OPAL EVALUATION PROJECT FINAL REPORT

OPAL PHASE 1 and 2

5 September 2016

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ACKNOWLEDGEMENTS

We extend our thanks to:

- The Obesity Prevention and Lifestyle (OPAL) project team, including State Managers Mark Williams and Fraser Keegan, and Evaluation Manager Dr Michelle Jones.
- Students (and their parents) and schools for consenting to be involved in the OPAL Evaluation Project.
- Child Youth and Women's Health Service, SA Health, for providing OPAL access to de-identified 4-5 year old anthropometric data.
- Students who have been involved in evaluation activities and data analyses.
- Trish Sechser for her administrative assistance of the OPAL Evaluation Management Committee and in preparation of this Report.

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ABBREVIATIONS

MEASUREMENTS/UNITS	
%	Proportion
BMI	Body Mass Index
cm	centimetre
kg	kilogram
m^2	metres squared
INSTITUTIONS/SECTORS	
LGA	Local Government Area
CaFHS	Child and Family Health Service [Department of Education and Child Development]
CYWHS	Children, Youth and Women's Health Service's
MSAC	Medical Services Advisory Committee
NHMRC	National Health and Medical Research Council
PBAC	Pharmaceutical Benefits Advisory Committee
SCU	Statewide Co-ordination Unit
STATISTICAL	
IRSD	Index of Relative Social Disadvantage
n	Sample size
OR	Odds ratio
p value	Statistical significance; alpha-level (α) set at $p<0.05$
SEIFA	Socio-economic Index for Areas
SD	Standard Deviation
SE	Standard Error
95%CI	95% Confidence Interval
PROGRAMS/SURVEYS	
OPAL	Obesity Prevention and Lifestyle
NCNPAS	National Children's Nutrition and Physical Activity Survey
TECHNICAL	
CCB	Community Capacity Building
COMP	Comparison community (OPAL)
PA	Physical activity
INT	Intervention community (OPAL)
CHU9D	Child Health Utility 9D
HRQoL	Health-related quality of life
ICSEA	Index of Community Socio-Educational Advantage
IOTF	International Obesity Task Force
QALY	Quality-adjusted life year
MISCELLANEOUS	
NA	Not applicable
NT	Northern Territory
SA	South Australia
Veg	Vegetables
Vs	versus
Y	Year

EXECUTIVE SUMMARY

Overview

This Report summarises the key outcome data for the Flinders OPAL Evaluation Project. Findings are presented for all OPAL communities sampled in Phase 1 and 2 only. Baseline findings are compared to final data to assess the effectiveness of the 5 year OPAL program.

Introduction

Childhood overweight is a leading public health concern with at least 1 in 5 Australian children overweight or obese. As a response, the South Australian government committed to the OPAL intervention program, a multi-site, multi-setting, multi-strategy community based childhood obesity prevention program that operated in 20 communities. The aim of OPAL was to improve eating and physical activity patterns of South Australian children, through families and communities in OPAL regions and thereby increase the proportion of 0-18 year olds in the healthy weight range and improve their quality of life. To determine the effectiveness of this approach a comprehensive evaluation framework (including qualitative and quantitative methods) was developed. The data collected and compiled in this Report are the baseline and final data for Phase 1 and 2 of the quantitative evaluation and baseline and final qualitative evaluation, namely a community capacity building evaluation.

Methods

Early childhood centres, primary and secondary schools from all 20 South Australian communities and one Northern Territory community were invited to participate in the OPAL Evaluation, together with centres and schools from matching comparison communities. Directors, principals, parents and students from intervention and comparison communities provided data through self-report questionnaires.

The OPAL Evaluation utilised a quasi-experimental repeat cross-section design to obtain a series of 'snapshots' of the frequency and characteristics of the population at a particular point in time. In line with the staggered intake of communities into the OPAL program each year, the OPAL Evaluation was staggered over four Phases with data collected for Phase 1 & 2 in late 2011-mid 2012, Phase 3 in late 2012, and Phase 4 in 2013. As a result of significant budget cuts to the program, the OPAL evaluation concluded **mid-2015**; subsequently there was no final evaluation for Phase 3 and 4 communities in OPAL. The evaluation was also scaled back to only include parent and student surveys of 9-11 year olds at the final time-point. Hence, this Report deals with the evaluation of Phase 1 and 2 primary school children, and their parents, only. These data are supplemented with measures for preschool children, using data routinely gathered by Child and Family Health Services (CaFHS).

Students within participating schools in grades 4 to 6 (9-11 years old) were recruited to complete self-report questionnaires and anthropometric measures. The questionnaires measured students' behaviours, knowledge and attitudes and obtained descriptors of their home, school and local environments. In addition to the survey measures collected, students had height, weight and waist circumference measures taken, to determine the prevalence of overweight and obesity over the life of the OPAL program. Parents of children were also recruited to complete self-report questionnaires that measured behaviours of themselves and their child, their knowledge and attitudes, as well as descriptors of their home and local environments.

Key outcomes

The following section presents the key findings from a single level regression model used to estimate the changes between year 3 (baseline) and year 5 (final) for intervention and comparison communities and the time x group interaction. Key results from a multilevel model (children nested in schools) are presented where adopted.

Recruitment

At baseline, a total of 2611 students completed surveys and 2353 had measurements taken. The overall response rate for schools in the targeted communities at baseline was 56%; the response rate for students, and parents of students, in those schools was 23%. At final, a total of 1873 students completed surveys and 1760 had measurements taken. The overall response rate for schools in the targeted communities was 57%; the response rate for students, and parents of students, in those schools was 21% and 25%, respectively.

Early Childhood Growth (4-5 years)

Early childhood (4-5 years) growth data for children living in OPAL intervention and comparison communities for Phase 1 and 2 were obtained from the Child and Family Health Service (CaFHS), Department of Early Childhood and Development. These data (n=18944) are used to describe weight status for 4-5 year olds in OPAL communities across the intervention period; baseline (Y0) to final (Y5 for Phase 1; Y2 for Phase 2 as no data were supplied at the date of reporting for Y3, Y4, Y5). Despite small changes in BMI and BMI z-score between baseline (Y0) and final (Y5) in Phase 1 intervention (decreases) and comparison (increases) communities, respectively, these changes were not statistically significant. The time x group effect was also not significant. In phase 2 there were no significant changes in BMI or BMI z-score between baseline (Y0) and final (Y2) in intervention or comparison communities, nor any differences in change over time between groups. There were no significant changes over time in the prevalence of healthy weight, overweight, obesity, or combined overweight and obesity, in Phase 1 and Phase 2 children in intervention or comparison communities when both a single level and multilevel model was used.

Weight status (9-11 years)

Of the total students measured (n=2353 baseline; n=1760 final), around half were boys and half girls. Of these there were higher proportions from urban locations (66% baseline, 69% final; difference p=0.019) than from rural locations. The average BMI z-score was 0.32 ±1.20 at baseline and 0.43±1.15 at final. Nearly three-quarters of all students/children were a healthy weight at baseline (72%) and final (70%) and nearly one-quarter were overweight or obese (baseline 22%, final 24%).

Overall, the combined prevalence of overweight and obesity was stable for children in intervention communities from baseline to final. In contrast, the prevalence of combined overweight and obesity in comparison communities increased by almost 5% over the intervention period. However findings were not statistically significant for intervention or comparison communities over time or between intervention and comparison communities at final. Yet, according to the prevalence of obesity (excluding overweight), there was a 52% lower likelihood of obesity in children from intervention communities than from comparison communities at final (OR 0.48, 95% CI 0.26–0.89, p=0.019).. This remained significant when a multilevel model was adopted ((OR 0.51, 95%CI 0.28 – 0.92, p=0.026). The proportion of children in the healthy weight range did not significantly change after the 5 year OPAL intervention period.

Healthy Eating

Key dietary variables were intake of fruit, vegetable and discretionary (non-core) foods. Students were asked to report whether they consumed these foods 'yesterday' and responses used to classify them as consumers or not (fruit and vegetable only; including number of serves consumed) and having intakes meeting recommendations or not, namely 2 or more serves of fruit, 5 or more serves of vegetable and 2 or less serves of discretionary foods, as per the 2013 Australian Dietary Guidelines.

Eighty one percent of all students/children at baseline, and 80% at final, consumed fruit the previous day, however only two-thirds met the recommendations at each time point. The average number of fruit serves consumed was significantly greater (by almost half a serve) at the end of the evaluation period, in both intervention and comparison communities. The probability of children meeting the recommended fruit intake significantly increased in intervention communities (OR 1.5, 95%CI 1.2-1.7, p<0.001) but not in

comparison communities (OR 1.2, 95%CI 0.9-1.5, p=NS) over the evaluation period. Findings were similar when a multilevel model was adopted (INT, OR 1.5 95%CI 1.3 – 1.8, p<0.001; COMP, OR 1.2 95%CI 0.9 – 1.5, p=NS).

Eighty-one percent of all students/children at baseline and 79% percent at final consumed vegetables the previous day, however less than one-third met recommendations at each time point. In comparison communities, but not intervention communities, the average number of serves of vegetables consumed (0.46 serves, 95%CI 0.25-0.66, p<0.001) and the probability of children meeting the recommended vegetable intake (OR 1.5, 95%CI 1.2-1.8, p<0.001), significantly increased over time. However, there were no significant differences between groups at final for serves of vegetables consumed or meeting the recommended vegetable intake. There were no differences observed in findings when a multilevel model was adopted (INT, OR 1.2 95%CI 1.0 – 1.5, p=NS; COMP, OR 1.5 95%CI 1.2 – 1.9, p=0.001; Difference, OR 0.8 95%CI 0.6 – 1.1, p=NS).

Based on a limited number of questions relating to a variety of non-core foods and thus probably an underestimate of total discretionary food intake, less than half of all children met the non-core food recommendation of 2 serves or less without including sweetened beverages. When sweetened beverages were included in the discretionary food estimate this proportion of all children fell to approximately a quarter. There was a significant positive intervention effect on the probability of children meeting the discretionary food guideline, with a 40% increased probability at final when sweetened beverages were excluded (OR 1.4, 95%CI 1.1-1.9, p=0.020) and a 50% increased probability when sweetened beverages were included (OR 1.5, 95%CI 1.0-2.1, p=0.030), for children in intervention communities compared to comparison communities. Using a multilevel model, there was a 40% increased the probability of children in INT meeting the discretionary food guideline (when sweetened beverages were included) compared to children in COMP (OR 1.4, 95%CI 1.0-1.9, p=0.042).

Physical Activity

Physical activity levels were operationalised as compliance with the 2014 Australian guidelines (at least 60 minutes of moderate to vigorous activity on all 7 days of the last week). Over a quarter (28%) of all children/students at baseline and over a third (38%) at final met the physical activity guidelines on all 7 days. The average number of days that all children met the guidelines was 4.5 days at baseline and 5 days at final.

Children in intervention (by 0.8 days, 95%CI 0.6-0.9, p<0.001) and comparison (by 0.7 days, 95CI 0.5-1.0, p<0.001) communities met the physical activity guidelines on more days at final than baseline (no significant group x time effect). Children were 60-70% more likely to meet the physical activity guidelines at final than baseline in intervention (OR 0.16, 95%CI 1.3-1.8, p<0.001) and comparison (OR 1.7, 95%CI 1.3-2.1, p<0.001). There was no statistically significant difference between groups at final. Similarly, when a multilevel model was used, children (INT, OR 1.6, 95%CI 1.3-1.9; COMP, OR 1.6, 95%CI 1.2-2.0; both p<0.001) were 60% more likely to meet the physical activity guidelines at final than baseline.

Screen time

Levels of screen time were operationalised as compliance with the 2014 Australian guidelines (no more than 120 minutes of screen time for entertainment on all 7 days of the last week). Overall, 18% of all children met the screen time guidelines on all 7 days at baseline compared to 12% at final. The average number of days on which the guideline was met was two and a half days at baseline and three days at final.

Despite significant increases in the number of days children met screen time guidelines in intervention and comparison communities, children in both groups were less likely to meet the screen time guidelines at final than baseline. Nonetheless, this was worse in comparison communities (OR 0.5, 95%CI 0.4-0.7, p<0.001) than intervention communities (OR 0.7, 95%CI 0.5-0.9, p=0.006). The difference between groups at final was not statistically significant. This was true when a multilevel model was used (INT, OR 0.7, 95%CI 0.6-0.9, p=0.003; COMP, OR 0.5, 95%CI 0.4-0.7, p<0.001; Difference, OR 1.4, 95%CI 0.9-2.0, p=NS).

Quality of life

Using a multilevel model, a decreasing trend on CHU9D utilities was observed for both OPAL intervention and comparison communities, although the magnitude of change was much smaller in the intervention communities than comparison communities (-0.012 vs. -0.054). On average, at the final time-point students from the intervention communities had gained a mean utility of 0.034 ($p<0.05$) when compared to students from the comparison communities.

Economic Evaluation

The average total cost of OPAL program activities per person was $68.54. For children in the 0-18 year old age range, the average cost of the OPAL program was $287.93 per child. Significant limitations for the economic evaluation were: 1) the cross-sectional nature of the baseline and follow up populations for the assessment of HRQoL for the intervention and control communities, and 2) the relatively short time frame of evaluation (2-3 years). Thus, definitive conclusions about the relative cost effectiveness of the OPAL program can not be drawn from the information presented in this report.

Community capacity building

Community capacity building (CCB) is one of the approaches in the OPAL Program. The aim of the CCB evaluation was to gain greater insight into CCB as experienced by a community group active in the OPAL network, and to do this at two time points a year apart. The evaluation showed that for participants - all community groups - CCB positively changed over time. Whilst each group had their own identity, purpose and structure, OPAL workers played a role in these CCB processes. Respondents used the metaphor of community capacity building as a journey and so doing described the complexities (i.e. twists and turns) of CCB in action. Finally, the CCB evaluation made apparent the value of a community development approach in obesity prevention.

Limitations

Consideration must be given to the limitations of the OPAL Evaluation. Selection bias may be evident as the final student survey response rate for Phase 1 comparison communities was 11% and overall (Phase 1 and 2 intervention and comparison communities combined) around 20-25% at baseline and final. The effects on the outcomes are not known. However, the age and sex distribution of the sample at baseline and final were similar and the prevalence of overweight and obesity (23%) was similar to national (28%) and state (23%) estimates in this age group in 2007. The evaluation time period of 2-3 years is not long enough to see significant changes in weight status. Further, OPAL ran in discrete localities of greatest disadvantage across South Australia and thus the effects or outcomes may or may not be generalisable to other communities or populations.

Conclusions

The primary outcome of the OPAL Evaluation was children's weight status. The findings showed no significant changes in healthy weight among 9-11 year old intervention children when compared to students from comparison communities, yet a 53% reduced likelihood of obesity at the end of the intervention period.

Secondary outcomes were changes in parent and child behaviours, knowledge and attitudes, and environments. The findings indicated the OPAL program had a significant impact (above those on comparison communities) on children meeting the discretionary food guideline.

Evaluation of the multi-setting, multi-sectoral community-based systems-wide OPAL program has shown some positive impacts on primary school children aged 9-11 years in terms of behaviours and environments. This evaluation adds to the evidence base of community based obesity prevention initiatives both in SA and nationally.

1 INTRODUCTION

This Report is the **Flinders OPAL Evaluation Final Report.** To establish program outcomes this Report summarises information collected from Phases 1 and 2 of OPAL at two time-points (Year 3, termed baseline, and year 5, termed final) and makes comparisons between those communities that received the OPAL intervention and those that did not. As the OPAL Evaluation utilised a repeat cross-sectional design, the sample at Year 3 is not the same as that at year 5.

The research design for the OPAL evaluation was provided to all tenderers. Flinders University was contracted in 2011 by the Department for Health and Ageing to undertake this evaluation. Flinders University sub-contracted the data collection to Colmar Brunton, a social research company. The overall research design for the evaluation was developed by the Department for Health and Ageing with advice from the OPAL Scientific Advisory Committee which provided input and advice regarding the methodology and progress of the evaluation.

This Report follows the previous Interim Report completed at the end of final data collection for Phase 1; **OPAL Evaluation Project Interim Follow-up Report Phase 1.**

Section 1 of the Report briefly describes the OPAL program, including how it was delivered across communities in South Australia, and the purpose, hypotheses and outcomes of the OPAL evaluation.

Section 2 gives a detailed account of the evaluation design and methods used to gather data for the evaluation of the OPAL program.

Section 3 provides details of recruitment and survey outcomes for baseline and final in Phase 1 and 2 communities of the OPAL evaluation.

Section 4 provides a summary of weight status for children aged 4-5 years located in OPAL intervention and comparison communities, derived from secondary data obtained from annual growth checks, and key anthropometric outcomes for children in primary school settings, derived from measurements taken by the Flinders OPAL Evaluation research team.

Section 5 describes questionnaire data from students, and parents of students, in primary schools for the key outcomes of healthy eating (fruit and vegetable consumption, discretionary foods), physical activity, and sedentary behaviour (screen time) and environmental factors influencing these behaviours.

Section 6 provides analyses on quality of life data collected through primary school student questionnaires.

Section 7 describes the economic evaluation findings.

Section 8 describes the findings from the community capacity building component of the evaluation.

Section 9 discusses the limitations and generalisability

Section 10 details the conclusions of the OPAL evaluation.

Section 11 provides references.

Section 12 includes relevant appendices.

1.1 BACKGROUND TO THE OPAL PROGRAM

1.1.1 WHAT IS THE OPAL PROGRAM

The OPAL program is a multi-setting, multi-sectoral community-based systems-wide program designed to increase the percentage of 0-18 year olds who are of a healthy weight. The program is modeled on EPODE, (Ensemble, Prévenons l'Obésité des Enfants), a successful intervention from France which comprises political commitment, a scientific base, social marketing and partnerships (Romo M et al. 2009, Borys JM et al. 2012, Leslie E et al. 2015). The OPAL program is funded by three tiers of government – Local, State and Federal.

1.1.2 AIMS AND GOALS OF THE OPAL PROGRAM

The specific aim of the OPAL program was ***'to improve eating and activity patterns of South Australian children, through families and communities in OPAL regions and thereby increase the proportion of 0-18 year olds in the healthy weight range.'*** The following goals guided project implementation:

1. **Increasing healthy eating (HE)** through reducing energy dense nutrient poor food consumption and increasing nutritious food consumption through:

    a. **Increasing healthy food available at outlets** (e.g. schools, cafes, takeaways)
    b. **Increasing healthy meals in and from homes** (e.g. breakfast, lunchbox, breastfeeding)
    c. **Improving local healthy food production, access and distribution** (e.g. food gardens and co-operatives); and

2. **Increasing physical activity (PA)** and reducing sedentariness through:

    a. **Increasing active travel** (e.g. walking, riding, trains, buses)
    b. **Increasing active leisure participation** (e.g. sport, recreation, play, limiting recreational screen time)
    c. **Increasing the use of parks and places** (e.g. trails, play spaces, centres)

and ensuring alignment of these interventions with state, national and international principles, standards or guidelines.

1.1.3 GUIDING PRINCIPLES AND STRATEGIES

The OPAL program is guided by the following principles:

- Is **consistent** with the **EPODE methodology** and State & National HE & PA **guidelines**
- Is **positive and non-stigmatising** – OPAL is sensitive to body image concerns and does not demonise food, behaviours or factors connected with healthy weight
- Adopts a **multi-strategy portfolio** approach which is **evidence-based** with room for **innovation**
- Addresses broad **structural** change in conjunction with **individual** change
- Adopts **community development** principles
- Is **equity focused** – OPAL reaches all parts of the community with a focus on the disadvantaged
- Is **inclusive and respectful of diversity** – working with Aboriginal and culturally and linguistically diverse communities
- Will work in **partnership** with others across sectors, sites and settings
- **Values the local community** and responds to local needs and opportunities
- Uses **sustainable processes** and approaches

The OPAL program utilised seven overarching strategies for its implementation in the targeted intervention communities:

1. **Targeted programs and services**: provide opportunities to participate and experience
2. **Research and evaluation:** produce information to assist decision making
3. **Coordination and partnerships:** formalise relationships between organisations and individuals
4. **Policy, planning and legislation:** produce plans, policies or laws
5. **Infrastructure and environments:** create supportive physical and non-physical environments
6. **Awareness and marketing:** raise awareness and promote
7. **Education and training:** build knowledge and abilities.

1.1.4 OPAL INTERVENTION PROGRAM LOGIC MODEL

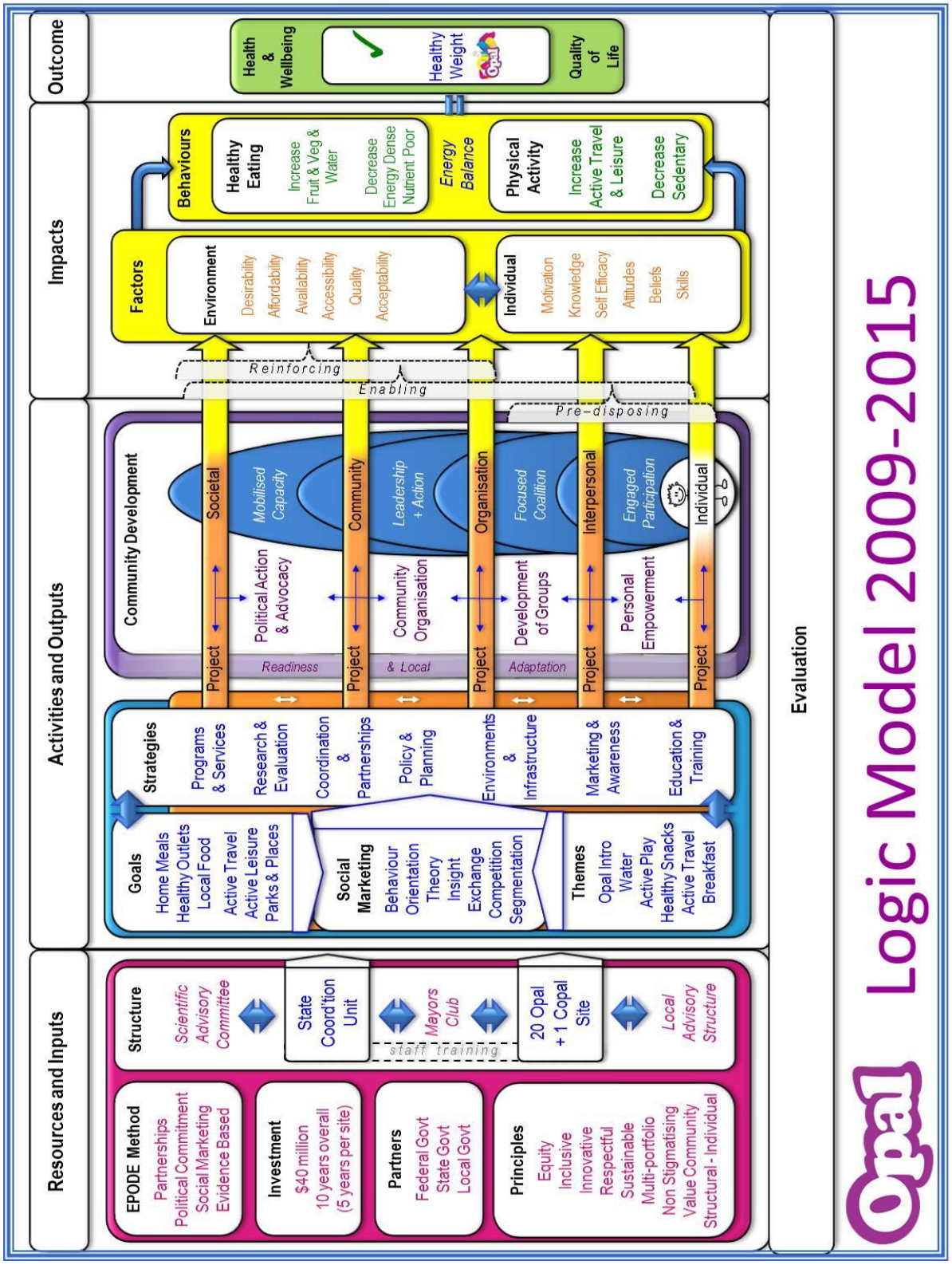

Figure 1: OPAL logic model demonstrating inputs and overall evaluation framework

1.1.5 SOCIAL MARKETING THEMES

At regular intervals OPAL developed a new social marketing theme (every six months in the first year, and then every twelve months). The theme focuses on an aspect of physical activity or healthy eating. To date OPAL has developed and implemented five themes (Table 1). To support the theme a suite of centrally coordinated materials is produced with resources complemented by Council level activity with community stakeholders to create structural, program, educational and policy changes in support of the theme and additional awareness activities.

Table 1: OPAL Social Marketing Themes

Timeline	Theme	Behaviour Target
Feb 2010 – Aug 2010	**'Water. The original cool drink'**	**Encouraging the replacement of sweet drinks with water**
Sept 2010 – April 2011	**'Give the screen a rest. Active play is best'**	**Encouraging less screen time in favour of outdoor activity.**
May 2011 – Jan 2012	**'Make it a fresh snack'**	**Encouraging the replacement of 'junk' food snacks with healthy options.**
Feb 2012 – Jan 2013	**'Think Feet First. Step, cycle, scoot to school'**	**Encouraging children and families to leave the car at home and actively travel to and from school.**
Feb 2013 – Feb 2014	**'A Health Brekky is easy as Peel, Pour, Pop'**	**Promoting a healthy breakfast.**
March 2014 – June 2015	**'Life looks brighter outside'**	**Promoting families to be active in local parks and playgrounds.**

1.1.6 SELECTION OF OPAL COMMUNITIES

The communities selected for **Phase 1** of OPAL (which commenced in September 2009) were the six local councils including Marion, Mount Gambier, Playford, Port Augusta, Onkaparinga and Salisbury. Phase 1 communities concluded the OPAL program early September 2014. The communities selected for **Phase 2** of OPAL (which commenced in September 2010) were the four local councils of Charles Sturt (Inner), Copper Coast, Port Adelaide Enfield, and Whyalla. Phase 2 communities concluded the OPAL program at the end of June 2015. Phase 1 OPAL communities ran for a period of five years and as a result of funding cuts Phase 2 ran for a period of 4.75 years.

OPAL communities were selected based on geographically contiguous suburbs with higher populations of children, higher populations of Aboriginal people, higher levels of disadvantage and higher levels of childhood overweight and obesity. They were also based on their local council's readiness, including articulated commitment to health and well-being, and financial commitment to the OPAL program (Leslie E et al. 2015). Thus, OPAL communities were defined as those communities with contracted political buy-in from Local, State and Federal (from 2009-2014) governments. They had two staff employed through SA Health located in local government acting in a defined, bounded region (whole for rural communities or part of a local government area: LGA in metropolitan regions).

The OPAL program intended to run in each community for a period of five years, commencing with six communities in 2009/2010. Each year, there was a staggered intake of communities reaching a total of 20 South Australian communities across 19 councils and one in the Northern Territory (**Error! Reference source ot found.**).

Table 2: Intake of OPAL communities

	2008/9	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Phase 1 6 Communities	Baseline	1	2	3	4	5			
Phase 2 4 communities		Baseline	1	2	3	4	5		
Phase 3 6 (incl. 1 NT) communities			Baseline	1	2	3	4	5	
Phase 4 5 communities				Baseline	1	2	3	4	5

1.2 BACKGROUND TO THE OPAL PROGRAM

1.2.1 THE PURPOSE OF THE OPAL EVALUATION

The purpose of the evaluation is to determine the effectiveness of the five-year OPAL program, using the underpinning ecological systems theory, social marketing and community development approaches that relates to the OPAL program, to changes within individuals, families, organisations, communities and environments, all of which will be used to explore how and why changes have occurred.

Key outcomes are evaluated in OPAL intervention communities and compared with communities that have not received any OPAL intervention.

1.2.2 PRIMARY HYPOTHESIS

The primary hypothesis underlying the OPAL program is that there will be an increased prevalence of healthy weight in 0-18 year olds in the OPAL (intervention) communities compared with those communities that did not receive the intervention (comparison) following five years of the OPAL intervention.

1.2.3 PRIMARY AND SECONDARY OUTCOME MEASURES

The OPAL Program Logic Model (**Error! Reference source not found.**) was used to identify key informants and ey indicators for the OPAL evaluation.

The **Primary outcome** measure for the Flinders OPAL Evaluation was the percentage change in children within the healthy weight range and change in health-related quality of life, after five years of OPAL implementation in the intervention sites as compared to non-intervention sites.

Secondary outcomes: Impact and process measures relating to the OPAL program activities included the following:

Medium-term outcome measures:

- Changes in eating practices (e.g. fruit, vegetable and energy-dense food and drink consumption)
- Changes in sleep, physical activity (PA) and sedentary practices
- Changes in physical environments (home and school) that can impact on healthy eating and physical activity
- Changes in skills, knowledge, behaviour and attitudes of stakeholders/organisations/community that can impact on HE and PA opportunities, environments and policies (i.e. community capacity building component)

Short-term outcome measures:

- Changes in social norms toward HE and PA, perceived weight

2 FLINDERS OPAL EVALUATION DESIGN AND METHODS

2.1 FLINDERS OPAL EVALUATION DESIGN

The quantitative OPAL Evaluation utilised a quasi-experimental repeat cross section design to obtain a series of 'snapshots' of the frequency and characteristics of the population at a particular point in time. A partial stepped wedge design was adopted. The OPAL intervention communities were matched with ***comparison communities*** for maternal education, geographical location (metropolitan vs. rural), index of relative social disadvantage; (IRSD, a measure of socio-economic status based on a basket of income- and education-related measures), and population of 0-18 year olds to facilitate evaluation of effectiveness. Matches avoided having intervention and comparison communities from within the same LGA. It was anticipated that over time some communities that were initially defined as comparison groups would elect to take up the OPAL program and thus become intervention communities. To account for this occurrence, a grouped matched comparison design was planned, with a 1:2 ratio of intervention to comparison communities in Phase 1 and 2 and then a 1:1 ratio for Phases 3 and 4 employed.

Qualitative measures of community capacity have been collected from the community in OPAL intervention sites at two time points a year apart. The aim of the CCB evaluation was to gain greater insight into CCB as experienced by community groups active in the OPAL communities. This data collection occurred for all Phase 1-4 communities at baseline, but collected at final for Phases 1-2 intervention communities.

2.2 FLINDERS OPAL EVALUATION DATA COLLECTION

Communities are the primary evaluation unit. The OPAL program had a staggered intake of metropolitan, rural and remote communities to reach a total of 20 South Australian communities by 2012, plus one Northern Territory community. Recruitment of communities for the OPAL intervention occurred over four Phases and the OPAL evaluation mirrored the program as closely as possible. Due to some initial delays in obtaining ethics permissions the evaluation for Phases 1 and 2 baseline data collection commenced late October 2011, approximately 2 years after the program began, and finished in May 2012. Baseline data collection for Phase 3 occurred between mid-July and late November, 2012, and for and Phase 4 between late May and mid-August, 2013. Final data collection for Phase 1 was undertaken in terms 3 and 4 2014 and Phase 2 data collection was undertaken in terms 1 and 2 2015. Data collections for the OPAL evaluation were initially planned to continue until 2017, however as a result of significant budget cuts to the program, the evaluation concluded **mid-2015** and subsequently, for this evaluation project, there was no final evaluation for Phase 3 and 4 OPAL communities (see Table 3). Thus, **this Final Report presents the quantitative findings for all OPAL communities sampled in Phase 1 and 2 only, including the differences between OPAL intervention and comparison communities from baseline to the final year of intervention**. (Note: Baseline evaluation for Phase 1 and 2 communities coincided with year 3 of the OPAL program – see Table 3). Community Capacity Building baseline data collection for Phase 1 communities occurred in 2013 and final in 2014. Phase 2 baseline CCB data collection occurred in 2014 and final in 2015.

2.3 FLINDERS OPAL EVALUATION PARTNERSHIPS

The OPAL Evaluation Project team was a consortium of Flinders University (lead organisation), the University of SA, and Colmar Brunton. This team was contracted by SA Health to undertake the evaluation and was managed by the Principal OPAL Evaluation Manager Michelle Jones. Until Sept 2014, the OPAL program had a Scientific Advisory Committee (SAC), chaired by Professor Boyd Swinburn, Deakin University, which provided input and advice regarding the methodology and progress of the evaluation. Members of the SAC provided specific advice to the OPAL Evaluation Manager, SA Health, and peer-review of the procedures and tools used for the evaluation. The SAC was formally dismantled due to a decision by the Premier to reform all boards and committees. An informal network took its place in 2015. The governance structure for the OPAL Evaluation Project is shown in Figure 2.

Table 3: Dates of planned versus actual OPAL Evaluation data collection

	2009	2010	2011	2012	2013	2014	2015	2016	2017
Planned	**Baseline evaluation Phase 1:** 6 ICs, 24 CCs				**Final evaluation Phase 1:** 6 ICs, 6 CCs				
		Baseline evaluation Phase 2: 4 ICs, 12 CCs				**Final evaluation Phase 2:** 4 ICs, 4 CCs			
			Baseline evaluation Phase 3: 5 ICs, 10 CCs				**Final evaluation Phase 3**: 5 ICs, 5 CCs		
				Baseline evaluation Phase 4: 5 ICs, 5 CCs				**Final evaluation Phase 4:** 5 ICs, 5 CCs	
Actual			**Baseline evaluation Phase 1:** 6 ICs, 12 CCs		**Final evaluation Phase 1:** 6 ICs, 6 CCs				
			Baseline evaluation Phase 2: 4 ICs, 8 CCs			**Final evaluation Phase 2:** 2 ICs, 4 CCs			
			Baseline evaluation Phase 3: 5 ICs, 2 CCs				**Final evaluation Phase 3:** *No evaluation*		
				Baseline evaluation Phase 4: 5 ICs				**Final evaluation Phase 4:** *No evaluation*	

2.4 ETHICS AND INFORMED CONSENT

Ethics approvals to conduct the OPAL Evaluation were granted by the Flinders University Social and Behavioural Research Ethics Committee (no. 5195), SA Health Human Research Ethics Committee (no. 442/03/2014), Aboriginal Health Human Research Ethics Committee (no. 04-11-390), and the relevant human research ethics committees from Department of Education and Child Development and SA Catholic Education. Ethics approval for access to the 4-5 year old growth data (CaFHS (Child and Family Health Service) data) was obtained from the Women and Children's Health Network Research Ethics Committee.

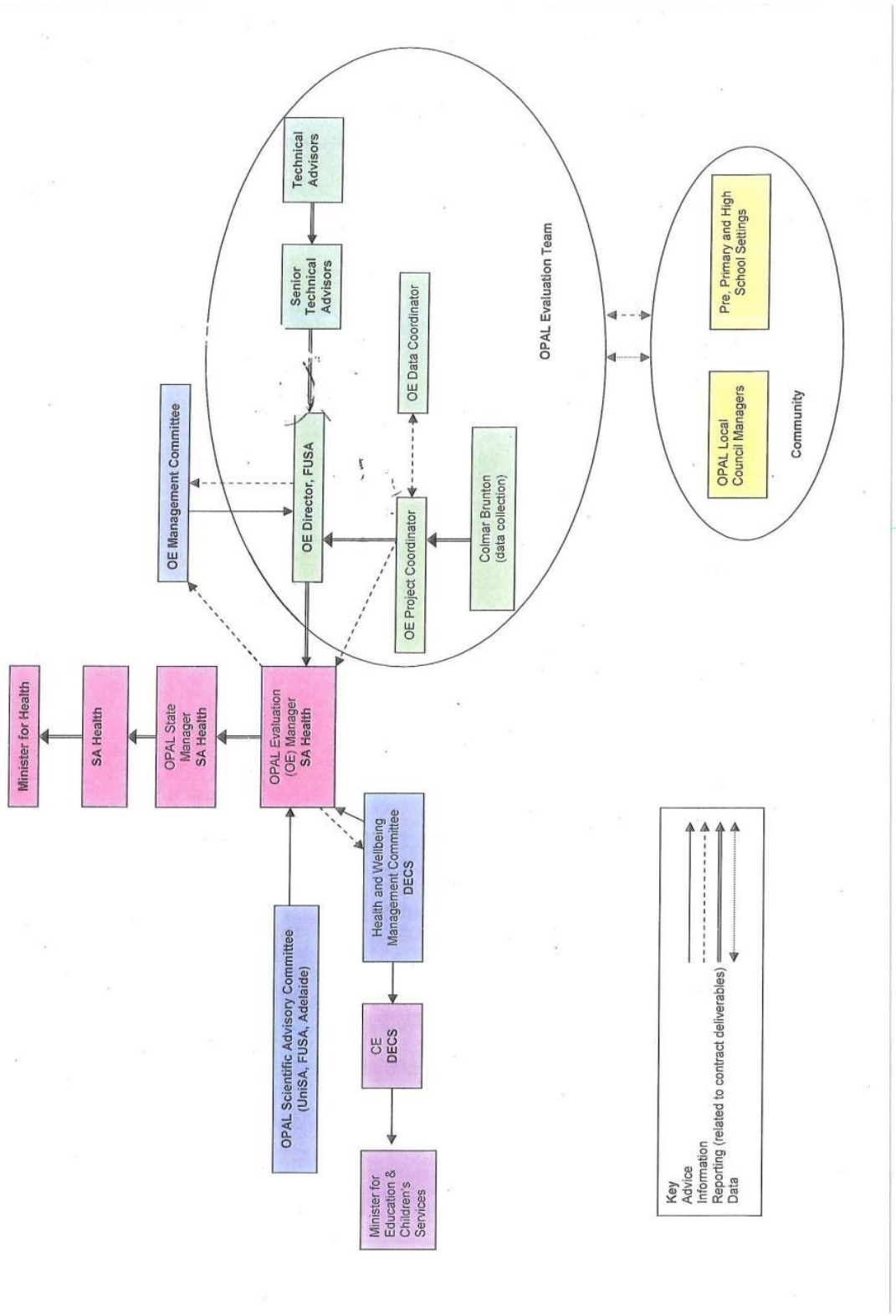

Figure 2: Flinders OPAL Evaluation governance structure

2.5 QUANTITATIVE EVALUATION METHODS

2.5.1 OVERVIEW

In-line with an ecological systems approach, the data collected for the OPAL evaluation included data from three key settings in the selected intervention and comparison communities. These included:

- **Early childhood settings** (i.e. pre-schools and long day care);
- **School settings** (i.e. primary schools, high schools, primary/secondary schools); and
- **Community settings** (councils and community stakeholders).

A summary of the planned data scope for the OPAL Evaluation is provided in Table 4. Outcome measures for evaluation were planned to be collected at three time-points using a repeat cross-section design; baseline (year 1), midpoint (year 3) and at the end of the 5 year intervention (year 5) for each community. Survey data were planned to be collected in Years 1 and 5 (Y1, Y5) for primary and secondary school children and their parents whereas year 3 (Y3) was to be limited to the cross-sectional 4-5 year old weight & height data and principal surveys.

However, as a result of a series of funding cuts the evaluation was scaled back in two stages. The first stage in 2013 resulted in losses of:

- Early Childhood
- Primary Schools - Principals and out-of-school hours care (OSHC) surveys
- High school
- Communities – Stakeholder surveys and Mayors focus groups

The second stage of funding cuts in 2014 resulted in the termination of the evaluation following Phase 2 final surveys. Only parent surveys and student surveys of 9-11 year olds were collected at the final time-point.

A summary of the survey and anthropometric measures available for analyses of final data are outlined in Table 5, by setting, along with the baseline data available to make comparisons between baseline and final year.

Analyses conducted for this Final Report use merged data from Phases 1 and 2 of the baseline and final data collection for primary school students (9-11 years, surveys and measures) and their parents (surveys only), and early childhood growth data (4-5 years) from CaFHS. Therefore, from this point forward, reference will only be made to these data.

Table 4: Summary of planned data collection time-points throughout the OPAL evaluation for all Phases

Setting	Who	Year 1		Year 2		Year 3		Year 4		Year 5	
		INT	COMP	INT	COMP	INT	COMP	INT	COMP	INT	COMP
CaFHS	Analysis of 4-5 year old measures already collected by CaFHS	√	√			√	√			√	√
Early childhood	Parents of 0-5 years survey	√	√							√	√
	Pre-school Director survey	√	√							√	√
	Long Day Care Director survey	√	√							√	√
Primary schools	Parents of 9-11 years survey	√	√							√	√
	9-11 year old children measures and survey	√	√							√	√
	Principals survey	√	√			√	√			√	√
	OSHC Director Survey	√	√							√	√
High schools	14-16 year old children measures and survey	√	√								
	Principals survey	√	√			√	√				
Community	Active OPAL stakeholders Community Capacity Tool	√		√		√		√		√	
	Other key stakeholders survey					√	√			√	√
	OPAL Mayors focus groups	√		√		√		√		√	

Table 5: A summary of the actual survey and anthropometric measures at baseline and final

			Baseline		Final
Setting	**Cohort**	**Survey**	**PHASE 1-3**	**PHASE 4**	**PHASE 1-2**
Early childhood	4-5 years	Parents	√		
		Directors preschool	√		
		Directors daycare	√		
Primary school	9-11 years	Parents	√	√	√
		Principals	√	√	
		Students	√	√	√
		Directors OSHC	√		
Secondary school	14-16 years	Principals	√		
		Students	√		
		Measures			
Early childhood	4-5 years	CaFHS	√	√	√
Primary school	9-11 years	OPAL	√	√	√
Secondary school	14-16 years	OPAL	√		

2.5.2 SURVEY DATA

The sources of survey data used in this Report are:

Primary and Primary/Secondary School

- Children 9-11 years – Student Survey (Appendix 1: Student survey)
- Parents 9-11 years – Parent/caregiver Survey (Appendix 2: Parent survey)

SELECTION OF SURVEY PARTICIPANTS

All in-scope primary schools (defined in section **Error! Reference source not found.**) in the Phase 1 and 2 ommunity sample provided by SA Health were invited to participate in the OPAL Evaluation. At baseline an introductory letter was sent to primary school Principals from the Ministers for Health and Ageing, and Education and Child Development outlining the importance of the evaluation. Contact was made with all Regional Directors to provide information about the evaluation of OPAL. All schools were sent an information pack containing an information letter and brochure, checklist and participation form. Consent for schools to be involved was sought from Principals.

Principals were invited to consent to their school being involved in the evaluation. Parents/guardians from the schools where the Principal agreed to be involved were invited to consent for their child to be involved in the evaluation. Parents of children were also invited to be involved.

All children in years 4-6 (9-11 year olds) in the participating schools were eligible to be involved in the evaluation. Schools received information packs containing letters explaining the evaluation and consent forms to parents via the classroom teachers of the relevant year levels. Students were requested to return the completed consent form with permission to undertake both or either part of the evaluation (anthropometry, web-based survey). Students were also required to provide written and verbal assent to complete the survey and/or the measurements being taken.

SURVEY TOOLS

All survey tools used to collect data were developed in consultation with the SAC and were approved by the relevant ethics committees. Details describing how the individual survey questions map against the key domains of the OPAL Logic Model are available in the OPAL Evaluation Framework Report (Flinders OPAL Evaluation Project team 2013). The source of items, including whether they have been tested for validity and reliability are detailed in Appendix 3: Survey domains and variables collected in the OPAL quantitative evaluation. Response rates are described in Section 3.

SURVEY DATA AND TREATMENT

DEMOGRAPHICS

Socio-demographic data including age, sex, and postcode or town of residence were collected via questionnaire. Area of residence was classified as urban or rural based on the location of the school the child attended. A measure of relative socio-economic status (SES) was determined using the Index of Community Socio-Educational Advantage (ICSEA) scores for schools (Australian Curriculum Assessment and Reporting Authority (ACARA) 2013) categorised as quintiles. The variables to calculate a school's ICSEA score include

socio-economic characteristics of the census collection districts where each student in a school lives, whether a school is in a regional or remote area, proportion of students from a language background other than English and the proportion of Aboriginal students enrolled at the school. ICSEA quintiles are based on national data in 2011 at baseline (cut-offs 940/980/1020/1076/1287) and 2014 at final (cut-offs 942/985/1023/1074/1292), where quintile 1 (Q1) represents school at greatest socio-economic disadvantage and quintile 5 (Q5) represents schools at least socio-economic disadvantage. Given that the ICSEA score is a school-level variable and not an individual-level SES measure, any comments related to social gradient should be treated with caution. ICSEA scores are not available for preschools (Australian Curriculum Assessment and Reporting Authority (ACARA) 2013) and are only used here to quantify socio-economic status of primary schools. Primary outcomes and key secondary outcomes were analysed according to age, sex, locality (urban/rural), SES (ICSEA quintile) and/or Phase of data collection (1 or 2). However, these sub-group analyses should be treated with caution due to the high chance of false positives when several tests are run, each with a small (5%) risk of a false positive.

NUTRITION AND EATING BEHAVIOURS AND ENVIRONMENTS

Questions regarding nutrition and eating behaviours and environments were addressed to 9-11 year old children and their parents. Given the perceived respondent burden, the breadth of items to be included in the survey and their relative importance, and the time restrictions of the total data collection period (i.e. within a one school lesson period), a complete food frequency or 24-hour recall methodology was not possible. Thus questions focused on issues that are relevant to obesity - its determinants and possible environmental correlates and also its prevention, based around the socio-ecological approach of OPAL and social learning theory. To maximise reliability of answers from 9-11 year olds, questions relating to food and beverage consumption referred to the time period of yesterday rather than being framed as 'usual' intake, which children often have difficulty in understanding. All findings are presented as means or proportion (%) of the survey sample.

Intake of fruit, vegetables, discretionary food and beverages

The NHMRC Dietary Guidelines revised in 2013 (National Health and Medical Research Council 2013) recommend an intake of 14 serves of fruit over 7 days (2 per day) and an intake of 35 serves of vegetable (5 per day) for children aged 8 to 16. Students were asked a series of questions regarding their fruit and vegetable intake, which were drawn, where possible, from existing instruments with either proven validity or reliability (Booth ML et al. 2005, de Silva-Sanigorski AM et al. 2010) or have been used in national (Department of Health and Ageing 2008) or state (SA Department of Health 2008) surveys in order to provide comparability or benchmarking with OPAL evaluation findings. Based on the Australian Dietary Guidelines (National Health and Medical Research Council 2013), child intake of fruit and vegetables was estimated from self-reported data regarding the number of serves consumed the previous day. Photographs of food and drinks with serve sizes were provided to assist estimation of portion size. Vegetable intake referred to all potato excluding fried potato (classified as a discretionary food (National Health and Medical Research Council 2013)), other vegetables and legumes. Fruit intake excluded fruit juice. These definitions are consistent with reporting of national (Department of Health and Ageing 2008) and state (SA Department of Health 2008) data. From these data it was possible to identify those students who did not eat fruit or vegetables on the day before completing the questionnaire and the number of serves eaten if these foods were consumed. From these data students were classified according to whether they ate fruit/vegetable yesterday and whether they met the recommended intake. Two serves of fruit and five serves of vegetables were set as recommended intakes based on the revised food modelling of the Australian Dietary Guidelines (National Health and Medical Research Council 2011) and the Eat for Health 2013 Australian Dietary Guidelines (National Health and Medical Research Council 2013). Parents were also asked to report the fruit and vegetable intake of their child the previous day. These data were classified as meeting or not meeting recommendations in the same manner as

for the child report data. The 2 fruit and 5 vegetable values were also used to assess knowledge of recommended serves reported by students. Responses were reported as the number of serves per day.

Students were asked to report whether or not they ate any foods from six groups of discretionary foods yesterday and if yes how much they ate. Response options were number of serves, where a serve was a standard portion or pre-packaged amount (e.g. can of sweetened beverage, muesli bar). The food groups were: (i) sweetened beverages including soft drinks, cordial, (ii) fruit juice and fruit juice drinks, (iii) lollies, chocolate, fruit bars (iv) cakes, doughnuts, sweet biscuits, muffins, muesli bars (v) ice cream, icy poles, ice blocks, and (vi) savoury snacks and/or salty snacks (e.g. potato crisps, corn chips, barbecue-flavoured twists). Usual portion sizes of discretionary foods were provided as a guide, e.g. one muesli bar, two sweet biscuits. Reported serves greater than nine for individual discretionary food items was deemed unrealistic and excluded. Parents were also asked to report their child's intake of these six discretionary food groups the previous day. To determine total intake of discretionary foods (child and parent report), the energy content of an average serve size for the range of items included in each of these groups was determined and reported intake was converted to serves based on one serve equating to 600 kJ of energy (National Health and Medical Research Council 2013) consistent with the Australian Guide to Healthy Eating. For example a serve of sweetened beverage was 125 ml orange juice or a 375 ml can of sweetened soft drink which equate to 153 and 600 kJ respectively. As a proportion of 600 kJ the former represents 0.26 of a serve so a factor of 0.26 was applied to serves of fruit juice to add to serves of soft drink. That is, all serves consumed were converted to 600kJ equivalents. *As the new dietary guidelines* modelling system (National Health and Medical Research Council 2011) does not prescribe the number of serves of discretionary food that should be consumed according to age and sex, as the amount is related to body size and activity level, the number recommended in the previous Australian Guide to Healthy Eating (Kellet L et al. 1998), namely two serves or fewer for 8-11 years, was used as a cut-point.

Water consumption was reported by children as the number of times a day they usually consume water, at baseline, and the number of serves (cups) they usually consume, at final. Whether children consumed milk yesterday or not and if so, how many serves were consumed, was reported by children and parents. Parents also reported the type of milk ('none', 'whole', 'low or reduced fat', 'skim', 'flavoured', 'milk alternatives (e.g. soya, goat, rice)' or 'condensed or evaporated') their child usually consumes as well as whether their child has ever received breast milk and if so the age the child stopped receiving breast milk. Open response questions were also asked regarding the age their child started receiving milk other than breast milk and the age they started solids.

As nutrition data (fruit, vegetables and discretionary food) have been reported as whole numbers for all serves, the results have reduced sensitivity for the measures reported and are likely to be overestimates of serves consumed. Further, it is important to note that the foods identified in the questionnaire are not exhaustive of discretionary foods that might have been consumed and therefore the proportion meeting guidelines is likely to overestimate the actual proportion in the sample.

Eating behaviours

Children's eating behaviours were reported by both children and parents. Children reported whether they had breakfast yesterday or not and the number of days they usually have breakfast in a week. Parents reported the number of days their child ate breakfast in the past week and where their child usually gets breakfast from (home, school canteen or tuck shop, school breakfast program, shop (outside school), from friends, OSHC). Snacking behaviours were captured by asking children whether or not they ate something between breakfast and lunch yesterday, between lunch and dinner yesterday and the overall number of times they ate between meals yesterday. Parents also reported the number of times their child usually eats between meals with responses dichotomised as: 1) three times per day or less ('never', 'once per day', 'two times per day', 'three times per day') and 2) four or more times per day ('four times per day', '5 or more times per day'). Parental perception of how much their child eats compared to others was reported and categorised as 1) 'a lot less', 'somewhat less', 'the same' and 2) 'somewhat more', 'a lot more'.

Environment factors influencing healthy eating

Questions that relate to the eating environment were directed mainly to parents. Parents were asked to respond on a 5-point Likert scale ('never', 'rarely', 'sometimes', 'often' and 'always') to the following questions and/or statements regarding their 'use of food at home': (1) I eat food I want my child to eat, (2) I sit with my child at mealtimes, (3) how often do you or another adult in the house cook an evening meal?, (4) how often does your child help prepare food?, (5) I encourage my child to eat fruit, (6) I encourage my child to eat vegetables, (7) at home we have vegetables at dinner, (8) how often can you child eat snacks and/or sweets without your permission?, (9) how often does your child eat in his/her bedroom?, (10) how often does your child ask for or take a second helping?, (11) I/we use food as a reward for good behaviour, (12) I/we withhold food as punishment for bad behaviour. Responses were dichotomised as: 1) never/rarely and 2) sometimes, often, always. Parents also reported the number of times per week they eat the main meal of the day with their child, the number of days in the past week they ate in front of the TV and the number of days a week their child *usually* eats fast food or takeaway. A home food environment score was created using these items to identify a healthy home environment whereby items 1 - 7 were scored as 'never' = 1, 'rarely' = 2, 'sometimes' = 3, 'often' = 4, 'always' = 5 and items 8 - 12 were reversed scored as 'never' = 5, 'rarely' = 4, 'sometimes' = 3, 'often' = 2, 'always' = 1. The number of days a week the primary and/or secondary caregiver eats the main meal of the day with the child and number of days in the last week the child watched TV while eating their evening meal were open-ended and scored as 1 = 'none', 2 = 'one to three days', 3 = 'four or five days', and 4 = 'six or more days' and 0 = 'six or more days', 1 = 'four or five days', 2 = 'three days', 3 = 'two days', 4 = 'one day', 5 = 'none', respectively. The number of days their child usually eats takeaway was scored as 'less than once per week' = 5, 'once per week' = 4, 'twice per week' = 3, 'three times per week' = 2, 'four or five times per week' = 1 and 'six or seven times per week' = 0. Individual scores were summed to give a continuous score (range 0-75) where a higher score represents a healthier home food environment.

Caregiver knowledge of recommended serves of fruit and of vegetables per day for 9-11 year olds was reported as number of serves per day and dichotomised to 'correct' (≥2 serves of fruit, ≥5 serves of vegetable) or 'incorrect' (<2 serves of fruit, <5 serves of vegetable). Caregiver role modelling was assessed as the number of serves of fruit and vegetables that they usually eat each day. Factors influencing parents' food purchasing were reported on a 4-point Likert Scale and dichotomised as: 1) not important ('not at all important)' and (2) important ('somewhat important', 'important', 'very important') for (i) taste, (ii) cost, (iii) convenience, (iv) nutrition, (v) serving size, (vi) weight control, (v) locally produced, (vi) minimal impact on the environment). Parents were also asked questions relating to food security; whether in the previous month they didn't have money to purchase food and whether their child has ever gone without food, and if so, on how many days. Whether there is a farmers/produce market in their area and if yes, how often it operates ('monthly', 'fortnightly', 'weekly', 'daily', 'don't know') and how often they buy produce from it ('never', 'monthly', 'fortnightly', 'weekly', 'daily') was reported by parents. The distance to the nearest supermarket and the number of greengrocers within 10 minutes of their home were also parent reported. The number of days per week their child attends school and takes lunch from home were reported by parents of students. Purchasing of food and drink on the way to school and home from school was also parent reported on a 5-point Likert scale: 1) 'never', 2) 'sometimes', 3) 'often', 4) 'usually', and 5)' always'. Parent also reported whether they had received useful information from the following groups or organisations promoting healthy eating in the past 12 months: 1) schools, 2) local council, 3) sporting clubs, 4) youth groups, 5) other, 6) none.

Children were asked a few questions relating to their home food environment. Availability of fruit at home and encouragement to eat healthy food by their family and friends (female carer, male carer and friends) were reported on a 4-point Likert scale and dichotomised a: 1) yes ('a lot', 'somewhat', 'a little') and 2) no ('not at all'). Whether or not children have a say in what foods are bought at home, what goes on their plate and how much they eat, were also reported by children.

PHYSICAL ACTIVITY, SEDENTARY BEHAVIOURS, SLEEP AND ENVIRONMENTS

Questions used to assess physical activity and sedentary behaviour were designed to explore the following aspects: actual behaviours, knowledge, and social and physical environmental determinants. These were based on the Bronfenbrenner model of behavioural determinants (Bronfenbrenner U 1979), capturing individual, interpersonal and environmental correlates and determinants of behaviour. The tools have been drawn, where possible, from existing instruments with proven validity and reliability (i.e. validated items of the *Health Behaviour of School Children Study (Currie C et al. 2009, Roberts C et al. 2009).* They assess behaviours in the main domains of physical activity (sport, play, active transport and chores) and screen time (television, videogames and computer use) and using a time-diary format, the times when activities were performed. As far as possible, the following principles were adhered to: (1) use "yesterday" recalls rather than "usual day" recalls, (2) use continuous rather than categorical scales, (3) minimise respondent burden, and (4) use age-appropriate questions and expression. All findings are presented as frequency (n) and proportion (%) of the survey sample.

Physical activity and sedentary behaviour

The 2014 Australian Physical Activity Guidelines (Department of Health 2014) recommend that children get at least 60 minutes of moderate to vigorous physical activity each day. The OPAL surveys contained a question, based on a validated item from the *Health Behavior of School Children Study*: "Over the last 7 days, on how many days were you physically active for a total of 60 min per day?" This question was used to estimate the percentage of children meeting the guidelines (i.e. active on all 7 days of the last week), and the average number of active days in the last week. As physical activity patterns differ between boys and girls, data are reported separately by sex. Time spent playing sport (e.g. football, netball), in active play (e.g. playground games), getting around actively (e.g. walking, cycling) and active chores (e.g. tidying your room) was reported by children (at baseline only) for various periods during the day on both school days and non-school days. These times were summed for each time period and an average time spent being active on school ('before school', 'at recess',' at lunch time', 'during school' and 'after school') and non-school days ('before breakfast', 'between breakfast and lunch', 'between lunch and dinner,' 'after dinner') was determined. In addition, parents reported whether their child's free time was spent being inactive or active, the time their child spent outside on the previous day their child was at home, and the number of times per week their child is involved in organised games, sport or dance (outside of school).

Sedentary behaviour was operationalised as screen time, reported to be an acceptable surrogate for overall level of sitting in children (Olds TS et al. 2010). The 2014 Australian Physical Activity Guidelines recommend that children get no more than 120 minutes of screen time (television, computer and videogame use) for entertainment each day. The OPAL surveys contained an item, modified from a validated question from the *Health Behavior of School Children Study*: "Over the last 7 days, on how many days did you get at least 120 minutes (or 2 hours) of screen time (TV, videogames or computer use) per day outside of school hours?" This question was used to estimate the percentage of children meeting the guidelines (i.e. ≤120 minutes on all 7 days of the last week), and the average number of days with no more than 120 minutes of screen time in the last week. Children were also asked (at baseline only) to report how much time they spent watching television, videos or DVD's, using the computer or playing videogames (sitting or active) at various periods during the day on both school days and non-school days. These times were summed for each time period and an average time spent in sedentary activity on school ('before school', 'during school' and 'after school') and non-school days ('before breakfast', 'between breakfast and lunch', 'between lunch and dinner', 'after dinner') was determined. In addition, parents reported the time their child spent yesterday on TV and computers.

Environment factors influencing physical activity and sedentary behaviour

Questions that relate to the physical activity environment were directed mainly to parents (family environment). Home availability of the following physical activity equipment was reported by parents: 1) tricycle/bike/scooter, 2) basketball hoop, 3) skipping rope, 4) active video games, 5) swimming pool, 6) roller skates, skateboard, scooter, 7) fixed play equipment e.g. swing set, 8) trampoline, 9) sandpit, 10) bats and/or balls, 11) features like cubby houses, trees to climb, 12) other, was reported by parents on a 7 point frequency scale of usage by the child for each item ('not available', 'available but never used', 'once a month or less', 'once a fortnight', 'once a week, 'two or three times a week', '4 times a week or more') and dichotomised to 'available' and 'unavailable' to determine a total score (0-12) of activity items available in the home. The number of items in the home used at least once per fortnight was determined by collapsing responses as follows: (1) used less than once per fortnight ('available but never used', 'used once/month') and (2) used at least once per fortnight ('used once per fortnight', 'used once per week, 'used two to three times per week', 'used more than four times per week'). Similarly, parents reported the availability and use of 10 locations in their neighbourhood for child activity: 1) indoor recreation or exercise facility, 2) beach, lake, river, or creek, 3) bike/hiking/walking trails, paths, 4) basketball court, 5) other playing fields/courts (e.g. football, softball), 6) indoor swimming pool, 7) public park, playground or open space, 8) friend or relative's home, 9) school grounds (during non-school hours), 10) swimming pool (during warmer months). Responses for each item were obtained on a 7 point frequency scale of availability and usage by the child (as above) and responses were dichotomised to 'available' and 'unavailable'. A total score (0-10) was created for '*number of community facilities available for physical activity'.* The number of community facilities used at least once per fortnight was determined as per above. Parents also selected the type of activities, meetings or events that they had attended in the past 12 months from the following list: 1) school activity involving physical activity for your child, 2) School activity involving healthy eating, 3) Community garden, 4) Community event involving physical activity for your child, 5) Community event involving healthy eating activities for your child, 6) other and 7) none.

The time it takes to get from home to school by walking, driving and in other transport was reported by parents and responses collapsed to create an 'active transport' variable with 'yes' reflecting walking, scooter (other) or bike (other) and 'no' reflecting driving, bus, train etc. Presence of a park within 10 minutes walking distance from home was a 'yes/no' question. Parents also reported whether they had received useful information from the following groups or organisations promoting physical activity in the past 12 months: 1) schools, 2) local council, 3) sporting clubs, 4) youth groups, 5) other, 6) none. The degree to which parents felt their neighbourhood was safe for their child to be out alone after dark was reported on a 6-point scale: 1) very safe, 2) safe, 3) reasonably safe, 4) unsafe, 5) very unsafe, 6) don't know. Caregiver knowledge of physical activity recommendations (reported as minutes per day) was assessed against the National Physical Activity Guidelines (Department of Health 2014) and dichotomised to 'correct' ($\geq$60 minutes per day) and 'incorrect' (<60 minutes per day). Caregiver role modelling was assessed as the frequency (times per week) that the primary and secondary caregivers participated in $\geq$30 minutes of physical activity in a week.

Children were asked a few questions relating to their activity and sedentary environment. Encouragement to be active by family and friends ('mother', 'father', 'male cousins or brothers', 'female cousins or sisters', 'friends') was reported on a 4-point Likert scale ('a lot', 'somewhat', 'a little', 'not at all'). Children's perception of their teachers as role models for being physically active and of their schools' encouragement of all students to be physically active at lunch time and recess were reported on 5-point Likert scales of 'excellent, 'good', 'OK', 'not very good', 'poor' and 'a lot', 'somewhat', 'a little', 'not at all', 'not applicable' respectively . The degree to which they are bothered by traffic, dogs and other people was reported and dichotomized as: 1) 'a lot', 'somewhat', 'a little' and (2) 'not at all'.

Home availability of sedentary equipment covered the number of TVs, computers (desktops, laptops, iPads) and video game consoles (Xbox, PlayStation excluding Wii) in the household. Presence of a TV in the child's bedroom and whether the child has a mobile phone were 'yes/no' questions. Another item asked about the TV being left on even when no one was watching, with responses on a 5 point frequency scale ('all the time', 'frequently', 'sometimes', 'occasionally', 'never'). Caregivers were further asked if they set rules on children's

usage of TV, video games or computer (1 item) with response options being 'a lot', 'somewhat', 'a little', 'not at all'. A score (1-9) reflecting 'TV rules' was created as a sum of 'rules regarding child's TV watching' (1 = not at all, 2 = a little, 3 = somewhat, 4 = a lot) and 'TV left on' (1 = all the time, 2 = frequently, 3 = sometimes, 4 = occasionally, 5 = never), whereby higher scores reflect a more favourable home environment. Caregiver knowledge of recommendations (reported as minutes per day) for the time a child should watch TV/videos/DVDs or play computer or electronic games was assessed against the National Physical Activity Guidelines recommendation for children 5-12 years (Department of Health 2014) and dichotomised into 'correct' (less than or equal to 120 minutes per day) or 'incorrect' (>120 minutes per day). Caregiver role modelling for sedentary behaviour was assessed as the amount of time the primary and secondary caregivers spent watching TV per day.

Sleep

There is considerable cross-sectional and longitudinal evidence suggesting that short sleep duration is associated with a greater risk of obesity in children (Cappuccio FP et al. 2008). In the OPAL intervention, children reported school day (Monday to Thursday) and non-school day (Saturday) wake up and bed times, allowing us to calculate time in bed. Time in bed is a good proxy for sleep duration, but is likely to be greater than sleep duration because it ignores waking after sleep onset, but also does not include daytime naps.

School day wake times were culled to permit only times between 0300 and 0900 (based on the fact that school starts about 0900, and data from the National Children's Nutrition and Physical Activity Survey (NCNPAS) (Department of Health and Ageing 2008) suggest almost no awakenings before 0300). Any school day bed times after 0200 and before 1900 were culled, based on data from the NCNPAS (Department of Health and Ageing 2008)(ref). On non-school days, wake up times before 0300 and after 1400 were culled, as were bed times after 0200 and before 1900, again based on NCNPAS data.

Sleep duration was calculated as the difference between bed time and wake up time. Sleep time has been averaged across school and non-school days, with a 1:1 weighting, based on the fact that children spend about one day in two in school across the course of a year.

There are no universally agreed guidelines for sleep duration for children and adolescents (Matricciani L et al. 2013), but the most commonly cited are those from the US National Sleep Foundation (NSF) (National Sleep Foundation 2015) which recommends that children in this age group get 9-11 hours of sleep. 7-8 hours and up to 12 hours may be appropriate for some children. On the basis of this classification, children's reported sleep was classified as:

- *meeting guidelines* (540-660 min/night);
- *not meeting guidelines* (<540 or >660 min/night)

Of 4484 records, plausible bed and wake time data were available for school days for 3139 children, and for non-school days for 3099 students. Plausible data for both types of day were available for 2286 students.

PERCEIVED HEALTH AND WEIGHT STATUS

Children reported on a 5-point Likert scale ('excellent', 'very good', 'good', 'fair', 'poor') how they perceive their health. Parents reported their perception of the primary caregiver, secondary caregiver, and their child's weight status. Responses were dichotomized as not overweight ('underweight', 'normal weight') and overweight ('somewhat overweight', 'very overweight').

2.5.3 ANTHROPOMETRIC MEASURES AND DATA TREATMENT

The sources of anthropometric data used in this report are:

- Children 4-5 years – early childhood
- Children 9-11 years – primary school

Measurement rates are described in Section 3. Anthropometric data are described in this report according to the following sequence: Early childhood, primary school. As measurement data for 4-5 year olds in OPAL intervention and comparison communities were obtained from secondary sources not collected by the Flinders OPAL Evaluation team, these data are reported separately to measurement data for 9-11 years olds in the next section.

EARLY CHILDHOOD (4-5 YEARS)

Early childhood (4-5 years) growth data for children living in OPAL intervention and comparison communities were obtained from the Child and Family Health Service (CaFHS) of the Women and Children's Health Network (formerly known as the Child Youth Women's Health Service (CYWHS)). These data are collected routinely throughout the year. De-identified data sets accessed at suburb levels are presented in this Report for the children residing in the suburbs in the intervention and comparison communities for OPAL Phases 1 and 2. These data are used to describe weight status for 4-5 year olds in OPAL communities across the intervention period.

This Report analyses data on children who were 4-5 years old prior to the start of the OPAL program in Phase 1 and 2. Thus, cross-sectional data from September 2008 – August 2009 were used for Phase 1 baseline (reported as year 0, (Y0)) and from September 2009 – August 2010 for Phase 2 baseline (reported as Y0). Cross-sectional data was collected every year thereafter for a total of 5 years, reported as Y1, Y2, Y3, Y4, Y5 for Phase 1 communities and a total of 2 years for Phase 2 communities, reported as Y1 and Y2 (no data supplied at the date of reporting for Y3, Y4, Y5). However, due to insufficient data supplied for Y4, Phase 1 analysis was conducted only for Y0, Y1, Y2, Y3 and Y5.

For consistency in reporting for previous OPAL reports and on the basis that the data collection may have been inaccurate, the following data management was undertaken:

- Any participant with a weight below 10 kg or above 60 kg was removed from analysis.
- Any participant with a height below 80 cm or above 140 cm was removed from analysis.
- Any participant with a BMI < 10 $kg.m^{-2}$ was removed from analysis.

Body mass index (BMI) was calculated as weight (m)/height^2 (cm) and z-score determined using the UK 1990 reference data (Cole TJ et al. 1995) and weight status determined by applying International Obesity Task Force (IOTF) cut-points to BMI (Cole TJ et al. 2000, Cole TJ et al. 2007). Underweight (corresponds with an adult BMI cut point of <18.5 kg/m^2), healthy weight (18.5 to <25 kg/m$^{2)}$, overweight (25 to <30 kg/m^2), obese (≥30 kg/m^2). Means (height, weight, BMI, BMI z-score) or proportions (prevalence of underweight, healthy weight, overweight, obesity, and combined overweight and obesity) are reported for cross-sectional data across the 5 years for Phase 1 and 2 years for Phase 2. The changes across these periods reported and analysed for statistical significance (Note: weight status models were adjusted by age).

PRIMARY SCHOOL (9-11 YEARS)

Each consenting child was measured in a private and screened area, out of view of other children, by a trained researcher. They were asked to remove their shoes and any heavy outer garments before measuring. Waist measurements were taken outside a shirt or blouse using a flexible tape. Two measures were recorded for

each of height, weight and waist circumference. If these two measure differed by more than 0.5 cm, 0.5 kg or 0.1 cm for height, weight and waist circumference respectively a third measure was recorded.

Details of measurement techniques are fully described in Appendix 4: The International Society for the Advancement of Kinanthropometry (ISAK) measurement protocols. All measurements were obscured from the child's view and recorded by the researcher without being discussed with the child, in line with the Body Image Guidelines developed and endorsed by the OPAL Scientific Advisory Committee (Appendix 5: Scientific advisory committee Body Image Guidelines). Researchers were trained in issues around body image, cultural sensitivities, mandatory reporting and anthropometry, and how to respond appropriately and respectfully, without providing measurements, to anyone who requested the information. Training included reliability and validity (inter and intra-tester error) and monitoring of techniques and interpersonal interaction.

Height, weight and waist circumference were determined as the mean of two measures or the median if three measures were taken. Body Mass Index (BMI) was calculated as weight (kg) divided by height (m) squared. Children were categorised as underweight, normal weight, overweight or obese using the International Obesity Taskforce cut-points (Cole TJ et al. 2000, Cole TJ et al. 2007), as per that for 4-5 year growth data. Similarly, BMIs were converted to age- and sex-specific z-scores using the UK 1990 reference data (Cole TJ et al. 1995). Means (height, weight, waist circumference, BMI, BMI z-score) or proportions (prevalence of underweight, healthy weight, overweight, obesity, and combined overweight and obesity) are reported as cross-sectional data for baseline (year 3) and final (year 5) and the changes across the two years are reported and analysed for statistical significance (Note: BMI, weight and waist models were adjusted by age and ICSEA score, BMI z-score model was adjusted by ICSEA score, height model was adjusted by age, weight status models were adjusted by age and ICSEA score).

2.5.4 STATISTICAL ANALYSIS – SURVEY AND ANTHROPOMETRIC DATA

The data were collected, checked and edited before being analysed. All statistical analyses were conducted using IBM SPSS Statistics version 22 (SPSS Inc., Chicago, IL, USA), STATA statistical software, version 14.0 (StataCorp 2012), and R version 3.1.2 (R Core Team 2014). Means were calculated for continuous data. Proportions are presented as percentages of the respective denominator.

REGRESSION MODEL

A linear regression model was used to estimate the changes of continuous measures between year 3 (baseline) and year 5 (final) for intervention and comparison communities. The time x group interaction was also assessed in the regression model. The following expression was used to determine the change of measures for interval data between baseline and final across intervention and comparison communities.

$$IC_{change} = IC_{final\ measure} - IC_{baseline\ measure}$$

$$CC_{change} = CC_{final\ measure} - CC_{baseline\ measure}$$

$$IC\&CC_{change} = IC_{change} - CC_{change}$$

A binary logistic model was used to estimate the relative change of binary measures (proportions) between year 3 (baseline) and year 5 (final) for intervention and comparison communities. Regression coefficients were expressed as odds ratios and considered statistically significant if their 95% confidence interval (CI) did not include unity. The greater the odds ratio deviates from 1, the stronger the association between the exposure variable and the condition being studied.

To account for the heterogeneity of measures between children within the community, the models were adjusted by a small unit of area called suburb. The models were also adjusted by child age and/or ICSEA score, described in table footnotes. All analyses were performed with two-tailed tests and the level of significance was set at $P < 0.05$. Where appropriate, 95% confidence intervals (95% CIs) were reported along with P values.

MULTILEVEL MODELLING APPROACH

A multilevel modelling approach was adopted as a result of the hierarchical structure of the data (children nested in schools). This model was used to explore changes from baseline to final across intervention and comparison communities in weight status (4-5 years and 9-11 years), diet (proportion meeting guidelines for fruit, vegetables and discretionary food), physical activity (proportion meeting activity guidelines), sedentary behaviour (proportion meeting screen time guidelines), active travel (likelihood of student using active travel), neighbourhood environments (presence of a farmers/produce market, attendance at a community garden), and food security (likelihood of parents rating cost as important). As the number of schools within the neighbourhood (suburb or postcode) was too small, the models were restricted to a two-level random slope model. The models (described below) were adjusted by age (as a child level characteristic; continuous variable) and ICSEA score (as a school level characteristic). ICSEA scores are based on national data in 2011 at baseline and 2014 at final.

Two-level random slope regression model

We started by estimating a two-level random slope regression model for interval scale data. Analytically, the model used was:

$$y_{ij} = \beta_0 + \beta_1 age_{ij} + \beta_2 ICSEA_{ij} + \beta_3 ICCC_{ij} + \beta_4 T1T2_{ij} + \beta_5 ICCC_{ij} \ x \ \ T1T2_{ij} + u_{0j} + u_{0j} ICSEA_{0j} + e\_ij$$

where Y_{ij} is an outcome measure (for example, child's BMI) . $\beta_0$represents the intercept term in the model and $\beta_1 to\ \beta_5$ are the fixed and interaction effect regression coefficients of age, ICSEA score, INT/COMP group, Baseline/Final and INT/COMP x Baseline/Final respectively. The random effect terms for schools (u_{0j}) captured the natural heterogeneity between schools. We allowed the slope for ICSEA score to vary at the school level, estimating a variance-covariance matrix consisting of intercept variance σ^2_{u0} and slope variance for ICSEA score σ^2_{u1}. The *xtmixed* function in STATA version 14 was used to estimate the parameters.

Two-level random slope binary logit model

A similar modeling strategy was adopted to examine binary data using a multilevel mixed-effect logistic regression model. In the binary logit model we started by estimating a two-level logistic regression model for binary outcomes. This model establishes that the binary outcome Y_{ij} follows a Binomial distribution of the form $Y_{ij} \sim Binomial(1, p_{ij})$ with conditional variance $var(y_{ij}|p_{ij}) = p_{ij}(1 - p_{ij})$, where p_{ij} is the probability of, for example, meeting guidelines for diet, physical activity or sedentary behaviours of child i of school j. Analytically, the model used was:

$$logit(y_{ij}) = \beta_0 + \beta_1 age_{ij} + \beta_2 ICSEA_{ij} + \beta_3 ICCC_{ij} + \beta_4 T1T2_{ij} + \beta_5 ICCC_{ij} \ x \ \ T1T2_{ij} + u_{0j} + u_{0j} ICSEA_{0j} + e\_ij$$

Since the equation of the logit model represents the log of the probability of, for example meeting guidelines, the exponential of the coefficients of the model was interpreted in terms of odds ratios. The *xtmelogit* function in STATA version 14 was used to estimate the parameters.

2.5.5 HEALTH-RELATED QUALITY OF LIFE AMONG CHILDREN

Health-related quality of life (HRQoL) is a multidimensional construct that measures the impact of health or disease on physical and psychosocial functioning (Fontaine KR et al. 2001, Naughton MJ et al. 2003). HRQoL has been widely used not only in clinical practice but also in the evaluation of public health and health promotion interventions (National Institute for Health and Clinical Excellence (NICE) 2009, Lehnert T et al. 2012). The OPAL evaluation provides a unique opportunity to assess changes over time in HRQoL as a consequence of the introduction of the OPAL intervention in South Australian communities. Obesity is a growing public health problem for Australia and internationally. OPAL and other public health interventions may therefore potentially have a major impact in improving the HRQoL of children through the prevention of childhood obesity with subsequent longer term benefits in HRQoL sustained into adulthood. The preliminary results using Phase 1 and 2 OPAL data found that compared with healthy-weight children and adolescents, HRQoL was poorer for underweight and overweight or obese young people (Chen et al, 2014).

Within the OPAL evaluation HRQoL was measured using a new generic preference-based measure, the Child Health Utility 9D (CHU9D), which is specifically designed for application within cost utility analyses of health care treatment and preventive programs targeted at young people (Stevens K 2009, Stevens K 2011). In contrast to other generic preference based measures of HRQoL that have been modified from existing instruments originally developed for adults, the CHU9D was developed from its inception with young people (Chen G et al. 2015). The dimensions included in the CHU9D were identified from in-depth qualitative interviews with young people with a variety of chronic and acute health problems which aimed to explore how their health affects their lives (Stevens K 2009).

The CHU9D has nine dimensions: worried, sad, pain, tired, annoyed, schoolwork, sleep, daily routine, ability to join in activities, with 5 different levels representing increasing levels of severity within each dimension. Originally developed for use with younger children aged 7 to 11 years, several recent studies have demonstrated the practicality, face and construct validity of the CHU9D in older adolescent populations aged 11-17 years (Ratcliffe J et al. 2011, Ratcliffe J et al. 2012, Stevens K et al. 2012, Chen G et al. 2015). As a consequence of this work to establish its validity in Australian adolescents, the CHU9D has been incorporated into the latest wave of the Longitudinal study of Australian children [http://www.growingupinaustralia.gov.au] and the second Australian child and adolescent survey of mental health and wellbeing (Lawrence et al, 2015).

The CHU9D instrument was administered as a component of the OPAL evaluation. The instrument formed part of the child survey for primary school students. Participants were instructed to complete the CHU9D from the perspective of their own current health. The instrument was scored using the newly developed Australian adolescent specific scoring algorithm (Ratcliffe J et al. 2015). The algorithm is preference based, generating utility values on the 0 to 1 quality adjusted life year (QALY) scale, and is thereby suitable for application in the measurement and valuation of health benefits for the economic evaluation of the OPAL program.

2.5.6 ECONOMIC EVALUATION

The total costs relating to the provision of the OPAL program reflect two main elements: firstly, the costs associated with the development and administration of the State Co-ordination Unit and secondly, the costs associated with council expenditures (reflecting OPAL grant expenditures plus any additional local council expenditures relating to the OPAL program).
The costs associated with the State Co-ordination Unit in phases 1 and 2 include expenditures upon several key elements listed below:

- Coordination (State Co-ordination Unit and license agreements related to the OPAL program)
- Administration (stationary and the development of a single IT platform for recording information on council grants and programs)
- Awareness and social marketing (theme based materials including printing, market research, art work and creative services)
- Education (staff training and development, travel (national and international).
- Salaries (OPAL field staff including equivalent FTE time spent working for the OPAL program by state manager, social marketing manager, evaluation manager, project officer and administrative officer plus a manager and support officer within each of the intervention communities in phases 1 and 2).
- Research and evaluation
- Local Government Council grants and additional expenditures

The costs associated with Local Government Council expenditures include grants and expenditures include grants made by SA health to local councils plus the additional local council expenditures attributed to the OPAL program. In the absence of complete information from Local Councils, additional expenditures have been calculated based on the initial OPAL agreement that SA health funded grants would be matched one on one by local government funding. The total costs relating to the provision of the OPAL program (state wide co-ordination unit, research and evaluation, grants to local councils and additional local council expenditures) were calculated and divided by the number of individuals in each of the intervention communities in phases 1 and 2 who could reasonably have been expected to have benefited from the OPAL programme to estimate the average total cost of the OPAL program at an individual level. Further examination of the single platform data revealed that 100% of the total OPAL program expenditures could be attributed to activities relating to children in the 0-18 year old age range. This information was utilised to generate the average costs of the OPAL program at the individual level for students in the intervention communities.

2.6 QUALITATIVE EVALUATION METHODS

2.6.1 OVERVIEW

Community capacity building (CCB) has been a significant component of the OPAL program. Whilst there are centrally determined social marketing themes that inform a schedule of activity and focus, OPAL Program objectives specify that "*OPAL will be shaped by the community and its needs, and the program will look different in each area*". Consistent with this community orientation, community development is the practice approach of OPAL, combined with program development and social marketing (OPAL Collective 2015).

A comprehensive discussion of OPAL practices is outlined in the paper published by *Health Promotion International,* 'Practitioner insights on obesity prevention: the voice of South Australian OPAL workers'[1], written as a collaborative paper by all OPAL staff in a process facilitated by Fiona Verity (OPAL Collective 2015). The paper explores obesity prevention OPAL practitioner insights from over two years of reflective sessions. It is structured using four themes; what is unique in the OPAL model, the value of reflective practice in obesity prevention, relational approaches in prevention work, and finally, insights for practice and policy makers.

The CCB evaluation was designed and conducted to gain a modest insight into the textured nature of community capacity building as it is taking place in the geographic areas where OPAL has a presence. In some respects, it is a window into community capacity at points in time, where the view through the window is formed by the collective agreement of those involved in a particular project. It is based on an interpretive approach that explores meanings that people use to describe and make sense of their world (Sarantakos S 1998). In the CCB evaluation, the focus is on interpretation of community capacity building over time, and the role of OPAL in supporting or contributing to this community capacity. All groups in the CCB evaluation have some focus on either physical activity or healthy eating/food security.

The material in this Report is one source of information about community capacity building in the OPAL Program. It compliments practice knowledge gained by OPAL staff, and the detailed evaluation material recorded on the SA Health OPAL Single Platform. The CCB evaluation findings are not about ascertaining causality but are about describing qualitative insights and views about community development processes, outcomes and value.

2.6.2 DEFINITIONS

One of the important undertakings in designing this evaluation was to be clear on a definition of community capacity building. In a large literature, the notion/practice is described in varying ways and promoted for different reasons (Verity F 2007). NSW Health (NSW Health 2001) define capacity building as:

1. "a 'means to an end', where the purpose is for others to take on programs;
2. an 'end' in itself, where the intent is to enable others, from individuals through to government departments, to have greater capacity to work together to solve problems;
3. a process, where capacity building strategies are routinely incorporated as an important element of effective practice".

The approach taken in this evaluation has been to view CCB as an approach that combines 'community' motivation, effort, time and resources, and leadership directed towards 'community' identified goals. These elements are the palette of change. It is common that capacity building is described using the metaphor of a journey, where the process and the destination beyond, all have value. Some authors explicitly relate community capacity to social capital concepts, and here there is delineation of the dimensions of social, human, financial and cultural capital (Eichler M 2002). Community capacity building in any context will change over time as circumstances shift, including the external context. It is also highly interpretative and CCB will be viewed by various groups differently depending on their value perspective, unique knowledge of their context and issues and level of involvement or participation.

Community is a fundamental concept in CCB. It is most likely to refer to some combination of Community as place: geography, workplace, geo-political space; Community as social system: networks, bonds and interactions between people; and Community as interest based group: heterogeneous groups of people who come together because of common interests or aspirations, to achieve common tasks, work in common occupations, or unite in common causes. It is well established that community is a contested notion and within any community development project there will simultaneously be a range of feelings, thoughts and desires for 'community'. This has a direct bearing on the evaluation of CCB in OPAL, as the Program has operated in council areas each with their own distinctive 'community' context. Across OPAL geographic sites, there are variations in demographic, cultural and socio-economic characteristics, community infrastructure, resources and networks. Moreover, many areas have rich tapestries of locality based community development, both instigated by residents or community groups and funded by governments through programs like the 'Stronger Families and Communities', local councils or SA Health programs like 'Eat Well Be Active'. OPAL is one player in the local community. The above provides important context for this CCB evaluation.

2.6.3 EVALUATION METHOD: CREATING A WINDOW INTO CCB IN OPAL SITES

As indicated above, community development or capacity building is one of the approaches in the OPAL program. The aim of the CCB evaluation is to gain insight into CCB, as experienced by a community group active in the OPAL network, and to do this at two time points. At each time point a CCB reflective discussion took place, guided by a modified version of the Public Health Agency of Canada's *Community Capacity Building Tool*. Developed by practitioners and academics the tool identifies nine features, which together, constitute the inputs of community capacity building. It is purposefully designed to support groups gain a 'snapshot' of where they are at on a journey of capacity building (Public Health Agency of Canada 2005).

The features in the *Community Capacity Building Tool* are: participation, leadership, skills and knowledge, community structures, external supports and linking, obtaining resources, sense of community and asking why. Under each feature are a set of reflection questions each with four journey markers: just started, on the road, nearly there, and we're there (For a copy of the Tool, see http://www.phac-aspc.gc.ca/canada/regions/ab-nwt-tno/downloads-eng.php). In the OPAL CCB evaluation, 6 features from the Tool were used: participation, leadership, skills and knowledge, linking/obtaining resources, sense of community and asking why. These are defined in the results section. External supports and linking and obtaining resources were collapsed to form one CCB feature, and feedback from a pilot session was that community structure was redundant for the purpose of this CCB evaluation as all groups were community structures.

Each participating community group came to a consensus assessment on their CCB journey for each of the 6 features using the journey markers which the evaluator scored from 1-4.

- *Just Started* is scored by 1.
- *On the Road* is scored as 2.
- *Nearly There* is scored as 3.

- *We're There* is scored as 4.

The consensus assessment is depicted in spider diagrams for Time 1 and Time 2 which rank the journey. This form of diagrammatic assessment is an approach used by Bjaras and colleagues (Bjaras G et al. 1991), and modified since by others. In addition to the group CCB assessments, the evaluator accessed project material and reports which provides information about the group and its activities. No participants are named and the groups are identified by the title of a broad focus area.

2.6.4 EVALUATION PROCESS

The conduct of the CCB evaluation has been an engagement process with 7 steps.

1. Introductory session with all OPAL teams to explain the purpose of the CCB evaluation, the evaluation method and seek support for recruitment of participants;
2. Liaison and discussion with the site OPAL manager to facilitate contact with a community group in their OPAL network. The criteria was that it be a group with a community focus;
3. OPAL manager approach to a community group and negotiation about possible involvement in the CCB evaluation. In some instances this required a formal written request to be tabled at a community group meeting;
4. Evaluator liaison with the community group about a convenient time to meet and facilitate the CCB discussion. At the beginning of the CCB discussion the method was explained, consent was obtained and the group given the opportunity to ask questions or not be involved;
5. The first task in the CCB discussion was to establish clarity about the shared reflection focus. In some instances, this has taken time to talk through, especially if the community group had a wide remit and was engaged in many activities. This discussion was important to ensure the group members were reflecting with the same capacity building journey in mind. A consensus was reached about assessment of each CCB feature;
6. Once completed, the evaluator sent typed notes of the CCB discussion to the community group for checking and confirmation.
7. Negotiation to revisit the group a second time. Repeat of the above process steps 4-6.

FOCUS GROUPS AND INTERVIEWS

CCB group discussions were between 40 minutes to 2 hours and were all conducted in the group's community setting. In three cases, the second snapshot could not be taken as a group process, in two cases owing to the dissolution of the group, and in one case an inability to access the group. Where the second snapshot could not be taken, interviews were held with a key worker who had been involved with the group. For one case, the CCB discussion was undertaken with a key person and not a group.

The diversity of the various community groups involved in the CCB evaluation required a flexible approach in setting up and facilitating the CCB discussion. For example, some focus group discussions were held sitting outside under trees, and others were formal discussions with large numbers of civic leaders in attendance. At other discussions, there have been members of different groups sitting together, and the focus has needed to shift between their particular focus, work and viewpoints. This was the case at a country site where present for the CCB discussion was a representative from a netball group, kindergarten and member of the local Progress Association. In this instance, three CCB snapshots were taken but in one larger group discussion. In other discussions, the time allocated by the group for the CCB discussion was limited and so managing the time

constraints and facilitating engagement became important process matters. The form of the discussion has also varied because of the group dynamics. All discussions were facilitated by Fiona Verity, with one exception where the second time snapshot was taken by the group leader.

3 FINDINGS: OPAL EVALUATION PARTICIPATION

3.1 RECRUITMENT AND SURVEY PARTICIPATION OUTCOMES

Recruitment and response rate outcomes for Primary and Primary/Secondary Schools sampled in Phase 1 and 2 OPAL and comparison communities at baseline and final data collection are shown in Table 6.

At baseline, the overall response rate from Primary Schools was 56% and 54% for Primary/Secondary schools. The overall school response rate for both settings combined at baseline was 56%. At final, the overall response rate from Primary Schools was 56%, and 64% for Primary/Secondary Schools. The overall school response rate for both settings combined at final was 57%.

Response rates at baseline and final for Primary and Primary/Secondary Schools in each Phase 1 and Phase 2 community are shown in Table 7 and Table 8, respectively.

Table 6: Response rates and recruitment outcomes for Phase 1 & 2 combined at baseline and final

	Baseline			Final		
	Primary Schools	**Primary/Secondary Schools**	**Total**	**Primary Schools**	**Primary/Secondary Schools**	**Total**
Unconfirmed[1]	3	3	**6**	22	5	**27**
Refused	79	13	**92**	61	9	**70**
Non-qualifier[2]	21	1	**22**	9	2	**11**
Recruit[3]	102	15	**117**	78	16	**94**
School Response Rate[4]	56%	54%	**56%**	56%	64%	**57%**
Total Sample	205	32	**237**	170	32	**202**
Schools visited	96	15	**111**	70	16	**86**
Information Packs Provided[5]	11253	-	**11253**	9100	-	**9100**
Parent Surveys[6]	2534	-	**2534**	2286	-	**2286**
Parent Response Rate[7]	23%	-	**23%**	25%	-	**25%**
Child Survey[6]	2611	-	**2611**	1873	-	**1873**
Child Survey Response Rate[7]	23%	-	**23%**	21%	-	**21%**
Student Measures	2353	-	**2353**	1760	-	**1760**

[1] Includes appointments and soft recruits (those that verbally said 'yes' but did not return a participation form) that were not visited. There are more 'unconfirmed' at final than baseline due to a longer field time at baseline allowing for the sample to be exhausted (resulting in fewer unconfirmed sample). At final, there was a shorter time in the field (~6 months) in which to contact schools and thus an answer could not be captured from all schools within the timeframe.

[2] Schools which do not fit within the scope of the OPAL Evaluation; this includes special schools, language schools and junior primary schools.

[3] Includes schools which were visited as well as hard recruits (those who returned a participation form but were not visited due to, for example, staffing change and/or change in mind).

[4] Recruits/(recruits + refusals).

[5] Approximate number of packs distributed to school.

[6] Includes both complete and incomplete survey data delivered.

[7] Response rate defined as 'students and parents who completed the relative surveys' and calculated as the 'number of parent surveys delivered/information packs provided'.

Table 7: Baseline recruitment response rates for Primary and Primary/Secondary schools in Phase 1 & 2 communities

		Primary Schools			Primary/Secondary Schools		
	Community[1]	Approached	Recruited[2]	Response Rate[3]	Approached	Recruited[2]	Response Rate[3]
Phase 1	Marion	13	7	54%	5	1	20%
	Mount Gambier	19	9	47%	3	3	100%
	Onkaparinga	36	20	74%	5	1	33%
	Playford	20	8	50%	4	2	50%
	Port Augusta	16	8	53%	3	1	33%
	Salisbury	21	10	56%	3	1	50%
Phase 1 Total		125	62	57%	23	9	45%
Phase 2	Charles Sturt	25	9	39%	2	1	50%
	Copper Coast	14	7	64%	4	3	75%
	Port Adelaide	14	8	62%	1	1	100%
	Whyalla	27	16	62%	2	1	100%
Phase 2 Total		80	40	55%	9	6	75%
Phase 1 & 2 Total		205	102	56%	32	15	54%

[1] Intervention and comparison communities combined.
[2] Includes schools which were visited as well as hard recruits (those who returned a participation form but were not visited).
[3] Recruits/(recruits + refusals).

Table 8: Final recruitment response rates for Primary and Primary/Secondary schools in Phase 1 & 2 communities

	Community[1]	Primary Schools			Primary/Secondary Schools		
		Approached	Recruited[2]	Response Rate[3]	Approached	Recruited[2]	Response Rate[3]
Phase 1	Marion	16	7	47%	6	2	50%
	Mount Gambier	20	10	56%	3	3	100%
	Onkaparinga	32	14	56%	5	2	50%
	Playford North	10	5	50%	4	1	33%
	Port Augusta	11	3	38%	1	0	0%
	Salisbury	14	6	80%	1	0	0%
Phase 1 Total		103	45	52%	20	8	50%
Phase 2	Charles Sturt Inner	13	8	80%	2	2	100%
	Copper Coast	11	4	50%	6	5	83%
	Port Adelaide Enfield	27	10	53%	3	0	0%
	Whyalla	16	11	73%	1	1	100%
Phase 2 Total		67	33	63%	12	8	89%
Phase 1 & 2 Total		170	78	56%	32	16	64%

[1] Intervention and comparison communities combined.
[2] Includes schools which were visited as well as hard recruits (those who returned a participation form but were not visited).
[3] Recruits/(recruits + refusals).

3.2 RESPONSE RATES FOR PARENTS

Response rates for parents of children from Primary and Primary/Secondary schools at baseline and final are shown in Table 9. The response rate is calculated by dividing the number of final surveys received by the number of information packs that were distributed within the schools. The response rates for parents at baseline ranged from 18% to 30% across the communities, with the overall response rate for parents as 23%. The response rates for parents at final ranged from 17% to 33% across the communities, with the overall response rate for parents as 25%.

Table 9: Survey response rates for parents from Primary and Primary/Secondary schools in Phase 1 & 2 communities at baseline and final

	Community[1]	Baseline			Final		
		Information Packs Provided[2]	Parent Surveys Delivered[3]	Parent Response Rate[4]	Information Packs Provided[2]	Parent Surveys Delivered[3]	Parent Response Rate[4]
Phase 1	Marion	806	228	28%	932	242	26%
	Mount Gambier	1143	216	19%	1120	324	29%
	Onkaparinga	2451	552	23%	2188	522	24%
	Playford	945	180	19%	877	145	17%
	Port Augusta	514	92	18%	218	45	21%
	Salisbury South	999	197	20%	726	138	19%
Phase 1 Total		6858	1465	21%	6061	1416	23%
Phase 2	Charles Sturt Inner	1133	337	30%	1084	363	33%
	Copper Coast	1110	275	25%	400	116	29%
	Port Adelaide Enfield	841	201	24%	616	172	28%
	Whyalla	1311	256	20%	939	219	23%
Phase 2 Total		4395	1069	24%	3039	870	29%
Phase 1 & 2 Total		11253	2534	23%	9100	2286	25%

[1] Intervention and comparison communities combined.
[2] Approximate number of packs distributed to school.
[3] Includes both complete and incomplete survey data delivered.
[4] Response rate calculated by the number of parent surveys delivered/information packs provided.

3.3 RESPONSE RATES FOR STUDENTS

Response rates for students from Primary and Primary/Secondary schools at baseline and final are shown in Table 10. At baseline the response rates ranged from 19% to 29% across the communities sampled. The overall response rate for primary students at baseline was 23%. Of the 2611 students surveyed 2353 were measured, resulting in a response rate for student measures of 21%.

At final, the response rates ranged from 13% to 29% across the communities sampled. The overall response rate for primary students was 21%. Of the 1873 student surveyed, 1760 were measured resulting in a response rate for student measures of 19%. The overall consent form response rate (the number of consent forms returned – yes or no divided by the number distributed) was 26%. Parent response rates at final were greater than that for students as a result of eight schools that were recruited but not visited. Information packs were sent to these schools prior to the visit (as per the coordination process); therefore there was an opportunity for parents to complete a survey without the corresponding child survey being surveyed due to the visit not taking place.

Table 10: Survey and measurement response rates for Students from Primary and Primary/Secondary schools in Phase 1 & 2 communities at baseline and final

	Community[1]	Baseline				Final			
		Information Packs Provided[2]	Student Surveys Delivered	Student Response Rate[3]	Student Measures Delivered[4]	Information Packs Provided[1]	Student Surveys Delivered	Student Response Rate[3]	Student Measures Delivered[4]
Phase 1	Marion	806	221	27%	208	932	158	17%	152
	Mount Gambier	1143	215	19%	178	1120	245	22%	211
	Onkaparinga	2451	545	22%	509	2188	423	19%	406
	Playford	945	199	21%	181	877	116	13%	109
	Port Augusta	514	105	20%	103	218	39	18%	33
	Salisbury South	999	212	21%	160	726	116	16%	112
Phase 1 Total		6858	1497	22%	1339	6061	1097	18%	1023
Phase 2	Charles Sturt Inner	1133	325	29%	290	1084	293	27%	276
	Copper Coast	1110	295	27%	254	400	101	25%	99
	Port Adelaide Enfield	841	223	27%	215	616	177	29%	170
	Whyalla	1311	271	21%	255	939	205	22%	192
Phase 2 Total		4395	1114	25%	1014	3039	776	26%	737
Phase 1 & 2 Total		11253	2611	23%	2353	9100	1873	21%	1760

[1] Intervention and comparison communities combined.
[2] Approximate number of packs distributed to school.
[3] Response rate calculated by the number of student surveys delivered/information packs provided.
[4] Based on frequency of the height measure.

3.4 SUMMARY RECRUITMENT AND SURVEY OUTCOMES AT BASELINE AND FINAL

A summary of recruitment and survey outcomes at baseline and final is provided in Table 11. Response rates were similar at baseline and final for:

- Schools: baseline 56%, final 57%,
- Students: baseline 23%, final 21%; and
- Parents: baseline 23%, final 25%.

Table 11: Survey and measurement response rates for Students from Primary and Primary/Secondary schools in Phase 1 & 2 communities

		Baseline[1]							Final						
		Recruited Schools	Recruitment Response Rate	Student Survey[2]	Student Response Rate[3]	Student Measurements[4]	Parent Surveys[2]	Parent Response Rate[3]	Recruited Schools	Recruitment Response Rate	Student Survey[2]	Student Response Rate[3]	Student Measurements[4]	Parent Survey[2]	Parent Response Rate[3]
Phase 1	INT	39	70%	884	21%	758	885	21%	33	61%	657	33%	601	871	44%
	COMP	32	44%	613	26%	581	580	24%	20	41%	440	11%	422	545	13%
Phase 1 total		71	55%	1497	23%	1339	1465	22%	53	51%	1097	18%	1023	1416	23%
Phase 2	INT	22	69%	489	25%	450	445	23%	25	83%	435	22%	409	523	26%
	COMP	24	49%	625	29%	564	624	29%	16	52%	341	32%	328	347	33%
Phase 2 total		46	57%	1114	27%	1014	1069	26%	41	67%	776	26%	737	870	29%
Phase 1 & 2 total		117	56%	2611	24%	2353	2534	24%	94	57%	1873	21%	1760	2286	25%

[1] Survey response rates have been calculated retrospectively based on the approximate number of information packs distributed. There is a slight difference in percentages (1-2%) from those calculated at baseline in Table 9 and Table 10 as the hard copy documents are unable to be accessed due to exceptional circumstances of flood.
[2] Includes both complete and incomplete survey data delivered.
[3] Student and Parent Response Rates (RR) calculated by the number of surveys delivered / approximate number of information packs provided.
[4] Based on frequency of height measure.

4 FINDINGS – ANTHROPOMETRICS

4.1 EARLY CHILDHOOD (4-5 YEARS) GROWTH DATA – PRESCHOOL CHILDREN

This section details the findings from the early childhood growth data obtained from CaFHS for children living in OPAL intervention and comparison communities. Findings are presented for Phase 1 and Phase 2 (separately) and results are compared by community; intervention (INT) and comparison (COMP) communities. Prevalence of combined overweight and obesity for each Phase is presented according to sex and locality.

4.1.1 CHARACTERISTICS OF THE PRESCHOOL SAMPLE

Data were available for 18919 children (Phase 1 and 2 combined; year 0 n=4496, year 1 n=4418, year 2 n=4776, year 3 n=3229, year 5 n=2000). Children in year 4 were excluded from the analysis due to the small numbers supplied (n=195 in Phase 1 only).

PHASE 1

- There were 13654 children (mean age 4.72±0.2 years) in Phase 1 communities; Y0 n=2853, Y1 n=2737, Y2 n=2835, Y3 n=3229, Y5 n=2000).
- Approximately half were boys (51.3%).
- Nearly two-thirds were INT (60.9%) and one-third COMP (39.1%).
- Three-quarters were from urban communities (74.1%) and one-quarter from rural communities (25.9%).

PHASE 2

- There were 5265 children (mean age 4.79±0.2 years) in Phase 2 communities Y0 n=1643, Y1 n=1681, Y2 n=1941.
- Just over half (51.1%) were boys.
- There were roughly equal proportions of children in INT (53.5%) and COMP (46.5%).
- Two-thirds of children were from urban communities (64.2% and one-third from rural communities (35.8%).

4.1.2 HEIGHT, WEIGHT, BMI AND BMI Z-SCORE BY COMMUNITY

PHASE 1

Comparisons between children aged 4-5 years in Phase 1 intervention and comparison communities across the period from baseline (Y0) to final (Y5) are reported in Table 12.

- There was a 0.05 point decrease in BMI, and 0.04 point decrease in BMI z-score, from baseline to final in INT, in comparison to a 0.07 point increase in BMI and 0.06 point increase in BMI z score in COMP. However, these changes over time were not statistically significant, nor were the time x group effects (BMI -0.12, 95%CI -0.35 – 0.11, p=0.295; BMI z-score -0.10, 95%CI -0.25 - 0.05, p=0.181).
- Using the multilevel model, there was a non-statistically significant 0.25 point decrease (-0.25, 95%CI -2.36 – 1.86, p=0.815) in BMI, and non-statistically significant 0.04 point decrease (-0.04, 95%CI -0.12 – 0.04), p=0.306) in BMI z-score, from baseline to final in INT. In comparison, there was a non-statistically significant increase in BMI (2.64, 95%CI -0.08 – 5.37, p=0.057) and BMI z-score (0.06, 95%CI 6.32 – 0.53, p=0.205) from baseline to final in COMP. There was no significant difference between groups at final for BMI (-2.90, 95%CI 6.32 – 0.53, p=0.098) or BMI z-score (-0.10, 95%CI -0.22 – 0.03, p=0.129).
- There was a statistically significant difference in age between baseline and final by -0.08 years (95%CI -0.12 - -0.04, p<0.001) in INT and -0.09 (95%CI -0.13 - -0.04, p=0.001) in COMP. There was no statistically significant difference in age between INT and COMP at final (0.01, 95%CI -0.05 – 0.07, p=0.741).

PHASE 2

Comparisons between children aged 4-5 years in Phase 2 intervention and comparison communities across the period from baseline (Y0) to final (Y2) are reported in Table 13.

- There were no statistically significant changes in BMI z-score over time in INT or COMP, or any statistically significant differences in change over time between groups.
- Using the multilevel model, there was a non-statistically significant increase in BMI (0.10, 95%CI -0.06 – 0.26, p=0.237) and BMI z-score (0.06, 95%CI -0.04 – 0.15, p=0.219) in INT and a non-statistically significant decreased in BMI (-0.02, 95%CI -0.19 – 0.15, p=) and BMI z-score (-0.03, 95%CI -0.13 – 0.07, p=0.521) in COMP. There was no significant difference between groups at final for BMI (0.12, 95%CI -0.12 – 0.35, p=0.320) or BMI z-score (0.09, 95%CI -0.05 – 0.23, p=0.191).

Table 12: Mean (95% CI) height, weight, BMI and z-scores for children aged 4-5 years in Phase 1 at each year, including change between Y0 and Y5[1]

	Year 0 (Baseline)		Year 1		Year 2		Year 3		Year 5 (Final)		Δ Change (Year 0 – Year 5)			
Data shown are means	INT	COMP	INT	COMP	INT	COMP	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]	P for change[5]
n	1628	1225	1631	1106	1762	1073	1970	1259	1321	679				
Age (years)	4.73	4.73	4.72	4.73	4.74	4.75	4.71	4.73	4.65	4.64	-0.08* (-0.12 - -0.04)	-0.09* (-0.13 - -0.04)	0.01 (-0.05 – 0.07)	0.741
Average height (cm)	108.44	108.38	108.39	108.61	108.47	108.86	108.03	108.47	107.96	108.02	-0.04 (-0.41 – 0.33)	0.14 (-0.44 – 0.71)	-0.18 (-0.84 – 0.49)	0.598
Average weight (kg)	19.22	19.00	19.17	19.06	19.31	19.19	19.11	19.12	19.01	19.01	-0.07 (-0.23 – 0.09)	0.18 (-0.09 – 0.45)	-0.25 (-0.56 – 0.06)	0.117
BMI (kg/m^2)	16.28	16.11	16.206	16.09	16.34	16.14	16.30	16.19	16.24	16.20	-0.05 (-0.17 – 0.07)	0.07 (-0.12 – 0.26)	-0.12 (-0.35 – 0.11)	0.295
BMI z-score	0.49	0.37	0.47	0.38	0.54	0.41	0.50	0.43	0.45	0.44	-0.04 (-0.12 – 0.04)	0.06 (-0.07 – 0.18)	-0.10 (-0.25 – 0.05)	0.181

*p<0.01

[1]There were insufficient data at Year 4 to include in the analysis; [2] Change from baseline to final in intervention; [3] Change from baseline to final in comparison; [4] Change from baseline to final in intervention, minus the change from baseline to final in comparison as determined using a linear regression model; [5] p value indicates group X time interaction effect for the difference between INT and COMP mean change from baseline to final as determined using a linear regression model.

Table 13: Mean height, weight, BMI and z-scores for children aged 4-5 years in Phase 2 at Y0, Y1, and Y2, including comparisons between Y0 and Y2[1]

	Year 0 (Baseline)		Year 1		Year 2 (Final)		Δ Change (Year 0 – Year 2)			
Data shown are means	INT	COMP	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]	P for change[5]
N[6]	865	778	899	782	1051	890				
Age (years)	4.80	4.78	4.81	4.78	4.78	4.79	-0.02 (-0.05 – 0.008)	0.01 (-0.03 – 0.05)	-0.03 (-0.08 – 0.02)	0.24
Average height (cm)	108.78	109.14	108.93	109.09	108.94	109.13	0.17 (-0.31 – 0.64)	-0.01 (-0.55 – 0.53)	0.17 (-0.54 – 0.89)	0.63
n	854	773	897	780	1047	886				
Average weight (kg)	19.27	19.53	19.49	19.42	19.46	19.50	0.19 (-0.05 – 0.43)	-0.03 (-0.32 – 0.27)	0.22 (-0.17 – 0.60)	0.27
n	850	774	891	778	1046	883				
BMI (kg/m^2)	16.23	16.32	16.34	16.26	16.32	16.30	0.09 (-0.07 – 0.26)	-0.02 (-0.17 – 0.13)	0.12 (-0.10 – 0.34)	0.30
n	847	770	890	777	1044	882				
BMI z-score	0.46	0.52	0.51	0.47	0.51	0.48	0.05 (-0.05 – 0.16)	-0.04 (-0.11 – 0.04)	0.09 (-0.04 – 0.22)	0.18
n	847	770	890	777	1044	882				

[1] The data post-Year 2 for Phase 2 for the OPAL program had not been supplied at the date of reporting; [2] Change from baseline to final in intervention; [3] Change from baseline to final in comparison; [4] Change from baseline to final in intervention, minus the change from baseline to final in comparison as determined using a linear regression model; [5] p value indicates group X time interaction effect for the difference between INT and COMP mean change from baseline to final as determined using a linear regression model; [6] Sample size varies for height, weight, BMI and BMI z-score due to missing values.

4.1.3 PREVALENCE OF OVERWEIGHT AND OBESITY

PHASE 1

The change in proportion of underweight, healthy weight, overweight and obese children, including combined overweight and obesity, in Phase 1 over the five-year period is shown in Table 14. There were no statistically significant changes in INT or COMP, nor any significant differential changes between groups. When a multilevel approach was adopted, findings were similar for: underweight (INT 0.95, 95%CI 0.68 - 1.33, p=NS; COMP 0.75, 95%CI 0.47 – 1.19, p=NS; Difference 1.28, 95%CI 0.72 – 2.25, p=NS); healthy weight (INT 1.06, 95%CI 0.89 – 1.25, p=NS; COMP 0.92, 95%CI 0.74 – 1.15, p=NS; Difference 1.14, 95%CI 0.87 – 1.51, p=NS); overweight (INT 0.87, 95%CI 0.71 – 1.07, p=NS; COMP 1.16, 95%CI 0.89 – 1.53, p=NS; Difference 0.75, 95%CI 0.53 – 1.05, p=NS); obese (INT 1.07, 95%CI 0.77 – 1.49, p=NS; COMP 1.20, 95%CI 0.76 – 1.87, p=NS; Difference 0.89, 95%CI 0.51 – 1.56, p=NS); and combined overweight and obesity (INT 0.91, 95%CI 0.76 – 1.10, p=NS; COMP 1.19, 95%CI 0.93 – 1.52, p=NS; Difference 0.91, 95%CI 0.76 – 1.10, p=NS)

A time series plot (baseline, Y0, to final, Y5) of children in Phase 1 according to weight status (underweight, healthy weight, overweight/obese) and community is shown in Figure 3.

The prevalence of combined overweight and obesity by sex and locality is shown in Table 15.

- There was a 40% increased odds in prevalence of combined overweight and obesity in COMP boys (OR 1.40, 95%CI 1.01-1.96, p=0.049), and a 29% reduced probability in prevalence of combined overweight and obesity in INT girls (OR 0.71, 95%CI 0.54-0.92, p=0.011). The probability of combined overweight and obesity was not significantly different between INT and COMP at final in either girls or boys.
- There were no statistically significant changes in probability of combined overweight and obesity over time in INT or COMP, or between INT and COMP at final, according to locality.

See Appendix 6: Anthropometric sub-group Analysis Tables for the prevalence of overweight (excluding obesity) and obesity (excluding overweight) by sex and locality.

PHASE 2

The change in proportion of underweight, healthy weight, overweight and obese children, including combined overweight and obesity, in Phase 2 over the three-year period is shown in

Table 16. There were no statistically significant changes in INT or COMP, nor any significant differential changes between groups.

When a multilevel approach was adopted, findings were similar for: underweight (INT 0.87, 95%CI 0.55 – 1.36, p=NS; COMP 1.19, 95%CI 0.75 – 1.90, p=NS; Difference 0.73, 95%CI 0.38 – 1.39, p=NS); healthy weight (INT 0.96, 95%CI 0.78 – 1.18, p=NS; COMP 0.92, 95%CI 0.74 – 1.15, p=NS; Difference 1.04, 95%CI 0.77 – 1.41, p=NS); overweight (INT 1.01, 95%CI 0.78 – 1.31, p=NS; COMP 1.02, 95%CI 0.78 – 1.34, p=NS; Difference 0.99, 95%CI, p=NS); obese (INT 1.34, 95%CI 0.91 – 1.97, p=NS; COMP 1.07, 95%CI 0.70 – 1.63, p=NS; Difference 1.25, 95%CI 0.70 – 2.23, p=NS); and combined overweight and obesity (INT 1.11, 95%CI 0.89 – 1.39), p=NS; COMP 1.04, 95%CI 0.82_1.32, p=NS; Difference 1.07, 95%CI 0.77 – 1.49, p=NS)

A time series plot (baseline, Y0, to final, Y5) of children in Phase 2 according to weight status (underweight, healthy weight, overweight/obese) and community is shown in Figure 4.

The prevalence of combined overweight and obesity by sex and locality is shown in Table 17.

- There were no statistically significant changes in probability of combined overweight and obesity over time in INT or COMP, or between INT and COMP at final, according to sex or locality.

The prevalence of overweight (excluding obesity) and obesity (excluding overweight) by sex and locality are shown in Appendix 6: Anthropometric sub-group Analysis Tables.

Table 14: Proportion (%, CI) of 4-5 year olds in Phase 1 in each weight status category[1] at baseline (Y0), final (Y5) and change between baseline and final

IOTF category	Year 0 (Baseline)		Year 5 (Final)		OR (95%CI) (Year 0 – Year 5)		
	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
n	1628	1225	1337	688			
Underweight	5.3	5.3	5.1	4.0	0.95 (0.70-1.30)	0.75 (0.45-1.23)	1.28 (0.71-2.28)
Healthy weight	73.5	76.3	79.8	74.5	1.06 (0.90-1.23)	0.92 (0.73-1.17)	1.14 (0.86-1.52)
Overweight	15.6	13.1	13.7	14.8	0.87 (0.65-1.16)	1.16 (0.86-1.57)	0.75 (0.49-1.13)
Obese	4.9	4.2	5.3	5.0	1.07 (0.77-1.48)	1.20 (0.75-1.93)	0.89 (0.50-1.57)
Combined overweight/obese	20.5	17.3	19.1	19.9	0.91 (0.74-1.12)	1.19 (0.89-1.60)	0.77 (0.54-1.10)

[1] International Obesity Taskforce cut-points (Cole TJ et al. 2000, Cole TJ et al. 2007); [2]Odds of weight status categories in year 5 for intervention group, Year 0 is the reference group; [3] Odds of weight status categories in year 5 for comparison group, Year 0 is the reference group; [4] Odds of weight status categories for INT, COMP is the reference group.
Note: A binary logistic regression model, adjusted by age, was used to fit the models.

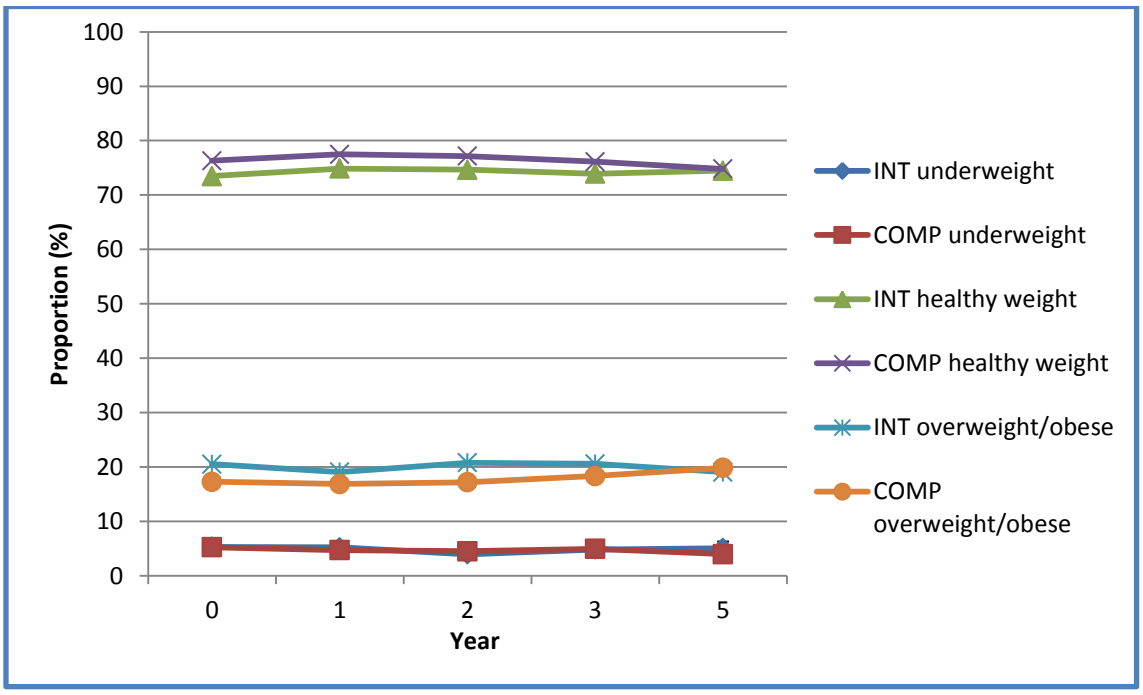

Figure 3: Time series plot of children in Phase 1 classified as underweight, healthy weight and overweight/obese at baseline (Y0), Y2, Y3, and Y5 according to community

Table 15: Prevalence (%) of combined overweight and obesity[1] for children aged 4-5 years in Phase 1 by community, sex and locality

	Year 0 (Baseline)		Year 5 (Final)		OR (95%CI) (Year 0 – Year 5)		
	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
n	1602	1198	1317	675			
Sex							
Boys	16.5	15.3	19.2	20.1	1.20 (0.90-1.61)	1.40** (1.01-1.96)	0.86 (0.55-1.34)
Girls	24.8	19.3	18.9	19.6	0.71** (0.54-0.92)	1.02 (0.67-1.56)	0.69 (0.42-1.14)
Locality							
Urban	20.8	16.8	20.2	19.0	0.96 (0.79-1.18)	1.17 (0.79-1.71)	0.83 (0.54-1.28)
Rural	19.8	19.3	16.5	22.4	0.80 (0.47-1.36)	1.21 (0.94-1.58)	0.66 (0.36-1.21)

**p<0.05

[1]International Obesity Taskforce cut-points (Cole TJ et al. 2000, Cole TJ et al. 2007); [2] Odds of weight status categories in year 5 for intervention group, Year 3 is the reference group; [3] Odds of weight status categories in year 5 for comparison group, Year 3 is the reference group; [4] Odds of weight status categories for INT, COMP is the reference group.
Note: A binary logistic regression model, adjusted by age, was used to fit the models.

Table 16: Proportion (%) of 4-5 year olds in Phase 2 in each weight status category[1] at baseline (year 0), final (year 2) and change between baseline and final

IOTF category	Year 0 (Baseline)		Year 2 (Final)		OR (95%CI) (Year 0 – Year 2)		
	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
n	1628	1225	1337	688			
Underweight	4.5	4.2	3.9	5.0	0.88 (0.50-1.53)	1.21 (0.81-1.79)	0.73 (0.37-1.44)
Healthy weight	74.8	74.5	74.0	72.9	0.96 (0.79-1.17)	0.92 (0.75-1.13)	1.04 (0.78-1.39)
Overweight	14.8	15.2	14.8	15.5	1.01 (0.76-1.35)	1.02 (0.79-1.33)	0.99 (0.67-1.46)
Obese	5.2	5.3	6.8	5.7	1.33 (0.89-1.99)	1.07 (0.71-1.60)	1.24 (0.70-2.21)
Combined overweight/obese	20.0	20.5	21.6	21.2	1.11 (0.89-1.39)	1.04 (0.84-1.30)	1.07 (0.78-1.46)

[1] International Obesity Taskforce cut-points (Cole TJ et al. 2000, Cole TJ et al. 2007); [2]Odds of weight status categories in year 5 for intervention group, Year 0 is the reference group; [3] Odds of weight status categories in year 5 for comparison group, Year 0 is the reference group; [4] Odds of weight status categories for INT, COMP is the reference group.
Note: A binary logistic regression model, adjusted by age, was used to fit the models.

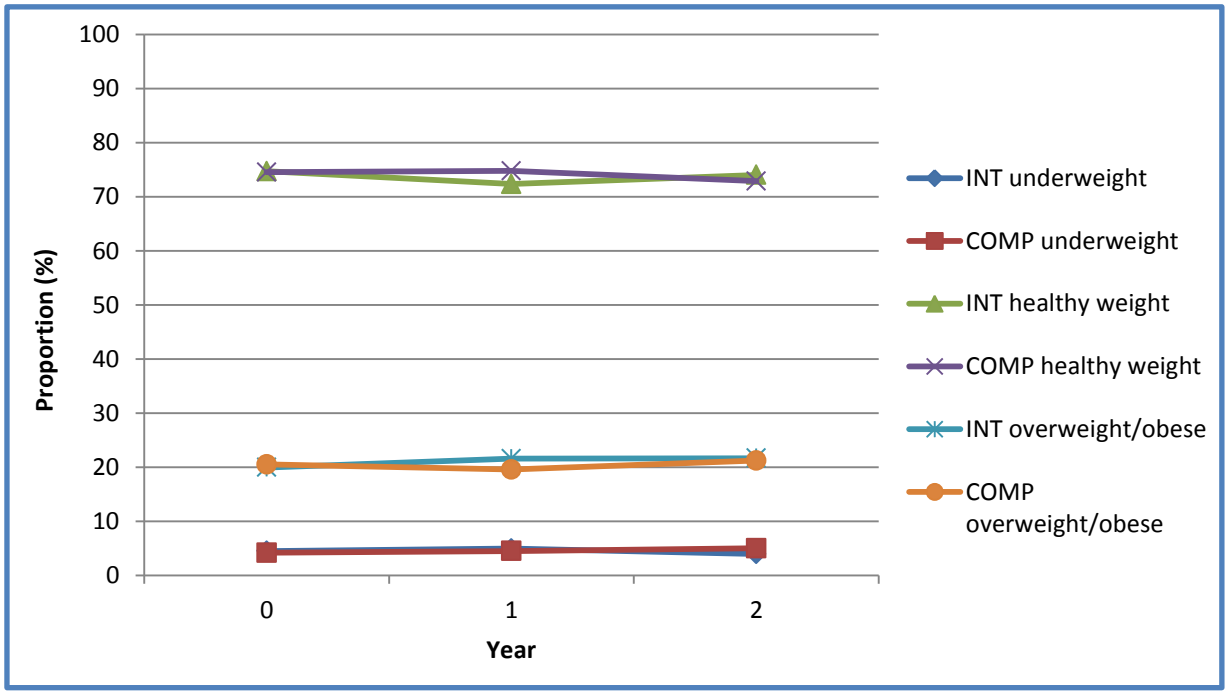

Figure 4: Time series plot of children in Phase 2 classified as underweight, healthy weight and overweight/obese at baseline (Y0), Y1 and Y2 according to community and weight status

Table 17: Prevalence (%) of combined overweight and obesity[1] for children aged 4-5 years in Phase 2 by community, sex and locality

	Year 0 (Baseline)		Year 2 (Final)		OR (95%CI) (Year 0 – Year 2)		
	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
n	847	770	1044	882			
Sex							
Boys	15.2	18.4	17.3	15.9	1.17 (0.82-1.66)	0.84 (0.61-1.17)	1.39 (0.86-2.24)
Girls	25.1	23.0	26.2	26.3	1.06 (0.81-1.40)	1.19 (0.87-1.63)	0.89 (0.59-1.36)
Locality							
Urban	17.5	19.5	20.5	22.0	1.22 (0.90-1.65)	1.16 (0.88-1.52)	1.05 (0.70-1.58)
Rural	23.8	22.8	23.5	19.5	0.99 (0.73-1.34)	0.83 (0.66-1.03)	1.20 (0.82-1.75)

[1]International Obesity Taskforce cut-points (Cole TJ et al. 2000, Cole TJ et al. 2007); [2] Odds of weight status categories in year 5 for intervention group, Year 3 is the reference group; [3] Odds of weight status categories in year 5 for comparison group, Year 3 is the reference group; [4] Odds of weight status categories for INT, COMP is the reference group;
Note: A binary logistic regression model, adjusted by age, was used to fit the models.

4.1.4 SUMMARY - PRESCHOOL CHILDREN

In summary, there were no statistically significant changes over time in preschool children's BMI or BMI z-score. There were decreases (although statistically non-significant) in BMI and BMI z-score for children in Phase 1 intervention communities, whereas small increases (although statistically non-significant) in these measures were observed for children in Phase 1 comparison communities. No statistically significant changes were observed for children in Phase 2.

Although there were no statistically significant changes over time in the prevalence of healthy weight, overweight, obesity, or combined overweight and obesity, in Phase 1 or Phase 2 intervention or comparison communities overall, differences were observed according to sex in *Phase 1* children only. There was a statistically significant increased probability of combined overweight and obesity in boys in comparison communities and a statistically significant decreased probability of combined overweight and obesity prevalence among girls in intervention communities, in year 5 compared with year 0. Sex and locality did not significantly influence the probability of combined overweight and obesity between groups at final assessment.

Few conclusions can be drawn from these findings. It is important to note that these estimates are based upon two different cohorts of individuals (baseline and final) during a relatively short term (Phase 1, 6 years; Phase 2, 3 years) follow-up period.

4.2 PRIMARY SCHOOL STUDENTS (9-11 YEARS)

This section details the findings from the measurement data for 9-11 year olds collected by the Flinders OPAL Evaluation team. Findings are presented for Phase 1 and Phase 2 combined and results are compared by community; intervention (INT) and comparison (COMP) communities. Prevalence of overweight, obesity, and combined overweight and obesity are presented according to a range of socio-demographic factors; sex, locality, age, SES and Phase.

4.2.1 CHARACTERISTICS OF THE SAMPLE WITH ANTHROPOMETRIC MEASURES

At baseline, 2611 children completed surveys and 2353 had measures taken. For three children, only height measures were taken (no weight measures) and for four children, age could not be calculated due to missing date of birth data and subsequently BMI z-score could not be calculated. Thus the sample available for analysis was 2346 (1102 INT, 1144 COMP). The mean age of the sample was 10.6 (0.9) years, comprising 50% boys, and higher proportions of children from urban locations (66%) than from rural locations (34%). A total of 1873 children completed surveys at final and 1760 had measures taken. However, there were 13 cases with height measures of ≤110 cm, deemed unrealistic (12/13 children were from the one school) and therefore, these cases were excluded. Of the 1747 remaining (998 INT, 749 COMP), approximately half were boys (47%). The average (SD) age was 10.6 (0.9) years and there were higher proportions recruited from urban locations (69%) than from rural locations (31%). The average ICSEA score for schools attended by children was 1007.5 at baseline and 997.6 at final, similar to the national average of 1000 (Australian Curriculum Assessment and Reporting Authority (ACARA) 2013).

Figure 5 and Figure 6 show the numbers of students providing anthropometric data at year 3 and year 5 by age and sex, and by locality and sex, respectively. Characteristics of the sample by community and according to a number of demographic factors are detailed in Table 18. There were statistically significant differences between INT and COMP at baseline for locality ($p<0.001$), SES ($p<0.001$) and Phase ($p<0.001$). There was a greater proportion of students from urban localities in INT (72%) than COMP (60%), a greater proportion of children at greatest disadvantage (Q1) in INT (17%) than COMP (8%), a lower proportion of children at least disadvantage (Q4 and Q5) in INT (28%) than COMP (58%) and a greater proportion of children recruited in Phase 1 (63%) than Phase 2 (51%). There were statistically significant differences between INT and COMP at final for locality ($p=0.001$) and SES ($p<0.001$), with a greater proportion of urban children in COMP (74%) than INT (66%) and a greater proportion of at least disadvantage in INT (42%) than COMP (22.0%).

Table 18: Characteristics of the sample of students (9-11 years) with anthropometric measures

	Year 3 (Baseline)		Diff[1]	Year 5 (Final)		Diff[2]
	INT	COMP	p value	INT	COMP	p value
All	1202	1144		998	749	
Sex			0.532			0.062
Boys	606 (50.4)	562 (49.1)		452 (45.3)	373 (49.8)	
Girls	596 (49.6)	582 (50.9)		546 (54.7)	376 (50.2)	
Locality[3]			<0.001			0.001
Urban	860 (71.5)	683 (59.7)		658 (65.9)	551 (73.6)	
Rural	342 (28.5)	461 (40.3)		340 (34.1)	197 (26.3)	
Age, years			0.124			0.061
≤9	329 (27.4)	347 (30.3)		316 (31.7)	202 (27.0)	
10	428 (35.6)	416 (36.4)		347 (34.8)	262 (35.0)	
≥11	445 (37.0)	381 (33.3)		335 (33.6)	285 (38.1)	
SES[4]			<0.001			<0.001
Quintile 1	199 (16.6)	87 (7.6)		230 (20.3)	52 (6.9)	
Quintile 2	376 (31.3)	205 (17.9)		193 (19.3)	133 (17.8)	
Quintile 3	293 (24.4)	187 (16.3)		238 (23.8)	216 (28.8)	
Quintile 4	225 (18.7)	544 (47.6)		317 (31.8)	348 (46.5)	
Quintile 5	109 (9.1)	121 (10.6)		20 (2.0)	0 (0)	
Phase			<0.001			0.239
1	755 (62.8)	581 (50.8)		589 (59.0)	421 (56.2)	
2	447 (37.2)	563 (49.2)		409 (41.0)	328 (43.8)	

[1] Difference between INT and COMP at baseline; [2] Difference between INT and COMP at final; [3] n=1 missing at final in COMP; [4] SES is measured by ICSEA scores. Quintiles are based on 2011 National data at baseline (cut-offs 940/980/1020/1076/1287) and 2014 National data at final (cut-offs 942/985/1023/1074/1292).. The national average ICSEA score is 1000 (Australian Curriculum Assessment and Reporting Authority (ACARA) 2013).

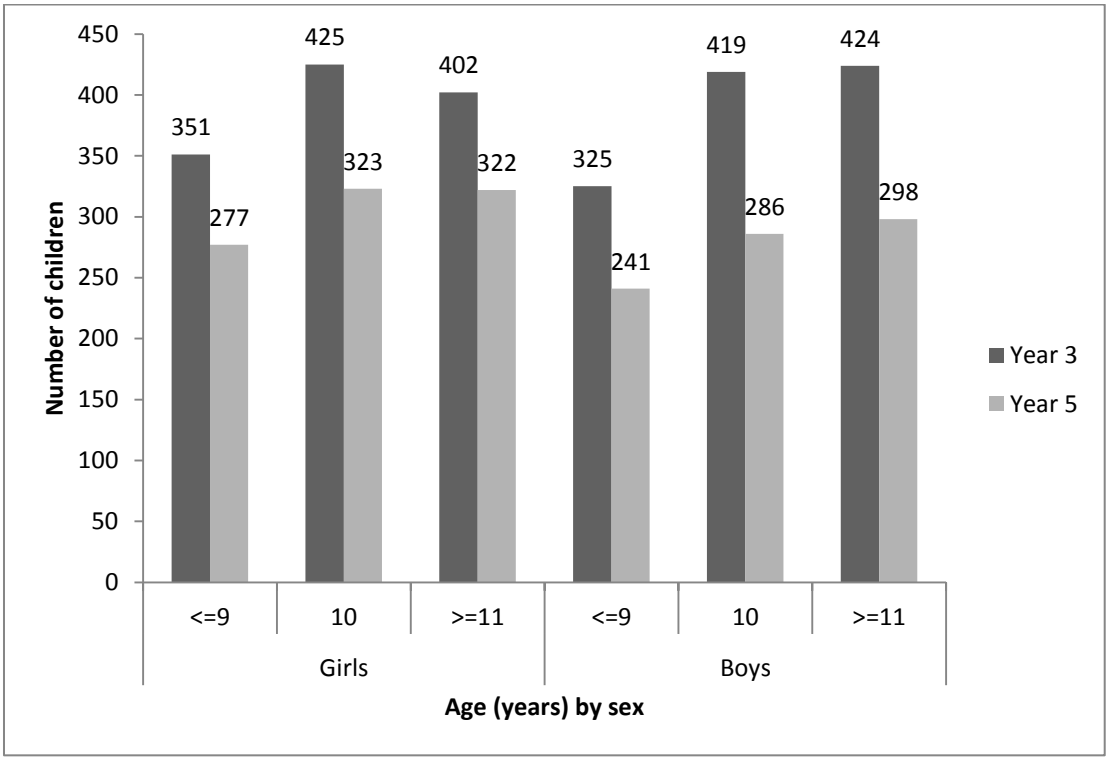

Figure 5: Distribution of anthropometric sample by age (years) and sex at year 3 (baseline) and year 5 (final)

Figure 6: Distribution of anthropometric sample by locality and sex at year 3 (baseline) and year 5 (final)

4.2.2 HEIGHT, WEIGHT, BMI AND BMI-Z-SCORE BY COMMUNITY

Overall, the average BMI z-score was 0.32 ±1.20 at baseline and 0.43±1.15 at final.

Comparisons in height, weight, BMI and BMI z-score between children aged 9-11 years in intervention and comparison communities across the period from baseline to final are reported in Table 19.

- Using a linear regression model, there was a statistically non-significant 0.07 point increase in BMI z-score from baseline to final in INT. However, a larger increase of 0.14 points in BMI z-score was observed in COMP; although the difference (-0.07 points) between change in INT and change in COMP was not statistically significant.
- Using a multilevel model, there were no statistically significant changes in BMI over-time for INT (-0.12, 95%CI -0.40 – 0.17, p=0.417) or COMP (0.16, 95%CI -0.17 – 0.50, p=0.338) and no statistically significant difference between INT and COMP at final (-0.28, 95%CI -0.72 – 0.16, p=0.209). However, there was a statistically significant 0.14 point increase in BMI z-score from baseline to final in COMP (0.14, 95%CI 0.02 – 0.26, p=0.027) and a statistically non-significant 0.05 point increase in INT (0.05, 95%CI -0.05 – 0.16, p=0.306). The difference in change over-time between INT and COMP was not statistically significant (-0.08, 95%CI -0.24 – 0.08, p=0.306).

Table 19: Mean age, height, weight, BMI and BMI z-score for children aged 9-11 years at baseline and final by community

	Year 3 (Baseline)		Year 5 (Final)		Δ Change (Year 3 – Year 5)[1]		
	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
n	1202	1144	998	749			
Age (years)	10.12	10.02	10.05	10.15	-0.07 (-0.22-0.08)	0.13** (0.02-0.24)	-0.20** (-0.39--0.02)
n	1208	1145	983	749			
Average height (cm)	144.34	144.05	143.49	144.54	-0.35 (-0.98 – 0.27)	-0.20 (-0.78 – 0.39)	-0.16 (-1.02 – 0.70)
n	1206	1144	1010	750			
Average weight (kg)	39.09	38.28	38.49	39.26	-0.35 (-1.04-0.34)	0.33 (-0.76-1.43)	-0.68 (-1.99-0.62)
n	1206	1144	998	749			
BMI (kg/m^2)	18.54	18.29	18.43	18.64	-0.09 (-0.33-0.16)	0.21 (-0.21-0.63)	-0.29 (-0.78-0.20)
n	1202	1144	998	749			
BMI z-score	0.33	0.30	0.40	0.46	0.07 (-0.03-0.17)	0.14 (-0.002-0.29)	-0.07 (-0.25-0.10)

**p<0.05

[1] BMI, weight and waist models were adjusted by age and ICSEA score, BMI z-score model was adjusted by ICSEA score and height model was adjusted by age; [2] Change from baseline to final in intervention; [3] Change from baseline to final in comparison; [4] Change from baseline to final in intervention, minus the change from baseline to final in comparison as determined using a linear regression model. Note: Models were adjusted by age and ICSEA score.

Table 20 shows the change in BMI z-score according to age, sex, locality and SES. BMI z-score did not significantly change over-time for either INT or COMP according to age, sex, and metropolitan and rural localities However, there was a significant difference in change in BMI z-score over-time between INT and COMP for children in ICSEA quintile 2 (-0.51, 95%CI -0.90- -0.13, p =0.010) and children in Phase 2 (-0.30, 95%CI -0.57- -0.03, p=0.030).

Table 20: Comparison of baseline and final mean BMI z-score for children aged 9-11 years, by sex, community, SES and Phase

	Year 3 (Baseline)		Year 5 (Final)		Δ Change (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[1]	COMP[2]	INT vs COMP[3]
n	1202	1144	998	749			
Sex							
Boys	0.42	0.37	0.48	0.56	0.07 (-0.10 – 0.24)	0.17 (-0.03 – 0.38)	-0.10 (-0.37 – 0.16)
Girls	0.24	0.23	0.34	0.36	0.09 (-0.04 – 0.21)	0.11 (-0.06 – 0.28)	-0.02 (-0.24 – 0.19)
Locality							
Urban	0.29	0.25	0.37	0.45	0.07 (-0.06 – 0.19)	0.16 (-0.04 – 0.35)	-0.09 (-0.32 – 0.14)
Rural	0.44	0.37	0.46	0.50	0.06 (-0.06 – 0.19)	0.12 (-0.08 – 0.33)	-0.06 (-0.30 – 0.18)
Age							
≤9	0.39	0.22	0.42	0.49	0.02 (-0.18 – 0.21)	0.25** (0.05 – 0.45)	-0.24 (-0.52 -0.04)
10	0.35	0.39	0.38	0.49	0.03 (-0.13 – 0.19)	0.07 (-0.14 – 0.27)	-0.03 (-0.30 – 0.23)
≥11	0.27	0.26	0.41	0.42	0.14 (-0.01 – 0.29)	0.13 (-0.05 – 0.31)	0.01 (-0.23 – 0.24)
SES[4]							
Quintile 1	0.51	0.39	0.53	0.73	0.02 (-0.20 – 0.24)	0.34 (-0.04 – 0.73)	-0.32 (-0.76 – 1.12)
Quintile 2	0.46	0.41	0.52	0.79	0.06 (-0.11 – 0.23)	0.39 (-0.005 -0.78)	-0.33 (-0.78 – 0.10)
Quintile 3	0.25	0.27	0.31	0.36	0.05 (-0.19 – 0.30)	0.09 (-0.27 – 0.44)	-0.03 (-0.46 – 0.40)
Quintile 4	0.23	0.26	0.34	0.36	0.10 (-0.05 – 0.26)	0.10 (-0.11 – 0.32)	0.0004 (-0.27 – 0.27)
Quintile 5	-0.001	0.26	-0.05	NE	-0.04 (-0.13 – 0.05)	NE	NE
Phase							
1	0.28	0.38	0.40	0.39	0.10 (-0.02 -0.22)	-0.01 (-0.17 – 0.16)	0.11 (-0.10 – 0.31)
2	0.42	0.21	0.41	0.55	0.01 (-0.14 – 0.16)	0.31* (0.09 – 0.54)	-0.30** (-0.57 - - 0.03)

NE – Not estimable due to zero children from COMP in Quintile 5 at final; * p<0.01; **p<0.05

[1] Change from baseline to final in intervention; [2] Change from baseline to final in comparison; [3] Change from baseline to final in intervention, minus the change from baseline to final in comparison as determined using a linear regression model; [4] SES is measured by ICSEA scores. Quintiles are based on 2011 national data at baseline (cut-offs 940/980/1020/1076/1287) and 2014 national data at final (cut-offs 942/985/1023/1074/1292). The national average ICSEA score is 1000 (Australian Curriculum Assessment and Reporting Authority (ACARA) 2013).

Note: Models were adjusted by age and ICSEA score.

4.2.3 WAIST CIRCUMFERENCE BY COMMUNITY

Comparisons in waist circumference between children aged 9-11 years in intervention and comparison communities across the period from baseline to final are reported in Table 21.

- There was a statistically non-significant 0.81cm (95%CI -1.93-1.32, p=NS) decrease over time in the waist circumference of children in INT and a statistically non-significant decrease of 0.13 cm (95%CI -1.27-1.01, p=NS) in COMP.
- Overall, there was a statistically non-significant reduction in waist circumference of children in INT compared to COMP at final (-0.68, 95%CI -2.28-0.92, p=NS).

Table 21: Mean waist circumference for children aged 9-11 years at baseline and final by community

	Year 3 (Baseline)		Year 5 (Final)		Δ Change (Year 3 – Year 5)[1]		
	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
n	1206	1144	998	749			
Age (years)	10.12	10.02	10.05	10.15	-0.07 (-0.22-0.08)	0.13** (0.02-0.24)	-0.20** (-0.39--0.02)
n	1206	1145	1010	750			
Average waist (cm)	65.59	64.46	64.68	64.85	-0.81 (-1.93-0.32)	-0.13 (-1.27-1.01)	-0.68 (-2.28-0.92)

**p<0.05

[1] Waist circumference models were adjusted by age and ICSEA score; [2] Change from baseline to final in intervention; [3] Change from baseline to final in comparison; [4] Change from baseline to final in intervention, minus the change from baseline to final in comparison as determined using a linear regression model.

Note: Models were adjusted by age and ICSEA score.

4.2.4 PREVALENCE OF OVERWEIGHT AND OBESITY

Overall, just more than one fifth of students at baseline (21.7%) and nearly a quarter at final (23.9%) were overweight or obese, with nearly three-quarters in the healthy weight range (baseline 71.7%, final 70.0%).

The proportion of students overall in each weight status category by community is shown in

Table 22.

- There was a 37% reduced odds of underweight prevalence in INT at final compared to baseline (OR 0.62, 95%CI 0.41-0.94, p=0.024), in comparison to a 25% reduced probability in COMP (OR 0.75, 95%CI 0.45-1.24, p=NS). The probability of underweight was not significantly different between INT and COMP at final. Findings were similar when a multilevel model was used (INT, OR 0.63, 95%CI 0.43 – 0.91, p=0.015; COMP, OR 0.75, 95%CI 0.48 – 1.17, p=NS; Difference, OR 0.84, 95%CI 0.47 – 1.52, p=NS).
- There were no statistically significant changes in probability of healthy weight over time in INT or COMP, or between INT and COMP at final. This was true when a multilevel model was used (INT, OR 0.11, 95%CI 0.92 – 1.35, p=NS; COMP, OR 0.85, 95%CI 0.67 – 1.06, p=NS; Difference, OR 1.31, 95%CI 0.98 – 1.76, p=NS).
- The prevalence of overweight at baseline and final was 18.1% and 18.7% respectively in INT, and 15.8% and 17.9% respectively in COMP. However, there were no statistically significant changes in probability of overweight over time in INT or COMP, or between INT and COMP at final. This was true when a multilevel model was adopted (INT, OR 1.01, 95%CI 0.80 – 1.27, p=NS; COMP, OR 1.16, 95%CI 0.88 – 1.54, p=NS; Difference, OR 0.87, 95%CI 0.60 – 1.25, p=NS).
- Obesity prevalence at baseline and final in INT was 5.5% and 4.6%, respectively, and in COMP was 3.9% and 6.5% respectively. There was a 20% lower odds of obesity (OR 0.80, 95%CI 0.55-1.17, p=NS) at final compared to baseline in INT and a 66% higher odds of obesity at final compared to baseline in COMP (OR 1.66, 95%CI 1.06 – 2.69, p=0.038). Overall, there were 52% lower odds of obesity in INT than COMP at final (OR 0.48, 95% CI 0.26–0.89, p=0.019). Findings were similar for INT (OR 0.81, 95%CI 0.54 – 1.21, p=NS) and COMP (OR 1.61, 95%CI 1.03 – 2.51, p=0.038) when a multilevel model was adopted. Using this model there were 49% lower odds of obesity in INT than COMP at final (OR 0.51, 95%CI 0.28 – 0.92, p=0.026).
- The prevalence of combined overweight and obesity at baseline and final was 23.5% and 23.3% respectively in INT, and 19.8% and 24.4% respectively in COMP. However, there were no statistically significant changes over time in the probability of children being classified as overweight or obese (combined) in either INT (OR 0.97, 95%CI 0.84 - 1.13, p=NS) or COMP (OR 1.25, 95%CI 0.95-1.64, p=NS), nor between INT and COMP at final (OR 0.78, 95%CI 0.57-1.06, p=NS). This was true when a multilevel model was adopted (INT, OR 0.96, 95%CI 0.78 – 1.18, p=NS; COMP, OR 1.27, 95%CI 1.00 – 1.62, p=NS; Difference, OR 0.75, 95%CI 0.54 – 1.04, p=NS).

Table 23, Note: A binary logistic regression model, adjusted by age and ICSEA score, was used to fit the models.

Table 24 and Table 25 show the prevalence of overweight, obesity, and combined overweight and obesity, respectively, by community and according to a range of demographic factors.

- The only factor significantly associated with the prevalence of overweight was SES. There was an increased probability of overweight prevalence over time for COMP children in SES Q2 (OR 2.21, 95%CI 1.35 – 3.62, p=0.002) and a decreased probability of overweight prevalence over time for INT children in SES Q5 (OR 0.30, 95%CI 0.27 – 0.33, p<0.001).
- At final, the probability of obesity was 62% lower for girls in INT (OR 0.38, 95%CI 0.19-0.76, p=0.006) than girls in COMP and 70% lower for children 11 years or greater in INT (OR 0.30, 95%CI 0.11-0.83, p=0.021) than those in COMP.
- There was also a significantly decreased probability of obesity at final for children recruited in Phase 2 (OR 0.21, 95%CI 0.09-0.51, p=0.001)
- There was a statistically significant increase in probability of combined overweight and obesity prevalence for children in SES Q2 in COMP over time (OR 2.37, 95%CI 1.30-4.32, p=0.005). Overall, there was a 53% lower probability of combined overweight and obesity prevalence in INT than COMP at final (OR 0.47, 95%CI 0.25 – 0.89, p=0.020) for children in Q2.

Table 22: Proportion (%) of students in each weight status category[1] for total sample

IOTF category	n	Year 3 (Baseline)		Year 5 (Final)		OR (95% CI) (Year 3 – Year 5)		
Data shown are n (%)		INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
n		1202	1144	983	749			
Underweight	250	7.4	5.8	4.7	4.4	0.62** (0.41 – 0.94)	0.75 (0.45 – 1.24)	0.83 (0.43 – 1.60)
Healthy weight	2905	69.1	74.5	70.9	70.5	1.10 (0.95 – 1.28)	0.86 (0.66 – 1.11)	1.28 (0.95 – 1.73)
Overweight	718	18.1	15.8	18.7	17.9	1.05 (0.91 -1.21)	1.11 (0.82 – 1.51)	0.94 (0.67 – 1.32)
Obese	205	5.5	3.9	4.6	6.5	0.80 (0.55 – 1.17)	1.66** (1.03 – 2.69)	0.48** (0.26 – 0.89)
Combined overweight/obese	923	23.5	19.8	23.3	24.4	0.97 (0.84 – 1.13)	1.25 (0.95 – 1.64)	0.78 (0.57 – 1.06)

** p<0.05

[1]International Obesity Taskforce cut-points (Cole TJ et al. 2000, Cole TJ et al. 2007); [2] Odds of weight status categories in year 5 for intervention group, Year 3 is the reference group; [3] Odds of weight status categories in year 5 for comparison group, Year 3 is the reference group; [4] Odds of weight status categories for INT[2], COMP[3] is the reference group.
Note: A binary logistic regression model, adjusted by age and ICSEA score, was used to fit the models.

Table 23: Comparison of baseline and final prevalence (%) of overweight[1] (excluding obese) for children aged 9-11 years, by community, sex, locality, SES and Phase

	Year 3 (Baseline)		Year 5 (Final)		OR (95%CI) (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
n	1202	1144	983	749			
All	18.1	15.8	18.7	17.9			
Sex							
Boys	18.2	15.7	17.5	18.8	0.96 (0.74 – 1.24)	1.18 (0.75 – 1.987)	0.81 (0.48 – 1.38)
Girls	18.0	16.0	19.8	17.0	1.12 (0.90 – 1.39)	1.04 (0.74 – 1.45)	1.08 (0.72 – 1.61)
Locality							
Urban	17.8	15.4	19.0	17.2	1.06 (0.88 – 1.29)	1.06 (0.71 – 1.58)	1.01 (0.65 – 1.57)
Rural	18.7	16.5	18.2	19.8	1.02 (0.79 – 1.30)	1.21 (0.80 – 1.84)	0.84 (0.52 – 1.37)
Age, years							
≤9	15.8	13.8	17.4	15.8	1.09 (0.76 – 1.59)	1.15 (0.61 – 2.17)	0.95 (0.46 - 2.00)
10	20.1	18.0	19.6	16.4	0.97 (0.72 – 1.30)	0.85 (0.53 – 1.37)	1.13 (0.65 – 1.98)
≥11	17.8	15.2	19.1	20.7	1.10 (0.82 – 1.48)	1.40 (0.97 – 2.01)	0.79 (0.50 – 1.26)
SES[5]							
Quintile 1	22.6	13.8	22.2	21.2	0.98 (0.70 – 1.37)	1.67 (0.66 – 4.19)	0.59 (0.22 – 1.56)
Quintile 2	18.4	17.6	22.8	32.3	1.33 (0.95 – 1.87)	2.21* (1.35 – 3.62)	0.60 (0.33 – 1.10)
Quintile 3	16.7	20.3	14.7	17.6	0.87 (0.58 – 1.29)	0.84 (0.50 – 1.42)	1.03 (0.53 – 2.00)
Quintile 4	16.9	15.1	17.7	12.1	1.05 (0.65 – 1.71)	0.76 (0.56 – 1.04)	1.38 (0.78 – 2.43)
Quintile 5	14.7	10.7	5.0	NE	0.30* (0.27 – 0.33)	NE	NE
Phase							
1	18.5	15.7	18.5	17.3	0.97 (0.84 – 1.13)	1.10 (0.79 – 1.53)	0.89 (0.62 – 1.27)
2	17.2	16.0	19.1	18.6	1.18 (0.89 – 1.58)	1.13 (0.72 – 1.78)	1.05 (0.61 – 1.79)

NE – Not estimable due to zero children from COMP in Quintile 5 at final; *p<0.01

[1]International Obesity Taskforce cut-points (Cole TJ et al. 2000, Cole TJ et al. 2007); [2] Odds of weight status categories in year 5 for intervention group, Year 3 is the reference group; [3] Odds of weight status categories in year 5 for comparison group, Year 3 is the reference group; [4] Odds of weight status categories for INT, COMP is the reference group; [5] SES is measured by ICSEA scores. Quintiles are based on 2011 national data at baseline (cut-offs 940/980/1020/1076/1287) and 2014 national data at final (cut-offs 942/985/1023/1074/1292).. The national average ICSEA score is 1000 (Australian Curriculum Assessment and Reporting Authority (ACARA) 2013).

Note: A binary logistic regression model, adjusted by age and ICSEA score, was used to fit the models.

Table 24: Comparison of baseline and final prevalence (%) of obesity[1] for children aged 9-11 years, by community, sex, locality, SES and Phase

	Year 3 (Baseline)		Year 5 (Final)		OR (95% CI) (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
n	1202	1144	983	749			
All	5.5	3.9	4.6	6.5			
Sex							
Boys	5.0	3.7	4.7	5.9	0.93 (0.49 – 1.76)	1.58 (0.87 – 2.88)	0.59 (0.24 - 1.42)
Girls	6.0	4.1	4.5	7.2	0.70 (0.45 – 1.07)	1.83** (1.06 – 3.14)	0.38* (0.19 – 0.76)
Locality							
Urban	4.9	3.5	4.0	6.2	0.76 (0.46 -1.23)	1.60 (0.81 – 3.20)	0.47 (0.20 – 1.09)
Rural	7.0	4.6	5.8	7.6	0.86 (0.48 – 1.55)	1.84** (1.13 – 3.00)	0.47 (0.22 – 1.00)
Age, years							
≤9	7.6	4.0	7.0	7.9	0.87 (0.49 – 1.54)	2.01 (0.94 – 4.33)	0.43 (0.17 – 1.12)
10	4.9	5.3	4.2	7.3	0.83 (0.46 – 1.53)	1.33 (0.65 – 2.74)	0.63 (0.24 – 1.60)
≥11	4.5	2.4	0.3	4.9	0.61 (0.33 – 1.12)	2.05 (0.90 – 4.67)	0.30** (0.11 – 0.83)
SES[5]							
Quintile 1	8.5	8.0	7.0	7.7	0.78 (0.43 – 1.42)	0.98 (0.37 – 2.68)	0.80 (0.25 – 2.59)
Quintile 2	8.5	4.9	6.2	8.3	0.69 (0.36 – 1.29)	1.86 (0.78 – 0.45)	0.37 (0.13 – 1.09)
Quintile 3	3.4	3.7	4.2	4.2	1.20 (0.43 – 3.34)	1.12 (0.41 – 0.31)	1.08 (0.25 – 4.54)
Quintile 4	3.1	3.5	2.5	7.2	0.81 (0.43 – 3.34)	2.25** (1.17 – 4.34)	0.36 (0.12 – 1.05)
Quintile 5	0	1.7	0	0	NE	NE	NE
Phase							
1	4.8	5.2	4.4	4.8	0.89 (0.56 – 1.40)	0.96 (0.54 – 1.73)	0.92 (0.44 – 1.93)
2	6.7	2.7	4.9	8.8	0.70 (0.38 – 1.28)	3.33* (1.73 – 6.40)	0.21* (0.09 – 0.51)

NE – Not estimable due to zero children from COMP in Quintile 5 at final; *p<0.01; ** p<0.05

[1]International Obesity Taskforce cut-points (Cole TJ et al. 2000, Cole TJ et al. 2007); [2] Odds of weight status categories in year 5 for intervention group, Year 3 is the reference group; [3] Odds of weight status categories in year 5 for comparison group, Year 3 is the reference group; [4] Odds of weight status categories for INT[2], COMP[3] is the reference group; [5] SES is measured by ICSEA scores. Quintiles are based on 2011 national data at baseline (cut-offs 940/980/1020/1076/1287) and 2014 national data at final (cut-offs 942/985/1023/1074/1292). The national average ICSEA score is 1000 (Australian Curriculum Assessment and Reporting Authority (ACARA) 2013).

Note: A binary logistic regression model, adjusted by age and ICSEA score, was used to fit the models.

Table 25: Comparison of baseline and final prevalence (%) of combined overweight and obesity[1] for children aged 9-11 years, by community, sex, locality, SES and Phase

	Year 3 (Baseline)		Year 5 (Final)		OR (95% CI) (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
n	1202	1144	983	749			
All	23.5	19.8	23.3	24.4			
Sex							
Boys	23.1	19.4	22.3	24.7	0.96 (0.74 – 1.25)	1.28 (0.88 – 1.88)	0.75 (0.47 – 1.19)
Girls	24.0	20.1	24.0	24.2	0.98 (0.79 – 1.21)	1.22 (0.89 – 1.68)	0.80 (0.55 – 1.18)
Locality							
Urban	22.7	18.9	22.9	23.4	0.99 (0.82 – 1.20)	1.18 (0.84 – 1.65)	0.84 (0.57 – 1.23)
Rural	25.7	21.0	23.8	27.4	0.94 (0.77 – 1.16)	1.38 (0.92 – 2.08)	0.68 (0.43 – 1.07)
Age, years							
≤9	23.4	17.9	24.7	23.8	1.03 (0.72 – 1.47)	1.39 (0.87 – 2.23)	0.74 (0.41 – 1.34)
10	25.0	23.3	23.3	23.7	1.03 (0.68 – 1.21)	0.95 (0.63 – 1.44)	0.95 (0.57 – 1.58)
≥11	22.2	17.6	21.8	25.6	0.98 (0.73 – 1.33)	1.52** (1.05 – 2.21)	0.65 (0.40 – 1.04)
SES[5]							
Quintile 1	31.2	21.8	29.1	28.8	0.91 (0.63 – 1.31)	1.45 (0.67 – 3.17)	0.62 (0.26 – 1.47)
Quintile 2	26.9	22.4	29.0	40.6	1.10 (0.89 – 1.39)	2.37* (1.30 – 4.32)	0.47** (0.25 – 0.89)
Quintile 3	20.1	24.1	18.5	21.8	0.90 (0.62 – 1.30)	0.88 (0.51 – 1.51)	1.02 (0.53 – 1.98)
Quintile 4	20.0	18.6	20.2	19.3	1.01 (0.69 – 1.48)	1.05 (0.71 – 1.56)	0.96 (0.56 – 1.67)
Quintile 5	14.7	12.4	5.0	NE	0.31* (0.29 – 0.34)	NE	NE
Phase							
1	23.3	20.8	22.8	22.1	0.94 (0.79 – 1.12)	1.06 (0.82 – 1.37)	0.89 (0.65 – 1.21)
2	23.9	18.7	23.9	27.4	1.03 (0.80 – 1.32)	1.52 (0.96 – 2.41)	0.68 (0.40 – 1.15)

NE – Not estimable due to zero children from COMP in Quintile 5 at final *p<0.01; ** p<0.05

[1]International Obesity Taskforce cut-points (Cole TJ et al. 2000, Cole TJ et al. 2007); [2] Odds of weight status categories in year 5 for intervention group, Year 3 is the reference group; [3] Odds of weight status categories in year 5 for comparison group, Year 3 is the reference group; [4] Odds of weight status categories for INT, COMP is the reference group; [5] SES is measured by ICSEA scores. Quintiles are based on 2011 National data at baseline (cut-offs 940/980/1020/1076/1287) and 2014 National data at final (cut-offs 942/985/1023/1074/1292). The national average ICSEA score is 1000 (Australian Curriculum Assessment and Reporting Authority (ACARA) 2013).Note: A binary logistic regression model, adjusted by age and ICSEA score, was used to fit the models.

4.2.5 SUMMARY – PRIMARY SCHOOL STUDENTS

In summary, BMI z-score did not change significantly in intervention or comparison communities and this was true for all children regardless of their age, sex, and locality. However, a larger non-significant increase in BMI z-score was observed for children in comparison communities (0.14 points) compared to those in intervention communities (0.07 points), which may indicate a small positive influence of the OPAL program on children's BMI z-score.

Overall, the prevalence of overweight and obesity combined was stable for intervention communities across the duration of the intervention, at approximately 23.5%, slightly lower than the national average of 28% (21% overweight; 7% obese, 9-13 years) (Department of Health and Ageing 2008). In contrast, the prevalence of combined overweight and obesity in comparison communities increased by almost 5% over the intervention period. Nonetheless, there were no significant changes over time in the probability of combined overweight and obesity in intervention or comparison communities, or between intervention and comparison at final assessment. However, the change in probability of obesity prevalence (excluding overweight) over-time was statistically significantly different between intervention and comparison communities at final assessment, with a 53% lower probability of obesity in intervention communities than comparison communities. Importantly, however, the primary aim of the OPAL program was to increase the proportion of children in the healthy weight range. There were no statistically significant differences in the prevalence of healthy weight in 9-11 year olds from intervention communities compared to comparison communities. Overall, these findings suggest a positive impact of the OPAL program on the overall pattern of weight status among South Australian children participating in the program.

Children's level of socio-economic disadvantage was significantly associated with both BMI z-score and prevalence of combined overweight and obesity. Larger decreases in BMI z-score were observed over time in children attending schools at low-moderate disadvantage (Q2) in intervention communities compared with comparison communities. Children in quintile 2 were also 65% less likely to be overweight or obese at final if in intervention communities compared to comparison communities. These findings are encouraging, indicating that the OPAL program may have positively impacted on children attending schools in areas of greatest risk. However, these findings should be interpreted with caution as the measure of disadvantage is at the school-level and not the individual-level.

These findings contribute to our understanding of the impact of the OPAL program. The OPAL intervention aimed to improve healthy eating and physical activity behaviours of children and thus increase the proportion of children in the healthy weight range. Although this proportion did not significantly change over the 2-3 year OPAL evaluation period,, the proportion of overweight and obese children in comparison communities increased whilst there was no change observed in intervention communities. This maintenance of overweight and obesity prevalence is encouraging.

5 FINDINGS – HEALTHY EATING, PHYSICAL ACTIVITY AND SEDENTARY BEHAVIOUR AND ENVIRONMENTS

This section details the findings from child and parent surveys on healthy eating behaviours and environments, and physical activity and sedentary behaviours and environments. Findings are presented for Phase 1 and Phase 2 combined and results are compared by community; intervention (INT) and comparison (COMP) communities. The primary outcomes (child fruit, vegetable and discretionary foods intake; physical activity level; screen time usage) are presented according to a range of socio-demographic factors; sex, locality, age, SES and Phase.

5.1 CHARACTERISTICS OF THE SURVEY SAMPLE

Students completed questions relating to their own eating, physical activity and sedentary behaviours; their knowledge and attitudes regarding eating, activity and sedentary behaviours; and their home, school and local environments. These are described elsewhere (section 2.5.2).

Children were on average 10.6 (0.9) years at baseline and 10.6 (0.9) years at final. Half were female (baseline 50.2%; final 53.1%) and approximately two-thirds were from urban localities (baseline 65.3%; final 68.3%) and the remaining from rural localities (baseline 34.7%, final 31.6%). The average ICSEA score for schools attended by children was 1005.5 at baseline and 995.9 at final, similar to the national average of 1000 (Australian Curriculum Assessment and Reporting Authority (ACARA) 2013).

Characteristics of the student survey sample by community and according to a number of demographic factors are detailed in Table 26. As per the anthropometric sample (4.2.1), there were statistically significant differences between INT and COMP at baseline for locality, SES and Phase (all $p<0.001$) and between INT and COMP at final for locality and SES (both $p<0.001$).

Table 26: Characteristics (n, %) of the student survey sample

	Year 3 (Baseline)		Diff[1]	Year 5 (Final)		Diff[2]
	INT	COMP	P value	INT	COMP	P value
All	1373	1238		1092	781	
Sex			0.199			0.040
Boys	673 (49.0)	600 (48.5)		490 (44.9)	388 (49.7)	
Girls	700 (51.0)	638 (51.5)		602 (55.1)	393 (50.3)	
Locality[1]			<0.001			<0.001
Urban	965 (70.3)	741 (59.9)		705 (64.6)	574 (73.7)	
Rural	408 (29.7)	497 (40.1)		387 (35.4)	205 (26.3)	
Age, years			0.051			0.125
≤9	374 (27.3)	379 (30.6)		340 (27.4)	214 (27.4)	
10	481 (35.1)	447 (36.1)		380 (34.6)	270 (34.6)	
≥11	514 (37.5)	412 (33.3)		372 (38.0)	297 (38.0)	
SES[2]			<0.001			<0.001
Quintile 1	271 (19.7)	88 (7.1)		268 (24.5)	54 (6.9)	
Quintile 2	421 (30.7)	220 (17.8)		217 (19.9)	140 (17.9)	
Quintile 3	328 (23.9)	198 (16.0)		251 (23.0)	223 (28.6)	
Quintile 4	237 (17.3)	607 (49.0)		334 (30.6)	364 (46.6)	
Quintile 5	116 (8.4)	124 (10.0)		22 (2.0)	0 (0)	
Phase			<0.001			0.097
1	884 (64.4)	613 (49.5)		657 (60.2)	440 (56.3)	
2	489 (35.6)	625 (50.5)		435 (39.8)	341 (43.7)	

[1] Difference between INT and COMP at baseline; [2] Difference between INT and COMP at final; [3] n=1 missing at final in COMP; [4] SES is measured by ICSEA scores. Quintiles are based on 2011 National data at baseline (cut-offs 940/980/1020/1076/1287) and 2014 National data at final (cut-offs 942/985/1023/1074/1292).. The national average ICSEA score is 1000 (Australian Curriculum Assessment and Reporting Authority (ACARA) 2013).

5.2 HEALTHY EATING BEHAVIOURS AND ENVIRONMENTS

5.2.1 CHILD REPORT OF CHILD DIETARY INTAKE

FRUIT INTAKE

Eighty one percent of all students at baseline and eighty percent at final reported consuming fruit the previous day and approximately two-thirds met recommendations of two serves (62% baseline, 68% final).

Fruit intake (whether reported consuming the previous day or not)

Table 27 shows the probability of change in proportion of students who reported consuming fruit on the day prior to completing the questionnaire.

- There were no statistically significant changes over time in the probability of children eating fruit the previous day in INT (OR 1.1, 95%CI 0.8-1.5, p=NS) or COMP (OR 0.8 95%CI 0.6-1.2, p=NS, or between INT and COMP at final (OR 1.34, 95%CI 0.8-2.3, p=NS).
- At final, children in INT were 2.1 times more likely (OR 2.1, 95% CI 1.0-4.5, p=0.046) than children in COMP to consume fruit the previous day if recruited in Phase 2, respectively.
- The probability of eating fruit the previous day was not significantly different between INT and COMP at final, according any of the other selected sociodemographic factors.

Fruit intake (mean number of serves)

Table 28 shows the change in average number of serves of fruit reportedly consumed.

- There was a statistically significant increase in the average number of serves of fruit reportedly consumed by children in both INT and COMP by approximately half a serve (INT 0.51, COMP 0.46; both p<0.001). The adjusted time x group effect (-0.06 serves, 95%CI -0.29-0.17, p=NS) was not statistically significant.
- Statistically significant increases in the average number of serves of fruit reportedly consumed were observed in INT and COMP when analysed by all sociodemographic variables: sex, locality, age, SES and Phase.
- Despite this, there were no statistically significant changes over time between INT and COMP according to these sociodemographic factors.

Fruit intake (proportion meeting guidelines)

Table 29 shows the change in proportion of students who met the recommended intake of two serves of fruit.

- The probability of students meeting the recommended fruit intake significantly increased by 50% in INT (OR 1.5, 95%CI 1.2-1.7, p<0.001) but did not significantly change in COMP (OR 1.2, 95%CI 0.9-1.5, p=NS). The probability of students meeting the recommended fruit intake was not significantly difference between INT and COMP at final (OR 1.2, 95%CI 0.9-1.6, p=NS). Findings were similar when using a multilevel model (INT, OR 1.5 95%CI 1.3 – 1.8, p<0.001; COMP, OR 1.2 95%CI 0.9 – 1.5, p=NS; Difference, OR 1.3 95%CI 0.9 – 1.7, p=NS).
- There were statistically significant increases in the probability of students meeting the recommended intake of fruit according to all sociodemographic factors in INT but not COMP (statistically significant for sex, SES and Phase but not locality or age).
- There were no statistically significant differences between INT and COMP at final for the probability of students meeting fruit recommendations the previous day, according to all sociodemographic factors.

Table 27: Proportion (%) of students (9-11 years) reporting eating fruit[1] the previous day at baseline and final by community and by sex, locality, age, SES and Phase

	Year 3 (Baseline)		Year 5 (Final)		OR (95%CI) (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
n	1356	1231	1090	776			
All							
Ate fruit yesterday	85.1	89.4	86.2	87.0	1.1 (0.8 - 1.5)	0.8 (0.6 – 1.2)	1.34 (0.8 – 2.3)
Sex							
Boys	81.9	85.5	84.7	86.5	1.2 (0.8 – 1.8)	1.2 (0.7 – 1.8)	1.1 (0.6 – 1.9)
Girls	88.5	92.9	87.5	87.5	0.9 (0.7 – 1.4)	0.5** (0.3 – 0.9)	1.7 (0.9 – 3.3)
Locality							
Urban	85.7	90.4	85.5	87.7	1.0 (0.7 – 1.6)	0.9 (0.5 – 1.5)	1.2 (0.6 – 2.3)
Rural	83.6	87.9	87.6	84.8	1.3 (0.9 – 1.9)	0.8 (0.4 – 1.4)	1.6 (0.8 – 3.3)
Age, years							
≤9	84.2	89.3	85.5	84.3	1.2 (0.8 – 1.8)	0.7 (0.4 – 1.3)	1.8 (0.8 – 3.8)
10	85.1	90.1	87.6	85.1	1.3 (0.8 – 2.0)	0.7 (0.4 – 1.0)	1.9 (1.0 – 3.6)
≥11	85.7	88.5	85.5	90.6	1.0 (0.6 – 1.5)	1.3 (0.8 – 2.2)	0.7 (0.4 – 1.5)
SES[5]							
Quintile 1	77.9	74.7	81.7	85.2	1.3 (0.8 – 2.0)	2.0 (0.9 – 4.2)	0.7 (0.3 – 1.6)
Quintile 2	86.2	91.3	79.7	77.1	0.6 (0.4 – 1.1)	0.3 (0.1 – 1.1)	2.0 (0.5 – 7.2)
Quintile 3	86.4	87.9	88.4	86.9	1.2 (0.6 – 2.4)	0.9 (0.5 – 1.7)	1.3 (0.51 – 3.4)
Quintile 4	86.5	91.0	91.6	91.1	1.7* (1.3 – 2.2)	1.0 (0.6 – 1.7)	1.7 (0.9 – 3.1)
Quintile 5	91.3	91.1	100	NE	NE	NE	NE
Phase							
1	85.2	87.0	86.0	89.5	1.1 (0.7 – 1.8)	1.3 (0.8 – 2.0)	0.9 (0.5 – 1.7)
2	85.0	91.6	86.7	83.8	1.1 (0.7 – 1.8)	0.5** (0.3 – 0.9)	2.1** (1.0 – 4.5)

NE – Not estimable due to zero children from COMP in Quintile 5 at final or 100% of children from INT in Quintil 5 reportingeating fruit the previous day at final; *p<0.01; ** p<0.05

[1] Fruit estimates exclude fruit juice; [2] Odds in year 5 for intervention group (INT), Year 3 is the reference group; [3] Odds in year 5 for comparison group (COMP), Year 3 is the reference group; [4] Odds for the intervention group (INT), the comparison group (COMP) is the reference group; [5] SES is measured by ICSEA scores. Quintiles are based on 2011 national data at baseline (cut-offs 940/980/1020/1076/1287) and 2014 National data at final (cut-offs 942/985/1023/1074/1292). The national average ICSEA score is 1000 (Australian Curriculum Assessment and Reporting Authority (ACARA) 2013)..Note: A binary logistic regression model, adjusted by age and ICSEA score, was used to fit the models. Sub-analyses should be treated with caution.

Table 28: Mean serves of fruit[1] consumed by students (9-11 years) the previous day at baseline and final by community and by sex, locality, age, SES and Phase

	Year 3 (Baseline)		Year 5 (Final)		Δ Change (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
n	1356	1231	1090	776			
All							
Number fruit serves[5] ate yesterday	1.94	2.11	2.39	2.60	0.51* (0.34 – 0.69)	0.46* (0.31 – 0.60)	-0.06 (-0.29 – 0.17)
Sex							
Boys	1.83	2.05	2.41	2.71	0.59* (0.42 – 0.76)	0.69* (0.43 – 0.95)	-0.10 (-0.41 – 0.22)
Girls	2.05	2.17	2.37	2.49	0.33** (0.16 – 0.53)	0.35* (0.16 – 0.53)	-0.02 (-0.34 – 0.30)
Locality							
Urban	1.97	2.15	2.47	2.63	0.52* (0.33 – 0.72)	0.54* (0.33 – 0.75)	-0.02 (-0.31 – 0.28)
Rural	1.87	2.06	2.23	2.51	0.33* (0.20 – 0.46)	0.47* (0.21 – 0.73)	-0.13 (-0.43 – 0.16)
Age, years							
≤9	1.92	2.06	2.40	2.47	0.49* (0.25 – 0.73)	0.43** (0.003 – 0.85)	0.06 (-0.42 – 0.55)
10	1.87	2.17	2.37	2.64	0.51* (0.27 – 0.75)	0.50* (0.24 – 0.77)	0.01 (-0.35 – 0.36)
≥11	2.00	2.10	2.39	2.66	0.38* (0.14 – 0.61)	0.60* (0.35 – 0.84)	-0.22 (-0.56 – 0.12)
SES[6]							
Quintile 1	1.76	1.66	2.28	2.28	0.52** (0.11 – 0.92)	0.62* (0.36 – 0.88)	-0.11 (-0.58 – 0.37)
Quintile 2	1.87	2.07	2.38	2.17	0.51* (0.17 – 0.85)	0.10 (-0.40 – 0.59)	0.42 (-0.18 -1.01)
Quintile 3	1.98	2.18	2.22	2.57	0.26** (0.01 – 0.51)	0.40* (0.18 – 0.61)	-0.14 (-0.47 – 0.19)
Quintile 4	2.07	2.16	2.57	2.83	0.51** (0.09 – 0.92)	0.66* (0.45 – 0.88)	-0.16 (-0.62 – 0.31)
Quintile 5	2.19	2.18	2.86	NE	0.66* (0.39 – 0.94)	NE	NE
Phase							
1	1.89	2.06	2.37	2.60	0.49* (0.29 – 0.70)	0.56* (0.32 – 0.80)	-0.06 (-0.38 – 0.25)
2	2.02	2.17	2.41	2.60	0.39* (0.22 – 0.55)	0.48* (0.15 – 0.80)	-0.09 (-0.46 – 0.28)

NE – Not estimable due to zero children from COMP in Quintile 5 at final; *p<0.01; **p<0.05

[1] Fruit estimates exclude fruit juice; [2] Change from baseline to final in intervention; [3] Change from baseline to final in comparison; [4] Change from baseline to final in intervention, minus the change from baseline to final in comparison as determined using a linear regression model; [5] As recommended by the 2013 Australian Dietary Guidelines (National Health and Medical Research Council 2013); [6] SES is measured by ICSEA scores. Quintiles are based on 2011 national data at baseline (cut-offs 940/980/1020/1076/1287) and 2014 national data at final (cut-offs 942/985/1023/1074/1292). The national average ICSEA score is 1000 (Australian Curriculum Assessment and Reporting Authority (ACARA) 2013). Note: Models were adjusted by age and ICSEA score. Sub-analyses should be treated with caution.

Table 29: Proportion (%) of students (9-11 years) who had an intake of fruit[1] meeting the recommended 2 serves of fruit at baseline and final by community and by sex, locality, age, SES and Phase

	Year 3 (Baseline)		Year 5 (Final)		OR (95%CI) (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
n	1356	1231	1090	776			
All							
Met fruit recommendations (2 serves)[5]	57.7	67.4	66.3	70.8	1.5* (1.2 – 1.7)	1.2 (0.9 – 1.5)	1.2 (0.9 – 1.6)
Sex							
Boys	55.7	62.6	64.5	70.1	1.5* (1.1 – 1.9)	1.4* (1.1- 1.9)	1.0 (0.7 – 1.5)
Girls	60.0	71.9	67.8	71.4	1.5** (1.1 – 1.9)	1.0 (0.7 – 1.3)	1.5 (1.0 – 2.2)
Locality							
Urban	58.6	68.1	66.5	70.8	1.5* (1.1 – 1.8)	1.2 (0.9 – 1.6)	1.2 (0.8 - 1.7)
Rural	55.6	66.5	66.1	70.6	1.5* (1.2 – 1.8)	1.2 (0.9 – 1.7)	1.2 (0.8 – 1.9)
Age, years							
≤9	55.9	64.5	63.7	67.1	1.4** (1.1 – 1.9)	1.2 (0.7 – 1.8)	1.2 (0.7 – 2.1)
10	56.5	68.4	68.3	68.8	1.7* (1.2 – 2.4)	1.1 (0.7 – 1.6)	1.6 (0.9 - 2.7)
≥11	59.8	69.0	66.7	75.1	1.3** (1.0 – 1.7)	1.4 (1.0 - 2.0)	0.9 (0.6 – 1.4)
SES[6]							
Quintile 1	50.2	54.0	60.4	70.4	1.5 (0.9 – 2.4)	2.0** (1.1 – 3.7)	0.8 (0.4 – 1.6)
Quintile 2	58.8	65.3	67.3	59.3	1.5* (1.1 – 1.8)	0.8 (0.3 – 1.6)	1.9 (0.8 – 4.4)
Quintile 3	59.3	67.7	68.4	70.1	1.5** (1.1 – 2.2)	1.1 (0.8 – 1.6)	1.4 (0.8 – 2.2)
Quintile 4	58.7	69.3	67.6	75.6	1.5** (1.1 – 2.2)	1.4** (1.0 – 1.8)	1.1 (0.7 – 1.7)
Quintile 5	66.1	71.8	86.4	NE	3.1* (2.1 – 4.6)	NE	NE
Phase							
1	56.6	64.4	66.5	73.9	1.6* (1.2 – 2.0)	1.6* (1.2 – 2.1)	1.0 (0.7 – 1.4)
2	59.6	70.4	66.1	66.6	1.3* (1.1 – 1.6)	0.9 (0.6 – 1.3)	1.5 (1.0 – 2.3)

NE – Not estimable due to zero children from COMP in Quintile 5 at final; *p<0.01; **p<0.05; [1] Fruit estimates exclude fruit juice; [2] Odds in year 5 for intervention group (INT), Year 3 is the reference group; [3] Odds in year 5 for comparison group (COMP), Year 3 is the reference group; [4] Odds for the intervention group (INT), the comparison group (COMP) is the reference group;. [5] As recommended by the 2013 Australian Dietary Guidelines (National Health and Medical Research Council 2013); [6] SES is measured by ICSEA scores. Quintiles are based on 2011 national data at baseline (cut-offs 940/980/1020/1076/1287) and 2014 national data at final (cut-offs 942/985/1023/1074/1292). The national average ICSEA score is 1000 (Australian Curriculum Assessment and Reporting Authority (ACARA) 2013). Note: A binary logistic regression model, adjusted by age and ICSEA score, was used to fit the models.. Sub-analyses should be treated with caution.

VEGETABLE INTAKE

Eighty one percent at baseline and seventy nine percent of students at final reported consuming vegetables the previous day; however, less than one-third met recommendations (31% baseline, 30% final)

Vegetable intake (whether reported consuming the previous day or not)

Table 30 shows the change in proportion of students who consumed vegetables on the day prior to completing the questionnaire.

- There were no statistically significant changes over time in the probability of children eating vegetables the previous day in INT (OR 0.9, 95%CI 0.7-1.2, p =NS) or COMP (OR 1.0, 95%CI 0.8-1.3, p=NS), or between INT and COMP at final (OR 0.9, 95%CI 0.6-13, p=NS).
- At final, children in INT were 40% less likely (OR 0.6, 95%CI 0.4-1.0, p=0.043) than children in COMP to consume vegetables the previous day if recruited in Phase 1.
- There were no other statistically significant differences according to socio-demographic factors.

Vegetable intake (mean number of serves)

Table 31 shows the change in average number of serves of vegetables consumed the previous day.

- Although improvements in the mean number of serves of vegetables consumed were observed for both INT (0.18 serves, 95%CI -0.01-0.38, p=NS) and COMP (0.46 serves, 95%CI 0.25-0.66, p<0.001), the change was only statistically significant for COMP.
- There were no statistically significant differences over time between INT and COMP overall (-0.27 serves, 95%CI -0.56-0.01 p=NS) and according to most socio-demographic factors, except for children ≥ 11 years (0.54 serves, 95%CI -1.04- -0.04, p=0.034),and children in Phase 1 (-0.40, 95%CI =0.77- -0.03, p=0.0345).

Vegetable intake (proportion meeting guidelines)

Table 32 shows the change in proportion of students who met the recommended intake of five serves of vegetables according to a number of socio-demographic factors.

- In COMP, there was a 50% increased probability of children meeting the vegetable guidelines at final than baseline (OR 1.5, 95%CI 1.2-1.8, p<0.001), compared to a non-significant 20% increased probability for children in COMP (OR 1.2, 95%CI 1.0-1.5, p=NS). Overall, there was a non-significant 20% decreased odds of children meeting the vegetable guidelines in INT compared to COMP at final (OR 0.8, 95%CI 0.6-1.1, p=NS).
- Findings were similar when using a multilevel model (INT, OR 1.2 95%CI 1.0 – 1.5, p=NS; COMP, OR 1.5 95%CI 1.2 – 1.9, p=0.001; Difference, OR 0.8 95%CI 0.6 – 1.1, p=NS).
- The probability of meeting the vegetable guidelines was not significantly different between INT and COMP at final when analysed by socio-demographic factors, except for children aged 11 years or older (OR 0.6, 95%CI 0.4-1.0, p=0.033).

Table 30: Proportion (%) of students (9-11 years) reporting eating vegetables[1] the previous day at baseline and final by community and by sex, locality, age, SES and Phase

	Year 3 (Baseline)		Year 5 (Final)		OR (95%CI) (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
n	1327	1188	1090	774			
All							
Ate vegetables yesterday	79.6	82.2	77.8	81.5	0.9 (0.7 -1.2)	1.0 (0.8 – 1.3)	0.9 (0.6 – 1.3)
Sex							
Boys	77.6	80.0	73.9	80.0	0.8 (0.5 – 1.2)	1.0 (0.7 – 1.5)	0.8 (0.5 – 1.4)
Girls	81.6	84.1	81.0	83.0	1.0 (0.8 - 1.2)	0.9 (0.6 – 1.4)	1.0 (0.7 – 1.6)
Locality							
Urban	79.5	82.5	77.8	82.3	0.9 (0.7 – 1.3)	1.1 (0.8 – 1.4)	0.9 (0.6 – 1.3)
Rural	79.8	81.6	77.7	79.8	0.8 (0.6 – 1.3)	0.9 (0.5 – 1.5)	0.9 (0.5 – 1.8)
Age, years							
≤9	78.0	81.9	75.5	79.9	0.9 (0.6 – 1.3)	0.9 (0.6 – 1.4)	1.0 (0.5 – 1.8)
10	79.1	82.7	78.4	77.6	1.0 (0.7 – 1.4)	0.8 (0.6 – 1.0)	1.3 (0.8 – 2.1)
≥11	81.2	81.8	79.3	86.2	0.9 (0.6 – 1.3)	1.5 (1.0 – 2.2)	0.6 (0.3 – 1.1)
SES[5]							
Quintile 1	74.1	74.7	74.6	71.7	1.0 (0.8 – 1.4)	0.9 (0.4 – 2.0)	1.2 (0.5 – 2.9)
Quintile 2	77.3	78.4	81.1	75.7	1.3 (0.7 – 2.4)	0.8 (0.5 – 1.5)	1.5 (0.6 – 3.6)
Quintile 3	79.7	81.1	72.8	83.2	0.7 (0.4 – 1.1)	1.2 (0.6 – 2.2)	0.6 (0.3 – 1.3)
Quintile 4	83.1	83.7	80.8	84.2	0.8 (0.6 – 1.2)	1.0 (0.7 – 1.5)	0.8 (0.5 – 1.4)
Quintile 5	92.2	88.6	95.5	NE	1.7** (1.1 – 2.6)	NE	NE
Phase							
1	80.2	81.1	79.6	86.9	1.0 (0.7 – 1.4)	1.6* (1.1 – 2.1)	0.6** (0.4 – 1.0)
2	78.4	83.2	75.1	74.6	0.8 (0.5 – 1.2)	0.6* (0.4 – 0.9)	1.3 (0.8 – 2.2)

NE – Not estimable due to zero children from COMP in Quintile 5 at final; *p<0.01; **p<0.05

[1] Vegetable estimates include potatoes (excluding fried potatoes); [2] Odds in year 5 for intervention group (INT), Year 3 is the reference group; [3] Odds in year 5 for comparison group (COMP), Year 3 is the reference group; [4] Odds for the intervention group (INT), the comparison group (COMP) is the reference group; [5] SES is measured by ICSEA scores. Quintiles are based on 2011 National data at baseline (cut-offs 940/980/1020/1076/1287) and 2014 National data at final (cut-offs 942/985/1023/1074/1292). The national average ICSEA score is 1000 (Australian Curriculum Assessment and Reporting Authority (ACARA) 2013). Note: A binary logistic regression model, adjusted by age and ICSEA score, was used to fit the models. Sub-analyses should be treated with caution.

Table 31: Mean vegetable[1] serves consumed by students (9-11 years) the previous day at baseline and final by community and by sex, locality, age, SES and Phase

	Year 3 (Baseline)		Year 5 (Final)		Δ Change (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
n	1327	1188	1090	774			
All							
Number serves[5] veg ate yesterday	2.56	2.57	2.74	3.02	0.18 (-0.01 – 0.38)	0.46* (0.25 – 0.66)	-0.27 (-0.56 - 0.01)
Sex							
Boys	2.54	2.66	2.80	3.32	0.25 (-0.04 – 0.56)	0.67* (0.33 – 1.00)	-0.42 (-0.86 – 0.03)
Girls	2.58	2.49	2.69	2.72	0.12 (-0.16 – 0.41)	0.24 (-0.04 – 0.52)	-0.12 (-0.52 – 0.29)
Locality							
Urban	2.56	2.63	2.77	3.05	0.22 (-0.04 – 0.48)	0.46* (0.21 – 0.71)	-0.24 (-0.61 – 0.13)
Rural	2.56	2.49	2.67	2.93	0.10 (-0.18 – 0.38)	0.44** (0.02 – 0.85)	-0.34 (-0.83 – 0.16)
Age, years							
≤9	2.49	2.43	2.47	2.89	-0.01 (-0.33 – 0.31)	0.48** (0.03 – 0.91)	-0.48 (-1.03 – 0.06)
10	2.48	2.66	3.06	3.05	0.58* (0.21 – 0.94)	0.41** (0.08 – 0.75)	0.17 (- 0.32 – 0.66)
≥11	2.68	2.60	2.65	3.08	-0.04 (-0.40 – 0.31)	0.50* (0.15 – 0.86)	-0.54** (-1.04 - -0.04)
SES[6]							
Quintile 1	2.45	2.43	2.73	2.70	0.28 (-0.11 – 0.67)	0.25 (-0.49 – 1.00)	0.02 (-0.82 – 0.87)
Quintile 2	2.48	2.40	2.90	2.91	0.43 (-0.04 – 0.90)	0.49 (-0.19 – 1.16)	-0.06 (-0.87 – 0.76)
Quintile 3	2.50	2.52	2.30	2.92	-0.18 (-0.60 – 0.24)	0.41 (-0.07 – 0.88)	-0.58 (-1.22 – 0.05)
Quintile 4	2.70	2.63	2.91	3.17	0.21 (-0.18 – 0.60)	0.51* (0.19 – 0.83)	-0.30 (-0.81 – 0.20)
Quintile 5	2.97	2.76	3.45	NE	0.44 (-0.10 – 0.98)	NE	NE
Phase							
1	2.56	2.62	2.78	3.24	0.22 (-0.04 – 0.48)	0.62* (0.37 – 0.88)	-0.40** (-0.77 - -0.03)
2	2.56	2.53	2.67	2.73	0.12 (-0.16 – 0.40)	0.22 (-0.08 – 0.53)	-0.10 (-0.52 – 0.31)

NE – Not estimable due to zero children from COMP in Quintile 5 at final; *p<0.01; **p<0.05

[1] Vegetable estimates include potatoes (excluding fried potatoes); [2] Odds in year 5 for intervention group (INT), Year 3 is the reference group; [3] Odds in year 5 for comparison group (COMP), Year 3 is the reference group; [4] Odds for the intervention group (INT), the comparison group (COMP) is the reference group; [5] As recommended by the 2013 Australian Dietary Guidelines (National Health and Medical Research Council 2013); [6] SES is measured by ICSEA scores. Quintiles are based on 2011 national data at baseline (cut-offs 940/980/1020/1076/1287) and 2014 national data at final (cut-offs 942/985/1023/1074/1292). The national average ICSEA score is 1000 (Australian Curriculum Assessment and Reporting Authority (ACARA) 2013). Note: Models were adjusted by age and ICSEA score. Sub-analyses should be treated with caution.

Table 32: Proportion (%) of students (9-11 years) who had a vegetable[1] intake meeting the recommended 5 serves of vegetables at baseline and final by community and by sex, locality, age, SES and Phase

	Year 3 (Baseline)		Year 5 (Final)		OR (95%CI) (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
n	1327	1188	1090	774			
All							
Met vegetable recommendations (5 serves)[5]	17.6	16.8	20.6	23.5	1.2 (1.0 – 1.5)	1.5* (1.2 – 1.8)	0.8 (0.6 – 1.1)
Sex							
Boys	16.9	18.8	20.8	27.8	1.3** (1.0 – 1.7)	1.6* (1.3 – 2.1)	0.8 (0.6 – 1.1)
Girls	18.2	15.0	20.3	19.3	1.1 (0.9 – 1.5)	1.3 (0.9 – 1.9)	0.9 (0.5 – 1.4)
Locality							
Urban	17.7	16.9	21.6	23.0	1.3 (1.0 – 1.6)	1.4* (1.1 – 1.9)	0.9 (0.6 – 1.3)
Rural	17.2	16.7	18.7	25.1	1.1 (0.8 – 1.5)	1.6** (1.1 – 2.4)	0.7 (0.4 – 1.1)
Age, years							
≤9	15.4	15.6	16.8	22.5	1.1 (0.8 – 1.6)	1.6** (1.1 – 2.3)	0.7 (0.4 – 1.2)
10	15.7	18.0	24.8	24.3	1.8* (1.2 – 2.6)	1.5 (1.0 – 2.1)	1.2 (0.7 – 2.1)
≥11	21.0	16.7	19.6	23.6	0.9 (0.7 – 1.3)	1.5** (1.1 – 2.2)	0.6** (0.4 – 1.0)
SES[6]							
Quintile 1	17.4	17.2	20.9	28.3	1.3 (0.8 – 1.9)	1.9 (1.0 – 3.6)	0.7 (0.3 – 1.4)
Quintile 2	16.5	18.2	25.3	25.0	1.7** (1.1 – 2.7)	1.5 (0.8 – 2.7)	1.2 (0.6 – 2.5)
Quintile 3	16.5	16.8	14.4	22.7	0.9 (0.5 – 1.3)	1.5 (0.9 – 2.4)	0.6 (0.3 – 1.2)
Quintile 4	19.5	16.6	21.6	22.7	1.1 (0.8 – 1.7)	1.4** (1.1 – 1.9)	0.8 (0.5 – 1.3)
Quintile 5	20.9	15.4	22.7	NE	1.1 (0.5 – 2.1)	NE	NE
Phase							
1	17.3	17.7	20.1	25.2	1.2 (0.9 – 1.5)	1.5* (1.1 – 2.1)	0.8 (0.5 – 1.1)
2	18.0	16.0	21.2	21.3	1.3 (0.9 – 1.7)	1.4** (1.0 – 1.9)	0.9 (0.6 – 1.4)

NE – Not estimable due to zero children from COMP in Quintile 5 at final; *p<0.01; **p<0.05

[1] Vegetable estimates included potatoes (excluding fried potatoes); [2] Odds in year 5 for intervention group (INT), Year 3 is the reference group; [3] Odds in year 5 for comparison group (COMP), Year 3 is the reference group; [4] Odds for the intervention group (INT), the comparison group (COMP) is the reference group; [5] As recommended by the 2013 Australian Dietary Guidelines (National Health and Medical Research Council 2013); [6] SES is measured by ICSEA scores. Quintiles are based on 2011 national data at baseline (cut-offs 940/980/1020/1076/1287) and 2014 national data at final (cut-offs 942/985/1023/1074/1292). The national average ICSEA score is 1000 (Australian Curriculum Assessment and Reporting Authority (ACARA) 2013). Note: A binary logistic regression model, adjusted by age and ICSEA score, was used to fit the models.Sub-analyses should be treated with caution.

DISCRETIONARY (NON CORE-FOOD) INTAKE

Based on a limited number of foods and thus probably an underestimate of total non-core food intake less than half of children met the non-core food recommendation of 2 serves or less without including sweetened beverages.

Discretionary intake (proportion meeting guidelines, without the inclusion of sweetened beverages)

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Table 33 shows the change in proportion of primary students who met the guideline of discretionary food intake of less than 2 serves (without the inclusion of sweetened beverages).

- The probability of children meeting the discretionary food guideline when sweetened beverages were excluded increased non-significantly in INT (OR 1.0, 95%CI 0.9-1.2, p=NS) and significantly decreased in COMP (OR 0.7, 95%CI 0.6-0.9, p=0.007). Overall, at final there was a 40% increased odds of children meeting the discretionary food guideline (when sweetened beverages were excluded) in INT compared to COMP (OR 1.4, 95%CI 1.1-1.9, p=0.020)
- There were no statistically significant changes over time in the probability of children in INT (except for SES Quintile 1; OR 0.70, 95%CI 0.5 – 1.0, p=0.025) meeting the discretionary food guideline according to socio-demographic factors, and few were observed for COMP.
- However, at final:
    - Urban children in INT were 50% more likely (OR 1.5, 95%CI 1.0-2.2, p=0.035) than urban children in COMP to meet the discretionary food guideline.
    - 10 year old children in INT were 60% more likely (OR 1.6, 95%CI 1.0-2.4, p=0.031) than 10 year old children in COMP to meet the discretionary food guideline.
    - INT children in Q1 and Q4 were 50% less likely (OR 0.5, 95%CI 0.3-0.9, p=0.014) and 1.9 times more likely (OR 1.9, 95%CI 1.2 -3.0, p=0.003), respectively, than COMP children in Q1 and Q4, respectively, to meet the discretionary food guideline.

Discretionary intake (proportion meeting guidelines, with the inclusion of sweetened beverages)

Table 34 shows the change in proportion of primary students who met the guideline of discretionary food intake of less than 2 serves (with the inclusion of sweetened beverages).

- The probability of children meeting the discretionary food intake guideline when sweetened beverages were included increased non-significantly in INT (OR 1.2, 95%CI 1.0-1.5, p=NS) and decreased non-significantly in COMP (OR 0.8, 95%CI 0.6-1.1, p=NS). Overall, at final there was a 50% increased odds of children meeting the discretionary food guideline (when sweetened beverages were included) in INT compared to COMP (OR 1.5, 95%CI 1.0-2.1, p=0.030).
- When sweetened beverages were included, similar findings were observed to when sweetened beverages were excluded according to selected sociodemographic factors. However,
    - Girls in INT were now statistically more likely to meet the discretionary food guideline at final compared to girls in COMP (OR 1.8, 95%CI 1.0-3.2, p=0.044).
    - INT children in Q2 and Q4, respectively, were 1.6 (OR 1.6, 95%CI 1.0 – 2.6, p=0.047) and 2.3 times more likely (OR 2.3, 95%CI 1.3 - 4.0, p=0.005) than COMP children in Q2 and Q4, respectively, to meet the discretionary food guideline.
- Using a multilevel model, the probability of children meeting the discretionary food intake guideline when sweetened beverages were included increased non-significantly in INT (OR 1.2, 95%CI 1.0-1.4, p=NS) and decreased non-significantly in COMP (OR 0.9, 95%CI 0.7-1.1, p=NS). Overall, there was a significant increase in the probability of children in INT meeting the discretionary food guideline (when sweetened beverages were included) compared to children in COMP (OR 1.4, 95%CI 1.0-1.9, p=0.042).

Table 33: Proportion (%) of students (9-11 years) reporting intake of discretionary food intake that met the recommendation of 2 serves or less (without the inclusion of sweetened beverages) the previous day at baseline and final by community and by sex, locality, age, SES and Phase

	Year 3 (Baseline)		Year 5 (Final)		OR (95%CI) (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[1]	COMP[2]	INT vs COMP[3]
n	1323	1207	1090	774			
All							
Met discretionary recommendation (2 serves or less)[4]	40.3	44.7	40.8	36.6	1.0 (0.9 – 1.2)	0.7* (0.6 – 0.9)	1.4** (1.1 – 1.9)
Sex							
Boys	39.7	42.6	39.6	24.8	1.0 (0.8 – 1.3)	0.7** (0.6 – 1.0)	1.4 (0.9 – 2.0)
Girls	40.9	46.5	41.8	38.3	1.0 (0.8 – 1.3)	0.7 (0.5 – 1.0)	1.5 (0.9 – 2.3)
Locality							
Urban	40.0	45.9	41.8	37.2	1.1 (0.8 – 1.4)	0.7** (0.5 – 1.0)	1.5** (1.0 – 2.2)
Rural	40.9	42.8	39.1	65.0	0.9 (0.8 – 1.1)	0.7 (0.5 -1.1)	1.3 (0.8 – 2.0)
Age, years							
≤9	40.7	41.6	39.5	35.9	1.0 (0.6 – 1.4)	0.8 (0.6 – 1.1)	1.2 (0.7 – 2.0)
10	39.1	46.5	39.1	35.1	1.0 (0.8 – 1.1)	0.6* (0.5 – 0.9)	1.6** (1.0 – 2.4)
≥11	41.0	45.5	43.8	39.4	1.1 (0.9 – 1.4)	0.8 (0.5 – 1.1)	1.5 (1.0 – 2.2)
SES[5]							
Quintile 1	44.6	31.4	36.6	39.6	0.7** (0.5 – 1.0)	1.4 (0.9 – 2.3)	0.5** (0.3 – 0.9)
Quintile 2	38.0	44.0	43.3	40.0	1.2 (1.0 – 1.6)	0.8 (0.6 – 1.3)	1.5 (0.9 – 2.4)
Quintile 3	37.1	46.6	37.2	37.7	1.0 (0.8 – 1.5)	0.7 (0.4 – 1.2)	1.5 (0.7 – 3.2)
Quintile 4	42.0	47.0	44.7	34.1	1.1 (0.8 – 1.5)	0.6* (0.4 – 0.8)	1.9* (1.2 – 3.0)
Quintile 5	44.2	41.0	50.0	NE	1.3 (0.7 – 2.2)	NE	NE
Phase							
1	39.4	43.5	41.4	37.8	1.1 (0.9 – 1.4)	0.8 (0.6 – 1.1)	1.4 (0.9 – 2.0)
2	41.96	45.8	40.0	34.9	0.9 (0.7 – 1.1)	0.6** (0.4 – 1.0)	1.4 (0.9 – 2.3)

NE – Not estimable due to zero children from COMP in Quintile 5 at final; *p<0.01; **p<0.05

[1]Odds in year 5 for intervention group (INT), Year 3 is the reference group;[2] Odds in year 5 for comparison group (COMP), Year 3 is the reference group; [3] Odds for the intervention group (INT), the comparison group (COMP) is the reference group; [4] As recommended by the 2013 Australian Dietary Guidelines (National Health and Medical Research Council 2013); [5] SES is measured by ICSEA scores. Quintiles are based on 2011 national data at baseline (cut-offs 940/980/1020/1076/1287) and 2014 national data at final (cut-offs 942/985/1023/1074/1292). The national average ICSEA score is 1000 (Australian Curriculum Assessment and Reporting Authority (ACARA) 2013). Note: A binary logistic regression model, adjusted by age and ICSEA score, was used to fit the models. Sub-analyses should be treated with caution.

Table 34: Proportion (%) of students (9-11 years) reporting intake of discretionary food intake that met the recommendation of 2 serves or less (with the inclusion of sweetened beverages) the previous at baseline and final by community and by sex, locality, age, SES and Phase

	Year 3 (Baseline)		Year 5 (Final)		OR (95%CI) (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[1]	COMP[2]	INT vs COMP[3]
n	1320	1206	1090	774			
All							
Met discretionary recommendation (2 serves or less)[4]	24.1	29.2	27.8	24.8	1.2 (1.0 – 1.5)	0.8 (0.6 – 1.1)	1.5** (1.0 – 2.1)
Sex							
Boys	25.4	27.0	26.1	23.9	1.0 (0.8 – 1.4)	0.9 (0.7 – 1.1)	1.2 (0.8 – 1.7)
Girls	22.7	31.1	29.2	25.7	1.4** (1.0 – 1.9)	0.8 (0.5 – 1.3)	1.8** (1.0 – 3.2)
Locality							
Urban	23.5	30.4	27.7	24.6	1.3 (0.9 – 1.7)	0.8 (0.6 – 1.1)	1.6** (1.0 – 2.5)
Rural	25.4	27.4	28.0	25.6	1.1 (0.8 – 10.6)	0.9 (0.7 – 1.3)	1.2 (0.7 – 2.0)
Age, years							
≤9	26.1	30.4	27.4	25.8	1.1 (0.7 – 1.6)	0.8 (0.6 – 1.2)	1.3 (0.8 – 2.3)
10	23.3	29.3	26.6	23.1	1.2 (0.9 – 1.6)	0.7 (0.5 – 1.1)	1.6 (1.0 – 2.6)
≥11	23.4	28.0	29.3	25.6	1.4 (1.0 – 1.9)	0.9 (0.7 – 1.2)	1.5 (1.0 – 2.3)
SES[5]							
Quintile 1	27.0	20.9	23.5	30.2	0.8 (0.5 – 1.4)	1.6 (0.9 – 3.0)	0.5 (2.2 – 1.1)
Quintile 2	21.7	27.3	28.1	24.3	1.4** (1.1 – 1.8)	0.9 (0.6 – 1.3)	1.6** (1.0 – 2.6)
Quintile 3	22.7	27.1	25.2	26.8	1.1 (0.6 -2.1)	1.0 (0.6 – 1.6)	1.2 (0.5 – 2.5)
Quintile 4	24.8	32.0	32.4	23.0	1.5 (0.9 – 2.4)	0.6* (0.5 – 0.9)	2.3* (1.3 – 4.0)
Quintile 5	28.3	27.9	36.4	NE	1.5 (0.9 – 2.4)	NE	NE
Phase							
1	23.6	29.9	25.4	25.9	1.1 (0.8 – 1.5)	0.8 (0.6 – 1.1)	1.3 (0.9 – 2.0)
2	25.1	28.5	31.4	23.4	1.3 (1.0 – 1.9)	0.8 (0.5 – 1.3)	1.7 (1.0 – 3.0)

NE – Not estimable due to zero children from COMP in Quintile 5 at final; *p<0.01; **p<0.05

[1] Odds in year 5 for intervention group (INT), Year 3 is the reference group;[2] Odds in year 5 for comparison group (COMP), Year 3 is the reference group; [3] Odds for the intervention group (INT), the comparison group (COMP) is the reference group; [4] As recommended by the 2013 Australian Dietary Guidelines (National Health and Medical Research Council 2013); [5] SES is measured by ICSEA scores. Quintiles are based on 2011 national data at baseline (cut-offs 940/980/1020/1076/1287) and 2014 national data at final (cut-offs 942/985/1023/1074/1292). The national average ICSEA score is 1000 (Australian Curriculum Assessment and Reporting Authority (ACARA) 2013). Note: A binary logistic regression model, adjusted by age and ICSEA score, was used to fit the models. Sub-analyses should be treated with caution.

5.2.2 PARENT REPORT OF CHILD DIETARY INTAKE

FRUIT, VEGETABLES, DISCRETIONARY FOOD

Parent report of child intake of fruit, vegetables and discretionary foods, including whether their intake met recommendations is detailed in

Table 35.

- Average serves of fruit and vegetables significantly decreased in COMP by approximately 0.2 (-0.16, 95%CI -0.26 - -0.06, p=0.001) and 0.3 (-0.25, 95%CI -0.37 - -0.13, p<0.001) serves, respectively. There were no statistically significant changes in serves of fruit or vegetables consumed in INT. The differences in change between groups were statistically significant for fruit (0.18, 95%CI 0.05 – 0.31, p=0.006) and vegetables (0.25, 95%CI 0.07 – 0.43, p=0.008).
- There were no statistically significant differences between baseline and final discretionary food intake for INT or COMP, or any significant time x group effect.
- According to parent report of child intake, approximately two-thirds of children at each time point (59-70% baseline, 61-63% final) met fruit recommendations, approximately one-third met discretionary food recommendations (30-33% baseline, 34% final) and very few met vegetable recommendations (5% baseline, 3-5% final).
- There was a statistically significant difference in the likelihood of children meeting fruit recommendations, according to parent reported intake, between INT and COMP at final (OR 1.42, 95%CI 1.09 – 1.86, p=0.010), with children in INT 42% more likely to meet recommendations.
- Although there was a significantly lower probability of children in COMP (OR 0.61, 95%CI 0.38-1.00, p=0.047) meeting vegetable recommendations, according to parent reported intake, there was no statistically significant difference between COMP and INT at final.
- There were no statistically significant changes in probability of meeting discretionary food guidelines, according to parent reported intake, in INT or COMP over time, or between INT and COMP at final.

Table 35: Parent report of child (9-11 years) dietary intake (fruit, vegetables, discretionary food) the previous day

	Year 3 (Baseline)		Year 5 (Final)		Δ Change or OR (95%CI)[1] (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
n	1330	1394	1204	899			
Serves consumed yesterday of:							
Fruit (mean)	1.79	2.04	1.82	1.88	0.23 (-0.06 – 0.11)	-0.16* (-0.26 - -0.06)	0.18* (0.05 – 0.31)
Vegetables (mean)	1.91	2.08	1.91	1.84	-0.001 (-0.13 – 0.13)	-0.25* (-0.37 - -0.13)	0.25* (0.07 – 0.43)
Discretionary food (mean)	3.34	3.20	3.19	3.13	-0.13 (-0.31 – 0.05)	-0.15 (-0.32 – 0.03)	0.02 (-0.23 – 0.26)
Met recommendation for:							
Fruit (≥2 serves) (%)	59.1	69.8	60.6	62.7	1.06 (0.89 – 1.26)	0.74* (0.61 - 0.91)	1.42** (1.09 – 1.86)
Vegetables (≥5 serves) (%)	5.4	4.5	5.4	3.1	0.98 (0.73 – 1.33)	0.61** (0.38 – 1.00)	1.60 (0.90 – 2.83)
Discretionary food (<2 serves) (%)	29.9	33.2	33.9	34.2	1.17 (0.98 – 1.39)	1.04 (0.88 – 1.23)	1.13 (0.89 – 1.43)

*p<0.01; **p<0.05

[1] Δ Change (95%CI) for continuous measures as determined using a linear regression model, Odds Ratio (OR) (95%CI) for binary responses as determined using a binary logistic regression model; [2] continuous measures: change from baseline to final in intervention, binary responses: odds in year 5 for intervention group (INT) (year 3 is the reference group); [3] continuous measures: change from baseline to final in comparison, binary responses: odds in year 5 for comparison group (COMP) (year 3 is the reference group); [4] continuous measures: change from baseline to final in intervention, minus the change from baseline to final in comparison, binary responses: odds for the intervention group (INT) (the comparison group (COMP) is the reference group).

Note: Models were adjusted by age and ICSEA score.

5.2.3 BEVERAGE INTAKE

Water and milk consumption, as reported by children and/or parents, is shown in Table 36**.**

Water

- At baseline children reported the number of times they usually drank water per day, with an average response of approximately six times per day. At final, this question was changed so that children reported the number of serves of water they usually drank per day. On average, children drank nearly 5 serves (cups) of water each day.

Milk

- There was a significant decrease in the probability of children reporting that they drank milk the previous day in INT (OR 0.8, 95%CI 0.6-1.1, p=NS) and COMP (OR 0.7, 95%CI 0.6-0.9, p=0.007), although this was only statistically significant in COMP. There was no significant difference between groups at final.
- Contrastingly, the number of serves of milk drunk the previous day, as reported by children, significantly increased over the evaluation period by 0.4 serves (95%CI 0.2-0.5, p<0.001) in INT and 0.3 serves (95%CI 0.2-0.5, p<0.001) in COMP. There was no significant difference in change over time between groups.
- In comparison, parent report of the number of milk serves their child consumed yesterday did not significantly change over time in either INT or COMP and there was no difference in change over time between groups.
- The most common types of milk consumed for both groups at both time points was whole milk (range 40-48%), followed by low fat or reduced fat milk (range, 24-34%).
- There was a statistically significant increase over time in the probability of children in INT not consuming any milk (OR 1.6, 95%CI 1.1-2.3, p=0.013) and this was significantly different to COMP at final (OR 1.8, 95%CI 1.1-3.0, p=0.028)
- Although the probability of children consuming low or reduced fat milk decreased significantly in COMP (OR 0.8, 95%CI 0.7-1.0, p=0.031), there were no statistically significant differences between INT and COMP at final.

Table 36: Child (9-11 years) and parent report of child beverage consumption

	Year 3 (Baseline)		Year 5 (Final)		Δ Change or OR (95%CI)[1] (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
Child report							
n	1373	1238	1092	781			
Water consumption							
No. of times water drunk yesterday[5] (mean)	6.32	6.49					
No. of serves water drank yesterday[6] (mean)			4.91	4.71			
Milk consumption							
Drank milk yesterday (%)	81.4	83.1	78.6	78.5	0.8 (0.6 – 1.1)	0.7* (0.6 – 0.9)	1.1 (0.8 – 1.7)
No. serves milk drank yesterday (mean)	2.08	1.94	2.31	2.27	0.4* (0.2 – 0.5)	0.3* (0.2 – 0.5)	0.0 (-0.2 – 0.3)
Parent report							
n	1330	1394	1204	899			
Child milk consumption							
Serves milk drank yesterday (mean)	1.72	1.70	1.66	1.71	-0.06 (-0.13 – 0.008)	0.02 (-0.06 – 0.10)	-0.09 (-0.19 – 0.02)
Type milk child usually consumes							
Does not drink milk (%)	4.1	6.2	6.7	5.4	1.6** (1.1 – 2.3)	0.9 (0.6 – 1.3)	1.8** (1.1 – 3.0)
Whole milk (%)	45.9	40.1	47.5	44.5	1.1 (0.9 – 1.2)	1.1 (0.9 – 1.4)	0.9 (0.7 – 1.2)
Low or reduced fat milk (%)	28.4	33.6	23.9	29.0	0.8 (0.7 – 1.0)	0.8** (0.7 – 1.0)	1.0 (0.7 – 1.3)
Skim (no fat) milk (%)	15.2	15.3	14.6	13.7	1.0 (0.7 – 1.2)	0.9 (0.7 – 1.2)	1.0 (0.7 – 1.5)
Flavoured milk (%)	3.9	2.8	4.7	3.4	1.2 (0.8 – 1.7)	1.2 (0.8 – 2.0)	1.0 (0.5 – 1.7)
Milk alternatives (e.g. soya, goat, rice) (%)	2.6	2.1	2.6	3.9	1.0 (0.7 – 1.5)	1.7** (1.1 – 2.7)	0.6 (0.3 – 1.1)
Condensed or evaporated milk (%)	-	-	0.1	0.1	Not estimable	Not estimable	Not estimable

*p<0.01; ** p<0.05

[1] Δ Change (95%CI) for continuous measures as determined using a linear regression model, Odds Ratio (OR) (95%CI) for binary responses as determined using a binary logistic regression model; [2] continuous measures: change from baseline to final in intervention, binary responses: odds in year 5 for intervention group (INT) (year 3 is the reference group); [3] continuous measures: change from baseline to final in comparison, binary responses: odds in year 5 for comparison group (COMP) (year 3 is the reference group); [4] continuous measures: change from baseline to final in intervention, minus the change from baseline to final in comparison, binary responses: odds for the intervention group (INT) (the comparison group (COMP) is the reference group); [5] Reported at baseline only; [6] Reported at final only.

Note: Models were adjusted by age and ICSEA score.

5.2.4 EATING BEHAVIOURS

Table 37 shows child and parent report of child breakfast and snacking behaviours.

Breakfast

- On average, children reported usually having breakfast on approximately six days at baseline and five and a half days at final. In comparison, parents on average reported their child consuming breakfast on nearly six and a half days at both baseline and final.
- The probability of children having breakfast the previous day was not statistically different at final than baseline for INT (OR 0.9, 95% CI 0.7-1.1, p=NS) or COMP (OR, 95% CI 0.7-1.3, p=NS), with the majority (87% baseline, 86% final) consuming breakfast the previous day.
- However, there was a statistically significant decrease in the mean number of days children in INT (-0.4, 95%CI -0.6- -0.2, p<0.001) and COMP (-0.4, 95%CI -0.6- -0.3, p<0.001) reported usually having breakfast. There was no statistically significant difference in change over time between groups.
- Parent reported number of days their child ate breakfast in the past week did not significantly change over the period of the intervention for INT or COMP and there was no differential change between the two groups.
- Nearly all parents reported that their child gets their breakfast from home (97-98% at baseline, 97% at final).

Snacks

- The likelihood of children snacking (eating between meals), as reported by children and parents, did not significantly change for INT or COMP from baseline to final and there were no significant differences between groups at final.

Lunch

- Out of the five days children attend school, parent's reported at baseline that on average their child takes lunch from home on nearly all these days.

Overall

- The proportion of parents who perceived their child to eat more than other children was similar at baseline and final for both INT (20.4% v 20.8%) and COMP (21.0% v 19.9%), with no differences in likelihood over time or between groups at final (OR 1.1, 95%CI 0.8-1.4, p=NS).

Table 37: Child (9-11 years) and parent report of child eating behaviour (breakfast, snacking, lunch)

	Year 3 (Baseline)		Year 5 (Final)		Δ Change or OR (95%CI)[1] (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
Child report							
n	1373	1238	1092	781			
Breakfast							
Had breakfast yesterday (%)	86.6	87.0	85.6	86.2	0.9 (0.7 – 1.1)	0.9 (0.7 – 1.3)	1.0 (0.6 – 1.4)
No. days usually have breakfast in a week (mean)	5.9	6.1	5.5	5.6	-0.38* (-0.56 - -0.19)	-0.43* (-0.60 - -0.27)	0.06 (-0.19 – 0.30)
Snacking							
Eats between breakfast and lunch (%)	74.9	75.9	78.7	77.4	1.2 (1.0 – 1.6)	1.1 (0.9 – 1.3)	1.2 (0.9 – 1.5)
Eats between lunch and dinner (%)	81.9	79.6	79.7	79.1	0.9 (0.7 – 1.1)	0.9 (0.8 – 1.1)	0.9 (0.7 – 1.2)
No. times ate between meals yesterday (mean)	2.8	2.7	2.9	2.8	0.03 (-0.19 – 0.26)	0.08 (-0.11 – 0.28)	-0.05 (-0.35 – 0.25)
Parent report							
n	1330	1394	1204	899			
Breakfast							
No. days child ate breakfast past week (mean)	6.4	6.5	6.4	6.5	0.1 (-0.1 – 0.2)	-0.1 (-0.2 – 0.1)	0.1 (-0.1 – 0.3)
Child usually gets breakfast from home (%)	96.9	98.1	96.6	97.0	0.9 (0.6 – 1.5)	0.7 (0.3 – 1.4)	1.3 (0.6 – 3.1)
Snacking							
Child eats between meals ≥4 times/day (%)	11.6	12.0	13.0	13.3	1.17 (0.97 – 1.41)	1.16 (0.93 – 1.44)	1.01 (0.76 – 1.34)
Lunch							
No. days child attends school[5] (mean)	5.0	5.0					
No. days/week child takes lunch from home (mean)	4.8	4.9	4.9	4.9	0.04 (-0.03 – 0.1)	-0.02 (-0.1 – 0.1)	0.1 (-0.1 – 0.2)
Overall							
Child eats more than other children (%)	20.4	21.0	20.8	19.9	1.0 (0.9 – 1.2)	0.9 (0.8 – 1.2)	1.1 (0.8 – 1.4)

*p<0.01

[1] Δ Change (95%CI) for continuous measures as determined using a linear regression model, Odds Ratio (OR) (95%CI) for binary responses as determined using a binary logistic regression model; [2] continuous measures: change from baseline to final in intervention, binary responses: odds in year 5 for intervention group (INT) (year 3 is the reference group); [3] continuous measures: change from baseline to final in comparison, binary responses: odds in year 5 for comparison group (COMP) (year 3 is the reference group); [4] continuous measures: change from baseline to final in intervention, minus the change from baseline to final in comparison, binary responses: odds for the intervention group (INT) (the comparison group (COMP) is the reference group); [5] Reported at baseline only.

Note: Models were adjusted by age and ICSEA score.

5.2.5 ENVIRONMENT FACTORS INFLUENCING HEALTHY EATING BEHAVIOURS

NUTRITION KNOWLEDGE

Table 38 shows the average number of serves of fruit and vegetables that children and parent report as the recommended amount for children to consume.

- On average, all children reported that the recommended number of fruit serves/day was 2.7 at baseline and approximately 3.0 at final. This significantly increased in COMP by 0.4 serves (95%CI 0.2-0.5, p<0.001).
- On average, children reported that the recommended number of vegetable serves/day was approximately three and a half at both baseline and final. There were no statistically significant differences over time between INT and COMP, or any time x group effect.
- Parent report of the number of serves of fruit/day children should consume was closer to the recommended 2 serves (approximately 2.2 serves at baseline and final) than that reported by children, yet further from the recommended 5 serves of vegetables (approximately 3 serves at both baseline and final).
- There was a statistically significant decrease over time in parents knowledge of the recommended vegetable serves for children in both INT and COMP (both -0.3 serves, p<0.001).

Places that parents had received information promoting healthy eating or physical activity for their child over the previous 12 months is also shown in Table 38.

- The most common place that parents reported received information regarding healthy eating or physical activity from was schools (58-68%), followed by sporting clubs (19-23%) and local council (10-20%).
- The probability of parents receiving healthy eating or physical activity information from schools significantly decreased over time in COMP (OR 0.6, 95%CI 0.5-0.8, p<0.001), which was significantly different to INT at final (OR 1.6, 95%CI 1.2-2.1, p=0.002).
- More parents in INT reported receiving information from local councils than from sporting clubs while in comparison more parents in COMP reported receiving information from sporting clubs than local councils.
- A greater proportion of parents in INT (baseline 18.6%, final 19.8%) than COMP (baseline 10.3%, final 13.0%) reported receiving information from local councils. However, there were no statistically significant changes in the probability of parent receiving healthy eating or physical activity information from local councils in INT (OR 1.1, 95%CI 0.9-1.3) or COMP (OR 1.4, 95%CI 1.1-1.9), or between groups at final (OR 0.8, 95%CI 0.6-1.1).

ROLE MODELLING OF HEALTHY EATING

Parental role modelling of fruit and vegetable intake is shown in Table 39. These behaviours were significantly worse at final than baseline for both INT and COMP.

- Usual consumption of fruit and vegetables by parents or caregivers decreased in INT by 0.2 serves (95%CI -0.4 - -0.1, p<0.001) and 0.1 serves (95%CI -0.2 - -0.04, p=0.002), respectively. Similarly, fruit and vegetable consumption decreased by 0.2 (95%CI -0.4 - -0.1, p<0.001) and 0.1 (95%CI -0.2 - -0.002, p=NS) serves respectively in COMP, although only the change in vegetable consumption was not statistically significant.
- The likelihood of parents meeting the fruit recommendations was lower at final than baseline in INT (OR 0.7, 95%CI 0.6-0.8, p<0.001) and COMP (OR 0.7, 95%CI 0.6-0.8, p=0.001). The same was observed for meeting vegetable recommendations (INT OR 0.7, 95%CI 0.5-0.8, p=0.001; COMP OR 0.6, 95%CI 0.5-0.8, p=0.001). There were no statistically significant differences in the likelihood of parents meeting the fruit or vegetable recommendations between INT and COMP at final.

Table 38: Child (9-11 years) and parent knowledge of child fruit and vegetable guidelines

	Year 3 (Baseline)		Year 5 (Final)		Δ Change or OR (95%CI)[1] (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
Child report							
n	1373	1238	1092	781			
Child nutrition knowledge							
No. serves of fruit per day (mean)	2.72	2.67	2.88	3.03	0.2 (-0.0 – 0.3)	0.4* (0.2 – 0.5)	-0.2 (-0.4 – 0.0)
No. serves of vegetables per day (mean)	3.49	3.51	3.35	3.51	-0.1 (-0.3 – 0.0)	-0.03 (-0.2 - -0.2)	-0.1 (-0.3 - 0.1)
Parent report							
n	1330	1394	1204	899			
Parent nutrition knowledge							
No. serves of fruit per day (mean)	2.20	2.29	2.23	2.24	0.01 (-0.1 – 0.1)	-0.1 (-0.1 - -0.001)	0.1 (-0.01 - 0.2)
No. serves of vegetables per day (mean)	3.25	3.37	2.99	3.07	-0.3* (-0.4 – -0.2)	-0.3* (-0.5 - -0.2)	0.03 (-0.2 – 0.2)
Received information promoting healthy eating or physical activity from groups/organizations past 12mo							
School (%)	64.4	67.7	64.1	57.5	1.0 (0.8 – 1.2)	0.6* (0.5 – 0.8)	1.6* (1.2 – 2.1)
Local Council (%)	18.6	10.3	19.8	13.0	1.1 (0.9 – 1.3)	1.4 (1.1 – 1.9)	0.8 (0.6 – 1.1)
Sporting clubs (%)	18.8	23.0	18.6	21.1	1.0 (0.8 – 1.3)	0.9 (0.7 – 1.1)	1.1 (0.8 – 1.5)
Youth groups (%))	2.8	3.1	3.0	2.8	1.0 (0.7 – 1.7)	0.9 (0.5 – 1.6)	1.2 (0.6 – 2.5)
Other (%)	8.5	8.5	6.0	6.3	0.7 (0.5 – 1.0)	0.7** (0.5 – 1.0)	0.9 (0.6 – 1.5)

*p<0.01; **p<0.05

[1] Δ Change (95%CI) for continuous measures as determined using a linear regression model, Odds Ratio (OR) (95%CI) for binary responses as determined using a binary logistic regression model; [2] continuous measures: change from baseline to final in intervention, binary responses: odds in year 5 for intervention group (INT) (year 3 is the reference group); [3] continuous measures: change from baseline to final in comparison, binary responses: odds in year 5 for comparison group (COMP) (year 3 is the reference group); [4] continuous measures: change from baseline to final in intervention, minus the change from baseline to final in comparison, binary responses: odds for the intervention group (INT) (the comparison group (COMP) is the reference group).

Note: Models were adjusted by age and ICSEA score.

Table 39: Parent usual intake of fruit and vegetables and proportion meeting fruit and vegetable recommendations

	Year 3 (Baseline)		Year 5 (Final)		Δ Change or OR (95%CI)[1] (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
n	1330	1394	1204	899			
No. serves parent usually eats per day of:							
Fruit (mean)	1.81	1.83	1.72	1.73	-0.2* (-0.4 - -0.1)	-0.2* (-0.4 - -0.1)	0.004 (-0.2 – 0.2)
Vegetables (mean)	2.87	3.02	2.65	2.78	-0.1* (-0.2 - -0.04)	-0.1 (-0.2 - -0.02)	0.02 (-0.1 – 0.1)
Usual intake meets recommendation for:							
Fruit (≥2 serves) (%)	51.3	54.9	43.0	45.8	0.7* (0.6 – 0.8)	0.7* (0.6 – 0.8)	1.1 (0.8 – 1.4)
Vegetables (≥5 serves) (%)	12.8	14.5	9.0	10.3	0.7* (0.5 – 0.8)	0.6* (0.5 – 0.8)	1.0 (0.7 – 1.5)

*p<0.01

[1] Δ Change (95%CI) for continuous measures as determined using a linear regression model, Odds Ratio (OR) (95%CI) for binary responses as determined using a binary logistic regression model; [2] continuous measures: change from baseline to final in intervention, binary responses: odds in year 5 for intervention group (INT) (year 3 is the reference group); [3] continuous measures: change from baseline to final in comparison, binary responses: odds in year 5 for comparison group (COMP) (year 3 is the reference group); [4] continuous measures: change from baseline to final in intervention, minus the change from baseline to final in comparison, binary responses: odds for the intervention group (INT) (the comparison group (COMP) is the reference group).

Note: Models were adjusted by age and ICSEA score.

HOME FOOD ENVIRONMENT

Table 40 details factors associated with the home food environment.

Availability of fruit

- Most children (approximately 95% at baseline, 93% at final) reported that fruit was available in the home. However, the probability significantly decreased in COMP by 46% (OR 0.6, 95%CI 0.4-0.8, p=0.001) between baseline and final.

Encouragement by family and friends to eat healthy

- Nearly all children reported that they were encouraged to eat healthy by their female (97-99%) and male carer/parent (97-99%), yet less than half reported being encouraged to eat healthy by their friends (43-46%).
- There were no statistically significant changes over time in probability of family members encouraging children to eat healthy foods in INT or COMP, nor between INT and COMP at final.

Foods at home

- Nearly two-thirds of children at baseline and final reported that they have a say in what foods are bought at home.
- Less than one-third of children reported being able to choose what they eat whilst approximately two-thirds reported being able to decide how much they eat.
- There were no statistically significant changes over time in INT or COMP in the probability of children having a say in what foods are bought at home or being able to choose what they eat. There were no statistically significant differences between INT and COMP at final.
- There was a statistically significant decreased odds of approximately 20% for children in both INT (OR 0.80, 95%CI 0.7-1.0, p=0.040) and COMP (OR 0.80, 95%CI 0.7-1.0, p=0.043) being able to decide how much to eat, however this was not statistically different between groups at final.

Home food environment and parenting practices

- The overall home food environment score decreased in both INT (-0.4, 95%CI -1.2-0.3 p=NS) and COMP (-1.0, 95%CI -1.6- -0.4, p=0.001), although only significantly in COMP.
- Nearly all (>95%) parents reported (at baseline and final, both INT and COMP):
    - Eating food they want their child to eat;
    - Sitting with their child at meal times;
    - Cooking evening meals;
    - Encouraging their child to eat fruit and vegetables; and
    - Having vegetables at dinner.
- Less reported that their child helps prepare food (77-82%) or that their child has a second helping (60-66%).
- Negative practices were less commonly used:
    - Child eats snacks and/or sweets without parental permission (39-45%);
    - Child eats in his/her bedroom (7-11%);
    - Parents use food as a reward (19-23%); and
    - Parents withhold food as a punishment (5-6%).
- On average, parents eat the main meal of the day with their child on approximately six days of the week and ate in front of the TV on approximately two days in the past week.
- Children, on average, ate take away one day per week.

Table 40: Child (9-11 years) and parent report of the home food environment

	Year 3 (Baseline)		Year 5 (Final)		Δ Change or OR (95%CI)[1] (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
Child report							
n	1373	1238	1092	781			
Fruit is available in the home (%)	94.1	95.7	92.7	92.6	0.8 (0.6 – 1.2)	0.6* (0.4 -0.8)	1.4 (0.9 – 2.5)
Encouraged to eat healthy foods by family members[a]							
Female carer (%)	99.2	97.6	98.7	96.5	1.0 (0.7 – 1.4)	1.1 (0.7 – 1.7)	0.9 (0.5 – 1.6)
Male carer (%)	97.2	98.2	98.3	99.1	1.0 (0.8 – 1.3)	1.1 (0.7 – 1.5)	1.0 (0.6 – 1.5)
Friends (%)	42.9	43.8	46.4	46.4	1.1 (1.0 – 1.3)	1.1 (0.9 -1.3)	1.0 (0.8 – 1.4)
Foods at home							
Child has a say in what foods are bought at home (%)	65.5	63.4	62.2	63.7	0.9 (0.7 – 1.1)	1.0 (0.8 – 1.2)	0.9 (0.7 – 1.2)
Child can choose what goes on his/her plate (%)	30.9	31.3	29.9	29.8	1.0 (0.8 – 1.2)	0.9 (0.7 – 1.1)	1.0 (0.8 – 1.4)
Child decides how much to eat (%)	67.5	67.7	62.7	63.2	0.8** (0.7 – 1.0)	0.8** (0.7 – 1.0)	1.0 (0.8 – 1.4)
Parent report							
n	1330	1394	1204	899			
Home food environment score (mean)	60.20	61.67	59.67	60.47	-0.4 (-1.2 – 0.3)	-1.0* (-1.6 - -0.4)	0.5 (-0.4 – 1.5)
Parenting practices							
I eat food I want my child to eat (%)	97.9	98.6	96.9	97.3			
I sit with my child at mealtimes (%)	98.4	98.7	98.3	98.5			
How often do you or another adult in the house cook an evening meal (%)	99.0	99.2	98.2	98.8			
How often does your child help prepare food? (%)	77.2	82.2	78.4	81.3			
I encourage my child to eat fruit (%)	99.6	99.6	99.2	99.1			
I encourage my child to eat vegetables (%)	99.8	99.7	99.3	99.5			

At home we have vegetables at dinner (%)	99.5	99.4	98.6	99.8			
How often can your child eat snacks and/or sweets without your permission (%)	42.0	39.4	44.6	43.5			
How often does your child eat in his/her bedroom (%)	10.2	7.1	11.3	10.5			
How often does your child ask for or take a second helping (%)	60.9	60.1	66.3	64.6			
I/we use food as a reward for good behaviour (%)	18.9	20.3	22.2	23.1			
I/we withhold food as punishment for bad behaviour (%)	5.3	5.4	5.7	6.1			
Times/wk caregiver eats main meal with child (mean)	6.3	6.2	6.2	6.1			
No. days child ate in front of TV in the past week (mean)	2.4	2.2	2.4	2.3			
No. days child usually eats takeaway food per week (mean)	1.1	1.0	1.1	1.1			

*p<0.01; **p<0.05

[1] Δ Change (95%CI) for continuous measures as determined using a linear regression model, Odds Ratio (OR) (95%CI) for binary responses as determined using a binary logistic regression model; [2] continuous measures: change from baseline to final in intervention, binary responses: odds in year 5 for intervention group (INT) (year 3 is the reference group); [3] continuous measures: change from baseline to final in comparison, binary responses: odds in year 5 for comparison group (COMP) (year 3 is the reference group); [4] continuous measures: change from baseline to final in intervention, minus the change from baseline to final in comparison, binary responses: odds for the intervention group (INT) (the comparison group (COMP) is the reference group).

Note: Models were adjusted by age and ICSEA score.

FOOD SECURITY

Items relating to food security are shown in Table 41.

- Few parents reported at baseline (7% INT, 5% COMP) having no money to purchase food in the previous month and this did not significantly change after the period of intervention (final 8% INT, 7% COMP).
- Although very few parents reported that their child has ever gone without food at both baseline and final, there was a statistically significant increased likelihood than children in INT had gone without food at final compared to children in COMP (OR 5.8, 95%CI 1.1-29.5, p=0.036).

Table 41: Proportion (%) of parents reporting having no money to purchase food (in previous month) and their child ever going without food

	Year 3 (Baseline)		Year 5 (Final)		OR (95%CI) (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[1]	COMP[2]	INT vs COMP[3]
n	1330	1394	1204	899			
Food security							
No money for food (%)	6.9	5.2	7.5	6.8	1.0 (0.8 – 1.3)	1.2 (0.8 – 1.8)	0.8 (0.5 – 1.3)
Child went without food (%)	1.2	2.3	1.5	0.7	1.5 (0.7 – 3.2)	0.3 (0.1 – 1.2)	5.8** (1.1 – 29.4)

**p<0.05

[1] Odds in year 5 for intervention group (INT) (year 3 is the reference group); [2] Odds in year 5 for comparison group (COMP) (year 3 is the reference group); [3] Odds for the intervention group (INT) (the comparison group (COMP) is the reference group), as determined using a binary logistic regression model.

Note: Models were adjusted by age and ICSEA score.

NEIGHBOURHOOD ENVIRONMENT

Table 42 shows the proportion of parents reporting the proximity to home, and use of, various food outlets.

- Twice as many parents in COMP than INT reported that there is a farmers or produce market close to home at baseline, whereas proportions were more similar at final (34% INT, 46% COMP). Parents in INT were 80% more likely than parents in COMP to report a farmers/produce market in their local area at final (OR 1.8, 95%CI 1.1-3.0, p=0.015). When a multilevel model was adopted, the likelihood of parents reporting a farmers/produce market in their local area at final was 2.1 times greater in INT than COMP (OR 2.1, 95%CI 1.1 – 3.8, p=0.016).
- Of those reporting a farmers or produce market in the local area:
    - more than three-quarters reported that they operate either weekly or daily. There was a 50% reduced likelihood of parents in INT than COMP reporting that the farmers/produce market operated weekly or daily at final (OR 0.5, 95%CI 0.3-0.9, p=0.021).
    - approximately one-third reported that they buy from them weekly or daily. There were no statistically significant changes over time in INT or COMP, or between INT and COMP at final.
- The average distance to the nearest supermarket from home was similar between INT and COMP at baseline (3.1 – 4.5km) and final (3.4 – 4.3km).

Table 42: Proximity and use of food outlets in the neighbourhood

	Year 3 (Baseline)		Year 5 (Final)		Δ Change or OR (95%CI)[1] (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
n	1330	1394	1204	899			
Food outlets							
Farmers/produce market in the local area (%)	25.8	51.1	33.8	45.9	1.5* (1.1 – 1.9)	0.8 (0.5 – 1.2)	1.8** (1.1 – 3.0)
Operation of farmers/produce market (Weekly or daily)[5] (%)	79.3	76.0	79.4	86.1	1.0 (0.7 – 1.5)	2.1* (1.3 – 3.4)	0.5** (0.3 – 0.9)
Buy from farmers/produce market (weekly or daily)[6] (%)	39.8	28.8	36.7	36.0	0.9 (0.6 – 1.3)	1.4 (0.9 – 2.0)	0.6 (0.4 – 1.1)
No. kilometres to the nearest supermarket (mean)	3.1	4.5	3.4	4.3	2.5 (0.2 – 25.6)	0.3 (0.04 – 3.2)	7.3 (0.3 – 193.6)

*p<0.01; **p<0.05

[1] Δ Change (95%CI) for continuous measures as determined using a linear regression model, Odds Ratio (OR) (95%CI) for binary responses as determined using a binary logistic regression model; [2] continuous measures: change from baseline to final in intervention, binary responses: odds in year 5 for intervention group (INT) (year 3 is the reference group); [3] continuous measures: change from baseline to final in comparison, binary responses: odds in year 5 for comparison group (COMP) (year 3 is the reference group); [4] continuous measures: change from baseline to final in intervention, minus the change from baseline to final in comparison, binary responses: odds for the intervention group (INT) (the

comparison group (COMP) is the reference group); [5] n=131 'don't know'; [6] n=23 'don't know'. Note: Models were adjusted by age and ICSEA score.

The proportion of children who purchase food and drinks on the way to and home from school is shown in Table 43.

- There was a reduced likelihood of children at final reporting that they never/sometimes buy food and drinks on the way to (OR 0.6, 95%CI 0.4-0.9, p=0.019) and from (OR 0.7, 95%CI 0.6-0.9, p=0.015) school in COMP. There were no statistically significant changes over time in INT, or any statistically significant differences between INT and COMP at final.

Table 43: Purchasing of food and drinks on the way to and home from school

	Year 3 (Baseline)		Year 5 (Final)		OR (95%CI) (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[1]	COMP[2]	INT vs COMP[3]
Child report							
n	1330	1394	1204	899			
Never or sometimes buy food and drinks on way:							
to school (%)	93.7	95.6	92.9	92.7	0.9 (0.6 – 1.4)	0.6** (0.4 – 0.9)	1.5 (0.8 – 2.8)
home from school (%)	87.8	89.4	85.0	86.2	0.8 (0.6 – 1.0)	0.7** (0.6 – 0.9)	1.1 (0.8 – 1.5)

** p<0.05

[1] Odds in year 5 for intervention group (INT) (year 3 is the reference group); [2] Odds in year 5 for comparison group (COMP) (year 3 is the reference group); [3] Odds for the intervention group (INT) (the comparison group (COMP) is the reference group), as determined using a binary logistic regression model.

Note: Models were adjusted by age and ICSEA score.

FACTORS INFLUENCING FOOD PURCHASING

The proportion of parents rating a number of factors as 'important' when purchasing food is shown in Table 44.

- Nearly all (>95%) parents rated taste, cost and nutrition as important when purchasing food.
- The likelihood of parents rating cost as important when purchasing food significantly increased in INT (OR 1.6, 95%CI 1.0-2.4, p=0.036) but not COMP (OR 1.5, 95%CI 0.8-2.8, p=NS). The difference between groups at final was not statistically significant (OR 1.1, 95%CIK 0.5-2.3, p=NS). When a multilevel model was adopted, the likelihood of parents rating cost as important when purchasing food did not significantly change in INT (OR 1.6, 95%CI 1.0-2.5, p=0.062) or COMP (OR 1.5, 95%CI 0.8-2.7, p=NS) and there was no significant difference between groups at final (OR 1.0, 95%CI 0.5 – 2.2, p=NS).
- Serving size was rated by approximately 92% of parents as important, whilst convenience was rated as important by 86-89% of parents.
- There was a statistically significant increase in the likelihood of parents in COMP (OR 1.3, 95%CI 1.0-1.7, p=0.035) rating local produce as important, which was not observed in INT, and a statistically significant decrease in the likelihood of parents in INT (OR 0.7, 95%CI 0.5-0.9, p=0.002), but not COMP, rating weight control as important.

Table 44: The importance of factors when purchasing food[1]

	Year 3 (Baseline)		Year 5 (Final)		OR (95%CI) (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[1]	COMP[2]	INT vs COMP[3]
n	1330	1394	1204	899			
Food purchasing considerations [4]							
Taste (%)	99.5	99.4	99.5	99.7	1.1 (0.4 – 3.0)	1.6 (0.5 – 5.7)	0.7 (0.1 – 3.5)
Cost (%)	96.3	96.9	97.6	97.4	1.6** (1.0 – 2.4)	1.5 (0.8 – 2.8)	1.1 (0.5 – 2.3)
Convenience (%)	87.0	85.9	89.0	86.9	1.2 (1.0 – 1.6)	1.1 (0.9 – 1.4)	1.1 (0.8 – 1.6)
Nutrition (%)	98.9	100	99.3	99.5	1.7 (0.7 – 4.0)	Not estimable	Not estimable
Serving size (%)	91.6	92.4	91.1	91.6	1.0 (0.7 – 1.3)	0.9 (0.6 – 1.1)	1.2 (0.8 – 1.7)
Weight control (%)	88.3	88.0	83.9	84.9	0.7** (0.5 – 0.9)	0.8 (0.6 – 1.0)	0.8 (0.6 – 1.2)
Locally produced (%)	79.9	85.4	81.5	87.8	1.1 (0.9 – 1.3)	1.3* (1.0 – 1.7)	0.8 (0.6 – 1.1)
Minimal impact on environment (%)	82.8	86.6	84.0	86.6	1.1 (0.9 – 1.3)	1.0 (0.8 – 1.3)	1.0 (0.8 – 1.5)

*p<0.01; **p<0.05

[1] Odds in year 5 for intervention group (INT) (year 3 is the reference group); [2] Odds in year 5 for comparison group (COMP) (year 3 is the reference group); [3] Odds for the intervention group (INT) (the comparison group (COMP) is the reference group), as determined using a binary logistic regression model; [4] Findings presented for those who rate each factor as important (somewhat important, important, very important).

Note: Models were adjusted by age and ICSEA score.

INFANT FEEDING PRACTICES

Table 45 details the proportion reporting at baseline and final whether their child was ever breastfed, and the mean age child stopped breastfeeding, started formula and started solids. Changes over the intervention period are not reported as these practices occurred prior to implementation of the OPAL program and thus it is not possible for the OPAL program to have impacted on these practices.

- The proportion of children ever breastfed was similar between baseline and final for both INT (85% baseline, 86% final) and COMP (89% baseline, 88% final).
- Children were breastfed until approximately 10 months of age, started formula at 8-9 months of age, and began solids when aged 5 and a half months, for INT and COMP at both time points.

Table 45: Breastfeeding, formula feeding and age of solid introduction

	Year 3 (Baseline)		Year 5 (Final)	
	INT	COMP	INT	COMP
n	1330	1394	1204	899
Child ever breastfed (%)	85.3	89.2	85.5	88.0
Mean age child:				
stopped breastfeeding (months)	9.8	9.8	9.7	9.5
started formula (months)	8.7	8.9	8.9	8.5
started solids (months)	5.5	5.3	5.5	5.5

5.3 PHYSICAL ACTIVITY, SEDENTARY BEHAVIOUR AND SLEEP

5.3.1 CHILD REPORT OF ACTIVITY AND SEDENTARY BEHAVIOURS

PHYSICAL ACTIVITY

At baseline, children met the physical activity guidelines on approximately four and a half days of the week, with just over a quarter (28%) meeting the guidelines on all 7 days. At final, the number of days children met the activity guideline was greater (approximately 5 days) as was the proportion meeting the guideline on all 7 days (38%).

Physical Activity (mean number of days)

Table 46 shows the mean number of days on which children met the physical activity guidelines.

- The mean number of days children met physical activity guidelines increased similarly in INT (by 0.8 days, 95%CI 0.6-0.9) and COMP (by 0.7 days, 95CI 0.5-1.0), which were both statistically significant (p<0.001), although there was no statistically significant difference between INT and COMP over time (0.04 days, 95%CI -0.2-0.3, p=NS).
- There were statistically significant improvements in the mean number of days children met the physical activity guidelines according to all sociodemographic factors for both INT and COMP. However, there were no statistically significant time x group effects for each sociodemographic subgroup.

Physical Activity (proportion meeting guidelines)

Table 47 shows the proportion of children who met the physical activity guidelines.

- The probability that children met the physical activity guidelines was 60% and 70% greater at final than baseline in INT (OR 1.6, 95%CI 1.3-1.8, p<0.001) and COMP (OR 1.7, 95%CI 1.3-2.1, p<0.001), respectively. The probability was not statistically significant different between INT and COMP at final (OR 0.9, 95%CI 0.7-1.2, p=NS).
- Findings were similar when a multilevel model was used. The probability that children met the physical activity guidelines was 60% greater at final than baseline in both INT (OR 1.6, 95%CI 1.3-1.9, p<0.001) and COMP (OR 1.6, 95%CI 1.2-2.0, p<0.001). The probability was not statistically significant different between INT and COMP at final (OR 1.0, 95%CI 0.7-1.3, p=NS).
- Despite statistically significant increases over time in the probability of children meeting the physical activity guidelines in both INT and COMP according to all sociodemographic factors, the probability was only statistically significant different between INT and COMP at final for children in rural communities (OR 0.6, 95%CI 0.4-10, p=0.047).

Table 46: Mean days students (9-11 years) met physical activity guidelines (≥60 min/d on 7 d/wk) at baseline and final by community and by sex, locality, age, SES and Phase

	Year 3 (Baseline)		Year 5 (Final)		Δ Change (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[1]	COMP[2]	INT vs COMP[3]
n	1359	1227	1092	777			
All							
Number days met PA recommendations (≥60 mins/d)[4]	4.4	4.5	5.1	5.2	0.8* (0.6 - 0.9)	0.7* (0.5 - 1.0)	0.04 (-0.2 - 0.3)
Sex							
Boys	4.5	4.7	5.2	5.4	0.8* (0.6 – 1.0)	0.6* (0.3 – 0.9)	0.2 (-0.2 – 0.5)
Girls	4.3	4.3	5.1	5.1	0.8* (0.6 – 1.0)	0.8* (0.5 – 1.1)	-0.1 (-0.4 – 0.3)
Locality							
Urban	4.3	4.5	5.1	5.2	0.9* (0.6 – 1.1)	0.8* (0.5 – 1.0)	0.1 (-0.3 – 0.4)
Rural	4.6	4.5	5.2	5.4	0.6* (0.3 – 0.8)	0.9* (0.5 – 1.2)	-0.3 (-0.7 – 0.1)
Age, years							
≤9	3.9	4.0	5.0	4.9	1.1* (0.8 – 1.4)	1.0* (0.5 – 1.4)	0.2 (-0.4 – 0.7)
10	4.5	4.7	5.2	5.3	0.7* (0.5 – 0.9)	0.6* (0.3 – 0.9)	0.1 (-0.2 – 0.5)
≥11	4.6	4.7	5.2	5.4	0.6* (0.3 – 0.9)	0.8* (0.4 – 1.2)	-0.2 (-0.7 – 0.3)
SES[5]							
Quintile 1	4.0	4.4	4.7	5.2	0.8* (0.3 – 1.2)	0.7 (-0.2 – 1.6)	0.1 (-0.9 – 1.1)
Quintile 2	4.4	4.2	5.2	5.1	0.9* (0.6 – 1.2)	0.8* (0.2 – 1.4)	0.1 (-0.6 – 0.7)
Quintile 3	4.5	4.8	5.3	5.4	0.8* (0.3 – 1.3)	0.7* (0.2 – 1.1)	0.1 (-0.5 – 0.8)
Quintile 4	4.4	4.4	5.3	5.2	0.9* (0.5 – 1.3)	0.7* (0.4 – 1.1)	0.2 (-0.4 – 0.7)
Quintile 5	5.1	5.0	6.0	NE	0.8* (0.6 – 1.1)	NE	NE
Phase							
1	4.3	4.4	5.1	5.2	0.8* (0.6 – 1.0)	0.7* (0.5 – 1.0)	0.1 (-0.3 – 0.4)
2	4.5	4.5	5.2	5.2	0.7* (0.3 – 1.0)	0.7* (0.4 – 1.1)	-0.1 (-0.6 – 0.5)

NE – Not estimable due to zero children from COMP in Quintile 5 at final; *p<0.01

[1] Change from baseline to final in intervention; [2] Change from baseline to final in comparison;

[3] Change from baseline to final in intervention, minus the change from baseline to final in comparison as determined using a linear regression model; [4] As recommended by the 2014 Australia's Physical Activity and Sedentary Behaviour Guidelines (Department of Health 2014); [5] SES is measured by ICSEA scores. Quintiles are based on 2011 National data at baseline (cut-offs 940/980/1020/1076/1287) and 2014 National data at final (cut-offs 942/985/1023/1074/1292). The national average ICSEA score is 1000 (Australian Curriculum Assessment and Reporting Authority (ACARA) 2013).

Note: Models were adjusted by age and ICSEA score. Sub-analyses should be treated with caution.

Table 47: Proportion (%) of students (9-11 years) who met PA guidelines at baseline and final by community and by sex, locality, age, SES and Phase

	Year 3 (Baseline)		Year 5 (Final)		OR (95%CI) (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[1]	COMP[2]	INT vs COMP[3]
n	1359	1227	1092	777			
All							
% met PA recommendations (≥60 mins/d)[4] (%)	27.7	28.3	37.0	39.9	1.6* (1.3 – 1.8)	1.7* (1.3 – 2.1)	0.9 (0.7 – 1.2)
Sex							
Boys	28.4	34.1	38.7	44.2	1.6* (1.3 – 2.0)	1.5* (1.2 – 2.0)	1.1 (0.7 – 1.5)
Girls	26.9	22.8	35.7	35.7	1.5* (1.2 – 1.9)	1.9* (1.3 – 2.7)	0.8 (0.5 – 1.2)
Locality							
Urban	25.9	26.7	38.2	38.3	1.8* (1.6 – 2.1)	1.8* (1.3 – 2.4)	1.0 (0.7 – 1.4)
Rural	31.9	30.6	34.9	44.6	1.1 (0.8 – 1.5)	1.8* (1.3 – 2.6)	0.6** (0.4 – 1.0)
Age, years							
≤9	22.7	23.1	34.4	36.2	1.8* (1.3 – 2.5)	1.9* (1.2 – 3.0)	0.9 (0.6 – 1.6)
10	30.8	32.7	41.8	40.4	1.6* (1.3 – 2.0)	1.4** (1.0 – 1.9)	1.1 (0.8 – 1.7)
≥11	28.2	28.3	34.4	42.1	1.3 (1.0 – 1.9)	1.9* (1.2 - 2.8)	0.7 (0.4 – 1.2)
SES[5]							
Quintile 1	25.1	33.3	28.7	42.6	1.2 (0.8 – 1.7)	1.5 (0.9 – 2.3)	0.8 (0.5 – 1.5)
Quintile 2	28.0	26.5	44.2	32.1	2.1* (1.5 – 2.8)	1.3 (0.7 – 2.3)	1.6 (0.8 – 3.0)
Quintile 3	26.4	31.6	39.0	45.2	1.9* (1.3 – 2.6)	1.8* (1.2 – 2.7)	1.0 (0.6 – 1.8)
Quintile 4	27.0	26.6	36.8	39.2	1.6** (1.0 – 2.4)	1.7* (1.2 – 2.5)	0.9 (0.5 – 1.6)
Quintile 5	37.4	30.9	45.5	NE	1.3 (0.9 – 1.9)	NE	NE
Phase							
1	26.0	27.6	37.6	38.8	1.7* (1.4 – 2.1)	1.7* (1.3 – 2.2)	1.0 (0.7 – 1.5)
2	30.7	29.0	36.1	41.3	1.3 (1.0 – 1.8)	1.8* (1.2 – 2.6)	0.7 (0.5 – 1.2)

NE – Not estimable due to zero children from COMP in Quintile 5 at final; *p<0.01; **p<0.05

[1]Odds in year 5 for intervention group (INT), Year 3 is the reference group;[2] Odds in year 5 for comparison group (COMP), Year 3 is the reference group; [3] Odds for the intervention group (INT), the comparison group (COMP) is the reference group; [4] As recommended by the 2014 Australia's Physical Activity and Sedentary Behaviour Guidelines (Department of Health 2014); [5] SES is measured by ICSEA scores. Quintiles are based on 2011 national data at baseline (cut-offs 940/980/1020/1076/1287) and 2014 national data at final (cut-offs 942/985/1023/1074/1292). The national average ICSEA score is 1000 (Australian Curriculum Assessment and Reporting Authority (ACARA) 2013). Note: A binary logistic regression model, adjusted by age and ICSEA score, was used to fit the models. Sub-analyses should be treated with caution.

SEDENTARY BEHAVIOUR (SCREEN TIME)

Children met the screen time guideline on approximately two and a half days at baseline and three days at final. However, the proportion of children meeting the screen time guidelines on all 7 days of the week decreased from 18% at baseline to 12% at final.

Screen time (mean number of days)

Table 48 shows the average number of days per week children met the screen time guidelines.

- There were statistically significant increases in the average number of days children met screen time guidelines in INT (by 0.3 days, 95%CI 01-0.5, p=0.003) and COMP (by 0.5 days, 95%CI 0.3-0.7, p<0.001), although there was no significant difference between INT and COMP over time (-0.2 days, 95%CI -0.5-0.1, p=NS).
- There were small statistically significant increases in the average number of days children met screen time guidelines for both INT and COMP according to all sociodemographic factors.
- However, the only statistically significant time x group effect was for children aged 10 years (-0.5, 95%CI -0.9- -0.1, p=0.020), and children in Q2 (-0.8, 95%CI -1.6- -0.05, p=0.037)

Screen time (proportion meeting guidelines)

Table 49 shows the proportion of primary school children meeting the screen time guidelines.

- Children in INT were 30% less likely (OR 0.7, 95%CI 0.5-0.9, p=0.006) and children in COMP 50% less likely (OR 0.5, 95%CI 0.4-0.7, p<0.001) to meet the screen time guidelines at final than baseline. However, there were no statistically significant differences between groups in probability of meeting the screen time guidelines at final (OR 1.4, 95%CI 0.9-2.0, p=NS).
- Findings were similar when a multilevel model was used. Children in INT were 30% less likely (OR 0.7, 95%CI 0.6-0.9, p=0.003) and children in COMP 50% less likely (OR 0.5, 95%CI 0.4-0.7, p<0.001) to meet the screen time guidelines at final than baseline. There were no statistically significant differences between groups in probability of meeting the screen time guidelines at final (OR 1.4, 95%CI 0.9-2.0, p=NS).
- There were several statistically significant changes over time in the probability of children meeting the screen time guidelines for both INT and COMP according to age, locality, SES and Phase; however there were no statistically significant differences between groups at final.

Table 48: Mean days students (9-11 years) met screen time guidelines at baseline and final by community and by sex, locality, age, SES and Phase

	Year 3 (Baseline)		Year 5 (Final)		Δ Change (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[1]	COMP[2]	INT vs COMP[3]
n	1346	1210	1090	777			
All							
Number days met screen time recommendations (≤120 min/d)[4]	2.7	2.5	3.0	3.1	0.3* (0.1 – 0.5)	0.5* (0.3 – 0.7)	-0.2 (-0.5 – 0.1)
Sex							
Boys	2.9	2.8	3.0	3.2	0.1 (-0.2 – 0.4)	0.3** (0.01 – 0.6)	-0.2 (-0.6 - 0.2)
Girls	2.4	2.2	2.9	2.9	0.5* (0.2 – 0.8)	0.7* (0.4 – 1.0)	-0.1 (-0.6 – 0.3)
Locality							
Urban	2.7	2.5	3.0	3.1	0.3* (0.2 – 0.5)	0.5* (0.2 – 0.8)	-0.2 (-0.5 – 0.2)
Rural	2.7	2.6	2.8	3.0	0.2 (-0.1 – 0.5)	0.4 (-0.1 - 1.0)	-0.2 (-0.9 – 0.4)
Age, years							
≤9	2.5	2.3	2.9	2.8	0.3** (0.01– 0.7)	0.5** (0.04 – 0.9)	-0.1 (-0.7 – 0.4)
10	2.7	2.5	2.7	3.1	0.1 (-0.2 – 0.3)	0.5* (0.2 – 0.9)	-0.5** (-0.9 - -0.1)
≥11	2.8	2.7	3.3	3.2	0.5* (0.2 – 0.8)	0.5** (0.7 – 0.9)	-0.02 (-0.5 – 0.5)
SES[5]							
Quintile 1	2.6	3.0	3.4	3.1	0.8* (0.3 – 1.3)	0.1 (-0.9 – 1.1)	0.6 (-0.5 – 1.8)
Quintile 2	3.1	2.4	3.1	3.3	0.1 (-0.3 – 0.5)	0.9* (0.2 – 1.6)	-0.8** (-1.6 - -0.05)
Quintile 3	2.6	2.7	2.8	3.0	0.3 (-0.1 – 0.6)	0.2 (-0.2 – 0.6)	0.04 (-0.5 – 0.6)
Quintile 4	2.3	2.4	2.7	3.0	0.4** (0.1 – 0.8)	0.5* (0.2 – 0.9)	-0.1 (-0.6 – 0.3)
Quintile 5	2.7	2.5	2.2	NE	-0.6* (-1.0 – 0.3)	NE	NE
Phase							
1	2.6	2.6	2.9	3.0	0.3** (0.04 – 0.5)	0.3 (-0.1 – 0.7)	-0.1 (-0.5 – 0.4)
2	2.8	2.4	3.0	3.2	0.3 (-0.03 – 0.6)	0.7* (0.4 – 0.9)	-0.4 (-0.8 – 0.1)

NE – Not estimable due to zero children from COMP in Quintile 5 at final; *p<0.01; **p<0.05

[1] Change from baseline to final in intervention; [2] Change from baseline to final in comparison; [3] Change from baseline to final in intervention, minus the change from baseline to final in comparison as determined using a linear regression model; [4] As recommended by the 2014 Australia's Physical Activity and Sedentary Behaviour Guidelines (Department of Health 2014); [5] SES is measured by ICSEA scores. Quintiles are based on 2011 national data at baseline (cut-offs 940/980/1020/1076/1287) and 2014 national data at final (cut-offs 942/985/1023/1074/1292). The national average ICSEA score is 1000 (Australian Curriculum Assessment and Reporting Authority (ACARA) 2013). Note: Models were adjusted by age and ICSEA score. Sub-analyses should be treated with caution.

Table 49: Proportion (%) of students (9-11 years) who met screen time guidelines at baseline and final by community and by sex, locality, age, SES and Phase

	Year 3 (Baseline)		Year 5 (Final)		OR (95%CI) (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[1]	COMP[2]	INT vs COMP[3]
n	1346	1210	1090	777			
All							
% met screen time recommendations (<120 min/d)[4] (%)	17.1	19.8	12.8	10.9	0.7* (0.5 – 0.9)	0.5* (0.4 – 0.7)	1.4 (0.9 – 2.0)
Sex							
Boys	13.5	17.3	9.6	9.1	0.7* (0.5 – 0.9)	0.5* (0.4 – 0.7)	1.3 (0.9 – 2.1)
Girls	20.8	22.2	15.3	12.7	0.7 (0.5 – 1.0)	0.5* (0.4 – 0.7)	1.3 (0.8 – 2.2)
Locality							
Urban	17.1	19.3	13.2	11.4	0.7 (0.5 – 1.0)	0.6* (0.4 – 0.8)	1.3 (0.9 – 2.0)
Rural	17.1	20.7	11.9	9.8	0.6* (0.4 – 0.9)	0.4* (0.3 – 0.7)	1.4 (0.8 – 2.6)
Age, years							
≤9	18.6	27.2	11.2	14.8	0.6** (0.3 – 0.9)	0.5* (0.3 – 0.8)	1.2 (0.6 – 2.4)
10	17.2	17.4	15.3	9.3	0.9 (0.6 – 1.3)	0.5* (0.3 – 0.8)	1.8 (0.9 – 3.3)
≥11	15.8	15.7	11.6	9.8	0.7** (0.5 – 1.0)	0.6 (0.3 – 1.0)	1.2 (0.6 – 2.3)
SES[5]							
Quintile 1	15.3	22.1	9.0	9.3	0.5** (0.3 – 1.0)	0.4* (0.2 – 0.6)	1.5 (0.7 – 3.4)
Quintile 2	15.6	20.5	10.6	10.0	0.6** (0.4 – 1.0)	0.4** (0.2 – 0.9)	1.4 (0.6 – 3.1)
Quintile 3	16.4	17.4	14.8	11.3	0.9 (0.5 – 1.4)	0.6** (0.4 – 1.0)	1.5 (0.7 – 2.9)
Quintile 4	22.4	20.1	15.0	11.3	0.6* (0.4 – 0.9)	0.5* (0.4 – 0.8)	1.2 (0.7 – 2.0)
Quintile 5	17.5	19.9	22.7	NE	1.5 (0.7 – 3.1)	NE	NE
Phase							
1	17.0	19.8	13.9	12.1	0.8 (0.6 – 1.1)	0.6* (0.4 – 0.8)	1.4 (0.9 – 2.2)
2	17.3	19.9	11.1	9.4	0.6* (0.4 – 0.8)	0.4* (0.3 – 0.7)	1.3 (0.7 – 2.3)

NE – Not estimable due to zero children from COMP in Quintile 5 at final; *p<0.01; **p<0.05

[1]Odds in year 5 for intervention group (INT), Year 3 is the reference group;[2] Odds in year 5 for comparison group (COMP), Year 3 is the reference group; [3] Odds for the intervention group (INT), the comparison group (COMP) is the reference group; [4] As recommended by the 2014 Australia's Physical Activity and Sedentary Behaviour Guidelines (Department of Health 2014); [5] SES is measured by ICSEA scores. Quintiles are based on 2011 national data at baseline (cut-offs 940/980/1020/1076/1287) and 2014 national data at final (cut-offs 942/985/1023/1074/1292). The national average ICSEA score is 1000 (Australian Curriculum Assessment and Reporting Authority (ACARA) 2013).Note: A binary logistic regression model, adjusted by age and ICSEA score, was used to fit the models. Sub-analyses should be treated with caution.

5.3.2 PARENT REPORT OF CHILD ACTIVITY AND SEDENTARY BEHAVIOURS

Child activity and sedentary behaviours, as reported by parents, is shown in Table 50.

- The probability of children spending their free time being inactive significantly increased in both INT (OR 1.5, 95%CI 1.2-1.7, p<0.001) and COMP (OR 1.7, 95%CI 1.4-2.0, p<0.001), whilst the proportion spending their free time being active decreased (INT OR 0.9, 95%CI 0.8-1.0, p=NS; COMP OR 0.7, 95%CI 0.6-0.9, p<0.001). There were no significant differences between groups at final for time spent inactive or time spent active.
- The average time children spent outside on the previous school day decreased in both INT (-12.3 min, 95%CI -18.5- -6.2, p<0.001) and COMP (-11.4 min, 95%CI 20.7- -2.0, p=0.018). There was no group x time effect.
- The average time children spent on TV significantly increased in COMP (9.4 min, 95%CI 1.7-17.2, p=0.018) yet decreased non-significantly in INT (-1.7, 95%CI -7.4–3.9). The time x group effect was statistically significant with intervention children spending approximately 11 minutes less on TV (-11.2 min, 95%CI 20.8 - -1.5).
- Children in both INT and COMP spent more time on computers at final than baseline by 6 minutes (6.0, 95%CI 0.3-11.7, p=0.040) and 13 minutes (12.5, 95%CI 5.9–19.2, p<0.001), respectively. There was no group x time effect.

Table 50: Parent report of child (9-11 years) activity and sedentary behaviours

	Year 3 (Baseline)		Year 5 (Final)		Δ Change or OR (95%CI)[1] (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
n	1330	1394	1204	899			
Child activity behaviours							
Free time spent inactive (%)	47.4	44.8	56.5	56.9	1.5* (1.2– 1.7)	1.7* (1.4 – 2.0)	0.9 (0.7 – 1.1)
Free time spent active (%)	63.8	65.5	61.4	60.1	0.9 (0.8 – 1.0)	0.7* (0.6 – 0.9)	1.2 (1.0 – 1.5)
Time (min) child spent outside previous day child was at school (mean)	133	134	122	124	-12.3* (-18.5 - - 6.2)	-11.4** (-20.7 - - 2.0)	-1.0 (-12.2 – 10.26)
Times/week child is involved in organised games, sports or dance (outside of school) (mean)	2.8	2.7	2.9	2.9	0.10 (-0.08 – 0.28)	0.20** (0.04 – 0.36)	-0.10 (-0.34 – 0.14)
Child sedentary behaviours							
Time (min) on TV (mean)	101	89	99	100	-1.7 (-7.4 – 3.9)	9.4** (1.7 - 17.2)	-11.2** (-20.8 - -1.5)
Time (min) on computers (mean)	41	36	47	50	6.0** (0.3 – 11.7)	12.5* (5.9 – 19.2)	-6.5 (-15.3 – 2.3)
Time (min) spent watching/playing TV/computers (mean)	87	79	92	83	6.8 (-7.1 – 20.7)	2.7 (-1.4 – 6.8)	4.1 (-10.6 – 18.8)

*p<0.01; **p<0.05

[1] Δ Change (95%CI) for continuous measures as determined using a linear regression model, Odds Ratio (OR) (95%CI) for binary responses as determined using a binary logistic regression model; [2] continuous measures: change from baseline to final in intervention, binary responses: odds in year 5 for intervention group (INT) (year 3 is the reference group); [3] continuous measures: change from baseline to final in comparison, binary responses: odds in year 5 for comparison group (COMP) (year 3 is the reference group); [4] continuous measures: change from baseline to final in intervention, minus the change from baseline to final in comparison, binary responses: odds for the intervention group (INT) (the comparison group (COMP) is the reference group). Note: Models were adjusted by age and ICSEA score.

5.3.3 SLEEP

On average, children spent 10h15 in bed each night, slightly longer (10h22) on non-school days, and slightly less (10h07) on school days. These figures are in close agreement with previous Australian data (Olds T et al. 2010) which found sleep durations of 10h11 to 10h39 for this age group.

Sleep durations of 9-11 year olds (average across school and non-school days) in INT and COMP at baseline and final are shown in Table 51.

- Sleep durations were similar between INT and COMP at baseline and final.
- At baseline and final, children in INT slept a total of 10h16, whilst children in COMP slept 10hr08 at baseline and 10hr17 at final.

Overall, most children (69%) met the NSF sleep guidelines. The proportion of children not meeting the US NSF guidelines (9-11 hours of sleep per night) in INT and COMP at baseline and final is shown in Table 52.

- At baseline, approximately one-third of children did not meet the sleep guidelines (INT 32%, COMP 33%). This was similar at final (INT 31%, COMP 30%).

Table 51: Mean (standard deviations) for sleep duration (h:min) in 9-11 year olds (averaged across school and non-school days)

	Year 3 (Baseline)		Year 5 (Final)	
	INT	COMP	INT	COMP
n	501	428	800	557
All				
Sleep	10:16 (1:06)	10:08 (1:05)	10:16 (1:03)	10:17 (1:01)
Sex				
Boys	10:18 (1:02)	10:01 (1:06)	10:08 (1:03)	10:09 (1:06)
Girls	10:15 (1:07)	10:23 (0:58)	10:22 (1:01)	10:16 (1:05)
Locality				
Urban	10:16 (1:05)	10:10 (1:04)	10:15 (0:59)	10:17 (1:00)
Rural	10:17 (1:08)	10:05 (1:05)	10:18 (1:08)	10:16 (1:05)
Age, years				
≤9	10:34 (0:57)	10:19 (1:08)	10:20 (1:06)	10:26 (1:03)
10	10:20 (1:04)	10:05 (1:06)	10:19 (1:02)	10:20 (1:01)
≥11	10:04 (0:59)	10:03 (0:59)	10:09 (0:59)	10:07 (0:59)
SES[1]				
Quintile 1	10:10 (1:15)	10:00 (1:04)	10:20 (1:00)	10:13 (1:09)
Quintile 2	10:17 (1:09)	9:57 (1:04)	10:07 (1:04)	10:25 (0:59)
Quintile 3	10:21 (1:04)	10:00 (1:05)	10:26 (0:58)	10:19 (1:06)
Quintile 4	10:25 (0:53)	10:36 (0:58)	10:14 (1:07)	10:19 (1:06)
Quintile 5	10:10 (0:56)	10:07 (1:05)	10:15 (0:59)	10:07 (0:55)
Phase				
1	10:16 (1:08)	10:06 (1:05)	10:14 (1:03)	10:19 (1:01)
2	10:16 (1:01)	10:10 (1:04)	10:19 (1:01)	10:13 (1:00)

[1] SES is measured by ICSEA scores and are based on 2014 data (cut-offs 950/994/1023/1050). The national average ICSEA score is 1000 (Australian Curriculum Assessment and Reporting Authority (ACARA) 2013).

Table 52: Proportion (%) of 9-11 year olds not falling within the National Sleep Foundation sleep recommendations of 9-11 hours per night (averaged across school and non-school days)

	Year 3 (Baseline)		Year 5 (Final)	
	INT	COMP	INT	COMP
n	501	428	800	557
All				
% not meeting guidelines	32	33	31	30
Sex				
Boys	27	33	31	32
Girls	35	33	30	29
Locality				
Urban	33	34	27	32
Rural	29	32	35	25
Age, years				
≤9	28	39	34	39
10	33	34	28	29
≥11	31	28	27	26
SES[1]				
Quintile 1	33	34	33	32
Quintile 2	34	34	30	34
Quintile 3	37	30	28	25
Quintile 4	28	37	31	35
Quintile 5	23	33	28	28
Phase				
1	33	34	31	31
2	28	33	30	30

[1] SES is measured by ICSEA scores and are based on 2014 data (cut-offs 950/994/1023/1050). The national average ICSEA score is 1000 (Australian Curriculum Assessment and Reporting Authority (ACARA) 2013).

5.3.4 ENVIRONMENT FACTORS INFLUENCING ACTIVITY AND SEDENTARY BEHAVIOURS AND SLEEP

KNOWLEDGE OF ACTIVITY AND SEDENTARY BEHAVIOUR RECOMMENDATIONS

Table 53 shows parent knowledge of activity and screen time recommendations for children.

- The average time that parents reported as the recommended time their child should be active was approximately 100 minutes per day, greater than the recommended 60 minutes or more of activity (Department of Health 2014).
- Parents' knowledge of activity recommendations for children was correct (≥60 minutes/day) for approximately three-quarters of respondents. There were no statistically significant changes over time in the probability of parents accurately reporting the activity recommendations for children in INT or COMP, or between INT and COMP at final.
- The average time that parents reported as the recommended time their child should spend in screen time was approximately 83 minutes at baseline (87 min INT, 79 min COMP) and 87 minutes at final (92 min INT, 83 min COMP), within the guidelines of less than 120 minutes per day (Department of Health 2014).
- Parents' knowledge of screen time recommendations for children was correct (<120 minutes/day) for over 90% of respondents at baseline (90.3% INT; 95.2% COMP) and final (90.6% INT; 92.8% COMP). There were no statistically significant changes over time in the probability of parents accurately reporting the screen time recommendations for children in INT or COMP, or between INT and COMP at final.

Table 53: Parent knowledge of child activity and sedentary behaviour guidelines

	Year 3 (Baseline)		Year 5 (Final)		Δ Change or OR (95%CI)[1] (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[1]	COMP[2]	INT vs COMP[3]
n	1330	1394	1204	899			
Time child should be active							
Average minutes/day (mean)	99	100	105	101	6 (-2 – 13)	-2 (-8 – 3)	8 (-1 - 17)
≥60 minutes/day (%)	70.5	76.1	70.5	75.5	1.0 (0.9 – 1.2)	1.0 (0.8 – 1.3)	1.1 (0.8 – 1.4)
Time child should be sedentary (screen time)							
Average minutes/day (mean)	87	79	92	83	3 (-5 – 11)	3 (-1 – 7)	1 (-9 – 9)
<120 minutes/day (%)	90.3	95.2	90.6	92.8	1.0 (0.8 – 1.4)	0.7 (0.4 – 1.1)	1.5 (0.9 – 2.7)

[1] Δ Change (95%CI) for continuous measures as determined using a linear regression model, Odds Ratio (OR) (95%CI) for binary responses as determined using a binary logistic regression model; [2] continuous measures: change from baseline to final in intervention, binary responses: odds in year 5 for intervention group (INT) (year 3 is the reference group); [3] continuous measures: change from baseline to final in comparison, binary responses: odds in year 5 for comparison group (COMP) (year 3 is the reference group); [4] continuous measures: change from baseline to final in intervention, minus the change from baseline to final in comparison, binary responses: odds for the intervention group (INT) (the comparison group (COMP) is the reference group).
Note: Models were adjusted by age and ICSEA score.

ROLE MODELLING OF ACTIVITY AND SEDENTARY BEHAVIOURS

Parental and teacher role modelling of activity and/or sedentary behaviours is shown in Table 54. These behaviours were significantly worse at final than baseline for both INT and COMP.

- The average number of times that parents were active for more than 30 minutes a day decreased significantly in COMP for primary caregivers (-0.3 days, 95%CI -0.5- -0.1, p=0.030), yet did not change significantly in INT. This resulted in a statistically significant differential change of 0.3 days (95%CI 0.03-0.6, p=0.005) for primary caregivers, favouring INT.
- The average time that primary and secondary caregivers spent watching TV did not significantly change over the duration of the intervention in INT or COMP. There were no statistically significant differences in change over time between groups.
- The proportion of children rating their teachers as good role models for being physically active was high across time points and groups (more than 90%). However, there was a statistically significant decrease in probability in COMP across the evaluation period by 59% (OR 0.4, 95%CI 0.3-0.6, p<0.001), and this was statistically significantly different between groups at final (OR 2.4, 95%CI 1.4-4.0, p=0.001).

HOME PHYSICAL ACTIVITY ENVIRONMENT

Home availability and use of physical activity equipment

The number of physical activity items reported by parents to be available (and used) at/or around the home is shown in Table 55.

- The most commonly available items at both baseline and final were tricycle, bike or scooter (≥95%), bats and/or balls (≥90%) and active video games (84-85%).
- There was a statistically significant decrease over the intervention period in the number of physical activity items available at home and used more than once/fortnight in COMP (-0.6,95%CI -0.9- -0.3, p<0.001), which was statistically different to INT at final (0.6, 95%CI 0.3-0.9, p<0.001). This pattern was also observed when analysed according to proportion of available items used more than once a fortnight (between INT and COMP at final; OR 6.1, 95%CI 3.1-9.1, p<0.001).

Table 54: Role modelling of activity and sedentary behaviours

	Year 3 (Baseline)		Year 5 (Final)		Δ Change or OR (95%CI)[1] (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
Parent report							
n	1330	1394	1204	899			
No. times/week active >30 minutes/day							
Primary caregiver (mean)	3.0	3.2	3.0	3.0	0.004 (-0.2 – 0.2)	-0.3* (-0.5 - -0.1)	0.3** (0.03 – 0.6)
Secondary caregiver (mean)	2.7	2.9	2.7	2.6	0.04 (-0.2 – 0.2)	-0.3** (-0.5 - -0.02)	0.3 (-0.03 - 0.6)
No. minutes/day watching TV							
Primary caregiver (mean)	137	123	134	131	-1.7 (-10.2 – 6.8)	6.0 (-3.9 – 15.9)	-7.7 (-20.7 – 5.3)
Secondary caregiver (mean)	145	134	142	141	-2.2 (-10.9 – 6.6)	3.6 (-5.9 – 13.1)	-5.8 (-18.5 – 7.0)
Child report							
n	1373	1238	1092	781			
Teachers are good role models for physical activity (%)[5]	93.3	95.9	93.2	90.2	1.0 (0.6 – 1.5)	0.4* (0.3 – 0.6)	2.4* (1.4 – 4.0)

*p<0.01; **p<0.05

[1] Δ Change (95%CI) for continuous measures as determined using a linear regression model, Odds Ratio (OR) (95%CI) for binary responses as determined using a binary logistic regression model; [2] continuous measures: change from baseline to final in intervention, binary responses: odds in year 5 for intervention group (INT) (year 3 is the reference group); [3] continuous measures: change from baseline to final in comparison, binary responses: odds in year 5 for comparison group (COMP) (year 3 is the reference group); [4] continuous measures: change from baseline to final in intervention, minus the change from baseline to final in comparison, binary responses: odds for the intervention group (INT) (the comparison group (COMP) is the reference group); [5] okay, good or excellent role models.

Note: Models were adjusted by age and ICSEA score.

Table 55: Availability and use of home physical activity items

	Year 3 (Baseline)		Year 5 (Final)		Δ Change or OR (95%CI)[1] (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
n	1330	1394	1204	899			
Home activity environment							
Tricycle/bike/ scooter (%)	95.9	97.7	94.5	95.7			
Basketball hoop (%)	60.2	66.0	63.4	66.9			
Skipping rope (%)	68.6	71.0	70.6	70.6			
Active video games (e.g. with dance pad, Wii, Xbox36) (%)	84.6	85.0	84.1	85.3			
Swimming pool (%)	50.5	55.2	43.7	43.1			
Roller skates, skateboard, scooter (%)	79.4	82.8	78.1	80.9			
Fixed play equipment (e.g. swing set, slides, playhouse, jungle gym) (%)	53.0	55.2	55.9	54.8			
Trampoline (%)	56.6	63.9	58.4	60.3			
Sandpit (%)	16.6	22.9	17.8	20.7			
Bats and/or balls (e.g. totem tennis, tennis, cricket, football) (%)	90.0	93.0	92.6	90.7			
Features like cubby houses, trees to climb (%)	45.4	56.1	47.0	53.5			
Other (%)	30.9	30.8	73.5	76.2			
Number of physical activity items in the home (0-10) (mean)	7.0	7.6	7.1	7.3	0.02 (-0.1 – 0.2)	-0.2 (-0.4 – 0.05)	0.2 (-0.1 – 0.5)
Number of items in the home used at least once a fortnight (mean)	4.9	5.4	4.9	4.8	-0.02 (-0.2 – 0.1)	-0.6* (-0.9 - -0.3)	0.6* (0.3 – 0.9)
Proportion of available home items used at least once a fortnight (%)	69.1	71.0	69.0	65.4	-0.3 (-2.0 – 1.4)	-6.4* (-9.0 - -3.9)	6.1* (3.1 – 9.1)

*p<0.01

[1] Δ Change (95%CI) for continuous measures as determined using a linear regression model, Odds Ratio (OR) (95%CI) for binary responses as determined using a binary logistic regression model; [2] continuous measures: change from baseline to final in intervention, binary responses: odds in year 5 for intervention group (INT) (year 3 is the reference group); [3] continuous measures: change from baseline to final in comparison, binary responses: odds in year 5 for comparison group (COMP) (year 3 is the reference group); [4] continuous measures: change from baseline to final in intervention, minus the change from baseline to final in comparison, binary responses: odds for the intervention group (INT) (the comparison group (COMP) is the reference group).

Note: Models were adjusted by age and ICSEA score.

NEIGHBOURHOOD AND SCHOOL ACTIVITY ENVIRONMENT

Neighbourhood activity environment

The number of community activity facilities reported by parents to be available and used, and attendance at community activities are shown in Table 57.

- The most commonly available facilities were public parks, playgrounds or open spaces (≥97%), friends or relative's homes (≥95%) and bike/hiking/walking trails/paths (89-93%).
- Less than two-thirds of children had access to a swimming pool.
- There were no statistically significant changes over the intervention period in the reported number of community activity facilities available for use or in the number used at least once a fortnight.
- The most common activity attended by parents at each time point in both INT (43% baseline and final) and COMP (53% baseline, 49% final) was a school or kindergarten activity involving physical activity for their child.
- Parents in INT were 2.4 times more likely than parents in COMP at final to attend a community garden (OR 2.4, 95%CI 1.3-4.4, p=0.003). Findings were similar when a multilevel model was used (INT, OR 2.2 95%CI 1.5 – 3.3, p<0.001; COMP, OR 1.0 95%CI 0.5 – 1.7, p=NS; Difference, OR 2.3 95%CI 1.2 – 4.7, p=0.016).

Other factors related to the neighbourhood activity environment are detailed in Table 57.

- Most parents at baseline (90% INT, 84% COMP) and final (89% INT, 85% COMP) reported having a park within 10 minutes walking distance from home.
- Compared to baseline (19.9%), significantly more parents in INT reported their neighbourhood to be safe after dark at final (24.9%). The difference over time was statistically significant (OR 1.4, 95%CI 1.1-1.7, p=0.005), however there was no statistically significant difference between INT and COMP at final.
- An increase in likelihood of parents in INT reporting their neighbourhood to be safe after dark was observed over time in urban (OR 1.5, 95%CI 1.1-1.9, p=0.007) but not rural (OR 1.1, 95%CI 0.9-1.3, p=NS) communities. There were no statistically significant differences between INT and COMP at final.
- The probability of children reporting being bothered by *dogs* significantly increased in both INT (OR 1.2 95%CI 0.02-1.0, p=0.022) and COMP (OR 1.3, 95%CI 1.1-1.6, p=0.014) over the intervention period. The between group difference at final was not statistically significant (OR 0.9, 95%CI 0.7-1.2)
- There was no change in the probability of children reporting being bothered by *traffic* in either INT or COMP, however the probability of children reporting being bothered by *other people* increased significantly in COMP (OR 1.4, 95%CI 1.2-1.7, p<0.001) but not in INT (OR 1.1, 95%CI 0.9-1.3). The probability was significantly different between INT and COMP at final, with a 22% reduced odds of children in INT being bothered by *other people* than children in COMP (OR 0.8, 95%CI 0.6-1.0, p=0.045).
- When assessed by locality, there was a statistically significant increased probability over time of children being bothered by *traffic* (OR 1.3, 95%CI 1.0-1.6, p=0.028) and by *dogs* (OR 1.2, 95%CI 1.0-1.5, p=0.046) if living in urban intervention communities. The latter was also true for children living in urban comparison communities (OR 1.4, 95%CI 1.1-1.9, p=0.007). There were no statistically significant differences in being bothered by *traffic* or *dogs* in urban communities between INT and COMP at final.
- In COMP, there was a 44% increased probability of children in urban communities bothered by *other people* at final (OR 1.4, 95% CI 1.2-1.8, p<0.001). However, this was not statistically different from INT at final.

School activity environment

- In INT, there was a 25% increased probability of children reporting being active at recess or lunch following the evaluation period (OR 1.3, 95%CI 1.1-1.5, p=0.014), whereas the odds were not significantly different for COMP (OR 1.0, 95%CI 0.7-1.4) or between groups at final (Table 57).

Table 56: Availability and use of community activity facilities

	Year 3 (Baseline)		Year 5 (Final)		Δ Change or OR (95%CI)[1] (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
n	1330	1394	1204	899			
Parent report							
Availability and use of activity facilities in the community							
Indoor recreation or exercise facility (public or private) (%)	62.8	71.9	59.3	65.7			
Beach, lake, river, or creek	84.7	85.8	83.7	86.5			
Bike/hiking/walking trails, paths (%)	89.0	93.0	90.4	90.9			
Basketball court (%)	64.0	68.2	66.9	71.3			
Other playing fields/courts (e.g. football, softball) (%)	81.3	87.5	82.6	86.7			
Indoor swimming pool (%)	61.3	60.8	59.2	46.4			
Public park, playground or open space (%)	97.2	97.3	97.8	96.7			
Friend or relative's home (%)	96.4	97.0	95.8	95.0			
School grounds (during non-school hours) (%)	75.3	77.5	73.3	76.2			
Swimming pool (during warmer months) (%)	79.9	87.5	81.4	83.9			
Number of community facilities available (mean)	7.7	8.1	7.7	7.8	-0.1 (-0.2 – 0.1)	-0.2 (-0.4 – 0.1)	0.1 (-0.2 – 0.4)
Number of community facilities used at least once a fortnight (mean)	4.3	4.7	4.3	4.5	0.05 (-0.1 – 0.2)	-0.1 (-0.4 – 0.1)	0.2 (-0.1 – 0.5)
Activities attended (yes)							
School/kindergarten activity involving physical activity for your child (%)	43.2	52.9	43.0	49.1	1.0 (0.9 – 1.2)	0.9 (0.7 – 1.1)	1.2 (0.9 – 1.5)
School/kindergarten activity involving healthy eating for your child (%)	13.3	13.5	13.9	11.8	1.1 (0.8 – 1.4)	0.8 (0.6 – 1.2)	1.3 (0.8 – 2.0)
Community garden (%)	3.6	4.4	7.7	4.3	2.3* (1.6 – 3.4)	1.0 (0.6 – 1.5)	2.4* (1.3 – 4.4)

Community event involving physical activity for your child (%)	29.9	36.5	30.8	31.1	1.1 (0.9 – 1.2)	0.8 (0.6 – 1.0)	1.3 (1.0 – 1.8)
Community event involving healthy eating activity for your child (%)	9.7	8.5	10.9	7.2	1.1 (0.9 – 1.4)	0.8 (0.6 – 1.2)	1.4 (0.9 – 2.1)
Other (%)	8.9	6.3	7.2	8.4	0.8 (0.6 – 1.1)	1.3 (1.0 – 1.9)	0.6** (0.4 – 1.0)
None (%)	38.5	31.6	37.4	35.6	0.9 (0.8 – 1.1)	1.2 (0.9 – 1.5)	0.8 (0.6 – 1.1)

*p<0.01; **p<0.05

[1] Δ Change (95%CI) for continuous measures as determined using a linear regression model, Odds Ratio (OR) (95%CI) for binary responses as determined using a binary logistic regression model; [2] continuous measures: change from baseline to final in intervention, binary responses: odds in year 5 for intervention group (INT) (year 3 is the reference group); [3] continuous measures: change from baseline to final in comparison, binary responses: odds in year 5 for comparison group (COMP) (year 3 is the reference group); [4] continuous measures: change from baseline to final in intervention, minus the change from baseline to final in comparison, binary responses: odds for the intervention group (INT) (the comparison group (COMP) is the reference group).

Note: Models were adjusted by age and ICSEA score.

Table 57: Factors associated with the neighbourhood and school activity environment

	Year 3 (Baseline)		Year 5 (Final)		OR (95%CI) (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[1]	COMP[2]	INT vs COMP[3]
Parent report							
n	1330	1394	1204	899			
Neighbourhood activity environment							
A park within 10 minutes walking distance from home (%)	90.0	83.9	89.2	85.0	0.9 (0.7 – 1.3)	1.1 (0.6 - 2.0)	0.8 (0.4 – 1.6)
Neighbourhood safe after dark (%)[2]	19.9	26.6	24.9	29.3	1.4* (1.1 – 1.7)	1.1 (0.8 – 1.5)	1.2 (0.9 – 1.7)
Neighbourhood safe after dark by locality (%)[4]							
Urban	17.1	20.7	23.0	23.6	1.5* (1.1 – 1.9)	1.1 (0.9 – 1.5)	1.3 (0.9 – 1.9)
Rural	27.3	35.8	28.4	46.7	1.1 (0.9 – 1.3)	1.5 (1.0 – 2.4)	0.7 (0.4 – 1.2)
Child report							
n	1373	1238	1092	781			
Bothered by (%)							
Traffic	62.2	60.5	66.3	63.2	1.2 (0.9 – 1.5)	1.1 (0.9 – 1.4)	1.0 (0.8 – 1.4)
Dogs	37.5	34.7	42.7	41.2	1.2** (1.0 – 1.5)	1.3** (1.0-1.6)	0.9 (0.7 – 1.2)
Other people	66.3	62.1	69.0	70.3	1.1 (0.9 – 1.3)	1.4* (1.2 – 1.7)	0.8** (0.6 – 1.0)
Bothered by traffic, by locality (%)							
Urban	63.4	63.0	69.2	67.8	1.3** (1.0 -1.6)	1.2 (0.9 – 1.6)	1.0 (0.7 – 1.5)
Rural	59.0	56.8	61.1	50.0	1.1 (0.7 – 1.6)	0.8 (0.5 – 1.1)	1.4 (0.8 – 2.5)
Bothered by dogs, by locality (%)							
Urban	36.5	31.0	41.8	41.0	1.2 (1.0 – 1.5)	1.5* (1.1 – 1.9)	0.8 (0.6 – 1.2)
Rural	39.9	40.1	44.3	41.7	1.2 (0.9 – 1.8)	1.1** (0.8 – 1.4)	1.2 (0.8 – 1.8)
Bothered by other people, by locality (%)							
Urban	67.7	62.0	70.3	71.0	1.1 (0.9 – 1.3)	1.4* (1.2 – 1.8)	0.8 (0.6 – 1.0)
Rural	62.8	62.4	66.6	68.6	1.2 (0.9 – 1.6)	1.3 (0.9 – 1.8)	0.9 (0.6 – 1.4)
Physically active at recess and lunchtime (%)[4]	76.8	77.1	80.4	77.6	1.3** (1.0 – 1.5)	1.0 (0.7 – 1.4)	1.2 (0.8 – 1.8)

*p<0.01; **p<0.05

[1] Odds in year 5 for intervention group (INT) (year 3 is the reference group); [2] Odds in year 5 for comparison group (COMP) (year 3 is the reference group); [3] Odds for the intervention group (INT) (the comparison group (COMP) is the reference group), [4] n=186 'don't knows'.

Note: A binary logistic regression model, adjusted by age and ICSEA score, was used to fit the models.

CHILD TRANSPORT TO SCHOOL

The time that children spent walking and driving to school is shown in Table 58.

- There were no statistically significant differences over time in the time spent walking or driving to school in both INT and COMP, or between INT and COMP at final.
- The likelihood of children using active transport in getting to school was lower at final in COMP (OR 0.7, 95%CI 0.5-0.9, p=0.013). There were no statistically significant differences between INT and COMP at final. Findings were similar when a multilevel model was adopted (INT, OR 0.8 95%CI 0.7 – 1.0, p=NS; COMP, OR 0.7 95%CI 0.5 – 0.9, p=0.022; Difference, OR 1.3 95%CI 0.8 – 1.9, p=NS).
- Few differences were found when compared by locality. There was a statistically significant decrease in the likelihood of urban children in COMP (OR 0.5, 95%CI 0.3-0.9, p=0.009) and of rural children in INT (OR 0.7, 95%CI 0.5-1.0, p=0.030) using active transport at final. However, there were no statistically significant differences between INT and COMP at final for urban or rural children.

HOME AVAILABILITY OF ELECTRONIC MEDIA ITEMS

The availability of items in the home that are associated with children's sedentary behaviour are detailed in Table 59. Nearly all changes across the intervention period were positive i.e. conducive to reducing children's sedentary behaviours.

- At final, approximately 10% less children in INT had a TV in their bedroom compared to baseline. Children in INT were 30% less likely than children in COMP to have a TV in their bedroom at final (OR 0.7, 95%CI 0.5-0.9, p=0.003).
- The likelihood of children having a mobile phone was significantly lower at final in both INT (OR 0.6, 95%CI 0.5-0.8, p<0.001) and COMP (OR 0.7, 95%CI 0.5-0.9, p=0.010). However, there was no significant difference between groups at final (OR 0.9, 95%CI 0.6-1.3).
- The 'TV rules' score was significantly greater in INT than COMP at final (0.2, 95%CI 0.01 – 0.4, p=0.037).
- The average number of TV's and videogame consoles in the home decreased in INT (-0.3, 95%CI -0.4 - -0.1, p<0.001; -0.2, 95%CI -0.3 - -0.1, p<0.001, respectively) and COMP (-0.1, 95%CI -0.2 – 0.1, p=NS; -0.2, 95%CI -0.3 - -0-.03, p=0.019, respectively), whereas the number of computers in the home significantly increased in both groups (INT 0.8, 95%CI 0.6-1.0, p<0.001; COMP 1.1, 95%CI 10.9-1.3, p<0.001).
- There was a statistically significant time x group effect for number of TV's (-0.2, 95%CI -0.4 – 0.02, p=0.030) and number of computers (-0.3, 95%CI -0.6 - -0.1, p=0.018) in the home.

Table 58: Average time children (9-11 years) spent walking and driving to school, and proportion (%) of children taking active transport to school

	Year 3 (Baseline)		Year 5 (Final)		Δ Change or OR (95%CI)[1] (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
Parent report							
n	1330	1394	1204	899			
Child transport to school							
Time (minutes) spent walking to school (mean)	25	28	24.	29	-0.6 (-3.5 – 2.2)	1.4 (-3.4 – 6.2)	-2.0 (-7.6 – 3.6)
Time (minutes) spent driving to school (mean)	9	11	9	10	0.1 (-1.0 – 1.2)	-0.2 (-2.2 – 1.7)	0.3 (-1.9 – 2.6)
Active transport to school (walk, bike, scooter, skate) (%)	71.4	66.3	67.9	59.1	0.8 (0.7 – 1.1)	0.7** (0.5 – 0.9)	1.2 (0.8 – 1.8)
Time (minutes) spent walking to school (mean) by locality							
Urban	25	27	22	27	-2.2 (-5.7 – 1.2)	1.1 (-4.8 – 7.1)	-3.4 (-10.3 – 3.5)
Rural	24	29	28	33	2.7 (-1.8 – 7.3)	3.5 (-4.0 – 11.1)	-0.8 (-9.7 – 8.1)
Time (minutes) spent driving to school (mean) by locality							
Urban	10	10	9	10	-0.4 (-1.8 – 1.1)	0.9 (-0.9 – 2.7)	-1.2 (-3.6 – 1.1)
Rural	8	12	9	10	1.0 (0.0 – 2.0)	-1.5 (-5.5 – 2.5)	2.5 (-1.7 – 6.7)
Active transport to school (%), by locality							
Urban	70.2	69.9	69.2	60.3	0.9 (0.7 – 1.3)	0.5* (0.3 – 0.9)	1.7 (1.0 – 3.0)
Rural	74.3	60.5	66.2	56.8	0.7** (0.5 – 1.0)	0.8 (0.5 – 1.2)	0.9 (0.5 – 1.4)

*p<0.01; **p<0.05

[1] Δ Change (95%CI) for continuous measures as determined using a linear regression model, Odds Ratio (OR) (95%CI) for binary responses as determined using a binary logistic regression model; [2] continuous measures: change from baseline to final in intervention, binary responses: odds in year 5 for intervention group (INT) (year 3 is the reference group); [3] continuous measures: change from baseline to final in comparison, binary responses: odds in year 5 for comparison group (COMP) (year 3 is the reference group); [4] continuous measures: change from baseline to final in intervention, minus the change from baseline to final in comparison, binary responses: odds for the intervention group (INT) (the comparison group (COMP) is the reference group).

Note: Models were adjusted by age and ICSEA score.

Table 59: Electronic media items available for children's use

	Year 3 (Baseline)		Year 5 (Final)		Δ Change or OR (95%CI)[1] (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
Parent report							
n	1330	1394	1204	899			
Home sedentary behaviour environment							
TV in child's bedroom (%)	39.4	27.6	29.9	29.9	0.7* (0.5 – 0.8)	1.0 (0.8 – 1.2)	0.7* (0.5 – 0.9)
Child has a mobile phone (%)	26.0	22.4	17.7	16.8	0.6* (0.5 – 0.8)	0.7* (0.5 – 0.9)	0.9 (0.6 – 1.3)
TV rules score (mean)	6.67	6.87	6.73	6.67	0.1 (-0.02 – 0.2)	-0.1 (-0.3 – 0.03)	0.2** (0.01 – 0.4)
Number TV's in home (mean)	2.9	2.7	2.7	2.7	-0.3* (-0.4 - -0.1)	-0.1 (-0.2 – 0.1)	-0.2** (-0.4 - -0.02)
Number computers in home (mean)	2.5	2.4	3.2	3.5	0.8* (0.6 – 1.0)	1.1* (0.9 – 1.3)	-0.3** (-0.6 - -0.1)
Number videogame consoles in home (mean)[4]	1.8	1.7	1.6	1.5	-0.2* (-0.3 - -0.1)	-0.2** (-0.3 - -0.03)	-0.1 (-0.2 – 0.1)

*p<0.01; **p<0.05

[1] Δ Change (95%CI) for continuous measures as determined using a linear regression model, Odds Ratio (OR) (95%CI) for binary responses as determined using a binary logistic regression model; [2] continuous measures: change from baseline to final in intervention, binary responses: odds in year 5 for intervention group (INT) (year 3 is the reference group); [3] continuous measures: change from baseline to final in comparison, binary responses: odds in year 5 for comparison group (COMP) (year 3 is the reference group); [4] continuous measures: change from baseline to final in intervention, minus the change from baseline to final in comparison, binary responses: odds for the intervention group (INT) (the comparison group (COMP) is the reference group).

Note: Models were adjusted by age and ICSEA score.

ENCOURAGEMENT TO BE ACTIVE

The proportion of children reporting that they are encouraged by family and friends to be active is shown in Table 60.

- Mothers (91-94%) most commonly encouraged their child to be active, followed by fathers (89-91%) and friends (79-82%).
- In INT, children were 44% more likely (OR 1.4, 95%CI 1.0-2.1, p=0.048) and 22% more likely (OR 1.2, 95%CI 1.0-1.5, p=0.036) to report being encouraged by their mother and best friends, respectively, to be active at final than baseline. These probabilities were not significantly different when compared to COMP at final.
- There were no statistically significant changes over time in the probability of children reporting being encouraged by their father, male cousins or brothers, or female cousins or sisters to be active in INT or COMP, or between INT and COMP at final.

Table 60: Encouragement to be active by family and friends (%)

	Year 3 (Baseline)		Year 5 (Final)		OR (95%CI) (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[1]	COMP[2]	INT vs COMP[3]
Child report							
n	1373	1238	1092	781			
Encouraged to be active by family members							
Mother (%)	91.0	92.2	93.3	94.0	1.4** (1.0 – 2.1)	1.3 (0.9 – 1.8)	1.1 (0.7 – 1.8)
Father (%)	89.0	90.5	89.9	90.9	1.1 (0.8 – 1.6)	1.0 (0.7 – 1.4)	1.1 (0.7 – 1.7)
Male cousins or brothers (%)	71.3	70.6	71.7	71.3	1.0 (0.8 – 1.3)	1.0 (0.8 – 1.3)	1.0 (0.7 – 1.4)
Female cousins or sisters (%)	70.2	70.3	70.7	66.6	1.0 (0.8 – 1.3)	0.8 (0.7 – 1.0)	1.2 (0.9 – 1.7)
Best friends (%)	78.7	80.2	81.8	81.0	1.2** (1.0 – 1.5)	1.0 (0.8 – 1.3)	1.2 (0.9 – 1.6)

**p<0.05

[1] Odds in year 5 for intervention group (INT) (year 3 is the reference group); [2] Odds in year 5 for comparison group (COMP) (year 3 is the reference group); [3] Odds for the intervention group (INT) (the comparison group (COMP) is the reference group)..

Note: A binary logistic regression model, adjusted by age and ICSEA score, was used to fit the models.

5.4 PERCEIVED HEALTH AND WEIGHT STATUS

Table 61 reports on child rating of their health and parental perception of their family as overweight or obese.

- Most children rated their health as good-excellent at baseline (94% INT, 95% COMP) and final (92% INT, 92% COMP).
- There was a significant decreased odds of children in COMP rating their health as good-excellent at final than baseline, by 37% (OR 0.6, 95%CI 0.4-0.9, p=0.019). This was not significantly different from INT at final.
- The probability of parents perceiving their child as being overweight or obese was significantly lower in INT than COMP at final (OR 0.7, 95%CI 0.5-1.0, p=0.035).

Table 61: Proportion (%) rating their health as good – excellent and perception of family members as overweight or obese

	Year 3 (Baseline)		Year 5 (Final)		OR (95%CI) (Year 3 – Year 5)		
	INT	COMP	INT	COMP	INT[1]	COMP[2]	INT vs COMP[3]
Child report							
n	1373	1238	1092	781			
Child rates health as good – excellent (%)[4]	93.8	95.1	92.3	92.1	0.8 (0.6 – 1.0)	0.6** (0.4 – 1.0)	1.2 (0.8 – 2.0)
Parent perception family weight status							
n	1330	1394	1204	899			
Primary caregiver[5] (%)	38.5	38.6	35.0	37.6	0.9 (0.7 – 1.1)	1.0 (0.8 – 1.1)	0.9 (0.7 – 1.2)
Secondary caregive[6] (%)	30.2	29.8	26.0	26.1	0.8 (0.7 – 1.0)	0.8** (0.7 – 1.0)	1.0 (0.8 – 1.3)
Child[7] (%)	12.6	10.8	10.3	11.4	0.8** (0.6 – 1.0)	1.1 (0.8 – 1.5)	0.7** (0.5 – 1.0)

**p<0.05

[1] Odds in year 5 for intervention group (INT) (year 3 is the reference group); [2] Odds in year 5 for comparison group (COMP) (year 3 is the reference group); [3] Odds for the intervention group (INT) (the comparison group (COMP) is the reference group).

Note: A binary logistic regression model, adjusted by age and ICSEA score, was used to fit the models.

6 FINDINGS - QUALITY OF LIFE

6.1 INTERVENTION EFFECT ON HEALTH-RELATED QUALITY OF LIFE

Table 62 presents the CHU9D utilities at baseline and final by community, Phase and socio-demographic characteristics sub-groups.

- For the total sample, a decreasing trend over time for CHU9D utilities is observed for both the intervention and comparison communities. The trend of decreasing CHU9D utilities as young people transition out of childhood and into early adolescence is a common phenomenon and is consistent with other empirical studies that have applied the CHU9D to assess the HRQoL of young people of different ages (see e.g. published studies by Ratcliffe et al , 2012; Stevens and Ratcliffe 2012).
- Table 61 indicates that the magnitude of the decrease over time is smaller for the intervention communities (-0.012) relative to the control communities (-0.054) and this difference is statistically significant at the 5% level. However, it is important to note that as the baseline and final assessment study participants represent different groups of individuals (with different socio-demographic characteristics – as described in 5.1), it is not possible to make any direct inferences about changes in health-related quality of life within individuals in intervention and comparison communities between baseline and final assessments.

6.2 CHANGES ON HEALTH-RELATED QUALITY OF LIFE DIMENSIONS

Table 63 presents the distribution of responses to the CHU9D classified according to communities and assessment time points for the full sample.

- Amongst all 9 dimensions, it can be seen that students were more likely to report having any problems for the tired, sleep and school work/homework dimensions.
- Comparing intervention and comparison communities, significant differences were found for the worried and ability to join in activities dimensions in the baseline survey with on average students from comparison community reporting fewer problems.
- In the final survey, significant differences were found for the tired dimension with students from the intervention communities reporting fewer problems for this dimension.

Table 62: CHU9D utilities of students (9-11 years) at baseline and final

	Baseline		Final		CHANGE (time)		CHANGE (time x group)
	INT	COMP	INT	COMP	INT[1]	COMP[2]	INT vs COMP[3]
All							
Mean	0.804	0.820	0.792	0.766	-0.012	-0.054***	0.034*
Median	0.869	0.876	0.834	0.825			
SD	0.190	0.181	0.195	0.209			
95% CI	0.794-0.814	0.794-0.814	0.794-0.814	0.794-0.814			
N	1363	1229	1087	768			
Gender							
Boys							
Mean	0.817	0.818	0.796	0.776	-0.021	-0.042**	0.020
Median	0.877	0.876	0.846	0.841			
SD	0.180	0.184	0.198	0.214			
95% CI	0.803-0.830	0.803-	0.779-0.814	0.755-0.798			
N	694	596	488	380			
Girls							
Mean	0.790	0.822	0.788	0.756	-0.002	-0.066***	0.053**
Median	0.852	0.875	0.827	0.811			
SD	0.199	0.178	0.192	0.205			
95% CI	0.775-0.806	0.808-0.836	0.772-0.803	0.736-0.777			
N	669	633	599	388			
Age							
≤9							
Mean	0.811	0.815	0.789	0.766	-0.022	-0.049**	0.025
Median	0.877	0.873	0.847	0.825			
SD	0.186	0.185	0.209	0.222			
95% CI	0.792-0.830	0.796-0.834	0.767-0.812	0.736-0.797			
N	368	377	337	209			
10							
Mean	0.791	0.821	0.787	0.788	-0.004	-0.033*	0.021
Median	0.844	0.876	0.846	0.853			
SD	0.195	0.180	0.203	0.198			

95% CI	0.774-0.809	0.804-0.838	0.766-0.807	0.764-0.811			
N	478	444	379	266			
≥11							
Mean	0.811	0.824	0.799	0.747	-0.012	-0.077***	0.061**
Median	0.873	0.877	0.825	0.795			
SD	0.186	0.178	0.173	0.209			
95% CI	0.795-0.827	0.806-0.841	0.781-0.817	0.723-0.771			
N	513	408	371	293			
Locality							
urban							
Mean	0.807	0.826	0.790	0.760	-0.017*	-0.066***	0.042*
Median	0.874	0.876	0.825	0.814			
SD	0.189	0.171	0.193	0.211			
95% CI	0.795-0.819	0.813-0.838	0.776-0.805	0.743-0.777			
N	957	737	702	566			
rural							
Mean	0.796	0.811	0.794	0.783	-0.002	-0.028	0.023
Median	0.843	0.876	0.856	0.846			
SD	0.192	0.195	0.199	0.205			
95% CI	0.778-0.815	0.794-0.829	0.774-0.814	0.755-0.812			
N	406	492	385	201			
SES[d]							
Quintile 1							
Mean	0.807	0.793	0.772	0.798	-0.035*	0.005	-0.035
Median	0.871	0.849	0.813	0.856			
SD	0.184	0.198	0.202	0.192			
95% CI	0.788-0.827	0.760-0.827	0.744-0.800	0.746-0.851			
N	355	136	204	53			
Quintile 2							
Mean	0.805	0.812	0.787	0.754	-0.018	-0.058**	0.037
Median	0.859	0.888	0.828	0.839			
SD	0.182	0.210	0.206	0.253			
95% CI	0.783-0.826	0.781-0.843	0.762-0.812	0.707-0.801			
N	278	180	258	115			
Quintile 3							

Mean	0.787	0.793	0.777	0.777	-0.010	-0.016	0.007
Median	0.873	0.825	0.825	0.834			
SD	0.214	0.174	0.206	0.204			
95% CI	0.763-0.810	0.765-0.821	0.744-0.811	0.745-0.808			
N	329	152	144	167			
Quintile 4							
Mean	0.817	0.839	0.807	0.782	-0.010	-0.057**	0.050
Median	0.881	0.881	0.875	0.818			
SD	0.187	0.170	0.188	0.182			
95% CI	0.791-0.843	0.822-0.857	0.783-0.830	0.747-0.817			
N	200	345	253	107			
Quintile 5							
Mean	0.811	0.826	0.807	0.755	-0.004	-0.071***	0.067**
Median	0.856	0.876	0.861	0.804			
SD	0.171	0.171	0.175	0.206			
95% CI	0.787-0.835	0.810-0.843	0.784-0.829	0.732-0.777			
N	201	416	228	326			
Phase							
1							
Mean	0.798	0.816	0.791	0.775	-0.007	-0.041***	0.032
Median	0.867	0.876	0.830	0.825			
SD	0.199	0.182	0.196	0.197			
95% CI	0.785-0.811	0.802-0.831	0.776-0.806	0.756-0.793			
N	878	607	656	432			
2							
Mean	0.814	0.824	0.792	0.755	-0.022	-0.069***	0.029
Median	0.870	0.876	0.846	0.822			
SD	0.173	0.180	0.194	0.224			
95% CI	0.799-0.830	0.810-0.838	0.774-0.810	0.731-0.779			
N	485	622	431	336			

* p<0.05, ** p<0.01, *** p<0.01

[1] Change from baseline to final in intervention as determined using a Wilcoxon rank-sum (Mann-Whitney) test; [2] Change from baseline to final in comparison as determined using a Wilcoxon rank-sum (Mann-Whitney) test; [3] Change from baseline to final in intervention, minus the change from baseline to final in comparison, estimated through difference-in-difference approach and operationalized as Equation 1 (see section 2.5.6).
Note: Models were adjusted by age and ICSEA score. Sub-analyses should be treated with caution.

Table 63: Change in distribution of CHU9D dimension levels for students (9-11 years) by community (%)

	BASELINE				FINAL			
CHU9D dimensions and levels	ALL (n=2592)	INT (n=1363)	COMP (n=1229)	P-value	ALL (n=1855)	INT (n=1087)	COMP (n=768)	P-value
Worried								
I don't feel worried today	75.42	75.79	75.02	0.01	72.45	73.78	70.57	0.53
I feel a little bit worried today	16.71	15.19	18.39		19.25	18.49	20.31	
I feel a bit worried today	4.55	4.84	4.23		5.01	4.69	5.47	
I feel quite worried today	1.58	1.69	1.46		1.83	1.84	1.82	
I feel very worried today	1.74	2.49	0.90		1.46	1.20	1.82	
Sad								
I don't feel sad today	84.41	83.86	85.03	0.75	81.89	83.07	80.21	0.52
I feel a little bit sad today	10.80	11.23	10.33		11.91	11.13	13.02	
I feel a bit sad today	2.39	2.27	2.52		2.91	2.76	3.12	
I feel quite sad today	1.08	1.10	1.06		1.46	1.20	1.82	
I feel very sad today	1.31	1.54	1.06		1.83	1.84	1.82	
Pain								
I don't have any pain today	73.23	71.39	75.26	0.13	65.50	67.16	63.15	0.35
I have a little bit of pain today	17.90	19.08	16.60		20.81	20.24	21.61	
I have a bit of pain today	5.25	5.36	5.13		7.49	7.08	8.07	
I have quite a lot of pain today	1.81	1.91	1.71		3.45	3.22	3.78	
I have a lot of pain today	1.81	2.27	1.30		2.75	2.30	3.39	
Tired								
I don't feel tired today	36.30	36.10	36.53	0.48	33.80	35.79	30.99	0.02
I feel a little bit tired today	37.15	36.32	38.08		37.57	37.17	38.15	
I feel a bit tired today	12.77	13.35	12.12		14.23	12.42	16.80	
I feel quite tired today	6.83	6.60	7.08		6.58	6.16	7.16	
I feel very tired today	6.94	7.63	6.18		7.82	8.46	6.90	
Annoyed								
I don't feel annoyed today	77.16	75.13	79.41	0.13	73.15	75.16	70.31	0.06
I feel a little bit annoyed today	15.28	16.58	13.83		17.57	16.38	19.27	
I feel a bit annoyed today	3.59	3.96	3.17		4.15	3.31	5.34	

I feel quite annoyed today	2.12	2.20	2.03		2.59	2.39	2.86	
I feel very annoyed today	1.85	2.13	1.55		2.53	2.76	2.21	
School Work								
I have no problems with my schoolwork today	67.98	67.13	68.92	0.73	65.34	66.70	63.41	0.57
I have a few problems with my schoolwork today	22.30	22.67	21.89		23.02	22.17	24.22	
I have some problems with my schoolwork today	5.48	5.50	5.45		7.12	6.53	7.94	
I have many problems with my schoolwork today	2.58	2.79	2.36		2.86	2.85	2.86	
I can't do my schoolwork today	1.66	1.91	1.38		1.67	1.75	1.56	
Sleep								
Last night, I had no problems sleeping	63.16	63.17	63.14	0.20	61.35	62.74	59.38	0.37
Last night, I had a few problems sleeping	23.84	23.70	24.00		23.07	21.53	25.26	
Last night, I had some problems sleeping	5.79	5.36	6.27		7.55	7.73	7.29	
Last night, I had many problems sleeping	3.24	3.01	3.50		3.72	3.50	4.04	
Last night, I couldn't sleep at all	3.97	4.77	3.09		4.31	4.51	4.04	
Daily routine								
I have no problems with my daily routine today	86.65	85.69	87.71	0.09	82.21	83.72	80.08	0.19
I have a few problems with my daily routine today	10.11	11.23	8.87		12.45	11.13	14.32	
I have some problems with my daily routine today	1.62	1.25	2.03		3.02	2.76	3.39	
I have many problems with my daily routine today	0.62	0.81	0.41		1.13	1.01	1.30	
I can't do my daily routine today	1.00	1.03	0.98		1.19	1.38	0.91	
Able to join in activities								
I can join in with any activities today	79.67	77.62	81.94	0.02	73.21	74.79	70.96	0.37
I can join in with most activities today	12.77	14.23	11.15		15.90	14.63	17.71	
I can join in with some	4.21	4.04	4.39		4.53	4.60	4.43	

activities today								
I can join in with a few activities today	2.12	2.57	1.63		3.88	3.59	4.30	
I can join in with no activities today	1.23	1.54	0.90		2.48	2.39	2.60	

7 FINDINGS – ECONOMIC EVALUATION

7.1 COSTS

The estimated total costs associated with the provision of the OPAL programme between 2008 and 2015 were $19,384,258 (state wide co-ordination unit, research and evaluation: $14,554,650 plus grants to local councils: $2,458,275 plus additional local council expenditures: $2,371,333 matched contributions). The estimated total number of individuals in each of the intervention communities in phases 1 and 2 who could reasonably have been expected to have benefited from the OPAL programme during the time period under consideration was 282,820. This equates to an estimated average total cost for the OPAL program of $68.54 ($19,384,258/282,820) per person.

The total costs associated with the provision of the OPAL programme between 2008 and 2015 for children in the 0-18 year old age range equates to $19,384,258 (100% of activities). The total number of children in the 0-18 year old age range in each of the intervention communities in phases 1 and 2 who could reasonably have been expected to have benefited from the OPAL programme during the time period under consideration was 67,322 (estimate taken from data published by the Australian Bureau of Statistics in the 2006 census). Hence the average costs of the OPAL program for children in the 0-18 year old age range was $287.93 ($19,384,258/67,322) per child.

7.2 ECONOMIC EVALUATION

7.2.1 CHALLENGES IN THE ECONOMIC EVALUATION OF PUBLIC HEALTH INTERVENTIONS

Economic evaluation has become a vital component to facilitate resources allocation decision-making in the health care sectors of many countries. Cost-utility analysis (CUA) is a preferred economic evaluation technique that has been recommended in guidelines published by government agencies across the world, including the National Institute for Health and Care Excellence (NICE) in the UK and the Pharmaceutical Benefits Advisory Committee (PBAC) in Australia [Brazier et al 2007]. There is also increasing attention in the application of economic evaluation to assess the cost effectiveness of public health interventions [Weatherly et al, 2009].

The economic evaluation of public health interventions raises several key methodological challenges:

[1] In contrast to many health care interventions, it is very difficult to conduct a randomised controlled trial of a public health intervention and often other, more pragmatic study designs are needed. A related issue is that outcomes for many health care programmes are often adequately captured in the short term whereas public health programmes, in particular prevention programmes, may have long term health impacts.

[2] Outcomes beyond health may be attributable to public health interventions including reassurance and the creation of an informed public as well as other non-health related outcomes such as education. CUA focuses on health outcomes and these are typically measured using the quality adjusted life years (QALY) framework. Currently, it is not possible to capture outcomes beyond health in the standard QALY framework.

[3] Equity considerations take on particular importance in the public health sector because reducing inequalities in health (as opposed to reducing inequalities of access to health care treatments and services) is a primary goal of many public health interventions. As such, the equity impacts tend to be much more important for public health interventions where in many cases the main objective of the intervention is to reduce health inequalities.

7.2.2 CHALLENGES IN THE ECONOMIC EVALUATION OF OPAL

The economic evaluation of the OPAL program was conducted as a subsidiary study to the main outcomes evaluation conducted by the Flinders University evaluation team. As such, the economic evaluation was constrained by the methodology adopted for the main outcomes evaluation. In particular, a significant limitation for the economic evaluation was the cross-sectional nature of the baseline and follow up populations for the assessment of HRQoL for the intervention and control communities. Ideally, the economic evaluation of the OPAL program would involve recruiting matched individuals (in terms of baseline health and socio/demographic characteristics) from both intervention and control communities who would be followed up longitudinally to measure the incremental HRQoL impact over time of the intervention. The economic evaluation was also constrained by the lifetime of the main outcomes evaluation which was based upon a relatively short time frame of 2-3 years. Public health interventions, such as the OPAL program may provide sustained health benefits potentially moving into adulthood. In the longer term, an increase in the proportion of children moving out of the overweight/obese categories and into the healthy weight category will likely be associated with a decrease in the incidence and prevalence of chronic health conditions associated with overweight/obesity in adults and the associated health care utilisation costs. If positive health changes are sustained into adulthood this then offers the potential for the cost effectiveness of the OPAL programme to improve significantly over time.

7.3 CONCLUSIONS

Given the limitations previously identified, it is not possible to draw any definitive conclusions about the relative cost effectiveness of the OPAL program from the information presented in this report. It is recommended that any future economic evaluation of the OPAL program or any similar public health intervention incorporates health economics expertise from the outset. Ideally the economic evaluation should be conducted alongside a randomised controlled trial. However, the difficulties associated with the conduct of a randomised controlled trial of a public health intervention are acknowledged. A more pragmatic study design e.g. a prospective cohort study whereby matched individuals from the intervention and control communities are followed up longitudinally for an extended time period to assess changes in their health behaviours, body mass index and health related quality of life over time, may therefore be considered as more appropriate in this context. Health economic modelling should also be conducted to extrapolate the outcomes from the economic evaluation, ideally over the life-time of the exposed individuals, to estimate the long term impact of a public health intervention on the incidence and prevalence of chronic health conditions related to overweight/obesity in adults and associated outcomes in terms of mortality, HRQoL and health care expenditures.

8 FINDINGS: COMMUNITY CAPACITY BUILDING (CCB)

This section of the Final Report outlines the main findings of a community capacity building evaluation, undertaken as a component of the overall Flinders University OPAL Program Evaluation.

8.1 CCB PARTICIPANTS

For Phase 1 and 2, 11 groups participated in the OPAL CCB evaluation. At Time 1, 11 group CCB discussions were conducted involving 89 people in total. At Time 2, 8 group CCB discussions were conducted involving 76 people across these groups. In total 164 people participated in the Phase 1 and Phase 2 CCB snapshots. Additional interviews were held with 3 respondents involved in the groups that had ceased.

Phase 1

The snapshots for Phase 1 communities were taken at two periods (Time 1=2013; Time 2=2014). The sites were Port Augusta, Marion, Mount Gambier, Onkaparinga, Playford, and Salisbury. The second snapshot in Phase 1 sites was taken in the closing months of the OPAL Program, and in the period following the Federal Government announcement of the defunding of the National Preventative Health Partnership, and the SA Government's budget announcements. This is mentioned for it was a recurring CCB discussion theme at final. Four sites were metropolitan areas and two were regional/rural areas

Phase 2

The snapshots for Phase 2 communities were taken at two periods (Time 1=late 2013 or early 2014; Time 2=2015). The sites were City of Port Adelaide Enfield, City of Charles Sturt, The City of Whyalla and the District Council of the Copper Coast. Two sites are metropolitan areas and two are regional/rural areas. At Time 2, group interviews were not possible for two groups as they were no longer meeting. Groups developed for parents of children in the early years are constantly changing as the children move to other levels of schooling.

Table 64: Groups by type - Phase 1 and Phase 2 OPAL CCB participants

Group type	Number
Local OPAL advisory partnership committee	1
Community garden/ home harvest	3
Families and children program	2
Community centre	1
Community planning group	2
Recreation group	1
Food security group	1

Table 65: Phase 1 and Phase 2 CCB participants

Participant	Description of core activities	Number participants at Snapshot Time 1	Number participants at Snapshot Time 2	Location	OPAL role
Community Planning Group 1	Leadership group seeking to facilitate collective responses to social and health issues in a region.	16	22	Rural	Facilitator Collaborator
Community Planning Group 2	Collaborative planning group to foster social health initiatives in a local government area.	10	7	Metropolitan	Collaborator
Community Garden and Home Harvest 1	Local community and backyard gardening, food and plant swap project. Garden to plate approach. Partnership with public housing department.	6	11	Rural	Facilitator Collaborator Resource provider
Community Garden and Home Harvest 2	Local community and backyard gardening, food and plant swap project. Based in a kindergarten. Garden to plate approach.	5	0	Rural	Facilitator Instigator Resource provider
Community Garden and Home Harvest 3	Local community and backyard gardening, food and plant swap project. Based in a primary school.	4	1	Metropolitan	Resource provider
Early Years Group	A group with the aim of facilitating healthy eating and physical activity information sharing, exchange of practical ideas and experiences amongst early childhood providers who work with kindergarten children /transition to school.	15	10	Metropolitan	Facilitator Collaborator Resource provider
Parenting and peer support group	A parenting and peer support group for parents of children 4-6/ transition to school.	8	1	Regional/Rural	Resource provider Support
Healthy eating/physical activity within a community centre	A community centre providing a range of programs and activities to meet local community needs. In recent times, this has included healthy eating/physical activity programs in partnership with OPAL.	1	1	Metropolitan	Collaborator Resource provider
Youth development/	Group of young people engaged in recreation, youth	7	5	Metropolitan	Collaborator Resource

sport and recreation	recreation planning and peer training. The group has been recognized with a number of awards for their youth work and youth leadership.				provider
Local Opal Advisory Committee	Support group to guide local OPAL work in the Council area. Members drawn community organisations, council and government agencies.	5	6	Regional/Rural	Facilitator
Food security group	A group focused on food security fostering community based approaches	12	9	Metropolitan	Facilitator Collaborator

8.2 CCB RESULTS

8.2.1 OVERVIEW

In the case of the 11 groups shown in Table 65, the OPAL program has played varying roles; this variation is consistent with the community development approach of the OPAL program.

Facilitator: For 6 of the groups, OPAL workers undertook a facilitation role, where the OPAL Program was the catalyst for the development of the group or program, and maintained an ongoing leadership and support role. One example was an early years group which at baseline had been in existence for 3 ½ years. OPAL had taken over the facilitation of the group from a preceding program, the Eat Well be Active (EWBA) Program and convened and facilitated the group.

Collaborator: For 7 of the groups, OPAL collaborated to support the realization of the group purpose and assist in building community capacity. An example is a locality based community centre which partnered with OPAL to develop a series of food and outdoor BBQ and physical exercise activities and a food based social enterprise.

*Resource provider***:** The nature of the OPAL Program was such that it played a role in enabling access to resources to support capacity building. These were mentioned by all of the groups and in positive terms. Examples include natural play information/practical resources and food and healthy eating information. The community garden and home harvest group (2) noted the practical support OPAL provided in funding the purchase of seedlings, potting mix and fertilizer. In a region OPAL sponsored cooking workshops to bring children together; supported activities such as a Farmers Market and School based programs, and were an instigator of a major Fun Run which had over 1300 participants in 2011.

The nature and purpose of the community project or community group, the local community context, who else is around and active are variables which influenced the role of OPAL practitioners in CCB. As mentioned previously, OPAL's role in community development is described more comprehensively in the paper 'Practitioner insights on obesity prevention: the voice of South Australian OPAL workers' (OPAL Collective 2015).

8.2.2 CCB CHANGE OVER TIME

CCB Individual Group Assessments

When reflecting on CCB over time for each feature participating groups assessed whether they had moved further along the road of the journey of capacity building. Eight groups participated in a second group CCB assessment process (n=8) and all of them reported a positive movement in CCB. The results at Time 2 are summarized below and shown in Table 66.

- No groups marked CCB as the same as baseline.
- Three groups reported a higher ranking for 1 CCB feature (participation [2] and sense of community [1]).
- Two groups report a higher ranking for 2 of the CCB features (skills and knowledge [1], links and resources [2] and leadership [1]).
- Three groups report a higher ranking for 3 of the CCB features (participation [3], asking why [2], links and resources [2] and skills and knowledge [1], leadership [1]).
- Two groups reported a lower ranking for 1 CCB feature (links and resources [1], and participation [1]).
- No groups report a lower ranking for 2 or more CCB features.

Table 66: CCB change between baseline and final

CCB Assessment final	Assessed as the same as baseline	Higher ranking for 1 feature	Higher ranking for 2 features	Higher ranking for 3 features	Lower ranking for 1 feature	Lower ranking for 2 or more features
Number of participants	0 groups	3 groups	2 groups	3 groups	2 groups	0
CCB Feature		Participation (2) Sense of community (1)	Skills and knowledge (1) Links and resources (2) Leadership (1)	Participation (3) Asking Why (2) Links and resources (2) Skills and knowledge (1) Leadership (1)	Links and resources (1) Participation (1)	

Spider diagrams of these journeys are shown below.

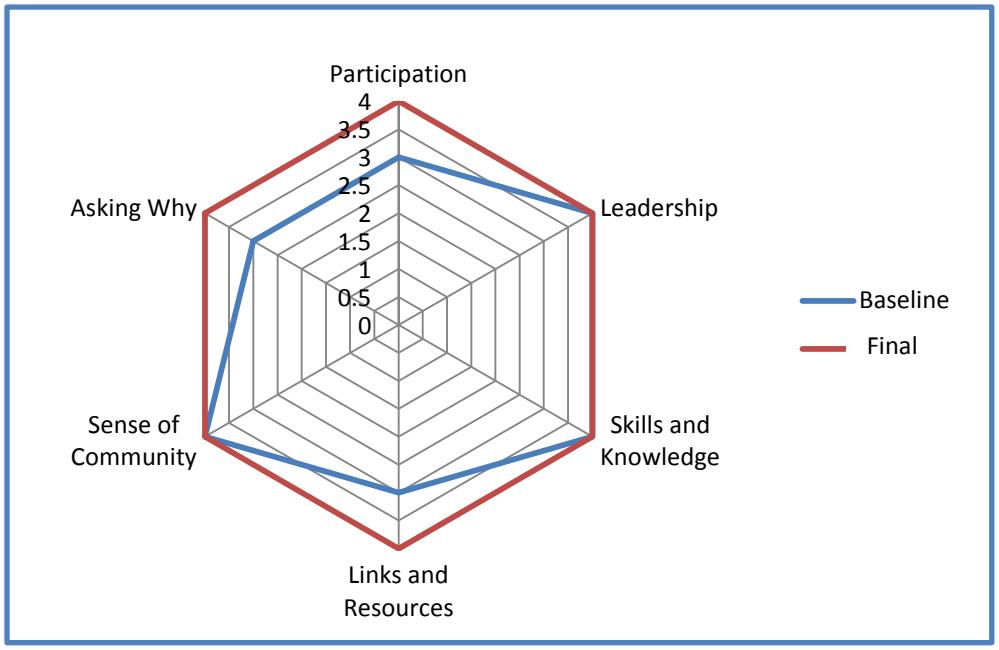


Figure 7: Youth Recreation Group-CCB at baseline and final

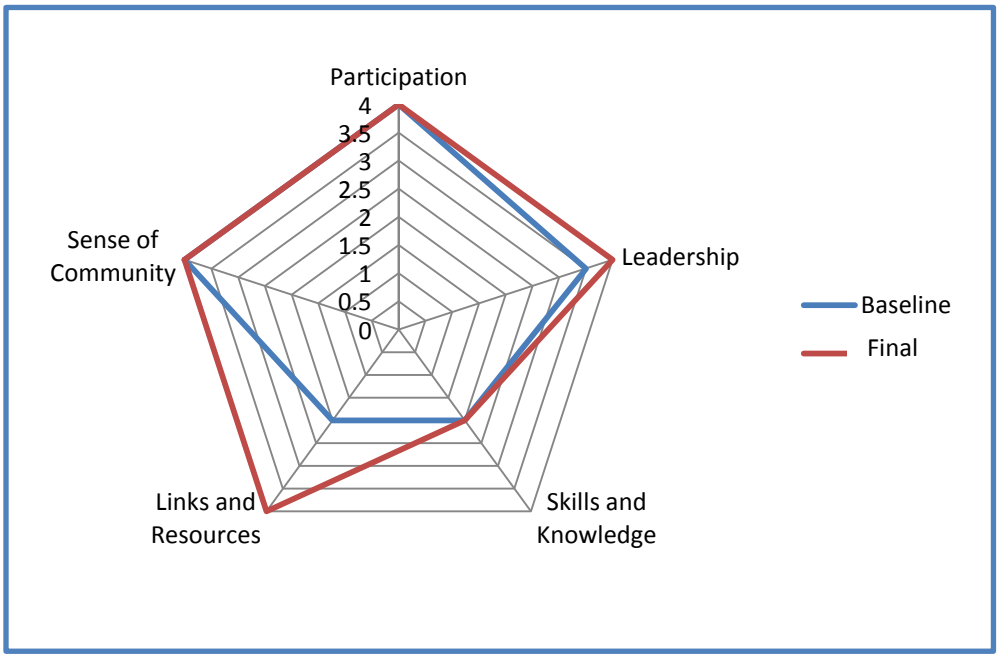


Figure 8: OPAL Advisory Committee-CCB at baseline and final

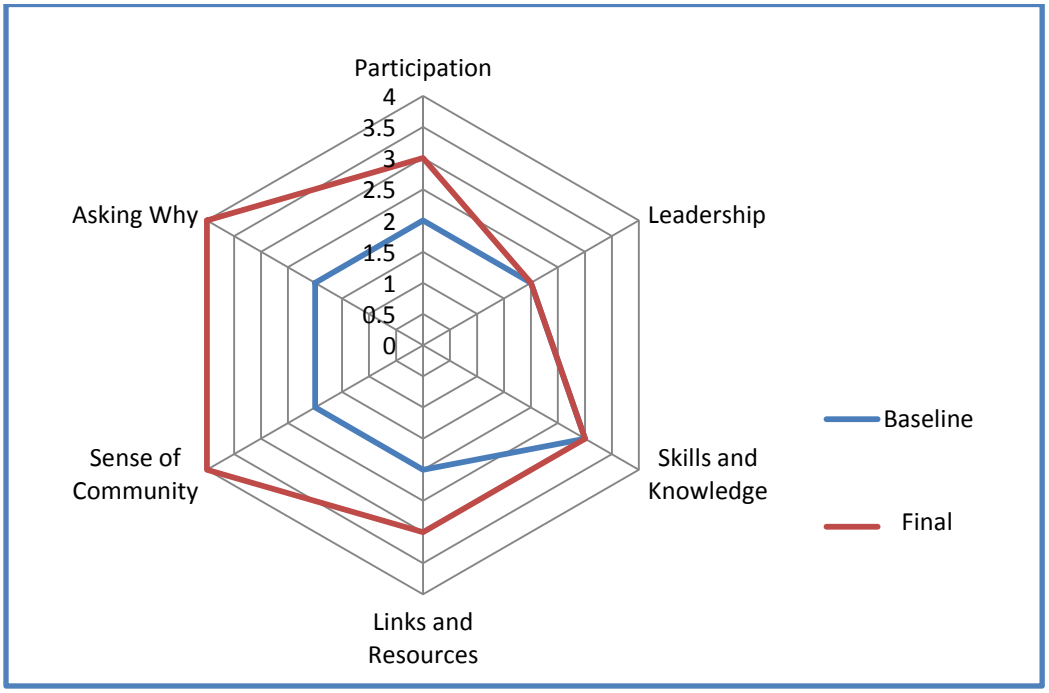


Figure 9: Food Security Group-CCB at baseline and final

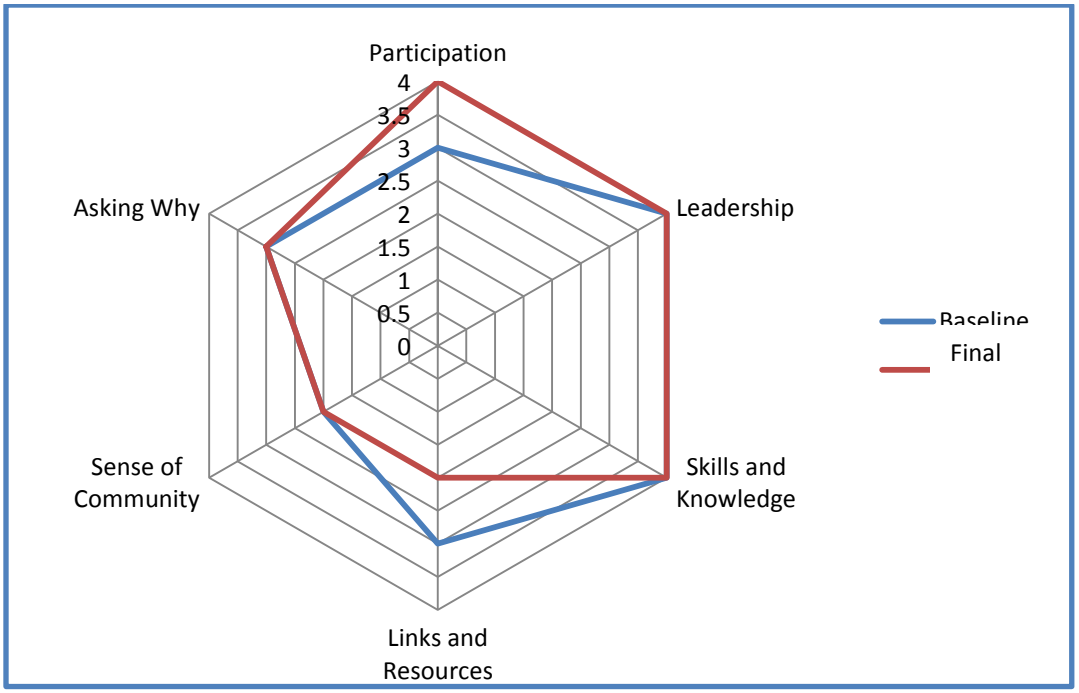


Figure 10: Community Centre-CCB at baseline and final

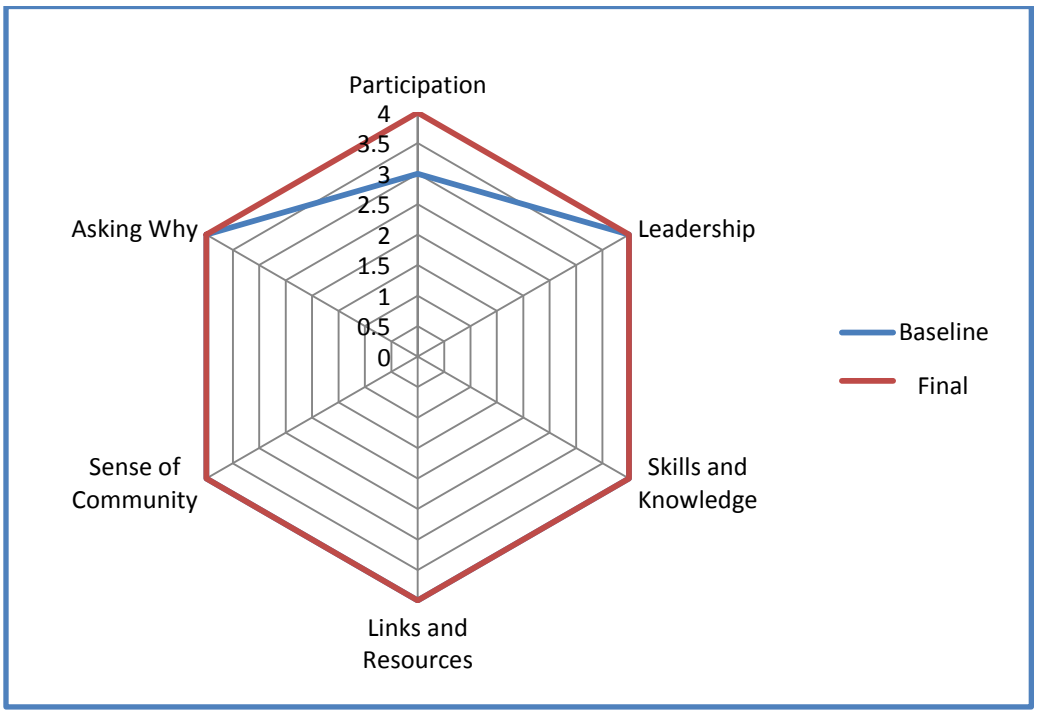
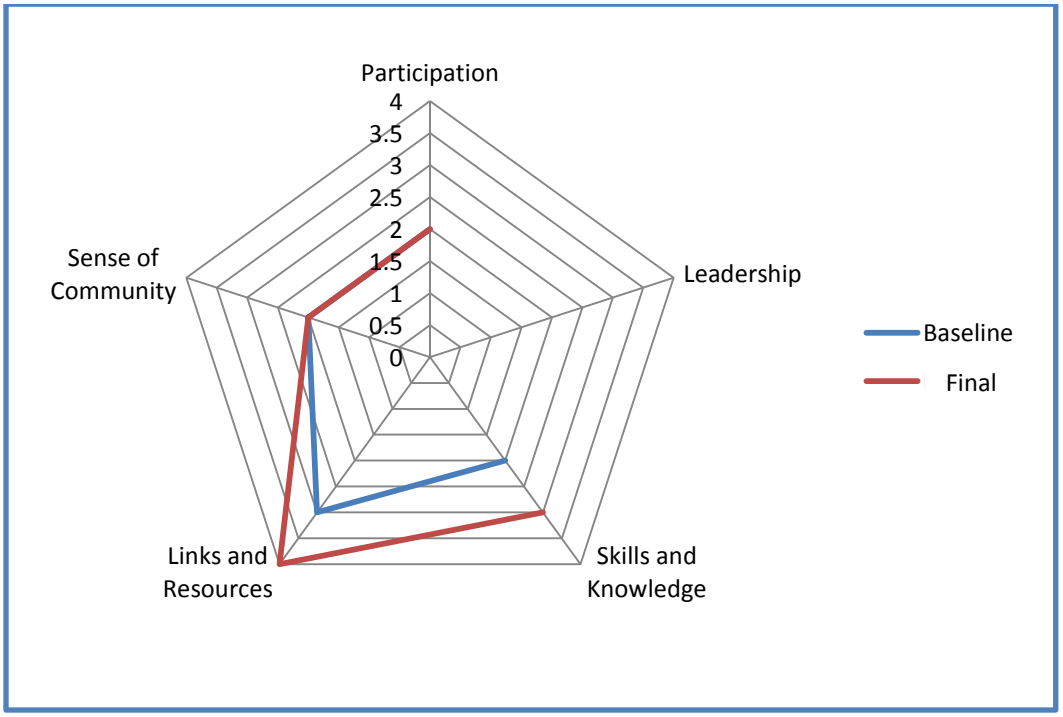


Figure 11: Early Years Group-CCB at baseline and final



(note: Leadership was not assessed at either baseline or final)

Figure 12: Community Garden and Home Harvest 1-CCB at baseline and final

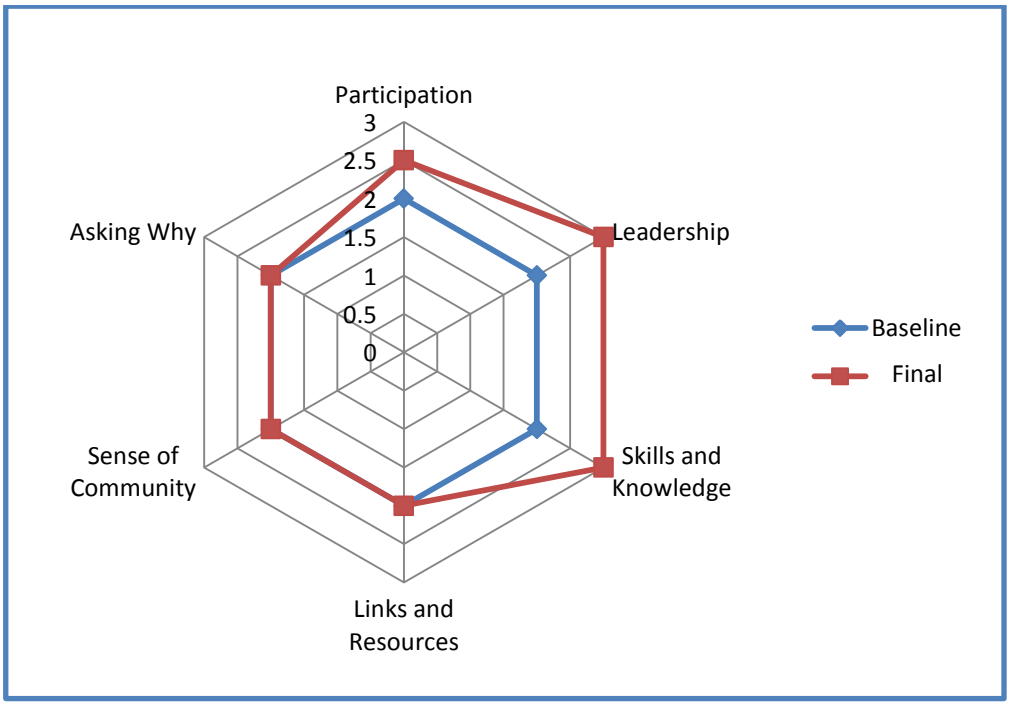


Figure 13: Community Planning Group 1-CCB at baseline and final

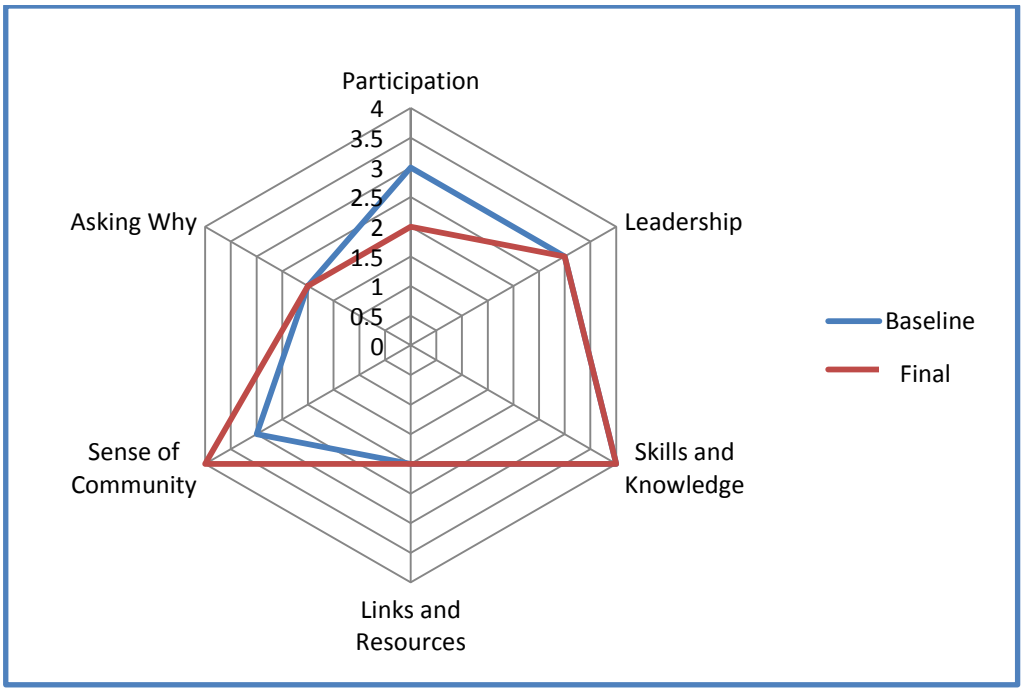


Figure 14: Community Planning Group 2-CCB at baseline and final

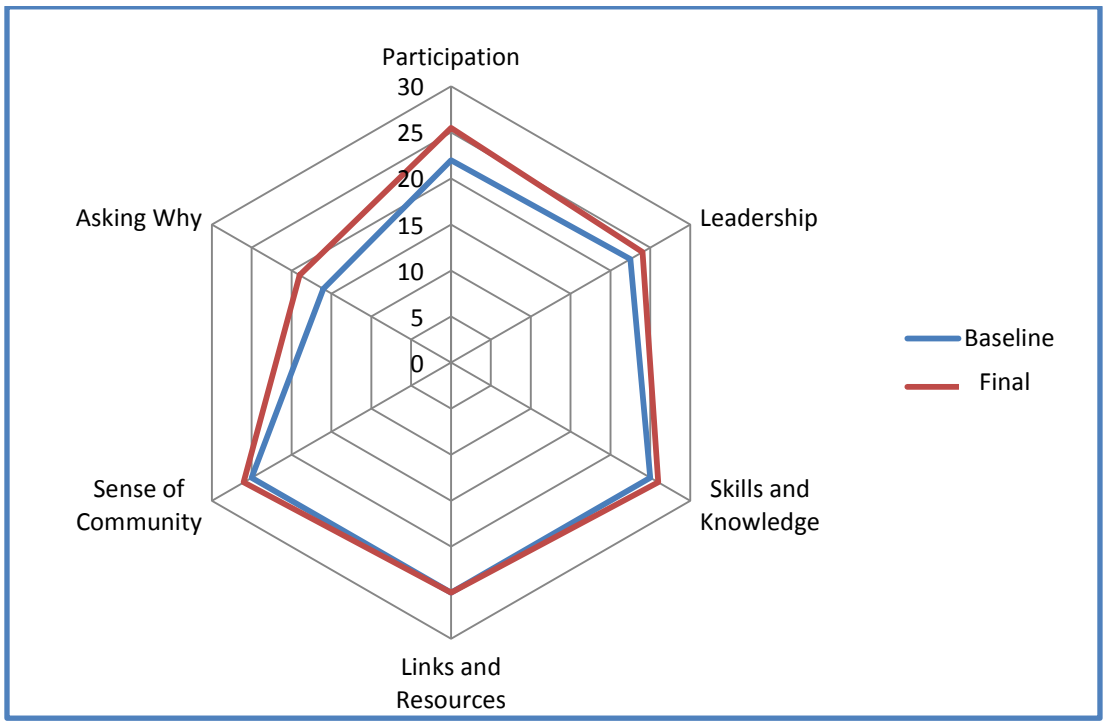


Figure 15: Aggregate CCB Assessment- baseline and final

8.2.3 CCB JOURNEY

Each group in their own unique way engaged creatively with the metaphor of CCB as a journey. Some examples are given below. A group described their collective journey of development and change as akin to travelling together in an expanding vehicle. Another spoke of the ongoing need of fuel in the form of skills and knowledge for a long journey. There was reference to uphill challenges, twists and bends in the road, and the dilemmas in entering complicated roundabouts when a group can abruptly find themselves on a road previously travelled.

One group, who agreed they had a high level of intra group trust and cohesion, noted that they are known to 'take side roads' especially when it comes to 'asking why'. Further comments about CCB as a journey include:

> *"We are packed well for the journey-we have water and all the food we need."*
>
> *"The destination is always changing, as the group changes and the needs change".*
>
> *"Progress has been made and we are in top gear".*
>
> *"Lots of lanes on the road of active participation".*
>
> *"There are swings and roundabouts in participation depending on what happens in people's lives".*
>
> *'While we are more certain about our destination it is an endless road".*

It was also noted that journey markers (such as on the road) can assess CCB as a linear journey, when it can be something altogether very different. A group expressed the view that CCB is organic and cyclical and that there are always multiple forks in the road of any CCB journey. Related was the view that in one form or another a community group is 'always on the road' in a journey of capacity building which makes it hard to state that a destination has been reached. For instance, one of the CCB features assessed was 'asking why'. One group discussed how they have developed a way of working that is purposely marked by a sense of curiosity and this is reflected in the nature of the lively discussions they have with each other. This particular group focused on planning; a sign of their esprit de corps was shared commitment to seek to understand the root causes of issues. They note:

> *"We would be reticent to say we have arrived as the group and our agenda has further still to go. Perhaps we are in the driveway and could go further?"*

All groups identified they constantly are feeling the impacts of change in the external environment. These external factors create an environment of review, stock taking, and change; in the words of one group with "*planning implications*"' and "*constraints*". Comments were made about the clash between a increasing prevalent "*business model*"' and a *"community development model"* and the pressures on community groups to balance competing agendas and values. Capacity to adapt in a changing context was identified as important to sustain community capacity building over time.

There was variation in assessment by groups that were recently formed and those that had been in existence for a longer period of time. This is evident in the baseline scores for all three of the community gardening and home harvest groups and the food security group which were between 'just started' and 'on the road'. In contrast, groups like the community centre, both community planning groups and early years group, were mature groups that assessed CCB at baseline with higher scores. This reflects how long each group had been in existence and the strength of their internal group processes.

A further theme is the observation that some community groups do run their course as they are developed for the 'here and now'. For example, groups developed for parents of children in the early years are constantly changing as the children move to other levels of schooling.

8.2.4 SENSE OF COMMUNITY

One of the dimensions of community capacity building is the collective 'sense of community'. The CCB Tool defines this as: "Community projects can strengthen a sense of community when people come together to work on shared community problems. Collaborations give community members confidence to act and courage to feel hopeful about change".

Each group defined 'sense of community' differently. For the community centre and community planning groups, each with a '*defined and diverse patch'*, interpreting sense of community was affected by group members understandings of their local demography and population mobility. For the community centre "*Community is an ongoing process of formation and growth*" and their sense of community is always on the road. For the interest based programs, such as the food security group, 'sense of community' was related to perceptions of internal group cohesion and clarity of their purpose and tasks. A group noted:

"People are here because they want to be here and want to make a difference…there is unity in our purpose".

One interest based group with a shared demographic saw themselves as a '*family*' and another linked their high sense of community with a collective support and care for one another. An internal dynamic of care for was one of the main reasons for the ongoing active participation in one group. Other groups noted that the sense of internal community and sense of external community can differ.

One group assessed their collective sense of community had increased between baseline and final. This was a community planning group in a metropolitan area. They considered they had developed a stronger sense of internal connection with each other. All other groups reported their sense of community as the same.

8.2.5 PARTICIPATION

This CCB feature refers to the active involvement of people and groups in the activity or project. This includes outward intelligence to know who should be involved, communication practices, and addressing participation barriers. Two groups reported participation to have remained the same between baseline and final. Five groups assessed that active participation had increased; the community centre, early year's group, youth recreation group, food security group and community planning group 1. Members of the early years group expressed how the level of 'trust' amongst group members, and the caliber of discussions relevant to the '*here and now*' shaped the nature of group participation and attendance. One group member made the comment that she "*would now never miss the group"* and another said "*she looks forward to coming"*.

Community planning group 2 assessed that participation had decreased from *nearly there* to *on the road.* Paradoxically this assessment was reflective of their stronger 'sense of community' and consequent questioning if the right people were sitting around the table. This assessment reflects group sophistication and insights into the unfolding CCB journey:

"A new road has been taken, as a new journey is unfolding building on the achievements of the past".

8.2.6 LINKS AND RESOURCES

Four groups assessed that links and access to resources had positively changed between baseline and final. One group assessed that links and access to resources had negatively changed and for three groups this had stayed the same. The groups that assessed CCB as the same were the early year's group and the community planning groups. The community centre assessed resources/links as lower. One group who assessed a growth in their links and resources attributed this to their collective confidence and knowledge about how to obtain resources and the increase of in-kind support from other non-government organisations.

In all the second CCB snapshots there was more discussion than the previous year about links and access to outside collaborators and resources and how these impact on the group's community capacity building. Examples of contextual factors were the major change in both Federal and State funding (e.g. Department of Social Services reduction in funding streams and defunding of the National Partnership Agreement on Improving Public Hospital Services and on Preventative Health) and implications for capacity building.

Themes in these discussions include the challenges in negotiating access to resources and external support in an increasingly competitive and constrained funding environment. A further theme was the efforts being put in place to develop internal self sustaining models for resource generation. The looming loss of OPAL was a recurring theme:

> *"It will be a noticeable absence with OPAL gone"*

> *"It's been a kaleidoscope of different programs… OPAL has been innovative"*

8.2.7 SKILLS AND KNOWLEDGE

This CCB feature related to the acquisition of skills and knowledge that were relevant to the raison d'être of the group. Two groups assessed that skills and knowledge had positively changed between baseline and final and for six groups this had stayed the same. Both groups with a positive change in skills and knowledge noted the contribution of OPAL in these processes. One was a community garden and home harvest group who had attained skills and knowledge in group processes, gardening and healthy food preparation.

Other comments were made about the quality of OPAL resources; that OPAL resources are high quality, stimulating and interactive and relevant to the age groups. In the words of one participant in the early year's group, they are "*appealing to children"*. They are "*simple, but not in the negative sense"*. Further comments about OPAL resources include:

> *"OPAL having resources has been really important to success in influencing change".*

> "*Have high functionality and are of high quality*".

8.2.8 LEADERSHIP

The CCB Tool defines leadership as 'developing and nurturing both formal and informal leaders during a project' (Public Health Agency of Canada 2005). Five groups assessed that leadership at final remained the same in the CCB journey. Two groups report that leadership had grown; the OPAL advisory committee and community planning group 1. Both groups have strong connections to their local council and both attribute an increase in leadership score to the involvement of the local council in the work of their respective groups together with purposeful development of local leadership capacity.

> *"People have taken on leadership roles and leadership capacity has been built, even though it has been a subtle process and change".*

8.2.9 ROLE OF OPAL IN SUPPORTING COMMUNITY CAPACITY BUILDING

In all CCB group discussions, there was acknowledgement of the positive contribution of OPAL to the community development work. These contributions were variously depicted reflecting that in each OPAL site the nature of community capacity varied. There was a view that OPAL had reinvigorated a focus on community development in a local government setting at a time when other agencies are retrenching community development work. This had both symbolic and practical value within the OPAL site, but also at a systems level.

Participants in a community planning group were emphatic that the OPAL program had been a practical and positive influence in their district. As one member said, OPAL had been an enabling force in the area:

> *"People around this table have come together because of OPAL, because of the role of OPAL and what they have done to support individual agencies/people"*
> "*I have worked with plenty of programs over 30 years and had seen nothing as effective as OPAL"*.

Another member of the same community planning group observed that OPAL had engaged in community development:

> *"Not to organize a bucket of money but to help others develop skills and connect to the right people… OPAL has been planting the seeds and teaching people how to fish".*

A similar theme is evident in other CCB group discussions:

> *"OPAL has been fantastic in supporting the development of skills and knowledge"*

The youth recreation group agreed that OPAL had made a positive contribution to the culture of their group and had increased knowledge and skills in healthy eating. Participants reported they now actively support healthy eating and are ambassadors of the OPAL program messages. It was noted that healthy eating had resulted in benefits to group members; eating unhealthy food had decreased and skills in preparation of healthy food increased. This is a prominent youth group that mentors other young people, and an assumption can be made that these personal changes will have multiplied impacts.

A number of the CCB evaluation participants made mention of the skills, personal qualities and accessible support from the OPAL workers. A group noted that the personal skills and enthusiasm of the OPAL Manager was seen as a key factor in generating and maintaining levels of excitement and engagement for CCB. She '*has been behind us all the way*' and facilitated the skills and knowledge needed to build community capacity. Another group comment that the OPAL Manager is *"a special person and great at driving change".* OPAL's role as an instigator, support for the development of partnerships and actual practical work in linking groups with one another were common themes raised in the CCB discussions at final.

8.2.10 CCB INTO THE FUTURE

The second time snapshot occurred close to the end of the OPAL program for the respective Phases. Not surprisingly, the impact of a withdrawal of funds for OPAL and sustainability was a topic of conversation. The cessation of Federal funding of OPAL was viewed as having an impact on community capacity building given the role of OPAL in providing resources, leadership and community development support. A member of a community centre, a partner with OPAL in supporting the development of healthy eating/physical activities, observed:

> "*Whilst we have moved further along the journey we will miss OPAL, who did a lot for us. We will still run, but not as efficiently*".
>
> *"If you pull the plug on OPAL it will deflate like a balloon'-developments do not just happen on their own. You need the right person and the resources with the drive to build. It takes at least 7 years"*

A local OPAL advisory committee reflecting on the end of five year funding of the OPAL program likened it to coming to a terminus. It was noted: "*Whilst the journey has ended other groups can take it up".* The group discussed the rippling out journeys set in motion through the work of OPAL. Another group commented that whilst transition plans are in place for life without OPAL, the *"transition will be bumpy"* and there will be "*potholes in the road".*

Leadership from the councils was seen as significant in picking up OPAL threads and supporting the ongoing momentum of the community development work. The above mentioned OPAL local advisory committee noted that their local council was active in support for OPAL's 'legacy' and thoughtful planning had gone into how to embed OPAL resources and material with local agencies and community groups. A comment was also made that a five year project was a "*fair run"*; this duration of time had allowed there to be ongoing impacts within the local geographic community and the development of local leadership and structures for capacity building.

Nonetheless, it was observed that keeping '*momentum rolling is an ongoing'* challenge, especially as there are many counter narratives and pulls away from healthy eating and physical activity. An example given by the food security group was planning approval for a fast food outlet in a major neighbourhood precinct. Sustainable change needs time and OPAL has been important to '*keep the ball rolling'*. It was further noted that the changes in the wider environments or contexts can impede community capacity, and a withdrawal of funds without effective support for ongoing developments can have unintended consequences.

8.3 CCB CONCLUSION

In conclusion, the assessments reported on in this section of the Evaluation Report tell a story of effective community capacity building in which OPAL has been a player. As one group notes: "*There is a footprint left behind that will carry on".*

9 LIMITATIONS AND GENERALISABILITY

The limitations of the analysis conducted for this Report must be considered. They are:

1. Selection bias – The Phase 1 student survey response rate at final was low (11%) in comparison communities, resulting in an overall response rate (intervention and comparison communities combined) at final of 18%. This may have biased the sample in comparison communities at final towards being healthier. When Phase 1 and 2 at final were combined, the student survey response rate was slightly higher at 21%. This was similar at baseline where the combined Phase 1 and 2 response rate was 24%. With response rates of less than 25%, the findings of the evaluation should be treated with caution as the effect on the outcomes are not known. Nonetheless, the age and sex distribution of children at baseline and final were similar and the prevalence of overweight and obesity in the whole sample (23%) was similar to national (28%) (Department of Health and Ageing 2008) and state (23%) (SA Department of Health 2008) surveys. The overall poor response rate may have been a product of selection of OPAL communities according to higher levels of disadvantage.

2. The relatively short evaluation period – All outcomes for 9-11 year olds in this Report have been measured over a relatively short (2-3 year) follow-up period. Thus, the period of evaluation may not have been long enough to have seen significant changes in the outcomes measured, in particular in weight status. Importantly, baseline data for the Flinders OPAL Evaluation was not collected at baseline (year 0) of the OPAL program, but at year 3, with final data collection occurring 2-3 years later at approximately year 5 of the OPAL program. Thus, the term 'baseline' throughout this Report should be treated with caution.

3. Anthropometric findings – It must be noted that when assessing the effect of the intervention in terms of BMI z-score, a decrease in BMI z-score may result from several possible causes , including but not limited to:
    a. An increase in the proportion of underweight children;
    b. No change in the proportion of overweight or obese children, but those within the healthy weight range experiencing a decrease in BMI z-score;
    c. No change in the proportion of overweight or obese children but overall those children who were overweight experiencing a decrease in BMI z-score.

4. Sub-group analyses – This Report has analysed many outcomes and often sub-group analyses have been conducted. Thus, a very large number of statistical tests have been performed and as each test involves a small (5%) risk of finding a false positive, it is likely with so many tests that there are several false positive results. For this reason, the sub-group analyses should be treated with caution and attention should be paid to patterns of change rather than on the result of any individual test.

5. Use of ICSEA as a measure of SES - As ICSEA score is not an individual-level SES measure but a school-level measure developed to enable comparisons between similar schools, based on the level of educational advantage or disadvantage that students bring to their studies (Australian Curriculum Assessment and Reporting Authority (ACARA) 2013), caution should be taken when interpreting the effects of the intervention across ICSEA quintiles. Importantly, ICSEA does not use individual information concerning the wealth of the parents or students.

6. Differences in baseline characteristics – There were statistically significant differences in SES and locality between intervention and comparison communities at baseline and final, with more children at greatest disadvantage, and more children from urban communities, in intervention communities than comparison communities. Subsequently, the analysis models were adjusted by ICSEA score (in addition to child age).

7. Questionnaire data – Although some questionnaire items that assessed diet, physical activity and sedentary behaviours were adapted from previously validated questionnaires, the psychometric properties of the OPAL surveys have not been tested. Additionally, dietary data were based on one day of intake and therefore do not reflect 'usual' eating patterns.

8. Time-related selective sampling – As data were collected only during the school term, not across holiday periods, and more heavily across summer than other seasons, the data may be biased as diet and activity behaviours change seasonally.

9. The evaluation scope – The Flinders OPAL Evaluation did not measure the dose of the OPAL intervention received by children and parents in intervention communities, nor how well it was adopted.

The generalisability of the findings presented in this Report must also be acknowledged. That is, OPAL ran in discrete localities across South Australia and thus the effects or outcomes may or may not be generalisable to other communities or populations.

Despite the limitations mentioned above, OPAL was a large, community based program, undertaken in areas of need and modelled on the successful French program EPODE (Ensemble, Prévenons l'Obésité des Enfants) (Romo M et al. 2009, Borys JM et al. 2012). The OPAL Evaluation involved comprehensive assessment of change in children's weight status, health-related quality of life, and diet, activity and sedentary behaviours and environments in a relatively large sample size.

10 CONCLUSION

Aim of the OPAL Evaluation:

To determine the effectiveness of the five-year OPAL program to increase healthy weight and health-relative quality of life among children; and to improve behaviours, attitudes, and environments associated with healthy eating and physical activity

In summary, there were no statistically significant changes over time in preschool children's BMI z-score or weight status. There were, however, small non-significant decreases and small non-significant increases, in BMI and BMI z-score of children in Phase 1 intervention and comparison communities, respectively. Similarly, among primary school children, larger increases in average BMI z-score (0.14, p=NS) were observed in comparison communities compared to intervention communities (0.07 points, p=NS), although these changes were not statistically significant. Additionally, although the probability of children being classified as healthy weight did not significantly change over the 2-3 year evaluation period, the probability of obesity decreased (by 20%, p=NS) for children in intervention communities across the duration of the OPAL program, yet increased significantly (by 71%) in comparison communities. This resulted in a 53% lower probability of obesity in intervention communities than comparison communities at the end of the intervention period. Further, the maintenance of combined overweight and obesity prevalence among children in intervention communities compared to an increase in comparison communities by nearly 5% (although findings were not statistically significant) is encouraging.

Adding to these findings are those from the economic evaluation which showed that the average total cost of OPAL program activities per person was $77.68. Given the limitations of the economic evaluation (cross-sectional nature of the data and short time frame of evaluation), definitive conclusions about the relative cost effectiveness of the OPAL program cannot be drawn from the information presented in this report. Future economic evaluation of the OPAL program or any similar public health intervention should incorporate health economics expertise from the outset.

Investigations into the impact of OPAL on children's weight status according to selected sociodemographic factors highlighted positive findings for those attending schools identified at moderate-high socio-economic disadvantage. That is, primary school children attending schools in ICSEA quintile 2 were 65% less likely to be overweight or obese at final assessment if in intervention communities compared to comparison communities. However, findings were not significant for any other ICSEA quintiles (for which all represent disadvantage) and given that the ICSEA score is not an individual-level SES measure this finding should be treated with caution.

Quality of life also improved significantly in primary school children from intervention communities. That is, at the end of the five year OPAL program, children from intervention communities had gained a mean utility of 0.034 ($p<0.05$) when compared to students from comparison communities. Importantly, statistically significant differences were found for the tired dimension with students from the intervention communities reporting fewer problems for this dimension at final assessment.

Several positive changes were observed in the behaviours of 9-11 year olds in intervention communities. There was a significant impact (above those on comparison communities) on probability of children meeting the discretionary food guideline (both with and without the inclusion of sweetened beverages) by 40-50%. Although the probability of children meeting the fruit guideline significantly increased in intervention communities but not in comparison communities, the difference at final assessment was not statistically significant. In contrast, positive findings for vegetable intake were observed for children in comparison communities, although compared to intervention communities at final assessment, these findings were not statistically significant. Improvements in physical activity behaviours were observed for children in both intervention and comparison communities. Although improvements in the number of days children in both intervention and comparison communities met the screen time guidelines, the probability of children in both groups meeting the screen time guidelines decreased over time (worse decline in comparison communities than intervention communities). Similarly, parent report of children's fruit and vegetable intake increased by 0.2 and 0.3 serves, respectively, whilst increases were seen for the proportion of children consuming at least two serves of fruit each day according to parent report.

Significant positive changes were observed in the environments in which children spend most of their time (home and school) and which are known to influence behaviours. The changes were observed in OPAL communities, above those of comparison communities, and include:

- More parents receiving nutrition and/or physical activity information from schools;
- More parents reporting a farmers or produce market in the local area;
- Children spending less time on TV, according to parent report;
- Primary caregivers being more active;
- More children rating their teachers as good role models for being physically active;
- Greater use of physical activity items in the home;
- Greater use of community gardens;
- Less children being bothered by other people;
- More rules at home around children's TV viewing;
- Less children with a TV in their bedroom; and
- Less TV's and computers in the home.

Further, findings of the Community Capacity Building evaluation indicated that community capacity building positively changed over time, for which OPAL workers played a key role.

Overall, evaluation of the multi-setting, multi-sectoral community-based systems-wide OPAL program has shown positive impacts on primary school children aged 9-11 years in terms of behaviours and environments. This evaluation adds to the evidence base of community based obesity prevention initiatives both in SA, nationally and internationally.

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12 APPENDICES

APPENDIX 1: STUDENT SURVEY

Please read each question carefully and try to answer every question as honestly as you can.

- This is not a test and there are no right or wrong answers.
- If you are unsure of what a question is asking you, please raise your hand and someone will come and help you.
- You do not have to show your answers to anybody.
- It is important that you try and answer all of the questions.
- All your answers to the questions in this survey are completely confidential.
- We have included pictures to help you answer some of the questions about what you eat and drink. Please read the information under the pictures before you answer the question.

Hard copy survey: 'Please note the time you started the survey HH:MM …… : ……'

The following questions are about you and your family.

Q1a. Could you please enter your first name below:

Q1b. Could you please enter your last name below:

Q2. Could you please enter the postcode of your address below:

Q3. Could you please enter the suburb or town you live in below:

Q3a. Could you please enter the name of your street you live on below:

Q3b. Could you please enter the name of the street at the corner nearest to your home below? (9-11 year olds) If you are unsure please enter 'DK' in the field below.

Q4. What year level are you in? (Code 1-5 for 9-11, code 6-9 for 14-16)

1. Year 3
2. Year 4
3. Year 5
4. Year 6
5. Year 7

1. Year 8
2. Year 9
3. Year 10
4. Year 11

Q5. Are you?

1. Male
2. Female

Q6. What is your date of birth? (DD/MM/YYYY)

DD	MM	YYYY

Q7. Are you of Aboriginal or Torres Strait Islander descent (descent means your ancestry or cultural heritage)?

1. No
2. Yes – Aboriginal descent
3. Yes – Torres Strait Islander descent
4. Yes – both Aboriginal and Torres Strait Islander descent

Q8. What is the **main** language spoken at home? Select only **one** language.

1. English
2. Italian
3. Greek
4. Cantonese
5. Arabic
6. Mandarin
7. Vietnamese
8. Another language (specify which language)

Q9. How many people usually live in your household (NOT including yourself)?

Enter the number of adults (18 years of age or over)

Q9a. How many people usually live in your household (NOT including yourself)?

Enter the number of children (under 18 years of age)

Q9b. Please add up the number of people in Q9 and Q9a and check that this matches the total number of people who **usually live in your household not including yourself**. If not, please go back and correct your responses.

The next questions are about your food and eating habits.

Q10. Do you eat fruit (do not include fruit juice)?

1. Yes Go to Q10a
2. No Go to Q11

Q10a. How many serves of fruit did you eat **YESTERDAY** (do not include fruit juice)? *You will need to add all the fruit you had over the day. Look at the pictures provided to see what a serve is.*

1. Enter the total number of serves of fruit you ate yesterday…….
2. Didn't eat fruit yesterday.

Q11. Do you eat vegetables (do not include vegetable juice)?

1. Yes Go to Q11a
2. No Go to Q12

Q11a. How many serves of potatoes did you eat **YESTERDAY**? *You will need to add all the potatoes you had over the day. Look at the pictures provided to see what a serve is.*

1. Enter the total number of serves of potatoes you ate yesterday… Go to Q11b
2. Didn't eat potatoes yesterday. Go to Q11c

Q11b. How many serves of the potatoes you ate **YESTERDAY** were fried (eg. hot chips, French fries, wedges, hash browns)? *You will need to add all the fried potatoes you had over the day.*

1. Enter the total number of serves of fried potatoes you ate yesterday…….
2. Didn't eat fried potatoes yesterday.

Q11c. How many serves of other vegetables or legumes (e.g. baked beans, kidney beans) did you eat **YESTERDAY** (do not include potato)? *You will need to add all the vegetables or legumes you had over the day. Look at the pictures provided to see what a serve is.*

1. Enter the total number of serves of vegetables you ate (do not include potatoes) yesterday…….
2. Didn't eat other vegetables yesterday.

Q12. Do you eat savoury and/or salty snacks (this includes potato crisps or other snacks such as corn chips, cheese or BBQ flavoured twists and rings)?

1. Yes Go to Q12a
2. No Go to Q13

Q12a. How many serves of savoury and/or salty snacks did you eat **YESTERDAY**? *You will need to add all the savoury/salty snacks you had over the day. Look at the pictures provided to see what a serve is*.

1. Enter the total number of serves of savoury/salty snacks you ate yesterday …….
2. Didn't eat savoury and/or salty snacks yesterday.

Q13. Do you eat fast food or takeaway (this includes burgers, pizza, fried chicken, fish and chips, pies/pasties)?

1. Never Go to Q14
2. Sometimes Go to Q13a

3. Often Go to Q13a
4. A lot Go to Q13a

Q13a. How many days a week would you **USUALLY** eat fast food or takeaway (this includes burgers, pizza, fried chicken, fish and chips, pies/pasties)?

Enter number of days <0-7>

Q14. Do you drink sugar sweetened soft drinks and cordials (do not include diet drinks)?

1. Yes Go to Q14a
2. No Go to Q15

Q14a. How many serves of sugar sweetened soft drinks and cordials did you drink **YESTERDAY**? *You will need to add all the soft drinks/cordial you had over the day. Look at the pictures provided to see what a serve is.*

1. Enter the total number of serves you drank yesterday…….
2. Didn't drink sugar sweetened soft drinks yesterday.

Q15. Do you drink fruit juice and fruit drinks?

1. Yes Go to Q15a
2. No Go to Q16

Q15a. How many serves of fruit juice and fruit drinks did you drink **YESTERDAY**? *You will need to add all the fruit juice/fruit drinks you had over the day*. *Look at the pictures provided to see what a serve is.*

1. Enter the total number of serves you drank yesterday…….
2. Didn't drink fruit juices and/or fruit drinks yesterday.

Q16. Do you eat sweets, lollies (confectionery), chocolates or fruit bars/straps?

1. Yes Go to Q16a
2. No Go to Q17

Q16a. How many serves of sweets/lollies (confectionery), chocolate, fruit bars or fruit straps/leathers did you eat **YESTERDAY**? *You will need to add all the sweets/lollies you had over the day*. *Look at the pictures provided to see what a serve is.*

1. Enter the total number of serves you ate yesterday…….
2. Didn't eat sweets etc. yesterday.

Q17. Do you eat cakes, doughnuts, sweet biscuits, muffins or muesli bars?

1. Yes Go to Q17a
2. No Go to Q18

Q17a. How many serves of cakes, doughnuts, sweet biscuits, muffins or muesli bars did you eat **YESTERDAY**? *You will need to add all the cakes/biscuits/muffins/muesli bars you had over the day*. *Look at the pictures provided to see what a serve is.*

1. Enter the total number of serves you ate yesterday…….

2. Didn't eat cakes etc. yesterday.

Q18. Do you eat ice cream, icy poles or ice blocks?

1. Yes Go to Q18a
2. No Go to Q19

Q18a. How many serves of ice cream, icy poles or ice blocks did you eat **YESTERDAY**? A serve is one ice cream or icy pole on a stick or one scoop of ice cream in a cone or a bowl. You need to add all the ice creams, icy poles or ice blocks you had in the day.

1. Enter the total number of serves you ate yesterday…….
2. Didn't have ice cream, icy poles or ice blocks yesterday.

Q19. How many times in **an average day** would you usually drink plain water (include non-flavoured water from the tap or bottles)?

1. Enter the total number of times a day…….
2. Don't drink plain water.

Q20. Do you drink milk (this includes alternatives like soya, goat, rice milk)?

1. Yes Go to Q20a
2. No Go to Q21

Q20a. How many serves of milk (or alternatives) did you drink **YESTERDAY** (this includes plain, flavoured and milk on cereal)? *You will need to add all the number of times you had milk (or alternatives) over the day*. *Look at the pictures provided to see what a serve is.*

1. Enter the total number of serves you drank yesterday…….
2. Didn't have milk yesterday.

Q21. Did you eat or drink something for breakfast **YESTERDAY** (do not include water)?

1. Yes
2. No

Q21a. Do you **USUALLY** eat or drink something for breakfast (do not include water)?

1. Yes Go to Q21b
2. Very rarely Go to Q21b
3. No Go to Q22

Q21b. How many days a week would you **USUALLY** eat or drink something for breakfast (do not include water)?

1. Enter number of days per week <0-7>

Q22. Did you eat or drink something between breakfast and lunch **YESTERDAY** (do not include water)?

1. Yes
2. No

Q22a. Did you have something to eat or drink between lunch and dinner **YESTERDAY** (do not include water)?

1. Yes
2. No

Q22b. Thinking about **YESTERDAY** overall, how many times did you eat or drink something between and after your main meals (do not include water)?

1. Enter the number of times…….
2. Didn't have anything to eat or drink between main meals yesterday.

Q23. For good health how many serves of fruit should a child your age eat **EACH DAY**? A serve is 1 medium-sized piece (e.g. apple), 2 smaller pieces of fruit (e.g. kiwi fruit), 1½ tablespoons dried fruit (e.g. sultanas or 4 dried apricot halves) or 1 cup canned or chopped fruit.

1. Enter the number of serves of fruit a day…….

Q24. For good health how many serves of vegetables should a child your age eat **EACH DAY**? A serve is ½ cup of cooked vegetables or legumes, 1 medium potato or 1 cup of salad vegetables.

1. Enter the number of serves of vegetables a day…….

Q25. Do you agree with the following statement? In my home fruit is available to eat at any time.

9-11 year old codeframe

1. Yes
2. No

14-16 year old codeframe

1. Strongly disagree
2. Disagree
3. Neither agree or disagree
4. Agree
5. Strongly agree

9-11 year old questions (Q26a – Q26c)

Q26a. Does your mother (or female caregiver) encourage you to eat healthy foods?

1. Yes
2. No
3. Not applicable

Q26b. Does your father (or male caregiver) encourage you to eat healthy foods?

1. Yes
2. No
3. Not applicable

Q26c. Do your friends encourage you to eat healthy foods?

1. Yes
2. No

14-16 year old questions (Q26)

Q26. How much do the following people encourage you to eat healthy food? Please select one answer in each row.

	Not at all	A little	Somewhat	A lot	Not applicable
1. Mother (or female caregiver)	1	2	3	4	5
2. Father (or male caregiver)	1	2	3	4	5
3. Older brothers and sisters	1	2	3	4	5
4. Friends	1	2	3	4	5

9-11 year old questions (Q27a)

Q27a. Thinking about the meals you have at home: Please select one answer in each row.

	Yes	No
1. Do you have a say in what foods are bought at home?	1	2
2. Do you choose what goes on your plate?	1	2
3. Do you decide how much to eat?	1	2

14-16 year old questions (Q27b)

Q27b. Thinking about the meals you have at home: Please select one answer in each row.

	Never	Sometimes	Often	Usually	Always
1. Do you have a say in what foods are bought at home?	1	2	3	4	5
2. Do you choose what goes on your plate?	1	2	3	4	5
3. Do you decide how much to eat?	1	2	3	4	5

9-11 year old questions (Q28a)

Q28a. Do you buy something to eat or drink on the way to or home from school? Please select one answer in each row.

	Never	Sometimes	Often	Usually	Always
1. On the way to school?	1	2	3	4	5
2. On the way home from school?	1	2	3	4	5

14-16 year old questions (Q28b)

Q28b. On how many days each week do you **USUALLY** buy something to eat or drink on the way to or home from school? Please select one answer in each row.

	Never or not allowed	Less than once a week	1-2 times a week	3-4 times a week	Every school day
1. On the way to school?	1	2	3	4	5
2. On the way home from school?	1	2	3	4	5

The next questions are about you.

9-11 year old question

Q29a. How happy are you with the way you look?

1. Not at all happy
2. Moderately happy
3. Very happy

14-16 year old question

Q29b. How satisfied are you with the way your body looks?

1. Very dissatisfied
2. A little dissatisfied
3. Neither satisfied or dissatisfied
4. A little satisfied
5. Very satisfied

9-11 year old question

Q30a. How often do you wish you looked like the models in magazines and on TV?

1. Never
2. Sometimes
3. All the time

14-16 year old question

Q30b. How important a goal is it for you to look like the models in magazines and on TV?

1. Not at all important
2. A little important
3. Moderately important
4. Very important

9-11 year old question

Q31a. Have you ever been on a diet to lose weight?

1. No
2. Yes, but not now
3. Yes, right now
4. I don't know

14-16 year old question

Q31b. How often have you gone on a diet to lose weight in the last year?

1. Never
2. 1-4 times
3. 5-10 times
4. More than 10 times
5. I am always on a diet to lose weight

Q32. In the past month, has anyone teased you about the size and shape of your body?

1. No
2. Sometimes
3. Yes

Q33. In the past year, have people teased you about the size and shape of your body?

1. Never
2. 1-4 times
3. 5-10 times
4. More than 10 times

9-11 and 14-16 year old questions

Q34. Thinking about today: Do you feel worried?

1. I don't feel worried today
2. I feel a little bit worried today
3. I feel a bit worried today
4. I feel quite worried today
5. I feel very worried today

Q35. Thinking about today: Do you feel sad?

1. I don't feel sad today
2. I feel a little bit sad today
3. I feel a bit sad today
4. I feel quite sad today
5. I feel very sad today

Q36. Thinking about today: Do you feel pain?

1. I don't have any pain today
2. I have a little bit of pain today
3. I have a bit of pain today
4. I have quite a lot of pain today
5. I have a lot of pain today

Q37. Thinking about today: Do you feel tired?

1. I don't feel tired today
2. I feel a little bit tired today
3. I feel a bit tired today
4. I feel quite tired today
5. I feel very tired today

Q38. Thinking about today: Do you feel annoyed?

1. I don't feel annoyed today
2. I feel a little bit annoyed today
3. I feel a bit annoyed today
4. I feel quite annoyed today
5. I feel very annoyed today

Q39. Thinking about today: Do you feel that you have problems with your schoolwork/homework (such as reading, writing, doing lessons)?

1. I have no problems with my schoolwork/homework today
2. I have a few problems with my schoolwork/homework today
3. I have some problems with my schoolwork/homework today
4. I have many problems with my schoolwork/homework today
5. I can't do my schoolwork/homework today

Q40. Thinking about today: Did you have any problems with sleeping last night?

1. Last night I had no problems sleeping
2. Last night I had a few problems sleeping
3. Last night I had some problems sleeping
4. Last night I had many problems sleeping
5. Last night I couldn't sleep at all

Q41. Thinking about today: Do you have any problems with your daily routine (things like eating, having a bath/shower, getting dressed)?

1. I have no problems with my daily routine today
2. I have a few problems with my daily routine today
3. I have some problems with my daily routine today
4. I have many problems with my daily routine today
5. I can't do my daily routine today

Q42. Thinking about today: Are you able to join in activities? (things like playing out with your friends, doing sports, joining in things)

1. I can join in with any activities today
2. I can join in with most activities today
3. I can join in with some activities today
4. I can join in with a few activities today
5. I can join in with no activities today

Q43. Thinking about today: In general would you say your health is?

1. Excellent
2. Very good
3. Good
4. Fair
5. Poor

The next few questions are about the activities you may do.

Q44. Over the **last 7 days**, on how many days were you physically active for a total of 60 min per day?

1. Enter number of days in the last 7 days…….

Q45. How much time did you spend doing the following activities at these times on the **last full day you**

spent at school (for example, if today is Wednesday, and Tuesday was a full day at school, then tell us what you did on Tuesday)?

Please enter the number of hours and circle the number of minutes in 15 minute blocks. If you are not sure what to include or where to put it, raise your hand and a survey assistant will help you.

Split in four to allow for better display online.

	Before school	At recess	At lunch time	During school	After school
1. SPORT: Like football, netball, cricket, dancing, jogging	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>
2. ACTIVE PLAY: Like playground games and mucking around	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>
3. GETTING AROUND: Like walking, cycling and skating	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>
4. ACTIVE CHORES: Like tidying your room or gardening	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>

Q46. How much time did you spend doing the following activities at these times on the **last weekend day** (for example, Sunday or Public Holiday Monday)?

Please enter the number of hours and circle the number of minutes in 15 minute blocks. If you are not sure what to include or where to put it, raise your hand and a survey assistant will help you.

Split in four to allow for better display online.

	Before breakfast	Between breakfast and lunch	Between lunch and dinner	After dinner
1. SPORT: Like football, netball, cricket, dancing, jogging	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>
2. ACTIVE PLAY: Like playground games and mucking around	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>
3. GETTING AROUND: Like walking, cycling and skating	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>
4. ACTIVE CHORES: Like tidying your room or gardening	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>

Q47. How much time did you spend doing the following activities at these times on the **last full day you spent at school** (for example, if today is Wednesday, and Tuesday was a full day at school, then tell us what

you did on Tuesday)?

Please enter the number of hours and circle the number of minutes in 15 minute blocks. If you are not sure what to include or where to put it, raise your hand and a survey assistant will help you.

Split in four to allow for better display online.

	Before school	During school	After school
1. TELEVISION: Watching TV, videos or DVD's	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>
2. COMPUTER: Using the computer for email, chat, internet etc. **not counting** school work or homework	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>
3. SITTING VIDEOGAMES: Played on consoles like Xbox, or things like iPads, iPhones or on computers	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>
4. ACTIVE VIDEOGAMES: When you move while playing, like Wii or video arcade games	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>

Q48. How much time did you spend doing these activities at these times on the **last weekend day** (for example, Sunday or Public Holiday Monday)?

Please enter the number of hours and circle the number of minutes in 15 minute blocks. If you are not sure what to include or where to put it, raise your hand and a survey assistant will help you.

Split in four to allow for better display online.

	Before breakfast	Between breakfast and lunch	Between lunch and dinner	After dinner
1. TELEVISION: Watching TV, videos or DVD's	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>
2. COMPUTER: Using the computer for email, chat, internet etc. **not counting** school work or homework	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>
3. SITTING VIDEOGAMES: Played on consoles like Xbox, or things like iPads, iPhones or on computers	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>
4. ACTIVE VIDEOGAMES: When you move while playing, like Wii or video arcade games	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>	Hrs: <1-6> Minutes: <15, 30, 45>

Q49. How much do the following things bother you when you are walking or playing in your neighbourhood? Please select one answer in each row.

	A lot	Somewhat	A little	Not at all
1. How much does traffic bother you?	1	2	3	4
2. How much do dogs bother you?	1	2	3	4
3. How much do other people bother you?	1	2	3	4

Q50. How much do the following members of your family or your friends encourage you to be physically active or play sports? Please select one answer in each row.

	A lot	Somewhat	A little	Not at all	Not applicable
1. Mother (or female caregiver)	1	2	3	4	5
2. Father (or male caregiver)	1	2	3	4	5
3. Older brothers or male cousins	1	2	3	4	5
4. Older sisters or female cousins	1	2	3	4	5
5. Best friends	1	2	3	4	5

Q51. How much does your school encourage ALL students to be physically active at lunch time and recess?

1. A lot
2. Somewhat
3. A little
4. Not at all
5. Not applicable

Q52. How do you rate the teachers at your school as role models for being physically active?

1. Excellent
2. Good
3. OK
4. Not very good
5. Poor

Q53. Over the **last 7 days**, on how many days did you get at least 120 minutes (or 2 hours) of screen time (TV, videogames or computer use) per day outside of school hours?

1. Enter number of days <0-7>

Q54. On the **last day** you went to school (Monday to Friday), at what time did you wake up in the morning (for example, enter 7:15 if you woke up at 7:15am)?

1. Enter time……

Q55. On the **last day** you went to school (Monday to Thursday), at what time did you turn off the lights and go to sleep (for example, enter 8:30 if you went to sleep at 8:30pm)?

1. Enter time……

Q56. **Last Saturday**, at what time did you wake up (for example, enter 9:30 if you woke up at 9:30am)?

1. Enter time……

Q57. **Last Saturday**, at what time did you turn off the lights and go to sleep (for example, enter 11:00 if you went to sleep at 11:00pm)?

1. Enter time……

Q58. Thank you for your help with this survey, if there is anything else you would like to write please do so in the box below.

Hard copy survey: 'Please note the time you finished the survey HH:MM …… : ……'

Survey Change Log

Section/question	Details of change(s)	Date	Version #	Made by
Q46 – Q48	Online survey - split these questions so we only have one row on each page, this will mean each respondent will have to select at least one field in each row to move forward.	9/11/11		ND
Allow half serves	Online survey - changed serving size questions to allow decimal points.	9/11/11		ND
Q54 – Q57	Online survey - added an AM/PM flag	15/11/11		ND
Survey start/end time	Hard copy surveys - added start and end time to the student survey	15/11/11		ND
Heading	Hard copy surveys - added headings	17/11/11		ND
Q2 & Q3	Changed postcode to Q2 and suburb to Q3 in order to match the order in the online survey where the suburb feeds off the postcode	27/03/12	2	ND

APPENDIX 2: PARENT SURVEY

Thanks for agreeing to take part in the OPAL evaluation. We would like to ask you some questions about your <4 or 5 year old child's(ren's) /9, 10 or 11 year old child's(ren's)> food, physical activity and neighbourhood environments.

There are no right or wrong answers. Please answer the questions as honestly as possible.

Please read every question carefully and answer the best you can. All information that you provide will be kept confidential and we have strict processes to ensure the security of your information. No individual responses will be reported. Information will be aggregated and a summary of the final report for each Phase will be made available on the OPAL website www.opal.sa.gov.au

The questions and processes for this study have been approved by the SA Department of Health Human Research Ethics Committee, the Flinders University Social and Behavioural Research Ethics Committee, the Aboriginal Health Research Ethics Committee, the Department of Education and Children's Services Research Unit, and the Catholic Schools Research Ethics Committee.

If you consent to participate in this survey, please complete this survey within two weeks. Please return the survey in the supplied return envelope to your child's(ren's) <centre/school>. Alternatively, you can complete the survey online by going to the following website www.flinders.edu.au/opal. Simply select <'4-5 year old Parent/Guardian'/9-11 year old Parent/Guardian'> from the first list and then select the <preschool/childcare centre/school> your <4-5/9-11> year old child(ren) attend(s) from the second list.

Participation is voluntary and you are free to withdraw from the survey at any time.

We will start by asking a few questions about the household, how many people live there and a little bit about each person. We will also ask about the general family background such as your (and your partner's) work and educational background and some general questions about the home environment that are relevant to your child(ren's) activity, and food behaviours.

Hard copy survey: 'Please note the date DD/MM/YY .... / .... / .... and time HH:MM ..... : ..... you started the survey'

The following questions are about you and your family.

D1. Could you please enter the postcode of your address below:

D2. Could you please enter the suburb or town you live in below:

D3. Could you please enter the name of your street below:

D4. Could you please enter below the name of the nearest street which crosses or intersects the street you live on:

4-5 year old question

D5a. How many children do you have aged 4-5 years?

1. Please specify ……

9-11 year old question

D5b. How many children do you have aged 9-11 years?

1. Please specify ……

We would now like to ask you some questions about the child(ren) in your household. If you have more than one child in the household aged <4-5 years/9-11 years> please fill out the following questions for the eldest child within this age range. We would then ask that you complete the same questions in the attachment for any other child(ren) there may be within this age range.

D6. Could you please enter the first name of the eldest child aged <4-5/9-11> years?

D7. Could you please enter the last name of the eldest child aged <4-5/9-11> years?

D8. What is the date of birth of this child? (DD/MM/YYYY) **(Restrict age based on survey type)**

DD	MM	YYYY

D8a. What is the gender of this child?

1. Boy
2. Girl

9-11 year old question

D9. What year level is the eldest child aged 9-11 years?

1. Year 4
2. Year 5
3. Year 6
4. Other .....

4-5 year old question

D10a. What is the name of the preschool that this child attends?

9-11 year old question

D10b. What is the name of the school that this child attends?

D11. In which country was this child born?

D12. Are you the primary caregiver for this child?

1. Yes
2. No

D13. How is this child related to you?

1. Biological child
2. Adopted child
3. Step child
4. Foster child
5. Grand child
6. Niece/Nephew
7. Cousin
8. Other relative/in-law
9. Unrelated child
10. Sibling

D14. Is there a another caregiver of this child living in your household?

1. Yes, male Go to D15
2. Yes, female Go to D15
3. No other caregiver in household Go to D17

D15. How is this other caregiver related to you?

1. Legal spouse
2. De facto partner
3. Other _____

D16. How is this child related to this other caregiver in the household?

1. Biological child
2. Adopted child
3. Step child
4. Foster child
5. Grand child
6. Niece/Nephew
7. Cousin
8. Other relative/in-law
9. Unrelated child
10. Sibling

D17. Are you of Aboriginal of Torres Strait Islander descent (descent means your ancestry or cultural heritage)?

1. No
2. Yes – Aboriginal descent
3. Yes Torres Strait Islander descent
4. Yes – both Aboriginal and Torres Strait Islander descent

D18. What is the main language spoken at home? Select only **one** language.

1. English
2. Italian
3. Greek
4. Cantonese
5. Arabic
6. Mandarin
7. Vietnamese
8. Another language (please specify which language) ☐

D19a. How many adults usually live in your household (NOT including yourself)?

Enter the number of adults (18 years of age or over)

☐

D19b. How many children usually live in your household? Enter

the number of children (under 18 years of age)

☐

D19c. Please add up the number of people in Q19a and Q19b and check that this matches the total number of people who **usually live in your household not including yourself**. If not, please go back and correct your responses.

D20. Now we would like to ask some questions about you. Are you male or female?

1. Male
2. Female

D21. What is the highest year of primary or secondary school that you have completed?

1. School Year 12 or equivalent
2. School Year 11 or equivalent
3. School Year 10 or equivalent
4. School Year 9 or equivalent
5. School Year 8 or below
6. Never attended school
7. Still at school

D22. What is the highest qualification that you have completed?

1. A post-graduate diploma or higher
2. Graduate diploma/graduate certificate
3. A bachelor degree (with or without honours)
4. Advance diploma/diploma
5. Certificate III/IV (including trade certificate)
6. Other
7. None

DO NOT ASK IF CODE 3 AT D14

D23. What is the highest year of primary or secondary school that the other caregiver has completed?

1. School Year 12 or equivalent
2. School Year 11 or equivalent
3. School Year 10 or equivalent
4. School Year 9 or equivalent

5. School Year 8 or equivalent
6. Never attended school
7. Still at school
8. No other caregiver in the household

DO NOT ASK IF CODE 3 AT D14

D24. What is the highest qualification that the other caregiver has completed?

1. A post-graduate diploma or higher
2. Graduate diploma/graduate certificate
3. A bachelor degree (with or without honours)
4. Advance diploma/diploma
5. Certificate III/IV (including trade certificate)
6. Other
7. None
8. No other caregiver in the household

The next few questions are about the activities your <4-5/9-11> year old may do. If you have more than one child in this age range, please complete these questions for the eldest child within the age range.

Q1. What does your child usually do when she/he has a choice about how to spend free time? Please select one option and enter a response. (Updated to allow MR in online survey)

1. Inactive pastimes, please provide an example……OR
2. Active, please provide an example……

Q2. How much time did your child spend outside on the last day your child was at <preschool/school>?

1. Enter the number of hours/minutes……/……
2. Didn't spend time outside yesterday

Q3. How many times **each week** is your child involved in organised games, sports, or dance (outside of <preschool/school> hours)?

1. Enter the number of times each week……
2. Not involved in organised games, sports or dance

Q4. To maintain good health how many minutes per day do you think your child should be physically active (number of hours/minutes)?

1. Enter the number of hours/minutes……/……
2. Don't know

Q5. How often does your child use the following items at or around home (or in a common area)? Please select one answer in each row.

	Not available (Don't have)	Available but never used	Once a month or less	Once a fortnight	Once a week	2 or 3 times a week	4 times a week or more
1. Tricycle/bike/scooter	1	2	3	4	5	6	7
2. Basketball hoop	1	2	3	4	5	6	7
3. Skipping rope	1	2	3	4	5	6	7

4. Active video games (e.g. with dance pad, Wii, Xbox360, etc)	1	2	3	4	5	6	7
5. Swimming pool	1	2	3	4	5	6	7
6. Roller skates, skateboard, scooter	1	2	3	4	5	6	7
7. Fixed play equipment (e.g. swing set, slides, playhouse, jungle gym)	1	2	3	4	5	6	7
8. Trampoline	1	2	3	4	5	6	7
9. Sandpit	1	2	3	4	5	6	7
10. Bats and/or balls (e.g. totem tennis, tennis, cricket, football)	1	2	3	4	5	6	7
11. Features like cubby houses, trees to climb	1	2	3	4	5	6	7
12. Other (please specify)……	1	2	3	4	5	6	7

Q6. About how long would it take to get from your house to your child's <preschool/school>?

1. Enter minutes walking.....
2. Enter minutes driving.....
3. Enter minutes spent on other mode of transport, please specify time: ....., please specify the mode of transport: .....
4. Don't know

Q7. Is there a children's playground, oval or park within 10 minutes walking distance of your home?

1. Yes
2. No
3. Don't know

Q8. How often is your child physically active (including active play) in/at the following locations. Please select one answer in each row.

	Not available (Don't have)	Available but never used	Once a month or less	Once a fortnight	Once a week	2 or 3 times a week	4 times a week or more
1. Indoor recreation or exercise facility (public or private) e.g. Scouts or Guides, Boys & Girls Club	1	2	3	4	5	6	7
2. Beach, lake, river, or creek	1	2	3	4	5	6	7

3. Bike/hiking/walking trails, paths	1	2	3	4	5	6	7
4. Basketball court	1	2	3	4	5	6	7
5. Other playing fields/courts (e.g. football, softball, tennis)	1	2	3	4	5	6	7
6. Indoor swimming pool	1	2	3	4	5	6	7
7. Public park, playground or open space	1	2	3	4	5	6	7
8. Friend or relative's home	1	2	3	4	5	6	7
9. School grounds (during non-school hours)	1	2	3	4	5	6	7
10. Swimming pool (during warmer months)	1	2	3	4	5	6	7

Q9. How many times a week does the child's primary caregiver go for a walk of **more than 30 minutes**, play sport, go running, swimming or cycling, or go to a gym?

1. Enter the number of times per week.....
2. Don't know

DO NOT ASK IF CODE 3 AT D14

Q10. How many times a week does the child's secondary caregiver go for a walk of **more than 30 minutes**, play sport, go running, swimming or cycling, or go to a gym?

1. Enter the number of times per week.....
2. No other caregiver
3. Don't know

9-11 year old question

Q11. How safe do you think it is for your child to be out alone in the neighbourhood after dark?

1. Very safe
2. Safe
3. Reasonably safe
4. Unsafe
5. Very unsafe
6. Don't know

Q12. **Yesterday**, how long did your child watch TV/videos/DVDs outside of <preschool/school> hours?

1. ……. hours……. minutes
2. Don't know

Q13. **Yesterday**, how long did your child play computer or videogames outside of <preschool/school> hours?

1. ……. hours ……. minutes 2.
3. Don't know

Q14. How many minutes **per day** do you think a preschool/primary child should watch TV/videos/DVDs or play computer/electronic games?

1. ……. hours ……. minutes
2. Don't know

Q15. How many TVs do you have in your home?

1. Enter the number of TVs.....

Q16. Does your child have a TV in their bedroom?

1. Yes
2. No

Q17. How many computers (desktop, laptop, iPads) do you have in your home?

1. Enter the number of computers.....

Q18. How many video game consoles (like X-Box, Playstation, excluding Wii) do you have in your home?

1. Enter the number of game consoles.....

9-11 year old question

Q19. Does your child have a mobile phone?

1. Yes
2. No

Q20. Do you set rules about your child's use of TV, videogames, or the computer (e.g. how long can they watch or play, what can they watch or play, what sites can they access)?

1. Not at all
2. A little
3. Somewhat
4. A lot

Q21. **Over the last week**, how many days did your child watch TV while eating their evening meal?

1. Enter the number of days.....

Q22. How often is your TV left on, whether or not it is being watched?

1. All the time
2. Frequently
3. Sometimes
4. Occasionally
5. Never

Q23. On average, how many hours of TV does the child's primary caregiver watch **per day**?

1. ……. hours ……. minutes
2. Not applicable

DO NOT ASK IF CODE 3 AT D14

Q24. On average, how many hours of TV does the child's secondary caregiver watch **per day**?

1. ……. hours ……. minutes
2. Not applicable

Q25. How would you describe the weight of the child's primary caregiver at present?

1. Underweight
2. Normal weight
3. Somewhat overweight
4. Very overweight
5. Don't know
6. Not applicable

DO NOT ASK IF CODE 3 AT D14

Q26. How would you describe the weight of the child's secondary caregiver at present?

1. Underweight
2. Normal weight
3. Somewhat overweight
4. Very overweight
5. Don't know
6. Not applicable

Q27. How would you describe your child's weight at present?

1. Underweight

2. Normal weight
3. Somewhat overweight
4. Very overweight
5. Not sure

Q28. How concerned are you about your child's weight at the moment?

1. Not at all concerned
2. A little concerned
3. Somewhat concerned
4. Very concerned

Q29. Compared to most other children who are the same age as your child, would you describe your child as:

1. A lot thinner than most children
2. A little bit thinner than most children
3. About the same as most children
4. A little bit fatter than most children
5. A lot fatter than most children
6. Not sure

Q30. Were there any days last month when your family did not have enough money to buy food?

1. Yes
2. No

Q31. Were there any days last month when your children went without food?

1. Yes, enter the number of days.....
2. No

The next series of questions are about what your <4-5/9-11> year old may eat. If you have more than one child in this age range, please complete the rest of the survey for the eldest child within the age range.

Q32. How many serves of fruit did your child eat **yesterday** (do not include fruit juice)? A serve is 1 medium-sized piece of fruit (e.g. apple, banana), 2 smaller pieces of fruit (e.g. kiwi fruit), 1½ tablespoons dried fruit (e.g. sultanas or 4 dried apricot halves), or 1 cup canned or chopped fruit. Total number of serves of fruit your child ate yesterday.....

1. Did not eat fruit yesterday

Q33. How often does your child **usually** eat fruit (do not include fruit juice)?

1. Never
2. Less than once a week
3. 1-2 times a week
4. 3-4 times a week
5. About 5-6 times a week
6. About once a day
7. 2 or more times a day

Q34. How many serves of potatoes did your child eat **yesterday**? A serve is equal to 1 medium potato, ½ cup mashed potato, a hash brown or 10-12 (75g) hot chips, wedges or French fries.

1. Total number of serves of potato your child ate yesterday..... Go to Q35
2. Did not eat potato yesterday Go to Q36

Q35. How many serves of potatoes that your child ate **yesterday** were fried (e.g. hot chips, French fries, wedges, hash browns)?

1. Total number of serves of fried potato your child ate yesterday.....
2. Did not eat fried potato yesterday

Q36. How many serves of other vegetables or legumes (e.g. baked beans, kidney beans) did your child eat **yesterday** (do not include potato)? A serve is ½ cup cooked vegetables or legumes (baked beans, kidney beans, or 1 cup of salad vegetables.

1. Total number of serves of other vegetables your child ate yesterday.....
2. Did not eat other vegetables yesterday

Q37. How often does your child **usually** eat vegetables or legumes (do not include potatoes)?

1. Never
2. Less than once a week
3. 1-2 times a week
4. 3-4 times a week
5. About 5-6 times a week
6. About once a day
7. 2 or more times a day

Q38. How many serves of savoury and/or salty snacks did your child eat **yesterday** (this includes potato crisps or other snacks such as corn chips, cheese or BBQ flavoured twists & rings)? A serve is a 20-25g pack or a small handful. A larger pack (50g) would be counted as 2 serves.

1. Total number of serves of savoury and/or salty snacks your child ate yesterday……
2. Did not eat savoury and/or salty snacks yesterday.

Q39. How many days a week would your child **usually** eat fast food or takeaway (this includes burgers, pizza, fried chicken, fish and chips, pies/pasties)?

Enter number of days <0-7>

Q40. How many serves of sugar sweetened soft drinks & cordials did your child drink **yesterday** (do not include diet drinks)? A serve is ½ cup or 125ml. So a 375ml can of soft drink is 3 serves and 1 cup is 2 serves.

1. Total number of serves of sweetened drinks your child drank yesterday.....
2. Did not drink sweetened drinks yesterday.

Q41. How many serves of fruit juices or fruit drinks did your child drink **yesterday**? A serve is ½ cup or 125ml.

1. Total number of serves of fruit juices or fruit drinks your child drank yesterday.....
2. Did not drink fruit juices or fruit drinks yesterday.

Q42. How many serves of sweets, lollies (confectionery), chocolate, fruit bars or fruit straps/leathers did your child eat **yesterday**? A serve is a row of chocolate from a family block, ½ a regular chocolate bar, a small handful of lollies, 1 fruit bar or 2 fruit straps/leathers.

1. Total number of serves of sweets etc. your child ate yesterday.....
2. Did not eat sweets etc. yesterday.

Q43. How many serves of cakes, doughnuts, sweet biscuits, muffins or muesli bars did your child eat **yesterday**? A serve is 3 plain sweet biscuits, 1 chocolate coated or cream filled biscuit, 1 small doughnut or cake, ¼ of a large muffin or 1 muesli bar.

1. Total number of serves of cakes etc. your child ate yesterday.....
2. Did not eat cakes etc. yesterday.

Q43a. How many serves of ice cream, icy poles or ice blocks did your child eat yesterday? A serve is one ice cream or icy pole on a stick or one scoop of ice cream in a cone or a bowl.

1. Total number of serves of ice cream, icy poles or ice blocks your child ate yesterday…….
2. Didn't have ice cream, icy poles or ice blocks yesterday.

Q44. How often do you offer your child water to drink with meals and snacks (only include non-flavoured water from the tap or bottles)?

1. Never
2. Rarely
3. Most of the time
4. Always

Q45. What type of milk does your child **usually** drink?

1. Does not drink milk
2. Whole milk
3. Low or reduced fat milk
4. Skim (no fat) milk
5. Flavoured milk
6. Milk alternatives (e.g. soya, goat, rice)
7. Condensed or evaporated milk

Q46. How many serves of milk (or alternatives) did your child drink **yesterday** (this includes plain, flavoured and milk on cereal). A serve is ½ cup or 125ml.

1. Total number of serves of milk your child drank yesterday.....
2. Did not drink milk yesterday

Q47. How many shops selling fresh fruit and vegetables are there within 10 minutes walking distance from your home?

1. Number of shops selling fresh fruit and vegetables.....
2. Don't know

Q48. Is there a Farmers/Produce market in your local area?

1. Yes	Go to Q49a
2. No	Go to Q50
3. Don't know	Go to Q50

Q49a. How often does the Farmers/Produce market operate?

1. Monthly
2. Fortnightly
3. Weekly

4. Daily
5. Don't know

Q49b. How often do you buy produce from the Farmers/Produce market?

1. Never
2. Monthly
3. Fortnightly
4. Weekly
5. Daily

Q50. What is the approximate distance from your home to the nearest supermarket?

1. Number of kilometres to the nearest supermarket ..... km
2. Don't know

Q51. Over the last week, on how many days did your child have something to eat or drink for breakfast (do not include water?

1. Number of days <0-7>

Q52. On <preschool/school> days, from where does your child **usually** get breakfast?

Code 4-5 year old question

1. Home
2. Preschool/centre breakfast program
3. Shop (outside preschool/childcare centre)
4. From friends
5. Does not eat breakfast

Code 9-11 year old question

1. Home
2. School canteen or tuck shop
3. School breakfast program
4. Shop (outside school)
5. From friends
6. OSHC
7. Does not eat breakfast

Q52a. How many **days per week** does your child **usually** take lunch to <preschool/school> from home?

1. Number of days per week.....

Q53. How many times does our child **usually** have something to eat or drink between main meals?

1. Never
2. Once a day
3. About 2 times a day
4. About 3 times a day
5. About 4 times a day
6. 5 or more times a day

Q54. To maintain good health, how many serves of fruit do you think a preschool or primary school child should eat **per day**? A serve is 1 medium-sized piece (eg. apple), 2 smaller pieces (eg. kiwi fruit), 1½ tablespoon dried fruit (eg. sultanas or 4 dried apricot halves) or 1 cup canned or chopped fruit.
Number of serves of fruit per day.....

Q55. To maintain good health, how many serves of vegetables do you think a preschool or primary school child should eat **per day**? A serve is equal to ½ cup cooked vegetables or legumes, 1 medium potato or 1 cup salad vegetables.

1. Number of serves of vegetables per day.....

Q56. Compared to most other children who are the same age as your child, how would you describe how much your child **usually** eats?

1. A lot less
2. Somewhat less
3. The same
4. Somewhat more
5. A lot more

Q57. When you purchase food for the family how important to you are the following: Please select one answer in each row.

	Not at all important	Somewhat important	Important	Very important
1. Taste	1	2	3	4
2. Cost	1	2	3	4
3. Convenience	1	2	3	4
4. Nutrition	1	2	3	4
5. Serving size	1	2	3	4
6. Weight control	1	2	3	4
7. It is locally produced	1	2	3	4
8. Minimal impact on the environment	1	2	3	4

Q58. What type of activities, meetings or events have you attended in the **past 12 months** held by the following types of groups or organisations? Please select your response(s) below.

1. School/kindergarten activity involving physical activity for your child
2. School/kindergarten activity involving healthy eating for your child
3. Community garden
4. Community event involving physical activity for your child (e.g. organised walk, swim etc)
5. Community event involving healthy eating activities for your child (e.g. tasting or cooking healthy foods)
6. Other (please specify .....)
7. None

Q59. Have you received useful information from the following types of groups or organisations promoting physical activity or healthy eating over **the last 12 months**? Please select your response(s) below.

1. School
2. Local Council
3. Sporting clubs

4. Youth groups
5. Other (please specify .....)
6. None

The next questions relate to the child's early feeding

practices. Q60. Has your child ever received breast milk?

1. Yes
2. No
3. Don't know

DO NOT ASK IF CODE 2 OR 3 IN Q60

Q61. How old was your child when he/she stopped receiving breast milk?

1. Number of months.....
2. Less than 1 month
3. Did not breastfeed
4. Don't know

Q62. At what age did you child receive milk other than breast milk regularly (e.g. formula or cow's milk)?

1. Number of months.....
2. Less than 1 month
3. Did not breastfeed
4. Don't know

Q63. How old was your child when he/she first ate soft or semi-solid food?

1. Number of months.....
2. Less than 1 month
3. Don't know

Q64. Please indicate how much the following statements/questions apply to your family. Please select one answer in each row.

	Never	Rarely	Sometimes	Often	Always
1. I eat food I want my child to eat	1	2	3	4	5
2. I sit with my child at mealtimes	1	2	3	4	5
3. How often do you or another adult in the house cook an evening meal?	1	2	3	4	5
4. How often does your child help prepare food?	1	2	3	4	5
5. I encourage my child to eat fruit	1	2	3	4	5
6. I encourage my child to eat vegetables	1	2	3	4	5
7. At home we have vegetables at dinner	1	2	3	4	5
8. How often can your child eat snacks and/or sweets without your permission?	1	2	3	4	5

9. How often does your child eat in his/her bedroom?	1	2	3	4	5
10. How often does your child ask for or take a second helping?	1	2	3	4	5
11. I/we use food as a reward for good behaviour	1	2	3	4	5
12. I/we withhold food as punishment for bad behaviour	1	2	3	4	5

Q65. How many times a **week** does the primary and/or secondary caregiver eat the main meal of the day with your child/children?

1. Times per week.....

Q66. How many serves of vegetables do **you** usually eat **each day**? A serve is ½ cup of cooked vegetables or legumes, 1 medium potato or 1 cup of salad vegetables?

1. Number of serves of vegetables you usually eat each day.....
2. Do not usually eat vegetables

Q67. How many serves of fruit do **you** usually eat **each da**y? A serve is equal to 1 medium-sized piece of fruit (e.g. apple, banana), 2 smaller pieces (e.g. kiwi fruit), 1½ tablespoons dried fruit (e.g. sultanas or 4 dried apricot halves) or 1 cup of canned or chopped fruit.

1. Number of serves of fruit you usually eat each day.....
2. Do not usually eat fruit

Thank you for your help so far, I would now like to ask you one final question.

Q68. Before income tax is taken out, what is your present yearly income (for you and your partner or total household combined)? Include pensions and allowances before tax, superannuation or health insurance.

1. $0 - $20,000 per year
2. $20,001 - $35,000 per year
3. $35,001 - $50,000 per year
4. $50,001 - $70,000 per year
5. $70,001 - $100,000 per year
6. More than $100,000 per year
7. Nil income
8. Negative income (loss)
9. Don't know
10. Refused to answer

Q69. Thank you for your help with this survey, if there is anything else you would like to write please do so in the box below.

Hard copy survey: 'Please note the date DD/MM/YY .... / .... / .... and time HH:MM ..... : ..... you finished the survey'

That's the end of the survey, thank you for your participation.

Survey Change Log

Section/question	Details of change(s)	Date	Version #	Made by
Heading	Hard copy surveys - added headings.	17/11/11		ND
Q38	Hard copy surveys – correct the codeframe to be: Total number of serves of savoury and/or salty snacks your child ate yesterday…… Did not eat savoury and/or salty snacks yesterday.	21/11/11		ND
Date and time	Hard copy surveys - added a start and end date and time.	21/11/11		ND
D9a and D9b	Hard copy and word surveys – added 'other' option as code 4.	23/11/11		ND
D15a and D15b	Hard copy and word surveys – made 'other' specify by adding a line afterwards.	23/11/11		ND
Q6	Updated code 3 to capture time and other mode of transport.	23/11/11		ND
Q69 - comments	All surveys – added a comments question at the end.	23/11/11		ND
Q23 and Q24	All surveys – changed to collect hours and minutes, previously only hours.	28/11/11		ND
Q68 (hard copy only)	Code 6 was missing a '0' from 100,000. Corrected in the hard copy master surveys, correct in the online and word surveys.	19/03/12	2	ND
D1 & D2	Changed postcode to D1 and suburb to D2 in order to match the order in the online survey where the suburb feeds off the postcode.	27/03/12	3	ND
Q1	Updated the online and word survey to make this question a multi response rather than single response based on high number of hard copy surveys coming back with multiple responses.	27/03/12	3	ND

APPENDIX 3: SURVEY DOMAINS AND VARIABLES COLLECTED IN THE OPAL QUANTITATIVE EVALUATION

Table 67 : Survey domains and variables collected in the OPAL quantitative evaluation

Domain	Variable	Method	Reference
Anthropometry	Height, weight, waist circumference	Direct measure	ISAK
Body image	Body satisfaction, dieting, beauty ideals, weight-related teasing Care-givers' self-reported weight, child perceived weight	Student Survey Parent survey	-
Community Activities	Participation, leadership, community structures, external supports, asking why, obtaining resources, skills, knowledge and learning, linking with others, sense of community Activities attended, organisations	Stakeholder Survey Parent Survey	CCBT
Demographics	Age, sex, income, education, etc.	Student/Parent Survey	NaSSDA, ANCAPAS
Eating behaviour	Fruit and vegetable consumption, snacks, water, milk Food purchasing	Student/Parent Survey	BAEW, SPANS, EPAQ
Environment	Neighbourhood, school, home (physical/social)	Student/Parent/Principal/ Director Survey	EWBA, EPAQ
Food Security	Affordability, availability	Principal/Director Survey	BAEW
General	ID, Centre ID, Phase, OPAL community, setting, postcode	Student/Parent/Principal/ Director Survey	-
Partnerships	Skills, capacity, commitment	Principal/Director Survey	EWBA, WHO
Physical activity behaviour	Physical activity, MVPA	Student/Parent Survey	HBSC
Policy	Regulations, rules, written policy guidelines (physical activity/healthy eating), implementation, public liability	Principal/Director Survey	WHO, EWBA
Quality of life	CHU9D (sad, pain, worried, tired, annoyed, schoolwork, sleep, daily routine, ability to join in activities)	Student Survey	CHU9D
Sedentary behaviour	Screen time (TV, video games, computer use)	Student Survey	HBSC
Sleep patterns	Sleep time (weekday/weekends)	Student Survey	ISCOLE
Self-rated health	Health status	Student Survey	CHU9D
Training	Skills, learning, knowledge	Principal/Director Survey	EWBA

ANCNPAS; Australian National Children's Nutrition and Physical Activity Survey (Department of Health and Ageing 2008)
BAEW; Be Active Eat Well (de Silva-Sanigorski AM et al. 2010)
CCBT; Community Capacity Building Tool (Maclellan-Wright MF et al. 2007)
CHU9D; Child Health Utility 9 Dimensions (Ratcliffe J et al. 2011)
EPAQ; European Prospective Investigation into Cancer (EPIC) Physical Activity Questionnaire (Wareham NJ et al. 2002)
EWBA; Eat Well Be Active (Wilson AM et al. 2010)
HBSC; Health Behavior of School Children Study (HBSC.org [Internet])
ISAK; International Society for the Advancement of Kinanthropometry (Marfell-Jones M et al. 2006)
ISCOLE; International Study of Childhood Obesity, Lifestyle and Environment (Katzmarzyk PT et al. 2013)
NaSSDA; National Secondary Students' Diet and Activity Survey (Morley B et al. 2012)
MVPA; Moderate to vigorous physical activity
WHO; World Health Organisation (World Health Organisation 1998)
SPANS; Schools Physical Activity and Nutrition Survey (Booth ML et al. 2005)

APPENDIX 4: THE INTERNATIONAL SOCIETY FOR THE ADVANCEMENT OF KINANTHROPOMETRY (ISAK) MEASUREMENT PROTOCOLS

1 Anthropometry

During the OPAL evaluation, children aged 9-11 and 14-16 will have the following dimensions measured:

- height
- weight
- waist girth

This section describes the equipment required, calibration procedures and measurement protocols to be used in taking these measurements. The guidelines are based on the protocols of the International Society for the Advancement of Kinanthropometry (ISAK):

Marfell-Jones, M., Olds, T., Stewart, A., & Carter, L. (2006).
International standards for anthropometric assessment.
Potchefstroom, RSA: North-West University.

1.1 General considerations

The precise assessment of anthropometric measurements can be difficult and therefore extreme care is required. In general, where not enough attention is paid to an accurate measurement technique, reproducibility cannot be obtained. Whereas the descriptions of measurement procedures seem quite simple, a high degree of technical skill in measuring is essential for consistent results, especially when conducted under field test conditions.

1.1.1 Accuracy and precision

Prior to measuring during the survey, the tester should develop the appropriate technique through training. Before being allowed to act as a measurer, the tester will be required to demonstrate sufficient levels of accuracy (ie how well their measurements compare to those of criterion measurer, in this case an ISAK Level 3 or 4 anthropometrist), and precision (ie how well repeated measurements by the same tester on the same participant compare). Accuracy and precision are quantified using a statistic called the Technical Error of Measurement (TEM). For this survey, the tester must demonstrate inter-tester TEMs (a measure of accuracy) of ≤2% and intra-tester TEMs (a measure of precision) of ≤1.5%. TEMs will be calculated during measurer training sessions.

1.1.2 Number of measurements

Two measurements should be taken for each measurement. A third measure should be taken where the second measure is not within

- 5 mm for height
- 0.1 kg for mass, and
- 10 mm for waist girth.

The mean value is used in any further calculations if two measurements are taken, and the median value is used if three measurements are taken.

Normally, measurements should not be taken after training or competition, sauna, swimming or showering, since exercise, warm water and heat can produce dehydration and/or hyperemia(increased blood flow). These may affect body mass and girth measurements. If measurements must be taken under these circumstances, it should be recorded on the data sheet.

1.1.3 Interacting with participants

We recognise that different customs and procedures may apply among different ethnic, cultural and socio-economic groups, and with children of different ages and sexes. In particular, some groups are very sensitive about being measured. Measurers must be aware of these sensitivities. It should be appreciated that all people have an area around their body known as "personal space" and that when this area is invaded they feel uncomfortable or threatened. This is particularly true for the front of a person and this is why most measurements are taken from the side or from behind. Measurers should be mindful that some participants may feel more comfortable being measured by people of the same sex. There will probably be some people for whom measurements cannot be accurately taken, for example, due to injury or illness. In this case, record the reason on your data sheet. Tell the participant what you are about to do, for example: "I'm going to measure your waist girth now. To get the right spot, I have to feel for the bottom of your ribs and the top of your hipbone. This may tickle a bit."

In the OPAL evaluation, measurers should be particularly mindful of the sensitivities of teenagers, especially girls. For this reason, measurers must adhere to the following principles:

• **Written informed consent** expressed in plain language must be obtained from every parent, and verbal assent from every child. Measurements should never be taken if the participant expresses unwillingness or discomfort.

• Measurers must **avoid using judgmental language** about measurements If a child asks about their measurement, reply with: "Height and weight vary a lot in children of your age."

• The child **should never see or hear the measured values** for weight or waist girth (height is less sensitive). The dial of the scales should be concealed from the child and the value should not be spoken aloud in the child's hearing.

• Every participant will be measured **in the presence of two measurers**. For younger children (9-11 years) the measurers will be female. For teenagers, they may be a mix of males and females. Participants will be offered the opportunity of being measured in the presence of a parent or guardian/support person.

• All measurements will be taken **in private**, in a separate room or screened-off area.

• Children will be measured in **light clothing**, and waist girth will be taken over the shirt or tunic. In the matter of dress, measurers should always be sensitive to the cultural beliefs and traditions of the participant.

• **Indigenous people** can be especially sensitive about being measured. Ensure you use cultural protocols like not looking Aboriginal people in the eye, and keep your distance when talking.

1.2 Equipment

1.2.1 Stadiometer

The stadiometer to be used in the OPAL evaluation is the Invicta Height Measure, which is designed to fully dismantle into a compact shape that will fit into a carry case.

The stadiometer should be checked before each use against a steel girth tape. Any mis-calibration should be recorded in the "Comments" section of the interview software. To assemble the Invicta stadiometer, find the first upright (marked with a large arrow) and place it firmly into the base. Then connect each of the other uprights, making sure the number scale continues at each join. Place the headboard over the uprights, making sure that that flat part is at the bottom. When reading the value, read directly next to the red arrows. When removing the uprights to disassemble the stadiometer, stand on the base to assist removal.

The Invicta stadiometer.

1.2.2 Weighing scale

Mass will be measured using Tanita HD332 portable electronic scales. The scales will be calibrated against a set of standard calibration weights from 10 to 50 kg. To use these scales, push with your foot on middle of the scales for a moment. The display will read "CAL". After a short time, the readout will revert to "0.0kg". The scales are now ready to use. If the scale is reading in Imperial (lb) rather than metric (kg)units, there is a switch on the underside which allows you to change to metric. These scales use one 3 V lithium battery, which is inserted on the underside of the scales. A spare battery should be taken on each visit.

The TanitaHD332 portable electronic scales.

1.2.3 Girth tape

The Lufkin W606PM tape has gained universal acceptance amongst ISAK members, and will be used in the OPAL evaluation. Note that this tape was initially used in the forestry industry, and the obverse side shows a scale in which the divisions are π (3.14159) times as great as the centimeter scale divisions. This allowed forestry workers to estimate the diameter of trees by measuring the girth.

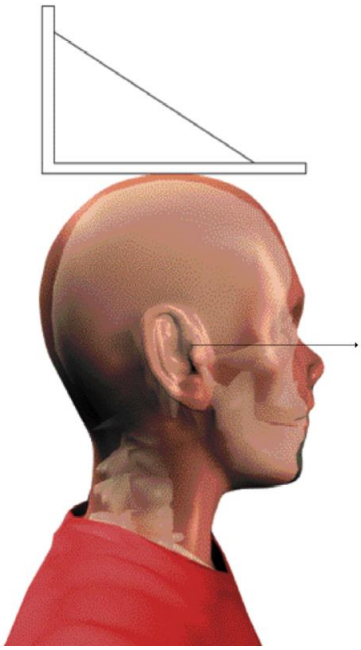
Lufkin W606PM steel girth tape.

1.3 Taking measurements

1.3.1 Measuring height

Definition: Height is the perpendicular distance between the transverse planes of the

Vertex and the inferior aspects of the feet. The Vertex is the most superior point on the skull when the head is positioned in the Frankfort plane. The Frankfort plane is the alignment of the head when the Orbitale (the lower bony margin of the eye socket) is in the same horizontal plane as the Tragion (the notch above the tragus or flap of the ear).



The head in the Frankfort plane.

Method

Height should be measured without shoes or thick socks. The young person stands with the heels together and the heels, buttocks and upper part of the back touching the upright of the stadiometer. The head, when placed in the Frankfort plane, need not be touching the scale. Positioning the head in the Frankfort plane is achieved by placing the tips of the thumbs on each Orbital, and the index fingers on each Tragion, then horizontally aligning the two. Having positioned the head in the Frankfort plane, the participant is instructed to take and hold a deep breath and while keeping the head in the Frankfort planes. The tester places the head board firmly down on the Vertex, compressing the hair as much as possible. Measurement is taken before the participant exhales.

There will be diurnal variation in height. Generally, people are taller in the morning and shorter in the evening. A loss of about 1% in height is common over the course of the day. The time of measurement should be recorded on the data sheet, this will allow a calculation to be made to compensate for the loss of height over the day.

1.3.2 Measuring weight

Method

Weight should be measured in light indoor clothing. Shoes, coats and jumpers should be removed. Check that the scale is placed on a hard, even surface (avoid carpet). The young person stands still on the centre of the scales without support and with the weight distributed evenly on both feet. Record the reading on the data sheet. Ask the participant to step off the scales, and to step on again. Again record the reading. If the reading differs by more than 0.1 kg (100 g), take a third measurement. Body mass exhibits diurnal variation of about 1 kg in children. Be sure to record the time of day when measurements are made on the datasheet.

1.3.3 Measuring waist girth

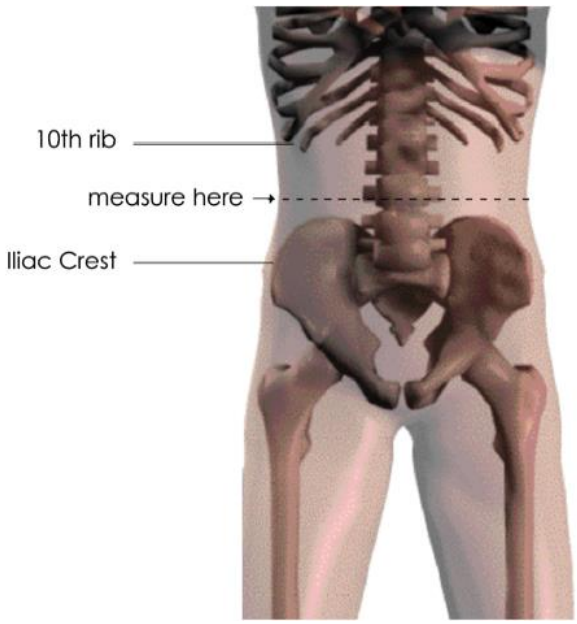
The cross-hand technique is used for measuring all girths and the reading is taken from the tape where, for easier viewing, the zero is located more lateral than medial on the young person. In measuring girths, the tape is held at right angles to the limb or body segment which is being measured. Measurements will be made over the shirt or tunic in the OPAL evaluation, but we are trying to estimate what the measurement would be against the skin. Be sure to pull the tape sufficiently tight to compress the clothing without excessive indentation of the skin. Anthropometrists should realise that this is not always achievable, and over clothing very difficult to estimate. Where the contour of the surface of the skin becomes concave (for example, across the spinal column), continuous contact with the skin is neither achievable nor desirable.

Reading the tape: align the zero mark with the top scale. Here the reading is 48.9 cm.

To position the tape, hold the case in the right hand and the stub in the left. Facing the body part to be measured, pass the stub end around the back of the limb or trunk and take hold of the stub with the right hand which then holds both the stub and the casing. At this point the left hand is free to manipulate the tape to the correct level. Apply sufficient tension to the tape with the right hand to hold it at that position while the left hand reaches underneath the casing to take hold of the stub again. The tape is thus around the part to be measured. The middle fingers of both hands are free to exactly locate the tape at the landmark for measurement and to orientate the tape so that the zero is easily read. The juxtaposition of the tape ensures that there is contiguity of the two parts of the tape from which the girth is determined. When reading the tape the measurer's eyes should be at the same level as the tape to avoid any error of parallax.

Definition: The circumference of the abdomen mid-way between the lower costal(10th rib) border and the top of the iliac crest, in the mid-axillary line, perpendicular to the long axis of the trunk. Use the coloured sticker supplied to temporarily identify the level at which the measurement is taken over clothes.

Participant position: The participant assumes a relaxed standing position with the arms folded across the chest.



Method: The anthropometrist stands in front of the participant and passes the tape around the abdomen. The stub of the tape and the housing are then both held in the right hand while the anthropometrist uses the left hand to adjust the level of the tape at the back to the adjudged level. The anthropometrist resumes control of the stub with the left hand and using the cross-hand technique positions the tape in front at the target level. The participant should breathe normally and the measurement is taken at the end of a normal expiration (end tidal).

APPENDIX 5: SCIENTIFIC ADVISORY COMMITTEE BODY IMAGE GUIDELINES

SCIENTIFIC ADVISORY COMMITTEE
BODY IMAGE PRINCIPLES FOR DATA COLLECTION

OPAL is positive and non-stigmatising in its approach to childhood obesity prevention. OPAL is sensitive to body image concerns and does not stigmatise people, behaviours or factors connected with weight.

Weight should be measured in as matter of fact and routine way as possible. Where possible weight should not be the only measurement taken, ideally it should be part of a health check including other measures such as sight and hearing checks.

The evaluation of OPAL will include a risk assessment and management of any potential positive or negative effect of anthropometric measurement of children.

To achieve these principles the following will be considered:

- **Data Collection Process**
    - Students will not be told their results for Phase 1 & 2 OPAL Evaluation data collection. Body Mass Index (BMI) is an adequate measure of population level weight however it needs careful interpretation at an individual level especially in relation to weight status categories. If children request their height and weight measures, measurement staff will be trained to respond in an appropriate and respectful manner without providing the measures.
    - Measurements are to be conducted in private out of view of teachers and other students.
    - Where possible weighing equipment should be sourced which limits the child's ability to read their weight status. This is to reduce opportunities for comparison and possible stigmatisation.
    - All results will be kept confidential and calculation of BMI will not be undertaken on-site.
    - Children are asked only to remove shoes and any heavy weight jumpers/jackets and may be asked to empty their pockets of heavy items such as mobile phones and small change while they are being measured. If waist measurements are being taken clothing must remain over the child's abdomen at all times.
    - All students will be measured by a female staff member unless the parent or child requests a male staff member.

- Consent
    - Child assent and parental consent are required for participation.
    - An information sheet accompanying the consent form will explain the population approach of OPAL and thus the focus on group not individual responses. Feedback will not be provided to parents.
- Staff Training
    - Measurement staff should be trained in body image sensitivity, disordered eating and cultural sensitivities by an external expert to ensure consistency of language and reduce transfer of negative messages about weight.
    - This training should also include communication skills including how to redress any negative comments the child might make. This training would also include awareness that weighing is liable to be distressing for a small number of children and how to respond sensitively.
    - Federal police criminal record checks and mandatory reporting training for all measurement staff are required.
    - The final copy of the training manual including data collection protocol for research assistants collecting data in the field will be reviewed by the OPAL Scientific Advisory committee before commencement of data collection.
- Reporting
    - When presenting results for publication, consideration will be given to the appropriate terms depending upon the intended audience. For example terms such as ‘below healthy weight’, ‘healthy weight’ and ‘above healthy weight’ will be used when reporting on the outcomes of the evaluation to parents, schools or community.

Resources

Gibbs L, O’Connor T, Waters E, Booth M, Walsh O, Green J, Bartlett J and B Swinburn 2007 ‘Addressing the potential adverse effects of school-based BMI assessments on children’s wellbeing’ *International Journal of Pediatric Obesity* Vol. 3:1, 52-7.

Tiggeman, M. Some principles in weighing children – OPAL. Personal Communication

Wilson AM, Magarey AM, Dollman J, Jones M, Mastersson N. The challenges of quantitative evaluation of a multi-setting, multi-strategy community-based childhood obesity prevention programme: lessons learnt from the eat well be active Community Programs in South Australia. *Public Health Nutrition*. 2009;(-1):1-9

OPAL by EPODE is a joint program of Australian, State and Local Governments.

APPENDIX 6: ANTHROPOMETRIC SUB-GROUP ANALYSIS TABLES FOR PRESCHOOL CHILDREN

Phase 1

Table 68 shows the prevalence of overweight by sex and locality.

- There was a 50% increase in the probability of overweight in COMP boys (OR 1.5, 90%CI 1.0-2.1, p=0.028), and 30% reduced probability of overweight prevalence in INT girls (OR 0.7, 95%CI 0.5-1.0, p=0.031). However, the probability of overweight was statistically not-significant between INT and COMP at final for either girls or boys.
- Rural children in COMP experienced a 60% increased probability of overweight (OR 1.6, 95%CI 1.2-2.2, p=0.002), however this was not statistically different to rural children in INT at final.

Table 69 shows the prevalence of obesity by sex and locality.

- There were no statistically significant changes in probability of obesity over time in INT or COMP for girls or boys, or between INT and COMP girls and boys at final.
- Rural children in COMP experienced a 40% reduced probability of obesity (OR 0.6, 95%CI 0.4-1.0, p=0.019), however this was not statistically different to rural children in INT at final.

Phase 2

Table 70 shows the prevalence of overweight by sex and locality.

- The only statistically significant change over the two year period was in the probability of overweight children in rural comparison communities (OR 0.7, 95%CI 0.6-1.5, p=0.001), yet this significant effect did not remain when compared to the probability of overweight rural children in INT at final.

Table 71 shows the prevalence of obesity by sex and locality.

- The probability of obese boys significantly decreased by 50% in COMP (OR 0.5, 9%CI 0.3-1.0, p=0.043), yet increased non-significantly in INT (OR 1.7, 95%CI 0.9-3.1, p=NS). Overall, the probability of obesity in boys was 3.2 times greater at final for those in INT than COMP (OR 3.2, 95%CI 1.3-7.4, p=0.009).
- There were no statistically significant changes in the probability of obesity over time in INT or COMP girls or boys, or between INT and COMP girls and boys at final.

Table 68: Prevalence (%) of overweight[1] (excluding obese) for children aged 4-5 years in Phase 1 by community, sex and locality

	Year 0 (Baseline)		Year 5 (Final)		OR (95%CI) (Year 0 – Year 5)		
Data shown are %	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
n	1628	1225	1337	688			
Sex							
Boys	12.6	10.8	13.9	15.2	1.1 (0.6 – 1.4)	1.5** (1.0 – 2.1)	0.8 (0.4 – 1.3)
Girls	18.3	14.8	13.1	13.8	0.7** (0.5 – 1.0)	0.9 (0.6 – 1.4)	0.7 (0.4 – 1.3)
Locality							
Urban	15.7	13.0	14.4	13.5	0.9 (0.7 – 1.1)	1.0 (0.7 – 1.5)	0.9 (0.6 – 1.4)
Rural	14.3	12.2	11.6	17.9	0.8 (0.3 – 2.0)	1.6* (1.2 – 2.2)	0.5 (0.2 – 1.3)

* p<0.01; **p<0.05

[1]International Obesity Taskforce cut-points (Cole TJ et al. 2000, Cole TJ et al. 2007); [2] Odds of weight status categories in year 5 for intervention group, Year 3 is the reference group; [3] Odds of weight status categories in year 5 for comparison group, Year 3 is the reference group; [4] Odds of weight status categories for INT[2], COMP[3] is the reference group; A log binomial model was used to fit the models.

Note: Adjusted by age

Table 69: Prevalence (%) of obesity[1] for children aged 4-5 years in Phase 1 by community, sex and locality

	Year 0 (Baseline)		Year 5 (Final)		OR (95%CI) (Year 0 – Year 5)		
Data shown are %	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
n	1628	1225	1337	688			
Sex							
Boys	3.6	4.1	5.0	4.4	1.4 (0.8 – 2.5)	1.1 (0.6 – 2.0)	1.3 (0.6 – 3.1)
Girls	6.2	4.1	5.5	5.5	0.9 (0.6 – 1.2)	1.3 (0.7 – 2.5)	0.6 (0.3 – 1.3)
Locality							
Urban	4.7	3.4	5.4	5.2	1.1 (0.8 – 1.6)	1.5 (0.8 – 2.8)	0.8 (0.4 – 1.5)
Rural	5.3	6.7	4.8	4.2	0.9 (0.5 – 1.7)	0.6** (0.4 – 1.0)	1.5 (0.7 – 3.3)

* p<0.01; **p<0.05

[1]International Obesity Taskforce cut-points (Cole TJ et al. 2000, Cole TJ et al. 2007); [2] Odds of weight status categories in year 5 for intervention group, Year 3 is the reference group; [3] Odds of weight status categories in year 5 for comparison group, Year 3 is the reference group; [4] Odds of weight status categories for INT[2], COMP[3] is the reference group; A log binomial model was used to fit the models.

Note: Adjusted by age

Table 70: Prevalence (%) overweight[1] (excluding obese) for children aged 4-5 years in Phase 2 by community, sex and locality

	Year 0 (Baseline)		Year 2 (Final)		OR (95%CI) (Year 0 – Year 2)		
Data shown are %	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
n	865	778	1051	890			
Sex							
Boys	11.4	13.1	11.3	13.1	1.0 (0.7 – 1.4)	1.0 (0.7 – 1.4)	1.0 (0.6 – 1.7)
Girls	17.7	17.3	18.4	17.6	1.0 (0.7 – 1.4)	1.0 (0.7 – 1.5)	1.0 (0.6 – 1.6)
Locality							
Urban	13.0	14.5	13.9	17.1	1.1 (0.7 – 1.5)	1.2 (1.0 – 1.5)	0.9 (0.6 – 1.4)
Rural	16.8	16.4	16.2	11.7	1.0 (0.6 – 1.5)	0.7* (0.6 – 1.5)	1.4 (0.8 – 2.3)

* p<0.01; **p<0.05

[1]International Obesity Taskforce cut-points (Cole TJ et al. 2000, Cole TJ et al. 2007); [2] Odds of weight status categories in year 5 for intervention group, Year 3 is the reference group; [3] Odds of weight status categories in year 5 for comparison group, Year 3 is the reference group; [4] Odds of weight status categories for INT[2], COMP[3] is the reference group; A log binomial model was used to fit the models.

Note: Adjusted by age

Table 71: Prevalence (%) of obesity[1] for children aged 4-5 years in Phase 2 by community, sex and locality

	Year 0 (Baseline)		Year 2 (Final)		OR (95%CI) (Year 0 – Year 2)		
Data shown are %	INT	COMP	INT	COMP	INT[2]	COMP[3]	INT vs COMP[4]
n	865	778	1051	890			
Sex							
Boys	3.6	5.0	5.9	2.8	1.7 (0.9 -3.1)	0.5** (0.3 – 1.0)	3.2* (1.3 – 7.4)
Girls	6.7	5.6	7.6	8.4	1.1 (0.7 – 1.9)	1.6 (0.9 – 2.7)	0.7 (0.3 – 1.5)
Locality							
Urban	4.2	4.8	6.5	4.8	1.6 (0.9 – 2.8)	1.0 (0.6 – 1.6)	1.6 (0.7 – 3.5)
Rural	6.3	6.3	7.1	7.4	1.1 (0.6 – 1.8)	1.2 (0.7 – 2.1)	0.9 (0.4 – 1.9)

* p<0.01; **p<0.05

[1]International Obesity Taskforce cut-points (Cole TJ et al. 2000, Cole TJ et al. 2007); [2] Odds of weight status categories in year 5 for intervention group, Year 3 is the reference group; [3] Odds of weight status categories in year 5 for comparison group, Year 3 is the reference group; [4] Odds of weight status categories for INT[2], COMP[3] is the reference group; A log binomial model was used to fit the models.

Note: Adjusted by age

APPENDIX 7: RESEARCH OUTPUT

Publications

Leslie E, Magarey A, Olds TS, Ratcliffe J, Jones M, Cobiac L. (2015) Community-based obesity prevention in Australia: Background, methods and recruitment outcomes for the evaluation of the effectiveness of OPAL (Obesity Prevention and Lifestyle). *Advanced in Pediatric Research* [dx.doi.org/10.12715/apr.2015.2.23].

Opal Collective (2015). Practitioner insights on obesity prevention: the voice of South Australian OPAL workers. *Health promotion international* [doi. 10.1093/heapro/dau118]

Bell L, Ullah S, Olds T, Magarey A, Leslie E, Jones M, Miller M, Cobiac L. Prevalence and socio-demographic distribution of eating, physical activity and sedentary behaviours among Australian children in urban and rural communities: An OPAL baseline evaluation' *Health Promotion Journal of Australia*, submitted (20th August 2015)

Conference/other presentations

Bell L 'Diet and Activity Behaviours of SA primary school children; Baseline OPAL findings', Healthy Development Adelaide (HDA) Thematic Evening 'Tackling childhood obesity: Practice-based research addressing nutrition in childhood'. Adelaide, Australia. 29 July 2015.

Bell L, Ullah S, Olds T, Magarey A, Leslie E 'Prevalence and socio-demographic distribution of eating, physical activity and sedentary behaviours among Australian children in urban and rural communities: An OPAL baseline evaluation' *Annual Meeting of International Society of Behavioral Nutrition and Physical Activity.* Edinburgh, Scotland. 3-6 June 2015

Ong J, Ullah S, Leslie E, Magarey A. Exploring the influences of the home environment on primary school children's diet and weight status. Obesity facts. The European Journal of Obesity. 2015;8(suppl 1):1-247