

Eat well be active.

Community Programs



Evaluation Report

Part 1: Baseline Data Collection

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Executive Summary

Introduction

Levels of overweight and obesity in children and young people have been trending upward since the mid 1980's. In response to this the South Australian State Government has released the *eat well be active* Healthy Weight Strategy for South Australia 2006-2010 and funded a number of initiatives including the *eat well be active* Community Programs. The *eat well be active* Community Programs comprise two intervention communities – one in Morphett Vale and the other in the rural city of Murray Bridge. The aim is to contribute to the healthy weight of young people and their families in these communities by increasing healthy eating and physical activity through the provision of locally relevant and sustainable interventions. To determine the effectiveness of this approach a comprehensive evaluation framework (including qualitative and quantitative methods) has been developed and the data collected and compiled in this report form the first part of the baseline data for the quantitative evaluation of *eat well be active* Community Programs (Australian Clinical Trials Registry Number: ACTRN12607000414415).

Methods

Year 5, 6 and 7 students from Government, Catholic and Independent schools in 2 urban (Morphett Vale and Sea and Vines) and 2 rural (Murray Bridge and Port Pirie) communities were invited to participate in the evaluation of the *eat well be active* Community Programs at the end of 2006. Sea and Vines and Port Pirie form the comparison sites for evaluation purposes. 1732 students completed either or both of the self-report nutrition and physical activity surveys. These surveys were developed specifically for *eat well be active* Community Programs to ascertain

the students' behaviour, knowledge and attitudes about their eating and physical activity patterns as well as descriptions of their home, school and local environments, key contributors to the maintenance of healthy weight.

In conjunction with these surveys, to determine the prevalence of overweight and obesity, 1637 students had height, weight and waist circumference measures taken.

Key Findings

Overweight and Obesity

49.9% of the sample (n=1637) were boys and 50.1% were girls.

56.8% students were from urban regions and 43.2% from rural regions.

31.2% of students were from Morphett Vale, 25.6% from Sea and Vines, 20.3% from Murray Bridge and 22.9% from Port Pirie.

The prevalence of overweight was 18.5% with a further 6.6% obese, combined overweight and obese level of 25.1%. There were no significant differences in prevalence of combined overweight and obesity between boys and girls.

There were significant differences in age, with prevalence being greatest in the youngest age group (9-10 years) at 31.1%.

There were no differences in prevalence of overweight and obesity combined between urban and rural regions for all students or for sexes separately.

Boys had greater overall BMI z-score but lower waist circumference z-score than girls.

The total sample had greater BMI and waist circumference z-scores than the UK reference population (McCarthy 2003; Cole 1995).

There were no significant anthropometric differences between rural and urban boys and rural and urban girls. Girls had greater waist circumference z-scores than boys in both rural and urban regions, while urban boys had greater BMI z-scores than urban girls.

Physical Activity

77% of students are usually physically active at school (recess/lunch/PE lesson). Boys were more likely to be physically active at school than girls.

45% of students used active transport at least once per day travelling to or from school.

67% of students used local parks and recreational facilities outside of school hours at least once per week. Boys were more likely to use local recreational facilities than girls.

80% of students exceeded the 2 hour recommended screen time per day. Boys were more likely to exceed the recommended screen time than girls.

51% of students reported that the local environment was supportive of physical activity. Boys were more likely to report that the local environment was supportive than girls.

36% of students agreed the school environment was conducive to physical activity.

58% of students reported support for physical activity in their home.

The vast majority of students believe that physical activity is fun.

28% of boys and 36% of girls played no club sport in the previous 12 months.

49% of boys and 59% of girls played no school sport in the previous 12 months.

School soccer was played most often by both boys and girls.

The most played club sports were Australian Rules football (AFL) for boys and netball for girls.

Both basketball and tennis were popular amongst boys and girls at both school and club level.

Nearly one third of girls did not engage in any moderate to vigorous physical activity at recess time.

About one quarter of girls did not engage in any moderate to vigorous physical activity at lunch time.

Less than one half of boys and girls reported engagement in vigorous physical play after school.

Nutrition

75% of students reported an excessive intake of non-core foods.

64% of students reported an excessive intake of sweetened beverages.

43% of students consumed adequate amounts of water.

45% of students reported an adequate daily intake of fruit.

Only 13% of students reported an adequate daily intake of vegetables.

79% of students reported having something for breakfast everyday.

53% of students reported helping to buy groceries or prepare dinner at least 1-3 times per week.

76% of students hold healthy attitudes towards fruit intake.

51% of students hold healthy attitudes toward vegetable intake.

91% of students reported a healthy fruit and vegetable home environment. This refers to vegetables being served at home, fruit is available to eat at home and encouragement from their parents to eat fruit and vegetables.

71% of students reported having water on their desk at school.

36% of students correctly reported the number of fruit serves they should consume.

77% of students correctly reported that a child of their age should consume 3-5 serves of vegetables each day.

1.0 Introduction

This report is the first of two baseline study reports. Part 1: Baseline Data Collection contains the outcomes from the first round of surveys and anthropometric data collected from students only. The first round of data collection surveys were also administered to parents, principals, teachers, canteens, out of school hours care centres, long day care centres and family day care providers. The outcomes from these surveys will be reported in Part 2: Baseline Data Collection.

Section 1 of this report introduces the *eat well be active (ewba)* Community Programs describing the aims and nature of *ewba*. Section 2 describes the quantitative methods of the evaluation. Sections 3, 4, 5 and 6 provide the outcomes of the baseline data collection in the Summary of Data Collection, Anthropometrics, Physical Activity and Nutrition sections respectively. These results in conjunction with outcomes reported in Part 2: Baseline Data Collection will form the baseline for the quantitative study and will be used to track the progress and efficacy of the *ewba* Community Programs by comparing them with data collected in 2009, and by comparing the outcomes of intervention and comparison schools over the three years of the study.

1.1 Background to eat well be active

South Australia, consistent with national and international trends, is experiencing a trend of increasing overweight and obesity across the whole population. Recent data from Child and Youth Health, a component of the Children Youth and Women's Health Service, clearly show that the increase in relative weight is occurring in children as young as 4 years old (Vaska & Volkmer 2004). In response to this trend, a whole of population approach that considers a wide variety of wellbeing activities was adopted.

The Department of Health (DH) is committed to promoting healthy weight (ie the prevention of overweight and obesity). This has been demonstrated through the funding of *ewba* Community Programs - two geographically based 3-year programs that support healthy eating and increased physical activity. The *ewba* Community Programs recognise the importance of adopting a population health approach to preventing overweight and obesity and promoting healthy weight. There is a need to address not only individuals' and families' knowledge and behaviour but also the environment and social issues that impact on peoples' lives, with the goal of making it easy for people to eat healthy food and be physically active.

The *ewba* Community Programs are a component of the state-wide plan to prevent overweight and obesity, developed by a state-wide government inter-sectoral task force. The *ewba* Community Programs will contribute to the State-wide plan by building on existing activities, measuring effectiveness and identifying further opportunities to foster innovation in addressing healthy weight promotion.

1.2 Aims of eat well be active

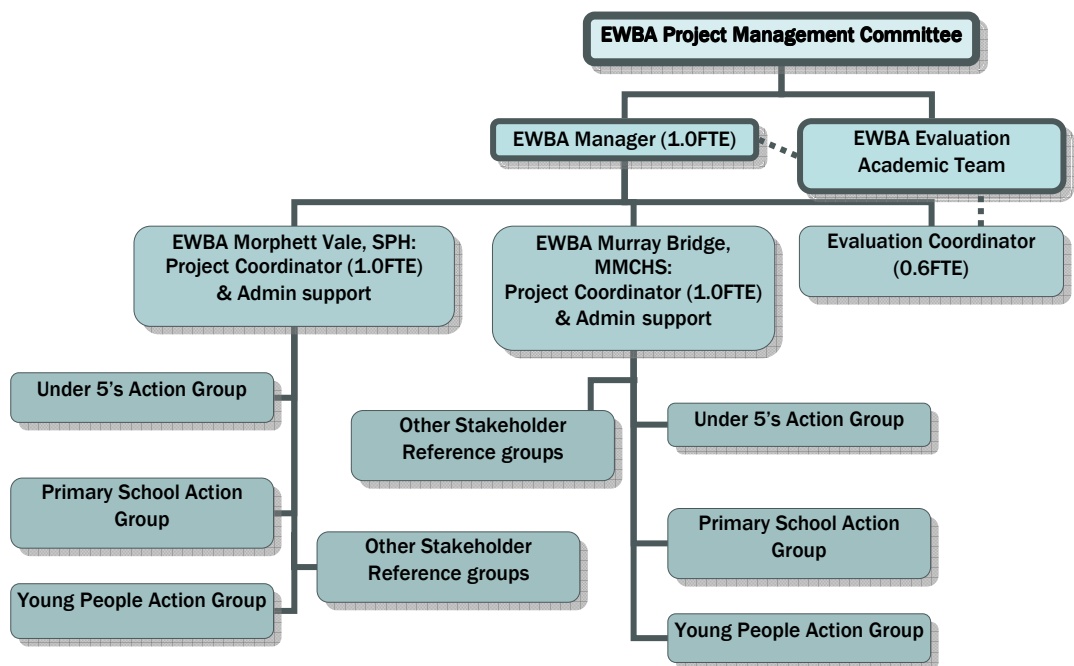
The South Australian Department of Health has allocated \$2.2 million over five years to the *ewba* Community Programs. *ewba* comprises two linked projects – one in Morphett Vale (southern metropolitan Adelaide, through Southern Adelaide Health Service) and one in the Rural City of Murray Bridge (Country region, through Murray Mallee Community Health Service) – that aims to contribute to the healthy weight of children, young people and their families in two demonstration communities through increasing healthy eating and physical activity. *ewba* will:

- Increase healthy eating and physical activity in partnership with a variety of settings (eg. schools, Under 5's settings, local government, homes, food services) by addressing both environmental and individual barriers.
- Determine the key components of a coordinated community approach to promoting physical activity and healthy eating that are sustainable and transferable to other areas.
- Determine the effectiveness of the community-wide programs to improve healthy eating and physical activity levels in the community.

1.3 Management of eat well be active

The programs are overseen by the Project Management Committee (see Fig 1) and managed by the *ewba* Manager reporting to this committee. The purpose of the Project Management Committee is to coordinate and endorse the development, implementation, evaluation and sustainability of *ewba*. The committee meets bi-monthly and has membership from the Department of Health's Health Promotion Branch, Southern Adelaide Health Service and Murray Mallee Community Health Service. In each site the program is coordinated by a Project Coordinator and has administrative support.

Figure 1: *ewba* Governance Structure



The Evaluation Academic Team is responsible for the development and implementation of all aspects of *ewba*'s evaluation and also provides support in ensuring the programs operate according to the best available evidence. The Evaluation Academic Team is managed by the Evaluation Coordinator and includes three University Academics with expertise in key fields including nutrition and childhood obesity, physical activity and community development.

1.4 Nature of eat well be active Interventions

The *ewba* model of intervention follows notions of an ecological approach whereby both individuals and social environmental factors form the sites of the health promotion interventions. An ecological approach is based on the assumptions that suitable changes in the social environment will produce changes in individuals, and that the support of individuals in the population is essential for implementing environmental changes (Egger & Swinburn, 1997; Kickbusch 1989; McLeroy et al 1988; Bronfenbrenner, 1977).

Population level approaches with a focus on children and young people are key characteristics of the overall *eat well be active* model. More particularly the model incorporates a number of strategies for action across a spectrum of health promotion settings (Poland, Green & Rootman 2000).

eat well be active Strategies For Action:

- policy review and development
- program and resource development
- community development
- promotion and social marketing
- workforce development
- peer education

eat well be active Settings of Change:

- schools
- government
- local and non-government settings
- food services
- businesses
- community organisations
- child care and after school hours care providers
- Indigenous organisations
- family and home settings
- recreation spaces.

Figure 2: *eat well be active* Model for Health Promotion



The *ewba* model of intervention is based on 'best evidence' (Swinburn and Egger, 2002; McNeil and Flynn, 2006: 404) as to the effectiveness of population level strategies to

reduce both the total burden of diseases and the prevalence of chronic diseases associated with overweight and obesity. Under a rubric of 'population health' various types of strategies have been identified to address overweight and obesity: legislative or regulatory approaches, mass media campaigns, health education and behavioural therapy, peer support groups and organisations, modifications to food supply, modifications to the physical environment, strategies aimed at professionals, and multi-strategy interventions (Gill, Bauman et al. 2004). Community wide interventions have broad reach, and the programme logic underpinning such approaches is that a small decrease in weight levels across the population is more likely to have an impact on population health status than larger decreases in a small number of people.

In addition interventions targeting 0-18 year olds are considered the most likely to produce long-term effects, for several reasons. Prevention and treatment interventions in adults have shown very limited long-term effectiveness, while some interventions aimed at children and adolescents have shown at least short-term effectiveness. With the correlation between childhood and adult obesity established (Viner and Cole 2005), it is possible that reducing childhood obesity may reduce adult obesity in the longer term. Consequently, there is potential for both immediate and long term benefits. Interventions are potentially easier and more cost efficient than treatment strategies or interventions aimed specifically at adults. A focus on children, young people and their families is also consistent with the *eat well be active* Healthy Weight Strategy for South Australia 2006-2010.

Community engagement, a further factor in the *ewba* approach, is widely held to be a key to successful public health programs (Department of Health 2005; NHS Modernisation Agency 2004; Summerbell, Waters et al. 2005). Mindful that there is no universally agreed definition of 'community engagement', *ewba* adopts a perspective wherein strategies for engagement include meaningful participation in planning and evaluation, participatory decision-making, and the establishment and maintenance of respectful partnerships.

Community participation is critical to ensuring that the perspectives, understandings, issues and needs of target communities are communicated and understood and that this knowledge informs actions developed to address the issues. Participatory decision-making increases both relevance of the decision to the target group and in turn their commitment to the decision. That commitment is a key factor in generating further active participation, community level leadership and support, and in the longer term, behaviour change (Gill, King et al. 2005; US Department of Health and Human Services 2002). Effective and respectful partnerships require an understanding of the resources and capabilities of partners, realistic expectations, identification and balancing of power structures, trust, multiple pathways for community participation, inclusive environments that allow for cultural, values and viewpoint differences, and in some cases, reorganisation of health care systems to encourage community participation (Zukoski et al 2004). It is important to ensure that target groups, including children and young people, and people of diverse cultural backgrounds, are engaged at all levels.

2.0 Methods

2.1 Evaluation Design

The evaluation aims to determine the impact of the *ewba* Community Programs on children and families using mixed quantitative and qualitative approaches. The interventions are community based and the design will compare one rural and one metropolitan community that receive the intervention with one rural and one metropolitan community that does not receive the *ewba* intervention. The design is a cross-sectional pre post design with comparison which Cook and Campbell (1979) cited as the most commonly used interpretable model of the quasi experimental designs.

A cross-sectional approach has been adopted because there are high mobility rates in the areas under study and the most useful measure for this type of community based project is on changes in the community over time including the effect of migration.

This report provides a summary of the quantitative methods used and the baseline findings from the first quantitative data collection period focusing on the students' survey and anthropometric data (end 2006). Outcomes from other surveys will be presented in Part 2: Baseline Data Collection. Data from the second quantitative data collection period (2009) will be compared with the initial data and presented in the Final Report in conjunction with the qualitative data collection outcomes.

2.2 Ethics and Informed Consent

Ethics approvals were granted by the relevant human research ethics committees from both the Department for Health (DH) and the Department of Education and Children's Services (DECS) as well as the Aboriginal Human Research Ethics Committee.

2.3 Selection of Intervention and Comparison Sites

Several factors were considered in making decisions about the location of the intervention and comparison sites. Norton (2003) recommended that the following variables be considered: area(s) most in need – socio-demographics, community acceptance and possible involvement, areas most likely to show successful change, issues of distance, population and size. Magarey (2003) also recommended that a 'metropolitan community of moderate size to achieve sufficient reach of interventions in multiple settings within the budget' and 'a community with the capacity in all sectors to undertake the work required'.

A metropolitan and a rural community have been selected as the two demonstration communities, and the key differences and similarities between such areas will be discussed. The *ewba* community initiatives are not intended as supplementary funding for areas with high levels of need and poor resources, they are however intended to focus on areas of disadvantage which have been shown to experience high levels of obesity. As mentioned previously the two sites selected for the *ewba* Community Programs are:

- Morphet Vale, southern metropolitan Adelaide
- Murray Bridge, Hills Mallee southern country region.

Noarlunga Health Services and Murray Mallee Community Health Service, that service the two communities respectively, were selected as the sites that have the infrastructure and experience needed to support the demonstration project.

The comparison sites were chosen using the following criteria including a similar rural-urban mix, number and age distribution of children, socio-economic status, educational levels, occupational and income distributions, family sizes and similar ethnic mix. The comparison communities selected are the Sea and Vines Education District (metropolitan

suburbs), a geographically separate area of the Onkaparinga Local Government Area and the rural municipality of Port Pirie.

2.4 Description of Intervention and Comparison Sites

The evaluation has a 'non equivalent control group' design. This means that the comparison communities will not exactly match the intervention communities. While every care has been taken to identify communities that match as closely as possible, there are important differences between intervention and comparison communities in ethnic mix and the public – private school mix.

Intervention Sites

Morphett Vale

Morphett Vale is a metropolitan suburb, south of Adelaide (see Figure 3). Morphett Vale is one of the older areas of white settlement within the City of Onkaparinga (1840's). Its geographic boundaries are Main South Road to the west, Pimpala Road to the north, Panalatinga Road to the east and Doctor's Road to the south. Morphett Vale primary and high schools fall within the SA Education Department's 'Wallara' schools district.

The total population of Morphett Vale in 2006 was 33,812 (ABS 2006). The Kaurna people are recognised as the Indigenous people of this region and in 2006 formed 1.1 per cent of the population of Morphett Vale.

In 2006:

- 20.7 per cent of the population (approx 7,000) of Morphett Vale was aged 0-14 years.
- The median age was 36 years, one year below the Australian average of 37 years.
- 20.2 per cent of the population of Morphett Vale was born overseas. Besides Australia the three most frequently cited countries of birth include: 9.9% from England, 1.4% from Scotland and 1.0% from New Zealand.
- The median family income in Morphett Vale is \$1070 per week, one hundred dollars below the Australian average.
- 19.1 per cent of the families in Morphett Vale are single parent families, above the Australian average of 15.8 per cent.

The index of relative social disadvantage (IRSD) is a measure of socio-economic status, the higher the score the less disadvantaged. The 2001 IRSD for Morphett Vale was 950-999, this compares with a higher IRSD of 1006 for Adelaide and an average IRSD for South Australia of 1000. The unemployment status in Morphett Vale in 2001 was 8.9%, slightly higher than the 8.0% average for City of Onkaparinga.

Morphett Vale is a discrete geographic community with existing infrastructure including shopping complexes, recreational spaces, primary and high schools and childcare/kindergartens, neighbourhood house and food retail outlets. There are a variety of recreational facilities available for use by local residents of Morphett Vale including: ovals, netball and tennis courts, skate park, equestrian facilities, archery and BMX track. Many of these are located within the Wilfred Taylor Reserve.

Figure 3: Map showing location of Morphett Vale in relation to Adelaide



Murray Bridge

The rural intervention site is in Murray Bridge and its outer towns (postcodes 5253/4 & 5259). Murray Bridge is a rural city located 80km east of Adelaide (Figure 4) and incorporates the regional fringe towns of Callington, Jervois and Mypolonga. Murray Bridge was established when a road bridge over the Murray River (which is how the city got its name) was completed in 1879.

The population of this region in 2006 was 18,725 (ABS 2006). About 6.3% per cent of the population is of Aboriginal background and the Ngarrindjeri Aboriginal people are the traditional land owners of this region. The Aboriginal population of Murray Bridge is 2.3% well above the Australian average.

In 2006:

- About 21% of the population were aged 0-14 years and the median age was 39 years, one and a half years above the Australian average.
- 10.4 per cent of the population were born overseas. In the city of Murray Bridge 2.9% were born in England, 1.4% born in China and 0.9% born in New Zealand. This highlights a significant Chinese born population in Murray Bridge. The people from the outer regions of Murray Bridge were predominantly born in England, but were also born in Italy, Netherlands, NZ and Germany.
- The median family income in Murray Bridge was \$860 per week and in the outer regions (postcodes 5254 and 5259) was \$975 and \$926 respectively, all below the Australian average.
- 18.9 per cent of families in Murray Bridge were single parent families and 10.9 and 9.5 per cent in the outer towns were single parent families.

In 2001 the IRSD for Murray Bridge was below 925 and in 2003 they had an unemployment rate of 8.0-9.9% (Social Health Atlas, 2006).

The city of Murray Bridge reports to be experiencing solid growth and is increasingly adopting the dual role of regional centre and the location of intensive activity serving the metropolitan regions (Social Health Atlas). Recent developments that have been announced within the region include the re-development of the Correctional Services sector with the building of two new prisons by 2011. An urban growth plan (2007) has predicted that Murray Bridge could 'double in population to 30,000 in the next 20 years' (City of Murray Bridge 2007).

Figure 4: Map showing location of Murray Bridge in relation to Adelaide



Comparison Sites

Sea & Vines

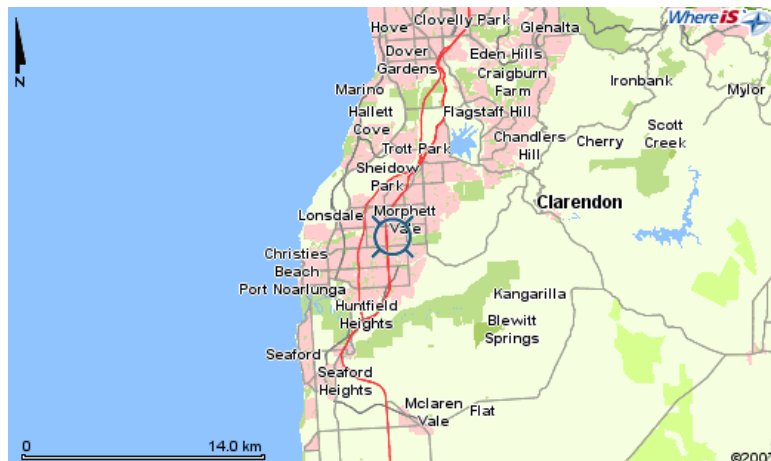
Sea and Vines community is a DECS district which includes the Southern Fleurieu Peninsula and Kangaroo Island. The DECS district encompasses both outer metropolitan and rural regions. For the purposes of the evaluation only the outer southern metropolitan schools and related suburbs are included as part of the comparison group. Our notion of Sea & Vines refers to the suburbs from within this region including: Hackham, Christies Downs, Christies Beach, O'Sullivan's Beach, Noarlunga, Noarlunga Downs, Moana and Seaford (see Figure 5). These suburbs are also located within the Onkaparinga Southern Health Region. Whilst it is a defined geographic community (made up of several suburbs) for our purposes, this community would not be recognised as such by members of these suburbs. They would identify as members of discrete suburbs, not as part of a 'Sea and Vines' community. In the following descriptions of this community the postcode (5163-5169) related ABS data have been combined. The Sea and Vines region is also recognised as a tourist destination however this concept of it refers to McLaren Vale wine region which is not included in our comparison group.

The population of Sea & Vines is 45,548 people of whom 1.9% identifies as Aboriginal (ABS 2006). The Kaurna people are the traditional Aboriginal people of this area.

In 2006:

- About 19 per cent of the population are aged between 0-14 years.
- The median age is 38 years, one year above the Australian average.
- About 25 per cent are born overseas and the most frequently cited countries of birth apart from Australia include England, Scotland and Germany.
- The average family income across these suburbs is \$882 per week – below the Australian average.
- About 22% of families are single parent families, above the Australian average of 15.8 per cent.

Figure 5 Location of suburbs in Sea and Vines in relation to Morphett Vale



Port Pirie

Port Pirie is situated on the upper reaches of the Spencer Gulf in the Southern Flinders Ranges of South Australia (see Figure 6). The Council area includes the city of Port Pirie (postcode: 5540), a historically significant city and busy commercial regional centre, as well as the rural towns of Crystal Brook (postcode: 5523), Napperby and Port Germein (postcode: 5495). It is a diverse region encompassing agricultural and industrial activities, with a history as a major manufacturing and export centre, where industry, century old buildings and attractive parks and gardens sit side by side.

In 2006 the total population of Port Pirie was 17,480 (ABS 2006). The Nukunu Aboriginal people are the traditional people of the area and the population of Aboriginal people in Port Pirie in 2006 was 2.5 per cent, Crystal Brook was 1.4 per cent and Port Germein was 3.9 per cent.

In 2006:

- 21.3% of the population of Port Pirie is aged 0-14 years (approximately 3,200) and the median age is 40 years.
- 7.5 per cent of the population of Port Pirie are born overseas. Of those born overseas most are born in England, then Italy and Scotland (2.5, 0.9 and 0.5% respectively).
- The median family income in Port Pirie is \$878 per week, below the Australian average. In Crystal Brook the median family income is \$1015 and in Port Germein it is \$680.
- There were 18.6% of single parent families residing in Port Pirie. The per cent of single parent families in Crystal Brook and Port Germein was 11.2 and 10.6% respectively.

Figure 6: Location of Port Pirie in relation to Adelaide



2.5 Selection of Schools and Students

All government and independent primary schools in the intervention sites of Morphett Vale and Murray Bridge were invited to participate in the intervention; the primary schools have been able to select the particular interventions that they take-up. All of the primary schools in the intervention sites have engaged at some level. All of the schools involved in the intervention have also been involved in the evaluation. In the comparison sites of Sea and Vines and Port Pirie all of the government and independent primary schools were invited to be involved in the evaluation. The primary schools participating in eat well be active evaluation are listed in Table 1.

Table 1: Primary schools participating in the eat well be active evaluation

Intervention		Comparison	
Morphett Vale	Murray Bridge	Sea & Vines	Port Pirie
Coorara Primary School	MB Christian College	Moana Primary School	Airdale Primary School
John Morphett Primary School	St Joseph's School	St John the Apostle Catholic Parish School	Crystal Brook Primary School
Morphett Vale West Primary School	Callington Primary School	Christies Beach Primary School	Napperby Primary School
Morphett Vale East Primary School	Fraser Park Primary School	Hackham South Primary School	Port Pirie West Primary School
Pimpala Primary School	Jervois Primary School	Hackham West Primary School	Risdon Park Primary School
Antonio Catholic School	Murray Bridge Primary School	Seaford Rise Primary School	St Mark's College
Calvary Lutheran School	Murray Bridge Southern Primary School	Port Noarlunga Primary School	Mid North Christian College
Southern Vales Christian Community School	Mypolonga Primary School	Noarlunga Downs Primary School	Port Germein Primary School
Sunrise Christian School	Unity College	Noarlunga Primary School	
Prescott Primary Southern		Pilgrim School Aberfoyle Park	
Woodcroft College			
Flaxmill Primary School			

2.6 Measures

Students

All of the students in years 5-7 were eligible to be involved in the evaluation. The schools distributed letters explaining the evaluation and consent forms to parents via the classroom teachers of the relevant year levels. There were three parts to the evaluation – nutrition survey, physical activity survey and anthropometry. The students were asked to return the completed consent form with permission from their parents to undertake all, any combination or none of the parts. To be involved in the evaluation both the parent and the student needed to provide consent.

Surveys

An extensive literature search was undertaken to locate appropriate surveys for use in the *ewba* evaluation, so as not to replicate work that had already been conducted. It was hoped that the surveys would capture the behaviour, knowledge, attitudes and environment for healthy eating and physical activity of students. It was decided that several data sources were to be targeted including school-age children, parents, Primary and High school principals, teachers, out of school-hours care (OSHC), canteens, long day care centres and family day care environments. Surveys which addressed both the breadth of inquiry as well as the project goals were unavailable in the published literature. Hence the *ewba* suite of surveys was developed through extensive consultation and an academic review process.

This report presents the data from the student anthropometric measurements and nutrition and physical activity surveys. The student physical activity survey included two questions from the Adolescent Physical Activity Recall Questionnaire (APARQ) which assesses usual or habitual physical activity participation using a self-report format and is intended for use by people aged 10 years or older. It has two main components: questions on participation in organised sports, games and other activities, and questions on participation in non-organised physical activities. The APARQ has been shown to be reliable and valid, at least among respondents aged 13 years and older (Booth, Okely et

al. 2002). Reliability and validity testing is currently being undertaken on the other questions in the student's physical activity survey.

Wilson, Magarey and Mastersson (2008) undertook the reliability and validity testing of the nutrition components of the students' questionnaire. They found that the survey was reliable and valid on the attitude, behavioural and environment questions but less so on the questions to determine students' knowledge of appropriate levels of fruit and vegetable consumption.

Scoring System

This report presents both the frequency data from each item in the surveys as well as the broader scores from the student nutrition and physical activity surveys. A scoring system was created by Emma Clover and Annabelle Wilson in consultation with Dr Anthea Magarey and Dr Jim Dollman for both the nutrition and the physical activity surveys. A score includes several elements of a single construct. For example, five questions about the student's attitude towards fruit consumption were combined to create a single fruit attitude score. The rationale for the use of scores was that they were deemed to be more sensitive to change and so when used for the analysis of the effectiveness of the intervention are more inclined to identify smaller changes.

Fourteen scores were developed from the nutrition survey and nine scores developed from the physical activity survey (excluding the APARQ questions).

A target healthy score was set (based on healthy eating guidelines, physical activity guidelines and advice from experts in the field). The scores vary between constructs and are set at levels relative to the amount of desirable behaviour, knowledge or attitudes. The scores are reported by providing the percentage of students that meet the target healthy score. For example 76.4% of students had a healthy attitude toward fruit (target score ≥ 20). The scores for the constructs are reported in text boxes and where possible will be located alongside the reporting of the frequencies of the items included within the construct. A formula was used to create the score and so it may not be possible to directly relate the frequency data to the healthy score data.

Anthropometrics

The height, weight and waist circumference of the students were measured. Height and weight were used to calculate the Body Mass Index (BMI) as an accepted measure of adiposity at the population level, although it gives no indication of body fat distribution (McCarthy, Ellis & Cole 2003). Waist circumference was used as a measure of central body fat accumulation; a large waist circumference is linked to an increased risk of metabolic complications (McCarthy et al 2003). BMI and waist girth z scores were calculated using LMS program (LMS growth) which is based on Cole's 1990 British reference curves (Cole et al, 1995) and to convert to overweight or obesity status using International Obesity Task Force (IOTF) cut-points (Cole et al 2000). Z score is a standardised score which adjusts for age and gender differences allowing comparison of two or more distributions or groups. A z score helps to determine how far above or below the average the group is. NHMRC (2003) recommends the use of z scores in research as the 'use of BMI-for-age z scores allows a more detailed statistical description of individuals, particularly individuals at extremes of BMI' (p.12). A z score of 0 is equivalent to the median, or 50th percentile.

Field staff were trained in basic anthropometry procedures (measuring height, weight and waist circumference) by Dr Jim Dollman, according to the protocols of the International Society for the Advancement of Kinanthropometry (ISAK; Norton and Olds 1996). Field staff also completed a course in body image sensitivity titled 'A Sensitive Approach to Obesity Prevention in Children: protecting body image and self esteem' by Australian health promotion consultant, writer and speaker Ms Thea O'Connor. Body image issues

were addressed through strategies such as using screened areas and the choice of either male or female field staff to undertake the measurements.

Body weight (to 100g) and stretch stature (to 0.1cm) were measured using Tanita digital lithium scales (HD-319) and a Mentone Educational portable height scale (PEO87), respectively. Stretch stature was used to minimise the effect of diurnal variation in stature, so that assessments could be made at any time during school hours. The process involves application of gentle upward pressure through the mastoid processes during measurement. BMI was calculated as weight (kg)/stature (m²). Waist girth was measured using Lufkin (W606PM) constant tension metal tapes at the level of the visible narrowing of the waist and at end-tidal expiration.

Data Quality Control

Anthropometry measurement skill was quantified by determining the technical error of measurement (TEM) for waist girth. The TEM is a measurement of precision and accuracy, with intra-tester TEM (precision) determined from repeat measures by the same measurer on the same subjects, while the inter-tester TEM (accuracy) is calculated by comparing measurements with those taken by a criterion measurer on the same subjects (Norton and Olds 1996). In this survey, the criterion measurer was trained to Level 3 of the International Society for the Advancement of Kinanthropometry (ISAK) accreditation scheme. The average intra-tester TEM, established on 5 measurers, was 0.6% (range 0.1 – 1.0), while the average inter-tester TEM for the same 5 measurers was 0.9% (range 0.6 – 1.1). These TEMs are well within those required by ISAK for accreditation at Level 1 (2.5% for intra-tester TEM and 5.0% for inter-tester TEM).

3.0 Data Collection Outcomes

This section provides a summary of the data collected from the participating schools.

3.1 Response Rates

Schools

Of the 44 primary schools selected to participate in the evaluation, 39 agreed to participate (89% acceptance rate). All of the schools that declined were in the comparison sites.

Table 2: School participation rates in the *ewba* evaluation.

	Intervention			Comparison			Total Sample
	Morphett Vale	Murray Bridge	Total	Sea and Vines	Port Pirie	Total	
Number of Primary Schools approached	12	9	21	14	9	23	44
Number of Primary Schools involved	12	9	21	10	8	18	39
Participation Rate (%)	100	100	100	71.4	88.9	78.3	88.6

Students

Of the total number of students eligible to participate in the evaluation 47.5% of students completed either a nutrition or physical activity survey. Overall more surveys were collected (n=1732) than anthropometric measures (n=1637) taken. This is likely to be due to the more sensitive nature of taking height, weight and waist circumference measures. Table 3 provides a summary of the rates of response based on 2006 school enrolments.

Table 3: Student response rates to survey and anthropometric measures

	Intervention			Comparison			Total Sample
	Morphett Vale	Murray Bridge	Total	Sea and Vines	Port Pirie	Total	
Enrolments [†] from schools agreeing to participate	1210	825	2035	909	703	1612	3647
Did not consent [‡]	108	59	167	35	60	95	262
Absent ^{††}	41	22	63	29	18	47	110
Nutrition Surveys Returned	528	347	875	455	402	857	1732
Rate of Return of Nutrition Surveys (%)	43.6	42.1	42.9	50.0	57.2	53.2	47.5
Physical activity Surveys Returned	530	343	873	456	403	859	1732
Rate of Return of Physical Activity Surveys (%)	43.8	41.6	42.9	50.2	57.3	53.3	47.5
Anthropometric Measures Taken	509	334	843	418	375	794	1637
Anthropometric Participation Rate (%)	42.1	40.5	41.4	46	53.3	49.3	44.9

† Enrolments as reported by the schools August 2006

‡ Did not consent refers to either the student or parent did not consent to either surveys or anthropometric measures being taken or on the day of data collection the student did not consent even if the consent form said 'yes'. It does not include those students that did not return their consent form.

†† Absent refers to those students that consented but were absent on the day of data collection.

After 11 schools had been involved in the pre-data collection, the student response rate averaged 43.1%. The decision was made to include the provision of incentives to students to encourage the return of a completed consent form. The student did not have to agree to be involved in the study to receive an incentive; they needed to return a completed consent form. The incentive was a 'be active hacky sack' which was selected as it encourages physical activity, an aim of the *ewba* Community Programs. One school refused the offer of the provision of incentives to students and so a total of 28 schools were offered and took up the use of incentives. The student response rate after the use of the incentive increased to 48.6%.

4.0 Anthropometrics

4.1 The Sample

A total of 1633 students had all anthropometric measures taken as part of the ewba baseline anthropometric assessment in August to October 2006. Two students had height and weight measures only. Seven students were excluded from the final analysis due to missing or questionable birth dates. The final sample (n=1626) included in the anthropometric analysis contained:

- 811 (49.9%) boys and 815 (50.1%) girls.
- 924 (56.8%) students from urban regions and 702 (43.2%) from rural regions.
- 507 (31.2%) from Morphett Vale, 417 (25.6%) from Sea and Vines, 330 (20.3%) from Murray Bridge and 372 (22.9%) from Port Pirie.

The students ranged in age from 9-14 years. The mean age was 11.8 years (standard deviation 0.99). The distribution by age and sex can be seen in Figure 7. As there were only three students with a whole age of nine and four students with a whole age of fourteen, these students were grouped with age groups 10 and 13 respectively to create age groups 9-10 years and 13-14 years. The students were enrolled in either Years 5, 6 or 7. The distributions by year level and sex are shown in Figure 8. Students were more likely to be involved in the anthropometric data collection part of the evaluation if they were in Years 5 and 6 than if they were in Year 7. The mean (sd) age of year 5,6 and 7 students was 10.9 (0.9), 11.9 (0.9) and 12.9 (0.9) years respectively. The mean (sd) age of the entire sample was 11.8 (0.9) years. There were no differences in the proportion of boys and girls between age groups or year levels ($p=0.19$) or between areas (rural versus urban) ($p=0.5$).

Figure 7: Distribution of the *eat well be active* anthropometric sub-sample by age (whole year) and sex (n=1626)

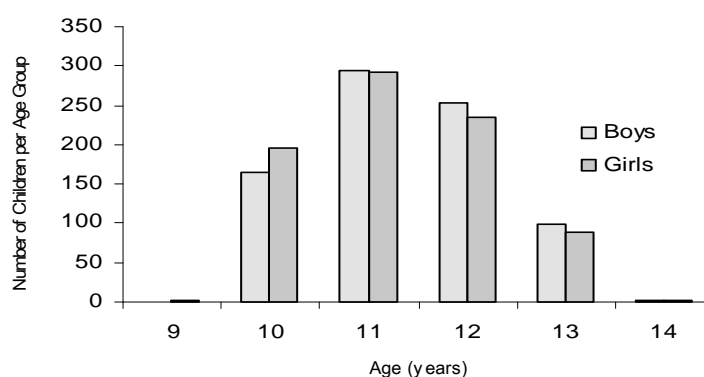
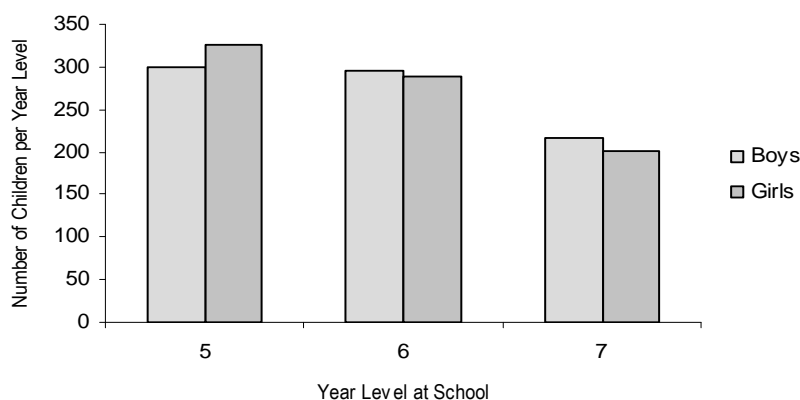


Figure 8: Distribution of the *eat well be active* anthropometric sub-sample by year level at school and sex (n=1626)



4.2 Weight, Height and Waist Circumference

The mean (sd) height, weight, BMI waist and BMI and waist z scores are shown in the table below for all subjects, all boys and all girls and within each gender for each age group. Mean values for each gender in rural and urban areas are also shown.

Applying a Bonferroni correction for multiple comparisons and using an α of 0.01 as significant there were no gender differences for height, weight, BMI or waist. Boys had greater overall adiposity (BMI z score; $p=0.003$) but lower central adiposity (waist z score; $p < 0.001$).

As expected there were significant differences according to age for height, weight, BMI and waist reflecting the differences in growth with age. There were however no differences according to age for either boys or girls for BMI and waist z scores. The z scores indicate that this sample had greater adiposity overall and centrally than the reference population.

There were no differences between rural and urban boys and rural and urban girls for any parameter. Girls had greater central adiposity than boys in both rural and urban regions ($p < 0.001$ for both) while urban boys had a greater BMI than urban girls (BMI z score) $p = 0.007$.

Table 4: Mean [sd] Height, Weight, BMI and Waist, and BMI and Waist z Scores

	n	Height	Weight	BMI	BMI z score ^a	Waist	Waist z score ^a
All	1626	150.1 [8.6]	44.8 [11.2]	19.7 [3.6]	0.60 [1.12]	66.3 [8.9]	0.74 [1.15]
Boys	811	150.0 [9.1]	44.6 [11.3]	19.5 [3.4]	0.68 [1.09] ^b	66.2 [8.9]	0.54 [1.08] ^b
9-10 years	164	142.9 [6.6]	39.6 [9.9]	19.2 [3.5]	0.83 [1.07]	64.6 [9.1]	0.71 [1.09]
11 years	293	147.2 [7.4]	41.7 [9.8]	19.0 [3.2]	0.58 [1.09]	64.8 [8.4]	0.46 [1.11]
12 years	254	153.9 [7.8]	47.8 [11.3]	20.0 [3.6]	0.69 [1.10]	67.0 [9.1]	0.56 [1.07]
13-14 years	100	159.4 [8.0]	52.1 [10.6]	20.4 [3.3]	0.67 [1.07]	68.9 [8.0]	0.47 [1.00]
p age difference		0.000	0.000	0.000	0.14	0.000	0.12
Girls	815	150.1 [8.4]	45.2 [11.0]	19.9 [3.6]	0.52 [1.15]	66.3 [8.9]	0.94 [1.18]
9-10 years	199	144.6 [7.2]	41.0 [9.6]	19.5 [3.5]	0.65 [1.13]	65.2 [9.0]	1.06 [1.16]
11 years	292	148.1 [7.2]	43.9 [11.2]	19.8 [3.9]	0.55 [1.17]	65.9 [9.6]	0.93 [1.21]
12 years	234	154.5 [7.0]	47.7 [10.2]	19.9 [3.5]	0.37 [1.14]	66.8 [8.0]	0.85 [1.12]
13-14 years	90	157.6 [6.2]	52.1 [10.7]	20.9 [3.5]	0.51 [1.11]	69.0 [8.8]	0.97 [1.23]
p		0.000	0.000	0.026	0.08	0.005	0.34
Rural							
Boys	352	150.6 [9.4]	45.3 [11.3]	19.8 [3.4]	0.77 [1.04] ^b	66.3 [8.6]	0.55 [1.05] ^c
Girls	350	150.4 [8.5]	45.8 [11.8]	20.1 [3.9]	0.54 [1.16]	66.4 [9.7]	0.91 [1.23]
Urban							
Boys	459	149.6 [8.9]	43.8 [11.2]	19.4 [3.5]	0.61 [1.10]	66.2 [9.1]	0.54 [1.10] ^c
Girls	465	149.9 [8.2]	44.7 [10.4]	19.7 [3.4]	0.50 [1.13]	66.2 [8.4]	0.97 [1.14]

a: based on UK reference population 1990 (Cole et al 1990, McCarthy et al 2001)

b: significant gender difference BMI z score $p = 0.003$, waist z score $p = < 0.001$

c: significant difference between sexes within the region

4.3 Prevalence of Overweight and Obesity

Overall the prevalence of overweight was 18.5% with a further 6.6% obese. There were no significant differences in prevalence of combined overweight and obesity between boys and girls but there was a significant age effect ($p=0.01$) with prevalence being greatest in the youngest age group (9-10 years) (31%). This age difference was attributable to differences in girls ($p=0.002$) rather than boys ($p=0.6$). Comparison by gender at each age showed a significant gender difference only for those aged 11 years ($p=0.03$).

Table 5: Prevalence (%) of Overweight and Obesity (O+O) according to the International Obesity Taskforce definition by Age and Sex (n=1626)

	9-10 years	11 years	12 years	13-14year	All
All - n	250	440	381	148	1219
Overweight	22.6	18.6	15.6	17.4	18.5
Obese	8.5	6.2	6.4	4.7	6.6
Overweight + Obese	31.1 ^a	24.8	22.0	22.1	25.1
CI^α for O+O	26.3:35.9	21.3:28.3	18.2:25.6	16.2:28.1	22.9:27.1
Boys - n	164	293	254	100	811
Overweight	16.5	16.7	15.4	19.0	16.5
Obese	9.8	4.1	8.3	4.0	6.5
Overweight + Obese	26.3	20.8	23.7	23.0	23.0
CI for O+O	19.4:33.0	16.1:25.5	18.4:28.9	14.6:31.4	20.2:26.0
Girls - n	199	292	234	90	815
Overweight	27.6	20.6	15.8	15.6	20.4
Obese	7.5	8.2	4.3	5.6	6.6
Overweight + Obese	35.1 ^a	28.8	20.1	21.2	27.0
CI for O+O	28.5:41.9	23.5:34.0	14.9:25.3	12.5:29.7	23.9:30.0

1: Cole et al BMJ 2000

a: significant difference according to age (ANOVA $p = 0.01$)

^αConfidence Interval

There were no differences in prevalence of overweight and obesity combined between urban and rural regions for all students (24.3% and 26.1% respectively) nor for sexes separately.

Table 6: Prevalence (%) of Overweight and Obesity according to International Obesity Taskforce (IOTF) definition by Region and Sex (n=1626)

	Urban	Rural
Boys	n=459	n=352
Overweight	15.0	18.5
Obese	6.5	6.5
Overweight + Obese	21.5	25.0
Girls	n=465	n=350
Overweight	21.5	18.9
Obese	5.4	8.3
Overweight + Obese	26.9	27.2

5.0 Physical Activity

The Australian Government (Dept Health and Ageing 2004) recommends that children and young people (5-18 years) should participate in at least 60 minutes (and up to several hours) of moderate-to-vigorous intensity physical activity (MVPA) everyday. Further they recommend that children and young people should not spend more than 2 hours a day using electronic media for entertainment (eg computer games, internet and television).

The total sample size (n) is 1733. This varies slightly across the following responses due to unanswered questions.

5.1 Active Time

School Environment

77% of students are usually physically active at school (recess/ lunch/ PE lesson)

Lunch and Recess Times

Students were asked what they usually do (3 or more times per week) at recess and lunch times. They were given 5 options or asked to specify other activities. The majority of students were found to engage in active or partly active activities at lunch and recess times. Students were only slightly more active at lunch than at recess.

Table 7: Percentages of students' that engage in various activities at recess and lunch times

	Recess Times	Lunch Times
Sit and talk to friends	15.9%	11.1%
Walk around the school	25%	22.2%
Run around playing sports/games	56.4%	63.7%
Read/study for next class	0.1%	0.5%
Nothing much	2.3%	2.2%
Other		

Physical Education Lessons

'The Australian Government requires, from 2005, that all primary and junior secondary (up to and including year 10) students undertake at least 2 hours of physical activity in the curriculum each school week. The commitment is subject to common-sense exemptions for children unable to undertake any form of physical activity.' (Australian Government, 2007) This policy has been legislated in Parliament and tied to Federal Grants to State education authorities from 1st Jan 2005. This policy does not specifically refer to Physical Education lessons and includes other incidental physical activity in other curriculum areas.

Students were also asked how many physical education or fitness classes they attended at school in the last week. 53.5% reported attending 3-4 classes or everyday. 44.8% attended 1-2 classes and 1.7% reported none or not having PE.

When asked how much time they were usually active in the PE lesson, 47.9% stated that they were active most or nearly all of the time.

Table 8: Active time in PE lessons

	Frequency (%)
Very little	8.8
Some of the time	19.9
About half the time	23.4
Most of the time	25.5
Nearly all the time	22.4

Boys (81.1%) were more likely to be physically active at school than girls (65%) $p < 0.001$.

Transport To and From School

45% of students used active transport at least once per day travelling to or from school

Students were asked about their mode of transport to and from school. They were asked to indicate the number of times per week that they walked, cycled, were driven in a car or caught a bus or train. A number of students indicated they used more than one form of transport everyday or 3 or more times a week (ie they might walk to the bus stop and then catch the bus). To manage this only the usual transport was considered (mode used 3 or more times per week). Walking or cycling 3 or more times per week was classified as active transport, catching the bus or train three or more times per week (including the walk to and from the bus stop/train station) was considered partly active and riding in the car was considered non-active transport. The frequencies of these modes of transport are reported in the table below.

Table 9: Frequency of modes of transport to and from school (n=1733)

	Active (%)	Partly Active (%)	Non-active (%)
To school	38.7	7.5	53.8
From school	40.3	9.2	50.5

Of the students that lived less than a 20 minute walk from school (n=880) 58.4% engaged in active transport to get to school and 59.7% engaged in active transport to get home from school.

There was no gender difference in the proportion who used active transport.

Outside of School Environment

67% of students used local parks and recreational facilities outside of school hours at least once per week

Students were asked about the frequency of their use of parks, ovals, playgrounds and recreational facilities in their local area both after school and on the weekend. The frequency (%) of the use of the outside of school environment for physical activity is reported in Table 10.

Table 10: Frequency (%) of use of the outside of school environment for physical activity

	Never/ Rarely	Sometimes	Once/ week	2-3 times/ week	Most days
Parks, ovals & playgrounds	16	37.3	13.3	17.1	16.3
Other recreational facilities (eg skate ramp, courts etc)	18.2	29.3	15.1	18.6	18.8

Boys (71%) were more likely to use local recreational facilities than girls (62%) $p < 0.001$.

5.2 Non-Active Time

80% of students exceeded the 2 hour recommended screen time per day

Years 5, 6 and 7 students were asked how long they spent either watching television, videos/ dvds or playing on the computer or video games on an average school day, Saturday and Sunday. The recommended daily electronic screen time is no more than 2 hours (Dept Health and Ageing 2004). The majority of students exceed their recommended daily engagement in electronic screen time.

Table 11: Frequency of students that met the daily electronic screen time (less than 2 hours of electronic viewing time per day)

	Frequency (%)
Weekdays (n=1731)	36.8
Saturday (n=1731)	33
Sunday (n=1732)	43.2
Everyday (n=1729)	28.8

Boys were more likely to exceed the recommended screen time (85%) than girls (76%) $p < 0.001$.

5.3 Environment

Local

51% of students reported that the local environment was supportive of physical activity

Students were asked about the facilities provided in their local neighbourhood:

- 44.4% agreed or strongly agreed that students have a say about what equipment is available at break times. 21.7% either disagree or strongly disagree. 33.9% were not sure.
- 65.5% agreed or strongly agreed that there are good parks, ovals or playgrounds for them to use. 11.8% were unsure and 22.7% either disagreed or strongly disagreed.
- 69% of students either agreed or strongly agreed that they have enough choice of different activities or sports to play. 15.8% either disagreed or strongly disagreed and 15.2% were not sure.
- 63.1% of students agreed or strongly agreed that they were able to walk by themselves to visit friends or to the shop. 25.5% disagreed or strongly disagreed and 11.4% were not sure.

Students were also asked how safe they felt walking or riding through their neighbourhood. 94% of boys and 88% of girls stated they felt either safe or very safe. 6% of boys and 12% of girls described feeling unsafe or very unsafe.

Boys were more likely to report that the local environment was supportive (57%) than girls 45% $p < 0.001$.

School

36% of students agreed the school environment was conducive to physical activity

Students were asked the degree to which they agreed or disagreed with several statements about the school environment:

- 44.4% agreed or strongly agreed that students have a say about what equipment is available at break times. 21.7% either disagree or strongly disagree. 33.9% were not sure.
- 26% of students either agreed or strongly agreed that the playground was too crowded for them to play at break times. 52.8% disagreed or strongly disagreed. 21.2% were not sure.
- 71.7% of students believed they have enough choice of different physical activities or sports to play at school. 13.3% disagreed or strongly disagreed with this statement and 15% were not sure.
- 9% of students agreed or strongly agreed that school bullies stopped them from playing at break times. 80.3% disagreed or strongly disagreed and 10.7% were not sure.

There was no difference in boys' and girls' assessment of the school environment.

Home

58% of students reported support for physical activity in the home

Students were also asked questions about the home environment and whether they are encouraged or supported to be physically active.

83.2% of students agreed or strongly agreed that their parents or carers encourage (say or do things) that 'make me want to be physically active'. 5.6% disagreed or strongly disagreed while 11.2% were unsure.

Students were asked whether their parents let them watch as much television as they wanted on school days. 24.1% agreed or strongly agreed while 55% disagreed or strongly disagreed. 20.9% were not sure.

There was no difference in boys' and girls' assessment of the home environment.

5.4 Physical Activity Attitudes

The vast majority of students believe physical activity is fun and healthy

To determine their attitudes toward physical activity students were asked how strongly they agreed or disagreed with four statements.

From the sample of 1732 students:

- 92.9% either agreed or strongly agreed that being physically active was fun.
- 95.1% either agreed or strongly agreed that being physically active was good for their health.
- 88.5% either agreed or strongly agreed that they can do sport or other physical activity even if they are not good at it.
- 78.5% either agreed or strongly agreed that they like to play outside when they get home.

There were no gender differences in responses to these questions.

62.7% of students agreed when asked if they had tried at least one organised physical activity or sport in the last 12 months for the first time. 22.6% responded that they did not and 14.7% could not remember.

5.5 Engagement in Organised Physical Activity

Students were asked about the organised sports and games that they played for a school or club in the last 12 months. They were asked what type of sport or games they played, the school terms they were undertaken in, the frequency per week they played them (training and competition) and the amount of time they spent undertaking the activities.

At baseline from a sample of 1732 students:

- 28% of boys and 36% of girls played no club sport in the previous 12 months.
 - 49% of boys and 59% of girls played no school sport in the previous 12 months.
- These percentages are similar to results from the 2002 South Australian Physical Activity Survey, a representative survey of 33 primary schools conducted by the University of South Australia. They found that 36% of girls and 36% of boys played

no club sport while 50% of girls and 52% of boys played no school sport (Dollman 2007).

Table 12: Percentages of students (N=1732) engaged in organised sport/activity in the previous 12 months

	Boys	Girls
At least one club sport	72%	64%
At least two club sports	35%	26%
At least one school sport	51%	41%
At least two school sports	18%	9%

The most frequently played sports were identified:

- School soccer was played most often by both boys and girls.
- The most played club sports are Australian Rules football among boys and netball for girls.
- Both basketball and tennis were popular among boys and girls, both at club and school level.

Table 13: Most frequently played sports in descending order for boys and girls

	Boys		Girls	
	Club	School	Club	School
1	AFL	Soccer	Netball	Netball
2	Basketball	AFL	Basketball	Soccer
3	Soccer	Cricket	Dance	Basketball
4	Tennis	Basketball	Tennis	Dance
5	Cricket	Tennis	Swimming	Tennis

5.6 Engagement in Non-organised Physical Activity

Students were asked about the non-organised sports and games that they played during recess, lunch, after school and on the weekends in the last month. They were asked the type of activities they did, how many times they did it per week and the amount of time they spent doing the activity.

From the baseline sample:

- Nearly one third of girls did not engage in any moderate-to-vigorous physical activity at recess times.
- About one quarter of girls did not engage in any moderate-to-vigorous physical activity at lunch times.
- Less than one half of boys and girls reported engagement in vigorous physical play after school.

Table 14: Percentages of boys and girls (n=1732) who do not engage in moderate-to-vigorous physical activity (≥ 3 METS) during free play

	Boys	Girls
Recess	17%	29%
Lunch	17%	25%
After School	21%	23%

Table 15: Percentages of boys and girls who do engage in vigorous physical activity (≥ 6 METS) during free play

	Boys	Girls
Recess	53%	34%
Lunch	56%	40%
After School	47%	43%

5.7 Energy Expenditure

Metabolic equivalent (MET) is a unit used to describe the energy cost of exercise. One MET is the amount of oxygen required per minute under resting conditions. The energy expenditure of the organised and unorganised activities undertaken by students was calculated based on the estimates provided by Ainsworth et al (2000). The following was found:

- Club sport and free play after school account for over one half of total energy expended in physical activity, for both boys and girls.
- Lunch and recess breaks account for about one quarter of total energy expended in physical activity, and therefore on a relative basis represent an important context for physical activity.

Table 16: Energy expenditure (MET.min) presented as means and standard deviations, for all boys and girls and probability values for sex differences.

	Boys n=740		Girls n=782		p for sex differences
	Met.min	sd	Met.min	sd	
Club Sport	1700	1872	1253	1678	<0.0001
School Sport	776	1014	487	812	<0.0001
All Organised Sport	2476	2228	1740	1909	<0.0001
Recess	446	246	362	234	<0.0001
Lunch	708	421	638	424	<0.0001
Lunch and Recess	1155	622	973	577	<0.0001
After School	1790	2200	1467	1934	0.002
Total Energy Expenditure	5412	3579	4187	2992	<0.0001

Note: MET.min calculated as MET value for each listed activity X frequency X duration. MET.min scores for reported activities are then summed for the activity contexts in the table.

Age based analysis of the energy expended in organised and non-organised activities was undertaken. Among boys, younger boys (Years 5 and 6) expend more energy in physical activity (MET.min) during free play at school, but less in organised sport. This reflects a shift in activity preferences from unstructured to structured contexts as boys age.

Table 17:Energy expenditure (MET.min) presented as means and standard deviations, for younger (Years 5, 6) and older (Year 7) boys and probability for year differences.

	Years 5, 6 n=526		Year 7 n=212		p for differences
	MET.min	sd	MET.min	sd	
Recess	458	248	415	237	0.03
Lunch	731	424	651	410	0.02
All Organised Sport	2364	2131	2756	2436	0.03
After School	1809	2251	1742	2072	0.71
Total Energy Expenditure	5350	3577	5564	3588	0.46

Note: MET.min calculated as MET value for each listed activity X frequency X Duration. MET.min scores for reported activities are then summed for the activity contexts in the table.

Among girls, the pattern was less clear, although older girls expended more energy in organised sport than younger girls. There was a non-significant trend towards higher energy expenditure among the younger girls during free play at school.

Table 18: Energy expenditure (MET.min) presented as means and standard deviations, for younger (Years 5, 6) and older (Year 7) girls and probability for year differences

	Years 5, 6 n=562		Year 7 n=217		p for differences
	MET.min	sd	MET.min	sd	
Recess	370	243	341	208	0.12
Lunch	619	413	585	392	0.30
All Organised Sport	1614	1776	2066	2187	0.003
After School	1492	1929	1404	1947	0.57
Total Energy Expenditure	4104	2909	4402	3194	0.21

Note: MET.min calculated as MET value for each listed activity X frequency X duration. MET.min scores for reported activities are then summed for the activity contexts in the table.

6.0 Nutrition

6.1 Food Intake

Non-core Food

75% of students reported an excessive intake of non-core foods

Non-core food refers to items of food that should be consumed sometimes and/or in small amounts. Non-core foods can also be referred to as 'junk' food or 'some-times' foods. They are foods 'that are high in energy but low in nutrient value' (Bell et al 2005) . Non-core foods consist of items such as potato crisps, chocolate bars or lollies, muesli bars, biscuits (savoury or sweet), ice cream or ice blocks. Foods such as pies/pasties or sausage rolls, hot chips/French fries or wedges and hot dogs or pizza are also non-core foods. The Australian Guide to Healthy Eating (AGHE; Kellett et al 1998) refers to these foods as extras and recommends only 1-2 serves¹ daily within a balanced diet.

Table 19: Students (n=1730) consumption or anticipated consumption of non-core foods on the day of testing at either recess/ lunch or after school.

	Recess	Lunch	After School
Potato crisps	43.4%	6.0%	18.2%
Chocolate/ Chocolate bar/ Lollies	30.5%	7.4%	24.2%
Muesli Bar	33.8%	4.8%	9.2%
Savoury/ Sweet Biscuits	29.4%	11.0%	29.0%
Ice cream/ Iceblock	1.6%	4.6%	20.4%
Pie/ Pasty/ Sausage Roll	0.8%	6.6%	5.5%
Hot Chips/ French Fries/ Wedges	0.6%	1.8%	7.2%
Hot Dog / Pizza	1.6%	9.9%	7.8%

The majority of non-core food is consumed at recess time, followed by after school and then lunch time.

Of those students that consumed non-core foods:

- 31.4% consume potato crisps (or equivalent) 4 or more times per week.
- 21.8% consume chocolates or lollies 4 or more times per week.
- 7.2% consume hot chips/ french fries or wedges 4 or more times per week.

¹ A sample serve of extra foods is the amount that provides 600kilojoules of energy.

Sweetened Beverages

64% of students reported an excessive intake of sweetened beverages

Sweetened beverages include items such as cordial, fruit juice/ juice drink, regular soft drinks, sports energy drinks and diet soft drinks. The AGHE recommends water and/or milk as the primary beverages consumed daily. Half a cup of juice is considered equivalent to a serve of fruit but the AGHE recommends only one serve of fruit daily should be consumed in the form of juice. All other sweetened beverages are considered non-core.

Table 20: Frequency (%) of students (n=1730) consumption or anticipated consumption of sweetened beverages on the day of testing at either recess/ lunch or after school

	Recess	Lunch	After School
Cordial	4.6	4.0	30.2
Fruit juice/ fruit juice drink	7.5	5.4	23.9
Regular soft drink/ energy sports drink	1.3	2.5	16.5
Diet soft drink	1.1	1.3	16.7

The vast majority of sweetened beverages are consumed after school.

Of those students that consume sweetened beverages:

- 35.4% consume fruit juice or fruit juice drink 4 or more times a week.
- 18.6% of students that consume soft drink (not diet) 4 or more times a week.

Water

43% of students consumed adequate amounts of water

Water is recommended as the primary beverage of choice.

On the day of testing the percentage of students (n=1730) who reported consuming or anticipated consuming water was:

- 76.9% at recess time.
- 81.8% at lunch time.
- 56.7% after school.

Daily water consumption is recommended. 85.5% reported consuming water everyday, 7.9% consume water 4-6 times per week and. 6.6% consume water less than 3 times per week.

Fruit

45% of students reported an adequate daily intake of fruit

The AGHE recommends the consumption of at least one serve of fruit (fresh/ canned/ dried/ juice) per day for 8-11 year olds and 2 to 3 serves for 12-18 year olds. Students were asked the number of serves of fruit they usually eat per day:

- 38.6% eat 3 or more serves of fruit per day, 49.8% eat 1-2 serves per day, 9.7% eat less than one serve per day and 1.8% reported that they do not eat fruit.

Table 21: Percentage of students (n=1730) that consumed or expected to consume fruit at specified times on the day of testing

	Recess	Lunch	After School
Fruit (fresh/ canned)	34.8	16.0	29.3
Dried Fruit	5.5	2.1	5.6

Vegetables

Only 13% of students reported an adequate daily intake of vegetables

The Australian Guide to Healthy Eating recommends the consumption of a minimum of 3 serves of vegetables per day for 8-11 year olds and 4 for 12-18 year-olds.

The students (n=1730) were asked the number of serves of vegetables they usually eat per day: 37.2% eat 3 or more serves of vegetables per day, 60.2% eat up to 2 serves of vegetables per day and 2.6% reported that they do not eat vegetables

Table 22: Percentage of students (n=1730) that consumed or expected to consume vegetables at specified times on the day of testing

	Recess	Lunch	After School
Vegetables/ Salad	4.0	9.8	17.1

Vegetables are infrequently consumed at school.

Core Food

Core foods and beverages are central to the diet. The core food groups are cereals; fruit; vegetables; meat and alternatives including poultry, fish, eggs, legumes and nuts; and milk and milk products.

Table 23: Frequency of students reported consumption or anticipated consumption of the following core foods at specified times on the day of testing (n=1730).

	Recess	Lunch	After School
Sandwich/ roll/ bread/ toast	4.6	66.0	11.7
Spaghetti/ pasta/ noodles/ rice	0.6	3.8	13.5
Soup	0.4	1.2	6.5

6.2 Food Behaviours

Students were asked to report how often they engaged in certain food related behaviours – five healthy and four unhealthy behaviours.

For the five healthy behaviours:

- 34.3% of students reported carrying a water bottle everyday.
- 79.3% of students reported having something for breakfast everyday.
- 53.5% of students reported helping to buy or choose groceries at least 1-3 times per week.
- 53.0% of students reported helping to prepare dinner at least 1-3 times per week.
- 63.9% of students reported eating dinner with most of the family everyday.

For the unhealthy behaviours:

- 28.4% of students ate dinner in front of the television 4 or more times a week.
- 36.6% of students ate snacks in front of the television 4 or more times per week.

Table 24: Students (n=1730) responses when asked about the frequency of eating food from a fast food outlet

	Frequency (%)
Never/ Rarely	31.2
Less than once per week	49.4
About 1-3 times per week	17.0
About 4-6 times per week	1.6
Everyday	0.8

Table 25: Percentage of students that reported not having or were not expecting to have anything to eat or drink at specified times

	Nothing to eat	Nothing to drink
Recess	18.2	3.9
Lunch	8.6	2.1
After School	2.9	6.8

6.3 Food Attitudes

Students were asked a series of questions to determine their attitudes toward the consumption of fruit and vegetables.

Fruit Attitudes

76% of students hold healthy attitudes towards fruit intake

- 88.2% of students either agreed or strongly agreed that eating fruit makes them feel healthy.
- 89.7% of students either agreed or strongly agreed that they like the taste of most fruit.
- 91.6% of students either agreed or strongly agreed that fruit is an easy snack.
- 73.5% of students either agreed or strongly agreed that they like tasting fruits they have not tried before.
- 70.1% of students either agreed or strongly agreed that it is cheaper to buy a piece of fruit like an apple rather than a packet of potato chips or a chocolate bar.

Vegetable Attitudes

51% of students hold healthy attitudes toward vegetable intake

- 80.4% of students either agreed or strongly agreed that eating vegetables makes them feel healthy.
- 66.5% of students either agreed or strongly agreed that they like the taste of many vegetables.
- 45.3% of students either agreed or strongly agreed that they like tasting new vegetables that they have not tried before.
- 77.4% of students either agreed or strongly agreed that it is easy to prepare vegetables to eat (eg make a salad).

6.4 Likes

Students were asked to identify which fruit and vegetables they liked from a list of 15 and 24 respectively.

Fruit

The 15 fruits were: apple, apricot, banana, watermelon, grapes, kiwi fruit, mandarin, orange, pear, plum, pineapple, strawberries, rockmelon, nectarine and watermelon

- 63.8% of students liked 11 or more of the fruits listed.
- 1% of students reported not liking any of the fruits listed.

Table 26: Number of Fruit Items Liked

	0	1-5	6-10	11-13	14-15
Frequency (%)	0.8	8.1	27.3	30.1	33.7

Vegetables

The 24 vegetables were: beans (green), beetroot, broccoli, brussel sprouts, cabbage, capsicum, carrot, cauliflower, celery, chinese greens, corn, cucumber, eggplant, legumes (baked beans, chickpeas, lentils, kidney beans), lettuce, mushroom, peas, potato (not hot chips), potato fried eg hot chips/French fries/wedges), pumpkin, spinach, sweet potato, tomato, zucchini and squash.

- 34.9% of students liked more than 15 of the vegetables listed.
- 1.2% of students reported not liking any of the vegetables listed.

Table 27: Number of Vegetable Items Liked

	0	1-5	6-10	11-14	15-18	19-24
Frequency (%)	1.2	9.8	25.9	28.1	19.8	15.2

6.5 Environments

Students were asked questions about their home and school environments.

Food

- 87.8% of students agreed or strongly agreed that vegetables are served at dinner most nights in their home.
- 89.6% of students agreed or strongly agreed that fruit is available to eat at any time at home.
- 89% agreed or strongly agreed that their parents encourage them to eat fruit and vegetables.
- 68.7% of students agreed or strongly agreed that their teachers encouraged them to eat fruit and vegetables.
- 48.8% of students never or rarely had a fruit and vegetable break at school. 32.6% of students had one everyday.

Water

71% of students reported having water on their desk at school

74% of students (n=1730) reported having a drink on their desk. 21% reported that they did not have a drink on their desk even though it is allowed.

Of those students (n=1267) that responded yes to having a drink on their desk, 92.2% reported that it was water.

Source of Recess and Lunch

Students (n=1730) were asked where they got their recess and lunch from.

Table 28: Reported source of students' recess and lunch

	Recess	Lunch
Home	90.8%	81.6%
Canteen	2.6%	13.1%
Shop Outside School	2.4%	2.3%
Friends/Home & Friends	0.7%	0.8%
Canteen & home/ shop outside/ friends	1.5%	1.1%
No food today	2.2%	1.1%

The vast majority of students bring their recess and lunch from home. Thirteen per cent of students purchase their lunch from the canteen. Equal proportions (just over 2%) of students travel off campus to purchase their recess and lunch (these may or may not be the same students).

6.6 Food Knowledge

To determine the knowledge of the recommended number of serves of fruit and vegetables a day, for someone their age, students were asked to select from the following tick boxes: none, less than 1 serve a day, 1-2 serves a day, 3-5 serves a day and more than 5 serves a day.

Fruit Knowledge

- 46% of students correctly reported the number of serves of fruit a day they should consume.
- 16.9% thought they should consume more than five serves a day.

Vegetable Knowledge

- 77% of students reported that a child of their age should consume 3 to 5 serves of vegetables each day.
- 20.3% of students thought they should consume more than 5 serves a day.

6.7 Gender Differences

Overall there were few differences between girls and boys for the derived scores although girls tended to have scores indicative of a more healthy food intake and attitude. Applying a Bonferroni correction for multiple comparisons and setting significance level at α 0.004 girls had a significantly higher fruit intake, healthy behaviour, attitude to vegetables, vegetable knowledge and water environment scores. However in practice the differences were small, for example the healthy behaviour score for girls was (median [IG range]) 29 [26:32] and for boys 28 [24:31]. With respect to the proportion meeting target scores there were even fewer differences with 96% girls and 92% boys meeting the target healthy behaviour score ($p=0.005$), 54% girls and 48% boys meeting the target vegetable attitude score ($p=0.012$).

7.0 Summary

This report describes baseline data collected at the end of 2006 that will be used to track the progress and efficacy of the *ewba* Community Programs being implemented in Morphett Vale and Murray Bridge, South Australia. More particularly it includes:

- descriptions of the behaviour, attitudes and knowledge of Year 5, 6 and 7 boys and girls in relation to healthy eating and physical activity within the intervention and comparison communities prior to the implementation of *eat well be active*.
- report of anthropometrics where the height, weight and waist circumference of the students were measured.
- insight into the home, school and local environments within which these students interact on a daily basis.

A quarter (25.1%) of the Year 5, 6 & 7 students (n=1637) involved in this baseline evaluation in 2006 were found to be either overweight or obese. This South Australian sample had greater BMI and waist circumferences z-scores than the UK reference population (McCarthy 2003; Cole 1995). Boys had greater BMI measures while girls had greater waist circumference measures. There were no significant differences according to age for BMI or waist circumference. Nor were there any significant differences between rural and urban boys and rural and urban girls.

This report forms the baseline from which behaviour, knowledge and attitudinal change in levels of physical activity, consumption of fruit and vegetables and water intake will be measured. The surveys and anthropometric measures will be repeated with a non-matched cohort in 2009 to determine what levels of personal and environmental change, if any, have occurred over the three year period.

The report that follows this report 'Part 2: Baseline Data Collection' gives more detail on the food and physical activity environments of the students' families, schools and communities through the reporting of surveys from parents, teachers, principals, School Canteens, Long Day Care, Family Day Care and Kindergartens.

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