

Outcome and Impact Evaluation of Romp & Chomp

Preliminary Findings



WHO Collaborating Centre for Obesity Prevention, Deakin University

September, 2009



DEAKIN
UNIVERSITY AUSTRALIA



Department of
Health

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We would like to acknowledge the significant contributions made to this evaluation by others in the Deakin University team: Colin Bell, Melanie Nichols, Florentine de Groot, Lauren Carpenter, Narelle Robertson, Anne Simmons, Karen Stagnitti, Cheryl-Ann Bennett and a large number of students over the years.

We would also like to acknowledge the contribution and support from the organisations, services and settings involved in both the intervention and evaluation and the time taken by individuals to participate.

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Executive Summary

Romp & Chomp was a whole of community obesity prevention demonstration project that targeted approximately 12,000 preschool children under 5 years of age and their families within the City of Greater Geelong (CoGG) and the Borough of Queenscliff (BoQ). The intervention was conducted from 2004 to 2008 and was designed, planned and implemented as a partnership between several key organisations, particularly Barwon Health, CoGG, Geelong Kindergarten Association, Leisure Networks, Department of Human Services, Deakin University (DU), Bellarine Community Health, Dental Health Services Victoria and *Kids Go For Your Life*. Deakin University also provided support, training and evaluation for the project.

Funding was received from the Department of Human Services, the Department of Education and Early Childhood Development (formerly Statewide Services, Office for Children), CoGG, Barwon Health, DU, Leisure Networks, VicHealth, and the Australian Research Council. Substantial in-kind contributions and resources were also provided by these organisations and all other partner organisations. The project funding for implementation was \$111,000 over 4 years (2004-8).

The overall aim of the Romp & Chomp intervention was to increase the capacity of the Geelong community to promote healthy eating and active play and to achieve healthy weight in children less than 5 years of age. The overall aim was supported by eight objectives developed through community consultation and stakeholder engagement. The intervention itself was complex and ambitious, involving multiple strategies and multiple settings. There was a strong focus on capacity building and developing sustainable changes in early childhood environments, with particular attention on the policy, socio-cultural, and physical aspects of the environments.

Design/Methods

A comprehensive, multi-level evaluation was conducted using a quasi-experimental design with comparison sample. The comparison sample was drawn from the rest of Victoria and included local government areas matched for socio-economic status (SES) and population size. A number of evaluation methods were used.

Questionnaires were used to collect policy, socio-cultural and physical environmental data in the early childhood settings of Long Day Care (LDC), Family Day Care (FDC) and kindergartens (preschools). A short Eating and Physical Activity Questionnaire (EPAQ) was used to collect behavioural data on children's eating and activity from parents when they attended for their Maternal Child Health (MCH) 'Key ages and stages' (KA&S) health check at both 2 and 3.5 years of age. Child anthropometry and demographics (weight, height, age, gender and SES) were obtained from the universal MCH child health data in 2004 and 2007 for Geelong and a Victorian State sample. The evaluation was complex and repeat cross-sectional environmental and behavioural data were collected from the intervention community (Geelong) only (see table 1). Only post-intervention or follow-up data were collected in the comparison communities for environmental and behavioural data. The anthropometric data were available for both the intervention and comparison communities at baseline (2004) and follow-up (2007), and is repeat cross-sectional in nature. The data were used to determine body mass index (BMI), standardised body mass index (zBMI) and

weight status (classification as healthy weight, overweight or obese) for children who attended their MCH KA&S health checks at 2 and 3.5 years.

Table 1: Data collected for the evaluation of Romp & Chomp

Data Type	Baseline		Follow-up	
	I	C	I	C
Environmental Surveys				
• LDC	19	0	10	161
• Kindergartens	38	0	41	223
• FDC	44	0	28	347
Behavioural survey (EPAQ)	950	0	375	786
Anthropometry				
• 2 year olds	1,587	17,732	1,611	21,911
• 3.5 year olds	1,191	14,647	1,239	19,050

I=Intervention sample, C=Comparison sample

Key Findings

The key findings in the intervention sample compared to the comparison sample from the **child anthropometric data** include:

- a statistically significant 2.6% reduction in the prevalence of overweight/obesity in the 2 year old (yo) intervention sample (overweight/obesity reduced from 17.1% to 14.6%)
- a statistically significant 3.4% reduction in the prevalence of overweight/obesity in the 3.5 yo intervention sample (overweight/obesity reduced from 18.6% to 15.2%)
- significant shift in the distribution of weight status (healthy weight, overweight, obesity) in the intervention sample at follow-up, to a higher proportion of children being of healthy weight and less being overweight or obese
- at baseline, the intervention sample were significantly heavier (higher mean weight, BMI and zBMI) than the comparison sample for both age groups
- significant reductions in the population mean weight, BMI and zBMI in the intervention sample in the 3.5 yo sample resulted in the intervention sample of 3.5 yo children no longer being significantly heavier than the comparison sample at follow-up
- although there were reductions in mean weight, BMI and zBMI in the 2 yo sample at follow-up, they remained significantly heavier compared to the comparison sample, although there was a significantly lower proportion of 2 yo children who were overweight/obese at follow-up

The key findings in the intervention sample compared to the comparison sample from the **child behavioural surveys** (all ages combined) include:

- a significantly lower intake of packaged snacks, fruit juice, and cordial, and a significantly higher frequency of vegetable intake in the intervention sample
- a significant increase in the intake of vegetables, fruit, water, plain milk, and a significant decrease in the intake of fruit juice and cordial from baseline to follow-up in the intervention sample
- no difference in amount of TV watched

The key findings from the **environmental questionnaires in early childhood settings** in the intervention sample compared to the comparison sample include the following:

- no sweet drinks (soft drinks, fruit juice, fruit drinks or cordial) in any of the early childhood settings (ECS) in the intervention sample (not different from the comparison sample)
- substantial adoption and implementation of comprehensive healthy eating policies that restrict obesity-promoting foods and drinks and promote healthy foods and water.
- the adoption of healthy food guidelines in services where parents provide the foods for their child, and the requirement that parents adhere to the guidelines
- increased nutrition and physical activity resources available for early childhood workers
- reduced use of unhealthy fundraising activities and food not used as a reward for children in each of the ECSs
- higher levels of membership and award status of the *Kids Go For Your Life* program

Implications

The Romp & Chomp intervention adopted whole-of-community and settings-based approaches to create environments for young children that were less obesogenic and promoted the development and maintenance of a healthy body weight. The results from this evaluation show that the intervention has significantly reduced the prevalence of childhood overweight and obesity in the Geelong community.

As a result of Romp & Chomp and its partnership with Smiles for Miles and *Kids Go For Your Life*, and implementation of programs such as Start Right, Eat Right, the early childhood settings in Geelong consistently promote healthy eating and physical activity for young children; children's diets have improved and they are drinking considerably less sweet drinks; and there has been a reduction in the prevalence of childhood overweight and obesity. In addition to improving children's health now, the intervention may prevent the development of overweight and obesity throughout the child's lifespan by establishing healthier behaviours early. Further, the implementation of sustainable policy-based strategies means that the intervention has the potential to benefit future cohorts of children, which is particularly significant given that the Geelong community is socio-economically disadvantaged and has a considerable proportion of children at high risk of poor health outcomes.

Romp & Chomp is the first successful community-based obesity prevention intervention in early childhood. The success of Romp & Chomp shows that we can take action to prevent childhood obesity and that young children's health can be improved using a community-wide and settings-based approach. However this requires long term, committed partnerships and working with a range of children's health, education and care settings across the whole community.

Background

Overweight and obesity is a major global public health problem because of its high and rapidly increasing prevalence and its association with a large range of chronic diseases [1-4]. The condition can lead to significantly lower quality of life and for the first time in centuries the current generation's life expectancy might be lower than that of the last generation [5].

The problem of excess adiposity and its consequences do not only affect adults, but also young children. Research shows that in the year 2000, 22 million children of 5 years or younger were overweight or obese worldwide [6]. In Australia childhood obesity has not been well documented, with the last national surveys conducted in 2007 [7] and in 1995 [8] prior to that. The combined prevalence of obesity and overweight among children aged 2-16 in the 2007 survey was 23% [7]. The health status in adults is of considerable concern and a recent report about Australian adults stated that 72% of all middle-aged males and 58% of all middle-aged females are overweight or obese [9]. But because it has been proven to be difficult in adults to reduce weight once overweight is established, children are considered the priority population for intervention strategies in obesity prevention. In addition, children are thought to be more accessible through the educational and care settings [10] and there is emerging evidence that early childhood settings present a key opportunity for developing and evaluating effective obesity prevention strategies and programs [11, 12]. To date, however there is a shortage of long-term community-wide interventions that aim to prevent childhood obesity in early childhood [13].

In the context of increasing childhood obesity and the lack of effective prevention strategies, the Deakin University (DU) Sentinel Site for Obesity Prevention was established in 2002 in the Barwon-South Western Region with funding from the Department of Human Services (DHS) and the Department of Health and Ageing. Subsequently, obesity prevention resources and expertise were focused within the BSW region to trial and evaluate innovative demonstration projects for obesity prevention. This sentinel site, which was part of the WHO Collaborating Centre for Obesity Prevention, supported and evaluated three community-based obesity prevention demonstration projects. Romp & Chomp was one of these projects.

Romp & Chomp was a community-based and community-wide obesity prevention project conducted in the City of Greater Geelong (CoGG) and the Borough of Queenscliffe (BoQ) targeting all children aged 0-5 years (approximately 12,000) and their families. The project funding for implementation was \$111,000 over 4 years (2004-8), and implementation activities were strongly focused on capacity building and involved predominately environmental and settings based strategies. In Romp & Chomp capacity building included bringing leadership, training and funding into the community (inputs) as catalysts for a cyclic and expanding process of community and organisational change [14].

In 2003, an interim steering committee was formed from a collaboration between DHS, DU, Barwon Health, CoGG, Geelong Kindergarten Association (GKA) and Leisure Networks and it was determined that one demonstration project would support healthy eating and active play in children under 5 years within the Geelong region. The Romp & Chomp project was subsequently developed with extensive community consultation and engagement.

The central aim of Romp & Chomp was **to increase the capacity of the Geelong community to promote healthy eating and active play and to achieve healthy weight in under 5s.**

This aim was to be achieved through eight project objectives:

- Objective 1: To increase the capacity of relevant Geelong organisations to promote healthy eating and active play.
- Objective 2: To increase the awareness of the project's key messages in homes and early childhood settings.
- Objective 3: To evaluate the process, impact and outcomes of the project.
- Objective 4: To significantly decrease consumption of high sugar drinks and promote consumption of water and milk.
- Objective 5: To significantly decrease consumption of energy dense snacks and increase consumption of fruit and vegetables.
- Objective 6: To significantly increase active play at home and decrease TV viewing time.
- Objective 7: To increase structured active play in kindergarten and child care settings.
- Objective 8: To achieve an integrated population growth monitoring program within Maternal and Child Health

(Note: Significantly means statistically significant.)

The behavioural strategies were targeted to the community and early childhood settings under four key messages;

- 1) Daily active play
- 2) Daily water and less sweet drinks
- 3) Daily fruit and vegetables, and
- 4) Less screen time.

The project logic model (see Figure 1) provides the framework for the program planning, implementation, and evaluation. This report details the comprehensive and multi-level evaluation of the Romp & Chomp intervention project.

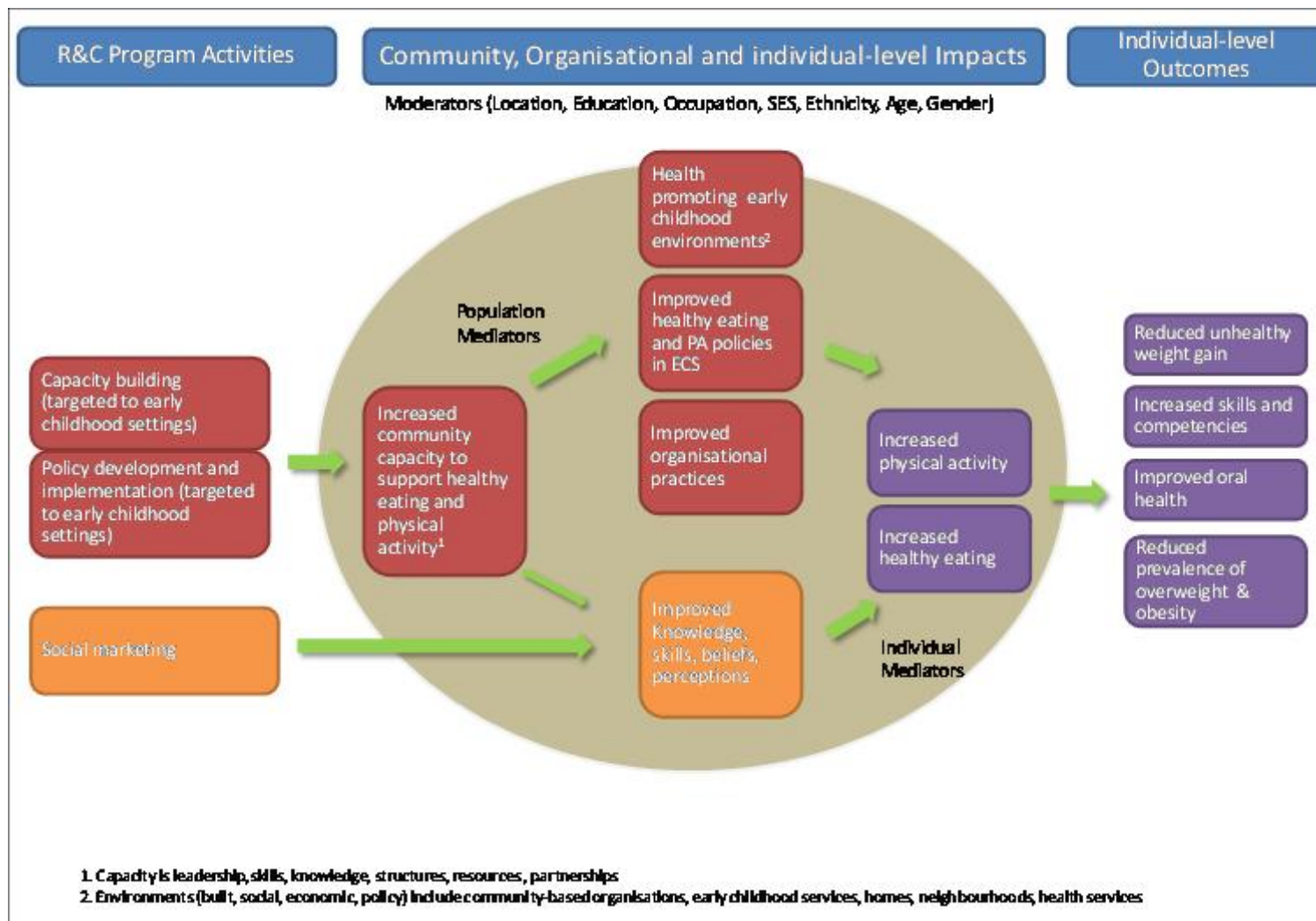


Figure 1: Romp & Chomp project logic model

Methods

Romp & Chomp intervention program

Romp & Chomp was a whole of community, obesity prevention demonstration project that targeted approximately 12,000 preschool children under 5 years of age and their families within the City of Greater Geelong (CoGG) and the Borough of Queenscliffe (BoQ). In 2003, an interim steering committee was formed from a collaboration between Victorian Government Department of Human Services (DHS) and Deakin University (DU), and it was determined that one demonstration project would support healthy eating and active play in children under 5 years within the Geelong region. The Romp & Chomp project was subsequently developed and the intervention was conducted from 2004 to 2008. The intervention program was designed, planned and implemented by several key organisations, particularly Barwon Health (Dental and Allied Health), CoGG, Geelong Kindergarten Association, Leisure Networks, DHS, Deakin University (DU), Bellarine Community Health, Dental Health Services Victoria, and *Kids Go For Your Life*; with DU also providing support, training and evaluation. Funding was received from the Department of Human Services, CoGG, Barwon Health, DU, Leisure Networks, VicHealth and the Australian Research Council. A management committee of stakeholders, oversaw the implementation of the action plan and assisted the project coordinators (employed through Barwon Health and DHS) to fulfil their duties.

The project had a strong focus on developing sustainable changes in areas of policy, socio-cultural, physical and economic environments. An action plan was developed in 2003/4 by the steering committee with extensive community consultation and stakeholder engagement. The action plan had an overall aim and then articulated eight specific project objectives, with a number of strategies detailed to achieve the objectives. Consistent with the other Sentinel Site for Obesity Prevention (SSOP) demonstration projects, the Romp & Chomp project objectives were either behavioural (focusing on active play, active transport, fruit and vegetables, water, television, car transport, energy dense snacks, and sweet drinks); standard objectives (focusing on awareness campaign, monitoring and evaluation, and community capacity); or innovation objectives (focusing on an integrated population growth monitoring program, Start Right Eat Right training in long day care, and structured active play in early childcare settings).

Table 2 provides a summary of the intervention strategies employed to achieve the behavioural objectives of Romp & Chomp. Detailed process reports are available elsewhere with the full implementation activities.

Table 2: Summary of the awareness raising and behavioural objectives and strategies implemented in Romp & Chomp

<p>Objective 2: To increase awareness of the project's key messages in homes and early childhood settings</p> <ul style="list-style-type: none"> • Overarching campaign message: "Children under 5 need daily (1) Active play (2) Healthy food choices provided" • Key messages: "Daily active play", "Less screen time", "More fruit and vegetables", "More water" • Communication plan and social marketing plan • Nutrition and physical activity resources for parents and early childhood service staff from reputable and compatible sources. • Series of poster, postcards and brochures promoting overarching campaign and key messages (see above). • Over 1000 postcards by December 2006 for dissemination to all families presenting to Maternal and Child Health, Long Day Care, and Family Day Care. • Approximately 1000 resource folders to 38 kindergartens by December 2006 to provide one to each family. • Resource folders to a total of 46 kindergartens in total by April 2008 • Community Allied Health and oral health professionals distribute folders to kindergartens with suggestions on possible applications. • All resource materials made available online for any Early Childhood (EC) worker to access • 1818 water bottles to 31 kindergartens in late 2006 (for 2007). • 2531 water bottles to 43 kindergartens in late 2007 (for 2008). • Additional water bottles for children attending Long Day Care and Family Day Care in April 2007. • 2194 lunch bags to 38 kindergartens in 2007 and 2826 lunch bags to 47 kindergartens in 2008. • 'Sweet drink demonstration' resource to 76 Kindergartens during 2005 to 2008. • 926 family members attend a kindergarten 'sweet drink demonstration' in 2008. • 'Energy dense foods display' produced in collaboration with dietetic staff and disseminated to all kindergartens and LDC centres for display.
<p>Nutrition Objectives</p> <p>Objective 4: To significantly decrease high sugar drinks and promote the consumption of water and milk</p> <p>Objective 5: To significantly decrease energy dense snacks and increase consumption of fruit & vegetables</p> <ul style="list-style-type: none"> • Use of benchmarks to inform policy, including the resources from like projects: Best Start, Start Right Eat Right [SRER], Smile for Miles [SAM]) and the Australian Guide to Healthy Eating (AGHE) for children. • Food safety regulations identified and supported • Production of three separate optional policies for kindergartens: (1) Fruit and Vegetable snack only (2) Fruit, Vegetable and Healthy Sandwich, and (3) Fruit, Vegetable, Sandwich and Healthy Alternative. All were pilot tested and finalised • Development and adoption of an overarching 'Health and Wellbeing policy' for the Geelong Kindergarten Association in 2007/8. • Inclusion of policies into parent handbooks/booklets • Collaboration with Dental Health Services Victoria (DHSV) who provided resources (lunch boxes, drink bottles and social marketing material for kindergarten children). • Collaboration with <i>Kids Go For Your Life</i>(KGFYL) from 2007 for healthy eating and drink choices resources • Engagement of dental and primary care staff into the Romp & Chomp project. • EC settings staff trained to reinforce nutrition messages and healthy eating choices for under 5s. • Kindergartens given support from allied and dental health professionals to engage with parents around healthy eating and to provide support for staff to adopt and implement health and wellbeing/nutrition policies. • A target of all kindergartens in the region to become members (by 2007) of the KGFYL program. • Community Health workers, allied health professionals trained to support kindergartens to undertake the health promotion activities. • Quarterly inserts into Early childhood newsletters • Festival presence (e.g.: Poppy kettle and Barwon Heads children's festivals, Corio Community Voice Conference, Geelong Kindergarten Conferences) • Email, phone or site visit access to dietitian and other allied health professionals for early childhood workers as required • Nutrition and drinks media release • Promotional Materials (eg. balloons, stickers, posters, postcards etc) produced and distributed
<p>Activity objectives</p> <p>Objective 7: To increase structured active play in kindergarten and day care</p> <ul style="list-style-type: none"> • Development, pilot testing and implementation of a physical activity policy for EC care and educational settings • Inclusion of policies into parent booklets • Collaboration with <i>Kids Go For Your Life</i> from 2007 for active play resources • 'Structured Active Play Program' (SAPP) developed with input from EC workers, pilot tested, produced and disseminated to all EC Settings in City of Greater Geelong (CoGG)

- Settings staff trained in fundamental movement skills and ways to provide active play opportunities for young children.

Professional Development for early childhood staff (active play workshops)

- Training included how to use the SAPP in the various settings and adaptation for each setting.
- Active play demonstrations at kindergartens in CoGG (provided by allied health and dental professionals)
- Active Play Newsletter (double sided A4- one side with information for parents the other side with games for children around active play)
- Quarterly inserts into Early childhood newsletters
- Structured Active Play Program training incorporated into certificate III for early childhood workers at Gordon TAFE, Geelong
- Festival presence where active play games were demonstrated and encouraged children and parents to participate (e.g.: Poppy kettle and Barwon heads children's festivals, Corio Community Voice Conference)
- Email, phone or site visit access to occupational therapists for early childhood workers as required around implementing active play program
- Active Play Media release
- Promotional Materials (eg. balloons, stickers, posters, postcards etc) produced and distributed

Objective 6: To significantly increase home/ family-based active play and decrease television-viewing time

- Overall needs assessment evaluation identifying factors found influencing quality and quantity of screen time viewing.

- Literature Review/ Mind Mapping Exercise/ Focus Groups with parents
- Overall summary of recommendations for possible future strategies directed at reducing screen time/exposure in children
- Development of posters and postcards
- Distribution of posters and postcards

Across all Strategies

- Romp & Chomp launch with the Minister for Children (2005)

- Media Coverage and responses to articles for 2007 (implementation phase)
- Awareness raising campaign (e.g. screen savers Barwon Health, CoGG and other partners, information packs for parents, fliers, media releases, radio time on PBS)
- Allied Health training package developed and implemented
- Partnership with Smiles for Miles- oral health program to increase reach into settings and train allied health and dental workers to support local early childhood settings to implement each strategy in their setting
- Festival Presences in all areas in CoGG (2006 and 2007)
- Presentations at early childhood conferences, health conferences etc
- Focus groups with all early childhood settings for each strategy to enable appropriate interventions
- Integration of policies and early childhood nutrition and active play into CoGG 'Municipal Health plan', Barwon Health 'strategic plan' and Bellarine community health service 'health promotion plan'.

Below is a brief summary of the evaluation design and methods used in this project. Full details are available elsewhere (Romp & Chomp Process report 3).

Evaluation design

The evaluation utilised a repeat cross-sectional quasi-experimental design with measures taken pre- and post intervention in Geelong (intervention sample) and a comparison sample drawn from local government areas (LGAs) across the rest of Victoria. The quasi-experimental design is viewed as useful for community-based interventions where it is not possible for randomization and also for testing the efficacy and feasibility of an intervention, as in this community-based demonstration project. The presence of a comparison sample greatly strengthens this experimental design as secular trends can also be accounted for.

The CoGG and BoQ were purposively selected as the intervention site as they had not previously been engaged in similar community-based projects, were geographically contained and had good infrastructure and community networks to support the intervention program. The comparison sample comprised a selection of other Victorian local government authority areas (LGAs, n=41) that had electronically-stored data on height and weight from the 2 and 3.5 year old Maternal and Child Health (MCH) 'Key ages and stages' (KA&S) health

check available at the required time. The initial sample of LGAs was based on population size, demographics and level of disadvantage (by SEIFA).

Survey methodology

A number of methods were employed to evaluate Romp & Chomp. Questionnaires were used to collect policy, socio-cultural and physical environmental data in the early childhood settings of Long Day Care (LDC), Family Day Care (FDC) and kindergartens (preschools). A short eating and activity survey was used to collect behavioural data on children's eating and activity from parents when they attended for their child's 2 year old or 3.5 year old MCH KA&S health check. Child anthropometry and demographics (weight, height, age, gender and SES) were obtained from the universal MCH child health data in 2004 and 2007 for Geelong and a Victorian/State sample.

Anthropometry measures:

Anthropometric measures used in this evaluation were from the routine height and weight data collected by experienced MCH nurses as part of routine KA&S health checks. The evaluation made use of data from the 2 and 3.5 year old KA&S health checks. Typically, the attendance in the CoGG by children for these visits is approximately 60% and 50% respectively (CoGG data).

Electronic data in Geelong, the intervention site was initially obtained through the CoGG. At follow-up, the required child anthropometric and demographic data were obtained through a collaboration with the Department of Education and Early Childhood Development. Data were obtained for 1,587 2 year olds and 1,191 3.5 year olds in the intervention sample and 17,732 2 year olds and 14,647 3.5 year olds in the comparison sample in 2004 (baseline), and 1,611 2 year olds and 1,239 3.5 year olds in the intervention sample and 21,911 2 year olds and 19,050 3.5 year olds in the comparison sample in 2007 (follow-up). This data were used to determine body mass index (BMI), standardised body mass index (zBMI) and weight status (using the IOTF Cole classification [15, 16]) for children who attended their 2 year old and 3.5 year old MCH KA&S health check.

Behavioural measures:

Eating and Physical Activity Questionnaire (EPAQ)

The EPAQ was developed and piloted for specific use in this project to examine eating and activity behaviours that are likely to be risk or protective factors for obesity development. EPAQ is a two page (one sheet, double-sided) survey which asks a series of general questions about the child and family and specific questions about diet and physical activity behaviours. The complete survey contained questions about demographic characteristics, activity levels and dietary information including the intakes of fruit juice, cordial and soft drink, water, plain milk, flavoured milk, vegetables, packaged snacks, fruit, chocolate and confectionary, and cake and sweet biscuits; the 'key foods' with established obesity-promoting or obesity-protective roles [17-20]. Parents completed the survey about their child's food and activity behaviours and they were provided with a series of pictures showing various foods and the recommended servings. For interpretation of the results, all beverages had a serving size of 250ml (1 cup), while the food categories vary but are based on the recommended serves in the Australian Guide to Healthy Eating [21]. Food category serving sizes were: 1 serve of fruit = 150g, vegetables = 75g, chocolate & confectionary = 25g, cake & sweet biscuits = 40g and packaged snacks = 25g.

Data on children's activity levels, preferences and time spent watching television were also captured using the EPAQ. Parents were asked to recall the amount of time their child spent

watching television, videos/DVDs or playing computer games during the previous day. Activity levels and activity preferences were also ascertained. The EPAQ had approximately 12 questions and took parents/carers approximately 10 minutes to complete.

The EPAQ was distributed to parents of children in the CoGG/intervention sample who visited the MCH nurse at the KA&S health check visits of 2 and 3.5 years old for 12 months in July 2005-June 2006 (baseline). In 2008, the EPAQ was distributed to parents of children in the intervention and comparison communities who visited the MCH nurse for their child's 2 or 3.5 year old KA&S health check during a 4 month timeframe (follow-up). At baseline 950 parent-reported child behavioural data were collected (intervention site only) and at follow-up 375 and 786 parent-reported child behavioural data were collected in the intervention and comparison samples, respectively.

Environmental Audits

The three environmental audit tools for Romp & Chomp contain measures of general characteristics of the settings (i.e., number of children cared for) as well as factors in the physical, policy, socio-cultural and economic environments of the setting that may enhance or inhibit efforts to promote healthy eating and active play for children who attend the setting. Several questions also enquire about staff training, resource requirements, confidence and perceived effectiveness in influencing parents. There were environmental audits developed for each of the LDC (approximately 50 questions), FDC (approximately 30 questions) and kindergarten (approximately 30 questions) settings. The questions were adapted from previously used environmental surveys and knowledge of the sector. The instruments were based on the ANGELO (Analysis Grid for Environments Linked to Obesity) framework of obesogenic environments described by Swinburn and Egger [22] incorporating the physical, economic, policy and socio-cultural aspects of environment. The audits were designed to be completed by the kindergarten and LDC directors and the FDC care providers.

The early childhood settings audits were posted directly to kindergartens and long day care centres in the Geelong region, and were sent to family day care providers on behalf of researchers by staff at the CoGG. In 2008 the distribution of the surveys was completed by the then Office for Children to kindergartens and LDC centres in 33 LGAs. Family day care surveys were distributed in 20 LGAs by the councils via the council FDC co-ordinator.

In 2005, baseline environmental and behavioural data were collected in the intervention community only and involved 19 LDC centres, 38 kindergartens, 44 FDC providers. In 2008, follow-up data were collected in the intervention community from 10 LDC centres, 41 kindergartens, and 28 FDC providers, and in the comparison sample from 161 LDC centres, 223 kindergartens and 347 FDC providers.

Socio-economic status

Socio-economic status was measured in two ways. The Socio-Economic Index For Areas (SEIFA) used was the index of relative socio-economic disadvantage derived from the residential or setting postcode. The index is based on data collected from the 2006 Australian census of population and housing, and incorporates variables such as income, education, occupation, living conditions, access to services and wealth. The SEIFA classification used was based on geographic postal area, with a higher score on the index indicating that an area is less disadvantaged. The second method was parent education level attained, as reported on the EPAQ.

Data analysis

Descriptive information (eg. means and frequencies) was used to summarise key variables. BMI (weight in kg/height in m²) and BMIz score (calculated against the 2000 CDC growth reference from the United States using the zanthro module in Stata) [23]. The International Obesity Task Force age-specific BMI cut-offs were also used to classify children's weight status into three categories: healthy weight, overweight or obese [15, 16]. Behavioural data was analysed using generalised linear modelling (glm) using a Poisson distribution, adjusted for child age, gender and maternal education level as a measure of socio-economic status (ses). Categorical weight status data were analysed using glm with child age, gender, height, ses in the model using a Poisson distribution. Continuous anthropometric data (weight, BMI and zBMI) were analysed using glm with child age, gender and height in the model. Analyses were conducted using Stata SE 10.0 (StataCorp, College Station, Texas, USA). In all cases, $p \leq 0.05$ was considered statistically significant.

Study Approval:

All applicable institutional and governmental regulations concerning the ethical use of human volunteers were followed during this research. This study was approved by the Deakin University Human Research Ethics Committee, the Department of Human Services, and the Department of Education and Early Childhood Development. The trial is also registered on the Australian Clinical Trials Registry (ACTRN12607000374460).

RESULTS SECTION 1:

ANTHROPOMETRIC OUTCOMES

The overarching aim of Romp & Chomp was related to promoting a healthy weight for young children. This aim was achieved as a result of the Romp & Chomp intervention.

- a statistically significant 2.6% reduction in the prevalence of overweight/obesity in the 2 year old (yo) intervention sample (overweight/obesity reduced from 17.1% to 14.6%)
- a statistically significant 3.4% reduction in the prevalence of overweight/obesity in the 3.5 yo intervention sample (overweight/obesity reduced from 18.6% to 15.2%)
- significant shift in the distribution of weight status (health weight, overweight, obesity) in the intervention sample at follow-up, to a higher proportion of children being of healthy weight and less being overweight or obese
- at baseline, the intervention sample were significantly heavier (higher mean weight, BMI and zBMI) than the comparison sample for both age groups
- although there were reductions in mean weight, BMI and zBMI in the 2 yo sample at follow-up, they remained significantly heavier compared to the comparison sample, although there was a significantly lower proportion of 2 yo children who were overweight/obese at follow-up
- significant reductions in the population mean weight, BMI and zBMI in the intervention sample in the 3.5 yo group resulted in the intervention sample of 3.5 yo children no longer being significantly heavier than the comparison sample at follow-up

The key results of the evaluation of anthropometric outcomes are presented for children who attended their 2 year old Maternal Child Health (MCH) KA&S health check (2 year olds) and those who attend for their 3.5 year old KA&S health check (3.5 year olds).

Children who attend for their 2 year old MCH KA&S health check

Key Results:

Figure 2 shows that at baseline (2004) 13% of children in the comparison sample and 17% in the intervention sample were classified as overweight or obese (overweight/obese). At follow-up, there was a 0.7% reduction in the comparison sample and a statistically significant 2.5% reduction in the prevalence of overweight/obesity in the intervention sample ($p=0.03$).

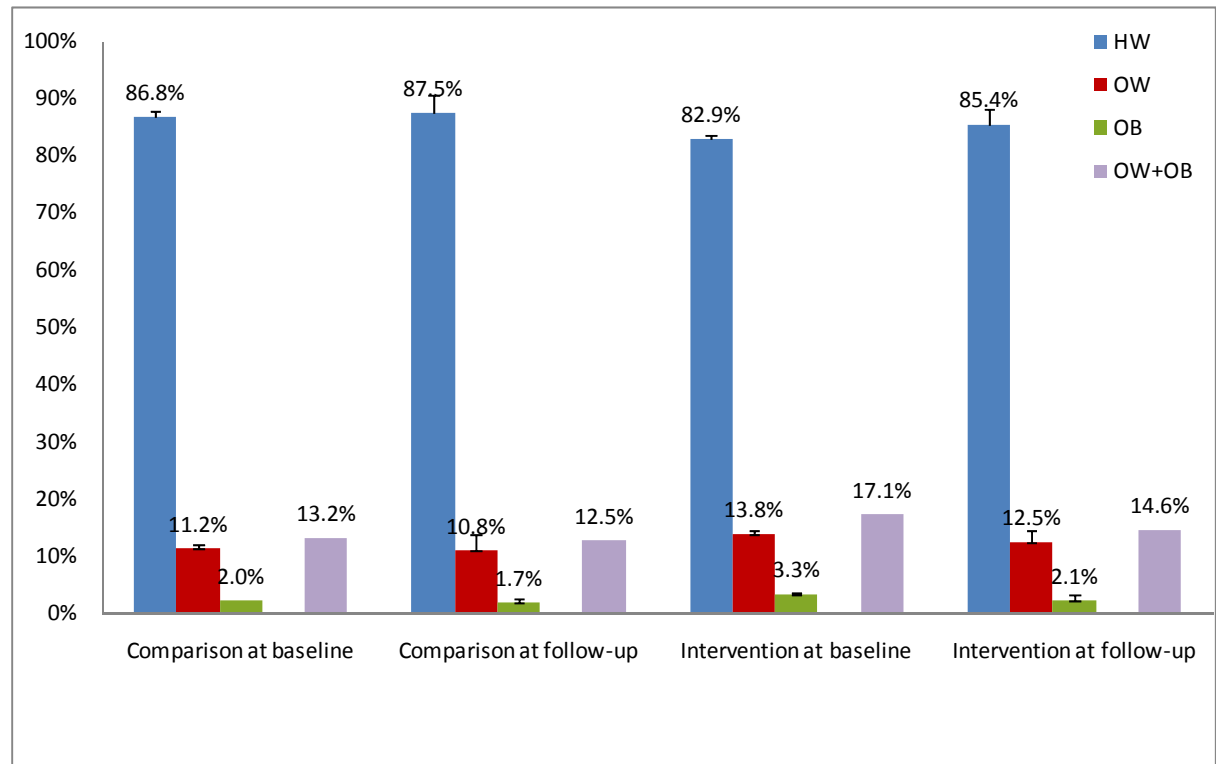
At baseline, weight, BMI, zBMI and weight status (coded as 1-3, healthy weight, overweight, obese) were all significantly higher in the intervention sample compared to the comparison sample. Although still higher at follow-up, there was a reduction in the size of the differences in all anthropometric indices between groups (as evidenced by the size of the regression coefficients in figure 3) and a significant shift in the distribution of weight status (health weight, overweight, obesity, $p=0.03$) in the intervention sample at follow-up, to a higher proportion of children being of healthy weight and less being overweight or obese.

Table 3: Demographic profile of participants (anthropometry) in the 2 year old sample

	Baseline (2004)		Follow-up (2007)	
	Comparison	Intervention	Comparison	Intervention
n	17,732	1,587	21,911	1,611
Female (%)	48.1	48.0	48.7	47.5
Child age (years ± sem#)	2.08 ± 0.001	2.07 ± 0.003	2.08 ± 0.001	2.06 ± 0.002
SEIFA percentile*	57.2 ± 0.2	49.2 ± 0.7	57.1 ± 0.2	49.6 ± 0.7

*from the 2006 census, index of relative disadvantage. Victorian percentile.

#sem: standard error of mean



HW=Healthy Weight, OW=Overweight, OB=Obese

Figure 2: Weight Status proportions in 2 year olds at baseline and follow-up

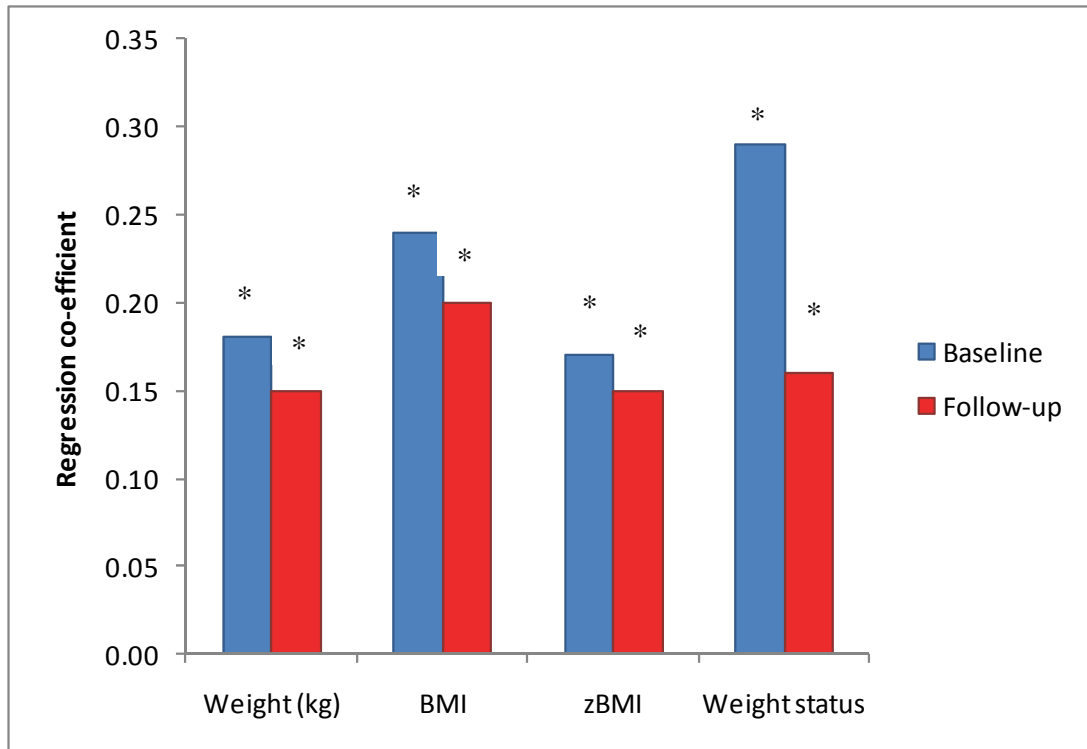


Figure 3: Regression coefficients showing the difference in anthropometric indices in the intervention sample compared to the comparison sample at baseline and follow-up, 2 year olds.

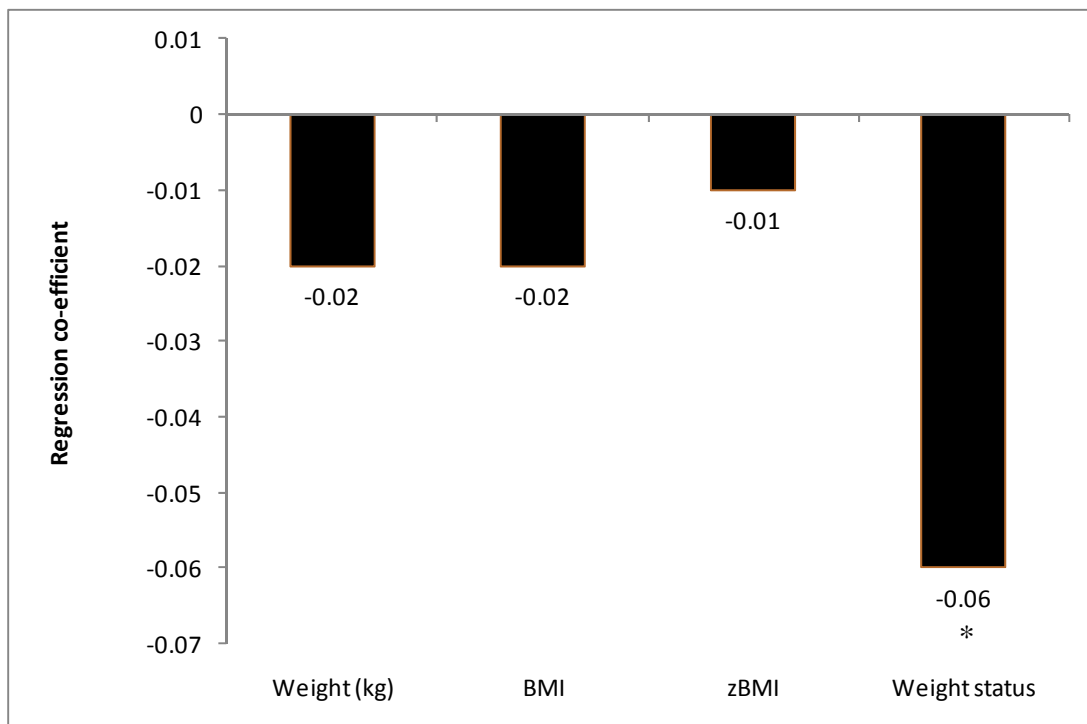


Figure 4: Regression co-efficients showing the differences in mean anthropometric indices at follow-up compared to baseline in the 2 year old intervention sample (*p<0.05).

Summary

At baseline children in Geelong were significantly heavier (by 0.18kg) and had a higher prevalence of overweight/obesity than the comparison sample. At follow-up (2007), Geelong 2 year old children still had significantly higher mean weight, BMI, zBMI and proportion of overweight/obesity than the comparison group however there was a reduction in the size of this difference by approximately 0.03 kg and 0.04 BMI units in 2 year olds children, and prevalence of overweight/obesity decreased by 2.6 percentage points; 1.9 percentage points more than the comparison sample.

Children who attend for their 3.5 year old MCH KA&S health check

Key Results:

Figure 4 shows that at baseline (2004) 16% of children in the comparison sample and 19% in the intervention sample were classified as overweight or obese (overweight/obese). At follow-up, there was a 0.7% reduction in the comparison sample and a statistically significant 3.4% reduction in the prevalence of overweight/obesity in the intervention sample ($p=0.02$).

At follow-up there were no differences between intervention and comparison samples for mean weight, BMI, zBMI or the distribution of child weight status (healthy weight, overweight, obese). This is an impressive result given that at baseline all of these indices (weight, BMI, zBMI and weight status) were significantly higher in the intervention sample compared to the comparison sample. This was the result of significant reductions in the mean weight, BMI, zBMI and weight status in the intervention sample (rather than an increase in the comparison sample).

Table 4. Demographics of participants (anthropometry) in the 3.5 year old sample

	Comparison	Intervention	Comparison	Intervention
<i>n</i>	14,647	1,191	19,050	1,239
<i>Female (%)</i>	48.8	49.5	49.5	47.7
<i>Child age (years ± sem)</i>	3.65 ± 0.001	3.63 ± 0.004	3.66 ± 0.001	3.63 ± 0.004
<i>SEIFA percentile*</i>	57.6 ± 0.3	50.6 ± 0.8	57.2 ± 0.2	51.4 ± 0.8

*from the 2006 census, index of relative disadvantage. Victorian percentile.

#Sem=standard error of mean

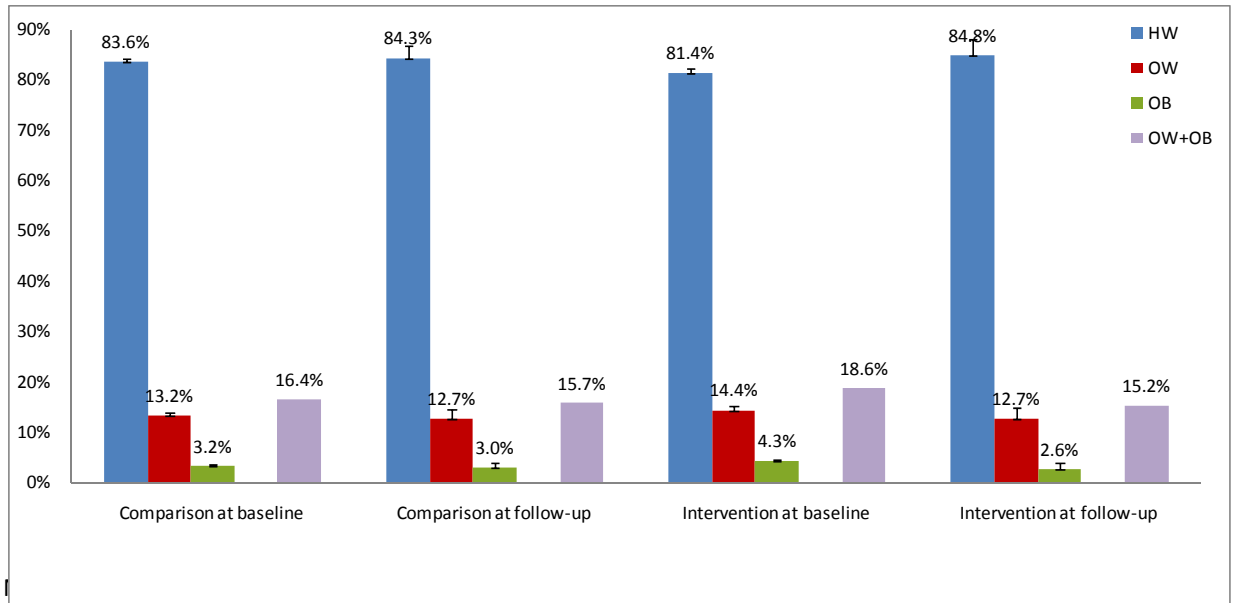
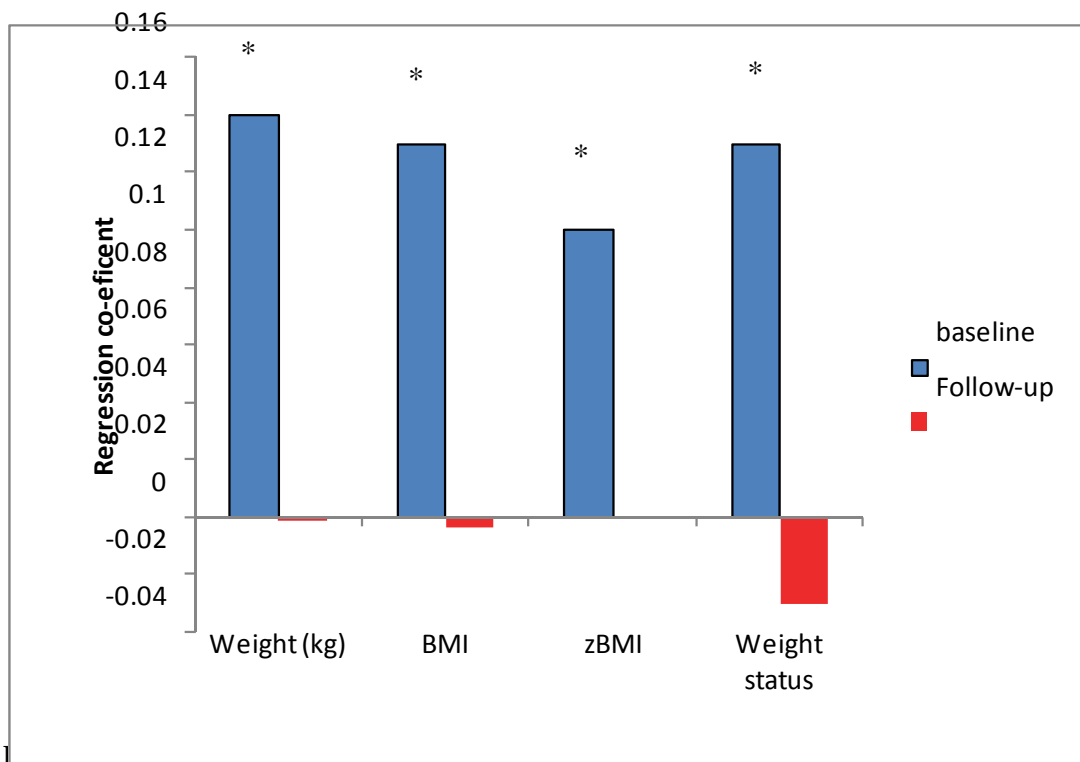


Figure 5: Weight status in comparison and intervention samples at baseline and follow-up (3.5 year olds)



intervention sample compared to the comparison sample at baseline and follow-up, 3.5 year olds.

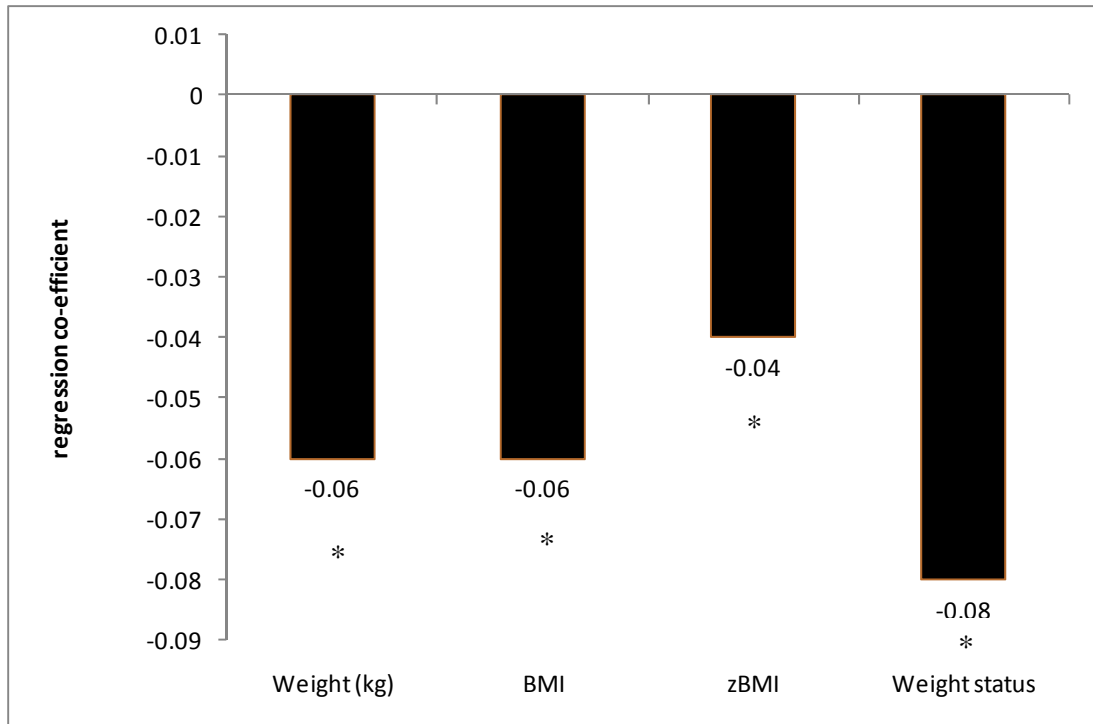


Figure 7: Regression co-efficients showing the differences in mean anthropometric indices at follow-up compared to baseline in the 3.5 year old intervention sample (*p,0.05).

Summary

At baseline children in Geelong were significantly heavier (by about 0.14kg), had significantly higher BMI and zBMI and had a higher prevalence of overweight/obesity than the comparison sample. At follow-up, children in the 3.5 year old group in Geelong were no longer significantly heavier than children in the comparison group, with a reduction in mean difference between the groups of approximately 0.14 kg and 0.13 BMI units, and prevalence of overweight/obesity decreased by 3.4 percentage points; 2.7 percentage points more than the comparison sample.

RESULTS SECTION 2: OBESITY RELATED BEHAVIOURS

Objectives 4 and 5 were to significantly reduce consumption of high sugar drinks and promote the consumption of water and milk; and to significantly decrease consumption of energy dense snacks and increase consumption of fruit and vegetables, respectively. All results are for the combined age groups.

- at follow-up, there was a significantly lower intake of packaged snacks, fruit juice, and cordial for the intervention sample compared to the comparison sample
- there was a significant increase in the intake of vegetables, fruit, water, plain milk, and a significant decrease in the intake of fruit juice and cordial from baseline to follow-up in the intervention sample
- the usual frequency of vegetable consumption also increased from baseline to follow-up in the intervention sample and was higher in the intervention sample compared to the comparison sample

Objective 6 was to increase active play at home and decrease TV viewing time. This objective was not achieved.

- at follow-up there was no difference in the number of occasions children were taken out to be physically active, with a mean of 3.5 occasions in both the intervention and comparison samples.
- at follow-up there was no difference in the amount of time that children watched TV/DVDs, with a mean of 105 and 104 minutes watched per day in the intervention and comparison samples, respectively

Intervention versus comparison sample at follow-up (combined age groups)

Key Results

From the regression models, with child age, gender and parental education level in the model the following results were seen.

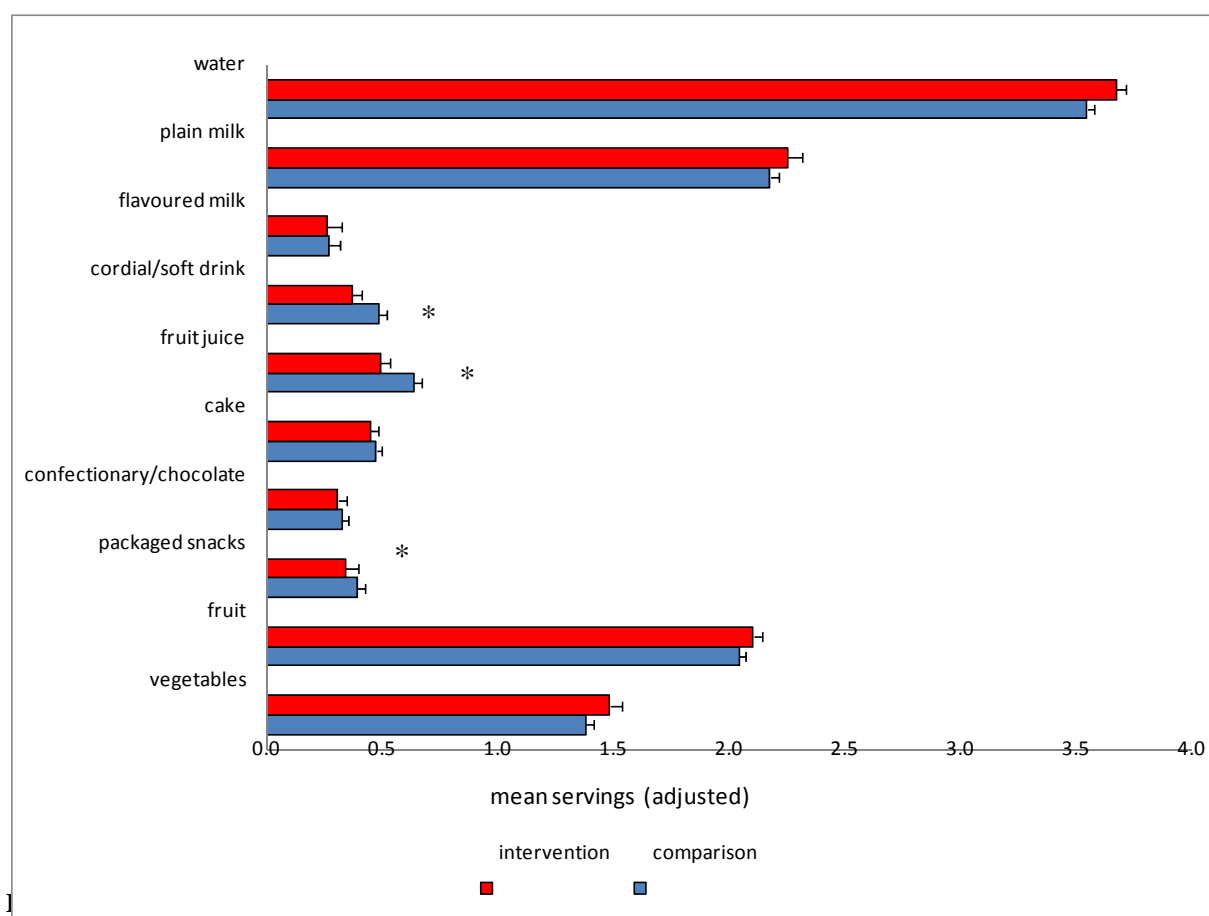
At follow-up, compared to the comparison sample there was a significantly lower intake of packaged snacks (by 0.23 serves), fruit juice (0.28 serves) and cordial (0.18 serves), and a higher usual frequency of vegetables consumption in the intervention sample. There was also a trend towards higher intake of vegetables in the intervention sample, although not statistically significant (0.10 serves, $p=0.07$). Intake of chocolates/lollies, cake/muffins/biscuits, water, milk were not different in the intervention and comparison samples (figure 8, table 6).

At follow-up there was no difference in the number of occasions children were taken to be physically active in the previous week or the amount of time children spent watching TV/DVDs in the intervention and comparison samples (table 7).

Table 5. Demographic profile of participants in the eating and activity questionnaire

	Comparison	Intervention	Comparison	Intervention
<i>n</i>	n/a	944	786	375
<i>Female (%)</i>	n/a	50.4	49.5	51.2
<i>Birth weight (kg, mean ± sem)</i>	n/a	3.5 ± 0.02	3.4 ± 0.02	3.5 ± 0.03
<i>Child age (years, mean ± sem)</i>	n/a	3.0 ± 0.03	2.8 ± 0.03	2.9 ± 0.04
<i>Maternal education level:</i>	n/a			
<i><secondary school (%)</i>	n/a	19.3	13.3	10.6
<i>Completed secondary school (%)</i>	n/a	22.1	20.6	23.7
<i>Tafe, diploma or technical qualification (%)</i>	n/a	20.1	21.7	18.9
<i>University degree (%)</i>	n/a	38.5	44.4	46.8

n/a-not available. No baseline data available for comparison sample



follow-up, adjusted for child age, gender and maternal education level (*p<0.05)

Table 6. Regression analysis showing the difference in servings in the intervention sample compared to comparison sample at follow-up (model includes child age, gender and maternal education)

<i>Vegetables</i>	0.10	0.07
<i>Packaged snacks</i>	-0.23	0.03
<i>Fruit</i>	0.07	0.14
<i>Chocolates/lollies</i>	-0.06	0.56
<i>Cake/muffins/biscuits</i>	0.02	0.82
<i>Fruit juice</i>	-0.28	<0.001
<i>Cordial</i>	-0.18	0.002
<i>Water</i>	0.02	0.64
<i>Plain milk</i>	0.01	0.88
<i>Flavoured milk</i>	-0.13	0.32
<i>Vegetables-usual frequency</i>	0.13	0.01
<i>Takeaways-usual frequency</i>	0.03	0.47

Table 7. Mean occasions of activity and screen time ‘yesterday’ for intervention and comparison samples

	Comparison	Intervention	Comparison	Intervention
<i>Number of times child taken to playground, park, pool etc last week</i>	-	3.5±0.01	3.5±0.02	3.5±0.02
<i>TV/DVD viewing time (mins)</i>	-	106.3± 0.76	103.8±0.88	104.6 ±1.25

Table 8. Regression analysis showing the difference in the number of occasions child taken for active play last week, and mean TV/DVD viewing time in the intervention sample compared to comparison sample at follow-up (model includes child age, gender and maternal education)

<i>Number of times child taken to playground, park, pool etc last week</i>	0.17	0.23
<i>TV/DVD viewing time (mins)</i>	-3.20	0.56

Baseline versus follow-up, Intervention sample (combined age groups)

Baseline behavioural data were only available for the intervention sample, and figure 9 and table 9 show a significant increase in the intake of vegetables (by 0.41 serves), fruit (0.52 serves), water (0.11 serves) plain milk (0.18 serves), and a significant decrease in the intake of fruit juice (0.49 serves) and cordial (0.23 serves). There were no statistically significant differences in the intake of packaged snacks, chocolates/lollies and cake/muffins/biscuits in the intervention sample (figure 9, table 9).

At follow-up there was no difference in the number of occasions children were taken to be physically active in the previous week or the amount of time children spent watching TV/DVDs from baseline in the intervention sample (table 10).

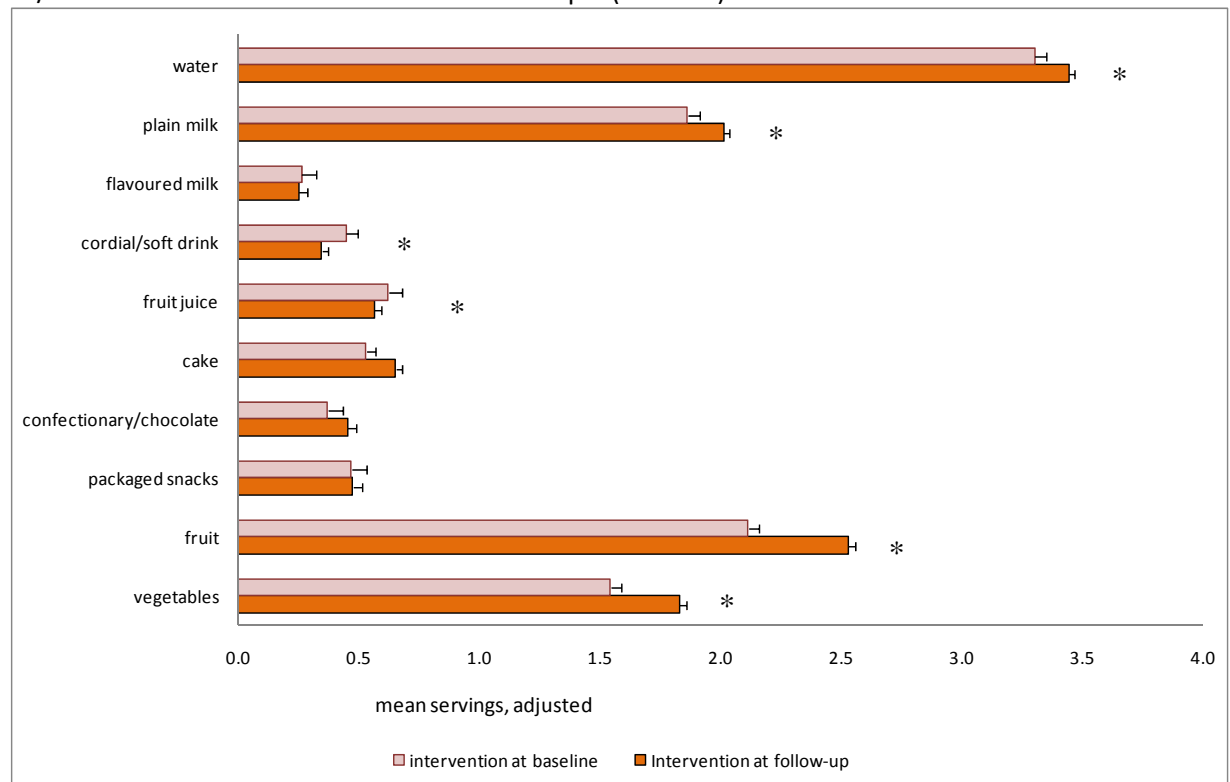


Figure 9: Mean serves of foods and beverages at baseline and follow-up, adjusted for child age, gender and maternal education (*p<0.05)

Table 9. Regression analysis showing the difference in servings from baseline and follow-up in the intervention sample (child age, gender and parental education in the model)

<i>Food/Drink</i>	<i>Coefficient</i>	<i>P</i>
<i>Water</i>	0.11	<0.001
<i>Plain milk</i>	0.18	<0.001
<i>Flavoured milk</i>	-0.05	0.72
<i>Cordial/soft drink</i>	-0.23	0.03
<i>Fruit juice</i>	-0.49	<0.001
<i>Cake/muffins/biscuits</i>	0.16	0.06
<i>Chocolates/lollies</i>	-0.02	0.80
<i>Packaged snacks</i>	-0.13	0.19
<i>Fruit</i>	0.52	<0.001
<i>Vegetables</i>	0.41	<0.001
<i>Vegetable-usual frequency</i>	0.11	0.03
<i>Takeaways-usual frequency</i>	-0.04	0.27

Table 10. Regression analysis of the number of occasions child taken for active play last week, and mean TV/DVD viewing time from baseline to follow-up in the intervention sample (model includes child age, gender and maternal education)

<i>Number of times child taken to playground, park, pool etc last week</i>	0.05	0.70
<i>TV/DVD viewing time (mins)</i>	1.00	0.83

RESULTS SECTION 3: CHILD CARE & EDUCATION SETTINGS

Long Day Care (LDC) Setting

Intervention activities in LDC centres related to objectives 4, 5 and 7. The key impacts and outcomes seen in the evaluation are as follows:

- At baseline there were no **soft drinks, fruit juice or fruit drinks** provided in the intervention LDC centres surveyed. As a consequence, intervention activities were not directed towards reducing sweet drinks in LDC centres and the Centres' restriction on sweet drinks did not change at follow-up
- water and milk were regularly provided and promoted to children in intervention LDC centres at baseline and this continued at follow-up
- packaged snacks and other obesity-promoting foods (chips, cakes etc) were not regularly allowed at baseline and were virtually eliminated at follow-up
- although not different from baseline or the comparison sample, fruit is regularly provided throughout the day and vegetables are provided mostly at lunchtime to children in the intervention LDC centres
- 95% of LDC surveyed had **nutrition policies** and all had healthy eating guidelines at baseline and this remained at follow-up. At baseline only 20% required parental adherence to these guidelines, however at follow-up this increased to 100%
- the content of the policies was generally consistent with healthy eating guidelines in the majority of intervention centres surveyed at baseline and this remained similar at follow-up, and was not statistically different in the comparison sample
- a large component of the intervention was directed towards developing and implementing a **structured active play** (SAP) resource for use in ECS. Despite this effort, the time children spent in structured active play was not different between intervention and comparison samples, although there was a significantly lower amount of time spent in quiet, sitting activities in the intervention sample
- the measures used to assess children's SAP in LDC may not have been sufficient to detect changes

Limitation

- One limitation is the small number of LDC services in the intervention sample which reduced the power to detect statistically significant differences.
- despite the limitations, the areas that still need improvement in LDC centres relate to the provision of healthy foods for celebrations and healthy alternatives for fundraising activities, and providing sufficient opportunities for children to develop fundamental motor skills.

LDC Summary of Results: Intervention versus Comparison sample (Combined age groups)

Healthy Eating (table 13)

No statistically significant differences were detected between the intervention and comparison samples, however the following promising results were found:

- All LDC centres in the intervention sample had policies related to healthy eating
- All LDC centres in the intervention sample required the provision of healthy foods, compared to 48% in the comparison sample
- Soft drinks and fruit juice/drinks were not provided in any of the intervention LDC centres and packaged snacks were restricted in 70% of the intervention LDC centres surveyed.
- At baseline there were no soft drinks, fruit juice or fruit drinks provided in the intervention LDC centres surveyed. As a consequence, intervention activities were not directed towards reducing sweet drinks in LDC centres and the Centres' restriction on sweet drinks did not change at follow-up.
- Water and milk were regularly provided and promoted to children in intervention LDC centres at baseline and follow-up
- The majority of intervention centres did not allow packaged snacks at baseline and this remained consistent at follow-up
- Only 33% of LDC centres in the intervention sample had used fundraising involving chocolate in the past 12 months, compared to 51% in the comparison sample
- In addition, although not captured in this questionnaire, many LDCs also now allow children to have water bottles throughout the day to sip from as needed.

Active Play (table 14 & 15)

The amount of time spent in quiet, sitting activities was significantly lower in the intervention sample, compared to the comparison sample

Although not statistically different, 40% of LDC centres in the intervention sample had a set minimum time for organised active play (compared to 25% in the comparison sample)

Although not statistically different, a higher proportion of LDC centres in the intervention sample were members and had reached award status of the KGFYL program.

Table 11. Profile of participating LDC services

	Comparison	Intervention	Comparison	Intervention
n	-	19	161	10
Type of service (%)				
-Community/Council		57.9	49.1	60.0
-Private/for-profit		42.1	50.9	40.0
SEIFA percentile (mean ± sem)		n/a	42.5 ± 2.2	20.7 ± 9.2
Total number of children attending centre(mean ± sem)		115.5 ± 11.8	98.7 ± 4.3	120.7 ± 24.5

Table 12. Results from the Long Day Care Questionnaire (LDCQ), Comparison sample and Intervention sample at Follow-up– Policy, Guidelines, and Fundraising

<i>does your centre have a written menu? - yes</i>	99	89	n.s
<i>does your setting have a written food or nutrition policy? - yes</i>	96	100	n.s
<i>does the policy include teaching about healthy eating?- yes</i>	86	100	n.s
<i>does the policy allow packaged snacks? - yes</i>	68	50	n.s
<i>does the policy promote fruit? - yes</i>	90	100	n.s
<i>does the policy promote vegetables? - yes</i>	88	100	n.s
<i>does the policy promote water? - yes</i>	92	100	n.s
<i>does the policy promote milk? - yes</i>	86	90	n.s
<i>does the policy promote cordial? - yes</i>	65	70	n.s
<i>does the policy allow soft drink? - yes</i>	66	70	n.s
<i>does the policy allow fruit juice? - yes</i>	67	70	n.s

Table 13: Results from the Long Day Care Questionnaire (LDCQ), Comparison sample and Intervention sample at Follow-up– Healthy eating

<i>are guidelines provided about bringing healthy food to setting?</i>			
<i>Yes</i>	92	100	n.s
<i>are healthy food guidelines requirements or recommendations – requirements</i>	48	100	n.s
<i>recommendations</i>	52	0	n.s
<i>how often do you take action in case foods do not meet guidelines? always</i>	58	67	n.s
<i>most of the time</i>	30	33	n.s
<i>Sometimes</i>	6	0	n.s
<i>Rarely</i>	6	0	n.s
<i>how often does your program include teaching children about healthy eating?</i>			
<i>never</i>	1	0	n.s
<i>At least once a week</i>	99	100	n.s
<i>how often is the majority of food at celebrations healthy? never/sometimes</i>	41	70	n.s
<i>always/most of the time</i>	59	30	n.s
<i>how often do staff promote water consumption?</i>			
<i>At least once a week</i>	100	100	n.s
<i>how often do you/staff allow cordial?</i>			
<i>never</i>	92	100	n.s
<i>At least once a week</i>	8	0	n.s
<i>how often do you/staff allow soft drinks?</i>			
<i>never</i>	99	100	n.s
<i>At least once a week</i>	1	0	n.s
<i>how often do you/staff allow fruit juice ?</i>			
<i>never</i>	84	100	n.s
<i>At least once a week</i>	16	0	n.s

Setting factor	Comparison %	Intervention %	p
<i>how often do you / staff allow packaged snacks?</i>			
<i>never</i>	88	70	n.s
<i>how often do you / staff promote fruit consumption?</i>			
<i>at least once a week</i>	99	100	n.s
<i>how often do you / staff promote vegetable consumption?</i>			
<i>At least once a week</i>	100	100	n.s
<i>Do you offer food as a reward?- yes</i>	10	0	n.s
<i>In the past 12 months have there been any fundraising involving fast food, softdrinks, chocolate? - yes</i>	51	33	n.s
<i>Do you ensure fundraising is consistent with healthy eating messages – yes</i>	22	33	n.s

Table 14: Results from the Long Day Care Questionnaire (LDCQ), Comparison sample and Intervention sample at Follow-up, Active Play

Setting factor	Comparison %	Intervention %	p
<i>Do you have an active play policy? - yes</i>	13	20	n.s
<i>Is the policy provided / explained to parents? - yes</i>	95	100	n.s
<i>Do you have a set minimum time for organised active play? Yes</i>	25	40	n.s

Table 15: Children’s activities while in care from the Long Day Care Questionnaire (LDCQ), Comparison sample and Intervention sample at Follow-up

	Comparison		Intervention		P
	mean	95% CI	mean	95% CI	
<i>how long did children spend in organised active play last session (min)</i>	184.6	162.0 - 207.1	153.3	43.1 - 263.6	n.s
<i>how long did children spend in quiet, sitting activities last session</i>	153.1	136.6- 169.6	90.0	45.5- 134.5	0.03
<i>what is the minimum length of time spent in organised active play per session / day (min)</i>	84.2	53.4 - 114.9	30	30 - 30	n.s
<i>do you have a set minimum time for outside play?</i>	1.7	1.66 - 1.80	1.6	1.23 - 1.97	n.s
<i>what is the minimum length of time spent in outside play per session / day (min)</i>	125.57	94.56 - 156.58	120	-15.02 - 255.02	n.s
<i>rated availability of resources about physical activity (0 -10)</i>	7.42	7.07 - 7.76	7.50	6.00 - 9.00	n.s
<i>rated confidence running activities to develop movement skills (0 - 10)</i>	8.22	7.94 - 8.49	8.48	7.15 - 9.81	n.s

Table 16: Results from the Long Day Care Questionnaire (LDCQ), Comparison sample and Intervention sample at Follow-up, Memberships and Awards

Setting factor	Comparison %	Intervention %	p
<i>is your service a member of Kids Go For Your Life? - yes</i>	31	50	n.s
<i>have you achieved the Kids Go For Your Life award? - yes</i>	20	50	n.s
<i>has the centre participated in ‘start right eat right’ program? - yes</i>	47	40	n.s

Family Day Care (FDC) Setting

Intervention activities in the FDC setting related to objectives 4, 5 and 7. The key impacts and outcomes seen in the evaluation are as follows:

The majority of FDC providers did not provide food for children in their care, with parents providing the food for their child.

- At follow-up, significantly more care providers in the intervention sample had written **healthy eating guidelines**
- through the intervention, **nutrition resources** were developed for FDC providers and at follow-up there was a significantly higher rating of the availability of nutrition resources in the intervention sample compared to the comparison group

A large component of the intervention was directed towards developing and implementing a **structured active play** resource for use in ECS.

- There was a significantly higher rating of the availability of physical activity resources in the intervention sample compared to the comparison group
- despite this, at follow-up, significantly fewer FDC providers in the intervention sample had a set minimum time for organised active play compared to those in the comparison group

In addition, a significantly higher proportion of intervention care providers were members of the **Kids Go For Your Life program** than in the comparison group

FDC Summary of Results: Intervention versus Comparison sample (combined age groups)

Healthy Eating (table 18)

- The majority of the FDC service providers surveyed indicated they had guidelines related to the provision of healthy foods within the service or by parents.
- In the intervention sample, significantly more of these healthy food guidelines were written.
- FDC providers in the intervention sample rated the availability of resources about nutrition significantly higher than those in the comparison sample
- Fewer FDC providers used food as a reward

Active Play (table 19)

- Fewer FDC providers in the intervention sample had a minimum time for organised active play each day
- FDC providers in the intervention sample rated the availability of resources about physical activity significantly higher than those in the comparison sample
- Significantly more FDC providers in the intervention sample were members of the KGFYL program
- Similar amounts of TV and computer usage were reported in the intervention and comparison samples

Table 17. Profile of participating FDC services

	Comparison	Intervention	Comparison	Intervention
n	-	44	223	28
SEIFA percentile (mean ± sem#)		n/a	42.5 ± 2.2	20.7 ± 9.2
Total children attending each week (mean ± sem#)		7.5 ± 0.5	6.6 ± 0.2	8.2 ± 0.5
#sem=standard error of mean				

Table 18: Results from the Family Day Care Questionnaire (FDCQ): Comparison sample and Intervention sample at Follow-up – Healthy Eating

	%	%	
<i>do you have rules about foods you provide to children in your care? Yes</i>	69	87	n.s
<i>are guidelines provided about bringing healthy food to setting? Yes</i>	84	93	n.s
<i>are the healthy food guidelines written? Yes</i>	32	54	0.02
<i>how often do you take action in case foods do not meet guidelines?</i>			
<i>Always</i>	41	42	n.s
<i>Most of the time</i>	36	50	n.s
<i>Sometimes</i>	11	4	n.s
<i>Rarely</i>	12	4	n.s
<i>do you offer food as a reward? No</i>	56	72	n.s

Table 19: Results from the Family Day Care Questionnaire (FDCQ): Comparison sample and Intervention sample at Follow-up - Active Play

	%	%	
<i>do you have a set minimum time for organised active play? Yes</i>	58	38	0.04
<i>do you regularly take children for active play time? yes</i>	89	86	n.s
<i>How often do children watch television</i>			
<i>Never</i>	3	0	n.s
<i>Once a week</i>	14	21	
<i>Twice a week or more</i>	83	79	
<i>how often do children play computer / electronic games?</i>			
<i>Never</i>	64	68	n.s
<i>Once a week</i>	28	32	
<i>Twice a week or more</i>	8	0	

Table 20: Results from the Family Day Care Questionnaire (FDCQ), Intervention and Comparison samples at Follow-up, means

Variable	Comparison		Intervention		P
	Mean	95% CI	Mean	95% CI	
<i>rated availability of resources about nutrition (0 - 10)</i>	8.0	7.7-8.3	8.7	8.0-9.3	0.02
<i>rated confidence answering questions about healthy eating (0 - 10)</i>	8.3	8.0-8.5	8.2	7.4-9.1	n.s
<i>rated confidence encouraging parents to supply healthy food (0 - 10)</i>	7.8	7.5-8.1	8.1	7.1-9.1	n.s
<i>how long did children spend in organised active play last session (min)</i>	120.8	110.3-131.3	89	71.8-106.2	n.s
<i>what is the minimum length of time spent in organised active play per session / day (min)</i>	80.6	66.3-94.9	73	42.6-103.4	n.s
<i>do you have a set minimum time for outside play?</i>	1.5	1.5-1.6	1.7	1.5-1.9	n.s
<i>what is the minimum length of time spent in outside play per session / day (min)</i>	82.0	71.9-92.1	95.6	64.9-126.4	n.s
<i>rated availability of resources about physical activity (0 -10)</i>	7.9	7.6-8.2	8.7	8.2-9.3	0.01
<i>rated confidence running activities to develop movement skills (0 - 10)</i>	8.3	8.0-8.5	8.2	7.3-9.0	n.s
<i>rating of outdoor space (0 - 10)</i>	8.6	8.1-8.9	8.7	8.2-9.3	n.s
<i>rating of outdoor equipment (0- 10)</i>	7.6	7.3-7.8	7.7	7.1-8.4	n.s
<i>rating of outdoor shade and shelter (0 - 10)</i>	8.1	7.8-8.4	7.9	7.1-8.7	n.s
<i>rating of indoor space (0 - 10)</i>	8.3	8.1-8.5	8.1	7.6-8.9	n.s
<i>rating of indoor equipment (0 - 10)</i>	8.7	8.5-8.9	8.4	7.9-9.0	n.s
<i>have staff participated in training about physical activity & movement skills?</i>	1.2	1.2-1.3	1.1	1.0-1.2	n.s

Table 21: Membership of KGFYL in Family Day Care samples

Variable	Comparison	Intervention	P
	%	%	
<i>is your service a member of Kids Go For Your Life? - yes</i>	25	58	0.001
<i>have you achieved the Kids Go For Your Life? - yes</i>	13	5	n.s

Kindergarten (4 year old) Setting,

Intervention activities in the kindergarten (preschool) setting related to objectives 4, 5 and 7. The key impacts and outcomes seen in the evaluation are as follows:

In kindergartens parents provide the food and drinks for their child to consume throughout the session. A considerable focus of the intervention was to provide support for kindergartens to implement the Romp & Chomp, Smiles for Miles, and *Kids Go For Your Life* programs assisted by local allied health professionals and the Geelong Kindergarten Association, and there was a particular focus on the adoption and implementation of healthy eating and active play policies as part of the intervention.

- At follow-up, a higher proportion of kindergartens in the intervention sample had written **food and nutrition policies**, and significantly more of these policies restricted obesity-promoting foods and drinks and promoted obesity-protective foods and drinks, than in the comparison sample.
- In line with the content of the policies, a higher proportion of staff within the intervention kindergartens **prohibited obesity-promoting foods and drinks**, than in the comparison sample.
- A higher proportion of kindergartens in the intervention sample had adopted an **active play policy**, although the proportion was low compared to the Healthy Eating policies.

Summary of Key findings:

Healthy Eating (tables 23 & 24)

- Significantly more kindergartens in the intervention sample had a written food and nutrition policy
- Significantly more of the policies included content related to restricting fruit juice/drinks, cordial and packaged snacks, and promoting fruit and vegetables
- Significantly more kindergartens had healthy food guidelines, rather than recommendations and planned to have fundraising that was consistent with Healthy Eating guidelines
- Consistent with the Healthy Eating policies, significantly more staff in kindergartens in the intervention sample 'never' allowed cordial, fruit juice/drinks and packaged snacks
- Significantly more kindergartens in the intervention sample reported ensuring that fundraising activities was consistent with healthy eating guidelines, although more than half of the sample had used fast food, soft drinks, or chocolates for fundraising activities in the previous 12 months, slightly lower than those in the comparison sample.

Active Play (table 25)

- Significantly more kindergartens in the intervention sample had an active play policy, although the proportion was still low.
- Significantly more kindergartens in the intervention sample were members of the *Kids Go For Your Life* program

Table 22. Profile of participating Kindergarten (preschool) services

	Comparison	Intervention	Comparison	Intervention
<i>n</i>	-	38	347	41
<i>SEIFA percentile (mean ± sem)</i>		n/a	41.6 ± 1.5	47.8 ± 4.5
<i>Total number of 4 year old children attending (mean ± sem)</i>		42.5 ± 2.4	45.8 ± 1.4	44.0 ± 2.4

Table 23: Results from the Kindergarten Questionnaire (KQ), Intervention sample and Comparison sample at Follow-up, Policies, Guidelines, and Fundraising

	%	%	
<i>does your setting have a written food or nutrition policy? Yes</i>	64.99	87.8	0.002
<i>does the policy contain promoting water?</i>			
<i>Yes</i>	94.53	100	n.s
<i>no/unsure</i>	5.47	0	n.s
<i>does the policy contain promotion milk? Yes</i>	33.85	47.06	n.s
<i>does the policy contain allowing soft drink? Yes</i>	68.04	82.35	n.s
<i>does the policy contain allowing cordial? Yes</i>	59.69	85.29	0.003
<i>does the policy contain allowing fruit juice? Yes</i>	56.7	85.29	0.001
<i>does the policy contain allowing packaged snacks? Yes</i>	67.02	85.71	0.02
<i>does the policy contain promoting fruit? Yes</i>	87.44	100	0.01
<i>does the policy contain promoting vegies? Yes</i>	81.41	100	0.001
<i>does the policy contain teaching about healthy eating? Yes</i>	79.9	85.71	n.s
<i>are guidelines provided about bringing healthy food to setting? Yes</i>	97.37	97.56	n.s
<i>are healthy food guidelines requirements or recommendations?</i>			
<i>Requirements</i>	38.96	64.1	0.002
<i>Recommendations</i>	61.04	35.9	n.s
<i>how often do you take action in case foods do not meet guidelines?</i>			
<i>Always</i>	20.06	27.5	n.s
<i>most of the time</i>	33.53	20	n.s
<i>sometimes</i>	27.25	20	n.s
<i>rarely</i>	19.16	32.5	n.s
<i>how often is the majority of food at celebrations healthy?</i>			
<i>Never/sometimes</i>	77.13	70	n.s
<i>sometimes/most of the time</i>	22.87	30	n.s
<i>do you offer food as a reward? yes</i>	6.98	0	n.s
<i>does your planned program include teaching children about healthy eating?</i>			
<i>Yes</i>	96.23	100	n.s
<i>ensuring fundraising is consistent with healthy eating messages? Yes</i>	18	40	0.005
<i>in the past 12 months have there been any fundraising involving fast food, soft drinks, chocolates? Yes</i>	68.51	52.78	n.s

Table 24: Results from the Kindergarten Questionnaire, Intervention sample and Comparison sample at Follow-up, Promoting/Allowing foods and drinks

<i>how often do you/staff promote water consumption? Once a week</i>		100	100	n.s
<i>how often do you/staff promote milk consumption?</i>	<i>Never</i>	37.61	40	n.s
	<i>Once a week</i>	62.39	60	n.s
<i>how often do you/staff allow soft drinks?</i>	<i>Never</i>	94.74	100	n.s
	<i>Once a week</i>	5.26	0	n.s
<i>how often do you/staff allow cordial?</i>	<i>Never</i>	64.41	95.12	<0.001
	<i>Once a week</i>	35.59	4.88	
<i>how often do you/staff allow fruit juice?</i>	<i>Never</i>	48.21	95.12	<0.001
	<i>Once a week</i>	51.79	4.88	
<i>how often do you/staff allow packaged snacks?</i>	<i>Never</i>	37.39	73.68	<0.001
	<i>Once a week</i>	62.61	26.32	
<i>how often do you/staff promote fruit consumption?</i>	<i>Never</i>	0.29	0	n.s
	<i>Once a week</i>	99.71	100	n.s
<i>how often do you/staff promote vegetable consumption?</i>	<i>Never</i>	1.47	0	n.s
	<i>Once a week</i>	98.53	100	n.s

Table 25: Results from the Kindergarten Questionnaire, Intervention sample and Comparison sample at Follow-up, Active Play

	%	%		
<i>does the setting have an active play policy? Yes</i>	3.26	15.79	0.004	
<i>is the policy provided/explained to parents? Yes</i>	92.31	66.67	n.s	
<i>do you have a set minimum time for organised active play? Yes</i>	35.09	41.46	n.s	
<i>how often do children play computer/electronic games?</i>				
	<i>Once a week or more</i>	84.87	79.49	n.s
	<i>Twice a week or more</i>	15.13	25.81	n.s

Table 26: Results from the Kindergarten Questionnaire, Intervention sample and Comparison sample at Follow-up, Memberships & Awards

	%	%	
<i>is your service a member of Kids Go For Your Life? Yes</i>	26.74	77.5	<0.001
<i>have you achieved the Kids Go For Your Life award? Yes</i>	6.57	6.25	n.s

Parental Awareness

Evaluation of parental awareness of Romp & Chomp and the project key messages in 2006 and 2008

In order to measure the awareness of the Romp & Chomp project and its key messages, surveys were presented to parents of preschool children within two community festivals.

Key Findings:

- There was a large increase in awareness of the Romp & Chomp project from 2006 to 2008, with close to 50% of parents surveyed aware of the program)
- There was high awareness of the generic key messages consistent across all three health promotion projects (Romp & Chomp, KGFYL and Smiles 4 Miles) by parents in the community (above 80% for all key messages)

The figures below show an increase in awareness among the parents between 2006 and 2008 (awareness increasing from 23% to 47% in 2008, see Figures 8 and 9). Although not shown here, additional data show that kindergartens were the main sources of awareness-raising.

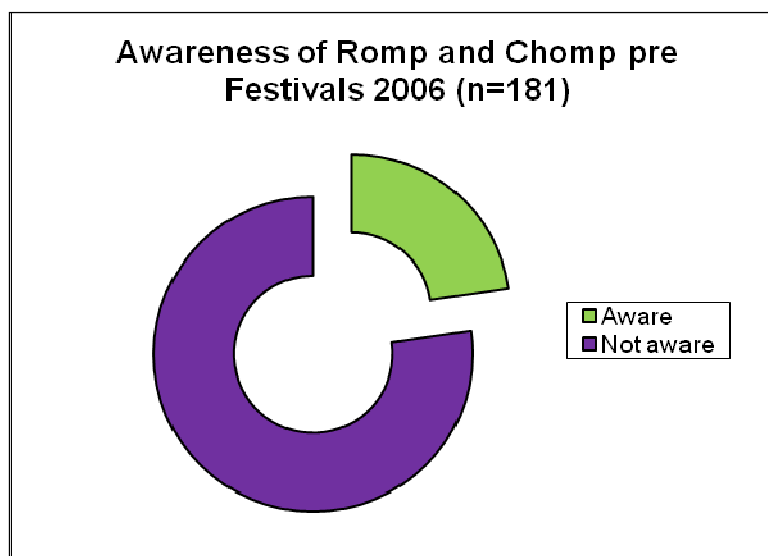


Figure 10: Parental Awareness of Romp & Chomp in 2006

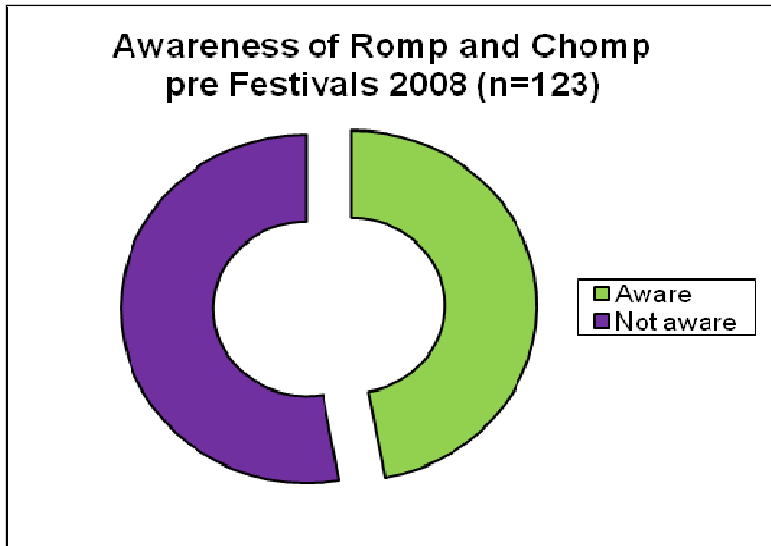


Figure 11: Parental Awareness of Romp & Chomp in 2008

- There was a large increase in awareness of the Romp & Chomp project from 2006 to 2008, with close to 50% of parents surveyed aware of the program)
- There was high awareness of the generic key messages consistent across all three health promotion projects (Romp & Chomp, KGFYL and Smiles 4 Miles) by parents in the community (above 80% for all key messages)

In 2008 parents were asked about the five Romp & Chomp and Smiles 4 Miles key messages: drink water daily; eat fruit and vegetables daily; play actively everyday; plan how much TV/computer/videos/electronic games you watch in your family; and, clean your teeth well. Figure 10 shows that parents were very aware of the messages, particularly the first three: daily water (97.6%), daily fruit and vegetables (100%) and daily activity (98.3%). Less screen time was still very well known (84.2%), although this message was not actively implemented in all settings.

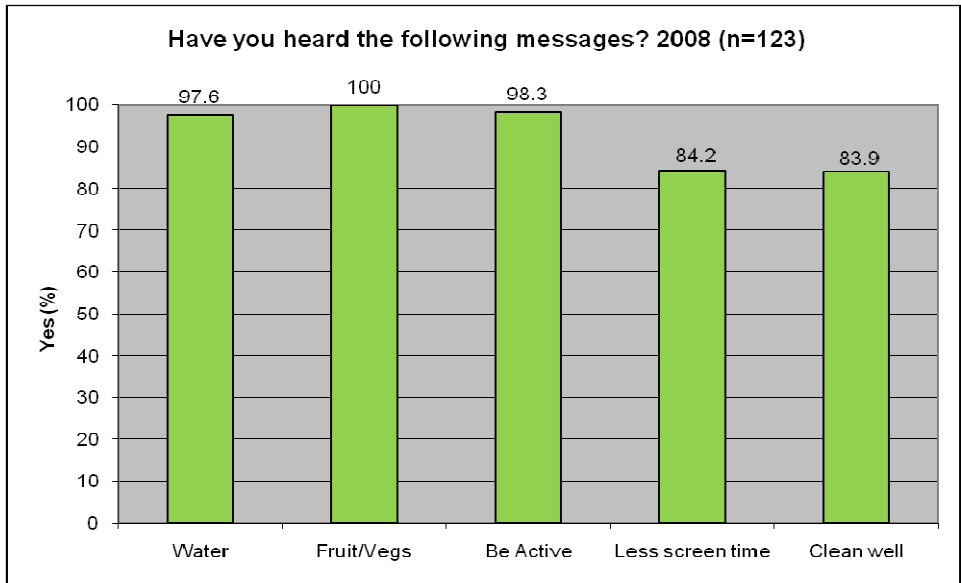


Figure 12 Awareness of the Romp & Chomp key messages in 2008

Summary:

There was a large increase in awareness of the Romp & Chomp project from 2006 to 2008, and there was high awareness of the projects key messages by parents in the community, above 80% for all key messages.

Discussion

The Romp & Chomp intervention, working in partnership with Smiles 4 Miles and *Kids Go For Your Life* and implementing programs such as Start Right, Eat Right has significantly reduced the prevalence of childhood overweight and obesity for children in the City of Greater Geelong (CoGG). Young children in the Geelong community are now spending time in early childhood care and educational settings that are less obesogenic and promote good health. They are eating more nutritious foods and less unhealthy foods and drinks, and the prevalence of overweight and obesity in Geelong children has reduced. These results are of international significance and provide strong evidence in support of whole of community and settings-based approaches to obesity prevention.

At follow-up, the prevalence of overweight and obesity in Geelong children was shown to be lower in both the 2 year old and 3.5 year old age groups by 2.5% and 3.4% respectively and there was a significant shift in the distribution of weight status to a higher proportion of children being of healthy weight and less being overweight or obese. These are substantial reductions in the prevalence of overweight/obesity in young children and well above the reductions seen in the comparison sample of 0.7% in both age groups. Given the size of the Geelong population at baseline, a conservative estimate of approximately 300-500 fewer children are now overweight or obese in the Geelong community.

The intervention had objectives to significantly reduce the consumption of high sugar drinks and energy dense snacks and to increase consumption of fruit, vegetables and water. These objectives were achieved and the diets of children in Geelong have been improved. Compared to children in the comparison communities, children in Geelong are drinking less sweet drinks and eating less packaged snacks at follow-up. This can be attributed to substantial reductions in these behaviours in Geelong, with children at follow-up drinking approximately $\frac{1}{2}$ a cup less fruit juice, $\frac{1}{4}$ cup less cordial and eating 1 extra small fruit and about $\frac{1}{2}$ a serve more vegetables each day, than before the intervention.

We hypothesise that these behaviour changes are related to the changes in children's environments across Geelong, which have now created a community in which fruit, vegetables and water are promoted and packaged snacks and sweet drinks are restricted or discouraged. The project funding for implementation was \$111,200 and the consistency of changes across the various early childhood settings in Geelong was only achievable through the partnership with the other health promotion initiatives, Smiles for Miles and *Kids Go For Your Life*, and the mobilisation of the allied health workforce through Barwon Health and other health services in the Geelong region to support the early childhood settings to implement the combined program. Although it was challenging to implement three projects with different branding and requirements into settings with limited time and capacity to adopt the programs, the common health promotion messages and policy-based approach enabled the development of an overall approach that achieved the desired outcomes for each project while presenting a unified package to the early childhood workers. The strategies used to disseminate social marketing through early childhood settings and services appear to have attained reasonably high awareness of the Romp & Chomp project and very high awareness of generic key messages common to the three health promotion projects by parents in the general community.

The results from the environmental audits in early childhood settings show that at baseline there was considerable momentum towards the creation of health promoting environments for children in all of these settings. Although there have been improvements, particularly in kindergartens, there are still a number of factors to be addressed. These include the frequent use of television in the FDC setting, the continued use of unhealthy foods for fundraising activities and celebrations in ECS and the need for policy-level commitment to active play for children in a number of settings.

Significance of these results

The results from this evaluation show that the Romp & Chomp intervention working together with Smiles for Miles and KGFYL has significantly reduced the risk of childhood overweight and obesity in the Geelong community and produced larger changes than for background interventions operating across the state. The intervention effects on child behaviours and reduction in prevalence of overweight and obesity are larger than those seen in the Colac *Be Active, Eat Well* project, suggesting that this population group may be more receptive to environmental changes than older children and that the comprehensive, community-wide approach to obesity prevention is a worthwhile investment.

In addition to improving children's health now, the intervention may also prevent the development of overweight and obesity throughout the child's lifespan by establishing healthier behaviours early. Further, the implementation of sustainable policy-based strategies means that the intervention has the potential to benefit future cohorts of children, which is particularly significant given that the Geelong community is socio-economically disadvantaged and has a considerable proportion of children at high risk of poor health outcomes. Importantly, the reductions in consumption of sweet drinks and increase in water intake will also improve children's oral health and reduce their risk of dental decay-another significant public health issue for children in disadvantaged communities.

Implications

Romp & Chomp is the first successful community-based obesity prevention intervention in early childhood. The success of Romp & Chomp shows that we can take action to prevent childhood obesity and that young children's health can be improved using a community-wide and settings-based approach. However this requires long term, committed partnerships and working with a range of children's health, education and care settings across the whole community.

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