo (21% compared to 13% in the Waikato region and 11% nationally), almost double for both percentages. Comparisons were made with both the Waikato region and national early education statistics to contribute to an overall picture of sample representation. Not matching the Waikato or national characteristics for most criteria was purposefully planned to fit Ministry of Health funding criteria. This was achieved by selection of geographic areas shown to have a high proportion of

Māori and Te Kōhanga Reo. The U5E sample also contained double the regional and national proportions of kindergartens, similarly related to Ministry funding criteria, although indirectly through an external partnership, resulting in the Hamilton cluster being made up solely of kindergartens. Additionally, the sample was biased towards centres with a low Equity Index indicating a greater number of centres located in deprived areas compared to Waikato and national proportions. Moreover, a greater proportion of centres were community funded in U5E (77%), a characteristic of the Waikato region (60%) but not of centres nationally, where it is about half (54%). The generalisability of U5E to other areas is limited by the lack of similarity of the U5E sample to both the Waikato region and nationally; however, it is acknowledged that learnings on how to improve the food and physical activity environments of centres with the most need is desirable (McGoey et al., 2016). There would also be application of these findings to other regions of NZ with similar subgroups of high need and funders prioritising these groups.

Of the 120 centres in this study, there were 25 Kōhanga Reo. This can be compared with a cross-sectional, descriptive study on tribally affiliated early childhood centres in the US, in which only 18% of eligible programmes (7 programmes in 11 centres out of 38 programmes) in the state and 8% of the childcare centres in Oklahoma (n = 82) were recruited (Sisson, Li, et al., 2016). While the authors recorded this low participation rate, it should be noted that 13 programmes were ineligible to participate as they did not have a childcare facility and if excluded from the denominator the participation rate would rise to 28%. Representativeness of the target group in the intervention also did not match the quoted “state-wide proportion of children with any indication of American Indian or Alaska Native ([sic] 49% compared to 67%)” despite the intervention targeting tribally affiliated centres (Sisson, Li, et al., 2016). The strong participation from targeted, Māori tribally affiliated centres, Te Kōhanga Reo (93%, only two declined) in U5E was probably facilitated by personal contact with Māori Energizers and local Māori health provider partnerships. The majority of the Kōhanga Reo (19 of 25) were recruited by Energizers identifying as Māori (two of the four Energizers), one of whom was tribally affiliated to Te Kōhanga Reo in her area, while the other was from outside the tribal area, and both had knowledge and experience of this centre type. Tribal affiliation of the Energizer meant that in some cases the Energizer was known to the centres which also aided engagement. Use of well-respected Māori and Pacific providers as sub-contractors (part of the Energize model)

was also beneficial to the engagement of centres in two clusters and was interpreted by some centres as a form of endorsement of U5E, particularly for Māori- and Pacific-led centres.

A continued and targeted face-to-face (kanohi-ki-te-kanohi) approach to reaching Māori and tribally affiliated centres appeared essential to achieving high participation. Sisson, Li, et al. (2016) selected tribally affiliated centres in response to elevated obesity rates among American Indian in a region with a high proportion of American Indian similar to the U5E targeted approach in the Waikato. However, the participation rates were considerably lower than for U5E. Working with indigenous people with a shared goal of better health for children was up-front from the start. Studies like that of Sisson, Li, et al. (2016), which looked for cross-sectional relationships between adiposity, and food and physical activity characteristics, meant that engagement with the centres was less meaningful for the centres. In the US study, centres were recruited by phone unlike U5E where a kanohi-ki-te-kanohi (face-to-face) visit was the first stage of the engagement process (Figure 4.1). Sisson, Li, et al. (2016), did, however, spend face-to-face time with the recruited tribally affiliated centres to enhance child participation in the research observations. Kanohi-ki-te-kanohi engagement initially with local iwi, Tainui, the iwi Te Kōhanga Reo regional organisation, purapura and kaiako at individual Kōhanga Reo, and on an ongoing basis, were key factors contributing to high reach of U5E according to the programme manager and Energizers, particularly for Kōhanga Reo. It was already known that providing a 'face' or meeting face-to-face, known as the practice of kanohi kitea, in order for trust to be built and a relationship to develop, was one of the Kaupapa Māori practices that guide Māori researchers (Smith, cited in Pipi et al., 2004) and that this approach was successful in Project Energize (Rush et al., 2011). Kanohi-ki-te-kanohi was preferred over phone contact, among Māori recipients of the Green Prescription programme (Williams, 2014). Having a regional presence, to be 'both known and seen' in the local area of work was also important in a large programme according to Pipi et al. (2004, p. 147), akin to the Energizers being located and visible in the community within the four cluster areas. In fact, the Energizers were described as being more than just a face by their on-the-ground support of centre activities. U5E used the principle of kanohi-ki-te-kanohi to enhance engagement and build a strong relationship with all centres; however it was particularly successful for Te Kōhanga Reo. Building of personal relationships in the health service and also in research, particularly for Māori, is a key element (Pipi et al., 2004).

Kanohi-ki-te-kanohi contact with centres also allowed tailoring or ‘fitting’ of the programme to meet the needs of the four centre types. Tailoring in the education setting is essential; Harn, Parisi, and Stoolmiller (2013) state that every educational environment is unique and the ability to match the intervention to the environment is vital to ensure programme implementation is successful and sustained. Tailoring of playground alterations within each school was part of the PLAYgrounds physical activity programme (Janssen, Toussaint, van Mechelen, & Verhagen, 2013). Increased reach in the ManUp intervention was achieved by strategic selection of community events to promote participation and this was dependent on tailoring programmes to target groups (Grier & Bryant, 2005 cited in Caperchione et al., 2016). However, previous literature suggests there is a conflict between fit and the fidelity of interventions, postulating that an intervention may lose fidelity if it is significantly modified. Adherence to study design is more problematic in effectiveness studies compared to efficacy studies where fidelity is closely scrutinised (Cohen et al., 2008). Harn et al. (2013) states that interventions need to develop in a way that they can be adapted to the variety of educational settings (setting and student differences) yet still maintain high fidelity. Furthermore, if adaptability was part of an intervention, educators were more likely to be supportive, thus leading to a more sustained implementation and ultimately providing the desired outcome, a positive effect on children (Harn et al., 2013). Cohen et al. (2008) also showed that face-to-face interactions between the research team (similar role to Energizers) and general practice staff, combined with on-the-ground support, was important to modify an intervention to fit the varying environments within a group of general practices. Flexibility to mould interventions to fit the setting, facilitated by kanohi-ki-te-kanohi local support, appears to enhance reach and implementation.

Time taken to effectively engage and for activity to occur in the ECC was on average eight months, with Kōhanga Reo needing the greatest amount of time, nine months. This may be explained by a larger number of steps (Figure 4.2) and contact points (Figure 4.3) required for engaging Kōhanga Reo compared to other centre types. Overall, 121 centres in U5E achieved four of the five stages of recruitment (Figure 5.7) in 18 months. Unlike randomised controlled trials the uptake of health promotion programmes has been suggested as typically slow, despite good programme efficacy. The slow uptake of many health promotion programmes was postulated by Hallfors and Godette (2002) as due to the benefits not being immediately realised (chronic disease

prevention) and may be perceived as non-essential (children are not currently visibly overweight). Their study, based on the diffusion of innovation theory, which RE-AIM draws upon (Glasgow, McKay, Piette, & Reynolds, 2001), also postulated ‘complexity’ and ‘compatibility’ (defined as ‘consistency with existing values, past experiences and needs of potential adopters’) (Rogers, 1995 as cited in Hallfors & Godette, 2002, p. 462) as concepts influencing the diffusion of a health promotion programme.

Compatibility or fit with ECC policy and practices facilitated sign-up to U5E for many centres, however, centres reported needing time in the early stages to find out about the programme and consult within the centre structure. The staged engagement process (Figure 4.1) assisted this process, together with the Energizers recognising and working alongside the centres at their pace, despite an eagerness to start delivery. Numerous interventions are implemented with short time frames making provision of meaningful results difficult. Funding of health services in the real world in NZ can also influence the ability to show effectiveness, as contracts may be issued and renewed for short periods or ceased because of a change of government priority and funding. U5E was originally funded for two years and has subsequently been renewed year by year. Short study time frames were a limitation in two RE-AIM studies, one with preschoolers was five months (Larsen et al., 2017) and the other in schools (fourth grade) was three months (Larsen et al., 2015). However, both were primarily nutrition education interventions which may show results quicker than policy or environmental change. Longer programme sign-up time frames for tribally affiliated and more remote centres need to be considered if the programme is to expand to other centres in the region or around NZ.

Non-participation of centres targeted by U5E was low (n = 12). Reasons for declining U5E participation were collected from the U5E database. Four ECCs that were selected were not approached; three centres could not be contacted and were presumed closed; a further centre was deemed ineligible due to travel distance. Centres that declined did so due to time constraints, workload or other priorities. These reasons were similar to those expressed by schools in a school-based physical activity intervention in the Netherlands, though additional reasons centred around schools already completing the activities offered by the intervention, children perceived as physically active enough and participation in other school-based physical activity programmes (Janssen et al., 2013). The latter reason was not an issue for ECCs in NZ as there are no national physical activity programmes for preschool children in NZ. Non-participating centres were

equally distributed by centre type and Equity Index. However, more centres declined in the North Waikato cluster (n = 8) compared to other clusters (Thames-Hauraki n = 1 and South Waikato n = 3) and the proportion of enrolled children identifying as Māori was slightly higher compared to U5E (44% compared to 38%). Overall, centre non-participation in U5E was low and the reasons for not participating were similar to another education based programme.

One of the reasons for U5E achieving high reach of targeted centres was that the programme appeared to meet a perceived need to improve poor food choices among preschool children enrolled in ECCs. Qualitative responses supported these notions with educators reporting that while ECCs had made some efforts to improve children's food choices, additional direction and endorsement was needed. U5E appeared to be providing this external support to educators to make improvements to food choices by communicating food guidelines to children and whānau. Acknowledging previous efforts of centres in both nutrition and physical activity was an important strategy used by the Energizers to engage centres in further positive change. The preschool-specific focus of U5E was also ideally suited and welcomed by educators. U5E provided the tools such as workshops and printed resources for parents to encourage food choice improvement.

The ECE sector has limited availability of programmes, especially those addressing nutrition and physical activity, and programmes usually have restricted or no centre level support, which can make engagement less likely. In contrast, schools have been described as a 'virtual dumping ground' for programmes from outside organisations, including health promotion (Austin, Bell, Caperchione, & Mummery, 2011). There are only two national nutrition programmes available to ECCs, namely the Heart Foundation HHAs and 5+ A DAY. As well as its own activities and resources with regular on-the-ground support, U5E delivered both of these programmes and in 2015, added He Pi Ka Rere, a preschool physical activity initiative specifically for Te Kōhanga Reo, to its delivery options. By offering a range of preschool focused options, from which centres can choose to engage, U5E perpetuated the success of the Energize model by being a 'one-stop shop' for nutrition and physical activity (Rush et al., 2011). Lack of flexibility was a barrier to use of a FMS programme, FunMoves, in ECCs in Australia (Petrunoff, Lloyd, Watson, & Morrissey, 2009). Provision of support from U5E enabled ECCs to participate in these additional programmes as 5+ A DAY provided no local support (printed resources mailed to centres) while the Heart

Foundation offered minimal support (part time staff member for the whole of the Waikato, responding to multiple contact points with external agencies). U5E offered a suite of options for centres to engage with including existing preschool programmes, 5+ A DAY and HHAs.

The fit of U5E with centres was another major reason for the high reach of U5E. The programme catered for the variety of centre philosophies, policies and practices, underpinned by its flexible nature and by the Energizers developing strong relationships with the centres. Fit between the school PLAYgrounds programme (6–12 years) and the Physical Education (PE) curriculum was highlighted during interviews with PE teachers (Janssen et al., 2013), although, the PE curriculum was only one of three aspects of the programme. Other aspects were tailored playground spaces, supply of physical activity equipment and stepped timing of recess to reduce the number of children in the playground at one time. In contrast, interviewees from centres in U5E referred to the fit of the entire U5E programme to their centre philosophy, policies and practices. Austin et al. (2011) also found that the fit of the intervention to the school environment was a facilitator to the implementation of the Play Zone physical activity programme; however, a lack of fit between the programme and school goals and usual practices was a barrier to full engagement. The Energizers worked effectively alongside the centres and facilitated a good fit by adapting the programme to meet centre needs as the programme developed.

U5E was designed to be flexible and centre staff reacted favourably to this accommodating approach. The suite of activities offered by U5E aimed to meet the needs of the diverse range of centres in NZ, allowing centres to select activities to support their communities to eat well and be physically active. This was another reason U5E achieved high reach. In contrast, the PLAYgrounds programme involved provision of a ‘complete intervention package including funding, support and research’ (Janssen et al., 2013, p. 214). This prescriptive programme was thought to be preferred because schools had large existing workloads and their priority was learning rather than physical activity (Austin et al., 2011; Janssen et al., 2013). Like schools, ECCs are busy places where the main focus is learning (Janssen et al., 2013) with limited time for other initiatives. U5E added minimally to the workloads of educators by the Energizers streamlining documentation, encouraging task-sharing between educators within centres, and providing new ideas and printed resources for nutrition and physical activity promotion to the ECC community. U5E offered support and research

(evaluation) but no funding directly to centres. However, centres participated at no cost, rather than receiving any additional funding or equipment. Interestingly, only one educator commented on the ‘free’ nature of U5E but perhaps centres did not expect to pay for a health related programme as these are typically free. Similarly, the HHA and 5+ADAY programmes are also provided at no cost to ECCs. A flexible approach to use of programme activities suited ECCs in U5E.

The presence of infrastructure to support reach has been shown to positively influence the dissemination of interventions (Mitchell et al., 2016). In a RE-AIM analysis of community-based weight loss programmes compared to efficacy-based programmes (Mitchell et al., 2016), lack of infrastructure, in terms of location of facilities, was a limiting factor to programme reach, especially as programmes were not available to remotely located participants. While shown to be important for reach of weight loss programmes, it is also of relevance to the Project Energize model in that the Energize model relied on infrastructure in the form of local, ethnic-specific health providers and Energizers, providing local community networks and face-to-face contact, to engage participants in local areas. Use of existing providers that have broad infrastructure and consequent high reach was recommended by Mitchell et al. (2016). Furthermore, Energizers can be described as ‘linking or change agents’ between the adopter (in this thesis, the ECC) and the health agency or source of the health initiative, Sport Waikato (Monahan & Scheirer, 1988, p. 419). Linking agents can be organisations or individuals who make face-to-face contact, convey information and actively encourage change within a target agency. The extent of face-to-face contact between the linking agent and the adopter has also been shown to be highly influential in the diffusion of a health promotion programme, as are credibility of the linking agent and pre-existing relationships (Monahan & Scheirer, 1988). Kanohi-ki-te-kanohi contact, the credibility of Sport Waikato and hence the Energizers in terms of sound nutrition and physical activity advice, and pre-existing relationships with ethnically affiliated local health providers, and between one Energizer and tribally affiliated centres, all featured in the interviews as important reasons for the high reach of U5E.

An unintended benefit of U5E was the positive intra- and inter-centre connections made during U5E. While U5E activities provided the reason to connect, for example, to engage in discussion and learning about physical activity and healthy eating, the ECCs responded by initiating and organising centre community events with limited Energizer support. Prior to U5E, inter-centre connections appeared uncommon despite Te Whāriki

containing a community engagement strand. Intra centre connections (Figure 5.9) were obviously in place prior to U5E; however, U5E added a positive reason to engage with families which met both centre and U5E goals to improve the health of children. It must be acknowledged that these connections were taking place within busy environments, families and early childhood centres, with some centres operating under a business model (23% in U5E, low compared to national proportion of 54%), suggesting that time to connect may be limited as well as a low priority. Increased communication about nutrition, in particular fruit and vegetables, between parents and early childhood centre providers was found in the ‘Lunch is in the Bag’ programme and thought to be the first intervention to demonstrate this important feature of obesity prevention among children under five (Sharma et al., 2015). Furthermore, the American Dietetic Association supported increased communication between parents and childcare providers as an essential step in obesity prevention to facilitate discussion of food and beverage choices for children (American Dietetic Association, 2011).

The intra- and inter-centre connections, built as a result of U5E, appeared to be a form of community capacity building known as “collective efficacy” in a framework for child health promotion (Mistry et al., 2012, p. 1691). It was described as an essential step in this framework which recommended that policy makers develop policies or programmes to ‘enhance capacities’ as it is one of the “foundations of health” for children (Mistry et al., 2012, p. 1689). Community capacity can influence child health through institutional resources and collective efficacy. ‘Institutional resources’ are community features including ECCs, and fruit and vegetable shops which influence the health of a child. For example, an ECC that serves a high proportion of unhealthy food choices on the menu makes it difficult for a child to be adequately nourished.

“Community efficacy” is defined as “the ability of communities to establish informal social structures and a broad sense of mutual trust and shared values” and works synergistically with family capacity building, with parents having an important role in both, to support child health and development (Mistry et al., 2012, p. 1692). U5E appeared to be contributing to capacity building of ECCs within communities through increased communication.

Barriers to engagement and reach of U5E were few and effectively overcome by the Energizers’ skills, knowledge and kanohi-ki-te-kanohi support. The main barriers were expectations about how the programme would promote physical activity, management and reporting of the stocktake data and a perception by some educators that children

were already active and eating well. The Energizers reported using their communication skills, kanohi-ki-te-kanohi contact, knowledge of how the programme worked and delivery of workshops to overcome these barriers, well supported by ongoing professional development from Sport Waikato. Clarity of the U5E goals and activities with centres at the outset was important, as some centres expected provision of equipment and physical activity sessions with the children, based on past interactions with Sport Waikato, whereas the U5E model was a 'train the trainer' approach providing support and ideas to enhance educator delivery to children. Communication skills were paramount, along with acknowledgement of previous efforts and experiences of centres in FMS development and healthy eating. Details of the storage, use and reporting of stocktake figures by Sport Waikato was provided to centres to allay data ownership concerns, although data comprehensiveness may have been affected by this. Delivery of workshops in nutrition and fundamental movement skills has benefitted centres by increasing educator awareness and knowledge of healthy eating and FMS and as a result, policy and practices were beginning to change. Well-trained and skilled Energizers, together with provision of on-the-ground kanohi-ki-te-kanohi support, were successful in overcoming participation barriers in U5E.

RE-AIM has been minimally used as a framework for evaluating nutrition interventions, especially those in the early childhood setting. In a systematic review of RE-AIM use, of the 71 articles published between 1999 and 2010 included in the review, around a third ( $n = 26$ ) addressed physical activity and obesity but nutrition was absent as a major topic (Gaglio et al., 2013). Even though RE-AIM has been used more widely for assessing interventions targeting physical activity, these have not been in the early childhood setting. Community or policy settings and primary care were the settings where RE-AIM has been mainly employed (Gaglio et al., 2013). Since this review, RE-AIM analyses of nutrition-based interventions have been reported (Caperchione et al., 2016; Huye, Connell, Crook, Yadrick, & Zoellner, 2014; Nothwehr, Haines, Chrisman, & Schultz, 2014; Schwingel, Gálvez, Linares, & Sebastião, 2016; Shanks & Harden, 2016) but in target groups; namely school children, adults, older adults and restaurants. Only one intervention was found using RE-AIM as the evaluation framework in the preschool setting, assessing the nutrition knowledge of kindergarteners before and after resource-based teaching sessions (Larsen et al., 2017). Although the target group for this intervention were called 'kindergarteners', these children were 5–6 years old which is different to the NZ ECE setting where children at kindergarten are younger, 3 to 5

years old. Furthermore, certain dimensions of RE-AIM such as participation at the setting and individual levels, along with maintenance, were often excluded in research applications of RE-AIM (Gaglio et al., 2013). To determine the overall public health impact of nutrition and physical interventions, greater use of the RE-AIM framework was needed in a range of settings, including early childhood centres, together with measures of efficacy.

#### **5.4.1 Strengths and limitations**

The strengths of this study have been the ability to track and evaluate an early childhood nutrition and physical activity programme from its inception. The close, collegial relationship with staff and the programme has enabled the researcher to experience the process both as a whole and in parts (through the four cluster areas), and to get feedback in real time, facilitating the iterative process of data gathering and interpretation. The action research approach with a qualitative, reflective component has provided U5E programme management with timely feedback from participants (educators and parent educators, in parent-led centres, not children), adding value to the contracted programme evaluation plan. For example, priority was given to the provision of all printed materials in Te Reo after interview responses indicated that Te Kōhanga Reo participants preferred this option to fit with their kaupapa and message delivery to tamariki and whānau. Furthermore, the researcher has a public health nutrition qualification and background, qualification in ECE (achieved through Playcentre), an existing relationship with Sport Waikato's Project Energize from previous roles and a shared vision of improving childhood health through supportive environments.

The association with Sport Waikato's Project Energize was another major strength of this research. U5E built on the successful systems, processes and experiences including a way of working used in Project Energize, and adapted them to work in the early childhood sector. This included a meticulously collected, objective database of the daily Energizer engagement and activities completed by the Energizers, and made available to the researcher for this research. An example of this was having the dates recorded for every step of the engagement process, which enabled the calculation of time taken to engage. Attendance at the U5E fortnightly team meetings by the researcher provided a wealth of background information on the programme's progression that not only informed this study design and interpretation but also facilitated data collection and presentation of study findings to support ongoing programme development. To illustrate this, using the example outlined above, the Energizers commented that Te Kōhanga Reo

took the greatest amount of time to sign up to U5E, and the data-based calculation of time taken to engage confirmed this. Consideration of this finding is important for ongoing programme implementation and future roll-out of U5E as Te Kōhanga Reo have cultural and organisational processes that need to be accommodated.

Qualitative assessment of reach, also a strength of this study, can aid the interpretation of quantitative results, yet it is rarely conducted. The systematic review in 2013 of RE-AIM usage, since its introduction in 1999 until 2010, showed that only eight out of 65 (12%) studies employed a qualitative analysis to comprehend reach and in fact qualitative analysis was a minimally used form of analysis across all dimensions of RE-AIM (Gaglio et al., 2013). The only RE-AIM analysis of a preschool intervention found in the scientific literature, addressing either nutrition and/or physical activity, in this case nutrition, used quantitative rather than any qualitative measures to assess reach (Larsen et al., 2017). Gaglio et al. (2013) highlighted the importance of qualitative research to enhance the understanding of RE-AIM results. Interviews with ECC representatives, in this study, were conducted to explain in detail why almost all the centres invited to participate in U5E joined. This analysis demonstrated the suitability of the 'Energize' model, with minor adaptations, to the preschool setting.

Limitations of this study include that the calculation of reach in RE-AIM used the original sample identified by U5E management as the denominator and this was determined on geographic proximity to the location of four Energizers, distance and health providers. No other centres were approached although centres external to the programme contacted U5E asking to be involved and were subsequently placed on a wait list should further funding become available. Comparisons with regional and national data were included to provide a broader assessment of reach. The slightly higher proportion of Māori children in non-participating centres shows that the U5E target group was close but not truly representative of the population. Lack of investigation into why these centres did not participate by the researcher represents a missed opportunity to provide more detailed insight which would have had the potential to strengthen future expansion. However, contact with these centres would have required the approval of U5E programme management and these centres may not have welcomed investigation having not agreed to the programme. Glasgow et al. (1999) noted that as well as being problematic to gather feedback from non-participants, it may breach the ethical approval of the study. Calculation of the denominator for reach was

influenced by the programme aims and funding, therefore may not be truly accurate; however, comparisons with regional and national data were also presented.

The timing of the relatively small number of interviews for some centres was not always optimal. Some were in the implementation phase rather than at an earlier post-initiation stage, meaning participants had to recall the early phase of the programme. A rolling schedule of interviews at a defined life stage of the programme, for example, after one year for each centre, may have helped avoid this. An additional limitation of the interviews was that two of the 13 participants were new to the role as the U5E representative for their centres, although they were not new to the centre and met the inclusion criteria. As a result, their responses were recalling the sign-up process from an educator's perspective rather than as the U5E representative, as intended. This may have been avoided by having an additional exclusion criterion stating that the U5E representative had to have held the role for at least six months. Interviews scheduled earlier in the programme life stage may have also prevented this limitation.

The sample recruited for the interviews may have included centres that were motivated to be involved rather than being representative of the target group for this research. Only two responses, a Playcentre and a Kōhanga Reo, were received from the initial participation information sheet invitation delivered to all centres by the Energizers. This required centres to respond to the researcher by phone or email. A further 11 centres were recruited by the Energizers following up the participation information sheet inviting centres to participate. Those agreeing to participate were followed up by the researcher by phone, as were all responses. The Energizers may have unwittingly approached centres they thought more likely to participate compared to others. However, qualitative research does not sample based on representativeness like that required for quantitative research, but rather samples people because they are 'good sources of information' to help answer the particular research question (Braun & Clarke, 2013, p. 56). Additionally, Braun and Clarke (2013, p. 58) highlight "hard to reach" or "hidden populations" are not usually recruited through typical sampling methods. These include poorer or less educated communities, people who have had adverse research experiences, leading to avoidance of future approaches, including Māori (Smith, 1999), rurally located groups and those who may face a risk of disclosure by participating. By sampling and recruiting a range of centre types, including Kōhanga Reo, and centre locations (including centres located in low socioeconomic areas), this research aimed to produce 'insight and in-depth understanding' (Patton, 2002, p. 230),

provide a “diversity of perspectives” and “give voice” to all centre types including Kōhanga Reo (Braun & Clarke, 2013, pp. 56-58).

Definition of the geographic area for U5E prior to engagement unwittingly excluded some centres within ECE organisational groups, especially Kōhanga Reo. This was identified in the early stages of the programme as each Kōhanga belongs to a group of centres, geographically close, known as a ‘purapura’, meeting regularly for collegial support. In some instances, the Energizers were invited to present U5E to the purapura, in addition to individual Kōhanga Reo, but unfortunately not all the Kōhanga Reo at the purapura were able to join U5E as they were outside the targeted areas. As Kōhanga reo were a centre type of interest to the Ministry of Health, specification of including Kōhanga Reo based on purapura clusters would be advisable, if the programme was to be expanded further.

The representativeness of U5E was influenced by Ministry of Health funding criteria for maternal and child health programmes in one cluster compared to the other clusters. The Ministry’s contractual requirements specified that providers, in this case Sport Waikato, develop initiatives that preferably included partnerships with other organisations (Ministry of Health, 2012c). This prompted Sport Waikato to replace a prior linkage with the Waikato Kindergarten Association with a more formal partnership, effectively engaging 34 kindergartens in U5E. This formed the Hamilton cluster although in addition to Hamilton, kindergartens in surrounding towns Cambridge, Ngaruawahia and Raglan were also enrolled. This excluded all other centre types in this cluster. The partnership enhanced the participation and engagement of all 34 centres identified by WKA and reduced the Energizer’s workload as WKA signed the Memorandum of Understanding for all 34 centres (Figure 4.4). Despite this, the time taken to engage kindergartens from all four clusters was not significantly less compared to other centre types (Chapter 5.2). Nevertheless, it denied participation of other centre types including Te Kōhanga Reo (six in Hamilton) and engaged centres from lower need areas such as Cambridge and Hamilton East. One participant from a centre located in one of these lower need areas commented that her centre already held the Pa Harakeke (gold) HHA prior to U5E and received limited benefit from involvement although what had been relevant, in particular the workshop on food labelling, was valued. While reach to Māori and children in high need areas was achieved in three of the four clusters, it was limited in the Hamilton cluster by Ministry funding criteria directing providers to include external partnerships.

In summary, the key elements of U5E that distinguish it from other programmes were the time and effort invested into firstly designing a programme to cater to the range of centre types within the ECE setting in NZ and prioritisation of building long-term relationships with the centres. This was based on credibility, trust, delivering the programme as described and the positive way Energizers worked with the centres. Despite the limitations, this study showed U5E achieved high reach, in terms of both participation and representativeness. A strength of this study was the qualitative element, which presented multiple reasons for the high reach of U5E, including that U5E fitted well with centres, was a flexible ‘way of working’ with centres that met their needs and provided benefits which became more tangible as the programme progressed.

#### **5.4.2 Conclusions and recommendations**

This study provided a comprehensive analysis of the reach dimension of RE-AIM by the inclusion of both quantitative and qualitative analyses. This is rare in the published literature particularly for public health services and informs recommendations for future roll-out of the programme.

Health policies direct health providers to develop initiatives to address inequities that exist in health in NZ, with efforts targeted at those populations most in need, especially children. This research study showed how targeting specific geographical areas and the ECE setting, in particular centres with high-enrolled populations of Māori and located in high need areas, contributed knowledge of how to engage these centres. This approach is recommended as it is cost effective from efficient use of Energizer time by building the capacity of centres to shift centres’ norms towards healthier environments for children.

Decisions on the geographical boundaries of the target populations should take into account the boundaries of the various centre organisations to facilitate engagement. In particular, Te Kōhanga Reo, belong to a purapura (cluster of centres) and consideration of Te Kōhanga Reo boundaries, to include all those within each purapura, is recommended, rather than fragmenting established groups. Consideration of the greater sign-up time required for Te Kōhanga Reo needs to be factored into the time allowed for the programme engagement. Target groups containing more Te Kōhanga Reo will require additional time compared to other centre types for kanohi-ki-te-kanohi consultation and cultural organisational processes.

Engagement of 34 kindergartens as a group in one cluster, using an organisational agreement, was an effective way to sign up a large number of centres. Although other centre types in the Hamilton cluster were excluded, it was an engagement method that could be applied to all centre types. Centres could either be signed up as groups of centres including kindergartens, or in the case of parent- or whānau-led centre types, Playcentre and Te Kōhanga Reo. U5E should seek support from centre organisational bodies and encourage the communication of organisational support of U5E to individual centres. This is essential if nutrition and physical activity policies are to be adopted by organisations. This recommendation assumes organisational support of U5E policies and practices; however, if this is not evident then effort should be directed at the organisational body to encourage change, prior to seeking engagement of individual centres under its jurisdiction. This has the potential to be time saving for the Energizers and potentially increases programme reach.

Steps that preceded the engagement process, namely the community hui, could be delayed or excluded from the U5E engagement process (Figure 4.2). Community hui aimed to raise awareness of the programme among centres and the wider community. However, poor attendance by centres and recognition by the Energizers that *kanohi-ki-te-kanohi* was the preferred method of engagement for many centres, especially Te Kōhanga Reo, provided evidence for this recommendation. Community hui may be more useful once centres in a community are signed up, to provide another opportunity to find out more about how the programme works and connect with other participating centres in their community for collegial support and future joint nutrition and physical activity events such as celebration of Matariki. Educators found that connecting with other centres in their community through U5E, mainly for physical activity events or workshops, was an advantage of involvement in U5E. It was recommended that community hui, held after centres had signed up rather than before, could initiate inter-centre connections as well as informing community agencies of the aims of the programme.

Participation in the Hamilton cluster involved centres in low need areas, some of whom were already following best practice nutrition and physical activity. Future roll-out of the programme should consider either only approaching centres with an Equity Index of 1 to 3 (sourced through the Ministry of Education Early Education database), similar to the Fruit in Schools programme. This is provided to Decile 1 to 3 schools to reach 30% of the poorest schools (<http://www.health.govt.nz/our-work/life-stages/child->

health/fruit-schools-programme). Other centres (Equity Index 4, 5 or 5+ or located in low need areas) could access an abridged version of U5E. All centres could undergo an initial screening process using the existing audit (Chapter 6.1.1, Appendix B: Stocktake) to determine if they are already providing the required level of nutrition and physical activity for ECC, for example, having achieved one or more levels of the HHA or showing evidence of physical activity policy and practices that develop fundamental movement skills. Based on the screening result and discussion with the centre during engagement, centres would be allocated to the full or abridged version of U5E. The full version would be the programme as it is currently provided and the abridged version of U5E could consist of notifications of professional development in nutrition and fundamental movement skills, access to associated resources and regular communications and phone contact with the Energizer, rather than regular face-to-face contact. However, the engagement process would need a similar investment of time by the Energizers to build relationships with the centres and screen effectively. Centres should also have the ability to opt up or down as needed, for example, a centre may request increased Energizer contact and services when a group of new staff are employed. Responses from existing high functioning centres within U5E support the need for an abridged version of the programme especially after a period of time receiving the programme, estimated to be around 18 months to two years. This new method would be more cost effective by directing services and expertise to where it is most needed.

The timing of the initial approach to identified centres may not have suited the centre workload and priorities although it suited 93% of the targeted centres. Non-participating centres with this issue need to be offered the opportunity to be followed up at a later date. For example, if a centre is focused on an Education Review Office assessment then an approach after this event may be more suitable. Subsequent to this study finishing, this option was tried by U5E and was successful in engaging most centres who had initially declined due to workload issues.

### **5.4.3 Summary**

This study in the ‘real world’ and ‘real time’ setting of U5E used the RE-AIM framework to assess the overall public health impact of U5E. This work is unique because it was not the usual well-controlled research environment which focuses on efficacy and requires a control group to answer the question, – “Does the intervention ‘work’ in principle?” In addition, U5E is ongoing (at the time of writing) and maintains

the same key face-to-face personnel and centres throughout each year. U5E is indicative of initiatives DHBs around NZ develop within the population health service but they may not have a comprehensive evaluation model or plan such as RE-AIM. Convincing, triangulated evidence has been presented that the intervention was effective in reaching the target community (121 ECCs with an emphasis on Māori and low equity participation) and that the community (over 4500 children, 3000 families and 700 educators) were increasing engagement with the process and activities.

## **Chapter 6. Implementation and effectiveness of Under 5 Energize**

An environment that promotes and role models healthy food and physical activity behaviours will be supportive of the development of childhood healthy behaviours and has gained recognition as an essential obesity prevention strategy (Osei-Assibey et al., 2014). Creating supportive environments is one of the five action areas of the Ottawa Charter for health promotion, first proposed 30 years ago (WHO, 1986). The topic of interest in this chapter is the influence of U5E on the food and physical activity environment within participating ECCs and this is measured by milestones in the implementation of U5E.

This section of the study uses a range of measures to evaluate the implementation and effectiveness dimensions of the RE-AIM framework of U5E within ECCs.

Implementation is the degree to which the planned activities of the intervention take place as intended including investigation of possible barriers to implementation such as cost and acceptability of activities. The effectiveness domain is the extent to which the intervention meets its desired outcomes or impact without adverse consequences (Glasgow et al., 1999).

The first part of this study aimed to determine within each ECC the structural and administrative changes concerning the physical activity and food environment that occurred because of involvement in U5E within the first two-years. The number and type of nutrition and physical activity goals identified in ECC action plans, whether they were achieved and how they related to the U5E programme goals, were investigated in the second part of this study as a method of measuring the extent of implementation of the U5E programme.

### **6.1 Physical activity and food environment audit**

#### **6.1.1 Method**

The audit questionnaire aimed to assess physical activity and food environmental factors considered important in the behaviour of an early childhood centre to positively encourage children and families to eat healthy food and be physically active. The Project Energize physical activity and food environment stocktake questionnaire for primary schools, provided by Sport Waikato, was modified to suit the early childhood sector and used as the baseline survey questionnaire (Appendix B: Stocktake). The two-

year follow-up questionnaire did not ask the centre characteristic questions again to reduce respondent burden. Five questions were added to reflect changes related to the implementation of the U5E programme. The new questions included one to provide an estimation of the yearly turnover of staff and children at ECCs and two questions to provide information on whether centres had made changes to improve the availability of healthy food and decrease the availability of unhealthy foods. A fourth question was added to find out whether centre staff had attended professional development facilitated by U5E in nutrition and physical activity and the fifth required centres to report how the quality and quantity of physical activity and food choices had changed since being involved with U5E.

The stocktake audit was administered at two time points, one when the programme began (2013) and the second approximately two years later (2015). The first stocktake was conducted as part of the engagement process of U5E at the beginning of the programme between August 2013 and August 2014 (as centres joined the programme) (Figure 4.1) and repeated between August 2015 and February 2016. In consultation with the Energizer, the centre liaison educator completed each questionnaire.

All (n = 121) ECCs completed the baseline audit. The nutrition and physical activity environment of early childhood centres is described at baseline using numbers and percentages of the total number of participating centres for the following factors: food and nutrition education and programmes operating within the ECC, food rewards and fundraising, food provision at centre and use of electronic devices and screens within centres. The frequency of consumption of lunchbox foods was assessed by the educator recording frequency of a range of foods typically consumed at the centre either from home or provided by the centre from the following frequency options: all the time, frequently, sometimes, rarely or never or don't know. A total of 35 foods were included although only 16 (common lunchbox foods and beverages) (Table 6.5) were selected for the analysis. The food and physical activity policy questions asked centres to document whether they had written (policy or guidelines) or unwritten (policy or guidelines) for three physical activity (Table 6.6) and 14 food topic areas (Table 6.7). In the 87 ECC, that completed follow-up, stocktake responses were compared to baseline, the number of changes noted and the proportion of ECCs changing used as an objective measure of implementation of the programme.

Table 6.1 Sequence of activities and messages in relation to measures of change: Baseline 2013 Follow-up 2015

<b>Date</b>	<b>Message</b>	<b>Baseline measures</b>	<b>Activities</b>	<b>Outcomes</b>
August 2013	Less sweet drinks More active play every day	Existence of a nutrition and PA policy Frequency of consumption of sugary drinks	Sugary drinks workshops for educators and parents Printed resources for parents Posters for ECC Policy development support Messaging in parent newsletters	Policy and practice change Change in frequency of consumption of sugary drinks
July 2014	Daily fruit and vegetables Less energy-dense snacks More active play every day	Policy Frequency of consumption of selected every day and occasional foods Number of HHAs	Healthy lunch-box workshops for educators and parents Printed resources for parents Support to achieve HHA Displays at pickup/drop-off of nutrition messages Modelling of FMS	Policy change Change in frequency of consumption of selected every day and occasional foods Increase/decrease consumption of healthy foods Number of HHAs
July 2015	Less screen time	Policy Screen time use	Food labelling workshops for educators and parents Eating for Under 2's workshops for educators and parents Printed resources for parents Modelling Events Resources	Increase/decrease in quality and quantity of PA Awareness of U5E programme and messages

*Note.* ECC = early childhood centre, FMS = fundamental movement skills; HHA = Healthy Heart Award; PA = physical activity; PD = professional development

### **6.1.2 Approval to audit U5E data**

External ethical approval was not required as the audit was a measurement of ECC policies, guidelines and practices in order to effectively deliver a health programme. Centres signing the U5E MoU agreed to information collection for quality control and programme development purposes, including the audit and action plans. For purposes of reporting, data were de-identified and anonymised. Approval and oversight for the researcher to use the data collected by the Energizers from participating U5E early childhood centres and stored in the U5E database, was obtained via email from the U5E programme manager.

### **6.1.3 Statistical analysis**

Responses from baseline and follow-up questionnaires were entered (LY) into a Microsoft Excel™ (2010) database and then transferred to IBM SPSS statistics version 23 (IBM, [www.ibm.com](http://www.ibm.com)) for analysis. The data were aggregated and de-identified. Data cleaning was conducted by the researcher to ensure the data were correctly entered and were feasible. Continuous data were explored for normality by comparing median and means, kurtosis and skewness and inspection of box plots. Numbers of centres and percentages of the total number of centres are used to describe transience, attendance at nutrition and physical activity training, and the changes made since attending the training, and involvement in U5E. The frequency of consumption of 16 selected every-day and sometimes foods and beverages (<http://www.fuelled4life.org.nz/about>) variable was converted to continuous scale 0.05 (rarely or never), 0.2 (sometimes), 0.6 (frequently) and 1 (all the time) (Table 6.2). Independent t-tests compared the frequency of consumption at baseline between centres that had follow-up data and those who did not. Paired t-tests (two-tailed) were used to determine differences between the two time periods for the food and beverage consumption frequency (16 foods and beverages) of 87 centres. The number of centres with unwritten and written physical activity and nutrition policy categories were counted and a chi-squared test was used to determine if there was a difference between baseline and follow-up audits. Percentages of centres reporting each policy category at baseline and follow up were also calculated.

Table 6.2 Frequency of consumption of food and weighting factor used to standardise to a daily rate

Frequency of consumption	Interpretation	Weighting factor per day
Rarely or never	Once per month (20 days)	1/20
Sometimes	Once per week (5 days)	1/5
Frequently	Three times per week	3/5
All the time	Each day (5 days)	5/5

#### 6.1.4 Results

##### **The nutrition and physical activity environment of early childhood centres in 2013**

The following section provides a description of the baseline food and physical activity environmental practices in U5E centres and although change in these factors was not a major focus of this research, they provide an indication of the nutrition and physical activity environment within centres, as a backdrop to U5E.

##### ***Participation in food and nutrition education and programmes within ECCs***

Most ECCs (n = 107/121, 88%) in U5E reported having a vegetable garden within the centre. Eighty-three percent of centres (n = 101) reported teaching healthy eating as part of the centre curriculum and 84% of centres involved children in food preparation and cooking. Activities included food preparation (74%), cooking (74%) or process cooking (step-by-step cooking process, 58%). Only a third of centres were involved in the 5+ A DAY programme (n = 41, 33%), which involves national social marketing initiative for fresh fruit and vegetables and Enviroschools (n = 36, 30%), a programme and culture fostering sustainability that has synergies with promoting nutrition, for example in, reduction of waste such as food packaging.

##### ***Food rewards and fundraising***

Food was used as rewards for children in only 17 (14%) of centres. Of the 17 centres using food rewards, only three centres reported using rewards weekly, five used them monthly and four rarely used rewards. Five did not respond about the frequency.

Seventy centres (58%) indicated fundraising with food was occurring at their centre. Of those centres that used food as a fundraiser, 37 (53%) fundraised yearly, 22 (31%) once per term, 2 (3%) monthly and 2 (3%) weekly, with 3 (7%) reporting 'don't know' and 2 (3%) not-responding. Centres that fundraised with food were asked what food was used and the most frequently stated foods were sausage sizzles (26), food hampers (non-perishable foods) (23), cakes (18) and pastry foods including pies and sausage rolls

(16). Chocolate (6), homemade burgers (6) and hangi (4) were less frequently reported fundraising options. At community events, the major way of sharing food was by 'pot-luck' contributions from families. While most had no restriction on what was provided, some centres (n = 11) encouraged parents to provide healthy options. Sausage sizzles, hangi, salads, vegetables, and fruit were the foods commonly available at community events. Food was shared at birthdays by 108 (90%) centres and a wide range of practices was reported. Food was predominantly provided by parents and centred on a cake, possibly with additional foods such as a treat bag of sweets, potato chips and cheerio sausages. Some centres commented that they provided some guidelines to control the amount, type and timing of unhealthy food choices brought in for birthdays and others noted that they intended to develop guidelines.

### ***Food provision at centres***

The majority of centres (n = 113, 94%) allowed food to be brought from home and in most of these centres (n = 95, 84%) this occurred daily; in eight centres, food was brought in occasionally and this question did not apply for 10 centres. Around three-quarters (n = 85, 71%) of the centres also provided some form of food (child-centred cooking and baking activities excluded). Of the centres that provided food, only half provided food regularly (daily) (n = 47) and occasionally in 6 (7%) centres. Provision of snacks was the predominant form of food provided by centres (n = 60), while 30 centres provided lunch and 23 provided breakfast.

### ***Use of electronic devices***

Televisions or DVDs and computers were the main electronic devices used within centres by children in approximately two-thirds (n = 59, 68%) of centres (Figure 6.1). Around a third of centres (n = 32) reported children having access to an iPad.

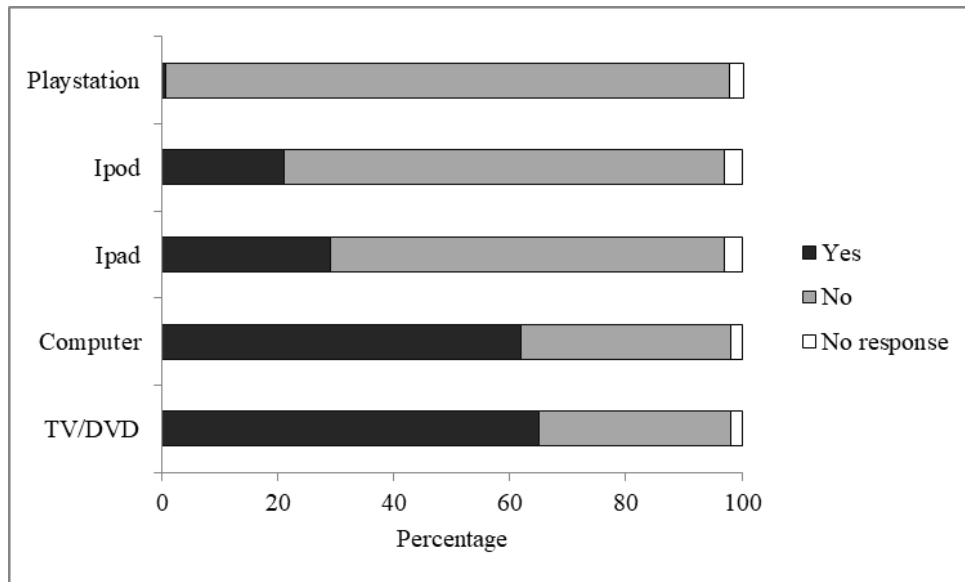


Figure 6.1. Use of screen-based electronic devices within centres in Under 5 Energize at baseline (2013)

### **The nutrition and physical activity environment in 2015**

#### ***Comparison of the characteristics of the baseline and follow up samples of the audit***

The follow up sample of 87 centres were attended by similar proportions of children by ethnicity ( $P > 0.95$ ) to those in the 121 centres. The proportion of low equity index centres in each sample were also not different (20% versus 18%), however, due to lower numbers of centres from one cluster completed the follow up stocktake (11 from 28) and therefore there was a higher proportion of kindergartens (Hamilton cluster was kindergartens only) and education and care centres compared to the earlier stocktake.

#### ***Transience of children and educators***

Excluding those leaving to go to school, approximately half of the 87 centres experienced a 20% change or less in enrolled children in the previous year (August 2014-August 2015), one-third of the centres reported greater than 40% change in enrolled children (Table 6.3). In other words, the rolls were not stable and a child had at least a one in five probability of transience in a year.

Table 6.3 Percentage change of children in Under 5 Energize early childhood centres during the past year (August 2014-August 2015) excluding 4 year olds

Categories of percentage change	Number and percentage of each category that have changed in the past year (n = 87 ECCs)	
	Number	Percentage
0–20%	41	47
21–40%	23	26
41–60%	16	18
61–80%	4	5
81–100%	2	2
No response	1	1

*Note.* ECC = early childhood centre

Few centres (n = 3) experienced a change of eight teachers or more in the previous year (August 2014–August 2015); however, one-third of centres reported a change of three or four teachers (Table 6.4). In the first stocktake audit, the reported mean number of teachers per centre was six and the median two suggesting a turnover of around half the staff in these centres, which is a potential barrier to programme implementation and maintenance.

Table 6.4 Number and percentage of educators who left or changed in the past year (August 2014-August 2015)

Categories of numbers of teachers	Number and percentage of teachers who left or changed in the past year (n = 87 ECCs)	
	Number	Percentage
0–2	48	55
3–4	30	35
5–7	6	7
8–10	1	1
Over 10	2	2

*Note.* ECC = early childhood centre

### ***Educator training and effect on practice***

The majority of educators reported attending professional development in physical activity and nutrition provided by the U5E programme, 97% percent for physical activity (n = 84) and 98% (n = 85) for nutrition. Educators indicated that the main changes made following attendance were sharing learnings with other centre staff (n = 81/84, 96%), feeling better informed about FMS (n = 78, 93%) and many were

including FMS development into general play at the centre (n = 77, 92%) (Figure 6.2). Although lower compared to the afore mentioned changes, using equipment differently to promote FMS development, changes to policy or practice and purchasing new equipment were reported by at least 70% of the educators who attended professional development.

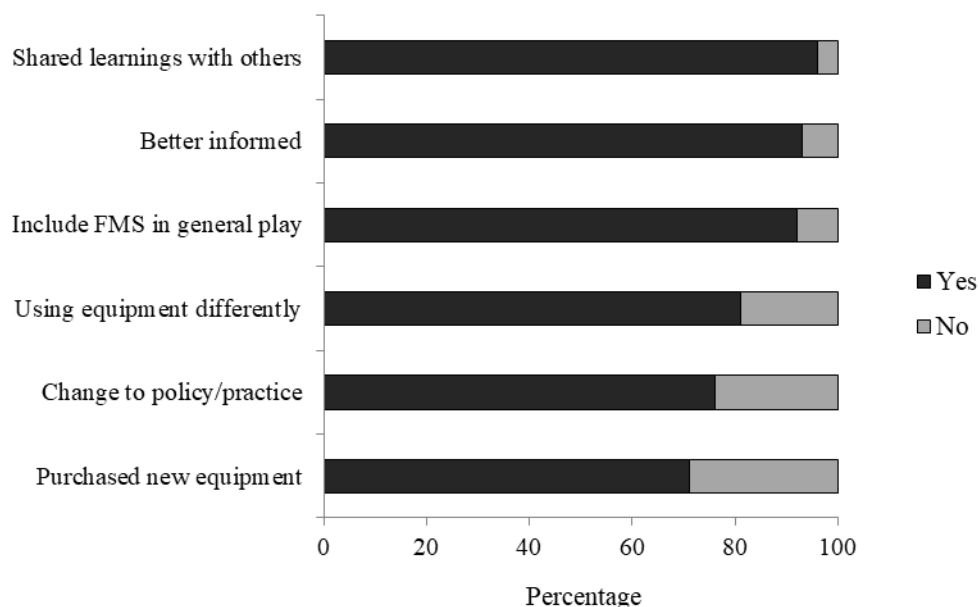


Figure 6.2. Improvements reported by educators following attendance at professional development sessions of those who attended sessions (2015)  
FMS = Fundamental movement skills

### ***Quality and quantity of physical activity at centre since joining U5E***

The majority of respondents indicated that the quality and quantity of physical activity at centres since joining U5E has improved (n = 51, 57%) or improved greatly (n = 22, 24%). Small numbers reported that the quality (n = 12, 13%) and the quantity (n = 17, 19%) of physical activity in the centre had not changed.

### ***Availability of healthy food choices***

Similar to the improvements in physical activity, over two-thirds of educators reported an improvement in the availability of healthy food and beverage choices because of involvement in U5E with 49 (56%) reporting improved availability and 25 (29%) reporting greatly improved availability. ‘No change’ was the response from 14 (16%) centres. Of these 14 centres, most had signed a MoU in 2013 (only one in 2014) and had taken around the mean times of eight to twelve months to fully engage. Ten were

kindergartens with a well-established organisational nutrition policy, suggesting respondents may consider that no further change was needed.

Of the centres that responded that either the availability of food had improved or improved greatly, the three most frequently reported food changes made were ‘more fruit’ (n = 62, 71%), ‘more water’ (n = 56, 64%) and ‘less packet foods’ (n = 54, 62%), as shown in Figure 6.3. The lowest frequency food changes reported were ‘less sweet treats’ (n = 40, 48%) and ‘more milk’ (n = 30, 34%).

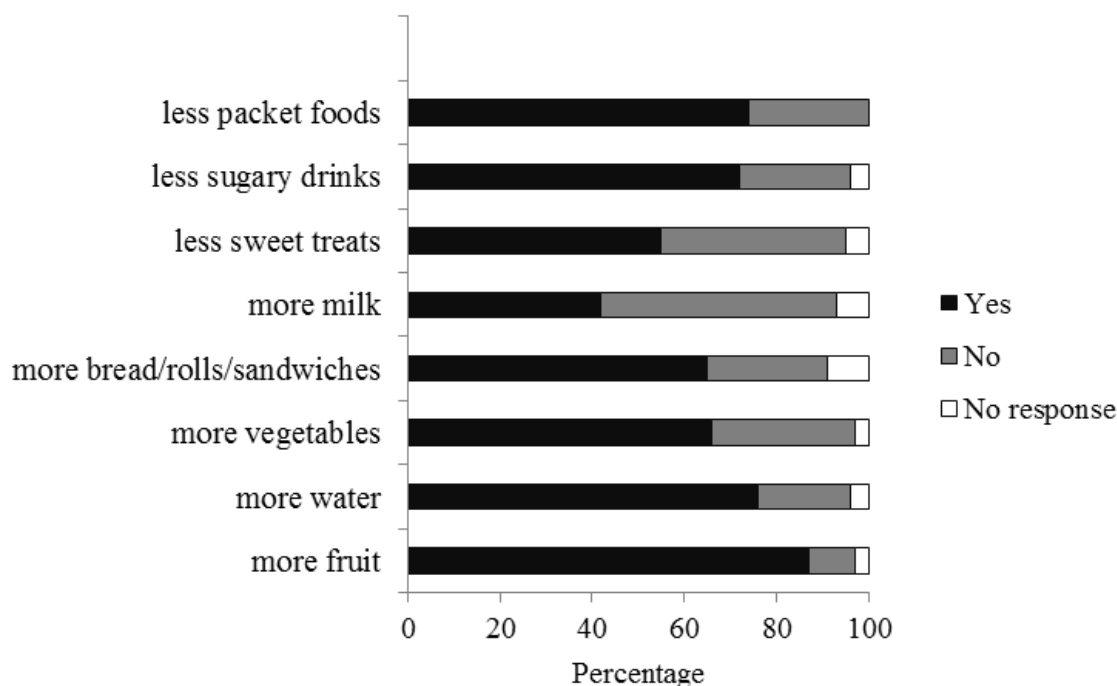


Figure 6.3. Main changes made to food and beverage choices in centres reporting that the availability of healthy food and beverages in centre had improved or improved greatly

Additionally, centres were asked if their involvement with U5E had improved the availability of healthy food and beverages provided or brought into the centre, and decreased the availability of unhealthy food and beverages provided or brought into the centre. Approximately two-thirds of centres indicated ‘yes’ to involvement with U5E improving the availability of healthy food and beverages (n = 69, 79%) and decreasing the availability of unhealthy food and beverages (n = 59, 68%). Few centres reported ‘no’ (n = 7, 8% and n = 10, 11% respectively) and ‘not sure’ (n = 8, 9% and n = 7, 8% respectively).

### ***Frequency of consumption of key lunch-box foods***

The frequency of consumption of the 16 key lunch-box foods and beverages changed significantly for all foods and beverages excluding water, bread or bread rolls and full

fat milk (Table 6.5). Everyday foods, such as vegetables, fruit, sandwiches, and reduced fat milk increased, and occasional foods and beverages, such as flavoured noodles, sweetened drinks, potato chips, cakes, fruit juice, flavoured milk, muesli bars, chocolate and sweets, and muffins all decreased. The largest effect sizes of 0.4–0.5 were seen for noodles, potato chips, cakes, vegetables, sweetened drinks and fruit; all in a favourable direction.

A change to the frequency of consumption of water and bread or bread rolls was not expected, as it was high at baseline. For water, 98% of centres reported consumption frequency of all the time (n = 114, 94%) or frequently (n = 4, 3%) at baseline, and it remained high (all the time n = 89, 99%), in line with ECE regulations to have potable water available at all times (Education [Early Childhood Services] Regulations, 2008). Similarly for bread or bread rolls, over half the centres (n = 71, 59% of centres) reported consuming breads all the time and a third (n = 35, 30%) frequently. This remained high among the 87 centres that completed the second stocktake (n = 59, 67%).

Table 6.5 Mean difference of frequency of consumption of 16 selected everyday and sometimes foods at 87 Under 5 Energize early childhood centres at baseline and 2 years 2013–2015

Food	Stocktake 1 – times/day			Stocktake 2 – times/day			Mean difference	95% confidence interval of the difference		<i>p</i> <sup>a</sup>
		±			±			Lower	Upper	
Bread or rolls	0.84	±	0.25	0.84	±	0.26	0.002	-0.081	0.084	0.967
Cakes	0.59	±	0.34	0.42	±	0.31	0.166	0.088	0.244	<0.0001 <sup>b</sup>
Chocolate	0.16	±	0.20	0.09	±	0.06	0.070	0.027	0.113	0.002
Cordial	0.15	±	0.20	0.07	±	0.08	0.080	0.037	0.123	<0.0001 <sup>b</sup>
Fruit	0.83	±	0.30	0.97	±	0.14	-0.134	-0.205	-0.063	<0.0001 <sup>b</sup>
Fruit juice	0.16	±	0.19	0.10	±	0.14	0.064	0.020	0.109	0.005 <sup>b</sup>
Milk, flavoured	0.19	±	0.22	0.11	±	0.10	0.084	0.035	0.133	0.001 <sup>b</sup>
Milk, plain, full fat	0.31	±	0.35	0.31	±	0.37	0.005	-0.103	0.114	0.924
Milk, reduced fat	0.16	±	0.25	0.26	±	0.34	-0.106	-0.202	-0.010	0.031 <sup>b</sup>
Muesli bars	0.56	±	0.35	0.43	±	0.35	0.130	0.048	0.212	0.002 <sup>b</sup>
Muffins	0.49	±	0.30	0.37	±	0.26	0.121	0.047	0.195	0.002 <sup>b</sup>
Noodles	0.28	±	0.31	0.13	±	0.15	0.149	0.091	0.208	<0.0001 <sup>b</sup>
Potato chips	0.58	±	0.38	0.37	±	0.32	0.206	0.115	0.298	<0.0001 <sup>b</sup>
Sandwiches	0.83	±	0.27	0.95	±	0.14	-0.116	-0.182	-0.050	0.001 <sup>b</sup>
Vegetables	0.61	±	0.36	0.81	±	0.27	-0.203	-0.302	-0.104	<0.0001 <sup>b</sup>
Water	0.98	±	0.14	1.00	±	0.04	-0.020	-0.051	0.011	0.202

Mean ±SD <sup>a</sup>Paired t-test, <sup>b</sup>statistically significant values when *p* < .05

### ***Physical activity policy***

At baseline, more than two-thirds of the 87 centres did not have formal written guidelines or policies for planned, daily and fundamental movement skills physical activities (Table 6.6). There was a substantial increase in the number of centres with written guidelines and policies at follow-up in all three categories of physical activity policy ( $p < 0.001$ ). Approximately 25 (30%) of the 87 centres reported shifts from having either no or non-written expectations about physical activity to having a formal written guideline or policy. Of the three categories of physical activity policy the most marked increase was in planned physical activity each week ( $n = 30$ ,  $p < 0.001$ ), followed by fundamental movement skills ( $n = 28$ ,  $p < 0.001$ ).

Table 6.6 Numbers of centres with unwritten expectations and written physical activity guidelines and policy for 87 Under 5 Energize early childhood centres at baseline, two years and change in 2013–2015

Categories of physical activity policy	No and non-written expectations			Written guidelines or policy		
	Before n (%)	After n (%)	Change	Before n (%)	After n (%)	Change
Planned physical activity each week (5,3)	55 (67)	27 (32)	↓***	27 (33)	57 (68)	↑***
Daily huff and puff (7,4)	70 (88)	51 (61)	↓**	10 (13)	32 (39)	↑***
Fundamental movement skills (5,2)	58 (71)	33 (39)	↓***	24 (29)	52 (61)	↑***

*Note.* (Number of missing data: before, after) NS not significant \* $p < 0.05$  \*\* $p < 0.01$  \*\*\*  $p < 0.001$  Chi squared test

### **Food and nutrition policy**

Eighty-seven per cent of ECCs reported having a written nutrition policy ( $n = 93$ ) or written guideline ( $n = 11$ ) at baseline. Education and care and Playcentre had the highest proportion of services with a nutrition policy (95% and 91%), followed by 89% of kindergartens and 79% of Te Kōhanga Reo. Fifty percent of the centres had both a written nutrition policy and written nutrition guidelines.

A consistent pattern of favourable change in every category of food procedures was observed at follow-up although not all were statistically significant (Table 6.7).

Approximately 15 of the 87 centres reported shifts from having either no or non-written expectations about food to a formal written guideline or policy. More than 20 centres made the change to a more formal policy for food brought from home in the following categories: sweet drinks ( $p < 0.001$ ), healthy brain food ( $p < 0.01$ ), reducing high-energy dense snacks ( $p < 0.05$ ). There were very similar increases in documented policy

categories of food provided at centre in particular (reduce sweet drinks  $p<0.001$ , increase healthy brain food  $p<0.01$ , reduce high energy low nutrient foods available  $p<0.001$ ). Additionally, 21 centres changed to a written policy for birthdays ( $p<0.001$ ) and there were statistically significant increases in written policy for food at events ( $n = 14$ ,  $p< 0.001$ ) and fundraising ( $n = 10$ ,  $p<0.01$ ). Only a small number of centres ( $n = 4$ ) indicated a change to written policy for sponsorship or fast food (delivered by parents), possibly because many centres considered this had little relevance to their centre community. The high number of missing (not answered) data for the questions on sponsorship or fast food indicated this.

Table 6.7 Numbers of centres with unwritten expectations and written food guidelines and policy for 87 Under 5 Energize early childhood centres at baseline, two years and change in 2013–2015

Categories of food policy	No and non-written expectations			Written guidelines or policy		
	Before n (%)	After n (%)	Change	Before n (%)	After n (%)	Change n (%)
<b>Food brought from home</b>						
Packet food high in fat and salt (8,10)	48 (61)	37(48)	↓NS	31 (39)	40 (52)	↑NS
Sweet drinks (9,7)	46 (59)	18 (23)	↓***	33 (42)	60 (69)	↑***
Fast food (7,26)	63 (79)	40 (66)	↓**	17 (21)	21 (34)	↑NS
High energy density snacks (6,8)	51 (63)	32(41)	↓*	30 (37)	47 (59)	↑*
Healthy brain food from four food groups (7,10)	43 (54)	18 (23)	↓***	37 (46)	59 (77)	↑**
<b>Food provided at centre</b>						
Healthy choices are preferred (4,6)	33 (40)	17 (20)	↓*	50 (60)	58 (72)	↑NS
Water always available (1,4)	17 (20)	6 (7)	↓*	69 (80)	77 (93)	↑NS
Sweet drinks (30,9)	39 (68)	28 (12)	↓NS	18 (31)	50 (64)	↑***
Healthy brain food (8,8)	40 (51)	17 (22)	↓***	39 (50)	62 (79)	↑**
Reduce high energy low nutrient foods available (9,9)	49 (63)	31 (39)	↓**	29 (37)	47 (60)	↑***
<b>Consistent messages</b>						
Food at events (3,6)	68 (81)	51 (63)	↓**	16 (19)	30 (37)	↑***
Fundraising (25,35)	57 (89)	37 (71)	↓***	5 (8)	15 (29)	↑**
Birthdays or celebrations (23,6)	44 (69)	40 (49)	↓NS	20 (31)	41 (51)	↑***
Sponsorship (34,62)	53 (100)	21 (84)	↓***	0 (0)	4 (16)	↑NS

Note. (Number of missing data: before, after) NS not significant \* $p<0.05$  \*\* $p<0.01$  \*\*\*  $p<0.001$  Chi squared test

## ***Healthy Heart Awards***

From the 121 centres engaged with U5E in 2015, 43 had gained a HHA, an increase from eight of over 400%, and now one in three U5E centres has an HHA (Table 6.8).

Table 6.8 Number of Healthy Heart Awards achieved by centres participating in Under 5 Energize at baseline in 2013 and 2016

<b>Levels of Healthy Heart Award achieved</b>	<b>August 2013</b>	<b>May 2016</b>
Rito	2	20
Whānau	1	8
Pa Harakeke	5	15
Total	8	43

*Note.* Rito = bronze; Whānau = silver; Pa Harakeke = gold

## **6.2 Action plans**

### **6.2.1 Method**

Each centre developed an action plan with support from the Energizer based on the U5E programme goals and using the findings of the first stocktake and needs analysis (Figure 4.1). It outlined the actions the centre would undertake in partnership with the Energizer, in both nutrition and physical activity, and the individual U5E programme physical activity and food goal which it addressed (Table 6.9).

Table 6.9 Under 5 Energize programme goals for physical activity and food

<b>Under 5 Energize programme goals</b>	
<b>Physical activity</b>	<b>Food</b>
More active play everyday	Water and milk as the best choices
Less screen time	Less sweet drinks
	Daily fruit and vegetables
	Less energy dense snacks

The action plan was valid for six months and at the end of this time, it was to be reviewed with the Energizer to jointly monitor progress towards achieving agreed actions. Actions in the action plan were recorded in the U5E database as achieved, not achieved or ongoing (repeated). Following review, another action plan was co-developed for a second six-month period. After the second action plan, a yearly action plan followed; however, this was not included in this evaluation due to the small number of centres through to this stage of the programme at the time of the analysis.

The total number of action plan goals was totalled for the 121 participating ECCs and of those, the number of goals for nutrition and physical activity were calculated, including the number of goals that were achieved, not achieved and ongoing (repeated and actioned over time). The goals were also reviewed and grouped under defined nutrition and physical activity topic areas, to determine the major action areas that early childhood centres aimed to implement, and if this changed in subsequent action plans. The goal topic areas were partly predetermined from programme knowledge by the researcher (10 for nutrition and 9 for physical activity); however, new topic areas were added during data entry if a suitable topic area did not exist (28 for physical activity and 29 for nutrition). Once data entry was completed, these topic areas were reviewed and grouped into categories (11 for nutrition and 12 for physical activity) for analysis (Appendix C: Visual categorisation of action plan fundamentals). The types of nutrition and physical activity categories for the goals are shown in Table 6.10.

Table 6.10 Nutrition and physical activity categories for action plan goals

<b>Types of goals</b>	
Nutrition	Professional development for educators and caterers Healthy eating messaging to parents Healthy Heart Award Policy/guideline review and/or change Develop new/continue vegetable garden Include healthy recipes Improve lunchboxes Teaching healthy eating to children Introduce healthy foods to the menu Strengthen linkages to other programmes Other
Physical activity	Professional development for educators Source and introduce new ideas/programmes for PA within the centre Planned FMS teaching sessions with children Equipment modifications to encourage fundamental skill development Promotion of PA messages to parents Incorporate traditional Māori games Plan excursions/events to increase PA Policy/practice review and change to increase quality and/or quantity of PA Change landscape of centre play area to encourage PA Healthy Heart Award Modelling of FMS by Energizers to educators and/or children Other

*Note.* FMS = Fundamental movement skills; PA = Physical activity

## **6.2.2 Analysis**

Action plans (n = 120) were reviewed and numbers and types of goals were entered into a Microsoft Excel™ (2010) database for analysis. The number of goals in each action plan was summed to provide a total number of goals, the number of individual nutrition and physical activity goals and the number of goals achieved, not achieved and ongoing for each six months. This was compared between two periods (0–6 months and 7–12 months). Action plan goals within each U5E programme goal were totalled and progression with time determined. The number of nutrition and physical activity goals within each category was also totalled and progress tracked.

## **6.2.3 Results**

### **Number and proportion of nutrition and physical activity action plan goals**

U5E centres (n = 120) established a total of 920 action plan goals to be achieved in the first six months of the programme; slightly more nutrition (481) than physical activity (439). This is an average of approximately eight goals per centre, four nutrition and four physical activity goals each centre. In the second six months, fewer goals were detailed in the action plans (690 for 116 centres); however, this was due in part to centres reducing the number of goals in the action plan and four centres had not completed the first action plan review. Despite this, there were similar numbers of nutrition (352) and physical activity (338) goals. The number of nutrition and physical activity goals in each action plan reduced to around six in the second six months of U5E.

### **Achievement of action plan goals**

One-third of the nutrition goals in the first six-month action plan (n = 167) were achieved and 50% of the goals (n = 238) were categorised as ongoing (repeated) in 115 centres (Figure 6.4). Only 14% (n = 66) of the goals were not achieved, with a small number incomplete (n = 10). Just over one-quarter of the physical activity goals were achieved, 53% were ongoing, 16% were not achieved and 3% were incomplete (n = 15). At the end of the second action plan (a further six months), the percentage of nutrition goals achieved reduced to one-quarter, although the overall number also decreased, as did the number of centres with incomplete action plan reviews. In contrast, in the second action plan, the percentage of physical activity goals achieved remained the same. This shows that centres were more active in achieving nutrition goals in the first six months whereas actions in physical activity continued to be achieved at a constant rate over the first 12 months.

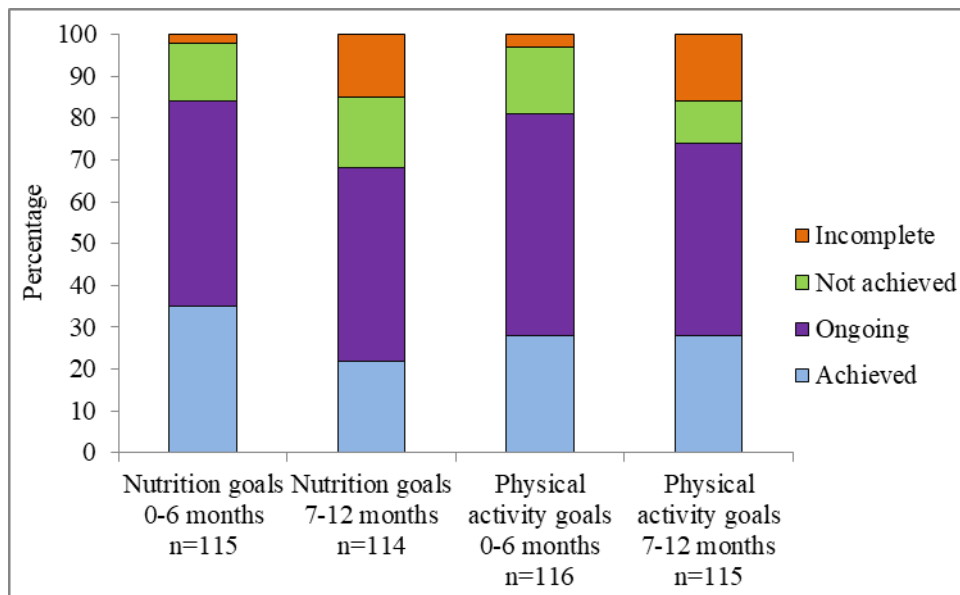


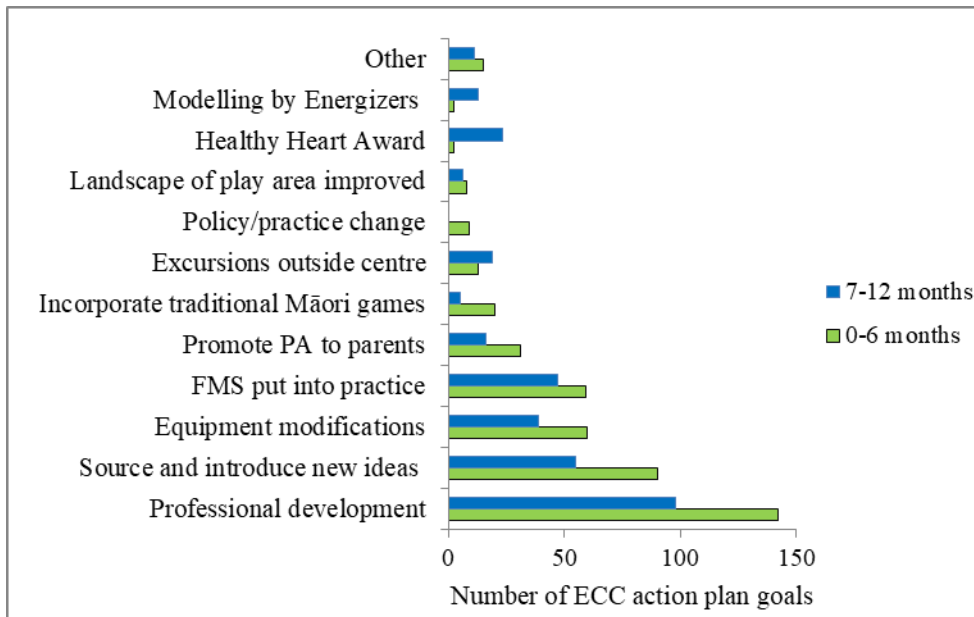
Figure 6.4. Percentage of action plan goals achieved, ongoing (repeated), not achieved and incomplete in nutrition and physical activity after six months and one year of U5E

### Action plan goal alignment with Under 5 Energize programme goals

The majority of the centres' physical activity action plan goals focused on the U5E programme goal 'more active play every day', in both the first and second six months. This relates well to the initial focus of U5E by the programme staff. Only one-third of the centre physical activity goals focused on the U5E goal of 'less screen time'. All four nutrition U5E programme goals shared an equal focus in centres' action plans in the first year, although the number of each fell in the second six months mirroring the drop in the overall number of action plan goals.

### Categories of action plan goals

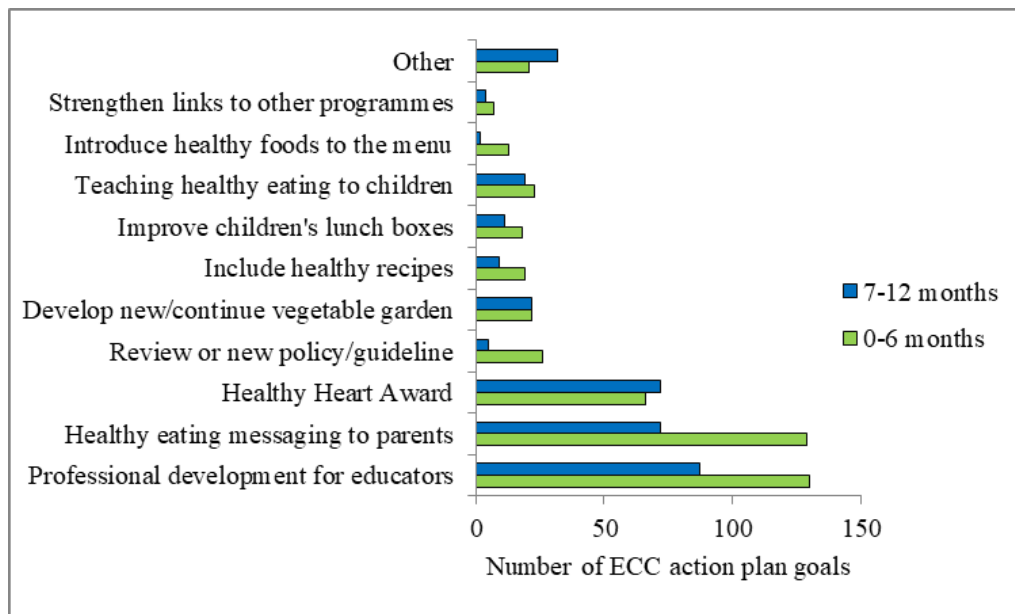
In the first year of U5E, the main category of action plan goals in physical activity was overwhelmingly professional development for the educators (Figure 6.5). Sourcing and introducing new ideas or programmes for physical activity, equipment modifications and the introduction of FMS into everyday practice were the second most frequent physical activity categories of action plan goals in the first year. While the number of goals in most categories reduced after the first six months by around a third, Healthy Heart Awards, excursions outside the centre or events, setting up equipment to encourage FMS development as well as modelling by the Energizers increased in number in the 7–12 month period. Inclusion of traditional Māori games was a more frequent goal in the 0–6 month period compared to the 7–12 month period.



PA = Physical activity; FMS = Fundamental movement skills; ECC = early childhood centre

Figure 6.5. Number of early childhood centre action plan goals in each physical activity category at 0–6 months and 7–12 months

Professional development for educators and healthy eating messaging to parents were the two main nutrition categories for action plan goals in the first six months of U5E (Figure 6.6). Both these categories reduced in the second six months, professional development for teachers by a third and healthy eating messaging to parents almost halved. HHAs was ranked third in the first six months and remained approximately stable in the second six months, indicating centres were reporting this goal as a focus for the entire 12 months. Lower ranked categories, teaching healthy eating sessions for children and developing or continuing a vegetable garden remained consistent in both six-month periods. Reviewing or developing a new policy or guideline was a more frequent action plan category in the 0–6 month period compared to 7–12 months.



ECC = early childhood centre

Figure 6.6. Number of early childhood centre action plan goals in each nutrition category at 0–6 months and 7–12 months

### 6.3 Discussion

After two years of U5E involvement, centres had implemented the U5E programme activities and improvements were being made to aspects of the food and physical activity environment within ECCs. There were more centres with written physical activity (n = 20) and nutrition policies or guidelines (n = 15), and more were working towards or had achieved a Healthy Heart Award (from 8 to 43). At least one quarter of the physical activity and one third of the nutrition goals were achieved with a further 50% being repeated and actioned in an ongoing way in the first six months. Centres prioritised professional development in action plans and as a result, educators attended nutrition and physical activity workshops, found them useful and were implementing positive change in the centre environment. The frequency of consumption of everyday foods increased and consumption of occasional foods decreased. The quality and quantity of physical activity improved and centres reported that the U5E programme meant they had increased the availability of healthy food choices and reduced the availability of unhealthy food choices. These findings provided evidence that centres were committed to the U5E programme, had adopted and implemented the key features of the programme and were building an ECC environment conducive to the development of healthy food and physical activity behaviours in preschool children.

This discussion will compare the following findings in the context of relevant literature:

- Food and physical activity environmental practices found in ECCs variably support the development of healthy behaviours in children
- Policy quality
- Improved food choices
- Educators' training in nutrition and physical activity
- Action plan goal achievement
- Transience of educators and children at U5E ECCs

ECE environments are increasingly a common feature of the lives of young children in NZ, 96% attend some form of preschool by age 4 years, yet they have been shown to be variable in their support of healthy food and physical activity behaviour development among enrolled young children (MoE, 2014c). Two previous surveys of the ECE environment in NZ (Gerritsen et al., 2015; Pledger et al., 2010) have shown variable ECC food and physical activity practices similar to the findings of the baseline audit in this body of work in Waikato U5E preschools. Although the study in this thesis was smaller (n = 121 at baseline and n = 87 at follow-up) 25 Te Kōhanga Reo (21%) were included, in contrast to the other surveys which reported few (1.9%) (Gerritsen et al., 2015) or no Kōhanga Reo (Pledger et al., 2010). In fact, Pledger et al. (2010) noted that a lack of engagement with Kōhanga Reo was a limitation of the study and a data collection method specific to Kōhanga Reo was required (but not undertaken for reasons unknown). The national survey conducted in 2007 and 2009 (Pledger et al., 2010) did show some improvements to nutrition practices after two years, including strengthened nutrition policies and decreased consumption of 'occasional' foods. But interestingly, the more recent regional survey (2014) (Gerritsen et al., 2015) showed that despite the five-year time difference since the national survey, considerable scope for policy and practice improvement remained. This study adds to the body of knowledge about the preschool nutrition and physical activity environment across the four main centre types over a two-year period for 87 centres and therefore has the ability to determine if U5E was effective at developing healthy food and physical activity environments to protect children's health.

Policy can be very influential in an environment to support the development of healthy food (Hawkes et al., 2015) and physical activity preferences (Larson et al., 2011) particularly for young children. Policy can operate at multiple levels; national, (for example, ECE regulations), regional (for example, District Health Board policy requires ECCs to have a nutrition policy) and local or organisational environments (for example,

individual early childhood centres) and ideally, are mutually supportive. There has been review of ECE regulations at state and federal regulations in the United States in relation to support of healthy food and physical activity behaviours within the ECE sector (Larson et al., 2011) and an increasing amount of research demonstrating the effectiveness of policy at the individual ECC level (Alkon et al., 2014; Bell et al., 2015; Tomayko et al., 2017). Given this potential, environments such as early childhood centres are an important opportunity for policy improvement. Although Hawkes et al. (2015, p. 2415) notes that policy development in a setting needs to be part of a range of ‘complementary and mutually reinforcing actions’. Under 5 Energize, like many other interventions (de Silva-Sanigorski et al., 2010; Fitzgibbon et al., 2005; Messiah et al., 2017), support policy change with training for ECE educators, education sessions and resources for parents and participation in an Award scheme (HHA). Falbe, Kenney, Henderson, and Schwartz (2011) state a preference for written policy because of the importance of clarity and accountability and it can be used to assess practice. Policies supportive of the development of healthy food and physical activity habits that centres follow and implement potentially have long-term health benefits for children (Falbe et al., 2011). In fact, it is recommended that policies aim to ensure the healthy choice is not just the ‘easy choice but the preferred choice’ (Hawkes et al., 2015, p. 2417).

The majority of centres in U5E (four out of five centres,  $n = 93$ , 87%) reported having a written nutrition policy or guideline at baseline which is interestingly similar to findings from the only two other previous NZ surveys, one large repeated national (2007 and 2009) and one smaller regional survey (2014). The national survey aimed to monitor the effect of the ‘Mission-On’ policy which consisted of a number of nutrition promotion activities and guidelines to improve the food available in ECCs and schools, which was part of the Government’s Healthy Eating Healthy Action strategy from 2006–2010 (Pledger et al., 2010). It showed that 87% of centres in 2007 ( $n = 562$ ) and 2009 ( $n = 637$ ) had a food and nutrition policy, with no significant change between surveys. The more recent survey (2014) of 257 ECCs in Counties Manukau and Waikato comparably reported 82% ( $n = 237$ ) of centres (with children from the Growing Up in NZ cohort) had a food and nutrition policy (Gerritsen et al., 2015). This lack of change between 2007 and 2014 is not surprising given that four out of five already had a policy and Healthy Eating Healthy Action was disestablished when the government changed in 2008 and many nutrition and physical activity interventions underway at the time lost funding but it is of concern.

Mere existence of a food and nutrition policy or guideline at an ECC may not be a marker of a good quality policy. The quality of policies for nutrition and physical activity in ECC can be assessed using the Wellness Child Care Assessment Tool (WellCCAT) and has been validated tool (Falbe et al., 2011). It measures the comprehensiveness (range of topics included) and strength (extent of use particular and authoritative words) of written policies (Falbe et al., 2011). It has 65 items in five categories; nutrition education, nutrition standards for food and beverages, promotion of healthy eating in the child-care setting, physical activity, and communication and evaluation. Early childhood centres policies are given a score of 0, 1 or 2 for each of the 65 items in the tool depending on the adherence to the item. A score of 0 is given if recommended policy areas are missing, a score of 1 is assigned if the item is present but vague while items that are ‘specific and directive’ score a 2 (Falbe et al., 2011, p. 5).

The Wellness Child Care Assessment Tool was used in a detailed analysis of 114 ECC food and nutrition policies in NZ ECC and huge variability and overall, poor breadth, content and strength of policies was reported (Gerritsen et al., 2015). Specifically, policy statements about the type of food provided or brought into the centres, although usually present, were described as “weak and phrased as suggestions...rather than requirements” (Gerritsen et al., 2015, p. 3). However, policy statements governing the nutrition education of children, educators and parents were more frequent and strongly worded. Furthermore, parent-led centres, Playcentres, were significantly less likely to have comprehensive or strongly worded policy statements compared to private day care, community day care and kindergartens (Gerritsen et al., 2015). ECC policies in NZ would benefit in effectiveness if modified to improve breadth and strength across five key areas according to a format such as the Wellness Child Care Assessment Tool.

Improvement in policy breadth was shown by the repeated national food environments survey (Pledger et al., 2010) commissioned to detect change in response to the HEHA strategy (McLean et al., 2009). It reported increased specificity around the ‘types of foods or beverages allowed or encouraged’ within centres after two years but guidelines on food or drinks provided to children did not alter between surveys although this survey used a non-validated survey tool. Similarly, this thesis showed increased breadth of policy content after two years of U5E implementation in specific areas including sweet drinks, packet food high in fat and salt, and food brought in by parents for birthday celebrations. Additionally, significant numbers of centres at follow up (2013-2015) reported the inclusion of ‘fundraising’ ( $p < 0.01$ ) and ‘birthdays or celebrations’

( $p < 0.001$ ) to written guidelines or policy. However, these findings need to be interpreted with caution because of the large numbers of missing data in these categories (range 23 – 35 centres) and a non-validated tool was used. Furthermore, non-fundraising centres (44% in U5E) may not have answered the question on fundraising because of its irrelevance. This thesis did not collect and assess the content of individual centre policies, but relied on self-reporting by ECC educators with support from the Energizers to complete the audit (Appendix B: Stocktake). Although U5E influenced centres to increase the breadth and strength of policy statements for some aspects of nutrition and physical activity, use of a validated tool such as WellCCAT (Falbe et al., 2011) would have enhanced the rigour of this study.

Internationally, preschoolers have been shown to have physical activity levels below the recommended dose; 60 minutes of moderate to vigorous physical activity a day, according to a previous review (Reilly, 2010). Compounding this are the high rates of sedentary behaviours including ‘screen-time’ among preschool children (Wolfenden, Neve, et al., 2011). Research has shown that one of the factors amenable to change associated with improving physical activity among preschoolers in care was having a written policy (Bell et al., 2015). Wolfenden, Neve, et al. (2011), found only 50% of centres surveyed in Australia ( $n = 293$ ) had a written policy for physical activity. In comparison, a regional NZ survey (Waikato and Counties Manukau) in 2014 reported only 35% of centres with a policy (Gerritsen et al., 2016). This U5E study similarly found only a third of centres had a written policy or guideline for physical activity. Furthermore, most of the centres in U5E did not include planned physical activity each week, fundamental movement skills or daily moderate to vigorous activity at baseline. Of these three policy aspects, the absence of daily moderate to vigorous activity was more likely to be missing from policies. After two years of U5E adoption and implementation, there was a notable increase in inclusion of daily moderate to vigorous activity in policies (from 10 to 32 centres), along with an overall shift from non-written to written guidelines or policies (at least 25 centres). U5E has increased the number and quality of written physical activity policies in line with best practice guidelines for early childhood care (Commonwealth of Australia, 2012; Department of Health Physical Activity Health Improvement and Protection, 2011).

Fundraising with food, an unhealthy food environment practice, was more prevalent in U5E ECCs (56%), although the frequency was shown to be low compared to the previous national and recent regional surveys, and the nutritional value of food used to

fundraise was poor (Gerritsen et al., 2015; Pledger et al., 2010). The higher proportion of centres fundraising with food in U5E may reflect the greater number of centres that were community funded and the absence of a national schools' nutrition strategy and promotion of healthier or non-food fundraising alternatives compared to during the 'Mission-On' strategy 10 years ago when a list of 'healthy fundraisers' was developed and promoted widely, as part of a national schools nutrition strategy. Although, the Heart Foundation currently has a website link for healthy fundraising ideas for schools, this may not be so visible and promoted to ECCs

([http://www.learnbyheart.org.nz/images/resources/Healthy\\_Fundraising\\_Ideas\\_FINAL\\_2015.pdf](http://www.learnbyheart.org.nz/images/resources/Healthy_Fundraising_Ideas_FINAL_2015.pdf)). Fundraising with food declined between national surveys from 36.8 in 2007 to 29.4% of centres in 2009 (Pledger et al., 2010), possibly due to the 'Mission-On' campaign. Fundraising frequency was low in U5E, with half of the centres reporting only fundraising yearly and a third once per term (four times per year). The types of foods used for fundraisers nationally were of poor nutritional value (high in saturated fat, sugar and salt and low in vegetable and fruit content), similar to the finding from U5E and Gerritsen et al. (2015), including pizza, sausages and pastry foods (pies and sausage rolls). Food hampers, containing non-perishable foods, were also popular fundraisers reported by centres in U5E, followed by cakes. Fundraising with unhealthy food is not consistent with nutrition and good health principles; in fact, it undermines those (Richards, Darling, & Reeder, 2005). Stakeholder consultation undertaken by Richards et al. (2005) recommended that schools develop a policy or guidelines to inform decision making around fundraising and sponsorship, shown to be non-existent at schools in the study. U5E shifted some centres (n = 10) to develop a written fundraising policy or guideline; however, about one-third of centres did not respond to this question, indicating that it was perhaps not an issue for some centres rather than reluctance to address the issue. Sponsorship appeared even less of an issue as two-thirds of centres failed to respond to this question; however, four centres reported developing a written guideline or policy on sponsorship. Fundraising with unhealthy food should be regulated by a centre policy with proactive advice about alternative ways to fundraise.

Food provision in U5E differed from the only other previous survey collecting this statistic. In U5E, most centres (77%) required parents to supply food for children, whereas Gerritsen et al. (2015) showed that only 47% of centres had food supplied from home. However, in many centres, mixed food provision (from home and centre) was the norm. This may have been because the U5E sample contained more community funded

centres including Kōhanga Reo. Similar to findings from Gerritsen et al. (2015), the main meal type provided by U5E centres was snacks, followed by one-quarter supplying lunch and a third gave children breakfast. Furthermore, U5E centres located in deprived areas were more likely to provide breakfast.

Interventions aimed at promoting healthy eating have improved food choices within ECCs. U5E decreased the frequency of consumption of occasional foods and increased the consumption of everyday foods with the largest changes in a favourable direction: fewer noodles, potato chips, cakes and sweetened drinks, and more fruit and vegetables. A systematic review of nutrition interventions in preschools showed increased consumption of vegetables, with most of the multi-component interventions (6 of 8) and half of the educational interventions reporting this, although none of the educational studies achieved statistical significance (Mikkelsen et al., 2014). Similarly, Zask, Adams, Brooks, and Hughes (2012) also found improvement in vegetable and fruit consumption from pre- and post-assessment of lunch-box contents in a multi-component intervention in Australian preschools. Greater increases in vegetable consumption were recorded from the multi-component studies, suggesting that a broader intervention approach increased the potential of a successful outcome.

A wide range of strategies to influence food selection have been used in the preschool interventions. Studies included in a review (Mikkelsen et al., 2014) included strategies such as nutrition games (Piziak, 2012), interactive classroom activities together with workshops for teachers and parents (Céspedes et al., 2013) and teaching sessions in the classroom by a nurse educator (Baskale & Bahar, 2011). U5E also used a range of activities targeting educators and parents using a train the trainer approach, rather than directly interacting with the children. The expectation of U5E was that these ‘gatekeepers’ would educate, support and improve the food choices of the children. Strategies included educator and parent nutrition workshops, healthy eating messages to parents in printed resources and newsletters, policy development support and sharing of key strategies to encourage healthy food selection. Professional development and messaging to parents were the most frequent actions in centre action plans. The disadvantage of multi-component strategies is that it is often not apparent which strategy is most effective (Waters et al., 2011) and it is likely that they are synergistic. Multi-component strategies like U5E have been shown to improve healthy food choices.

Two-thirds of centres report that U5E increased the availability of healthy foods, which is similar to findings for the HHA programme (82%) and 5+ A DAY (75%) from the national food environments survey (Pledger et al., 2010). Furthermore, this national survey showed approximately half the centres reported that HHA and 5+ A DAY decreased the availability of unhealthy foods in centre whereas a higher percentage (68%) of centres reported that U5E was achieving this although the U5E sample size was smaller (n = 87 compared to n > 500). Adding to this positive result, U5E respondents also noted that the most frequent types of changes made to food choices were more fruit, more water and less packet food aligning with the food goals of U5E (Table 6.9).

This body of work found that one in four children moved in the previous year and almost half the centres had three or more staff changes. The reported mean number of teachers per centre at programme initiation was suggesting a turnover of around half the staff in these centres. Enrolment changes and staff turnover were greater in lower Equity Index ECCs. Project Energize, in primary schools, found lead teachers from schools identified a high school roll turnover as a barrier to “the levels of engagement and participation” in Project Energize but as all primary schools in the Waikato region receive the Energize service (Mrkusic, 2012, p. 70), the child could benefit, if the move was within the region. Teacher turnover was higher than the national turnover rate for ECE teachers of 19% in 2013 (Ministry of Education, 2013). This has implications for programme delivery and implementation, increasing cost and reducing potential impact (Young, 2016). (Petrunoff et al., 2009) found high staff turnover negatively influenced programme delivery of FunMoves, a structured FMS development initiative in Australia. Areas experiencing high mobility require new relationships to be established and ongoing regular message delivery sessions to accommodate new educators and families. A focus on embedding programme aims into policy and practices nationwide is imperative to avoid loss of programme gains when staff and families move, unless U5E was in all preschools in NZ, in which case turnover would be less of a problem.

The implementation of programmes face barriers of poor fit, inflexibility, limited training and lack of ongoing support. A FMS intervention in ECCs showed that after four months, ECC staff found implementation of the programme to be time consuming, despite demonstrating increased knowledge and confidence in FMS delivery from attending the training provided (Petrunoff et al., 2009). However, this was probably due to the highly structured nature of the programme, which required the delivery of 30-

minute lessons at least twice weekly requiring additional time to organise, and only a three-hour, one-off training session for educators (Petrunoff et al., 2009). As a result, implementation and ongoing use was limited. The conclusions drawn were that a less structured programme and further support for staff after training would be beneficial (Petrunoff et al., 2009). This is in contrast to U5E, which was less structured, and had well supported implementation with co-design and review of action plans by the educator and the Energizer, ongoing from 2013 to the time of writing.

Training of educators, using a train the trainer approach, was a major strategy of U5E. This involved the Energizers receiving training from a U5E dietitian or FMS expert to deliver the sessions to ECC educators. In spite of the train the trainer approach having little evidence of effectiveness, it is widely used and has many positive features such as reducing cost, reaching larger numbers of participants and allowing tailoring of information to local audiences (Yarber et al., 2015). Also, this approach has been shown to increase knowledge and skills (Yarber et al., 2015).

The amount of nutrition education in undergraduate ECC educator training was suggested by Gerritsen (2016) to be only 3–4 hours long, and any additional training ECC educators received was usually as a result of participation in a healthy eating programme such as the Healthy Heart Awards. There is neither definition of the core competencies required in either nutrition or physical activity nor any certification for ECE educators in nutrition and physical activity. Training courses in nutrition and FMS are poorly available, although Sport Waikato had previously offered FMS training but in a limited way with no formal certification. This directs organisations to use on-the-job training opportunities but these may be limited by poor availability of trained leaders (Yarber et al., 2015).

The ability of the Energizer to deliver training sessions to educators added to the credibility of the Energizer and achieved the Project Energize vision of the Energizer being a ‘one-stop shop for nutrition and physical activity information’ within the local area. The train the trainer approach was chosen by programme management to contribute to the sustainability of U5E, whereby over time the expertise shifted from the Energizer to the educators. There was evidence of this from the qualitative interviews in this body of work from the theme “it’s part of what we do now” (Chapter 7.2.3), especially as ongoing funding of U5E was not secure at the initiation stage nor at the time of writing this thesis.

The training U5E offered was well attended, shared within centres and influenced policy and practices within participating ECCs. Most educators reported that they had attended professional development sessions in both nutrition and physical activity, had increased their knowledge, were disseminating the information and as a result, improving ECC food choices and incorporating FMS practices. This was evidenced by reports of increased quality and quantity of physical activity and availability of healthy food choices within centres and that a high proportion of action plan goals were focused on professional development. This provided validation of the use of an education-based strategy, as part of the multi-component U5E programme. Education-based strategies are well used in childcare interventions, with 11 of 26 interventions in a systematic review using solely this strategy and many of the seven multi-component interventions containing some form of education, although overall these mainly targeted parents and children rather than educators (Mikkelsen et al., 2014). This review also indicated that although education-based strategies did not result in reductions of BMI, apart from one study where significant reductions in BMI and BMI percentiles were reported after one year, these studies were successful in increasing nutrition-related knowledge and fruit and vegetable identification by preschool children (Mikkelsen et al., 2014).

Action plan goals in both nutrition and physical activity were co-developed by the educators and centres working with the Energizer, with actions in nutrition more prominent at the start of the programme. Numbers of nutrition goals reduced in the second six months in contrast to physical activity which remained constant in the first year of U5E. Nutrition was a major focus at the outset of the programme because the need had been identified by centres in the needs analysis (Figure 4.1) (researcher knowledge of U5E from attending team meetings and interviews with educators [Chapter 5.3.4]). Emphasis shifted to physical activity in the second six-month action plan after the initial need for nutrition actions was addressed and centres sought physical activity which explains why there was a reduction in nutrition goals in the second six-month action plans. The flexible nature of U5E enabled the programme to respond to the needs identified by centres and their communities.

The progressive nature of implementation of the U5E nutrition and physical activity goals of the programme is revealed in the action plan analysis. Rather than focusing on all goals at once, there was a step-by-step approach to programme goal delivery. The physical activity promotion began with “active play every day” in the first year followed by “less screen time”. Nutrition actions appear to have focused across all four

messages equally in the first year. However, as professional development topics were combined, closer inspection of the raw data showed that the development and delivery of the nutrition workshop topics did change over time. They began with the “sugary drinks” topic in the first six months as this was felt by programme management to be a relevant starting point (topical in the media at the time), and the Project Energize sugary drinks workshop could be easily modified for ECCs. This was followed by ‘healthy lunchboxes’ in the second six months, which included introduction of the four food groups concept, known as ‘Go, Grow and Glow’ in the Energize model, and ‘healthy snack foods’. Subsequently, workshops on ‘food labelling’ and ‘foods for Under 2’s’ were introduced after 12 months.

### **6.3.1 Strengths and limitations**

A strength of this study was the ability to access and analyse the action plans of ECCs. Developing an action plan was a successful feature of Project Energize and hence was transferred to U5E. Following the stocktake and needs analysis, goals were co-developed by the ECC and the Energizer to suit the workloads of the centre. This was based on the premise that centre-developed goals were more likely to be owned by the centre and increase the centre’s responsibility for delivery. Extensive record-keeping of action plans by U5E to facilitate delivery, also a feature of Project Energize, enabled this analysis. The findings of this analysis showed the number and types of action plan goals, which provided detailed insight into the areas and ways centres were making changes towards a healthy environment, with professional development for educators the key strategy for both nutrition and physical activity. At least one-quarter of the goals were achieved, half the goals were being worked on in an ongoing way and only 14% were not achieved, indicating strong programme implementation and also commitment to the programme over time. The number of goals reduced over time, suggesting that changes had been achieved, perhaps the ‘easy to change’ practices first (for example, incorporation of U5E-provided nutrition messages into centres’ newsletters), and that the programme was becoming ‘routinised’ over time into the usual operational practices of ECCs (Monahan & Scheirer, 1988, p. 418), no longer requiring change. For example, when a centre became a ‘water only’ centre, this led to less messaging of parents about sweetened drinks, at least within the centre. It also indicates that ECCs was balancing initial programme enthusiasm with the reality of what was achievable over time. Use of goals, followed by review and resetting goals, appeared to be a familiar task for ECC

educators as this was the process used for education practice development (Chapter 5.3.4) therefore fitted well with the usual way of working within centres.

Another strength of this study was the study time frame of two years. This allowed the 121 centres to become fully engaged and implement the programme messages and activities, as well as time for valuable programme evaluation using an action research approach, facilitating feedback and enhancing delivery. Duration of most nutrition and physical activity interventions in the ECE setting is brief. In a Cochrane review of childhood obesity interventions, only two of eight studies targeting children 0–5 years were one year or longer, while the other studies were six months or less (Waters, 2011). A more recent systematic review of healthy eating interventions (not physical activity) similarly showed that most of the 26 studies included were one year ( $n = 4$ ) or less ( $n = 21$ , one not stated) with only one longer at four years (Mikkelsen et al., 2014). This is of concern, as the average time to fully engage in U5E was eight months before any actual programme delivery began, as shown in Chapter 5.2. Health promotion is also not the main focus of the early childhood setting (Janssen et al., 2013), suggesting that longer time frames are needed to accommodate high education-delivery workloads and, in the case of tribally affiliated centres, to accommodate cultural processes and practices. This is supported by Monahan and Scheirer (1988), who state that dissemination and adoption of new public health programmes is a lengthy process, especially those that are prevention focused. Additionally, Glasgow et al. (1999) noted time frames of six months to one year are required for assessing implementation, although this was said to be subjectively based and more research was needed to define time frames systematically. The implementation time frame of at least two years in this study recognised that health prevention programmes take time to disseminate and be adopted.

A major limitation of this study was the lack of inclusion of a control group. This would have enabled stronger conclusions to be drawn regarding the success of the intervention similar to the randomised controlled trial conducted when Project Energize was initiated (Graham et al., 2008; Rush et al., 2012a). Ideally a similar design for U5E would have been selected; however, contract specifications (delivery of a health service with evaluation rather than a research trial) and funding restrictions (Ministry of Health, 2012c) precluded this option. Therefore the current study design used in this thesis cannot rule out external and secular influences on centres to make improvements to the food and physical activity environment from other initiatives such as the government Childhood Obesity Plan (Ministry of Health, 2015a). Furthermore; retention of staff and

children is problematic in a controlled trial within the education setting. In the two year outcomes of the randomised controlled trial of Project Energize 20% of the five year old children consented and measured at baseline were not available to follow-up two years later (Rush et al., 2012a). The loss to follow up of ten year old children was because many had moved to high school. This situation is amplified in ECC where children who are five move to primary school increasing the turnover of children in ECC. Also, almost half the centres in U5E had three or more staff changes in the previous two years potentially influencing a control group had teachers changed from an 'Energized' centre to a 'control' centre. Preventing contamination of the control group is difficult in population health interventions like U5E and leads researchers to consider what is practicable in the setting and funding, for example, quasi and pre-experimental (pre- and post-study) designs (Bauman & Nutbeam, 2014).

Another major limitation of this study was the use of a non-validated tool for the audit of the ECC food and activity environment. The audit instrument, while not validated, did use standardised questions previously found to be of value to programme evaluation of Project Energize in primary schools such as, 'Does your centre have a written food and/or nutrition policy or guideline?' Although a validated tool for assessing food environments is available, called the Environment and Policy Assessment and Observation (EPAO) instrument (Ward, Hales, et al., 2008), which is used frequently to evaluate interventions (S. C. Ball, Benjamin, & Ward, 2007; Benjamin Neelon, Taveras, Ostbye, & Gillman, 2014), it requires a day of observations and document review of each ECC by a trained researcher. It collects data on a range of factors deemed important from literature review, recommendations from reputable organisations and expert opinion. These include observations of food served, engagement between educators and children at meal times, amount of active play, the physical activity environment (playground equipment), sedentary time and the food environment. Document review is required of menus, fundraising documents, nutrition and physical activity lesson plans, nutrition and physical activity policies, and staff education plans. The EPAO could have been collected at baseline and again at the two-year point, as per the audit done for this thesis, and similar to a randomised controlled trial of the Baby NAP SACC (0–2years) programme in the US (Benjamin Neelon et al., 2014). The six-month intervention of NAP SACC required centres to self-assess their nutrition and physical activity policies and practices, decide what area needed the greatest improvement and make change with the help of a trained interventionist. Intervention

centres (n = 11) increased their mean EPAO scores (range 0–320) by 18.5 points.

However, the respondent burden for completing the EPAO was considered too great on newly engaged U5E ECCs, plus the U5E programme began as the researcher started this body of work, leaving little time to be trained and collect EPAO data. Also, U5E was modelled on Project Energize, therefore similar assessment tools were planned to be used. Despite use of a non-validated audit tool, the pre- and post-test nature of data collection did contribute somewhat to its rigour. Additionally, the researcher had to fit environmental measures within what was reasonable and agreeable by U5E programme management and Ministry of Health contractual arrangements. In addition, the audit was a tool to inform the intervention and as far as the Energize programme was concerned, to then co-design the intervention from a position of shared knowledge and shared benefit (Steen, Manschot, & Koning, 2011).

Additional to the above limitation, the audit relied on educator reports of environmental change rather than actual measurement by a trained observer as required for the EPAO. Staff turnover, shown to be one-third or 3–4 teachers in the previous year (August 2014–August 2015) during the audit’s two-year time frame may have resulted in educators underestimating the centre’s actual achievements. Although, the Energizer was usually present during the completion of the audit which would have assisted with the reliability of the responses and possibly enhanced the data collection overall, for example, ensuring all questions were completed and contributing knowledge and programme records of what improvements had been made to the centre.

The sample size for the audit was small (n = 87) and the scope and generalisability of the U5E food and activity environmental audit were limited to the Waikato region. The U5E sample was limited to 121 centres in the Waikato because of funding restrictions of the Ministry of Health contract; however, numbers of ECCs included in the pre- and post-test comparisons had to be restricted further due to time constraints for this investigation. Small sample sizes are not necessarily representative of the population and therefore reduce the generalisability of the findings. The participation of a lower numbers of centres from one cluster (11 from 28) in the follow up sample of 87 centres resulted in lower numbers of parent- or whānau-led centre types, Playcentre (11 in baseline and 5 centres in follow-up sample) and Te Kōhanga Reo (24 in baseline and 14 in follow up sample), compared to the baseline sample. This is possibly related to the slower recruitment time shown for Kōhanga Reo (one month longer than other centre types) and the great number of steps required in the recruitment process Figure 4.2 for

both Kōhanga Reo and Playcentre which are parent-led. This lack of true representativeness of the follow up sample further limits the generalisability of the findings of this section of the thesis.

### **6.3.2 Conclusion and recommendations**

Implementing change in the food and physical activity environment of ECCs in the Waikato is needed, as the baseline audit from this body of work showed similar results to a 2009 food and nutrition environment audit by the government, which indicates little improvement since then. Furthermore, a more recent survey in 2014 found weak nutrition and physical activity policy and practices unsupportive of healthy eating and activity to optimise growth and development in ECCs. Programmes such as U5E provide the opportunity to improve ECC norms around food and physical activity to align with those supportive of the development of healthy food and physical activity behaviours, and covertly to develop obesity prevention policy and practice development. The Energize programmes are positioned to the schools or ECCs as being focused on healthy eating, being active and having fun, rather than obesity prevention.

This study used a pre-and post-test audit and an analysis of number and type of action plan goals as measures of the implementation domain of the RE-AIM framework, contributing to evaluation of the overall public health impact of U5E. Follow-up of public health programmes over time is important to determine programme impact. However; the time frame needs to take into account that improvements in public health are typically slow. This study assessed changes to the food and activity environment over a two-year period, as the programme is being delivered in real time and is ongoing. In future, funding should include capacity to continue to evaluate the programme and any roll-out in this way.

Use of a validated and more comprehensive tool such as EPAO would provide a more accurate assessment of ECC food and physical activity environments as it has been specifically designed for that purpose but this could be the role of the Education Review Office as part of their audits. It could be used to investigate the impact of policies and guidelines on ECC environments over time but has never been used in NZ to date, and some adjustments may therefore need to be made to suit the NZ childcare setting. However, the respondent burden (on each centre) is high and may not be welcomed by all of the diverse centre types. Some centres showed initial reluctance to participate in the collection of the audit information, yet it was a tool requiring far less time than the

EPAO and it was collected with the purpose of informing the next actions. With these barriers in mind, use of the EPAO should be investigated for use in assessing NZ childcare settings.

High turnover of populations, especially in areas of high need, is limits health programme engagement, participation, evaluation and outcomes. Time to engage and deliver a health promotion programme to high need populations or services working with these groups is likely to be higher compared to a lower need area or population. Frequent residential change should be an important consideration in the design, implementation, evaluation and funding of health promotion programmes especially in populations experiencing transiency. However, if all schools and ECCs had the Energize programmes then dilution of the effect by transience should not be a concern.

### **6.3.3 Summary**

This section aimed to determine if the U5E programme and activities had been implemented as intended. This was achieved by a pre- and post-test food and physical activity environmental audit and descriptive analysis of centre action plans. Findings showed that centres were implementing programme activities, such as professional development and healthy messaging to parents, and improvements were being made to food and physical activity environments within ECCs. Examples included increased consumption of everyday foods and beverages (fruit, vegetables, water) and quality and quantity of physical activity. The baseline results were similar to findings from 2009 (food and nutrition) and 2014 (food and nutrition and physical activity) environmental surveys indicating improvement was warranted for obesity prevention. This body of work was enhanced by two years of monitoring from the start of the intervention and use of centre-developed U5E action plans yet limited by a small sample size and use of a non-validated environmental assessment tool.

These findings provided strong evidence that centres were committed to the U5E programme, had implemented the key features of the programme and were building an ECC environment conducive to the development of healthy food and physical activity behaviours in children. Transience of both educators and children was identified as a barrier to implementation and extending the time and coverage of the programme would be required for effective public health programme implementation.

## **Chapter 7. Perspectives on the effectiveness and maintenance of Under 5 Energize**

The effectiveness domain of RE-AIM is the extent to which the intervention meets its desired outcomes or impact without adverse consequences. The intended outcome of this research was that U5E would influence the food and physical activity policies and practices within ECCs and in the home, thus providing a healthier food and physical activity environment for children. The aim of this study was to determine the effectiveness of the intended outcomes. This was measured by firstly conducting a survey of parents of children attending ECCs to determine parent awareness, and their understanding and use of the U5E messages in the home. The second part of this study was measuring changes within the ECCs. That involved a focus group and one-on-one interviews with U5E programme staff and ECC staff from participating ECCs, to ascertain their opinions and experiences of change (if any) occurring in ECCs as a result of interaction with the U5E programme. The results of the study will be discussed and conclusions made, followed by recommendations.

### **7.1 Parent survey**

#### **7.1.1 Ethical approval**

Ethical approval to consult with parents or caregivers at U5E early childhood centres was obtained from the Auckland University of Technology Ethics committee (AUTEK), along with a draft questionnaire (15/17 Appendix A: Ethics approval and approved forms).

#### **7.1.2 Sample selection**

Participants were parents of children attending U5E early childhood centres. Microsoft Excel (2010) was used to generate a random list of numbers assigned to each centre from highest to lowest. The first four Kōhanga Reo with the highest numbers were selected first, followed by the next nine centres with the highest numbers, to achieve an approximately equal distribution in the four cluster areas and a total sample of 13. Consultation with the Energizers eliminated one Kōhanga Reo as this centre had only participated in the programme for a very short time. Another centre with the next highest number was selected. In total, 13 of the 121(10%) participating U5E centres were identified. The aim was to obtain 10 parent responses from each centre.

### **7.1.3 Questionnaire**

Topics for the questionnaire covered three areas: awareness of the U5E programme (and Project Energize in primary schools) and messages, understanding of the aims of the programme and use of the messages. At least one or two questions on each topic were included. Prior to administration of the questionnaire by the interviewer, a pilot test of the questionnaire was undertaken with 10 parents at one centre to test the method of approaching parents at the 'front-door', check understanding of the questions by participants and that the questions were providing data matching the aim of the survey. There were 10 simple questions including five that were yes or no (dichotomous) and four where a list of answer options in large print were provided. They were also asked to state the length of time (in months or years) their child or children had been attending the ECC.

### **7.1.4 Data collection**

At each identified centre, the Energizer provided the participant information sheet and consent form for the parent survey (Appendix A: Ethics approval and approved forms). Participation status of the centre was followed up a week later by the Energizer. The Energizer then advised the researcher of consenting centres and recommended survey times. Subsequently, the researcher confirmed scheduled times with the U5E liaison educator or manager at each centre. The survey was administered by the researcher and by a Māori research officer, contracted specifically for the surveys at Te Kōhanga Reo. Parents were approached within the centre when entering or leaving the centre and invited to participate in the survey. The participant information sheet and consent form details were reiterated; once verbal consent was obtained, the survey was administered.

### **7.1.5 Analysis**

Microsoft Excel™ was used to collate and analyse questionnaire responses. The data were checked to detect input errors. The categorical responses were aggregated to provide overall numbers and percentages of responses. Overall numbers and percentages were also calculated for the multiple response questions. The responses to the questions with an open-ended sub-question were coded into themes. A summary of the descriptive responses from all centres was sent to participating centres for display to parents. A chi-squared test was used to determine if there was a relationship between the length of time in centres and awareness of U5E.

## 7.1.6 Results

### Sample

Eleven of the 13 early childhood centres identified consented to participate. Only 10 of the centres were able to be contacted and the survey conducted. One consented to participate and was contacted; however, the survey was not able to be arranged within the allocated time frame. The sample represented the four geographical clusters and types of early childhood centres, although there were small numbers of participants from the North cluster and Te Kōhanga Reo Table 7.1. Participants were from one centre located in the North cluster and three in each of South, Thames-Hauraki and Hamilton clusters. The centre types surveyed consisted of five education and care centres, three kindergartens, one Kōhanga Reo and one Playcentre. A total of 78 parents' survey responses was collected between October 2015 and February 2016, coinciding with all U5E centres being approximately two years since initiation. The parent sample consisted of 25 responses from the Hamilton cluster, 22 from the South cluster, 21 from Thames-Hauraki and 10 from the North cluster. There were 43 education and care responses, 25 from kindergarten, 6 from Playcentre and 4 from Te Kōhanga Reo. The mean length of time that children of respondents had been enrolled in the centres was 19 months and median was 16 months.

Table 7.1 Sample centre type, cluster and number of participants

<b>Centre identifier</b>	<b>Cluster</b>	<b>Centre type</b>	<b>Number of participants</b>
1	North	Te Kōhanga Reo	No consent
2	North	Te Kōhanga Reo	No consent
3	North	Education and care	Consented but unable to schedule
4	North	Education and care	10
5	South	Te Kōhanga Reo	4
6	South	Education and care	11
7	South	Education and care	7
8	Thames-Hauraki	Education and care	11
9	Thames-Hauraki	Playcentre	6
10	Thames-Hauraki	Education and care	4
11	Hamilton	Kindergarten	9
12	Hamilton	Kindergarten	5
13	Hamilton	Kindergarten	11
<b>Total</b>			<b>78</b>

### What changed at home as a result of U5E

When participants were asked if they had heard of or seen the U5E programme, 58% (n = 45) responded yes, 42% (n = 33) said no. The majority of the participants who had heard of or seen U5E reported that the programme was about nutrition and physical activity (75%, n = 33). Other responses included good health (n = 8), movement skills (n = 8), all of the above (n = 7), healthy eating (n = 4) and physical activity (n = 1).

The main healthy eating and physical activity messages heard or seen in the centre by parents were ‘less sugary drinks’ and ‘healthy lunchboxes’ with 89% (n = 40) of parents reporting both of these messages (Figure 7.2). Sixty-seven percent of parents reported hearing or seeing the message, ‘water and milk are the best drinks’ (n = 30), 56% (n = 25) the ‘food labelling’ message and 44% (n = 20) the ‘less screen-time’ message. Only a third had heard or seen the ‘fundamental movement skills’ messages (31%, n = 14) and a quarter the ‘healthy eating for under 2 year olds’ message (24%, n = 11).

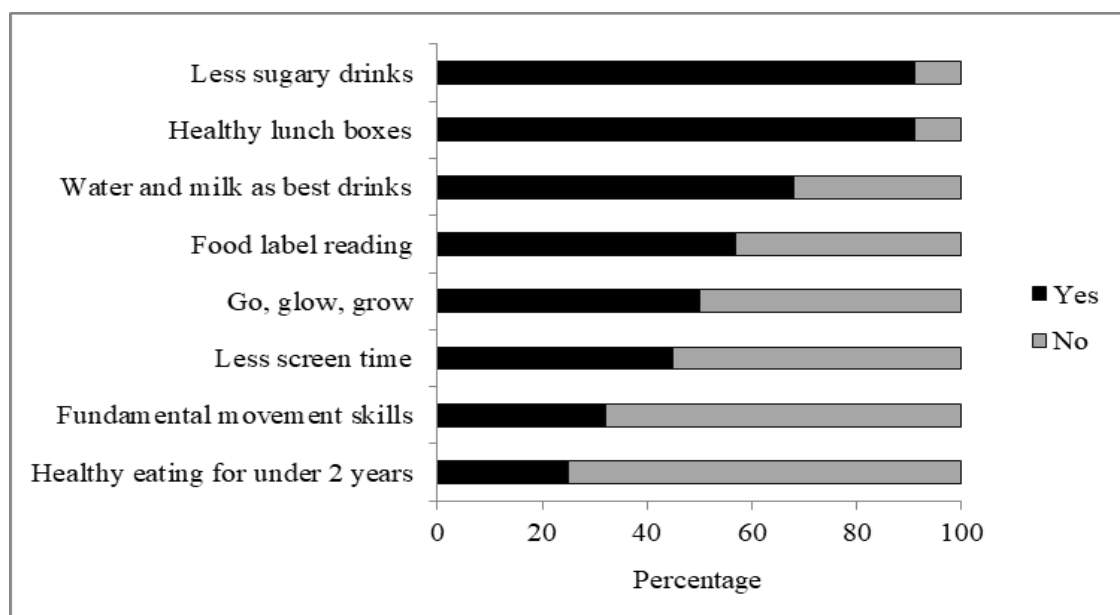


Figure 7.1. Under 5 Energize healthy eating and physical activity messages heard or seen by parents

Ninety-three percent of parents who had heard or seen U5E reported having seen U5E promotional material. The most frequently reported form (seen by 90%) was the tip sheets (Appendix D: Tip sheet; Figure 7.2). Approximately half the parents cited the Energize posters (56%) and the Energizer’s car (46%). Smaller numbers had seen the messages in the centre newsletter (41%), the Energizer in person (39%) and advertisements for workshops (29%). The Energize noticeboard and Energizer photo were the least recognised forms of programme promotional material, probably as these options were mainly utilised in the initial phases of the programme.

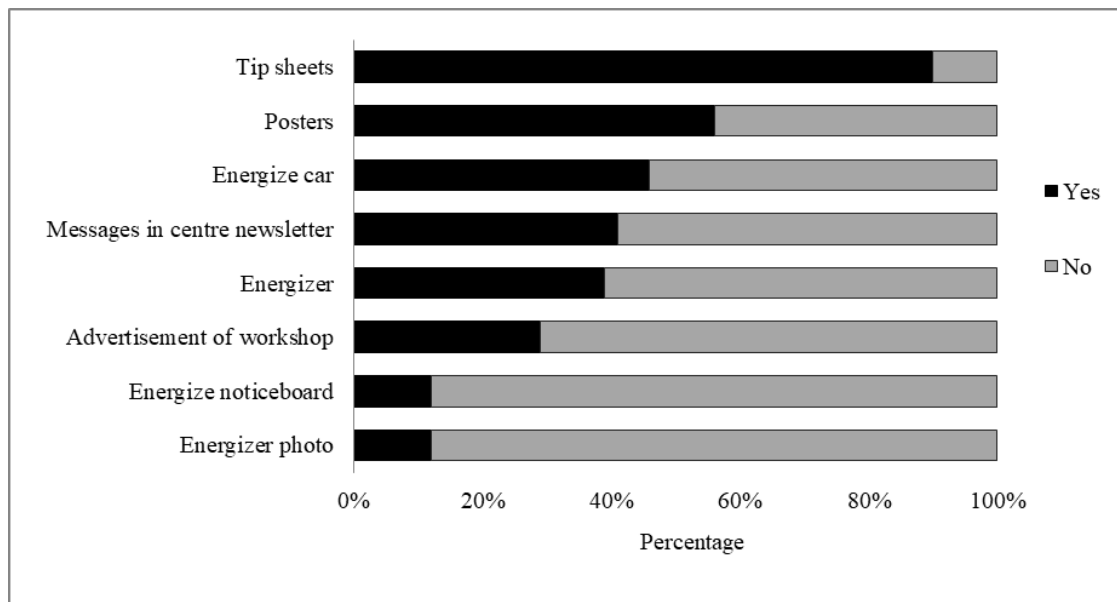


Figure 7.2. Type of Under 5 Energize promotional material seen by parents

Tip sheets were the U5E resource found most useful by parents (80%, n = 36) with only 9% (n = 4) of parents reporting ‘none’ of the resources were useful. One-fifth of parents reported the parent workshops, physical activity events and information in the centre newsletter as useful. Only 9% of parents noted the displays at centre as useful.

Of the respondents who had heard or seen U5E, three-quarters (76%, n = 34) reported using healthy eating messages to make changes to food choices at home or to food provided to children at centre. This is in contrast with reported changes to physical activity at home, where only a third of parents (n = 14) described making changes.

Having ‘healthier lunchboxes’ (n = 9) was the most frequent change documented by the researcher when parents were asked what specific changes had been made at home or to food provided for children at centre. Other frequent changes were spread evenly among ‘less packet food’ (n = 7), ‘healthy drinks’ (n = 6), ‘new ideas for healthy options’ (n = 6), ‘reminding us what is healthy and what is not’ (both for parents and children) (n = 6) and ‘food labelling’ (n = 5).

The main change documented for physical activity was that parents felt more knowledgeable and confident to assist their child with movement (n = 7). One example given was ‘more confident to help her son such as learning to jump off the couch and land safely’. Other changes included more ‘outside play’ (n = 4) and ‘walking’ (n = 3).

Parents were asked if they had heard or seen the Project Energize programme operating in primary schools; 43% reported that they knew of this programme and 57% did not.

A statistically significant association was shown between length of time in the centre and awareness of U5E using a chi-squared test ( $\chi^2 = 4.7151$ ,  $p = 0.029$ ). Parents who had children enrolled for longer in ECCs were more likely to be aware of U5E.

### **7.1.7 Summary**

Parents or caregivers ( $n = 78$ ) were surveyed as they left or arrived with their children at U5E participating centres to determine their awareness of the U5E programme and use of the programme messages. Just over half the sample (58%) was aware of the U5E programme and aims. Of these parents, a high proportion was aware of the programme messages that had been delivered and of the programme resources, in particular the tip sheets. More parents were making changes at home with food compared to changes with physical activity as a result of U5E messages, and the main change was healthier food choices in children's lunchboxes. Longer attendance time at childcare was associated with greater awareness of U5E.

## **7.2 What changed in early childhood centres as a result of Under 5 Energize**

The aim of the second part of this study was to investigate the changes within the ECC environment from receiving the programme. Separate interviews were held with U5E staff delivering the programme, the programme manager and centre staff receiving the programme. This was done to obtain a broad perspective of the ongoing effectiveness of the programme from the different viewpoints. In particular, data were gathered on the opinions and experiences of the main changes (if any) in the food and physical activity environments of the early childhood centres in the U5E programme and the main drivers of change. Barriers and enablers of change, overall opinions of the U5E programme and opportunities for U5E in the future were also explored.

### **7.2.1 Under 5 Energize programme staff focus group 2**

#### **Recruitment**

U5E programme staff was notified in the participant information sheet (Appendix A: Ethics approval and approved forms) that the research involved two focus groups, one timed for early 2015 and the other late 2015. Following the first interview, contact was made to arrange participation in a second focus group in October, 2015. The recruitment process of the four U5E programme staff for focus group 2 was the same as that presented in Chapter 5.3.1. The programme manager was interviewed separately from the Energizers.

## Data collection

Five main discussion areas and prompts were pre-planned (Table 7.2). Data were collected in the same manner as described in Chapter 5.3.1.

Table 7.2 Discussion areas and prompts in the Under 5 Energize programme staff focus group follow-up

Discussion areas	Prompts
Changes in the ECC environment	What do you think have been the main changes to nutrition in ECC as a result of U5E? What do you think have been the main changes to physical activity in ECC as a result of U5 Energize?
Response to change	What has been the response from a) educators, b) parents c) wider community to the changes centres want to make/have made?
Drivers of change	What do you think are the key drivers of change in nutrition and physical activity in (your) ECC? What are the barriers and enablers to changing nutrition and physical activity in your ECC?
Opinion of the programme	What do you like about the programme? What do you dislike about the programme?
Future	What else could U5E offer to support your ECC to provide a healthy eating and physically active environment at your centre?

*Note.* ECC = early childhood centre; U5E = Under 5 Energize

## Data analysis

The data were analysed in the same way as described in Chapter 5.3.1 except for the following: the codes for the focus group included the main areas of research interest, namely the main changes (if any) to the food and physical activity environment as a result of programme participation, barriers and enablers to change, opinion of the programme and recommendations for the future.

## Integration of the researcher

Integration of the researcher was the same as described for Chapter 5.3.1.

### 7.2.2 Interviews with early childhood centre staff follow-up

#### Recruitment

The participants were the same self-selected sample of U5E programme liaison representatives from the four main early childhood centre types and the U5E programme manager identified in Chapter 5.3.1. Centre liaison representatives were notified in the PIS (Appendix A: Ethics approval and approved forms) that agreeing to participate involved two interviews, the second to be scheduled in the latter part of

2015. The participants were contacted by phone in October 2015 to arrange the interview at a convenient time at their ECC.

### **Data collection**

The semi-structured interview guide was developed for the data collection using the discussion areas and prompts from the focus group (Table 7.2). The interviews were structured around the discussion topics and the prompts were used to guide the dialogue, with opportunity for the researcher to explore points of interest or aspects that needed further explanation. This was important considering the sample represented four types of centres operating in different ways.

The interviews were conducted, recorded and transcribed as described in Chapter 5.3.1, including the distribution of a \$50 koha to each participating centre at the end of the interview.

### **7.2.3 Focus group and interview follow-up findings**

The focus group included all four Energizers. There had been no staff changes since the first focus group, hence the sample description in Chapter 5.3.1 is the same. At the time of the focus group, the Energizers had been employed by Sport Waikato for between two- and two-and-a-half years. The focus group discussion was 92 minutes in length. The interview with the programme manager, the same participant, continued for 100 minutes.

The number of centres in the interview 2 sample was one less than the interview 1 sample (Table 7.3). Although agreeing to participate in the second interview, one kaiako from a Kōhanga Reo was unable to attend the scheduled interview time because of a death in the whānau of Te Kōhanga Reo. The interviewees from the ECCs were the same participants, although at one Kōhanga Reo, where in addition to the two previous interviewees, four whānau members had been invited by the Kōhanga Reo to attend the interview (three female and one male). Interviews lasted between 25 and 40 minutes. Similar to the findings for the first interviews, the data from the three different types of participants were written up together as the findings were comparable. After twelve interviews the researcher concluded that similar responses were being repeated and no new or different information was received therefore data saturation had been reached (Guest et al., 2006).

Table 7.3 Follow-up interview sample numbers of early childhood centre types and centre representatives

Centre type	Number of centres and interviews	Number of interviewees
Education and Care	5	5
Kindergarten	2	2
Playcentre	2	2
Te Kōhanga Reo	3	12
<b>Total</b>	<b>12</b>	<b>21</b>

### Introduction of the themes

In the first interviews and focus group held towards the end of the programme initiation stage of U5E, four main themes emerged (Figure 7.3). The second round of interviews and focus group were conducted 10 months later, when the programme was well into the implementation stage. Three new themes emerged from the second round of interviews; however, two of the three themes were a progression of the previous themes. The emerging theme ‘part of what we do now’ appeared to be a development of the previous themes, ‘fit’, ‘Energizer factor’ and ‘reason to connect’. It was also the most dominant theme to appear. The ‘could see benefit’ theme evolved into a new theme known as ‘this is what we are here for’. The third and only new theme coming from the second interviews was ‘setting the standard’.

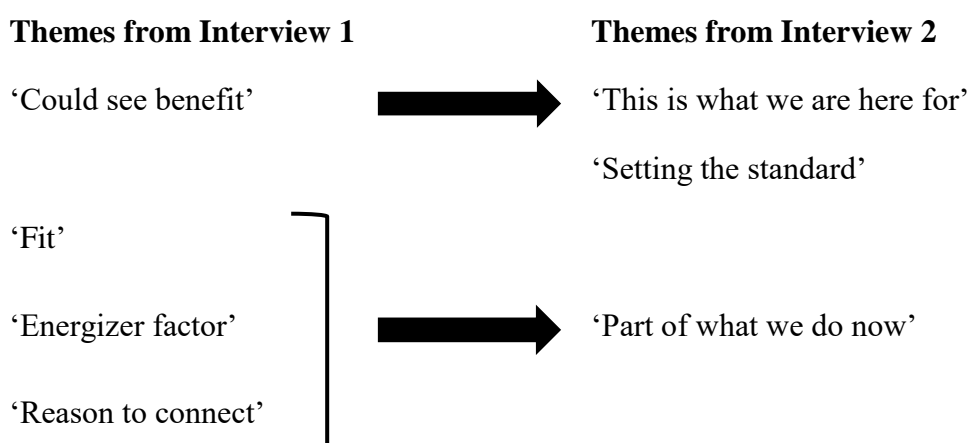


Figure 7.3. Relationship between themes from the first interviews and follow-up interviews

The new themes reflected the implementation phase of U5E, when the interviews were conducted, and showed that the programme was becoming embedded into centre policy and practices. Also, all three themes are inter-related. It appeared that the ‘fit’,

‘Energizer factor’ and ‘reason to connect’ themes that contributed to high initial centre reach and adoption also contributed to longer term investment in U5E. Centre educators seemed to have a greater role in programme delivery evident in the ‘it’s part of what we do now’ theme, compared to the findings of the first interviews when the Energizers, shown by the ‘Energizer factor’ theme, had the dominant position. A change to the emphasis of FMS training by U5E, after employing an in-house FMS expert rather than using an external group (GymSports NZ), created connections between health and education outcomes for the educators not so evident at the outset of the programme. The connection is that physical activity, particularly quality movement skills, is an essential component of a child’s development (Sport New Zealand, 2008). This connection between health (physical activity) and education shifted the benefit of the programme from solely health (found in the first interviews) to a broader child development, benefit of which health was a subset. The theme ‘this is what we are here for’ was underpinned by this. Furthermore, two years into the programme, participants seemed to view U5E as ‘setting the standard’ for healthy food choices and physical activity within ECCs, also not shown in the initial phase of U5E. At the beginning of the section on each theme, the theme will be defined, followed by a discussion of the theme with relevant participant quotes to illustrate relevant aspects of the theme.

### **Theme 1: ‘This is what we are here for’**

This theme ‘this is what we are here for’ describes the connection that centre and programme staff made between U5E, programme messages and child learning and development. The ‘this is what we are here for’ theme was a progression of the ‘could see benefit’ theme identified in the first interviews (Chapter 5.3.4), however, the benefits to child health evident in the ‘could see benefit’ theme, while still present, were not as dominant as those for child learning and development. The ‘this is what we are here for’ theme indicated that there had been a shift in the way centre staff were interpreting the role of U5E and how programme staff were positioning the programme to ECCs. By the second interview phase, the integration of health and education was more visible compared to findings from the first interviews. It appeared to stem from the programme messages around fundamental movement skill development contributing to educational outcomes for children. The change in focus seemed to be coming predominantly from the physical activity rather than the nutrition workshops. The overall commitment of educators and centres and perceived role in U5E appeared to have gained momentum and were strengthened as a result.

Educators were making the connection between FMS and children's learning, consequently affirming their role in ensuring children learnt FMS. They described that they had a greater understanding of the link between specific physical activity movements and brain and cognitive development of children, termed by some participants as '*the why*'. Provision of 'the why' was also discussed by participants in the first interviews but at that time, the link to learning and development was less prominent. This may have been because nutrition was identified by centres as the priority in the early stages of the programme and U5E responded by providing the support of a dietitian for training and resource development. Subsequent to the first interviews, a fundamental movement skills advisor joined the team to provide similar support and expertise for the Energizers and educators. While some educators reported already knowing about the importance of physical activity for child development, U5E had served as a refresher for them and, together with new knowledge, appeared to be driving change in physical activity within the centre.

*We definitely had that prior knowledge (of FMS), but I guess Energize Under 5 just drummed it a bit more home for us, yeah. In terms of the learning and how that can help our children. (IP)*

The relationship between FMS and child learning and development appeared to be a critical connection and focus for the educators, endorsing the importance of physical activity to child development and demonstrating that U5E was not only assisting them to achieve centre goals for children's learning and development but affirming their important role in ensuring children were developing FMS.

*It's (U5E) supportive, it's proactive; it's everything I think is important for children's development. (IP)*

Educators also acknowledged that the timing of development of these skills was important before children went to school.

*It (U5E) supports the centre well with all the things that we want to do for learning and development with children on the physical side of that. And doing that bucket filling I think it's very important for children prior to going to school. (IP)*

The role of physical activity appeared to have become considerably more important to the educators compared to its status in the first interviews where nutrition was the priority.

*When they do come to the physical activity sessions ... educators say "Oh we just want some new games." And then they learn a whole lot of new stuff, the awareness is just like mind blowing about how important physical activity is. And yeah they are using their equipment differently, they are changing policies, they are being actively involved with their children. So all that stuff kind of wasn't really happening before. (FGP)*

According to the Energizers, the information presented in the U5E FMS workshops seemed to increase staff awareness of the importance of monitoring individual skill development of children and showed them how to develop specific FMS. New knowledge from the workshops was reportedly being used to identify children who showed signs of lacking specific FMS developmental milestones and implementation of corresponding activities to develop absent skills.

*I think the approaches and the information that is shared through the workshops now have made them become aware of the needs of the child and they're able to recognise what a child is lacking. So yeah, that's pretty, that's huge. (FGP)*

U5E offered centres ways to meet centre goals for child learning and development. The fact that U5E provided the tools enabling centres to achieve goals for children facilitated centre implementation. Connecting FMS with child learning and development seemed to confirm the position of the U5E programme within the education setting for the educators and their vital role in developing FMS for children.

Raising awareness of the importance of early development of healthy eating and exercise habits and knowing that U5E was part of a broader initiative to prevent obesity seemed important to the educators, increasing the relevance of U5E and the 'this is what we are here for' theme. Educators commented that they were seeing change to food choices in settings around their centre, such as the marae and schools, and improvements to food choices made within the centre aligned with these. Examples were Project Energize and Fruit in Schools. They also noted that healthy changes for children led to a healthy whānau and future. Educators stated that they felt parents wanted their kids to be healthy despite the low nutritional value of some foods, such as sweets, potato chips and sugar sweetened beverages that parents supplied to children seeming to contradict this. Centres reported that having strategies in place to address this, including explaining to children and parents that these were not 'kindy' foods, helped support staff to improve centre practice, and if relevant, they were able to

explain that provision of certain foods and beverages contravened centre policy and could return them to families.

*If there's like biscuits with chocolate on it, it gets taken out and it'll be put back in at the end of the day with a note until they stop. (IP)*

Increased media attention on obesity seemed to increase the relevance of U5E to ECCs and educators perceived they had a role to play in obesity prevention by developing healthy eating habits early. An educator noted that after she had read media reports linking sugary drinks to obesity she was motivated to make change within her centre, stating she wanted to find *'just the best way we can promote and support our whānau with healthy options'* (IP). There was also acknowledgement that the healthy eating and exercise focus for children within centres should include the educators themselves, with many commenting on the importance of role modelling healthy practices to the children. Educators said they had made healthy changes, for some, as a team initiative. Keeping up the impetus on U5E messages within the centre was described as *"hard"* by some centres, *"it's remembering to keep implementing it"* but ongoing support from U5E was helping (IP). Increased media attention on obesity and shifts towards healthy food choices in settings around centres, together with U5E involvement, affirmed the educators' role in improving food choices for children in centres to prevent obesity and despite barriers, they were responding with appropriate strategies.

Although the benefits of U5E had progressed from predominantly a health focus to a child learning and development focus, health benefits were still evident to educators by increased reporting of tangible benefits compared to the first interviews. The association with health benefits was also being communicated to children and parents. The health benefits seemed to be associated with improving food choices rather than physical activity. There were early indications of tangible health benefits from the first interviews, where one centre reported fewer dental visits among children; however, more centres seemed to note this positive outcome during the second interviews. Additionally, one centre noted that constipation problems among children appeared to have declined, which they attributed to an increased fruit and vegetable intake. Educators reported using the health consequences of poor diet, for example, increased dental visits, to educate children about the importance of healthy food and beverages. Although not widespread, one parent educator reported using poor dental health as a way to check if beverage consumption habits needed improvement, apparently unaware of the effect decayed first teeth had on the health of permanent teeth.

*What about the dental care ... have check-ups to see if they've got good teeth and if they don't then that's when you kind of realise, need to make changes and stop the sugary drinks. (IP)*

The health benefits of healthier food and physical activity were being communicated to parents in children's learning stories (a record of child activities by an educator using text and photographic evidence, usually collected into paper or online records for parents, often called a portfolio). Educators used the learning stories as a way to increase awareness, for example of water consumption instead of sugar sweetened beverages. While many other forms of message delivery to parents were also used, including workshops and centre newsletters, there was recognition by the educators of the importance parents placed on engaging with the learning stories as they were related to children's learning progress. There was increased reporting by participants of the actual health benefits from acting on U5E food messages and communication of the benefits to families using child learning records which demonstrated the close ties and mutually supportive nature of health and education in the early childhood setting, in the 'this is what we are here for' theme.

U5E appeared to enhance the 'care' role from Te Whāriki that ECCs have with their children, whānau and community. Te Whāriki states 'early childhood services are jointly involved with families in the socialisation, care, and education of children' and the curriculum's principle 'Family and Community' and the strand 'Belonging' further reflect this overarching role (MoE, 2017, p. 7). Educators reported a strong responsibility to care for the children and community within centres and this was one of the reasons behind the theme 'this is what we are here for'. Programmes that helped them achieve this, such as U5E, were seen as valuable additions to what they already offered.

*But whatever we can do for them the better I think. I mean they're not our children personally, but they are part of kindergarten whānau, so they're important to us. (IP)*

Educators reported that they provided food daily at centres and at community events to address the issue of children coming in with little or no food. Involvement in U5E had guided centres to offer healthier options in place of unhealthy food choices. U5E appeared to encourage centres to consider the nutritional quality of food provided at centre events as a way to extend teaching about healthy eating by role modelling it where they could, including community events.

*That's been a change back from when I first started, we did do a whānau event and we did have hot chips and had sausages and pizza, feed the masses. ... our Christmas party's coming up and we're also having another parent evening, and we actually did talk about whether or not we could make leafy green salad, or a pasta salad, or a tuna salad and provide other options, to practise what we're preaching right the way through. (IP)*

They recognised that food had multiple roles within the centre, including being necessary for children being ready to learn, providing a way to bond with whānau, that there were learning opportunities around food and it was essential for the health of children. Educators reported being more mindful of the type of food they shared with children because of U5E and they had encouraged whānau to make healthy changes, despite some resistance, demonstrating commitment to caring for their wider community.

*I think the parents understood why we did it and some got a little bit upset and we just showed them the picture of the teeth and they're all good with it. (IP)*

*I think to show that you actually care about their child's health and their well-being ... You just kind of need someone to take that, to show that interest as well, and then it's encouraging I think. (IP)*

*We know, it's just common sense, it's just, because we've got that kind of āhua in us we'll keep giving our children [food] I suppose what we think what they want and what, just keep giving and giving. Which now our whānau have realised that giving less is actually giving more. (IP)*

Te Whāriki documents that centres and educators have a role in the care of children, in addition to child education, and involvement in U5E facilitated this role by promoting change to healthy food choices within ECCs to enrich the future health of children and families.

## **Theme 2: 'Setting the standard'**

This theme 'setting the standard' describes the nutrition and FMS goals the U5E programme was providing for centres to aspire to. Although programme staff used the term 'benchmark' and 'reference point' when describing this theme, their definitions seemed to imply a 'standard' for all centres to work towards rather than a benchmark comparing centres against one another. Establishing standards appeared to be new to most centres unless they had accessed the HHA programme from the Heart Foundation,

which contains criteria for nutrition and physical activity. The benefit of U5E was providing the support and assistance for centres to reach the standard. While HHA set the standard, it was not able to provide practical on-the-ground support. Staff education in nutrition and FMS and ongoing help for centres to achieve the standards, which may have included a HHA, strongly contributed to U5E having a ‘standard setting’ function. It was seen as important and enabled the programme staff to have a more positive role of meeting a standard, rather than being seen as the “food police”. U5E became known as ‘setting the standard’ and provided the goals, staff education and support for centres to achieve them.

Having clear nutrition and physical activity goals made the U5E programme was an important initiator of change. Centres reported reflecting on current practices to determine if amendments were needed to align with U5E recommendations.

*I guess it helped us to look at and analyse whether we were extending kids enough through their physical activity. So that prompted purchase of some of those bigger climbing blocks. (IP)*

One of the outcomes of this process for physical activity was the purposeful use of existing outdoor equipment.

*It's amazing, we don't need to buy into all this really expensive in vogue ... equipment, actually we just need planks and tyres and some bean bags and we can do all sorts of stuff with that. (FGP)*

In some cases, centres purchased new physical activity equipment to facilitate FMS development, in line with U5E recommendations. Other reported changes in the physical activity environment were increased physical activity undertaken in inside spaces when weather was inclement and sessions for toddlers, as well as more active involvement of educators with the children in physical activity.

In terms of food ‘standards’, the Energizers noted the importance of having a standard for food choices whereas “parent choice”, as described by the Energizers, meant any food could be brought in to centre. Setting the standard for beverages as ‘water and milk as the best drinks for children’ had had a big effect on beverages coming in to centres with Energizers commenting that that had been “... *the biggest change. It was the easiest one to do*” (FGP) and had led to “*more access to water, so I've had like two or three or four centres put in outside drinking fountains, water coolers inside*” (FGP). Similarly, food choices changing as a result of U5E standards were also reported.

*... their progress from chips, Tim Tams, two-minute noodles, KFC coming in to feed their children, it's now these beautiful Healthy Heart Award meals, cooked by a cook, which is, I think is a major change. (FGP)*

As well as the standard-setting role of U5E encouraging centres to reflect on current food choice and physical activity practices, centres were working towards achieving U5E recommendations. U5E supported centres to achieve standards which may have included attaining a HHA. The positive approach used by U5E, particularly for nutrition, was highly valued by centres and seen as a key factor in encouraging change. Educators were changing centre practices according to the standards stipulated by U5E because they were positively framed and they were supported to achieve them.

Staff education strongly underpinned a centre's ability to recognise their role and develop their confidence to change nutrition and physical activity practices according to the U5E standard. Programme staff felt that knowledge from U5E workshops empowered educators to support parents to make food choice changes for their children and change their own practice with respect to physical activity at centres.

*As teachers gain more knowledge then we also see what equipment, what resources we need to help children in certain areas. (IP)*

An Energizer commented that daily poor food choice was a big issue in her community prior to U5E, describing educators as having “*a sense of exasperation*” and consequently feeling unable to address the issue with parents as it was “*too big*” and they “*didn't know how*” (FGP). According to the Energizers, this reluctance to address the issue may also have been related to educators' awareness of potentially “*losing children*” from the centre if parents were challenged about food choices and consequently jeopardising educator jobs (FGP). Through workshops and other support, U5E had provided educators with the confidence to engage with parents and respond to parents' concerns about food policy changes, including no sugary drinks or sweets in lunchboxes and healthy food at events such as birthdays and community gatherings. The confidence of the educators had built over time, according to the Energizers. This followed on from the theme ‘reason to connect’ from the first interviews where centres stated that U5E provided “*backing*” or “*leverage*” for them to make change (Chapter 5.3.4) and although these terms did not feature in the second interviews, one educator commented that although whānau would “*rather listen to someone else than us*” (i.e., the Energizers), the resulting action was the same (IP). Educator attitudes appear to

have changed from “*we can't tell our parents what to do*”, at the outset of U5E in some centres to “*we are an U5E centre*”, in fact an Energizer reported that one centre even requested a door sticker to advertise the fact, similar to the “*we're a sun smart centre*” sign (FGP). This use of the programme by educators to effect change appears to have developed over time, with the Energizers describing educators as becoming “*passionate*” about the programme and taking on the role as “*advocates*” for U5E and hence child health and development, which was not evident in the first interviews (FGP).

*I think they (educators) feel more confident to advocate and actually say, “We want these children to be thriving, to be ready for school and that's our job, so therefore health and nutrition and physical activity is a big part of that, and actually we're going to advocate, that's part of our job”. (FGP)*

This quote also demonstrated that educators had the confidence to step up to an Energizer-type role in the centre and hence reduced the need and prominence of the Energizers previously pronounced in the first interviews’ theme of the ‘Energizer factor’, which was less prominent in the second interviews.

Increased confidence and role in changing food and physical activity had resulted in centres informing prospective and new parents of the centre’s U5E participation and their healthy food and beverage guidelines, either verbally or with written guidelines in the enrolment packs, making it clear from the beginning. While this initiative was indicated during the first interviews, subsequently it appears a more common practice. Educators have gained the confidence to address poor food choices coming into centres and improve physical activity practices from workshops and U5E support, with some becoming advocates for U5E within their centres in place of the Energizers.

Offering the opportunity and support to achieve a HHA within the U5E programme reinforced the standard-setting role of U5E. To achieve an award centres were required to meet selected food and physical activity criteria. Standards from the HHA were being used within the centre to guide and reward change; however, the educators also felt the HHA was providing external recognition of standard achievement for centres in the local community, as well as national recognition from the Heart Foundation. The Energizers also commented that the HHA scheme was endorsing their work enabling centres to reach the required standards at a regional level.

*Centres say, “We are in an Under 5 Energize centre and we are also with the Healthy Heart Award programme, so we need to eliminate our packets for a start.” Or just eliminate the sugary drinks or do something along those lines. So I do think we’ve more and more become a benchmark. (FGP)*

The Energizers commented that the HHA standards, especially the Pa Harakeke (gold) award, suited the centres that were high achievers stating that it “*pushes them a bit more*” and “*it’s definitely important to have it as an option*” (FGP). Achieving standards and consequent change in line with recommendations appeared to be more easily achieved for physical activity compared to nutrition for some centres.

*Physical was easier, it’s changing the mind frames of our whānau members of the nutritional one. That was the hardest and it’s still the hardest. (IP)*

This may be due to the fact that educators were in control of physical activity delivery at centres compared to the food choices which required parental involvement and support of change. Offering HHA within U5E has provided centres with additional standards to aspire to and external recognition for centres and Energizers.

Within the parent- or whānau-led centres, communication of the standards for food choice and FMS have been direct to the family, as the educators attending the workshops are parents of the children. This is in comparison to teacher-led centres where the communication to families is less direct, requiring educators to facilitate this and parents to engage with the messages. Parent- or whānau-led centre educators described this direct engagement with parents positively because parents were learning alongside their children, noting that it was resulting in food choice changes at home as well as at centre.

*I suppose for us, because these are actual whānau members instead of just workers that it actually makes a difference, instead of just us telling parents or putting in the panui that they actually come in and do it and learn with their children. So it actually makes a big difference on the rest of their family, ‘cause then they actually go back and start making changes into their home life. So yeah I congratulate family members. (IP)*

There was acknowledgement that not all families attend whānau hui or meetings and workshops. The timing of workshops in the evening made it difficult for some parents to attend, compared to those run during centre opening times. Within Playcentre, U5E workshops were recognised by one regional Playcentre organisation as satisfying

Playcentre parent education requirements, which was useful as Playcentre provides parent education in child development, and parents can achieve NZQA qualifications through their programmes (Playcentre Association New Zealand, n.d.). Communication with parents was difficult for other types of centres, with participants stating that questions about the U5E programme were rare. Despite this, many participants felt parents were responding to the messages by changing lunch-box choices to healthier options. Centres that had offered workshops to parents felt they had been beneficial for parents who attended, both as a source of knowledge and as a chance to communicate, similar to the ‘reason to connect’ theme from the first interviews.

*Parents is really a hard one in general because we do have such busy, busy parents, that communicating with them is sometimes hard. So I don't think I would, I have ever sat down and had a really good conversation with a parent about Energize Under 5, purely because I don't think I've ever been asked about it. I just know that that is a, I know that they know that is a programme we offer. (IP)*

*It shows in the lunchboxes that come in ...that they're taking on board about nutrition and when they don't, well they just get a reminder through a panui that it's get back to kai tika. (IP)*

The fact that the children within these centres experienced healthy lunch-box food choice changes as a group was described as making it easier to implement and parent educators noted a sense of pride in achieving the recommended improvements to food choices such as sandwiches instead of potato crisps.

*Before like give them their lunch-box they always will eat their strings and muesli bars, chippies. But now I think you see more enjoyment with the changes, they'll eat their sandwiches and then have their fruit. ... So it was great to witness as a whānau member to see that, that they're actually eating their kai, not eating the rubbish. So yeah that was a big thing for me. (IP)*

Parent-led centres appeared to be influencing food choice change within families in a more direct way compared to teacher-led centres as parents were both the educators and part of the target group as the food provider, and families were reacting positively to the changes in food choice for their children.

### **Theme 3: ‘Part of what we do now’**

This theme ‘part of what we do now’ describes how U5E had become routinized in centre processes and practices, due to benefits and alignment with child learning and development and support from centre management, centre team and externally from

other centres. It describes how centres were taking ownership of the U5E programme rather than considering it as an extra activity or job to do. This theme was a progression of the ‘fit’, ‘Energizer factor’ and ‘reason to connect’ themes from the first interviews (Chapter 5.3.4) emerging only during the second interviews. It showed that the U5E programme had shifted from the initiation phase in the first interviews, where the ‘fit’ of the programme was prominent, to being embedded as ‘part of what we do now’ in centre policies and practices in the implementation phase. This had occurred approximately two years after it was introduced. Second interview responses reflected all three of the first interview themes; however, they were less prominent. The reason U5E became ‘part of what we do now’ in centres appeared to be because of the benefits and strong alignment between U5E and the ECC goals for child learning and development. U5E supported Te Whāriki and other nutrition-related programmes and activities already embedded in centres including Enviroschools and vegetable gardens.

Features of this stage of U5E, reported by participants were reduced reliance on the Energizer and increased visibility of healthy food messages in many aspects of the centre environment. A management and teaching or parent team supportive of U5E was highlighted by centre participants as important to ongoing programme involvement without which the programme would have had limited traction.

The ‘reason to connect’ theme dominant in the first interviews seemed to have become absorbed into the ‘part of what we do now’ theme, although the external connections with other centres continued to be important to educators. This was possibly because it enabled centres to meet Te Whāriki goals and allowed educators to share experiences of U5E with other centres implementing the programme at the more regular ‘cluster’ events and training organised by U5E in the implementation phase of the programme.

U5E had become embedded in the systems, processes and practices of participating centres. Centres used descriptions such as “*ingrained in our programme*”, “*flows through into our learning stories*”, “*part of educator self-review*”, “*integral part of their curriculum*” and that Energizers were considered as “*another staff member*” to denote how U5E was integrated in centres. Centres commented that the U5E programme was considered during centre planning and budgeting, for example, the allocation of funding for the purchase of new equipment to support FMS development.

*We look at the Under 5 Energize in our budget and we put money aside to spend on, to promote active play and things like that. So*

*that's probably a change actually, is we're, like I said, we're more specific, it's part of our planning, our budgeting, our focus, weekly focus, our termly focus. (IP)*

Another example is the embedding of FMS into child learning documentation processes.

*I think we probably always did physical activity, I mean three- and four-year-olds are very physically active. But I guess it's us as teachers stepping back and looking at what they are actually doing to be physically active and how we can document that in their learning, and we can also show and tell parents why that is important. (IP)*

This documentation was used by the educators to inform parents about the link between FMS and child development, demonstrating that U5E was becoming part of what educators routinely carried out for child physical activity. Educators commented that prior to U5E; communications to parents were not as specific about the links to child development or health. U5E was supporting this process of embedding by raising awareness of the importance of nutrition and FMS and offering training to update knowledge. Participants remarked on the increased attention given to healthy eating in daily learning discussions with the children who were responding by identifying foods as 'go' or 'glow' foods.

*It's just become an integral part of their curriculum that this is, healthy nutrition is a big part of their daily curriculum now... (FGP)*

Incorporation of Māori physical activity movement and language into U5E FMS development sessions reflected Te Whāriki and facilitated the incorporation of U5E messages into centre activities.

*(Energizer name) came in the other day and did some poi and rākau so it's culturally, they're culturally aware and she was using Te Reo with the children, it culturally uses the biculturalism, using both so that's really cool as well. (IP)*

There was alignment between U5E and another externally managed programme, Enviroschools, especially at kindergartens where the programme was well established, along with centre vegetable gardens. The philosophy of sustainability and themed areas zero waste and living landscapes from Enviroschools (Enviroschools, n.d.), and growing vegetables fitted well with the healthy eating goals of U5E. One Energizer reported an increased emphasis on growing vegetables in her centres since U5E.

*I've seen quite a few garden improvements. So a lot of the centres kind of had gardens, that they would have like a couple of strawberry plants and maybe one tomato plant. But now I'm seeing those gardens be really extended and really used as learning and teaching environments for the kids. (FGP).*

Incorporation of U5E into 'part of what we do now' at centres was testament to the value and benefits U5E brought to the centres, how well it aligned with Te Whāriki and other established initiatives such as Enviroschools and growing vegetables with the children.

Strong management and educator or parent team support for U5E was an influential factor in the adoption of U5E and it becoming 'part of what we do now'. Centre managers were leading teams to not only initiate the programme but were instrumental in enlisting staff teams to embed the programme in centres' policies and practices.

*It works really well, but obviously you have to have a supportive network. You have to have teachers that are on board with the programme. You have to have a centre manager that's willing to drive the programme as well as team leaders that are willing to drive it as well to support their team. (IP)*

Regional ECE organisational support for U5E, where present, appeared to be valued by centre managers in supporting change, by providing organisational policy, encouraging educator attendance at U5E training sessions and menu development following the Pa Harakeke (highest) HHA guidelines. According to the Energizers, at least two staff at each centre were driving the programme delivery in the implementation stage. Typically this was an educator supported by a manager, and possibly also a team leader. In the initiation phase, the Energizers dealt mainly with the managers. Having U5E delivery as part of an educator's job was seen as working well; however, lack of support from centre staff and in some centres, no regional organisational support for improving nutrition and physical activity, were barriers to change in some centres.

*The changes, in some centres have been slow, but the changes in other centres have been massive and that all depends on a whole lot of...who's driving it. (FGP)*

Additionally, changing staff, especially management, posed problems with the continuity of the programme and its messages, although the Energizers noted that a change of staff could also work in their favour.

*I have had a couple of centres with management changes that have come and gone. ... I feel like I've gone back to the beginning with them two times round now, which is quite frustrating in a sense. (FGP)*

The Energizers reported using a range of strategies to work alongside centres with challenges such as high transience. These included allowing centres time to adjust to internal change including staff movement, focusing on building a good relationship with the centre and free giveaways such as sunscreen. Educators reported an increased awareness of their influential role in improving food choice and physical activity of children in centres. This was a key factor leading to increased centre ownership of the responsibility for the U5E programme and delivery of its messages. One educator commented, “*We’re quite powerful in what we can say*” (IP). The educators felt they were influential in the messages they shared through discussion with families, educational opportunities with children and role modelling of healthy behaviours because of “*the amount of time we spend with the children*” (IP). Energizers felt that educators were directing healthy eating messages at parents as they were the source of food for children.

*If you’re going to eat with the kids, eat good food, not a pie and chicken and chips and, so it’s about a whole centre change. (IP)*

The ‘Energizer factor’ theme found in the first interviews demonstrated the Energizers played a lead role in programme delivery. This appeared to have been replaced by the educators establishing a stronger position as the champions of the programme in the centres, in the ‘part of what we do now’ theme. This was shown by centres producing their own solutions to improving food and beverage choices that suited their needs. This included increased centre provision of healthy food. A centre reported using equity funding (per child funding provided to centres based on their Equity Index, with lower equity receiving greater funding) to provide food for the children, reducing the need for parent provision of food, while other centres asked for food donations or had made small increases in attendance fees to fund food provision. The Energizers reported that while some centres were only supplying healthy snacks others were now producing all the daily food consumed, as a way to address the poor food choices supplied in children’s lunchboxes. An example was a centre providing a fruit and vegetable platter for afternoon tea which the children enjoyed together instead of eating what was left of their lunch, expressed as mainly “*the packet stuff*” (FGP). The Energizers commented

that centres were experiencing the benefits of healthier food on the health and behaviour of children as a result.

*But the changes they're seeing, like in the few centres that are now either doing morning and afternoon tea or the whole shebang (providing all the child's food), way better behaviour. So I just think that having healthy food during the day is just making huge improvements. Less snotty noses, less kind of school sores, shiny healthy hair and just all that sort of, like real physiological changes in the kids. (FGP)*

The role that educators perceived themselves as having within U5E was expressed by one educator as being a necessary “*part of her job*”, affirming the educator role in U5E had become ‘part of what we do now’ (IP). Ardent management and team support appeared to increase the educators’ role and responsibility in the delivery of U5E and consequent development of centre-based solutions to improving food choices for children.

‘Part of what we do now’ was underpinned by the ‘train the trainer’ strategy. It was used by U5E to equip centres with the skills, rather than the Energizers running programmes such as physical activity sessions for the children at centres. The manager reported that it was an aim of U5E from the outset to firstly train the Energizers to then train the educators to deliver quality physical activity sessions to children. This required provision of FMS training including the evidence linking FMS to child development and a shift in educators’ thinking or experiences of physical activity away from considering physical activity as simply “*just playing games*”. Physical activity appears to have taken more time to embed compared to nutrition, possibly because the programme had the support of nutrition expertise from the beginning whereas FMS expertise was not completely available until the implementation phase. Additionally, nutrition seemed to be what the centres wanted to address first, as was evident in the first interviews.

*It needed to be in an environment where, here's some ideas that you can carry on doing, rather than, yeah I can come in and run those games for you... It's about that relationship building where the educators can easily pick up some of the tools we leave with them and carry on doing those to improve the children's physical competencies and see the reasons behind what they're doing, rather than just playing games for the sake of it. And that has taken a lot longer to build within the team and for them all to feel comfortable going and doing that.” (IP)*

The train the trainer approach by U5E was a deliberate strategy to empower educators and centres to deliver nutrition and physical activity and although it took time to become ‘part of what we do now’, it contributed to enhanced centre ownership and delivery of the programme.

Despite the increased prominence of the educators’ role in U5E within centres, ongoing support from the Energizers remained of value to the educators to maintain the profile of the programme messages. Educators described it as “*keep[ing] U5E at the forefront of our minds*” (IP) and “*keeping it active in our centre*” (IP). Educators were appreciative of the support, with one centre even describing the regular contact as keeping them “*accountable about how much physical activity we are doing*” (IP). Also, stating that large centre workloads, busy roles of the educators and commitments to other programmes such as Enviroschools were the reasons for the programme to easily “*get lost*” if regular programme support was missing (IP). U5E was viewed as “*driving the same thing that we want to be part of*” and making it easier to keep U5E messages being used in centres by providing the tools, such as written resources and workshops. This was shown by a participant stating, “*It’s not us completely having to then go and invent a workshop*” (IP). It was also described as beneficial for staff knowledge by “*reinforcing it and bringing it up again*” (IP).

The development of action plans with regular review dates were the programme tools that educators thought helped keep the programme active in the centre and ‘part of what we do now’. The action plans were described as being used to plan and drive change, as well as review progress. At a Pa Harakeke (gold) HHA centre, achieved prior to U5E, the manager was unsure what the next action plan goals would be, as they were already a health-focused centre. This participant described the changes made since U5E as “*tweaking*” what they were already doing rather than major shifts (IP), an example being the inclusion of breastfeeding promotion in the centre policy. Despite this, the centre had found staff participation in the food labelling workshop enhanced staff knowledge and they changed a yearly community fish and chip night to a healthier, culturally focused meal.

*Often it’s really hard to find the where, what next to do, because you get to a stage where, oh we’re already doing that and we’re already doing that. (IP)*

This participant also stated that they would be agreeable to less regular support from the Energizer in the future, knowing that they could phone for assistance when required. The Energizers also felt that ongoing delivery and review processes could be streamlined as centres achieved goals and U5E became ‘part of what they do now’. This would potentially allow Energizers more time to engage new centres and receive training on other relevant topic areas. As U5E became ‘part of what we do now’, the regularity of ongoing support from U5E, while valued, could be reduced, as could action plan review processes, (six month review changed to yearly review) especially for the high achieving centres.

The ‘reason to connect’ theme from the first interviews was less pronounced possibly because it had become ‘part of what we do now’. Despite this, external connections with other centres seemed to have remained significant for the educators. Communication with parents and children about healthy food choices appeared to be well established, with centre staff describing this as “*nutrition is more visible in our centres*” (IP). This was in contrast to physical activity where visibility was less of an issue. Nutrition required greater parent interaction and engagement in centres where children brought food from home and the changes appeared to have become ‘part of what we do now’. Several centres commented that increased interactions through U5E were beneficial to the overall cohesiveness of the centre.

*If anything the workshops have made us interact more and communicate more so it's made us as a kōhanga stronger. (IP)*

As the U5E programme progressed, it increasingly offered opportunities for centres to connect as a group in local areas, compared to earlier in the programme. This appeared to be the reason educators valued this and continued to highlight this aspect of ‘reason to connect’ from the first interviews. Physical activity workshops were being run as a ‘cluster’ of centres, and physical activity events in an area, for example as part of Matariki, appeared to be more regular and valued, according to participants.

*I know around Matariki there was opportunities to come together and there's that cultural aspect there too ...they're (U5E) in a good position really because they are seeing lots of centres that it can almost, we can cluster together to share things, resources and share that same, yeah with special events or things like that. That's, I think, in small communities that's a really good thing. (IP)*

Educators commented that they enjoyed the option to view how other centres were delivering U5E, gain new ideas and hear about happenings in their communities. Even though connections within centres had become ‘part of what we do now’, external connections with other centres, offered by U5E, continued to be appreciated and of benefit to the educators.

### **Summary**

Two of the three themes from the second interviews were a progression of the themes from the first interviews, indicating that the U5E programme had shifted from the initiation phase to implementation. The ‘fit’, ‘Energizer factor’ and ‘reason to connect’ themes had morphed into the most dominant theme emerging from the second interviews, ‘part of what we do now’. At this point of the programme’s lifecycle the educators considered attention to nutrition and physical activity as a fundamental part of their role, accepting an integrated view of health and education. This shift was combined with taking ownership and a greater role in U5E compared to the Energizer, who had been more noticeable in the initial stages of the programme. The train the trainer approach of U5E meant educators were empowered by greater awareness and knowledge of the importance of nutrition and physical activity to child health and development from. Educators also sought support for change from other centres. Improving the nutritional value of food supplied to children at centres was being driven by health concerns, in comparison to physical activity enhancements which were responding to connections with educational outcomes for children that were important for school readiness. There was evidence of U5E becoming ingrained in centre policies and practices in the ‘part of what we do now’ theme.

The only new theme from the second interviews was the ‘setting a standard’ theme, which described how participants viewed the role of the programme for centres to make positive policy and practice change towards designated ‘reference points’. All the themes from the second interviews provided an indication of the future sustainability of the programme, particularly the evidence that U5E had become embedded in centres and centres were less reliant on Energizer support. Ongoing support from U5E continued to be valued but it could be less regular, as centres gained knowledge, confidence and skills. Streamlined centre delivery and action plan review processes by the Energizers would free up time for the Energizers to perhaps engage new centres.

### 7.3 Discussion

Surveying parents to assess the effectiveness of U5E reaching the families of children in centres that were participating in U5E showed that only 58% of the sample was aware of U5E; however, these parents were well versed in its nature, messages and main promotional materials. In fact, parents reported improvements were being made to the nutritional content of lunchboxes as a result of U5E messages. Furthermore, three key themes emerged from the follow-up interviews and focus group with programme and centre staff; ‘part of what we do now’, ‘this is what we are here for’ and ‘setting a standard’, all of which add perspectives on both the effectiveness and maintenance domains of the RE-AIM framework, after two years of delivery. The new themes were a progression of the four themes from the first qualitative study. The main theme, ‘part of what we do now’, indicated that U5E appeared to have become embedded in participating centres by inclusion in their planning, budgeting and teaching programme. These findings indicated sustainability was in progress. Educators integrated the health goals of U5E into centre education goals because of the strong connections between fundamental movement skill development and child development. U5E appeared to be setting a standard for nutrition and physical activity for centres to aspire towards.

This section provides in-depth insight on the changes and progress within ECC environments in response to U5E participation (interviews and focus group) and whether the U5E programme messages were reaching and changing families provision of food choices as a measure of effectiveness (parent survey). The findings of this section of the thesis will be discussed in relation to relevant literature under the following topic areas:

- Parent awareness and use of U5E messages
- Programme sustainability
- Integration of health and education
- Setting standards.

This will be followed by a discussion of the strengths and limitations and presentation of the conclusions and recommendations.

Awareness and use of the U5E programme messages was reported by only around half the parents surveyed, despite the programme providing multiple ways to engage parents. Nutrition education workshops and regular messaging through printed resources and

newsletters to parents were the main parental strategies. These findings suggest that programme staff need to prioritise assisting centres with increasing parent engagement with U5E messages. Investigation of new initiatives may be warranted, as existing methods may not be reaching parents, although it is unknown whether centres delivered the parental components and, if they did, which components were delivered. The small parent sample ( $n = 78$ ) may not be truly representative, therefore, the generalisability of these findings is limited. As parents are the main influence on child development in the first years of life, investigating the influence of caregiver attitudes and practices in obesity prevention interventions is important (Ventura & Birch, 2008). Links between many parental factors, child food intake, physical activity and body weight status have been well established, for example, a child's food intake is influenced by parental understanding of nutrition (Skouteris et al., 2011). Published studies of interventions including a parental component were few, and in a review of nine studies in preschools (Hesketh & Campbell, 2010), the lack of a parental component was suggested as a reason for poor effectiveness of obesity-related behaviour change. BMI was reduced in two obesity treatment studies with a strong parental component, where parents were engaged in education and activities (Bluford, Sherry, & Scanlon, 2007). Furthermore, a review (11 studies) of the influence of parental beliefs and practices on obesity-promoting behaviours found nutrition education and healthy lifestyle changes among caregivers improved one or more obesity-preventing behaviours, and in three of the studies, body weight reduced (Skouteris et al., 2011). This was despite widely varied study methods, most with methodological drawbacks, making firm conclusions problematic. Increasing nutrition knowledge and role modelling of nutrition and physical activity were the main strategies used in most interventions, both of which are used by U5E. Prioritising and further evaluation and development of the parental component of U5E is warranted.

U5E influenced ECC educators and parent educators to strengthen beliefs about the importance of health (physical activity and nutrition) to education and engage with health issues as an integral part of child development. Centre policies and practices changed as a result. Examples of this were the recognition of poor food choices available at previous centres events and the subsequent inclusion of healthier food and the planning and implementation of FMS in centre practices. These within-centre connections between health and education made by educators, forged through U5E, occurred in the absence of cross-sectoral collaboration between health and education at

a policy or ministry level in NZ in nutrition and physical activity. Health has been shown to be as important to education as education is to health, but limited evidence exists that these sectors collaborate to improve child well-being through good nutrition and physical activity (Chiang, Meagher, & Slade, 2015), although the evidence linking good nutrition and physical activity to improved educational outcomes is strong (Centres for Disease Control and Prevention, 2014). The advantages of increased collaboration are shared resource cost and better outcomes for both sectors (Chiang et al., 2015). Richards et al. (2005) recommended a partnership approach between health and education sectors to help schools address the myriad of fundraising initiatives that undermine the health of students. Health promotion programmes in the education sector, initiated by the health sector, for example the Heart Foundation HHA programme, have variable engagement rates (n = 8 HHA in the Waikato prior to U5E). However, the health sector in NZ collaborates successfully with the education sector for clinical health issues such as vaccinations of school-aged children (<http://www.health.govt.nz/our-work/preventative-health-wellness/immunisation/hpv-immunisation-programme>) and there have been cross-sectoral obesity prevention initiatives previously under the ‘Mission-On’ campaign (Pledger, McDonald, & Cumming, 2012). Raising awareness and supporting educators to incorporate public health issues within centre policy and practices would be further supported by increased national and regional collaboration of the health and education sectors.

A framework to guide collaboration between health and education in the US is the Whole School, Whole Community, Whole Child model from the Centres for Disease Control and Prevention and the Association for Supervision and Curriculum Development, released in 2014. It advocates for ‘coordinated policy, process and practice’ and greater ‘collaboration, alignment and integration’ (Chiang et al., 2015, p. 776). It has been implemented by the education and health sectors in the American states of Arkansas, Kentucky and Colorado, which have successfully collaborated at state, regional and local levels to make change. These states have changed legislation to improve nutrition and physical environments in schools, aligned policies and developed voluntary, online healthy school assessment tools to facilitate healthy change. Actions by the Ministry of Education in 2016 and 2017 to conduct an Education Review Office review of nutrition and physical activity within ECCs, primary and secondary schools, and the appointment of a Chief Education Health and Nutrition Advisor within the Ministry of Education (<https://www.education.govt.nz/news/anti-obesity-and->

wellbeing-expert-takes-up-new-role-with-the-ministry-of-education/) suggest that the education sector is recognising the need to address public health issues, such as nutrition and physical activity, and foster connections between health and education for the benefit of children in NZ.

The qualitative findings in this chapter provided perspectives on the sustainability or maintenance of U5E through the theme ‘its part of what we do now’. Maintenance in the RE-AIM framework is defined as the ‘extent to which a programme is sustained over time’ and can be measured at both the individual and organisational levels (Glasgow et al., 1999). For the purposes of this thesis, maintenance or sustainability was measured at the organisational level. Other terms used interchangeably in the literature to describe sustainability are institutionalisation and routinisation among others (Monahan & Scheirer, 1988; Pluye, Potvin, & Denis, 2004). K. Johnson, Hays, Center, and Daley (2004) distinguish sustainability as the ‘continued ability of a programme to meet the needs of its stakeholders’ involved, while institutionalisation refers to embedding the programme within an organisation and the feasibility of the programme in the long term. Sustainability of initiatives is important in public health because it enables time for the effect of a programme to be fulfilled and monitored, as outcomes within this sector can have a latency period of three to ten years (Roussos & Fawcett, as cited in (Pluye et al., 2004). Furthermore, if programmes are withdrawn early or before long-term outcomes are realised, it jeopardises future initiatives with communities because of disillusionment (Pluye et al., 2004).

Sustainability may not be considered in public health interventions, especially if measured only quantitatively at the individual level. In contrast, this research used qualitative measures at the setting level to provide greater understanding of how sustainability was being achieved. Quantitative measures at the individual level were used as measures of sustainability in a Cochrane review of childhood obesity prevention interventions (0–18years) (Waters et al., 2011). In the 0–5 year age group, four of eight studies included in the review investigated maintenance, with no additional effects found on adiposity post-intervention (Waters et al., 2011); however, the follow-up was short, (six months), for two of the studies. The other two studies had a two-year follow-up and reported a zBMI score in the desired direction, though it was not statistically significant. However, while there were some significant post-intervention behaviour changes, only one study showed improved behaviour change (namely, increased performance in movement skill tests) that was sustained after a six month intervention

and a six-month follow-up (Reilly et al., 2006). Maintenance of a school-based nutrition education resource programme in Californian kindergartens was simply measured by the proportion of teachers re-ordering the resource the following year, shown to be 24% or 25% in the intervention and 61% of teachers in the State (Larsen et al., 2017). Intervention studies need to address sustainability and include longer follow-up times to provide further information on the impact of the intervention.

Sustainability has been investigated with respect to the maintenance of physical activity and nutrition in preschools, as part of the Tootie Fruity Veggie programme in Australia (Adams, Molyneux, & Squires, 2011). Activities that were most likely to be continued after the intervention were the practical activities with children (taste-testing of fruit and vegetables, and FMS sessions), due to the fun element introduced for the children. Limited time, lack of training and the highly-structured nature were the barriers presented by centre managers (Adams et al., 2011). In another study investigating the appropriateness of a FMS intervention in ECCs, Petrunoff et al. (2009) showed that after four months, staff found the programme disruptive and time consuming, despite demonstrating increased knowledge and confidence in FMS delivery from attending relevant training provided. Conclusions from both authors were that ongoing support after training was needed (Petrunoff et al., 2009), as well as engaging parents in parent-staff project management committees to assist with developing and decision making around such initiatives. (Adams et al., 2011). Additionally, Adams et al. (2011, p. 9) discussed the importance of ECCs taking ‘ownership of programmes’ as supporting sustainability and this was shown by in U5E when participating centres appeared to have a greater responsibility for the programme evident by the second interview theme ‘it’s part of what we do now’, requiring less support from the Energizers.

As U5E was developed under a limited funding model from the beginning, consideration was given and steps were taken from the outset to ensure sustainability. Early consideration of sustainability is desirable to reflect the non-sequential, and recursive nature of sustainability, as well as the many factors that influence it as a programme is implemented (Pluye et al., 2004). U5E used a suite of strategies and activities to build sustainability over time. These included a train the trainer model for education (rather than delivering education to children directly) to increase educator knowledge, skills and confidence, modelling of FMS to educators, co-developed action plans (centre staff and Energizers) with support to achieve goals, simple programme messages (daily vegetables and fruit) (Table 6.9) and policy and practice change. In

other words, sustainability strategies were in place alongside implementation, as recommended by Pluye et al. (2004), rather than viewing dissemination as a separate sequential phase after implementation, although, some programme activities will be part of both the implementation and sustainability phases, and others will be more specific to each distinct phase. Furthermore, a sustainability-only activity would be ‘integration of rules relative to programmes into those of organisations’ (Pluye et al., 2004, p. 128) in contrast to implementation-only which would match the programme activities to the adopting organisation, For example, the ‘fit’ of programme objectives with the adopting organisation would relate to both implementation and sustainability. ~~An activity focused on while in contrast.~~ U5E planned and implemented strategies for sustainability from programme inception.

Within the ‘part of what we do now’ theme, a shift in the roles of the educators and Energizers was apparent as the programme progressed from initiation to implementation and beyond to a sustained stage. Educators increased their role and responsibility for U5E while Energizers reduced their part in the programme over two years. This ‘transfer of responsibility for a programme from one organisation over which the community has little or no power to an organisation over which it does’ was described by (Bracht and Kingsbury as cited in Pluye et al., 2004, p. 122) In U5E this occurred because the educators became more proficient and confident with the programme activities over time requiring less support from the Energizers. This was also found in the PLAYgrounds programme after three months when the programme had become part of the usual school routine (Janssen et al., 2013). Incorporation of programme activities into the routines of the adopting agency is known as routinisation, defined when a new activity has become a constant and consistent component of an organisational practice and behaviour, and is postulated to be fundamental to sustainability (Pluye et al., 2004). Routines can also become more sustained by being ‘standardised’, for example turning a routine into organisational policy (Pluye et al., 2004). The ‘part of what we do now’ theme provided evidence of this progression to standardised routines by ECCs in U5E from examples such as strengthening existing policy for food provided at birthdays and community events, and a beverages policy that established ‘water only’ ECC environments. These qualitative findings illustrated that centres had routinised practices in line with U5E healthy eating and physical activity messages with some practices becoming standardised and as a result, there was less need for guidance from the

Energizers as educators increased their responsibility and confidence with the programme.

Educators viewed U5E as ‘setting the standard’ for nutrition and physical activity in ECCs. This was despite the existence of government regulations stating that ECCs need to provide or promote healthy foods to children (Education [Early Childhood Services] Regulations 2008), although there are no regulations for physical activity in this setting. Furthermore, U5E promote six nutrition and physical activity goals (Table 6.9), rather than standards. Engagement in the HHA Heart Foundation initiative, which U5E encourages and supports ECCs to achieve, does contain criteria that must be met before an award is granted and could be considered ‘standards’ (Heart Foundation, 2014). Pluye et al. (2004) noted that even though institutional regulations may be available organisations do not necessarily develop routines that follow these. It is not known how aware the participating ECCs were of the government institutional regulations, but it appears that U5E was seen as the on-the-ground or surrogate standard for nutrition, and for physical activity, it was the only ‘standard’ available.

### **7.3.1 Strengths and limitations**

The main strength of this section of the study was inclusion of follow-up qualitative interviews and focus group, with the same sample, from the reach and adoption section (Chapter 5.3) of this thesis. Only one educator was not able to be interviewed at the time of follow-up. The follow-up interviews enabled the researcher to obtain perspectives on the U5E programme at another time period and for different RE-AIM domains, effectiveness and maintenance. As previously noted, use of qualitative methods within RE-AIM is infrequent, shown by only 7.3% of 55 studies using this method to assess effectiveness and 5.5% of 51 studies to assess maintenance at a setting level, yet it is recommended to facilitate the comprehension of quantitative results (Gaglio et al., 2013). Other RE-AIM evaluations in the childcare setting have not used a qualitative investigation to assess effectiveness and maintenance. These qualitative themes were not only in line with the quantitative findings (Chapter 6.1) but added a broader understanding about how change was occurring and the impact of the change on centres. Without this qualitative investigation, this would not have been known.

Another strength of this section of the research was the inclusion of a parent survey in the evaluation as a measure of effectiveness. This acknowledges the important role parents and caregivers have in shaping the behaviours of young children and address

one of the key target groups for the U5E programme messages. The results provide an indication of parent awareness, use and understanding of the programme and its accompanying messages, to provide U5E with a measure of its effectiveness in reaching the ECCs' community. However, the survey findings were somewhat limited by sample and methodological shortcomings.

Use of a one-off, simple survey of dichotomous questions to assess change in parental food and physical activity behaviours may not have been the ideal data collection method. It was chosen to keep respondent burden low, as parent time is limited, especially at pick up and drop off times. However, a larger, more in-depth investigation may have provided evidence of how to increase the effectiveness of the parental component of U5E in the long term. A qualitative investigation of parental influencers on the development of healthy food and physical activity behaviours of primary school children found that interventions needed to be aware of caregiver motivation and understanding to increase effectiveness (K. H. Hart, Herriot, Bishop, & Truby, 2003). This study found that parent strategies within interventions would be more effective if they raised awareness of influential parental behaviours such as role modelling, focused on positive messaging, and included the 'how' to change behaviours rather than just the 'what' needed to change, to help parents support children thought to be resistant to change (for example, dislike of particular foods) (K. H. Hart et al., 2003). Focus groups with parents from ECCs may have helped to increase the relevance of the parental component of U5E, although recruitment of parents for focus groups may have been problematic.

A main limitation of the parent survey was the small sample size and use of a non-validated tool. Selection bias was addressed at the centre level by random sampling the centres but centres declining to participate and failure to schedule selected centres led to lower than desired participation numbers. Additionally, the timing of the study around the Christmas and New Year period was not ideal for contact with centres. Low numbers of Te Kōhanga Reo agreeing to participate was because these centres use a van to transport children; therefore parents do not come into the centre every day. Te Kōhanga Reo also typically have small roll sizes (mean 41, median 22, range 5–60), meaning the opportunity to obtain 10 responses from each centre was less likely. Inclusion of a larger sample size would have increased the representativeness of the survey and hence generalisability of the findings within the region and nationally. While the survey questionnaire, developed by the researcher, was a non-validated

questionnaire it was pilot-tested prior to use and does provide an indication of parent awareness, knowledge and understanding of U5E on which future investigations can be based.

Another limitation of the parent survey was the variation in data collection times excluding parents from the survey. The researcher had to fit data collection around the centre. Scheduling of data collection at each centre often was not able to begin until after some of the children were dropped off, for example at 8.00am not 7.00am when the centre opened, which therefore excluded some families from the survey. The parent completing the survey was not always the primary caregiver, and therefore some may have been less familiar with centre operations. Self-reporting of diet and physical activity improvements have the drawbacks of standard self-reported tools, including biased responses in the socially desirable direction instead of their true feelings, particularly with regard to food choices (Newell, Girgis, Sanson-Fisher, & Savolainen, 1999). The face-to-face nature of the survey may also have contributed to social desirability bias and therefore an over-estimation of awareness, use and understanding of the U5E programme and messages. Replacement of this survey with an online version, with centres promoting participation to parents, may have avoided some of the data collection timing issues and bias from face-to-face contact but may also have reduced participation. Alternatively, more objective measures such as pre- and post-intervention dietary records or accelerometers would overcome methodological shortcomings (Bluford et al., 2007), but it should be noted that these incur a larger respondent burden and may not suit the 'real-world' setting of U5E.

As well as collecting the length of attendance, it would have been also useful to collect children's attendance hours at centre from parents in the survey. Both the median and mean length of attendance of the oldest child at centre of parents surveyed were over 12 months, which suggested that parents would have been exposed to some U5E messaging. It was not known how many hours each child spent in care, and if it was low (for example, 10 hours per week), this may have influenced the amount of messaging parents would have been exposed to.

### **7.3.2 Conclusion and recommendations**

The survey finding that U5E was reaching only half the parents with children in U5E participating centres did not match with the fact that U5E employed many and varied ways to engage parents, although, the survey had methodological limitations restricting

its generalisability. Despite this, those who were engaged with the programme knew the key messages and reported improving the nutritional value of lunch-box choices for children. However, a more in-depth qualitative investigation among parents should be considered by U5E programme management especially as current methods may not be reaching and engaging all parents. It could provide direction on what parents want to know and how to engage parents about healthy eating and physical activity to re-align existing strategies (for example, include food behaviours and role modelling of healthy behaviours as a topic for parent workshops and a printed resource). It could also inform the design of new initiatives to increase effectiveness of the parental component as well as overall impact of U5E. This would be useful as many of the cluster areas were high need and were highly representative of Māori, so it is important to increase the effectiveness of U5E for these groups, although recruitment may be challenging (Tipene-Leach et al., 2010). To address the methodological shortcomings, recruiting strategies need to factor in non-participation to achieve the desired sample size. Use of a validated survey tool would increase the validity of the parent survey, but lessen the likelihood of participation, due to real-world respondent burden.

Educator training in FMS as part of U5E reinforced the importance of the relationship between physical activity and child development. Educators now viewed the benefits and outcomes of U5E as shared between health and education, not just health as the first interviews found. This shift to an integrated view of health and education was well supported by the Energizers, to help educators to achieve their goals of child development. The linkage seemed stronger for physical activity rather than nutrition. It not only increased the educators' engagement in U5E but led to greater responsibility and ownership for delivering the programme, evident in the 'this is what we are here for' theme. Alongside this, there appeared to be a definite shift in the roles of the educators and the Energizers within centres between the first and follow-up interviews, with the educators increasing their confidence and delivery of U5E and a concomitant decline in the Energizers' position, as U5E appeared to have become routinised in centres. In some cases, routines had progressed to standards in the form of plans and policies in ECCs and had become 'part of what we do now'. These were strongly suggestive of U5E achieving sustainability alongside programme implementation. The longer intervention time of U5E (2013 to 2017 at the time of writing) was also contributing to the sustainability of programme aims. Over time, U5E had become

known as ‘setting the standard’ for nutrition and physical activity through its staff, activities, resources and ongoing supportive approach.

Use of qualitative techniques to assess effectiveness and maintenance was uncommon yet provided unique insights from programme staff on the effect of the programme on educators’ beliefs and roles in the programme, improvements to the environment and factors enabling sustainability. These findings support the notion that as centres became more proficient and U5E more routinised in centre policies and practices, expansion of the programme within the region could be realised. Additionally, it would be useful for future delivery of U5E into other areas. The three themes were strongly inter-related and reflective of the aims of U5E.

### **7.3.3 Summary**

After two years, U5E messages were becoming embedded in centre policies and practices, and educators had assumed a stronger role in delivering U5E and putting into action improvements within their centres. Because of better understanding of the strong connections between FMS and child development, acquired from U5E workshops, educators perceived that delivering FMS was an essential role for them. Concomitantly, the Energizers had a declining role, suggesting that this would allow time to engage additional centres.

More effective parent engagement strategies were needed to increase parent awareness and support of obesity-preventing food and physical activity child behaviours. Use of qualitative interviews and focus group to understand U5E effective and maintenance was rare and insightful.

## Chapter 8. Final discussion and conclusions

This thesis reports on the impact of the U5E programme (funded by the Ministry of Health) on the food and physical activity environments within 121 ECCs (kindergartens, Playcentres, Kōhanga Reo and education and care), located in socioeconomically disadvantaged areas in the Waikato region. The RE-AIM framework and action research approach suited the real-world setting of U5E and provided timely feedback to the programme manager and Energizers to enhance delivery. U5E achieved high reach and adoption and the equity, ethnicity and type of centres participating matched Ministry of Health contract targets of intervening for priority groups, namely Māori and the socioeconomically disadvantaged. Centres became involved in U5E because the programme ‘fitted’ centre philosophies, complemented their way of working, provided health benefits for children and gave them a positive reason to connect with their communities. The Energizers’ skills, knowledge and ‘way of working’ with centres, including ethnically affiliated centres, appeared to also greatly enhance programme engagement. Programme effectiveness was shown by centres’ developing new policies or strengthening existing ones, particularly in physical activity, and increased engagement and achievement of Healthy Heart Awards. Additionally, the consumption of ‘everyday’ lunch-box foods increased and there was a concomitant reduction in ‘occasional’ lunch-box foods (Heart Foundation, n.d.). Implementation was evidenced by the achievement of a high proportion of nutrition and physical activity goals set in co-designed, regularly reviewed action plans with each centre. Despite ‘messaging to parents’ being a common action plan goal, only around half the centre parents surveyed were aware of the U5E programme and messages. After two years, U5E had become embedded in participating centres’ planning, budgeting and teaching programmes, with educators describing U5E as ‘part of what we do now’. Educators felt U5E assisted with achieving centres’ child development and education goals, through fundamental movement skills training, was aligned with the Te Whāriki curriculum strands, and was ‘setting a standard’ for nutrition and physical activity for centres to aspire to.

This chapter will discuss the overall findings of the RE-AIM analysis of U5E and, with reference to relevant literature, answer the research questions, provide explanations and discuss the implications of the affirmative research outcomes. Finally, this chapter will finish with a discussion of the significance, contribution, limitations, strengths and

topics for future work in this area before the conclusions and recommendations of this thesis are presented.

In addition this chapter connects the findings and discussion of each research stage (Chapters 5–7) to answer the research questions, and to provide background and explanation of the overall positive evaluation of U5E. Proof of reach, effectiveness, adoption and implementation of U5E will be critically discussed with reference to relevant literature.

This thesis aimed to fill a gap in the literature with regard to understanding better the process of initiation and delivery of obesity-prevention interventions in “real-time” in the early childhood setting. While there is growing evidence of the efficacy of behaviour change strategies within the ECE environment that reduce the body weight of children (Bluford et al., 2007; Waters et al., 2011), there is a lack of reports as to how this research may be translated into real-world settings. Promising strategies include the presence of strong food and physical activity policy, healthy food supplied or provided in centres and provision of training to educators in nutrition and FMS. This study assessed the public health impact of the U5E intervention in the real world setting of NZ’s diverse early childhood care centres located in high need communities. The results of this thesis are opportune, considering the increasing emphasis on intervening early to protect children from obesity in the World Health Organization’s *Report of the Commission on Ending Childhood Obesity* (World Health Organization, 2016), the 2015 NZ Government Childhood Obesity Plan (<http://www.health.govt.nz/our-work/diseases-and-conditions/obesity/childhood-obesity-plan>) and the 2017 appointment of physical activity and nutrition expert adviser to the Ministry of Education. Furthermore, the first large ERO review of the food, nutrition and physical activity in ECCs and schools (n = 202) has shown that promoting healthy food environments was a challenge identified by both ECCs and schools (Education Review Office, 2016).

This research was developed from a critical social theory paradigm and socio-ecological theory. Though pragmatism is often associated with mixed methods (Creswell & Plano Clark, 2011), this thesis aimed to challenge the status quo of environmental practices within ECCs and high obesity prevalence among Māori and the socioeconomically disadvantaged. Surprisingly, the findings of the qualitative analysis in this body of work did not reflect critical theory. This may have been because U5E, developed using the

Project Energize model in place for over 10 years (Rush, McLennan, et al., 2014), already had processes in place that helped to address the social and ethnic inequities within ECCs in the Waikato (Table 4.4). These included an adaptable programme structure, partnerships with Māori and Pacific health providers, Energizers who identify as Māori and printed resources in Te Reo. In effect, U5E matched the targeted population by adopting a flexible approach strongly facilitated by the Energizers to meet the needs of ECCs and consequently the sample was highly representative of Te Kōhanga Reo and Māori children. Additionally, there was some evidence that centres themselves were aware of where and how the ‘need’ for the programme was targeted and delivered. Other evaluations of interventions using critical theory were not found, although use of the socioecological model was more common (Natale, Lopez-Mitnik, Uhlhorn, Asfour, & Messiah, 2014). This may have been because many of the studies targeted populations with higher obesity prevalence, like U5E, therefore the critical theory approach were not needed (Waters et al., 2011).

### **8.1.1 Reach and adoption**

This study measured the reach and adoption of U5E of a targeted sample of 121 centres and found it to be 93% of the targeted centres and was adopted by these centres over the three years. It met the requirement of Ministry of Health’s contracted outputs to deliver to Māori and centres located in socioeconomically disadvantaged areas. Although, the reach of centres was small, when compared nationally (3%) and in the Waikato region (30%), representativeness showed oversampling of Māori and centres located in high need areas compared to regional and national data. One of the key reasons for high participation and representativeness in U5E was due to a good ‘fit’ between the programme and ECCs. Lack of fit between what works in efficacy studies and what suits agents disseminating the programme in ‘real-world’ settings was identified as a barrier to translation in childhood obesity prevention studies, as well as limited time and incentive to deliver health prevention programmes (K. D. Reynolds & Spruijt-Metz, 2006). Good programme fit was achieved in U5E by programme design cognisant of the ECE sector’s needs and previous learnings from intervention studies (Waters et al., 2011), together with the proven systems and processes from Project Energize (Rush, McLennan, et al., 2014). The U5E programme was able to benefit greatly from the knowledge and experiences of Project Energize over 10 years (Rush, McLennan, et al., 2014). The printed nutrition and physical activity resources from Project Energize required small modifications to suit the under-five age group, but having the Project

Energize tip sheets (Appendix D: Tip sheet) gave U5E an advantage by not having to start from scratch, and Project Energize already had evidence that the format and style of the tip sheets were acceptable to parents.

Another key reason for good programme fit, also one of the key strategies from Project Energize, which sets U5E apart from other interventions (Waters et al., 2011; Wolfenden et al., 2016), was the ongoing (from 2013), regular support (onsite visits once per month plus emails and phone contact) from the agents of change, the Energizers (Table 8.2). This is in contrast with other interventions where follow-up support was low and for a short period, for example, Finch et al. (2012) provided two phone calls over three months when measuring the adoption of a physical activity intervention and delivered by research staff rather than programme staff. However, longer support, up to three or four years, may be necessary, similar to the *Romp and Chomp* intervention which showed reductions in body weight of two and three year old children after four years (de Silva-Sanigorski et al., 2010). Regular support from the Energizers in the form of onsite visits enabled kanohi-ki-te-kanohi (face-to-face) contact. This was shown to be very important for engaging ethnically affiliated centres, a target from the U5E Ministry of Health contract. Furthermore, it enabled Energizers to adapt U5E, where required, to fit the diverse centre types and needs of the individual centres further enhancing reach and adoption (Graham et al., 2008). Similarly, educators appreciated and wanted more face-to-face support from the HF Health Promotion Coordinators according to the evaluation of the Healthy Heart Awards programme in order to achieve an award (Malatest International, 2014), However, in the Waikato, this position is part-time and services a large number of centres (n = 425). Short intervention time (three months) and lack of intervention support were disadvantages in an effectiveness study of population-based adoption of physical activity practices (Finch et al., 2012). Only four of the eight physical activity practices were adopted and ‘intensive or more prolonged’ implementation support was recommended as potentially improving the outcome (Finch et al., 2012, p. 10). Although, there were increased numbers of centres with written policies, including policies that limited sedentary time and educator training (Finch et al., 2012), shown to be important in obesity prevention within the ECE setting. Intensive support, from child health care consultants (existing role), was provided in a study implementing the NAP SACC programme, and while there was no effect on physical activity, the zBMI score declined (Alkon et al., 2014). While the Energize model is intensive with respect to the centre, the benefits of this approach

shown over time were that the programme became embedded in centre policies and practices as centres increased their confidence and responsibility for delivery and it resulted in a concomitant reduction in Energizer delivery time. Use of Energizers with strong local community linkages, not research staff as is the case in many interventions (Waters et al., 2011), enabled trusting relationships to be forged with centres and was shown in this thesis to be especially important for ethnically affiliated centres, resulting in engagement in programme activities and practice improvement.

Short intervention times and lack of long-term follow-up is a common problem among many previous interventions in early childhood services. A longitudinal study by Yoong et al. (2016) addressed short study time frames by monitoring the adoption of healthy policies and practices in ECCs over seven years, during which time two programmes, Good for Kids, Good for Life, and Munch and Move, were implemented in New South Wales in Australia. It showed significant increases in the adoption of five of six practices promoting nutrition and physical activity over the study period (Yoong et al., 2016). Interestingly, while the results were positive, the authors still recommended more ongoing support to enhance the breadth of policy and practice adoption. Public health prevention programme dissemination and subsequent adoption takes time, and linking agents who focus on longer term relationships with organisations are postulated to be considered more “credible and trustworthy by clients” (Monahan & Scheirer, 1988, p. 430).

Increased connections within and between centres (Figure 5.9) was one of the findings from the qualitative study. U5E encouraged centres to connect with their communities about healthy eating and physical activity and centres found this very positive. Of interest and an unintended benefit were the inter-centre connections, for example, between Kōhanga Reo, kindergartens, Playcentres and education and care centres within a town. These did not appear to exist before U5E and provided benefits to centres as a source of support for practice change and opportunity for shared learning. Centres in U5E connected in local communities to celebrate events such as Matariki, which were also opportunities for shared learning and cultural experiences for the educators and the children. Forming informal networks for educator peer support was suggested by Finch et al. (2012) as a cheap yet sustainable way to support ongoing practice change by centre educators. It also contributed to community capacity building and shifting norms towards healthy food and physical environments for children.

U5E, based on the Project Energize model, invested significantly in the reach domain of RE-AIM and achieved excellent penetration. This was important for achieving the overall programme effectiveness goals and the basis on which other RE-AIM components, adoption, implementation and maintenance, depended. Similarly, engagement and support from educators and ECC management for improvement of healthy eating and physical activity together with multi-component external support (for example, government and other agencies) were factors found important to implementation success in an intervention in Australia (Wolfenden et al., 2015). The design of U5E with Energizers as the engagement agents to inform, inspire and encourage participation, overcame barriers through face-to-face contact. The Energizers role was located external to the ECCs and this was their key focus in contrast to the NAP SACC intervention where child health staff were trained in the additional role of delivering a nutrition and healthy eating intervention (Ward, Benjamin, et al., 2008). However, ongoing Energizer support is dependent on Ministry of Health continued funding of U5E. Placing emphasis on reach signalled to programme staff, the Energizers, its important role in programme quality and performance, while representativeness was indicative of how robust the study findings were (Austin et al., 2011).

### **8.1.2 Implementation**

Although there is increasing evidence of what works in early education environments to improve the nutritional quality of diets of enrolled children, and increase physical activity and fundamental movement skills development, what appears to be lacking is evidence for effective and wider implementation of these strategies in obesity prevention in ECCs. Implementation has been described as a complex process with multiple factors influencing its progression. A systematic review of 10 studies by Wolfenden et al. (2016, p. 30) looking at methods to enhance implementation of obesity prevention in ECCs found ‘weak and inconsistent evidence of effectiveness’ of the methods tested to improve nutrition, physical activity and obesity outcomes for children in early education environments. But it was noted that the strategies evaluated were only a subset of what could be used to improve evaluation results. The methods used to enhance implementation were limited to mainly the provision of education and resources (Wolfenden et al., 2016). Use of an implementation framework was recommended to improve identification of barriers and enabling factors and support the development of effective implementation strategies (Wolfenden et al., 2016). The

Consolidated Framework for Implementation Research was used for the first time in the ECE setting in a study to provide an in-depth investigation of implementation factors and the study authors called for ECE setting specific validated tools (Wolfenden et al., 2015). The logic and short, medium and long term goals of the implementation and evaluation of U5E were planned before the programme began (Appendix E: Logic model) and guided programme delivery however use of an implementation-specific framework would aid future implementation research of U5E.

U5E displayed many of the features of successful implementation outlined by Rohrbach et al. (2006) and detailed in Table 8.1. Table 8.1 also includes a description of the factors that were unique to the NZ environment, in particular those related to Māori, including observance of cultural practices when engaging with Te Kōhanga Reo and producing printed resources in Te Reo. Enhancing organisational capacity was also emphasised as an essential element of implementation and that this needed to begin before implementation, to build the adopting organisation's capacity to implement programmes. In fact, it should occur throughout the implementation process and is achieved by working in partnership with the adopting organisations (Rohrbach et al., 2006). Furthermore, if one or more of the implementation factors (Rohrbach et al., 2006) are missing, the translatability of a prevention programme would be compromised.

Table 8.1 Factors influencing programme implementation, a description of the Under 5 Energize implementation activities within each factor and unique to the New Zealand early childhood environment

<b>Factors affecting implementation</b>	<b>Description of implementation activities in U5E</b>	<b>Description of implementation activities in U5E unique to the NZ environment</b>
Identified need for the programme	Consultation with sector Five-stage engagement process enabled each centre to reflect on need and engage appropriately, 93% of eligible centres signed up	Consultation with iwi and tribally affiliated early childhood centre organisation
Programme 'fit' with the organisation	Qualitative interviews with programme staff and educators indicated good 'fit', enhanced by informed design, flexibility of programme, culturally responsive Energizers and programme	Printed resources in Te Reo Introduction of the Māori model physical activity programme He Pi Ka Rere Celebration of Matariki
Build organisational capacity	Educator training	He Pi Ka Rere training Traditional Māori games training
Administrative support	Detailed record keeping by Energizers in Sport Waikato database	
Programme champion	Sport Waikato, developer of successful Project Energize programme in primary schools	Iwi support obtained
Local, motivated and skilled staff to implement the programme	Implementers employed by delivering agency using detailed staff selection process Qualitative interviews with programme staff and educators report passionate and motivated staff built strong trusting relationships with centres Ongoing professional development of Energizers	Employment of Māori Energizers with previous experience working with Te Kōhanga Reo Cultural processes followed during engagement of centres, including a whakatau for the Māori Energizer without tribal affiliation to the local iwi Sharing of cultural practices with the other Energizers to enhance cultural competency, for example, development of a mihi for use at Te Kōhanga Reo
Community support	Support from WKA, child health organisations, AUT, DHB	Ethnically affiliated health providers

<b>Factors affecting implementation</b>	<b>Description of implementation activities in U5E</b>	<b>Description of implementation activities in U5E unique to the NZ environment</b>
Support in the form of on-site visits, phone, email	Energizers provide ongoing support to centres in the form of regular on-site visits, phone calls, emails and workshops for educators and parents	Attendance at whānau and purapura hui
Detailed implementation plan	Co-design of six-monthly action plans and review with centres	
Plan for sustaining programme implementation	Annual plan for U5E with review, ongoing professional development of the Energizers and plan and activities in place to address staff turnover	
Technical assistance	Services from a dietitian and FMS advisor funded within the programme and provided by Sport Waikato	Training from Toi Tangata for the delivery of He Pi Ka Rere
Evaluation - conducting and reporting	Evaluation plan in place to collect and report to stakeholders including timely reports to funder Use of information from routinely collected administrative data Results contributing to programme quality improvement and sustainability Present and publish programme outcomes where appropriate	
Funding	Submit required reports to funder and regular contact with funder to secure funding	

*Note.* AUT = Auckland University of Technology; DHB = District Health Board, FMS = Fundamental movement skills; WKA = Waikato Kindergarten Association; U5E = Under 5 Energize  
(Adapted from Rohrbach, Grana, Sussman, & Valente, 2006)

U5E influenced educators' beliefs about the role of health in education, in particular nutrition and FMS. This was evidenced by the 'this is what we are here for' theme. This was done by providing centres with the information together with practical ways to meet centre goals for child learning and development. Centres changed their behaviour and practice by incorporating planning and scheduling of FMS development and improving food and nutrition policy and practice which facilitated U5E implementation. While many may have been aware of the importance and linkages before U5E, provision of the tools, support, guidance and modelling enabled educators to make changes to children's nutrition and physical activity environments.

One of the few but important barriers to implementation was the ongoing change to centre staffing and children at centres, possibly more evident in centres located in lower socioeconomic areas, which disrupt and slow programme delivery (Young, 2016). Turnover, delays, and the need for refreshing, should therefore be factored into future programme planning, delivery and sustainability.

### **8.1.3 Effectiveness**

There was evidence suggestive of U5E effectiveness. Qualitative and quantitative data were indicative of improvements to the food and physical activity environment within ECCs. U5E was effective at increasing the number and quality of food and physical activity policies, improved food and physical activity practices and the frequency of consumption of everyday and occasional foods, as well as a substantial increase in the number of centres engaging with the HHA programme and achieving HHA, all used as measures of programme effectiveness.

The most significant changes were observed improvements to food intake, both food from home and food supplied by the centre. Improving food from home was an identified need in a theme from the first round of interviews and improvements were noted in the follow-up interviews, with centres viewing U5E as providing a standard for food and nutrition which appeared to be lacking beforehand. Evidence of change was supported by the follow-up interviews and was triangulated by quantitative evidence from the pre- and post-audit data. While not measured by quantitative means (food intake data), it indicated that programmes like U5E are needed to guide centres and parents with information about appropriate foods. Without guidance, policy and support, external influences, such as the high availability of poor quality, inexpensive food, prevail (Swinburn et al., 2011).

Another significant change with regard to physical activity was an increased number of centres with policy on physical activity and an increase in the quality and quantity of FMS development activities included in centre programmes. Though this was not measured quantitatively with tools such as accelerometers, self-reported audit data collected before and after two years of U5E implementation showed improvements. Other studies have shown similar improvement (Finch et al., 2012); however, without long-term follow-up it is difficult to know if change would be sustained. Positive change was well supported by staff education opportunities and Energizer support.

Table 8.2 Description and outcomes of studies implementing nutrition and physical activity interventions in early childhood centres (2010–2016) compared to Under 5 Energize

Location, type, number, population /Sample reference	Baseline measures	Length of intervention Delivery method	Intervention activities Contact frequency			Outcomes
			Knowledge	Policy development	Other	
<i>Romp &amp; Chomp</i> 12,000 0-5 years Australia Repeat cross sectional with a quasi-experimental design and comparison sample ECC, home-based care and child health centres (de Silva-Sanigorski et al., 2010)	<b>Pre and post test</b> Food and activity behaviours (EPAQ) Parent awareness of the programme (survey) Height and weight (intervention sample had a lower SES and higher prevalence of overweight and obesity at baseline)	4 years  Multiple methods	Capacity building, printed resources, communication of programme messages, engagement with parents about screen time and increasing family active play	Policy development support	Joint delivery with dental and PA programme Media releases Water bottles distributed FMS and food demonstrations and displays	2 year olds Remained significantly heavier than comparison group ↓prevalence of obesity/overweight 3 year olds ↓weight, BMI, zBMI and no longer heavier than comparison group ↑ parental awareness of programme and messages between baseline and follow-up ↓ consumption of packaged snacks, fruit juice and cordial

Location, type, number, population /Sample reference	Baseline measures	Length of intervention Delivery method	Intervention activities Contact frequency			Outcomes
			Knowledge	Policy development	Other	
<i>NAP SACC</i> RCT licenced childcare centres (n = 17 in 3 States in USA, 9 intervention and 8 control ECC) 552 children (260 intervention, 292 control) 137 childcare providers Low income, ethnically diverse 3-5year olds (Alkon et al, 2014)	BMI (n = 211) Nutrition and physical activity policy (blinded review using CCHP health and safety policies checklist) Nutrition and PA practices (EPAO) Observations of food intake (DOCC) and physical activity (OSRAP) of random sample of children (n = 209) Parent and provider pre- and post- workshop knowledge (4 questions)	7 months Child care health consultants-monthly visit	Nutrition and physical activity information and resources for educators and parents Five one hour workshops for child care providers and cooks and one workshop for parents (7 out of 9 centres)  \$500 for physical activity equipment	Support to develop healthy policy and practices		Knowledge ↑Parent and provider knowledge Policy and practices ↑ quality and quantity of nutrition and physical activity policies ↔ EPAO ↔ DOCC ↔ OSRAP BMI ↓Mean zBMI scores (0.14 in the mean child-level analysis, 0.26 in the centre-level analysis)
<i>Healthy and Ready to Learn USA</i> 4 Head Start centres, 405 children, low income Latino, 3-5 years (Winter & Sass, 2011)	Weight, height, BMI SOFIT Brigance Diagnostic Inventory of Early Development—II Peabody Picture Vocabulary Test III (PPVT-III)	24 weeks	Child activities Parent training Teacher training			↔BMI, body weight ↑ SOFIT ↑Brigance ↑PPVT

Location, type, number, population /Sample reference	Baseline measures	Length of intervention Delivery method	Intervention activities Contact frequency			Outcomes
			Knowledge	Policy development	Other	
<i>Munch and Move</i> (scaled up version of <i>Tooty Fruit Veggie</i> ) (professional development focus) 15 intervention and 14 control (n = 430) RCT, pre and post design (Hardy et al., 2010)	Pre and post children's lunch-box contents, FMS (TGMD-2), preschool policies and practices, staff attitudes, knowledge and confidence related to PA, healthy eating and recreational screen time Centre managers interviewed pre and post intervention about policies and practices (nutrition, PA and screen time) and surveyed on their attitudes, knowledge and confidence of nutrition, PA and screen time Training participants surveyed on experience of the programme	Project officer from local health service Visited twice after training day	One day training on healthy eating, PA, & reduce screen time Resources-Manual (FMS, healthy eating games, policy examples)	policy development including fundraising covered in one-day training	Lanyard with FMS performance criteria, Fact sheets for noticeboards Posters Snakes and ladders game of 5 Munch and Move messages Small grant for training or PA equipment	Reach 48% (29/61) ↑ FMS sub scores (locomotor, object control and total FMS) ↔ FMS overall (intervention group showed larger improvement but not SS) ↑ FMS session by 1.5 ↓ sweet drink serves (46 mls) ↔ other foods in lunchboxes ↔ frequency or time for structured and unstructured active play ↔ offering food based activities ↔ food policies NS ↑ attitudes and confidence in both groups, higher for intervention group ↔ knowledge on guidelines for fruit and vegetables and screen time Workshop rated useful and increased their knowledge and confidence in teaching and communication to parents

Location, type, number, population /Sample reference	Baseline measures	Length of intervention Delivery method	Intervention activities Contact frequency			Outcomes
			Knowledge	Policy development	Other	
<i>Tootie Fruity Vegie</i> Cluster RCT 18 ECC intervention, 13 control ECC 966 children 29-73 months (Zask et al., 2012)	BMI FMS Food intake and behaviours of child reported by parent Lunch-box contents assessment	10 months	Parent and educator workshops on nutrition, FMS and screen time Cooking classes with children Regular FMS classes as part of curriculum (twice weekly) Posters Parent newsletter	Develop nutrition policy	DVD for centre library on healthy food behaviours Staff role modelling healthy behaviours Increased access to water Playground environment review Increased access to sports equipment in free play time Grant for sports equipment	↑Movement skills, more in the intervention schools compared to control, more in girls than boys ↑mean number of fruit and vegetables in lunchboxes by 0.63 serves ↑number of children with no EDNP foods ↓ number of children with 2 or more EDNP foods ↔ obesity prevalence ↓ BMI z score ↑ waist circumference, more in control compared to intervention

Location, type, number, population /Sample reference	Baseline measures	Length of intervention	Intervention activities			Outcomes
			Delivery method	Knowledge	Policy development	
<i>HI-HO</i> RCT, 8 ECC 2-5years (n = 307) Low income, ethnically diverse (Natale et al., 2014)	BMI - height, weight Nutrition intake data collected at baseline, 3, 6 and 12 months (NHANES questions) PA, screen time FFQ of ECC food (by owners) Parent satisfaction and attendance in the intervention  Control centres received an injury prevention education programme	6 months  Trained HI-HO specialists and dietitians	Teacher training (2 per centre) and weekly HI-HO specialist visits Parent training by dietitian (similar ethnicity to parents), newsletters, monthly dinner and at-home activities	Policy development support – low sugar beverages, lower fat milk, healthy snacks, 60 minutes of PA and less screen time	Menu modification support from dietitian - cost neutral changes Healthy snack bag prize for families completing 6 at-home activities Completion certificate for parents attending 3 dinner events	BMI (6 and 12 months) Mean BMI z-score increased in both groups but not as much in the intervention group (0.60 to 0.76 in controls versus 0.67 to 0.72 in intervention although not significant) ↓BMI among children whose parents implemented and were satisfied with at-home activities although not significant 97% of children of normal weight after 12 months FFQ at centre (6 months) ↓junk food and juice ↑more fresh fruit and vegetables and low fat milk compared to control at 6 months Satisfaction with at-home activities was associated with healthier food intake (less sweet drinks, less salty and fatty snacks), statistically significant for fruit juice PA (6 months) ↔physical activity levels but analysis of lesson plans show more screen time among control children

Location, type, number, population /Sample reference	Baseline measures	Length of intervention Delivery method	Intervention activities Contact frequency			Outcomes
			Knowledge	Policy development	Other	
22 CACFP registered ECC, full day care, 2042 children, 2-5 years Georgia, USA (Lyn et al., 2013)	Pre-test post-test design using EPAO to assess the nutrition and PA environment	14 months	Training in best practice nutrition and PA and adoption and implementation of wellness policies (n = 4 trainings)	Centres choose 6/12 wellness policies designed to improve nutrition and PA environment Technical assistance from dietitian and PA expert	\$2000 to assist implementation	Significant improvements in both nutrition and PA overall scores Nutrition Significant difference found for nutrition environment and nutrition training and education ↔ nutrition policy, fruits and vegetables, grains, high sugar/high fat foods, beverages and staff behaviour PA Significant improvements in active play, sedentary environment, portable equipment, staff behaviour and PA training and education ↔fixed environment, PA policy, sedentary behaviour
Healthy Caregivers, Healthy Children 24 ECCs (12 intervention, 12 control centres) 2-5 year olds Florida, USA (Messiah et al., 2016)	RCT (centres randomised) EPAO, dietary intake, PA patterns surveys Child BMI Use of RE-AIM	3 years	Daily curricula for parents/teachers and children		Technical assistance with menu improvements	Cost \$114 in Year 1 and \$29 in year 2 and 3, average total cost over 3 years was \$172.

Location, type, number, population /Sample reference	Baseline measures	Length of intervention Delivery method	Intervention activities Contact frequency			Outcomes
			Knowledge	Policy development	Other	
<i>Under 5 Energize</i> 121 ECC, 5000 children, 800 educators RE-AIM mixed method analysis (Young, 2017)	Food and PA environmental audit at baseline and 2 years Qualitative interviews to investigate reach and adoption  Qualitative interviews to investigate effectiveness and maintenance	3+ years  Delivered by trained 'Energizers' employed by agent Sport Waikato	Workshops for educators and parents Printed resources Messages in centre newsletters U5E newsletter Modelling of FMS to educators	Energizer support to develop policy and achieve HHA	Support to stage PA events Nutrition displays at pick up and drop off	93% centre participation, no attrition Good programme 'fit', met centre needs Sample highly representative of Māori and centres located in high need areas ↑30 centres written PA policy or guideline ↑20 centres with written nutrition policy or guideline ↑40 centres actively working towards or achieved HHA (from 8 at baseline) ↑consumption of everyday foods (p<0.05) ↓consumption of occasional foods (p<0.05) 58% parents aware of U5E programme Qualitative interviews indicate programme sustainability by increased role of educators

RCT = randomised controlled trial; NAP SACC = Nutrition and Physical Self-Assessment for Child Care; PA = physical activity; CCHP = California Childcare Health Programme; EPAO = Environmental Physical Activity Observation; HHA = Healthy Heart Award; OSRAP = Observation System for Recording Activity in Preschools; DOCC = Diet Observation in Child Care; ↔ = No significant change; ↑ = increase; ↓ = decrease; EPAQ = Eating and physical activity questionnaire; NHANES = National Health and Nutrition Examination Survey; EDNP = energy dense, nutrient poor; NS = not statistically significant; mls = millilitres; TMGD-2 = Test for Gross Movement Development, DHB = District Health Board

### **8.1.4 Maintenance**

The ‘part of what we do now’ theme from the follow-up interviews provided evidence of the progression to standardised routines and less reliance on the Energizers by ECCs in U5E. Examples include development of new policy in planned daily physical activity by 30 centres (Chapter 6.2.3) and the strengthening of existing policy around beverages, such as establishing ‘water only’ ECC environments. Increasing the capacity of ECCs through provision of training in nutrition and FMS also contributed to maintenance of the programme messages and environmental change.

There are many processes involved and factors affecting the dissemination, implementation and routinisation of a health promotion programme. However, this study has shown that U5E has achieved strong dissemination, implementation and was becoming sustainable after three years. Barriers to these processes were being overcome although strengthening of the parental component of U5E may be needed.

## **8.2 Significance of this research**

There are four areas where the results of this thesis have relevance, application and implication. These are:

1. Early childhood centres
2. The early childhood sector including centre organisations (Te Kōhanga Reo, kindergarten associations, Playcentre associations and both community and private education and care organisations)
3. Education policy and regulation
4. Public health policy.

Each area will be discussed in turn.

### **8.2.1 For early childhood centres**

The implications of this research for ECCs are that centre leaders and educators have an important role to play in engaging with children, whānau, parents and communities to develop robust policy, promote and role model healthy behaviours in all aspects of the centre to protect young children from obesity and dental decay. Training in nutrition and FMS such as provided by U5E, was found in this thesis and other interventions (de Silva-Sanigorski et al., 2012) to improve educator knowledge and the food and physical activity practices of ECCs and identified the need for training to be continued to fill the gap in ECE teacher training in this area. This thesis showed that educators were

empowered by finding out the ‘why’ behind physical activity. Informal inter-centre connections within communities fostered capacity building and sharing of healthy practices, and should be continued to build a culture and norms around healthy environments for children.

Nutrition and physical activity need to be incorporated into child education goals within ECC. There are learning outcomes within Te Whāriki related to children learning how to keep their bodies healthy and early childhood regulations specify the provision of healthy food choices or encouraging healthy food provision from home. This thesis showed that greater integration between health and education was needed to improve outcomes for both sectors and children.

Nutrition and physical activity resources can be used to “set a standard” for nutrition and physical activity, within centre communities. There are a few tools and support mechanisms for centres available either online such as the HHA, on-the-ground within the region including DHB health promoters and provided by other health providers (for example the He Pi Ka Rere resources and training). These tools will assist centres to assess the current environment, and provide guidelines and standards for food and nutrition and physical activity. These can be accessed by centres and successfully used to develop healthy environments and subsequent behaviours, but, the Energizer was able to make these resources more accessible.

### **8.2.2 For the early childhood sector**

This body of work has shown benefits of the integration of health and education services within ECCs. After U5E training in FMS, educators could see the importance of physical activity to child development and that they had an important role, described in the qualitative theme, ‘this is what we are here for’. The ECE sector should engage with the health sector in a more coordinated way at regional and national levels to reap the benefits this would have for children’s health and educational outcomes.

Additionally, the early childhood sector needs to prioritise physical activity and nutrition of children alongside other key strategies for child development. Early childhood centres and health and education ministries all taking a leading role in children’s formative years for developing and role modelling eating and movement skills through Te Whāriki within the Mana Atua (wellbeing) and Mana Aoturoa (exploration) strands (MoE, 2017) with children, whānau and community would also be a significant action from this research.

### **8.2.3 For education policy and regulation**

This research has indicated that educators had gaps in knowledge with regard to physical activity and nutrition. Educators would benefit from the inclusion of nutrition and physical activity, particularly FMS development, in the curriculum of early childhood training programmes. This would reduce the need for programmes such as U5E to provide nutrition and FMS theory training at centre level. Instead, programmes could focus on practical applications of knowledge and support such as providing new ideas and modelling activities to educators.

Standards in nutrition were welcomed by ECCs in this study as a way to address poor food supplied to centres and encourage improvement. The Ministry of Education needs to expand the criteria within the Education (Early Childhood Services) Regulations 2008 to include the requirement for a strongly worded and measurable food and nutrition policy and provide increased support to achieve these standards. This could be by providing more context specific information on nutrition and physical activity issues within ECCs, including resources specific for tribally or ethnically affiliated centres, similar to the Australian government guidelines *Get Up & Grow: Caring for our kids* (Commonwealth of Australia, 2012). These resources deliver, on the government website, standards and support manuals for ECC directors together with information on a wide range of topics, including outdoor active play, lunch-box ideas and meals for early childhood centres. Enhancing state regulations was recommended by Larson, Ward, Neelon and Story (2011) after a review of regulations showed they were variable in their support of the healthy eating and physical activity that would be necessary for obesity prevention. As well as Australia, Canada also has detailed government guidelines for early childhood food and physical activity (Alberta Government, 2013; Commonwealth of Australia, 2012). Limited regulation was found in Ireland (Scully, 2016). At present, regulation support in NZ is simply the Food and Nutrition Guidelines for children and young people (0–18 years) which are not specific to the early childhood sector. Efforts to improve the food and physical activity environments and practice within ECCs operating at a DHB population health level are increasing (Building Blocks, ARPHS) but national direction and guidance would facilitate change as well as provide standards for ECC organisations and individual ECCs.

In addition to standards, the sector would benefit from regular monitoring of the policy and practices related to food and nutrition in ECE services by the Education Review

Office. This could include analysis of records of food served in ECCs (three months of menu records are required to be kept by the regulations).

This research has shown that national physical activity guidelines for ECE are non-existent and educators found professional development delivered by U5E increased knowledge and frequency of FMS development sessions at centres. The Ministry of Education needs to develop criteria for the quality and quantity of physical activity for inclusion in the regulations and as guidelines for the sector and educators, as a priority, together with monitoring the policy and practices of physical activity in ECCs.

The “curriculum response” that is planned following the release of the recent ERO report (Education Review Office, 2016) needs to consider the findings of this thesis as food and nutrition and physical activity environments were identified as one of the challenges ECE services identified. There needs to be consultation with relevant nutrition and physical activity content experts and review of recent and relevant literature including NZ surveys to identify obesity-protecting factors within NZ ECCs (Gerritsen et al., 2015; Pledger et al., 2010). This will aid development of curriculum relevant and reflective of sector needs and address obesity health concerns.

#### **8.2.4 For public health policy and funding**

This research has shown that ECC environments require improvement in order to be more supportive of children developing healthy food and physical activity behaviours and preventing obesity. It has also shown that on-the-ground support in the form of change agents (Energizers) is advantageous to building ECC capacity to change or to develop healthy ECC environments (McLeroy et al., 1988). Currently, there is little external support for centres to achieve healthy environments apart from printed and online resources, sporadic DHB support and limited Heart Foundation on-the-ground support. Funding programmes such as U5E through either Regional Sports Trusts or DHBs together with stronger regulations and guidelines has the potential to improve ECE environments on a national scale. Furthermore, nationally developed ECE-specific, online nutrition and physical activity resources in English and Te Reo to support this would be advantageous for widespread use and consistent standards.

The Ministry of Health and the Health Research Council need to prioritise funding for translational research, including monitoring the effect of obesity prevention initiatives within the early childhood and other sectors, and therefore be able to measure the effect of any regulation and policy changes in nutrition and physical activity in ECE.

U5E has set standards and goals, provided a framework, training and resources and ongoing support to change in line with standards. Centres have responded by using the standards (best practice) to reflect on practices, gained new knowledge on the links between nutrition, and physical activity and child development, prioritised changes required, embedded standards in systems, policies and practices, connected, informed and worked with their communities to drive change. U5E produced benefits for both the education and health sectors.

### **8.3 Contribution of this research**

This research has added to the body of knowledge about evaluation of nutrition and physical programmes in four ways. Firstly, this thesis employed the RE-AIM framework to evaluate the public health impact of the early childhood targeted U5E programme. It is the first time in NZ that this framework has been used to evaluate a programme being delivered in a ‘real-world’ setting. Secondly, this researcher followed U5E over three years, using an action research approach to provide timely feedback to programme staff and enhance programme dissemination and implementation. Thirdly, the findings contributed to the limited literature of translation of programmes in the ECE sector into a real-world setting. Lastly, this research showed the Energize model was effective at improving environmental factors, nutrition and physical activity policy and practices, and supportive of a healthy nutrition and physical activity environment within ECCs. This model was also successfully improving environments within centres located in high need communities.

### **8.4 Strengths and limitations of this research**

A key strength of this study was its assessment of an intervention in a real-world setting, enabled by use of the RE-AIM framework, which contributed to its external validity. Additionally, the evaluation of U5E was across all five dimensions to thoroughly assess the public health impact, which is not common yet recommended (Gaglio et al., 2013).

Another strength of this study was the ability to track and evaluate an early childhood nutrition and physical activity programme from its inception. The study sample was highly representative of centres with Māori communities and those in high need which, with support from the Energizers, consented to qualitative interviews and allowed quantitative data collection.

A further strength was that within the RE-AIM evaluation, this thesis used a mixed methods approach. Use of qualitative methods to investigate domains of RE-AIM is relatively uncommon but has been recommended to add insight to quantitative results (Gaglio et al., 2013). Additionally, this thesis used two rounds of interviews at different time periods to increase the understanding of programme reach, implementation and effectiveness. For example, responses from the follow-up interviews had some similarities with the first interviews, including continued support for professional development and Energizer contact, indicating that many of the factors that aided reach continued and supported centre's longer term investment in the programme. Two sets of interviews, combined with quantitative data, provided a comprehensive understanding of RE-AIM domains and triangulation of findings.

Furthermore, the framing of this thesis with the socioecological model and critical theory contributed to the researcher's understanding, in that the programme was being delivered and evaluated in a multi-layered context (children, families, ECC, ECC organisations, other ECCs, wider community) and that the outcomes of the programme would also be influenced by multiple, persistent, external forces including social, economic and political factors. Combined with this was the background of the researcher who brought a public health nutrition programme development lens to the study.

A perceived limitation of this study was that it was not a randomised controlled trial or case control design, i.e. there was no matched control group of centres. However, this study aimed to assess an intervention in real time, and RCT designs, requiring a control group not exposed to the intervention, are problematic in public health because of the influence of other nutrition and physical activity programmes that may be operating in the same area (Graham et al., 2008) and in education settings where staff turnover can be high (Young, 2016). A strength of the programme was that the Energizers did not change but this would be a future concern if the right fit between Energizer and community was not achieved and the relationships with the centres would have to be rebuilt.

There was also no direct measurement of children's food intake, physical activity or BMI, measurements which may have added to the assessment of programme effectiveness; however, this thesis used the ECC as the treatment unit not individual children. Such intensive data collection and consequent respondent burden may not

have been welcomed by Sport Waikato and may have influenced centre decision making around participating in the programme. The measurement of individuals would introduce bias because of the need for informed consent from parents (Giraudeau, Caille, Le Gouge, & Ravaud, 2012) i.e. selection bias and additional bias would be introduced if participants know that they are observed e.g. healthier food provided on the day of measurement. Furthermore, the impact of U5E on BMI and dental decay was being assessed by others using Ministry of Health data from the Before School check programme (Rush et al., 2017) and comparing within the Waikato children attending an U5E centre with those not attending.

The implementation and effectiveness measures of this study were limited by an incomplete follow-up audit sample; only 87 of the 120 centres audited at baseline. This was further limited by the two-year timing of the audit, which meant that centres that had signed up in the shortest time, including the cluster of 34 kindergartens, tended to also engage in the follow-up audit. Fewer Te Kōhanga Reo were in the follow-up and may in part have been excluded by the timing, as these centres had taken the longest time to engage (Chapter 5.2). Additionally, use of self-reported audit data from ECC staff, was also a limitation with potentially some risk of social desirability and recall bias (de Silva-Sanigorski et al., 2012). The audit data were frequency of consumption rather than dietary intake data; however, as the treatment unit was the ECC, this was not considered. Also, the cost and respondent burden were major disadvantages of that option.

## **8.5 Future research**

This thesis has identified areas for future research. These gaps include the feasibility of scaling up the U5E programme for other high need communities, development and assessment of a stronger parental component and how to increase the connection between health and education sectors, to enhance outcomes for children particularly if there is little change to current early childhood regulations, licensing criteria or support for ECE services to improve food and physical activity environments. Cost and cost-effectiveness should also be a focus of future research.

Future research directions should focus on the feasibility of delivery of the U5E programme into centres in other areas of high need, geographical isolation and in particular investigate the needs of families, with the aim of developing an effective parental component that engages and encourages whānau to support the development of

obesity protective environments for children in both ECCS and homes in high need areas. The focus on inclusion of Kōhanga Reo in U5E was important but proportionally more Māori children attend “main stream” centres. Therefore this needs to be considered when targeting U5E to reach young Māori children. In addition, cost effectiveness evaluations should occur so that the intervention is as parsimonious as possible without losing quality.

More research is needed on how greater connection between the health and education ministries could be achieved, with the aim of better developmental and health outcomes for children. This would include the feasibility of including more nutrition and physical activity (including FMS) in the early childhood teacher training curriculum.

There is a dearth of studies investigating cost and cost-effectiveness of interventions in early childhood setting (Wolfenden et al., 2016). The current direct cost of U5E is \$100 per child per year but there have been no investigation of cost-effectiveness. It is less than the cost of the *Healthy Caregivers-Healthy Children* intervention estimated to be an average of \$253 (US\$172) (Messiah et al., 2017). However, the calculation of cost-effectiveness should take into consideration the positive effects of U5E on health not only BMI, for example, dental health (Rush et al., 2017).

## **8.6 Recommendations**

The recommendations from this body of work are as follows.

Although there are regulation and licensing criteria, there is no routine checking of ECC food quality by ERO. By default, children’s nutrition within care is influenced either by the choices of their parents or the early childhood centre management. Environmental interventions that support early childhood centre communities to develop food and physical activity policy and practices in line with NZ Food and Nutrition Guidelines, such as U5E, are strongly recommended.

It is recommended that early childhood education and teacher training programmes include nutrition and physical activity (in particular, FMS development) in the curriculum. This training needs to strongly link the importance of these two factors to child learning and development.

It is recommended that U5E develop levels of centre support in response to centre need, and based on assessment of the food and physical activity environment within the

centre. High need centres would therefore receive more intensive face-to-face support from Energizers, while low need centres receive support in the form of emails, phone contact and invitations to workshops that may be of interest. This would result in targeting support for change where it is likely to result in higher outcomes and benefits for children in those centres located in high need centres. Additionally, where centres experience high rates of transiency, greater investment in delivery may be required, for example, repeating workshops on a more regular basis. Any increase in numbers of centres in U5E either from the above approach or from extra funding that Te Kōhanga Reo and centres in other high need areas could be considered as a priority, in particular Te Kōhanga Reo in Hamilton that were excluded from the original sample (n = 6) and those from purapura who heard about the programme yet were also not in the originally identified sample. Consideration of Te Kōhanga Reo boundaries, with respect to purapura boundaries, would be advisable in future roll-out of U5E.

If U5E is to be rolled out to other areas, sufficient funding needs to be allocated for at least three to four years to allow the programme to be firmly embedded in ECC policies and practices and ongoing employment and pay rates of Energizers needs to be clear so that the best staff can be employed.

## **8.7 Conclusions**

Intervening in the early years of life has been described as the “best opportunity for obesity prevention” (Natale et al., 2013, p. 4) especially now that early childhood education and care options are a very common part of the lives of 96% of preschoolers in NZ. These environments need to nurture children in terms of their health as well as their educational development, with the awareness that the two are strongly inter-related. Baseline results from this body of work showed that ECC environments were similar to environments in 2009, indicating that there had been little improvement in almost five years since the dissolution of the Healthy Eating Healthy Action strategy. If NZ continues with broad, non-specific regulations with little direction, support or review of food and physical environments for children in ECE, these environments will remain obesity-promoting, rather than what is recommended in ECHO (World Health Organization, 2016) and guidelines from other countries (Alberta Government, 2013; Commonwealth of Australia, 2012). Therefore programmes such as U5E are warranted to support the ECE sector to improve existing environments within ECCs for young children.

Interventions can be successful in favourably changing the desired health outcome but can have poor public health impact if they fail to reach the intended population and are hard to implement or poorly implemented (Larsen et al., 2017). The RE-AIM analysis in this body of work provided evidence that the Energize model, successful in primary schools, could also have overall high impact in the early childhood centre setting, improving selected food and physical activity factors in the ECC environment that can predispose children to excess weight gain over time. This was shown by the U5E programme achieving high reach (>90%) of the targeted population, all ECC implementing programme activities, favourable changes to ECC food and physical activity practices, and becoming more sustainable over time. Use of mixed methods research provided the opportunity to collect both qualitative and quantitative data to provide a more in-depth understanding of the impact of the programme on the educators, ECC environments and how the programme staff were interacting and working to achieve this outcome.

This study has shown that U5E was able to capitalise on the successful elements of the Project Energize model. These include the five-stage engagement process, data collection and audit processes (for example, documented ECC action plans), Energizer support, existing relationships and community partnerships. This is important considering that the average time children spend in ECE is less than that spent in school, 22 hours average compared with 30 hours.

Regular and ongoing support to deliver U5E by the Energizers is a unique feature of U5E. It was extremely advantageous in building good relationship with ECCs which facilitated the fit of the programme to NZ's diverse ECE community, and together with flexibility of U5E delivery were the major factors contributing to the success of the programme engaging with the targeted population and making improvements to food and physical environments. Barriers such as lack of resources in Te Reo were overcome as the programme progressed by all centres recognising the need for support to provide a better service and U5E commitment to meeting this need in an ongoing way.

The Energizers had a strong influence at the start of U5E to set the standard until policies and practices became routine. At which time there was evidence of reduced need for the frequency of Energizer support. This demonstrated that the programme was becoming sustainable. It also suggests that as the programme became more ingrained,

this could lead to expansion of the programme, for example by adding new centres when existing centres shifted to more of a ‘maintenance’ phase.

The dual focus of U5E, on nutrition and physical activity, showed separate positive outcomes and indicated where U5E could be strengthened. Education around physical activity resulted in greater integration of beliefs around health and education among educators because of the raised awareness of the importance of FMS to child development. For nutrition, the change was around U5E providing an external standard for food and beverages within centres. While both outcomes were extremely important, they also show where gains from each could enhance the other and further increase the impact of U5E. This could be achieved by linking the importance of nutrition more strongly to beneficial outcomes for learning such as brain development (Quigley & Watts, 2005), highlighting the importance of good nutrition for children to ECCs, in particular to the educators. Similarly, the development of standards for physical activity, for example, the number of minutes per day a child should engage in moderate to vigorous physical activity, could encourage incorporation of the recommended physical activity in ECCs and in the required amounts over time.

Professional development and training provided by U5E was filling a gap in knowledge and skills among ECE educators in nutrition and physical activity. The train the trainer model was successful in increasing educator capacity and programme sustainability and has been shown in the literature to be cost effective (Yarber et al., 2015).

U5E provided a framework, training and resources and ongoing support for centres to change in line with standards. Centres responded by using the standards to reflect on practices, gained new knowledge on the link between nutrition and physical activity and child development, prioritised changes required, embedded standards in their systems, policies and practices and connected, informed and worked with their communities to drive change. This has produced benefits for both the education and health sectors.

The processes U5E used for engagement were effective. The five stage process resulted in centres reflecting on their food and physical activity practices. Reflection was a familiar and commonly used process in ECE, particularly for teaching practice, therefore the engagement process benefitted from this. The Energizers found the administrative side of the five stages time consuming in the beginning, particularly for ethnically affiliated centres where each stage needed to be approved at the monthly whānau hui, as they wanted to start delivery. A staggered sign-up of centres in a cluster,

instead of all at once could be trialled should U5E be rolled out in other areas. But, over time, they acknowledged the need for the process and that it was effective at encouraging centres to review current practices and consider improvements.

Engagement with an ECC organisational group enhanced the sign-up of 34 centres but not the speed of sign-up. Another disadvantage of this process was that it also enrolled some centres in low need areas but despite this, it was a good model to begin engagement with a group that had influence over the policies and practices of a large number of centres. Other centre organisations may not have the same level of influence for example, in the Playcentre organisation, each centre is its own entity. However, engagement with ECE organisational groups to obtain some form of endorsement for healthy eating and physical activity would be advantageous when contacting individual centres within that organisation about U5E.

In the absence of stronger governmental regulation and criteria or review of food and physical activity provision or practices in ECCs, U5E provided a benchmark, framework, tools and support that suited centre needs. Centre policies and practices improved, supporting the development of healthier food and physical activity environments within ECCs.

## Glossary

Atua	god
B4 School Check	Health check conducted in general practice when children are 4 years old, includes height, weight and dental check.
Equity funding	Funding provided to centres based on the Equity Index of the centre, with lower index centres receiving more funding
Fruit in Schools	Fresh fruit is provided to all Decile 1 and 2 schools daily. This was introduced as a cancer control strategy.
5+ A DAY	Yearly fruit and vegetable promotion campaign provided by the 5+ A DAY Charitable Trust
Fundamental movement skills	This is the name given to the movement skills for young children necessary to be developed early in life, that precede more complicated adult movement skills. Precursor to child development of literacy and numeracy.
He Pi Ka Rere	He Pi Ka Rere is a kaupapa Māori physical activity programme for Kōhanga Reo. It combines the traditional movement skills of Māori ancestors with the skills required for organised sport.
Hikoi	walk, march, hike
Hui	meeting
Kai tika	good food
Kaiwhakahaere	support person, administrator, facilitator or manager . Reference in this research within Kōhanga refers to an administrator role and in the consultation process to an iwi advisory role.
Kanohi kitea	Provide a 'face' or meeting face-to-face
Kaupapa	strategy, philosophy
Learning stories	This is a record of a child's learning recorded by an educator or parent in a story format within the early childhood setting.
Mahi	work, activity, job
Mana Aoturoa	Exploration, one of five strands in the early childhood curriculum.
Mana Atua	Wellbeing, one of five strands in the early childhood curriculum.
Matariki	Māori New Year
Poi	Māori word for a soft 'ball' on the end of a length of rope or cord. Used in the traditional form of dance, kapahaka.

Purapura	A meeting of administrators or head kaiko from Kōhanga Reo that cluster together for operational, teaching and collegial support.
Routinised	When a new activity has become a constant and consistent component of an organisational practice and behaviour.
Tamariki	children
Tamaiti	child
Te Reo	Māori language
Toi Tangata	National organisation providing advocacy, coordination and training in the public health sector, predominantly in physical activity and nutrition.
Tika	good, authentic
Tī rākau	Traditional Māori stick game in which wooden sticks are thrown and caught between players, usually to a chant. One of a set of Māori traditional games adapted by Sport Waikato for the Energizers to promote physical activity.
Train the trainer	A form of workforce development where personnel are trained to deliver workshops or sessions on a selected topic by a more experienced person resulting in a group of trained leaders to deliver the material.
Whānau	family
Whānau hui	Meeting of family members attending a Te Kōhanga Reo to discuss the operation and teaching of the Kōhanga.
Young children	Children under 5 years



# Appendices

## Appendix A: Ethics approval and approved forms



11 February 2015

Elaine Rush  
Faculty of Health and Environmental Sciences

Dear Elaine

Ethics Application: 15/17 Under 5 Energize: Improving child nutrition and physical activity through early childhood centres, reach and effectiveness.

Thank you for submitting your application for ethical review. I am pleased to confirm that the Auckland University of Technology Ethics Committee (AUTECS) has approved your ethics application for three years until 9 February 2018.

AUTECS would like to commend the researchers on their excellent comprehensive application.

AUTECS suggests that it may be appropriate to offer limited confidentiality only to the managers of the centre. AUTECS also suggests that it might be beneficial to put notices up in the centre to notify parents that the research is taking place.

As part of the ethics approval process, you are required to submit the following to AUTECS:

- A brief annual progress report using form EA2, which is available online through <http://www.aut.ac.nz/researchethics>. When necessary this form may also be used to request an extension of the approval at least one month prior to its expiry on 9 February 2018;
- A brief report on the status of the project using form EA3, which is available online through <http://www.aut.ac.nz/researchethics>. This report is to be submitted either when the approval expires on 9 February 2018 or on completion of the project;

It is a condition of approval that AUTECS is notified of any adverse events or if the research does not commence. AUTECS approval needs to be sought for any alteration to the research, including any alteration of or addition to any documents that are provided to participants. You are responsible for ensuring that research undertaken under this approval occurs within the parameters outlined in the approved application.

AUTECS grants ethical approval only. If you require management approval from an institution or organisation for your research, then you will need to obtain this. If your research is undertaken within a jurisdiction outside New Zealand, you will need to make the arrangements necessary to meet the legal and ethical requirements that apply there.

To enable us to provide you with efficient service, we ask that you use the application number and study title in all correspondence with us. If you have any enquiries about this application, or anything else, please do contact us at [ethics@aut.ac.nz](mailto:ethics@aut.ac.nz).

All the very best with your research,

A handwritten signature in black ink, appearing to read 'K O'Connor', is positioned above the typed name.

Kate O'Connor  
Executive Secretary  
Auckland University of Technology Ethics Committee

Cc: Leanne Young [leanne.young@xtra.co.nz](mailto:leanne.young@xtra.co.nz); Alain Vandal; Annette Dickinson

# Consent Form

Focus groups



**Project title:** *Under 5 Energize: Improving child nutrition and physical activity through early childhood centres, Reach and Effectiveness*

**Project Supervisor:** *Professor Elaine Rush*

**Researcher:** *Leanne Young*

- I have read and understood the information provided about this research project in the Information Brochure dated 4<sup>th</sup> November, 2015.
- I have had an opportunity to ask questions and to have them answered.
- I understand that identity of my fellow participants and our discussions in the focus group is confidential to the group and I agree to keep this information confidential.
- I understand that notes will be taken during the focus group and that it will also be audio-taped and transcribed.
- I understand that I may withdraw myself or any information that I have provided for this project at any time prior to completion of data collection, without being disadvantaged in any way.
- If I withdraw, I understand that while it may not be possible to destroy all records of the focus group discussion of which I was part, the relevant information about myself including tapes and transcripts, or parts thereof, will not be used.
- I agree to take part in this research.
- I wish to receive a copy of the summary report from the research (please tick one): Yes  No
- I agree to review a draft of the focus group transcript to ensure my contribution has been accurately represented and add any subsequent comments/thoughts.

Participant's signature: .....

Participant's name: .....

Participant's Contact Details (if appropriate):

.....  
.....  
.....  
.....

Date:

*Approved by the Auckland University of Technology Ethics Committee on 9 February, 2015*

*AUTEC Reference number 15/17*

*Note: The Participant should retain a copy of this form.*

# Participant Information Sheet

## Focus group



### Under 5 Energize: Improving child nutrition and physical activity through early childhood centres, Reach and Effectiveness

Tena koe,

My name is Leanne Young and I invite you to participate in focus group research as part of my PhD thesis at Auckland University of Technology.

#### Do you have to take part?

Your participation in this research is completely voluntary. If you agree to take part in the study and change your mind, you are free to withdraw from being involved at any time. You do not have to answer all of the questions and you can stop participation in the group at any time.

#### What is the purpose of this research?

The main purpose of this research is to find out if the Under 5 Energize programme, is helping early childhood centres provide a healthy food and physically active environment for young children. This will help children grow up to be healthy adults.

Results from the research will be used for conference presentations and scientific publications in an academic context (New Zealand and international).

#### How was I identified and why am I being invited to participate in this research?

You have been invited to participate because you are involved in the delivery of the Under 5 Energize programme into early childhood centres. Therefore, you know the most about why centres originally joined the programme and how the centres are interacting and if any practices are changing as a result of involvement in the programme.

#### What will happen in this research?

You are invited to participate in two focus groups. A focus group interview is an interview with a small group of people about a predetermined set of topics. The group will ideally be made up of the four Energizers for the Under 5 Energize programme. The first focus group is timed for early 2015 and the other near the end of 2015. The first focus group will ask you questions about why and how centres you work with engaged with the Under 5 Energize programme. The second focus group will ask you questions about what, if anything, has changed in the centres you work with as a result of involvement with the Under 5 Energize programme and what are the main drivers of change in centres.

The focus groups will be audio recorded as well as notes may be taken during the interview to ensure an accurate record of responses is collected.

#### What are the discomforts and risks?

You may be concerned about identification of your name and the names of the early childhood centres who you work with in the research reporting. You may also have concerns about what questions will be asked and potentially answering the questions with a response that may appear negative or in contrast with the other members of the group.

**How will these discomforts and risks be alleviated?**

Your personal details will not be identified in the research report and your responses to the interview questions will be aggregated with responses from others and not associated with your identity. Nor will your responses be identified with the name of the early childhood centres who you work with. This is not the intention of the research, rather the aim is to obtain feedback on the Under 5 Energize programme overall.

There are no right or wrong answers to the questions; I am interested in your experiences working with the centres in the Under 5 Energize programme both positive and negative and because you work in different areas of the Waikato your interactions with centres potentially will be wide and varied.

If desired, you can be sent a copy of your responses to the questions to review, alter and add to after the focus group.

**What are the benefits?**

The benefit for you will be to participate in a Waikato wide project contributing to improving the well-being of young children.

Your experiences and opinions of aspects of the Under 5 Energize programme will assist Sport Waikato to tailor the programme to better meet the needs of early childhood centres and potentially provide evidence to expand the programme to all centres in the Waikato.

This research will be used for the qualification for my PhD from Auckland University of Technology.

**How will my privacy be protected?**

Your name and the centre names will be confidential to the researcher and not be disclosed verbally or in any written form to third parties.

**What are the costs of participating in this research?**

The interview will take approximately two hours and arranged to coincide with regular meetings at Sport Waikato offices in Hamilton.

**What opportunity do I have to consider this invitation?**

Two weeks

**How do I agree to participate in this research?**

To participate in this research please contact the author, Leanne Young, by phone, mobile 027 341 4202 or by email [leanne.young@aut.ac.nz](mailto:leanne.young@aut.ac.nz) indicating your interest. At which time your contact details will be recorded to enable arrangement of the focus group if you wish to proceed. You will also be sent a Consent Form to complete, sign and return by post using the self-addressed envelope provided or return at the time of the focus group.

**Will I receive feedback on the results of this research?**

Yes, you will be sent a summary report of the results of this research via email.

**What do I do if I have concerns about this research?**

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Professor Elaine Rush, [elaine.rush@aut.ac.nz](mailto:elaine.rush@aut.ac.nz), 09 921 9758

Concerns regarding the conduct of the research should be notified to the Executive Secretary of AUTEK, Kate O'Connor, [ethics@aut.ac.nz](mailto:ethics@aut.ac.nz), 921 9999 ext 6038.

**Whom do I contact for further information about this research?*****Researcher Contact Details:***

Leanne Young, mobile phone number 027 341 4202

c/- Professor Elaine Rush,  
Faculty of Health and Environmental Science Auckland University of Technology  
Private Bag 92006 Auckland 1142  
[leanne.young@aut.ac.nz](mailto:leanne.young@aut.ac.nz)

***Project Supervisor Contact Details:***

Professor Elaine Rush,  
Faculty of Health and Environmental Science Auckland University of Technology  
Private Bag 92006 Auckland 1142  
Phone 921 9758 Cell phone 021 624 077  
[elaine.rush@aut.ac.nz](mailto:elaine.rush@aut.ac.nz)

Approved by the Auckland University of Technology Ethics Committee on \_\_\_\_\_

AUTEC Reference number \_\_\_\_\_

## Focus group 1 - interview guide

### Introduction

My name is Leanne Young and I am from Auckland University of Technology and I have invited you here today to participate in a group interview. This is my research assistant, Lisa Carlson, who is assisting with the note taking during the session today. She has signed a confidentiality agreement prior to participating today.

Today is what we call a 'focus group'; it is a group discussion with a semi-structured set of questions related to a particular topic. I am interested in your views/opinions to the questions; there are no right or wrong answers. We expect differing points of view-please share even if it is different from the other points of view. I am here to ask questions, listen and make sure everyone has a chance to share. So if you are talking a lot I may ask you to give others a chance, or if you aren't saying much I may call on you. We just want to make sure all of you share your ideas. Please follow up on each other's points and discuss rather than responding to me for each question, I won't participate in the discussion.

### Privacy, confidentiality and your rights

Participation is voluntary and what is said in the group is confidential - we also will not be assigning names to the opinions/ ideas that you express. Centre names will also not be reported if they are mentioned during the discussion. We will be audio recording and taking notes so we don't miss anything. You have the right to withdraw at any time and decline to answer any question. You are not obliged to give any reasons for these choices and there will be no repercussions for withdrawal. The interview should take around an hour; however, this will depend on how much you would like to say.

If you are happy to be involved in this interview, please sign the consent form if you haven't done so already.

Contract – I have put together these points however, please add any others.

- I'd like you all to agree to respect each other's opinions
- let everyone have a say
- only one person talking at a time – there will be time for everyone
- go around the group for each question
- 'stays in room' (confidentiality, privacy)
- Interested in similarities and differences, positive and negative experiences

Remember your opinions are very important.

### Questions

Today we are going to be discussing the engagement process for centres in the Under 5 Energize programme (from first contact whether that was a hui for some or an initial visit to action plan sign off) – what worked and how it worked, what didn't work, and learnings for the future. The second focus group later in the year will investigate the changes made by centres.

Icebreaker activity: Let's start by thinking about 'engagement' - can you share how many centres you work with and a strategy you used when meeting your centres for the first time or during the first few meetings – what worked for you?

Once we have gone around the group I will just check the recording device is picking up all your voices.

#### Background

1. Let's start by casting your mind back to the very beginning of your role - when you first started the job what was already in place that eased the way/assisted the engagement process?  
Probes: What things had been put in place before you started that helped the engagement process? Why was it important/what did it do for the process/how did it help?
2. What hindered the engagement process in those early stages?
3. What would you change, if anything, if you started this job or process again?
4. Thinking back about this stage, what particular skills or knowledge were required for this early stage?

#### Engagement process

5. Let's move on now to discuss the actual engagement process in detail. How did you engage the centres – what process did you follow (step by step from first initial contact)  
Probes: if I was observing you during a day, what would I see and hear you doing? What experiences would I observe you having?
6. What strategies, tools or approaches have you made use of with the centres during engagement that you think have worked well? Why?
7. What strategies, tools or approaches have you made use of with the centres that you think have been less successful and why?
8. What factors affected the time to fully engage the centres, that is from initial visit to signing the action plan?
9. Overall, how did the engagement process differ, if at all, for the different types of centres?  
Probes: Were some types easier or harder? Did some types take a longer or shorter time? Why?

10. Were there any other differences noted during the engagement process?

Probes – What factors affected the engagement process?

- rural versus urban,
- size of centre e.g. large versus small centres,
- Management structure e.g. parent led versus commercial?

Please describe any other differences between centres in engagement –

Probes - think of your time commitments/time investment, length of time to fully engage

11. What was the role of the person you engaged with mainly at the centre?

Probes: What are your opinions on the 'best contact' to engage with e.g. lead teachers/kaiako/kaiwhakahaere/ manager/president? Does it vary depending on centre type? Who did you engage with at the parent-led centres?

12. How would you describe centre reaction to the idea of the Under 5 Energize programme?

Probes: How would you describe it overall?

13. What did centres have to do to engage/before they engaged? E.g. discuss with management/other teachers or did they sign up straight away? Did this differ between centre types?

14. What is your overall opinion of the how the engagement process went?

Probes: What were the good parts? What were the bad parts?

15. In your opinion what were the key factors influencing the success of the engagement process? E.g. motivated Kaiako/manager, training, prior skills/knowledge, community knowledge/connections

### Halfway

#### Programme

16. I'd now like to move on to talk about aspects of the programme - Why do you think centres signed up to the programme? What boxes did the programme 'tick' for centres?

17. What do you think were the aspects of the programme that attracted them?

Probes - cost, access to experts, link to Project Energize, access to professional development for teachers, other? Why did these aspects attract them?

18. In your opinion, do centres have a clear understanding of the Under 5 Energize programme?

19. In your opinion, how important is the promotion of nutrition and physical activity promotion to early childhood centres, overall? Please explain your answer

#### Enhancers and barriers

20. This next section is about barriers and success factors to the engagement process. What do you think were the success factors to the engagement process? Why were they successful?
21. What were the barriers you encountered to engagement/participation? How were they overcome?
- 22.
23. For the centres that declined – what were the barriers expressed? What were the characteristics of the centres – parent led, low decile, small, rural, etc How do you think these barriers could be overcome if the programme is offered in the future?
24. If you were doing the engagement of centres again, how would you do it differently/what would stay the same? What else would have helped? What are the learnings for the future? Probe: What would you add/remove from the current engagement process?
25. Was Project Energize mentioned by Centres (independently) as part of the 'sign-up' process? How was it mentioned? What was it in relation to?

#### Future

26. Last section, here are some general questions - What are you most excited about in terms of the potential that USE has?
27. Do you have any concerns about the programme?
28. What do you think (in your opinion) will be required to sustain the start that has been made with the centres?
29. Are there any other comments you would like to make about the engagement process that we haven't covered already?

Thankyou for your participation (turn off recorder)

**Probes:**

Would you explain further?

Can you give us an example?

Would you say more?

Tell us more

Is there anything else?

Please describe what you mean?

I don't understand

# Consent Form

Interview 1



*Project title: Under 5 Energize: Improving child nutrition and physical activity through early childhood centres: Reach and Effectiveness*

*Project Supervisor: Professor Elaine Rush*

*Researcher: Leanne Young*

- I have read and understood the information provided about this research project in the Information Sheet dated 24 March, 2015.
- I have had an opportunity to ask questions and to have them answered.
- I understand that notes will be taken during the interviews and that they will also be audio-taped and transcribed.
- I understand that I may withdraw myself or any information that I have provided for this project at any time prior to completion of data collection, without being disadvantaged in any way.
- If I withdraw, I understand that all relevant information including tapes and transcripts, or parts thereof, will be destroyed.
- I agree to take part in this research.
- I wish to receive a copy of the summary report from the research (please tick one): Yes  No
- I agree to review a draft of the interview transcript to ensure my contribution has been accurately represented and add any subsequent comments/thoughts.

Participant's signature: .....

Participant's name: .....

Participant's Contact Details:

.....  
.....  
.....  
.....

Date:

*Approved by the Auckland University of Technology Ethics Committee on 9 February, 2015*

*AUTEC Reference number 15/17*

*Note: The Participant should retain a copy of this form.*

# Participant Information Sheet



## Early childhood centre approval of parent or caregiver survey

Under 5 Energize: Improving child nutrition and physical activity through early childhood centres, Reach and Effectiveness

Tena koe,

My name is Leanne Young and I invite your centre to agree for parents or caregivers to participate in a short survey for a research project for my PhD thesis through Auckland University of Technology.

**Do you have to take part?**

Participation in this research is completely voluntary. If your centre agrees for parents to take part in the survey and change your mind, you are free to withdraw from being involved at any time. You can stop participation in the research at any time.

**What is the purpose of this research?**

The main purpose of this research is to find out if parents or caregivers with children attending a centre which has the Under 5 Energize programme operating in it, are aware of and understand the Under 5 Energize programme and use the programme messages.

This research will be used in the qualification for my PhD. Results from the research will also be used for conference presentations and scientific publications.

**How was your centre identified and why are we being invited to participate in this research?**

Your early childhood centre was identified through a random sample of the early childhood centres participating in the Sport Waikato Under 5 Energize programme. Sport Waikato has given approval to approach centres as part of this research.

Your centre will be included in the study if you agree for parents/caregivers to be interviewed.

**What will happen in this research?**

This project involves parents/caregivers being invited to participate in a short face-to-face survey as they drop-off or pick up children at the centre. This would be arranged with you on a day to suit your centre and not interfere with centre activities or policies. The researcher and research assistant would invite parents until a total of 10 parents or caregivers have answered the survey.

The survey does not collect any personal details.

**What are the discomforts and risks?**

Parents/caregivers would have to provide up to 10 minutes of their time to answer the face-to-face survey. You may be concerned about identification of your name and the name of the early childhood centre in the research reporting.

**How will these discomforts and risks be alleviated?**

The questionnaire has been designed to be administered as efficiently as possible. Your personal details and the name of the early childhood centre will not be identified in the research report.

**What are the benefits?**

The benefit for you will be to participate in a Waikato wide project contributing to improving the well-being of young children.

This survey will assist Sport Waikato to tailor the Under 5 Energize programme to better meet the needs of early childhood centres and potentially provide evidence to expand the programme to all centres in the Waikato.

This research will be used for the qualification for my PhD from Auckland University of Technology.

**What are the costs of participating in this research?**

There is no financial cost. Your centre would have to agree to survey parents/caregivers and the survey will take up to 10 minutes for each parent/caregiver.

**What opportunity do I have to consider this invitation?**

Two weeks

**How does the centre agree to participate in this research?**

A centre representative signs the attached consent form and returns it to the Under 5 Energizer.

**Will I receive feedback on the results of this research?**

Yes, a summary report of this survey will be emailed to your centre for distribution or display for parents. (Please note: The results are aggregated and will not identify any person or centre names).

**What do I do if I have concerns about this research?**

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Professor Elaine Rush, [elaine.rush@aut.ac.nz](mailto:elaine.rush@aut.ac.nz) Phone 09 921 9758

Concerns regarding the conduct of the research should be notified to the Executive Secretary of AUTEK, Kate O'Connor, [ethics@aut.ac.nz](mailto:ethics@aut.ac.nz) Phone 921 9999 ext 6038.

**Whom do I contact for further information about this research?**

*Margaret Williams  
Research Assistant*

*Leanne Young  
Researcher*

**Researcher Contact Details:**

Leanne Young, Mobile 027 341 4202  
c/- Professor Elaine Rush,  
Faculty of Health and Environmental Science  
Auckland University of Technology  
Private Bag 92006 Auckland 1142  
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**Project Supervisor Contact Details:**

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Approved by the Auckland University of Technology Ethics Committee on 9th February 2015  
AUTEK Reference number 15/17

## Interview 1 questions

### Introduction

My name is Leanne Young and I am from Auckland University of Technology and I have invited you here today to participate in a semi-structured interview.

Today is what we call an interview with a semi-structured set of questions related to a particular topic. I am interested in your views and opinions to a range of questions; there are no right or wrong answers.

### Privacy, confidentiality and participant rights

Participation is voluntary and what is said in the interview is confidential - I will not be assigning your name to the opinions/ ideas that you express. I will be audio recording and taking notes to help summarise the ideas. You have the right to withdraw at any time and decline to answer any question. You are not obliged to give any reasons for these choices and there will be no repercussions for withdrawal. The interview should take no longer than an hour; however, this will depend on how much you would like to say!

If you are happy to be involved in this interview, please sign the consent form if you haven't done so already. I will now start the audio recorder.

### Questions

Today we are going to be discussing the engagement/signing up process for centres in the Under 5 Energize programme (define as the steps from community hui/initial visit to signing off the action plan) – what worked, what didn't work, and learnings for the future.

#### Programme

1. How did you first hear of the Under 5 Energize programme? Probes: Flyer invitation advertising the community hui? Attendance at a community hui? What was first contact with an Energizer?
2. Thinking back to the beginning of your involvement with Under 5 Energize, what were your initial thoughts and opinions of the Under 5 Energize programme? Probe: How would you describe this programme to someone? What is Under 5 Energize programme about?
3. Why do you think your centre or organisation signed up to the programme? Probe: What were the main reasons you know of for joining the programme? What did you see it as 'adding' to your centre? What 'boxes' did the programme tick for the centre?

4. What aspects of the Under 5 Energize programme do you believe attracted your centre/ your organisation to take part in program?

Probes

- cost (free),
- access to 'experts'/nutrition and physical activity resources,
- access to professional development for teachers,
- new experiences for the children,
- other?

#### Engagement process

5. Let's now discuss the sign-up or engagement in the programme - How did your centre engage/register with the Under 5 Energize programme – explain the steps you followed? What steps/processes did you have to take before deciding to engage? Probes: What consultation, if any, was required e.g. discussion with management/other teachers/parents/committee or did your centre sign up straight away?
6. Thinking back about the engagement process, there were five stages, I'll remind you of them (show diagram), what do you think of this process overall? If your organisation signed up for you ie Stage 1 and 2, what are your comments on Stage 3-5? Probes: What were the good parts? What were the bad parts?
7. How useful was the engagement process? What particular parts were more useful? Initial visit, Signing of MoU, Stocktake, Needs analysis, Develop and sign action plan How useful were the steps to your understanding of the programme? How useful were the steps to your understanding of what the programme was trying to achieve? (If your organisation signed up for you, only comment on steps Stocktake, needs analysis and action plan)
8. What things/factors did you find easy about the engagement process? What do you think were the success factors with the engagement process (not the programme itself)? And please provide examples.  
Probes: What helped the engagement process?  
Possible probes: Energizer led/driven, number of steps, paperwork, and time taken?
9. What were the barriers you encountered to the engagement process? How were they overcome? What was difficult about the engagement process?  
Probes: paperwork, time taken, number of steps, Energizer led/driven?

10. Thinking about the engagement process what would you add/remove/change? And please provide examples. What else would have helped? What are the learnings for the future, if this programme was rolled out to other areas?

Probes: More information at the start, less steps?

11. Is there any other feedback you would like to share about the engagement/sign up process that we haven't covered already?

#### Programme

12. What are you most excited about in terms of the potential that Under 5 Energize programme has?

13. What, if any, concerns do you have about the programme?

14. What do you think (in your opinion) will be required to sustain the start that has been made with your centres and also other centres that are participating?

15. If you familiar with Project Energize how did the linkage to Project Energize influence your decision to participate in Under 5 Energize- if at all?

#### Promotion/communication about the programme

16. Thinking back to the beginning of the programme, how did you as a centre communicate the 'engagement' with the Under 5 Energize programme to your parents and community? What did you say about the programme? Please provide examples

Probes: Newsletter, centre noticeboards, website, Facebook page? Provide examples?

17. What were the initial reactions from your parents and the wider community?

Probes: Provide any examples of parents/community reaction?

18. As the programme progressed how did you communicate the Under 5 Energize programme messages to your parents and your wider community?

Probes: Newsletter, noticeboard, website, Facebook?

19. What were the initial reactions from your parents and the wider community?

Probes: Provide any examples of parents/community reaction?

20. Are there any other comments you would like to make about the communication/promotion process, or any other aspect that we haven't covered already?

Probes: How did you communicate to staff? What was the staff reaction to USE?

Thank you for participating.

**Stop recording**

Check consent form to confirm if participant wants to review a copy of transcript and where to send.

Remind re confidentiality

Koha

## Focus group 2 – interview guide

### Introduction

My name is Leanne Young and I am from Auckland University of Technology and I have invited you here today to participate in a group interview. This is my research assistant, Name, who is assisting with the organisation of the session today.

Today is what we call a 'focus group' it is a group discussion with a semi-structured set of questions related to a particular topic. I am interested in your views/opinions to the questions, there are no right or wrong answers.

### Privacy, confidentiality and your rights

Participation is voluntary and what is said in the group is confidential - we also will not be assigning names to the opinions/ ideas that you express. Centre names will also not be reported if they are mentioned during the discussion. We will be audio recording and taking notes to help us summarise the ideas. You have the right to withdraw at any time and decline to answer any question. You are not obliged to give any reasons for these choices and there will be no repercussions for withdrawal. The interview should take no longer than an hour; however, this will depend on how much you would like to say!

If you are happy to be involved in this interview, please sign the consent form if you haven't done so already.

Format – I will be providing a series of topics and questions for discussion

Contract – I'd like you all to agree to respect each other's opinions, let everyone have a say, only one person talking at a time – there will be time for everyone.

### Questions

Today I would like to discuss the change (or not) early childhood centres have experienced as a result of being involved with the Under 5 Energize programme. Also what you think are the factors that have influenced change to happen.

1. What do you think have been the main changes in the ECCs as a result of U5 Energize?
2. More specifically, what has changed in:

### *Nutrition*

Probes: Please describe change (if any) in:

- Practices
- Attitudes
- Policy
- Food choices either coming in or provided by the centre

*Physical activity*

Probes: Please describe change (if any) in:

- Practices
- Attitudes
- Policy

Can you provide any examples of change to the nutrition or physical activity environment that you think was as a result of U5E participation?

3. Why do you think these changes have occurred? What has helped or hindered change?
4. What were the changes that centres' found easy to make? What were the changes that centres' found more difficult to make?
5. What do you think are the key/main drivers of change in nutrition and physical activity in the ECCs? How does change happen?
6. Who drives the change within the centre?
7. What else would have helped? What are the learnings for the future? What have you enjoyed about the changes (if any) that you have seen in centres?
8. If this programme was going to be rolled out elsewhere what advice would you provide to the Energizers (staff), programme management?
9. Any other further comments you would like to make?

## Survey of parents/caregivers at early childhood centres

To be stated to the participant at the beginning: By agreeing to answer the questions in this survey provides your consent to participate in this research. Questions to be read to the participant and answers circled or written.

1. How long has your child/children been attending this centre? \_\_\_\_\_
2. Have you heard or seen that the Under 5 Energize programme is operating in your centre?  
Yes / No (If no, go to question 9)
3. What is the Under 5 Energize programme about? (Circle or write answer or answers)  
Healthy eating/ physical activity/ both nutrition and physical activity/ good health/movement skills/ all of the above /other –please specify \_\_\_\_\_
4. What is the healthy eating and physical activity messages you have heard or seen at this centre?  
Less sugary drinks / water and milk as best drinks/ healthy lunchboxes / Go, Glow, Grow/ food label reading/healthy eating for Under 2 year olds/ fundamental movement skills/ less screen time?  
other- please specify / none of the above  
\_\_\_\_\_
5. Have you seen any of the Under 5 Energize promotional material/advertising? Yes / No  
If yes, what? (Circle)  
Energizer photo/poster/tip sheet/advertisement of workshop/Energizer/Energize car/Energize noticeboard/messages in centre newsletter
6. What Under 5 Energize resources have you found most useful to provide healthy eating or physical activity information? (circle)  
None / parent workshops/ tip sheets/ information in the newsletter or e newsletter / displays/ physical activity events/ other – please specify  
\_\_\_\_\_
7. Have you used any of the food/healthy eating messages/promotional material from Under 5 Energize to make changes to your food choices at home or food provided to your child at centre?  
Yes/No  
If yes, what changes have you made?  
\_\_\_\_\_
8. Have you used any of the physical activity/movement messages to increase the amount of physical activity you do either yourself or with your child (children) at home? Yes/No  
If yes, what changes have you made?  
\_\_\_\_\_
9. Have you heard or seen the Project Energize programme that is in primary schools? Yes/No  
(If no, thank you for participating)
10. What organisation delivers Under 5 Energize and Project Energize?  
Don't know or write name \_\_\_\_\_

Thank you for your time, your centre will be sent a summary of the survey findings for display.

## Interview 2 questions

### Introduction

My name is Leanne Young and I am from Auckland University of Technology and I have invited you here today to participate in a semi-structured interview.

Today is what we call an interview with a semi-structured set of questions related to a particular topic. I am interested in your views, opinions and experiences related to the questions; there are no right or wrong answers.

### Privacy, confidentiality and your rights

Participation is voluntary and what is said in the interview is confidential - we also will not be assigning your name to the opinions/ ideas that you express. We will be audio recording and taking notes to help us summarise the ideas. You have the right to withdraw at any time and decline to answer any question. You are not obliged to give any reasons for these choices and there will be no repercussions for withdrawal. The interview should take no longer than an hour; however, this will depend on how much you would like to say!

If you are happy to be involved in this interview, please sign the consent form if you haven't done so already.

### Questions

Today I would like to ask you about if and how you think early childhood centres have changed (or not) as a result of being involved with the Under 5 Energize programme – in relation to nutrition and physical activity, providing examples where you can. Also what you think are the factors that have influenced change to happen. We will start broadly/overall and then there will be more specific questions.

#### What changed?

1. Thinking back to before Under 5 Energize started in your centre, what, if any, have been the main/overall changes in your ECCs as a result of U5 Energize?

#### Probes

- More specifically, what have been the main changes in **nutrition/healthy eating within your centre? Examples?**
- What have been the main changes in the **physical activity? Examples?**

## Additional probes

- What are the main policy/guidelines have been influenced/changed – can you explain, provide examples? E.g. water only, birthday protocol etc
  - Food available/brought from home - explain, provide examples
  - Drinks available or brought from home? Examples
  - Physical activity quality/type? Examples
  - Amount of physical activity-increase/decrease?
  - Teaching of nutrition and PA to children
  - Physical changes to centre e.g. Physical activity/play equipment purchases, cooking equipment, water bottles/fountains
- What knowledge/awareness/attitudes changes have there been about healthy eating/PA? among....
  - Children
  - Staff e.g. PD
  - parents
  - Other changes not covered already? E.g. health outcomes, school-community linkages (parents/whanau, agencies)? Behaviour

2. What do you think were the key factors/factors that influenced your centre to make these changes?

Probes:

- What has helped change? What has hindered change/barriers to change?
  - What factors made the changes successful? E.g. support, relationships, modelling and support on the ground
  - What else would have helped?
3. Why do you think these changes have occurred?
4. What were the types of changes that your centre found easy to make? What were the changes that your centre found more difficult to make? Probes: Why?
5. How has the Under 5 Energize enhanced/made/influenced centres a healthier place/environment for children? Or can you describe how...

Probe:

- How would you describe the 'environment' for children in your centre in terms of nutrition and physical activity and/or general health?
- What parts of your environment support/influence healthy eating and physical activity the most? E.g. policy, committed staff, WKA support, PD or combination?
- How has the programme supported you or your centre to make change?

6. What parts of Under 5 Energize have worked well in your centre? Why? What parts haven't worked well? Why?

#### Response to change

7. What has been the response to the changes your centre has made?

Probes:

- From staff
- From children
- From community/families
- From organisational group (if any)

8. How would you describe your overall experience of the change process – positive/negative/easy/hard/worthwhile/little out of it?

#### Drivers of change

9. What do you think are the key drivers of change in nutrition and physical activity in the ECCs? What makes change happen in your centre?

Probes:

- How does change happen?
- Who drives change within the centre?
- If you wanted to make a policy/practice change in your centre how would you go about it? Consult/ provide information /outside influence/mixture?

10. What has driven the change in response to Under 5 Energize? – what factors have made change happen? E.g. Energizer regular contact/WKA support/action plan or combination/ can see benefits?

### Programme opinions?

11. What is your opinion of the programme after two years? What do you like about the programme? What don't you like about the programme?
  - What are the strengths/success factors of the programme? What are the weaknesses of the programme? What are the barriers to the programme?

### What next?

12. Have you any thoughts about what else this programme could offer you to support you to make change/provide healthy eating and physically active environment at your centre?
13. If this programme was going to be rolled out elsewhere what advice would you provide to other centres?
14. Any other further comments you would like to make?

# Consent Form

Parent/caregiver survey



**Project title:** *Under 5 Energize: Improving child nutrition and physical activity through early childhood centres, Reach and Effectiveness*

**Project Supervisor:** *Professor Elaine Rush*

**Researcher:** *Leanne Young*

- I have read and understood the information provided about this research project in the Information Sheet dated 22 October, 2015.
- I have had an opportunity to ask questions and to have them answered.
- I understand that the identity of the early childhood centre will be kept confidential.
- I understand that the identity and any identifiable information of parents/caregivers participating in the survey will not be collected as part of the survey.
- I understand that I may withdraw the centre or any information that I or the parents/cargivers interviewed have provided for this project at any time prior to completion of data collection, without being disadvantaged in any way.
- I agree for parents/caregivers from the early childhood centre that I am employed at/manage/own to be invited by the researcher to take part in the survey.
- I wish to receive a copy of the summary report from the research (please tick one): Yes  No

Centre representative signature : .....

Centre representative name: .....

Centre representative contact details:

.....  
.....  
.....

Email : .....

Date: .....

*Approved by the Auckland University of Technology Ethics Committee on 9 February, 2015*

*AUTEC Reference number 15/17*

*Note: The Centre representative should retain a copy of this form.*

# Participant Information Sheet

## Interviews



### **Under 5 Energize: Improving child nutrition and physical activity through early childhood centres, Reach and Effectiveness**

Tena koe,

My name is Leanne Young and I invite you to participate in interviews for this research project. It is for my PhD thesis at Auckland University of Technology.

**Do you have to take part?**

Your participation in this research is completely voluntary. If you agree to take part in the study and change your mind, you are free to withdraw from being involved at any time. You do not have to answer all of the questions and you can stop the interview at any time. You are welcome to bring a support person with you to the interview.

**What is the purpose of this research?**

The main purpose of this research is to find out if the Under 5 Energize programme, developed by Sport Waikato for early childhood centres, is helping early childhood centres provide a healthy food and physically active environment for young children. This will help children grow up to be healthy adults.

Results from the research will also be used for conference presentations and scientific publications in an academic context (New Zealand and international).

**How was I identified and why am I being invited to participate in this research?**

You have been invited to participate because you are the Manager of the Under 5 Energize programme. Therefore, you probably know the most about how you planned to engage the centres in the programme and how and why centres engaged in the programme.

**What will happen in this research?**

The research involves two interviews - one timed for early 2015 and the other near the end of 2015. The first interview will ask you questions about why and how centres 'engaged' or joined the Under 5 Energize programme. The second interview will ask you questions about what, if anything, has changed in centres as a result of involvement with the Under 5 Energize programme, what drives change in centres and barriers and successes of the programme overall.

The interviews will follow a semi-structured set of questions. It will be audio recorded as well as notes may be taken during the interview to ensure an accurate record of your responses is collected.

**What are the discomforts and risks?**

You may be concerned about identification of your name, the names of early childhood centres and how identifiable your responses to the questions will be in the research reporting. You may also have concerns about what questions will be asked, potentially answering the questions with a response that may appear negative and what the research will be used for.

**How will these discomforts and risks be alleviated?**

Your personal details and position will not be identified in the research report and your responses to the interview questions will be aggregated with responses from others where possible and not associated with your identity. Nor will your responses be identified with names of any early childhood centres. This is not the intention of the research, rather, the aim is to obtain feedback on the Under 5 Energize programme overall. However, there may be instances where your feedback could be associated with your identity and giving consent to this interview will be agreeing to this possibility.

If you wish to view the questions prior to deciding to become involved these can be sent to you. There are no right or wrong answers to the questions; I am interested in your experiences of the Under 5 Energize programme both positive and negative.

If desired, you can be sent a copy of your responses to the questions to review, alter and add to after the interview.

The research findings will be used to improve the effectiveness of the Under 5 Energize programme to help centres provide recommended healthy eating and physical activity opportunities for young children.

**What are the benefits?**

The benefit for you will be to participate in a Waikato wide project contributing to improving the well-being of young children.

Your experiences and opinions of aspects of the Under 5 Energize programme will assist Sport Waikato to tailor the programme to better meet the needs of early childhood centres and potentially provide evidence to expand the programme to all centres in the Waikato.

This research will be used for the qualification for my PhD from Auckland University of Technology.

**How will my privacy be protected?**

Your name and centre names will be confidential to the researcher and not be disclosed to third parties.

**What are the costs of participating in this research?**

The interview will take approximately one hour and arranged to suit your commitments.

**What opportunity do I have to consider this invitation?**

Two weeks

**How do I agree to participate in this research?**

To participate in this research please contact the author, Leanne Young, by phone or text, mobile 027 341 4202 or by email [leanne.young@aut.ac.nz](mailto:leanne.young@aut.ac.nz) indicating your interest. At which time your contact details will be recorded to enable arrangement of the interview if you wish to proceed. You will also be sent a Consent Form to complete, sign and return at the time of the interview.

## Survey of parents/caregivers at early childhood centres

To be stated to the participant at the beginning: By agreeing to answer the questions in this survey provides your consent to participate in this research. Questions to be read to the participant and answers circled or written.

1. How long has your child/children been attending this centre? \_\_\_\_\_
  
2. Have you heard or seen that the Under 5 Energize programme is operating in your centre?  
Yes / No (If no, go to question 9)
  
3. What is the Under 5 Energize programme about? (Circle or write answer or answers)  
Healthy eating/ physical activity/ both nutrition and physical activity/ good health/movement skills/ all of the above /other –please specify \_\_\_\_\_
  
4. What is the healthy eating and physical activity messages you have heard or seen at this centre?  
Less sugary drinks / water and milk as best drinks/ healthy lunchboxes / Go, Glow, Grow/ food label reading/healthy eating for Under 2 year olds/ fundamental movement skills/ less screen time?  
other- please specify / none of the above  
\_\_\_\_\_
  
5. Have you seen any of the Under 5 Energize promotional material/advertising? Yes / No  
If yes, what? (Circle)  
Energizer photo/poster/tip sheet/advertisement of workshop/Energizer/Energize car/Energize noticeboard/messages in centre newsletter
  
6. What Under 5 Energize resources have you found most useful to provide healthy eating or physical activity information? (circle)  
None / parent workshops/ tip sheets/ information in the newsletter or e newsletter / displays/ physical activity events/ other – please specify  
\_\_\_\_\_
  
7. Have you used any of the food/healthy eating messages/promotional material from Under 5 Energize to make changes to your food choices at home or food provided to your child at centre?  
Yes/No  
If yes, what changes have you made?  
\_\_\_\_\_
  
8. Have you used any of the physical activity/movement messages to increase the amount of physical activity you do either yourself or with your child (children) at home? Yes/No  
If yes, what changes have you made?  
\_\_\_\_\_
  
9. Have you heard or seen the Project Energize programme that is in primary schools? Yes/No  
(If no, thank you for participating)
  
10. What organisation delivers Under 5 Energize and Project Energize?  
Don't know or write name \_\_\_\_\_

Thank you for your time, your centre will be sent a summary of the survey findings for display.

## Appendix B: Stocktake

### Under 5 Energize Stocktake



Centre Name \_\_\_\_\_ Date \_\_\_\_\_

Kia ora and welcome to our U5E Project on Physical Activity and Nutrition. We are thrilled to have your centre on board and look forward to visiting and seeing all the wonderful things you are doing. This stocktake will provide a snapshot of where your centre is currently at. We will repeat the same stocktake in 2015 to monitor progress.

#### Notes to interviewees:

- The contents of this questionnaire will remain confidential to U5E and the centre being interviewed.
- Where research related to this information is published, the centre will not be identified.
- To ensure the stocktake is as complete as possible, please call on information from other staff and documents where necessary.
- Most questions require either ticking a box or circling the appropriate answer.
- Any answers of which you are unsure, please write 'Don't Know'.

#### A. General

- Hours of operation: \_\_\_\_\_  
Sessional / School Day / Other  
(Circle please)
- Do you close during school holidays? Yes  No
- Preferred U5E contact time: \_\_\_\_\_
- Total number of children: \_\_\_\_\_  
Under two                      Over two
- Age range of children: \_\_\_\_\_
- Ethnicity of children (numbers)
 

a. Māori	<input type="checkbox"/>	b. NZ European	<input type="checkbox"/>	c. Samoan	<input type="checkbox"/>	d. Tongan	<input type="checkbox"/>
e. Fijian	<input type="checkbox"/>	f. Fijian Indian	<input type="checkbox"/>	g. Chinese	<input type="checkbox"/>	h. Cook Islander	<input type="checkbox"/>
i. Indian	<input type="checkbox"/>	j. _____	<input type="checkbox"/>	k. _____	<input type="checkbox"/>	l. _____	<input type="checkbox"/>

What is the total number of families at your centre? m
- Number of Educators
 

a. Male	<input type="checkbox"/>	b. Female	<input type="checkbox"/>	c. Total	<input type="checkbox"/>
---------	--------------------------	-----------	--------------------------	----------	--------------------------

Comment \_\_\_\_\_
- Centre contact
 

Name _____	Position Held _____
Name _____	Position Held _____
- Are you registered in the Healthy Heart Award Scheme
 

Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	Unsure	<input type="checkbox"/>	
Status: Achieved	Pa-Harakeke	<input type="checkbox"/>	Whanau	<input type="checkbox"/>	Rito	<input type="checkbox"/>
Working towards	Pa-Harakeke	<input type="checkbox"/>	Whanau	<input type="checkbox"/>	Rito	<input type="checkbox"/>

Date Completed: \_\_\_\_\_

**B. Centre Life**

10. What programmes/agencies is your centre working with?

Police Education	<input type="checkbox"/>	Group Special Education	<input type="checkbox"/>
Heart Foundation (Healthy Heart Award)	<input type="checkbox"/>	McKenzie Centre	<input type="checkbox"/>
Enviroschools Projects for U5s	<input type="checkbox"/>	B4School checks	<input type="checkbox"/>
Denlite	<input type="checkbox"/>	Transition to school programmes	<input type="checkbox"/>
Hearing and Vision	<input type="checkbox"/>	5+ A day	<input type="checkbox"/>
Public Health Nurse	<input type="checkbox"/>	Happy Feet	<input type="checkbox"/>
		Other	

Comment: \_\_\_\_\_

11. Which of these are used in the centre by children? If yes what is the purpose?

**TV/DVD:**Yes  No  Occasionally  Frequently  Entertainment  Educational **Computer:**Yes  No  Occasionally  Frequently  Entertainment  Educational **Camera:**Yes  No  Occasionally  Frequently  Entertainment  Educational **Ipad:**Yes  No  Occasionally  Frequently  Entertainment  Educational **Ipod:**Yes  No  Occasionally  Frequently  Entertainment  Educational **Playstation:**Yes  No  Occasionally  Frequently  Entertainment  Educational 

Other: \_\_\_\_\_

Comment: \_\_\_\_\_

12. Is there a food storage area in your centre for Children's food to be stored and kept cool?

Yes  No 

Comment: \_\_\_\_\_

13. Does your centre use food for fundraising?

Yes

No

If Yes how often:

Per week

Per month

Per Term

Per Year

Don't Know

What food? \_\_\_\_\_  
\_\_\_\_\_

14. What foods does your centre allow at social/whanau/community events?

\_\_\_\_\_

How often? \_\_\_\_\_

15. Do you have an edible garden?

Yes

No

a. What do you do with the produce?

\_\_\_\_\_  
\_\_\_\_\_

b. Who maintains the garden?

\_\_\_\_\_  
\_\_\_\_\_

**C. Physical Activity/Active Play**

16. Does your centre have Written Policies /Written Guidelines or Unwritten Expectations about physical activity?

Please tick where appropriate:	Written Policy	Written Guidelines	Unwritten Expectation	No Expectation
a) Planned PA each week	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Daily Activity : Huff n Puff to increase the heart and breathing rate)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c)Foundation/Fundamental Skills Development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d)Other (please specify):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

17.To what extent is physical activity implemented at your centre?

	5 High	4	3	2	1 Low
a)The level of priority for planned physical activity at your centre?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b)The centre management's support for physical activity?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c)The extent to which Educators at your centre act as role models by being physically active?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18.What Professional Development has your staff attended in the past year regarding Physical Activity?

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19. Rate the range of appropriate equipment in your centre to encourage the development of:

	5 High	4	3	2	1 Low
<b>a) Manipulative skills</b> <i>Sending/receiving objects eg. throw, catch, kick</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>b) Locomotion skills</b> <i>Moving: run, hop, skip, jump</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>c) Tummy time / Rolling / Crawling</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>d) Eye Movement</b> <i>Tracking, moving objects</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>e) Balance</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>f) Rotation</b> <i>Turning, swinging, rocking</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>g) Movement / Dance</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>h) Huff 'n Puff</b> <i>Increase in breathing and heart rate</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>i) Imaginative Play</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>j) Upper Body Strength</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. With regard to your centre's Physical Activity programme, what is the most effective for your children? ( i.e. standout activity) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

### D. Healthy Eating

21. Does your centre have Written Policies / Written Guidelines / or Unwritten Expectations about healthy eating?

Written Policies: Yes  No  If yes copy provided

Written Guidelines: Yes  No  If yes copy provided

Unwritten expectations please Comment: \_\_\_\_\_

---

22. Does your centre allow food to be brought from home?

Yes  No  Occasionally  Daily

If yes please tick Breakfast  Lunch  Snacks  Other

Comment: \_\_\_\_\_

---

23. Is food provided at your centre? (Exclude child centred cooking and baking activities)

Yes  No  Occasionally  Daily

If yes please tick Breakfast  Lunch  Snacks  Other

24. If you have selected Yes who prepares and cooks the food?

Educator/Teacher  Cook  Children  Other

Comment: \_\_\_\_\_

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25. Do you involve the children with any of these activities? If yes, please comment?

Yes  No

Food preparation  Cooking activities  Process cooking

Comment: \_\_\_\_\_

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26. Do you share food for Birthdays/Celebrations?

Yes  No

Comment: \_\_\_\_\_

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## 27. Please tick where appropriate:

	Written Policy	Written Guidelines	Unwritten Expectation	No Expectation
<b>a) Food brought from home:</b>				
1) Pocket food high in salt and fat <i>(e.g. potato chips)</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Sweet Drinks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) Fast food (fish n chips, burgers, fried chicken etc. delivered by parents)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) High density snacks (sugar, fat) <i>(e.g. Muesli bars, yoghurt, chocolate bars)</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) Healthy 'brain food' from the 4 food groups <i>(e.g. breads &amp; cereals, fruit &amp; veges, milk products lean meats, eggs, legumes)</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>b) Food provided at centre:</b>				
1) Healthy choices are preferred	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Water is always available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) Sweet drinks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) Healthy 'brain food' from the 4 food groups are preferred	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) To reduce amount of high energy/low nutrient food available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>c) Consistent nutrition messages in all aspects of centre and parent/caregiver /community interaction:</b>				
1) Food at events	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Fundraising	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) Birthdays or Celebrations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) Sponsorship (e.g. no fast food sponsors)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>d) Other (please specify) _____</b>				

28. Please rate the importance of **healthy eating to your centre**?:

	5 High	4	3	2	1 Low
1)The centre's practices and policies for the promotion of healthy eating?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2)The centre management's support for healthy eating?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3)The promotion of healthy foods at whanau /community events?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4)The extent to which Educators at your centre act as role models by eating healthy food?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## 29. Please indicate which of the following foods and drinks are consumed at your centre – either brought from home and/or provided by your centre.

	All the time	Frequently	Sometimes	Rarely or Never	Don't know
1) Water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Milk - flavoured - primo, milo, hot chocolate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) Milk – plain, full fat or blue top	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) Milk – plain, reduced fat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) Fruit juice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) Cordial, powdered drinks, Soft drinks.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7) Juicies (frozen juice), ice blocks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8) Fruit – fresh, canned, stewed, Frozen.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9) Vegetables – fresh, raw, frozen, cooked.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10) Roll-ups / Fruit strings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11) Muesli Bars	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12) Cheese	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13) Yoghurt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14) Cakes, cookies, biscuits, slices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

All the time  
Frequently  
Sometimes  
Rarely or Never  
Don't know

15) Muffins, Scones, pikelets, pancakes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16) Deep Fried – fish, sausages, Hot dogs, chicken.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17) Pastry based e.g. pies, sausage rolls, quiche, apple pies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18) Crumbed or battered fish or chicken fingers, sticks or nuggets.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19) Bread or bread rolls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20) Pizza	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21) Hot chips	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22) Sandwiches – toasted sandwiches, filled rolls, wraps, pita bread.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23) Soup	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24) Noodles - flavoured	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25) Crackers - plain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26) Crackers - flavoured	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27) Potato chips e.g. crisps, rashuns, cheezels, corn chips, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28) Rice, pasta	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29) Popcorn - plain	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30) Dried fruit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31) Meat – chicken, beef, lamb	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32) Fish, shellfish	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33) Baked beans, lentils, chickpeas,	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34) Eggs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35) Chocolate, lollies, sweets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36) Other: (Specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37) Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

30. Do you teach healthy eating as part of your curriculum?

Yes  No

a. If yes, how often? \_\_\_\_\_

\_\_\_\_\_

b. What professional development do your Educators receive for teaching healthy eating?

\_\_\_\_\_

\_\_\_\_\_

31. Does your centre use food as rewards?

Yes  No

a. If yes, what? \_\_\_\_\_

\_\_\_\_\_

b. How often

Daily  Weekly  Monthly  Rarely

Never  Don't Know

**Thank you very much for your time!**

## Appendix C: Visual categorisation of action plan fundamentals

Initial categories	Data entry categories	Final categories
<b>Nutrition</b>		
<ul style="list-style-type: none"> <li>Professional development for teachers, parents, caterers</li> <li>Healthy Heart Award – sign up/achieve Award/move up an Award status</li> <li>Policy review and change</li> <li>Strategies to improve food choices brought from home (e.g. messages to parents)</li> <li>Purchase/fund new equipment to improve food and beverage choices (e.g. water bottles, crockpot, water filter, equipment for teaching children to cook)</li> <li>Promotion of healthy eating messages to parents (e.g. displays, newsletter messages, tip sheets)</li> <li>Healthy changes/additions to food provided at events held at Centre e.g. birthdays, community events</li> <li>Teaching healthy eating to children – cooking/gardening/mat session/during kai time</li> </ul>	PD - teachers/cook Healthy eating messaging to parents via resources/workshops/tips in newsletter Display for parents HHA Review/Develop new policy/guideline Policy or practice change Develop and improve/continue vegetable garden Include healthy recipes and share with whānau e.g. baking Improve contents of lunch/snack boxes Increase/provide teaching of HE to children e-including cooking USE education sessions for whānau/children Introduce healthy foods on menu- e.g. milk on daily basis, fruit bowl Encourage water and milk only Link USE to other programmes e.g. EnviroSchools, 5+ A DAY Healthy alternatives to cling wrap explored &and or promoted/less processed food/zero waste Source new resources e.g. books on healthy eating Run a nutrition event Start to provide food rather than come from home Ask to contribute koha of food Improve oral health Find training course for cook i.e. food safety Source surplus donated food Share excess produce between families Seek funding for new equipment e.g. drinking fountain, vegetable gardens Raise awareness about specific food issues e.g. allergies Introduce structured meal times Staff challenge for healthy eating Improve food at events-birthdays/community Improve or new equipment to facilitate HE or healthy drink	Professional development for educators and caterers Healthy eating messaging to parents HHA Policy/guideline review and/or change Develop new/continue vegetable garden Include healthy recipes Improve lunch boxes Teaching healthy eating to children Introduce healthy foods on menu Strengthen links to other programmes Other

	consumption	
<b>Initial categories</b>	<b>Data entry categories</b>	<b>Final categories</b>
Physical activity		
<ul style="list-style-type: none"> <li>• Professional development for teachers, parents</li> <li>• Planned Fundamental Movement Skills teaching sessions with children</li> <li>• Equipment – review needs/purchase/modify existing equipment</li> <li>• Policy review and change to increase quality and/or quantity of physical activity/fundamental movement skills</li> <li>• Planned daily/weekly excursions to increase physical activity</li> <li>• Promotion of physical activity messages to parents (e.g. events, newsletter messages)</li> </ul>	Increase staff knowledge by attending PD on FMS External PD for staff Source & introduce new ideas for PA within centre e.g. Under 2's, music and movement, wet weather games, small space games, age specific games, new equipment FMS into practice with focus time each week, report in learning stories Improve existing or source new equipment for FMS Help Seek funding for equipment to support PA e.g. sunshades Source new ideas/support for parents to be active with their children Messaging about FMS/PA to parents Improve understanding of value of play for learning Keep resources updated Education sessions for parents/children Incorporate TMG Set up new PA programme to encourage more PA including huff and puff e.g. Jiggle Jam, Happy Feet, Rueben-Safety for bikes/walking, Jump Jam, Music and movement, brain gym Excursions outside centre to increase FMS/Huff and Puff Organise or attend PA event Developing or making policy or practice change Change landscape of play area to expand/develop play area Set up equipment in a certain way to encourage FMS development e.g. challenge circuit Modelling by Energizers HHA Purchase of wet weather gear for children Reduce screen time Staff role modelling of PA He Pi Ka Rere Information for teachers on specific physical needs of child e.g. walk on toes Staff challenge	Professional development for educators Source and introduce new ideas/programmes for PA within centre Planned Fundamental Movement Skills teaching sessions with children Equipment modifications to encourage fundamental skill development Promotion of physical activity messages to parents Incorporate traditional Māori games Planned excursions/events to increase physical activity Policy/practice review and change to increase quality and/or quantity of physical activity Change landscape of centre play area to encourage PA Healthy Heart Award Modelling by Energizers Other

FMS fundamental movement skills, PA Physical activity, PD Professional development, TMG Traditional Māori games

Appendix D: Tip sheet

**Under 5 Energize**

# EASY STEPS TO HEALTHY LUNCHBOXES!

**STEP 1**  
GRAB SOME BREAD, A BUN, CRACKERS OR A WRAP

crispy crackers, roll, bread, wrap

+ ADD SOME FILLINGS...

ham, egg, tuna, chicken, cheese

+ ADD SOME VEGES...

carrot, cucumber, lettuce, tomato

**TIP!**  
jam, marmite & peanut butter are good too!

**STEP 2**  
ADD SOME VEGES & FRUIT...

mandarin, banana, carrot, grapes, apple, celery, pear, kiwifruit

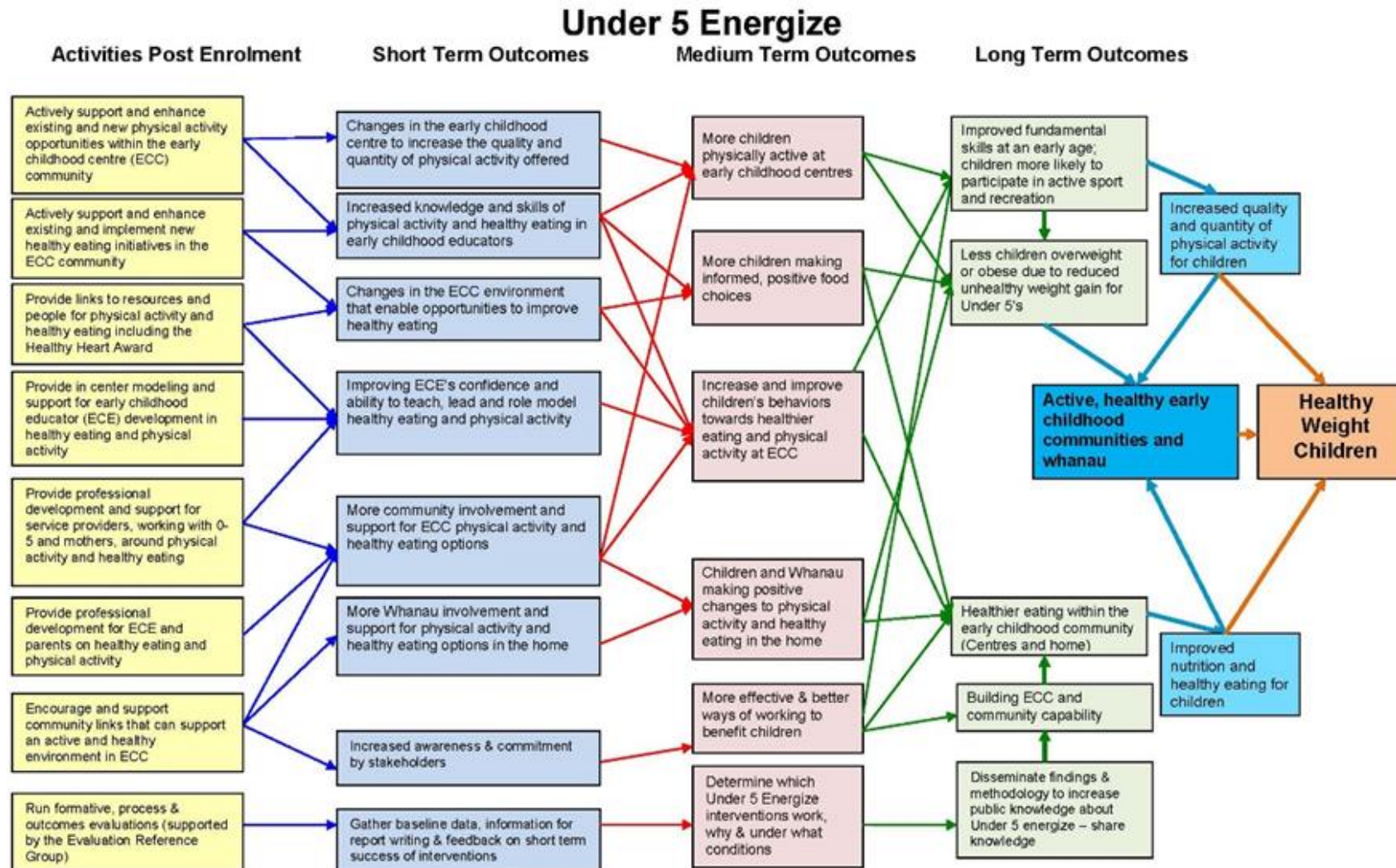
**STEP 3**  
ADD SOME SNACKS... + ADD WATER & YOU'RE DONE!

cheese & crackers, apricots, raisins, pickles, popcorn, small muffin, yogurt

\* these foods are more likely to cause choking - supervision recommended

**www.sportwaikato.org.nz**

## Appendix E: Logic model



## References

- 5+ A DAY. (n. d.). *Learning with 5+ A Day*. Retrieved October 1, 2014, from <http://www.5aday.co.nz/education/education-resources.aspx>
- Adamo, K. B., Wilson, S., Harvey, A. L. J., Grattan, K. P., Naylor, P. J., Temple, V. A., & Goldfield, G. S. (2016). Does intervening in childcare settings impact fundamental movement skill development? *Medicine and Science in Sports and Exercise*, *48*(5), 926-932. doi:10.1249/MSS.0000000000000838
- Adams, J., Molyneux, M., & Squires, L. (2011). Sustaining an obesity prevention intervention in preschools. *Health Promotion Journal of Australia*, *22*(1), 6-10. doi:10.1071/HE11006
- Alberdi, G., McNamara, A. E., Lindsay, K. L., Scully, H. A., Horan, M. H., Gibney, E. R., & McAuliffe, F. M. (2016). The association between childcare and risk of childhood overweight and obesity in children aged 5 years and under: A systematic review. *European Journal of Pediatrics*, *175*(10), 1277-1294. doi:10.1007/s00431-016-2768-9
- Alberta Government. (2013). *Healthy eating for children in childcare centres*. Retrieved from <http://www.health.alberta.ca/documents/Nutrition-Healthy-Eating-AB-ChildcareCentres.pdf>
- Alkon, A., Crowley, A. A., Neelon, S. E., Hill, S., Pan, Y., Nguyen, V., . . . Kotch, J. B. (2014). Nutrition and physical activity randomized control trial in child care centers improves knowledge, policies, and children's body mass index. *BMC Public Health*, *14*(1), 215. doi:10.1186/1471-2458-14-215
- Alvesson, M., & Ashcraft, K. L. (2009). Critical methodology in management and organisational research. In D. A. Buchanan & A. Bryman (Eds.), *The Sage handbook of organisational research methods* (pp. 61-77). London, England: Sage Publications.
- American Dietetic Association. (2011). Position of the American Dietetic Association: Benchmarks for nutrition in child care. *Journal of the American Dietetic Association*, *111*, 607-615. doi:10.1016/j.jada.2011.02.016
- Atkins, M. S., Rusch, D., Mehta, T. G., & Lakind, D. (2016). Future directions for dissemination and implementation science: Aligning ecological theory and public health to close the research to practice gap. *Journal of Clinical Child and Adolescent Psychology*, *45*(2), 215-226. doi:10.1080/15374416.2015.1050724
- Auckland Regional Public Health Service. (2009). *Food for under 5s*. Retrieved from <http://www.arphs.govt.nz/Portals/0/Health%20Information/HealthyEnvironment/Early%20childhood%20education%20centres/ECEC%20Food%20for%20under%205s/Food%20for%20under%205s%202008/Food%20For%20Under%205's%20ECE%20resource%20Final%20June%202008-1.pdf>
- Austin, G., Bell, T., Caperchione, C., & Mummery, W. K. (2011). Translating research to practice: using the RE-AIM framework to examine an evidence-based

physical activity intervention in primary school settings. *Health Promotion Practice*, 12(6), 932-941. doi:10.1177/1524839910366101

- Ball, K., Timpero, A. F., & Crawford, D. A. (2006). Understanding environmental influences on nutrition and physical activity behaviors: Where should we look and what should we count? *International Journal of Behavioral Nutrition and Physical Activity*, 3(33). doi:10.1186/14795868-3-33
- Ball, S. C., Benjamin, S. E., & Ward, D. S. (2007). Development and reliability of an observation method to assess food intake of young children in child care. *Journal of the American Dietetic Association*, 107(4), 656-661. doi:10.1016/j.jada.2007.01.003
- Ball, S. C., Benjamin, S. E., & Ward, D. S. (2008). Dietary intakes in North Carolina child-care centers: Are children meeting current recommendations? *Journal of the American Dietetic Association*, 108(4), 718-721. doi:10.1016/j.jada.2008.01.014
- Baskale, H., & Bahar, Z. (2011). Outcomes of nutrition knowledge and healthy food choices in 5-to 6-year-old children who received a nutrition intervention based on Piaget's theory. *Journal for Specialists in Pediatric Nursing*, 16(4), 263-279. doi:10.1111/j.1744-6155.2011.00300.x
- Bauman, A., & Nutbeam, D. (2014). *Evaluation in a nutshell: A practical guide to the evaluation of health promotion programmes*. Australia: McGraw Hill.
- Bélanger, M., Humbert, L., Vatanparast, H., Ward, S., Muhajarine, N., Chow, A. F., . . . Leis, A. (2016). A multilevel intervention to increase physical activity and improve healthy eating and physical literacy among young children (ages 3-5) attending early childcare centres: The Healthy Start-Départ Santé cluster randomised controlled trial study protocol. *BMC Public Health*, 16(1), 313. doi:10.1186/s12889-016-2973-5
- Bell, A. C., Finch, M., Wolfenden, L., Fitzgerald, M., Morgan, P. J., Jones, J., . . . Wiggers, J. (2015). Child physical activity levels and associations with modifiable characteristics in centre-based childcare. *Australian and New Zealand Journal of Public Health*, 39(3), 232-236. doi:10.1111/1753-6405.12314
- Benjamin Neelon, S. E., Taveras, E. M., Ostbye, T., & Gillman, M. W. (2014). Preventing obesity in infants and toddlers in child care: results from a pilot randomized controlled trial. *Matern Child Health Journal*, 18(5), 1246-1257. doi:10.1007/s10995-013-1359-x
- Birch, L. L., & Ventura, A. K. (2009). Preventing childhood obesity: what works? *International Journal of Obesity*, 33 (Suppl. 1), 74-81. doi:10.1038/ijo.2009.22
- Bluford, D. A., Sherry, B., & Scanlon, K. S. (2007). Interventions to prevent or treat obesity in preschool children: A review of evaluated programmes. *Obesity Research & Clinical Practice*, 15(6), 1356-1372. doi:10.1038/oby.2007.163
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3, 77-101. doi:10.1191/1478088706qp063oa

- Braun, V., & Clarke, V. (2013). *Successful qualitative research: A practical guide for beginners*. London, England: Sage Publications.
- Bronfenbrenner, U. (1994). Ecological models of human development. In *International Encyclopedia of Education* (2nd ed., Vol. 3). Oxford, England: Elsevier.
- Bronner, S. E. (2002). *Of critical theory and its theorists* (2nd ed.). London, England: Routledge.
- Brownson, R. C., Haire-Joshu, D., & Luke, D. A. (2006). Shaping the context of health: a review of environmental and policy approaches in the prevention of chronic diseases. *Annual Review of Public Health, 27*, 341-370. doi:10.1146/annurev.publhealth.27.021405.102137
- Caperchione, C. M., Duncan, M., Kolt, G. S., Vandelanotte, C., Rosenkranz, R. R., Maeder, A., . . . Mummery, W. K. (2016). Examining an Australian physical activity and nutrition intervention using RE-AIM. *Health Promot Int, 31*(2), 450-458. doi:10.1093/heapro/dav005
- Carter, K. N., Lanumata, T. S., Kruse, K., & Gorton, D. (2010). The determinants of food security in New Zealand and does this differ for males and females? *Australia New Zealand Journal of Public Health, 34*, 602-608. doi:10.1111/j.1753-6405.2010.00615.x
- Centres for Disease Control and Prevention. (2014). Health and academic achievement. Retrieved from [https://www.cdc.gov/healthyyouth/health\\_and\\_academics/pdf/health-academic-achievement.pdf](https://www.cdc.gov/healthyyouth/health_and_academics/pdf/health-academic-achievement.pdf)
- Céspedes, J., Briceño, G., Farkouh, M. E., Vedanthan, R., Baxter, J., Leal, M., . . . Fuster, V. (2013). Promotion of cardiovascular health in preschool children: 36-month cohort follow-up. *The American Journal of Medicine, 126*(12), 1122-1126. doi:10.1016/j.amjmed.2013.06.021
- Chiang, R. J., Meagher, W., & Slade, S. (2015). How the whole school, whole community, whole child model works: Creating greater alignment, integration, and collaboration between health and education. *Journal of School Health, 85*(11), 775-784. doi:10.1111/josh.12308
- Child Health Forum. (2014). *Budget 2014 spending increases and new initiatives for the Early Education (ECE) Sector*. Retrieved February 13, 2017, from [https://www.childforum.com/index.php?option=com\\_content&view=article&id=1194:budget-2014-spending-increases-and-new-initiatives-for-the-early-childhood-education-ece-sector&catid=64:news-for-early-childhood-education-&Itemid=172](https://www.childforum.com/index.php?option=com_content&view=article&id=1194:budget-2014-spending-increases-and-new-initiatives-for-the-early-childhood-education-ece-sector&catid=64:news-for-early-childhood-education-&Itemid=172)
- Child Poverty Action Group. (2014). *Our children, our choice: Priorities for policy*. Retrieved from <http://www.cpag.org.nz/assets/Publications/1-0%20Our%20Children%20Our%20Choice%20COMPLETE.pdf>
- Cohen, D. J., Crabtree, B. F., Etz, R. S., Balasubramanian, B. A., Donahue, K. E., Leviton, L. C., . . . Green, L. W. (2008). Fidelity versus flexibility: Translating evidence-based research into practice. *American Journal of Preventive Medicine, 35*(5 Suppl.), s381-s389. doi:10.1016/j.amepre.2008.08.005

- Commission on Social Determinants of Health. (2008). *CSDH final report: Closing the gap in a generation: Health equity through action on social determinants of health*. Geneva: World Health Organization.
- Commonwealth of Australia. (2012). *Get up and grow: Caring for our kids*. Retrieved March 3, 2015, from <http://www.health.gov.au/internet/main/publishing.nsf/Content/gug-resource-order-guide>
- Connelly, L. M. (2016). Trustworthiness in qualitative research. *Medsurg Nursing*, 25(6), 435-436. Retrieved from <https://www.amsn.org/professional-development/periodicals/medsurg-nursing-journal>
- Creswell, J. W. (2014). *Research Design: Qualitative, quantitative, and mixed method approaches*. Los Angeles, California: Sage Publications.
- Creswell, J. W., & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research* (2nd ed.). Los Angeles, California: Sage Publications.
- Dant, T. (2003). *Critical social theory: Culture, society and critique*. London, United Kingdom: Sage Publications.
- De Onis, M., Blössner, M., & Borghi, E. (2010). Global prevalence and trends of overweight and obesity among preschool children. *American Journal of Clinical Nutrition*, 92. doi:10.3945/ajcn.2010.29786
- de Silva-Sanigorski, A. M., Bell, A. C., Kremer, P., Nichols, M., Crellin, M., Smith, M., . . . Boak, R. (2010). Reducing obesity in early childhood: Results from Romp & Chomp, an Australian community-wide intervention program. *American Journal of Clinical Nutrition*, 91. doi:10.3945/ajcn.2009.28826
- de Silva-Sanigorski, A. M., Bell, A. C., Kremer, P., Park, J., Demajo, L., Smith, M., . . . Swinburn, B. (2012). Process and Impact Evaluation of the Romp & Chomp Obesity Prevention Intervention in Early Childhood Settings: Lessons Learned from Implementation in Preschools and Long Day Care Settings. *Childhood Obesity*, 8(3), 205-215. doi:10.1089/chi.2011.0118
- Department of Health Physical Activity Health Improvement and Protection. (2011). *Start Active, stay active: A report on physical activity from the four home countries' Chief Medical Officers*. London, England: Department of Health.
- Dowda, M., Brown, W. H., McIver, K. L., Pfeiffer, K. A., O'Neill, J. R., Addy, C. L., & Pate, R. R. (2009). Policies and characteristics of the preschool environment and physical activity of young children. *Pediatrics*, 123(2), e261-e266. doi:10.1542/peds.2008-2498
- Education (Early Childhood Services) Regulations (2008). Retrieved from <http://www.legislation.govt.nz/regulation/public/2008/0204/latest/DLM1412501.html>
- Education Review Office. (2016). Food, nutrition and physical activity in New Zealand schools and early learning services: Key findings. Retrieved from <http://www.ero.govt.nz/assets/Uploads/Key-findings-report-food-nutrition-and-physical-activity.pdf>

- Edwards, C., & Willis, J. W. (2014). *Action research: Methods, models and examples*. Charlotte, North Carolina: Information Age.
- Enviroschools. (n.d.). Retrieved October 26 2016, from <http://www.enviroschools.org.nz/>
- Falbe, J., Kenney, E. L., Henderson, K. E., & Schwartz, M. B. (2011). The Wellness Child Care Assessment Tool: A measure to assess the quality of written nutrition and physical activity policies. *Journal of the American Dietetic Association, 111*(12), 1852-1860. doi:10.1016/j.jada.2011.09.006
- Finch, M., Jones, J., Yoong, S., Wiggers, J., & Wolfenden, L. (2016). Effectiveness of centre-based childcare interventions in increasing child physical activity: A systematic review and meta-analysis for policymakers and practitioners. *Obesity Reviews, 17*(5), 412-428. doi:10.1111/obr.12392
- Finch, M., Wolfenden, L., Falkiner, M., Edenden, D., Pond, N., Hardy, L. L., . . . Wiggers, J. (2012). Impact of a population based intervention to increase the adoption of multiple physical activity practices in centre based childcare services: A quasi experimental, effectiveness study. *International Journal of Behavioral Nutrition and Physical Activity, 9*(1), 101. doi:10.1186/1479-5868-9-101
- Finn, M., Clinton, J., & Mahoney, F. (2006). *Systematic review of the literature on interventions in schools and early childhood settings to improve nutrition and physical activity*. Auckland, New Zealand: National Heart Foundation of New Zealand.
- Fisher, A., Reilly, J. J., Kelly, L. A., Montgomery, C., Williamson, A., Paton, J. Y., & Grant, S. (2005). Fundamental movement skills and habitual physical activity in young children. *Medicine and Science in Sports and Exercise, 37*(4), 684-688. doi:10.1249/01.MSS.0000159138.48107.7D
- Fitzgibbon, M. L., Stolley, M. R., Schiffer, L., Van Horn, L., KauferChristoffel, K., & Dyer, A. (2005). Two-year follow-up results for Hip-Hop to Health Jr.: a randomized controlled trial for overweight prevention in preschool minority children. *Journal of Pediatrics, 146*(5), 618-625. doi:10.1016/j.jpeds.2004.12.019
- Fitzgibbon, M. L., Stolley, M. R., Schiffer, L., Van Horn, L., KauferChristoffel, K., & Dyer, A. (2006). Hip-Hop to Health Jr. for Latino preschool children. *Obesity, 14*(9), 1616-1625. doi:10.1038/oby.2006.186
- Flynn, S., & Harris, M. (2015). *Mothers in the New Zealand workforce*. Paper presented at Labour, Employment and Work 16 conference, Wellington, New Zealand, Retrieved from [http://m.stats.govt.nz/browse\\_for\\_stats/people\\_and\\_communities/Women/mothers-nz-workforce.aspx](http://m.stats.govt.nz/browse_for_stats/people_and_communities/Women/mothers-nz-workforce.aspx)
- Fusch, P. I., & Ness, L. R. (2015). Are we there yet? Data saturation in qualitative research. *The Qualitative Report, 20*(9), 1408-1416. Retrieved from <http://nsuworks.nova.edu/tqr/>

- Gaglio, B., Shoup, J., & Glasgow, R. E. (2013). The RE-AIM framework: A systematic review of use over time. *American Journal of Public Health, 103*(6), e38-e46. doi:10.2105/AJPH.2013.301299
- Geoffroy, M.-C., Power, C., Touchette, E., Dubois, L., Boivin, M., Séguin, J. R., . . . Côté, S. M. (2013). Childcare and Overweight or Obesity over 10 Years of Follow-Up. *Journal of Pediatrics, 162*(4), 753-758. doi:10.1016/j.jpeds.2012.09.026
- Gerritsen, S. (2016). Nutrition education for early childhood managers, teachers and nursery cooks: a prerequisite for effective obesity prevention. *Public Health, 140*, 56-58. doi:10.1016/j.puhe.2016.05.025
- Gerritsen, S., Dean, B., Morton, S. M. B., & Wall, C. R. (2017). Do childcare menus meet nutrition guidelines? Quantity, variety and quality of food provided in New Zealand Early Childhood Education services. *Australian and New Zealand Journal of Public Health, 41*(4), 345-351. doi:10.1111/1753-6405.12667
- Gerritsen, S., Morton, S. M. B., & Wall, C. R. (2016). Physical activity and screen use policy and practices in childcare: Results from a survey of early childhood education services in New Zealand. *Australian and New Zealand Journal of Public Health, 40*(4), 319-325. doi:10.1111/1753-6405.12529
- Gerritsen, S., Wall, C. R., & Morton, S. M. B. (2015). Child-care nutrition environments: results from a survey of policy and practice in New Zealand early childhood education services. *Public Health Nutrition, 19*(9), 1531-1542. doi:10.1017/S1368980015002955
- Giraudeau, B., Caille, A., Le Gouge, A., & Ravaud, P. (2012). Participant informed consent in cluster randomized trials: Review. *PloS One, 7*(7), e40436. doi:10.1371/journal.pone.0040436
- Glasgow, R. E., Bull, S. S., Gillette, C., Klesges, L. M., & Dzewaltowski, D. A. (2002). Behavior change intervention research in healthcare settings: A review of recent reports with emphasis on external validity. *American Journal of Preventive Medicine, 23*(1), 62-69. doi:10.1016/S0749-3797(02)00437-3
- Glasgow, R. E., Lichtenstein, E., & Marcus, A. C. (2003). Public health matters. Why don't we see more translation of health promotion research to practice? Rethinking the efficacy-to-effectiveness transition. *American Journal of Public Health, 93*(8), 1261-1267. doi:10.2105/AJPH.93.8.1261
- Glasgow, R. E., McKay, H. G., Piette, J. D., & Reynolds, K. D. (2001). The RE-AIM framework for evaluating interventions: What can it tell us about approaches to chronic illness management? *Patient Education and Counseling, 44*(2), 119-127. doi:10.1016/S0738-3991(00)00186-5
- Glasgow, R. E., Vinson, C., Chambers, D., Khoury, M. J., Kaplan, R. M., & Hunter, C. (2012). National Institutes of Health approaches to dissemination and implementation science: Current and future directions. *American Journal of Public Health, 102*(7), 1274-1281. doi:10.2105/AJPH.2012.300755
- Glasgow, R. E., Vogt, T. M., & Boles, S. M. (1999). Evaluating the public health impact of health promotion interventions: The RE-AIM framework. *American*

*Journal of Public Health*, 89(9), 1322-1327. Retrieved from  
<http://www.ajph.aphapublications.org/>

- Gluckman, P. D., & Hanson, M. A. (2008). Developmental and epigenetic pathways to obesity: An evolutionary-developmental perspective. *International Journal of Obesity (2005)*, 32 S62-71. doi:10.1038/ijo.2008.240
- Godfrey, K. M., Gluckman, P. D., & Hanson, M. A. (2010). Developmental origins of metabolic disease: life course and intergenerational perspectives. *Trends in Endocrinology and Metabolism*, 21(4), 199-205. doi:10.1016/j.tem.2009.12.008
- Goodman, R. A., Sacks, J. J., Aronson, S. S., Addiss, D. G., Kendrick, A. S., & Osterholm, M. (1994). Child day-care health: Themes, issues, and future directions. *Pediatrics*, 94(6), 1118-1120. Retrieved from  
<http://pediatrics.aappublications.org/content/140/4?current-issue=y>
- Gordon, E. S., Tucker, P., Burke, S. M., & Carron, A. V. (2013). Effectiveness of physical activity interventions for preschoolers: A meta-analysis. *Research Quarterly for Exercise and Sport*, 84(3), 287-294. doi:10.1080/02701367.2013.813894
- Graham, D., Appleton, S., Rush, E., McLennan, S., Reed, P., & Simmons, D. (2008). Increasing activity and improving nutrition through a schools-based programme: Project Energize. 1. Design, programme, randomisation and evaluation methodology. *Public Health Nutrition*, 11(10), 1076-1084. doi:10.1017/S136898000700153X
- Grant, B. M., & Giddings, L. S. (2002). Making sense of methodologies: A paradigm framework for the novice researcher. *Contemporary Nurse*, 13(1), 10-28. doi:10.5172/conu.13.1.10
- Grant, B. M., & Giddings, L. S. (2006). Mixed methods research for the novice researcher. *Contemporary Nurse*, 23(1), 3-11. doi:10.5172/conu.2006.23.1.3
- Grant, C. C., Wall, C. R., Brunt, D., Crengle, S., & Scragg, R. (2007). Population prevalence and risk factors for iron deficiency in Auckland, New Zealand. *Journal of Paediatrics & Child Health*, 43(7/8), 532-538. doi:10.1111/j.1440-1754.2007.01129.x
- Griffiths, L. J., Hawkins, S. S., Cole, T. J., & Dezateux, C. (2010). Risk factors for rapid weight gain in preschool children: Findings from a UK-wide prospective study. *International Journal of Obesity*, 34(4), 624-632. doi:10.1038/ijo.2010.10
- Gubbels, J. S., Kremers, S. P. J., Stafleu, A., Dagnelie, P. C., de Vries, N. K., & Thijs, C. (2010). Child-care environment and dietary intake of 2- and 3-year-old children. *Journal of Human Nutrition & Dietetics*, 23(1), 97-101. doi:10.1111/j.1365-277X.2009.01022.x
- Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough?: An experiment with data saturation and variability. *Field Methods*, 18(1), 59-82. doi:10.1177/1525822x05279903
- Gunner, K. B., Atkinson, P. M., Nichols, J., & Eissa, M. A. (2005). Health promotion strategies to encourage physical activity in infants, toddlers, and preschoolers.

*Journal of Pediatric Health Care*, 19(4), 253-258. doi:10.1111/j.1365-277X.2009.01022.x

- Gupta, R. S., Shuman, S., Taveras, E. M., Kulldorff, M., & Finkelstein, J. A. (2005). Opportunities for health promotion education in child care. *Pediatrics*, 116(4), e499-e505. doi:10.1542/peds.2005-0467
- Hallfors, D., & Godette, D. (2002). Will the 'principles of effectiveness' improve prevention practice? Early findings from a diffusion study. *Health Education Research*, 17(4), 461-470. doi:10.1093/her/17.4.461
- Hanson, M. A., & Gluckman, P. D. (2011). Developmental origins of noncommunicable disease: Population and public health implications. *American Journal of Clinical Nutrition*, 94(6 Suppl), 1754S-1758S. doi:10.3945/ajcn.110.001206
- Harn, B., Parisi, D., & Stoolmiller, M. (2013). Balancing fidelity with flexibility and fit: What do we really know about fidelity of implementation in schools? *Exceptional Children*, 79(2), 181-193. doi:10.1177/1098214008329523
- Hart, E., & Bond, M. (1995). *Action research for health and social care : A guide to practice*. Buckingham, Philadelphia: Open University Press.
- Hart, K. H., Herriot, A., Bishop, J. A., & Truby, H. (2003). Promoting healthy diet and exercise patterns amongst primary school children: A qualitative investigation of parental perspectives. *Journal of Human Nutrition and Dietetics*, 16(2), 89-96. doi:10.1046/j.1365-277X.2003.00429.x
- Hawkes, C., Smith, T. G., Jewell, J., Wardle, J., Hammond, R. A., Friel, S., . . . Kain, J. (2015). Smart food policies for obesity prevention. *The Lancet*, 385(9985), 2410-2421. doi:https://doi.org/10.1016/S0140-6736(14)61745-1
- Heart Foundation. (2014). *Healthy Heart Award for Early Childhood Services*. Retrieved May 24, 2014, from <http://www.heartfoundation.org.nz/programmes-resources/schools-and-eces/healthy-heart-award>
- Heart Foundation. (n.d.). *Fuelled4life*. Retrieved 20 April, 2017, from <http://www.fuelled4life.org.nz/about>
- Hesketh, K. D., & Campbell, K. J. (2010). Interventions to prevent obesity in 0–5 year olds: An updated systematic review of the literature. *Obesity*, 18(Suppl. 1), 27-35. doi:10.1038/oby.2009.429
- Hopgood, T., Asher, I., Wall, C. R., Grant, C. C., Stewart, J., Muimuiheata, S., & Exeter, D. (2010). Crunching the numbers: The affordability of nutritious food for New Zealand children. *Nutrition & Dietetics*, 67(4), 251-257. doi:10.1111/j.1747-0080.2010.01472.x
- Hotu, S., Carter, B., Watson, P. D., Cutfield, W. S., & Cundy, T. (2004). Increasing prevalence of Type 2 diabetes in adolescents. *Journal of Paediatrics and Child Health*, 40, 201-204. doi:10.1111/j.1440-1754.2004.00337.x
- Hudson, M., Milne, M., Reynolds, P., Russell, K., & Smith, B. (2010). *Te Ara Tika Guidelines for Maori Research Ethics: A framework for researchers and ethics committee members*. Retrieved from

<http://www.hrc.govt.nz/sites/default/files/Te%20Ara%20Tika%20Guidelines%20for%20Maori%20Research%20Ethics.pdf>

- Huye, H. F., Connell, C. L., Crook, L. B., Yadrick, K., & Zoellner, J. (2014). Using the RE-AIM framework in formative evaluation and program planning for a nutrition intervention in the lower Mississippi Delta. *Journal of Nutrition Education and Behavior, 46*(1), 34-42. doi:10.1016/j.jneb.2013.09.006
- Janssen, M., Toussaint, H. M., van Mechelen, W., & Verhagen, E. A. L. M. (2013). Translating the PLAYgrounds program into practice: A process evaluation using the RE-AIM framework. *Journal of Science and Medicine in Sport, 16*(3), 211-216. doi:10.1016/j.jsams.2012.06.009
- Jebb, S., Kopelman, P., & Butland, B. (2007). Executive summary: Foresight 'tackling obesity: Future choices' project. *Obesity Reviews, 8*, vi-ix. doi:10.1111/j.1467-789X.2007.00344.x
- Johnson, K., Hays, C., Center, H., & Daley, C. (2004). Building capacity and sustainable prevention innovations: a sustainability planning model. *Evaluation and Program Planning, 27*(2), 135-149. doi:10.1016/j.evalprogplan.2004.01.002
- Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher, 33*(7), 14-26. doi:10.3102/0013189X033007014
- Kaphingst, K. M., & Story, M. (2009). Child care as an untapped setting for obesity prevention: State child care licensing regulations related to nutrition, physical activity, and media use for preschool-aged children in the United States. *Preventing Chronic Disease, 6*(1), A11. Retrieved from <http://www.cdc.gov/pcd/>
- Kessler, R. S., & Glasgow, R. E. (2011). A proposal to speed translation of healthcare research into practice: Dramatic change is needed. *American Journal of Preventive Medicine, 40*(6), 637-644. doi:10.1016/j.amepre.2011.02.023
- Kessler, R. S., Peyton Purcell, E., Klesges, L. M., Benkeser, R. M., & Peek, C. J. (2012). What does it mean to "employ" the RE-AIM model? *Evaluation and the Health Professions, 36*(1), 44-66. doi:10.1177/0163278712446066
- King, D. K., Glasgow, R. E., & Leeman-Castillo, B. (2010). Reaiming RE-AIM: Using the model to plan, implement, and evaluate the effects of environmental change approaches to enhancing population health. *American Journal of Public Health, 100*(11), 2076-2084. doi:10.2105/ajph.2009.190959
- Kitzinger, J. (1995). Qualitative research. Introducing focus groups. *British Medical Journal, 311*(July 29), 299-302. Retrieved from [www.bmj.com/](http://www.bmj.com/)
- Koshy, E., Koshy, V., & Waterman, H. (2010). *Action research in healthcare*. London, England: Sage Publications.
- Lal, A., Moodie, M., Ashton, T., Siahpush, M., & Swinburn, B. (2012). Health care and lost productivity costs of overweight and obesity in New Zealand. *Australian and New Zealand Journal of Public Health, 36*(6), 550-556. doi:10.1111/j.1753-6405.2012.00931.x

- Larsen, A. L., Liao, Y., Alberts, J., Huh, J., Robertson, T., & Dunton, G. F. (2017). RE-AIM analysis of a school-based nutrition education intervention in kindergarteners. *Journal of School Health, 87*(1), 36-46. doi:10.1111/josh.12466
- Larsen, A. L., Robertson, T., & Dunton, G. (2015). RE-AIM analysis of a randomized school-based nutrition intervention among fourth-grade classrooms in California. *Translational Behavioral Medicine, 5*(3), 315-326. doi:10.1007/s13142-015-0311-6
- Larson, N., Ward, D. S., Neelon, S. B., & Story, M. (2011). What role can child-care settings play in obesity prevention? A review of the evidence and call for research efforts. *Journal of the American Dietetic Association, 111*(9), 1343-1362. doi:10.1016/j.jada.2011.06.007
- Laws, R., Campbell, K. J., Van Der Pligt, P., Russell, G., Ball, K., Lynch, J., . . . Denney-Wilson, E. (2014). The impact of interventions to prevent obesity or improve obesity related behaviours in children (0-5 years) from socioeconomically disadvantaged and/or indigenous families: A systematic review. *BMC Public Health, 14*(1). doi:10.1186/1471-2458-14-779
- Lucas, P., & Schofield, G. (2010). Physical activity in the early childhood education centre environment. *New Zealand-International Research in Early Childhood Education Journal, 13*, 125-136. Retrieved from <https://www.childforum.com/research/about-the-journal/17-contents-early-childhood-research-journal.html>
- Malatest International. (2014). *Evaluation of Healthy Heart Award for early childhood education: Tohu Manawa Ora Kohungahunga*. Wellington, New Zealand: Malatest International.
- Maziak, W., Ward, K. D., & Stockton, M. B. (2008). Childhood obesity: Are we missing the big picture? *Obesity Reviews, 9*(1), 35-42. doi:10.1111/j.1467-789X.2007.00376.x
- McGoey, T., Root, Z., Bruner, M. W., & Law, B. (2016). Evaluation of physical activity interventions in children via the reach, efficacy/effectiveness, adoption, implementation, and maintenance (RE-AIM) framework: A systematic review of randomized and non-randomized trials. *Preventive Medicine, 82*, 8-19. doi:10.1016/j.ypmed.2015.11.004
- McKenzie, R., Naccarella, L., Stewart, A., Thompson, C. (2007). Targeting what matters in health promotion evaluation: Using the RE-AIM approach to identify success in real world settings. *Evaluation Journal of Australasia, 7*(7), 19-26. Retrieved from <https://www.aes.asn.au/evaluation-journal-of-australasia.html>
- McLachlan, C. (2013, May). *The role of early childhood education centres in the development of nutrition and physical activity in toddlers*. Paper presented at Lifestyle Choices for Early Life Learning conference, Massey University, Auckland, New Zealand, Retrieved from [http://www.massey.ac.nz/massey/learning/colleges/college-of-health/institute-food-nutrition-human-health/ifnhh\\_home.cfm](http://www.massey.ac.nz/massey/learning/colleges/college-of-health/institute-food-nutrition-human-health/ifnhh_home.cfm)
- McLafferty, I. (2004). Focus group interviews as a data collecting strategy. *Journal of Advanced Nursing, 48*(2), 187-194. doi:10.1111/j.1365-2648.2004.03186.x

- McLean, R. M., Hoek, J. A., Buckley, S., Croxson, B., Cumming, J., Ehau, T. H., . . . Schofield, G. (2009). "Healthy Eating - Healthy Action": Evaluating New Zealand's obesity prevention strategy. *BMC Public Health*, 9(1), 452. doi:10.1186/1471-2458-9-452
- McLeroy, K. R., Bibeau, D., Steckler, A., & Glanz, K. (1988). An ecological perspective on health promotion programs. *Health Education Quarterly*, 15(4), 351-377. doi:10.1177/109019818801500401
- Messiah, S. E., Lebron, C., Moise, R., Sunil Mathew, M., Sardinias, K., Chang, C., . . . Natale, R. (2017). Healthy caregivers-healthy children (HC2) phase 2: Integrating culturally sensitive childhood obesity prevention strategies into childcare center policies. *Contemporary Clinical Trials*, 53, 60-67. doi:10.1016/j.cct.2016.12.011
- Mikkelsen, M. V., Husby, S., Skov, L. R., & Perez-Cueto, F. J. A. (2014). A systematic review of types of healthy eating interventions in preschools. *Nutrition Journal*, 13(56), 1-19. doi:10.1186/1475-2891-13-56
- Ministry of Education. (2013). *Annual ECE Census: Report 2013*. Retrieved September 14, 2013, from <https://www.educationcounts.govt.nz/statistics/early-childhood-education/annual-ece-summary-reports/historical-reports/annual-ece-summary-reports2>
- Ministry of Education. (2014a). *Early childhood services directory*. Retrieved February 25, 2014, from <http://www.educationcounts.govt.nz/statistics>
- Ministry of Education. (2014b). *Licencing criteria for services*. Retrieved March 3, 2014, from <http://www.lead.ece.govt.nz/ServiceTypes.aspx>
- Ministry of Education. (2014c). *Participation in early childhood education*. Retrieved July 28, 2014, from <http://www.educationcounts.govt.nz/statistics/ece2/ece-indicators/1923>
- Ministry of Education. (2015). *Early childhood education me nga kohanga reo data summary report 2015*. Retrieved February 10, 2016, from <http://www.educationcounts.govt.nz/statistics/early-childhood-education/annual-ece-summary-reports>
- Ministry of Education. (2017). *Te Whāriki: Early Childhood Curriculum*. Wellington, New Zealand: Ministry of Education.
- Ministry of Health. (2003). NZ Food NZ Children: Key results of the 2002 national children's nutrition survey. Retrieved from <http://www.health.govt.nz/system/files/documents/publications/nzfoodnzchildren.pdf>
- Ministry of Health. (2004). *Healthy Eating - Healthy Action Oranga Kai – Oranga Pumau*. Wellington, New Zealand: Ministry of Health.
- Ministry of Health. (2005). *Influences in Childhood on the Development of Cardiovascular Disease and Type 2 Diabetes in Adulthood*. Wellington: Ministry of Health. Retrieved from

<https://www.health.govt.nz/system/files/documents/publications/influenzasinchildhood.pdf>

- Ministry of Health. (2008). *Food and nutrition guidelines for healthy infants and toddlers (Aged 0-2): A background paper*. Wellington, New Zealand: Ministry of Health.
- Ministry of Health. (2011). *A Focus on Nutrition: Key findings from the 2008/09 NZ Adult Nutrition Survey*. Retrieved from <http://www.health.govt.nz/system/files/documents/publications/a-focus-on-nutrition-v2.pdf>
- Ministry of Health. (2012a). *Food and nutrition guidelines for healthy children and young people (Aged 2-18years): A background paper*. Retrieved from <http://www.health.govt.nz/system/files/documents/publications/food-nutrition-guidelines-healthy-children-young-people-background-paper-feb15-v2.pdf>
- Ministry of Health. (2012b). *The Health of New Zealand Children 2011/12: Key findings of the New Zealand Health Survey*. Retrieved from <http://www.health.govt.nz/system/files/documents/publications/health-of-new-zealand-child-2011-12-v3.pdf>
- Ministry of Health. (2012c). *Request for Proposal: Proposals for public health services to improve maternal and child nutrition and physical activity*. Wellington, New Zealand: Ministry of Health.
- Ministry of Health. (2014). *Annual update of key results 2013/2014: New Zealand Health Survey*. Retrieved from <http://www.health.govt.nz/system/files/documents/publications/annual-update-key-results-nzhs-2013-14-dec14-v2.pdf>
- Ministry of Health. (2015a). *Childhood Obesity Plan*. Retrieved October 30 2015, from <http://www.health.govt.nz/our-work/diseases-and-conditions/obesity/childhood-obesity-plan>
- Ministry of Health. (2015b). *Understanding excess body weight: New Zealand Health Survey*. Wellington: Ministry of Health. Retrieved from <https://www.health.govt.nz/system/files/documents/publications/understanding-excess-body-weight-nzhs-apr15-v2.pdf>
- Ministry of Health. (2016a). *Annual Update of Key Results 2015/16: New Zealand Health Survey*. Wellington, New Zealand: Ministry of Health.
- Ministry of Health. (2016b). *Clinical guidelines for weight management for children and young people*. Wellington, New Zealand: Ministry of Health. Retrieved from <http://www.health.govt.nz/system/files/documents/publications/clinical-guidelines-weight-management-nz-children-young-people-dec16.pdf>
- Ministry of Health. (2016c). *Tier 1 statistics 2015/2016: New Zealand Health Survey*. Retrieved November 22, 2016, from <http://www.health.govt.nz/publication/tier-1-statistics-2015-16-new-zealand-health-survey>
- Ministry of Health. (2017). *Sit less, move more, sleep well: Active play guidelines for under-fives*. Wellington: Ministry of Health.

- Mistry, K. B., Minkovitz, C. S., Riley, A. W., Johnson, S. B., Grason, H. A., Dubay, L. C., & Guyer, B. (2012). A new framework for childhood health promotion: The role of policies and programs in building capacity and foundations of early childhood health. *American Journal of Public Health, 102*(9), 1688-1696. doi:10.2105/AJPH.2012.300687
- Mitchell, N. S., Prochazka M. D., & Glasgow, R. E. (2016). Time to RE-AIM: Why community weight loss programmes should be included in academic obesity research. *Public Health Research, Practice and Policy, 13*(E37), 1-7. doi:10.5888/pcd13.150436
- Monahan, J. L., & Scheirer, M. A. (1988). The role of linking agents in the diffusion of health promotion programs. *Health Education Quarterly, 15*(4), 417-433. doi:10.1177/109019818801500404
- Morton, S. M., Atatoa Carr, P. E., Grant, C. C., Berry, S. D., Bandara, D. K., Mohal, J., . . . Wall, C. (2014). *Growing Up in New Zealand: A longitudinal study of New Zealand children and their families. Now we are Two; Describing our first 1000 days*. Auckland, New Zealand: Growing Up in New Zealand.
- Mrkusic, A. (2012). *School engagement in the Project Energize health intervention programme. What works, what does not work, what next?* (Master's thesis, Auckland University of Technology, Auckland, New Zealand). Retrieved from <https://aut.researchgateway.ac.nz/handle/10292/3>
- Natale, R. A., Lopez-Mitnik, G., Uhlhorn, S. B., Asfour, L., & Messiah, S. E. (2014). Effect of a child care center-based obesity prevention program on body mass index and nutrition practices among preschool-aged children. *Health Promotion Practice, 15*(5), 695-705. doi:10.1177/1524839914523429
- Natale, R. A., Messiah, S., Asfor, L., Uhlhorn, S., Arheart, K., & Delamater, A. (2013). Healthy caregivers-healthy children (HC2): A childcare center based obesity prevention. *Journal of Nutrition Education & Behavior, 45*(4), S86-S87. doi:10.1016/j.jneb.2013.04.237
- Natale, R. A., Messiah, S. E., Asfour, L., Uhlhorn, S. B., Delamater, A., & Arheart, K. L. (2014). Role modeling as an early childhood obesity prevention strategy: Effect of parents and teachers on preschool children's healthy lifestyle habits. *Journal of Developmental and Behavioral Pediatrics, 35*(6), 378-387. doi:10.1097/DBP.0000000000000074
- Natale, R. A., Messiah, S. E., Asfour, L. S., Uhlhorn, S. B., Englebort, N. E., & Arheart, K. L. (2017). Obesity Prevention Program in Childcare Centers: Two-Year Follow-Up. *American Journal of Health Promotion, 31*(6), 502-510. doi:10.1177/0890117116661156
- Neergaard, M. A., Olesen, F., Andersen, R. S., & Sondergaard, J. (2009). Qualitative description – the poor cousin of health research? *BMC Medical Research Methodology, 9*(1), 52. doi:10.1186/1471-2288-9-52
- Newell, S. A., Girgis, A., Sanson-Fisher, R. W., & Savolainen, N. J. (1999). The accuracy of self-reported health behaviors and risk factors relating to cancer and cardiovascular disease in the general population: A critical review. *American*

*Journal of Preventative Medicine*, 17(3), 211-229. doi:10.1016/S0749-3797(99)00069-0

- Nothwehr, F., Haines, H., Chrisman, M., & Schultz, U. (2014). Statewide dissemination of a rural, non-chain restaurant intervention: Adoption, implementation and maintenance. *Health Education Research*, 29(3), 433-441. doi:10.1093/her/cyu008
- Onwuegbuzie, A. J., & Johnson, R. B. (2006). The validity issue in mixed research. *Research in the schools*, 13(1), 48-63. Retrieved from <http://www.msra.org/publications-rits.html>
- Opalinski, A. (2006). Pouring rights contracts and childhood overweight: A critical theory perspective. *Journal for Specialists in Pediatric Nursing*, 11(4), 234-243. doi:10.1111/j.1744-6155.2006.00075.x
- Organisation Economic Cooperation Development. (2013). *Health at a Glance 2013: OECD Indicators*. Retrieved from <http://www.oecd.org/els/health-systems/Health-at-a-Glance-2013.pdf>
- Organisation for Economic Cooperation and Development. (2009). *Doing Better for Children*. Retrieved March 25, 2014, from [www.oecd.org/els/social/childwellbeing](http://www.oecd.org/els/social/childwellbeing)
- Osei-Assibey, G., Dick, S., Macdiarmid, J., Semple, S., , Reilly, J. J., Ellaway, A., Cowie, H., & McNeill, G. (2014). The influence of the food environment on overweight and obesity in young children: a systematic review. *BMJ Open*, 2, e001538. doi:10.1136/bmjopen-2012-001538
- Padget, A., & Briley, M. E. (2005). Dietary Intakes at Child-Care Centers in Central Texas Fail to Meet Food Guide Pyramid Recommendations. *Journal of the American Dietetic Association*, 105(5), 790-793. doi:10.1016/j.jada.2005.02.002
- Patton, M. Q. (2002). *Qualitative research and evaluation methods*. (3rd ed.). Thousand Oaks, California: Sage Publications.
- Pearce, A., Li, L., Abbas, J., Ferguson, B., Graham, H., Law, C., . . . Law, C. (2010). Is childcare associated with the risk of overweight and obesity in the early years? Findings from the UK Millennium Cohort Study. *International Journal of Obesity*, 34(7), 1160-1168. doi:10.1038/ijo.2010.15
- Petrunoff, N., Lloyd, B., Watson, N., & Morrissey, D. (2009). Barriers to implementing a structured fundamental movement skills program in long day care centres: A process evaluation. *Health Promotion Journal of Australia*, 20(1), 65-68. doi:10.1071/HE09065
- Pipi, K., Cram, F., Hawke, R., Hawke, S., Huriwai, T., Mataki, T., . . . Tuuta, C. (2004). A research ethic for studying Maori and iwi provider success. In *Social Policy Journal of New Zealand* (Vol. 23, pp. 141-153). Retrieved from <http://www.communityresearch.org.nz/wp-content/uploads/formidable/pipi1.pdf>
- Piziak, V. (2012). A pilot study of a pictorial bilingual nutrition education game to improve the consumption of healthful foods in a Head Start population.

- Playcentre Association New Zealand. (n.d.). *What is Playcentre?* Retrieved October 26, 2016, from [http://www.playcentre.org.nz/Article?Action=View&Article\\_id=9](http://www.playcentre.org.nz/Article?Action=View&Article_id=9)
- Pledger, M., Black, J., Cumming, J., & McDonald, J. (2010). *2009 School and early childhood education services food and nutrition environment survey: Phase III report*. Wellington, New Zealand: Victoria University.
- Pledger, M., McDonald, J., & Cumming, J. (2012). Increases in support structures for healthy eating especially in low decile schools in New Zealand. *Australian and New Zealand Journal of Public Health*, 36(6), 543-549. doi:10.1111/j.1753-6405.2012.00930.x
- Pluye, P., Potvin, L., & Denis, J.-L. (2004). Making public health programs last: Conceptualizing sustainability. *Evaluation and Program Planning*, 27(2), 121-133. doi:10.1016/j.evalprogplan.2004.01.001
- Quigley, R., & Watts, C. (2005). A rapid review of the literature on the association between nutrition and school pupil performance. Retrieved from [http://www.ana.org.nz/sites/default/files/OAC\\_final\\_report\\_May\\_06.pdf](http://www.ana.org.nz/sites/default/files/OAC_final_report_May_06.pdf)
- Reason, P., & Bradbury, H. (2008). *The Sage handbook of action research : Participative inquiry and practice* (2nd ed.). Thousand Oaks, California: Sage Publications.
- Reilly, J. J. (2010). Low levels of objectively measured physical activity in preschoolers in child care. *Medicine and Science in Sports and Exercise*, 42(3), 502-507. doi:10.1249/MSS.0b013e3181cea100
- Reilly, J. J., & Kelly, J. (2011). Long-term impact of overweight and obesity in childhood and adolescence on morbidity and premature mortality in adulthood: Systematic review. *International Journal of Obesity*, 35(7), 891-898. doi:10.1038/ijo.2010.222
- Reilly, J. J., Kelly, L., Montgomery, C., Williamson, A., Fisher, A., McColl, J., . . . Grant, S. (2006). Physical activity to prevent obesity in young children: Cluster randomised controlled trial. *British Medical Journal*, 333(7577), 1041. doi:10.1136/bmj.38979.623773.55
- Reynolds, K. D., & Spruijt-Metz, D. (2006). Translational research in childhood obesity prevention. *Evaluation and the Health Professions*, 29(2), 219-245. doi:10.1177/0163278706287346
- Reynolds, M. A., Jackson Cotwright, C., Polhamus, B., Gertel-Rosenberg, A., & Chang, D. (2013). Obesity prevention in the early care and education setting: Successful initiatives across a spectrum of opportunities. *Journal of Law, Medicine and Ethics*, 41, 8-18. doi:10.1111/jlme.12104
- Richards, R., Darling, H., & Reeder, A. I. (2005). Sponsorship and fund-raising in New Zealand schools: implications for health. *Australian and New Zealand Journal of Public Health*, 29(4), 331-336. doi:10.1111/j.1467-842X.2005.tb00203.x

- Roberto, C. A., Swinburn, B., Hawkes, C., Huanh, T T-K., Costa, S. A., Ashe, M. Zwicker, L., Cawley, J. H., Brownell, K. D.,. (2015). Patchy progress on obesity prevention: emerging examples, entrenched barriers, and new thinking. *Lancet*, 385, 2400-2409. doi:10.1016/S0140-6736(14)61744-X
- Roblin, L. (2007). Childhood obesity: food, nutrient, and eating-habit trends and influences. *Applied Physiology, Nutrition & Metabolism*, 32(4), 635-645. doi:10.1139/H07-046
- Rohrbach, L. A., Grana, R., Sussman, S., & Valente, T. W. (2006). Type II translation: Transporting prevention interventions from research to real-world settings. *Evaluation and the Health Professions*, 29(3), 302-333. doi:10.1177/0163278706290408
- Rush, E., Graham, D., McLennan, S., & Latimer, K. (2011). *An evaluation of nutrition and physical activity in Waikato primary schools*. Retrieved from <http://www.waikatodhb.health.nz/assets/public-health-advice/project-energize/An-evaluation-of-nutrition-and-physical-activity-in-Waikato-primary-schools.pdf>
- Rush, E., McLennan, S., Obolonkin, V., Vandal, A. C., Hamlin, M., Simmons, D., & Graham, D. (2014). Project Energize: Whole-region primary school nutrition and physical activity programme; evaluation of body size and fitness 5 years after the randomised controlled trial. *British Journal of Nutrition*, 111(2), 363-371. doi:10.1017/S0007114513002316
- Rush, E., Obolonkin, V., McLennan, S., Graham, D., Harris, J. D., Mernagh, P., & Weston, A. R. (2014). Lifetime cost effectiveness of a through-school nutrition and physical programme: Project Energize. *Obesity Research & Clinical Practice*, 8(2), e115-122. doi:10.1016/j.orcp.2013.03.005
- Rush, E., Obolonkin, V., Parmar, P., Young, L., Kirk, M., & Tseng, M. (2017). Under 5 Energize: tracking progress of a preschool nutrition and physical activity programme with regional measures of body size and dental health at age of four years. *Nutrients*, 9(5), 456. doi:10.3390/nu9050456
- Rush, E., Reed, P., McLennan, S., Coppinger, T., Simmons, D., & Graham, D. (2012a). A school-based obesity control programme: Project Energize. Two-year outcomes. *British Journal of Nutrition*, 107(4), 581-587. doi:10.1017/S0007114511003151
- Rush, E., Reed, P. W., McLennan, S., Coppinger, T., Simmons, D., & Graham, D. (2012b). Tracking of body mass indices over 2 years in Maori and European children. *European Journal of Clinical Nutrition*, 66(2), 143-149. doi:10.1038/ejcn.2011.130
- Rutter, H. (2012). The single most important intervention to tackle obesity... *International Journal of Public Health*, 57, 657-658. doi:10.1007/s00038-012-0385-6
- Sallis, J. F., & Glanz, K. (2009). Physical activity and food environments: solutions to the obesity epidemic. *Milbank Quarterly*, 87(1), 123-154. doi:10.1111/j.1468-0009.2009.00550.x

- Sallis, J. F., Owen, N., & Fisher, E. B. (2008). Ecological models of health behaviour. In K. Glanz, Rimer, B. K., Viswanath, K. (Ed.), *Health Behaviour and Health Education* (4th ed.). California: J Wiley & Sons.
- Sandelowski, M. (1995). Sample size in qualitative research. *Research in Nursing and Health, 18*, 179-183. doi:10.1002/nur.4770180211
- Sandelowski, M. (2000). Whatever happened to qualitative description? *Research in Nursing and Health, 23*(4), 334-340. doi:10.1002/1098-240X(200008)23:4<334::AID-NUR9>3.0.CO;2-G
- Sandelowski, M. (2010). What's in a name? Qualitative description revisited. *Research in Nursing and Health, 33*(1), 77-84. doi:10.1002/nur.20362
- Savin-Baden, M., & Howell Major, C. (2013). *Qualitative Research. The essential guide to theory and practice*. Oxon, England: Routledge.
- Schroeder, K., Kulage, K. M., & Lucero, R. (2015). Beyond positivism: Understanding and addressing childhood obesity disparities through a Critical Theory perspective. *Journal for Specialists in Pediatric Nursing, 20*(4), 259-270. doi:10.1111/jspn.12122
- Schwingel, A., Gálvez, P., Linares, D., & Sebastião, E. (2016). Using a mixed-methods RE-AIM framework to evaluate community health programs for older Latinas. *Journal of Aging and Health, 29*(4), 551-593. doi:10.1177/0898264316641075
- Scully, H., Alberdi, G., Segurado, R., McNamara, A., Lindsay, K., Horan, M., . . . McAuliffe, F. (2017). Child care exposure influences childhood adiposity at 2 years: Analysis from the ROLO study. *Childhood Obesity, 13*(2), 93-101. doi:10.1089/chi.2016.0127
- Shanks, C. B., & Harden, S. (2016). A reach, effectiveness, adoption, implementation, maintenance evaluation of weekend backpack food assistance programs. *American Journal of Health Promotion, 30*(7), 511-520. doi:10.4278/ajhp.140116-QUAL-28
- Sharma, S. V., Rashid, T., Ranjit, N., Byrd-Williams, C., Chuang, R.-J., Roberts-Gray, C., . . . Hoelscher, D. M. (2015). Effectiveness of the Lunch is in the Bag program on communication between the parent, child and child-care provider around fruits, vegetables and whole grain foods: A group-randomized controlled trial. *Preventive Medicine, 81*(Suppl. C), 1-8. doi:10.1016/j.ypmed.2015.07.005
- Singh, A. S., Mulder, C., Twisk, J. W. R., van Mechelen, W., & Chinapaw, M. J. M. (2008). Tracking of childhood overweight into adulthood: A systematic review of the literature. *Obesity Reviews, 9*(5), 474-488. doi:10.1111/j.1467-789X.2008.00475.x
- Sisson, S. B., Campbell, J. E., May, K. B., Brittain, D. R., Monroe, L. A., Guss, S. H., & Ladner, J. L. (2012). Assessment of food, nutrition, and physical activity practices in Oklahoma child-care centers. *Journal of the Academy of Nutrition & Dietetics, 112*(8), 1230-1240. doi:10.1016/j.jand.2012.05.009

- Sisson, S. B., Krampe, M., Anundson, K., & Castle, S. (2016). Obesity prevention and obesogenic behavior interventions in child care: A systematic review. *Preventive Medicine, 87*, 57-69. doi:10.1016/j.ypmed.2016.02.016
- Sisson, S. B., Li, J., Stoner, J. A., Lora, K. R., Campbell, J. E., Arnold, S. H., . . . Stephens, L. (2016). Obesogenic environments in tribally-affiliated childcare centers and corresponding obesity rates in preschool children. *Preventive Medicine Reports, 3*, 151-158. doi:10.1016/j.pmedr.2016.01.003
- Skouteris, H., McCabe, M., Swinburn, B., Newgreen, V., Sacher, P., & Chadwick, P. (2011). Parental influence and obesity prevention in pre-schoolers: a systematic review of interventions. *Obesity Reviews, 12*(5), 315-328. doi:10.1111/j.1467-789X.2010.00751.x
- Smith, L. T. (1999). *Decolonising methodologies: Research and indigenous peoples*. Dunedin, New Zealand: University of Otago Press.
- Specker, B., & Binkley, T. (2003). Randomized trial of physical activity and calcium supplementation on bone mineral content in 3- to 5-year-old children. *Journal of Bone and Mineral Research, 18*(5), 885-892. doi:10.1359/jbmr.2003.18.5.885
- Sport New Zealand. (2008). *Active movement activity guides for children 0-5 years*. Retrieved from <http://www.sportnz.org.nz/assets/Uploads/attachments/managing-sport/young-people/Active-Movement-An-Introduction-1.pdf>
- Sport Waikato. (1990). *Kiwi manuals*. Retrieved February 15, 2016, from <http://www.sportwaikato.org.nz/programmes/under-fives/kiwi-manuals.aspx>
- Sport Waikato. (2013a). *Proposal Template for Services to Improve Maternal and Child Nutrition and Physical Activity*. Hamilton: Sport Waikato.
- Sport Waikato. (2013b). *Sport Waikato Annual Report 2013*. Hamilton: Sport Waikato.
- Stacey, F. G., Finch, M., Wolfenden, L., Grady, A., Jessop, K., Wedesweiler, T., . . . Yoong, S. L. (2017). Evidence of the potential effectiveness of centre-based childcare policies and practices on child diet and physical activity: Consolidating evidence from systematic reviews of intervention trials and observational studies. *Current Nutrition Reports*. doi:10.1007/s13668-017-0212-z
- Steen, M., Manschot, M., & Koning, N. D. (2011). Benefits of co-design in service design projects. *International Journal of Design, 5*(2), 53-60. Retrieved from <http://jodesign.org.tw/ojs/index.php/IJDesign/article/view/890/346>
- Stokols, D. (1992). Establishing and maintaining healthy environments: Toward a social ecology of health promotion. *American Psychologist, 47*(1), 6-22. doi:10.1037/0003-066X.47.1.6
- Stokols, D. (1996). Translating social ecological theory into guidelines for community health promotion. *American Journal of Health Promotion, 10*(4), 282-298. doi:10.4278/0890-1171-10.4.282

- Story, M., Giles-Corti, B., Yarooh, A. L., Cummins, S., Frank, L. D., Huang, T. T. K., & Lewis, L. B. (2009). Work Group IV: Future directions for measures of the food and physical activity environments. *American Journal of Preventive Medicine*, 36(Suppl. 4), S182-S188. doi:10.1016/j.amepre.2009.01.008
- Story, M., Kaphingst, K. M., Robinson-O'Brien, R., & Glanz, K. (2008). Creating healthy food and eating environments: Policy and environmental approaches. *Annual Review of Public Health*, 29, 253-272. doi:10.1146/annurev.publhealth.29.020907.090926
- Summerbell, C. D., Moore, H. J., Vogeleson, C., Kreichauf, S., Wildgruber, A., Manios, Y., . . . Gibson, E. L. (2012). Evidence-based recommendations for the development of obesity prevention programmes targeted at preschool children. *Obesity Reviews*, 13 (Suppl. 1), 129-132. doi:10.1111/j.1467-789X.2011.00940.x
- Sweetman, D., Badiee, M., & Creswell, J. W. (2010). Use of the transformative framework in mixed methods studies. *Qualitative Inquiry*, 16(6), 441-454. doi:10.1177/1077800410364610
- Swinburn, B., Egger, G., & Raza, F. (1999). Dissecting obesogenic environments: The development and application of a framework for identifying and prioritizing environmental interventions for obesity. *Preventive Medicine*, 29(6), 563-570. doi:10.1006/pmed.1999.0585
- Swinburn, B., Sacks, G., Hall, K. D., McPherson, K., Finegood, D. T., Moodie, M. L., & Gortmaker, S. L. (2011). The global obesity pandemic: shaped by global drivers and local environments. *The Lancet*, 378(9793), 804-814. doi:10.1016/S0140-6736(11)60813-1
- Taylor, R. W., Williams, S. M., Farmer, V. L., & Taylor, B. (2013). Changes in physical activity over time in young children: A longitudinal study using accelerometers. *PloS One*, November 25. doi:10.1371/journal.pone.0081567
- The Department of Health. (2010). National physical activity recommendations for children 0-5 years. Retrieved from [http://www.health.gov.au/internet/main/publishing.nsf/content/9D831D9E6713F92ACA257BF0001F5218/\\$File/PA%20Rec%200-5%20yo%20-%20Web%20printable%20version.pdf](http://www.health.gov.au/internet/main/publishing.nsf/content/9D831D9E6713F92ACA257BF0001F5218/$File/PA%20Rec%200-5%20yo%20-%20Web%20printable%20version.pdf)
- The Public Health Advisory Committee. (2010). *The Best Start in Life: Achieving effective action on child health and wellbeing*. Retrieved from <http://nhc.health.govt.nz/system/files/documents/publications/the-best-start-in-life-21may.pdf>
- Timmons, B. W., LeBlanc, A. G., Carson, V., Connor Gorber, S., Dillman, C., Janssen, I., . . . Tremblay, M. S. (2012). Systematic review of physical activity and health in the early years (aged 0–4 years). *Applied Physiology, Nutrition, and Metabolism*, 37(4), 773-792. doi:10.1139/h2012-070
- Tipene-Leach, D., Hutchison, L., Tangiora, A., Rea, C., White, R., Stewart, A., & Mitchell, E. (2010). SIDS-related knowledge and infant care practices among Maori mothers. *New Zealand Medical Journal*, 123(1326), 88-96. Retrieved from <http://www.nzma.org.nz/journal/123-1326/4445/>

- Toi Tangata. (n.d.). *He Pi Ka Rere*. Retrieved November 9, 2016, from <http://toitangata.co.nz/he-pi-ka-rere>
- Toi Te Ora Public Health Service Bay of Plenty District Health Board. (2014). *Building Blocks for Under 5s*. Rotorua: Bay of Plenty District Health Board.
- Tomayko, E. J., Prince, R. J., Hoiting, J., Braun, A., LaRowe, T. L., & Adams, A. K. (2017). Evaluation of a multi-year policy-focused intervention to increase physical activity and related behaviors in lower-resourced early care and education settings: Active Early 2.0. *Preventive Medicine Reports*, 8, 93-100. doi:10.1016/j.pmedr.2017.08.008
- Townsend, N., & Foster, C. (2011). Developing and applying a socio-ecological model to the promotion of healthy eating in the school. *Public Health Nutrition*, 16(06), 1101-1108. doi:10.1017/S1368980011002655
- Trost, S. G., Ward, D. S., & Senso, M. (2010). Effects of child care policy and environment on physical activity. *Medicine and Science in Sports and Exercise*, 42(3), 520-525. doi:10.1249/mss.0b013e3181cea3ef
- United States Department of Health and Human Services. (2008). 2008 Physical activity guidelines for Americans. Retrieved from <https://health.gov/paguidelines/pdf/paguide.pdf>
- Vanderloo, L. M., Tucker, P., Johnson, A. M., Burke, S. M., & Irwin, J. D. (2015). Environmental influences on preschoolers' physical activity levels in various early-learning facilities. *Research Quarterly for Exercise and Sport*, 86(4), 360-370. doi:10.1080/02701367.2015.1053105
- Vandevijvere, S., & Swinburn, B. (2014). Reducing childhood overweight and obesity in New Zealand through setting a clear and achievable target. *New Zealand Medical Journal*, 127(1406), 10-15. Retrieved from <http://www.nzma.org.nz/journal/123-1326/4445/>
- Ventura, A., & Birch, L. (2008). Does parenting affect children's eating and weight status? *International Journal Behavioural Nutrition and Physical Activity*, 5(15). doi:10.1186/1479-5868-5-15
- Waikato District Health Board. (2009, 26/06/2014). *Future Focus*. Retrieved March 30, 2014, from <http://www.waikatodhb.health.nz/about-us/waikato-health-needs/future-focus/>
- Waikato District Health Board. (2013). Waikato District Health Board Annual Plan 2013-2014. Retrieved from <http://www.waikatodhb.health.nz/assets/about-us/key-publications/Annual-Plan.pdf>
- Wake, M., Hardy, P., Canterford, L., Sawyer, M., & Carlin, J. B. (2006). Overweight, obesity and girth of Australian preschoolers: Prevalence and socio-economic correlates. *International Journal of Obesity*, 31, 1044. doi:10.1038/sj.ijo.0803503
- Ward, D., Benjamin, S. E., Ammerman, A. S., Ball, S. C., Neelon, B. H., & Bangdiwala, S. I. (2008). Nutrition and Physical Activity in Child Care: Results

from an Environmental Intervention. *American Journal of Preventive Medicine*, 35(4), 352-356. doi:10.1016/j.amepre.2008.06.030

- Ward, D., Hales, D., Haverly, K., Marks, J., Benjamin, S., Ball, S., & Trost, S. (2008). An instrument to assess the obesogenic environment of child care centers. *American Journal of Health Behavior*, 32(4), 380-386. doi:10.5993/AJHB.32.4.5
- Waters, E., de Silva-Sanigorski, A., Burford, B. J., Brown, T., Campbell, K. J., Gao, Y., . . . Summerbell, C. D. (2005). Interventions for preventing obesity in children (Review). *Cochrane Database of Systematic Reviews*(12). doi:10.1002/14651858.CD001871.pub3
- Waters, E., de Silva-Sanigorski, A., Hall, B. J., Brown, T., Campbell, K. J., Gao, Y., . . . Summerbell, C. D. (2011). Interventions for preventing obesity in children (Review). *Cochrane Database of Systematic Reviews*(12). doi:10.1002/14651858.CD001871.pub3
- Williams, M. H. (2014). *Te Rongoa Kakariki: Kanohi-ki-te-kanohi, e pai ana?* (Doctoral thesis, Auckland University of Technology, Auckland, New Zealand). Retrieved from <https://aut.researchgateway.ac.nz/handle/10292/8648>
- Wolfenden, L., Finch, M., Nathan, N., Weaver, N., Wiggers, J., Yoong, S. L., . . . Gillham, K. (2015). Factors associated with early childhood education and care service implementation of healthy eating and physical activity policies and practices in Australia: A cross-sectional study. *Translational Behavioral Medicine*, 5(3), 327-334. doi:10.1007/s13142-015-0319-y
- Wolfenden, L., Hardy, L. L., Wiggers, J., Milat, A. J., Bell, C., & Sutherland, R. (2011). Prevalence and socio-demographic associations of overweight and obesity among children attending child-care services in rural and regional Australia. *Nutrition & Dietetics*, 68(1), 15-20. doi:10.1111/j.1747-0080.2010.01487.x
- Wolfenden, L., Jones, J., Williams, C. M., Finch, M., Wyse, R. J., Kingsland, M., . . . L., Y. S. (2016). Strategies to improve the implementation of healthy eating, physical activity and obesity prevention policies, practices or programmes within childcare services. *Cochrane Database of Systematic Reviews*, 2012(10), 1-93. doi:10.1002/14651858.CD011779.pub2.
- Wolfenden, L., Neve, M., Farrell, L., Lecathelinais, C., Bell, C., Milat, A., . . . Sutherland, R. (2011). Physical activity policies and practices of childcare centres in Australia. *Journal of Paediatrics and Child Health*, 47(3), 73-76. doi:10.1111/j.1440-1754.2010.01738.x
- World Health Organization. (1986). *Ottawa Charter for Health Promotion*. Retrieved March 28, 2014, from <http://www.who.int/healthpromotion/conferences/previous/ottawa/en/>
- World Health Organization. (2004). *Global strategy on diet, physical activity and health*. Retrieved April 15, 2014, from [http://www.who.int/dietphysicalactivity/strategy/eb11344/strategy\\_english\\_web.pdf?ua=1](http://www.who.int/dietphysicalactivity/strategy/eb11344/strategy_english_web.pdf?ua=1)

- World Health Organization. (2013). *Global action plan for the prevention and control of noncommunicable diseases 2013-2020*. Retrieved from [http://apps.who.int/iris/bitstream/10665/94384/1/9789241506236\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/94384/1/9789241506236_eng.pdf)
- World Health Organization. (2016). *Report of the commission on ending childhood obesity*. Retrieved September 25 2016, from [http://apps.who.int/iris/bitstream/10665/204176/1/9789241510066\\_eng.pdf?ua=1&ua=1](http://apps.who.int/iris/bitstream/10665/204176/1/9789241510066_eng.pdf?ua=1&ua=1)
- World Health Organization. (n.d.). *Childhood obesity and overweight*. Retrieved February 8, 2014, from <http://www.who.int/dietphysicalactivity/childhood/en/>
- Yarber, L., Brownson, C. A., Jacob, R. R., Baker, E. A., Jones, E., Baumann, C., . . . Brownson, R. C. (2015). Evaluating a train-the-trainer approach for improving capacity for evidence-based decision making in public health. *BMC Health Services Research, 15*, 1-10. doi:10.1186/s12913-015-1224-2
- Yoong, S. L., Finch, M., Nathan, N., Wiggers, J., Lecathelinais, C., Jones, J., . . . Wolfenden, L. (2016). A longitudinal study assessing childcare services' adoption of obesity prevention policies and practices. *Journal of Paediatrics and Child Health, 52*(7), 765-770. doi:10.1111/jpc.13252
- Young, L., McLennan, S., Kirk, M., Rush, E. (2016). Residential mobility: Diluting the potential of public health programmes. *New Zealand Medical Journal, 129*(1140), 133-134. Retrieved from <https://www.nzma.org.nz/journal>
- Zask, A., Adams, J. K., Brooks, L. O., & Hughes, D. F. (2012). Tooty Fruity Vegie: An obesity prevention intervention evaluation in Australian preschools. *Health Promotion Journal of Australia, 23*(1), 10-15. doi:10.1071/HE12010