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1 **TITLE**

2 Dietary patterns of adolescent girls attending schools in low-income communities

3 highlight low consumption of core foods

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5 **KEY WORDS**

6 *Female, adolescent, BMI, diet, nutrition, socioeconomic position*

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ABSTRACT

AIM: Overweight and obesity prevalence is high among adolescent girls of low socio-economic position and this increases their risk of cardiovascular disease and metabolic disorders in adulthood. The aim of this study was to describe the dietary patterns of adolescent girls in terms of the relative contribution of core food groups to overall diet and by weight status category.

METHODS: Year 8 female students were recruited from schools in low-income communities. Weight status (i.e. underweight, healthy weight, overweight, obese) was determined using age- and sex-adjusted body mass index (z score). Dietary intakes were assessed using a validated semi-quantitative food frequency questionnaire. Individual foods were collated into core food group or energy-dense, nutrient-poor categories in line with the Australian Guide to Healthy Eating (AGHE) and the percentage contribution to total energy intake calculated.

RESULTS: Participants (n=332) were (mean±SD) 13.7±0.4 years old with BMI z score 0.63±1.22. Few girls met AGHE core food group recommendations for daily serves; meat and substitutes 69.3%, vegetables 28.6%, fruit 23.8%, dairy 15.7%, and breads/cereals 5.7%. Total percentage energy derived from energy-dense, nutrient-poor foods was 46.6% (37.2-54.6%)[(median (interquartile range))], with takeaways 9.8% (7.0-13.6%), confectionery 7.0% (4.1-10.9%) and packaged snacks 6.8% (4.0-10.7%), with no significant differences by weight status.

CONCLUSIONS: Core food intakes are poor with excessive consumption of energy-dense, nutrient-poor foods in these adolescent girls. Nutrition education programs targeting this population are needed to address this imbalance. Strategies

- 1 could include substitution of unhealthy snacks for core food items and greater inclusion
- 2 of core foods within main meals.
- 3

1 INTRODUCTION

2 Data reported by the Australian Bureau of Statistics show that the proportion of
3 overweight adolescent girls increased from 12% to 20% in the years between 1985 and
4 2008 with the obesity rate staying constant at 6%.¹ Overweight and obesity tracks from
5 childhood into adolescence and the relationship with morbidity and mortality is well
6 documented.^{2,3} If obesity progresses into adulthood, it increases the risk of metabolic
7 disorders, including type 2 diabetes, elevated triglyceride levels, hypertension and adult
8 cardiovascular disease (CVD).³⁻⁷ Many factors contribute to obesity and facilitate energy
9 imbalance.^{7,8} However limited evidence has been reported describing the association
10 between weight status and dietary patterns in adolescence.⁹

11 Emerging research from the Project Eat study (Minnesota, USA) has provided
12 insight into the dietary habits and nutrient intakes of North American adolescents.¹⁰⁻¹³
13 It has shown that adolescent girls are likely to retain similar dietary patterns
14 throughout adolescence and that intakes of fruit, vegetables and starchy foods are
15 positively associated with socioeconomic position (SEP).^{10,11} This may be one reason
16 why obesity levels are higher among adolescents living in low-income communities.¹⁴
17 Surprisingly few studies have explored the dietary patterns of Australian adolescent
18 girls of low SEP, although international evidence suggests adolescent girls are more
19 likely to report unhealthy eating behaviours, such as skipping breakfast and snacking
20 on energy-dense, nutrient-poor foods.¹⁵⁻¹⁷ Therefore, the primary aim of this
21 investigation was to determine the relative contributions of core foods and energy-
22 dense, nutrient-poor food groups to dietary intake in adolescent girls attending schools
23 in low-income communities in an Australian population. Secondary aims were to
24 investigate these dietary patterns by weight status, as determined by body mass index

(BMI) category (i.e. underweight, healthy weight, overweight, obese) and related dietary behaviours. It was hypothesised that girls from low SEP would have low intakes of core foods, and disproportionally high intakes of consumption of energy-dense, nutrient-poor foods and that this would vary based on weight status.

METHODS

This is a secondary analysis of baseline data collected in 2010 as part of the Nutrition and Enjoyable Activity for Teen Girls (NEAT Girls) cluster randomised control trial (RCT).^{18, 19} NEAT Girls is a 12-month obesity prevention program targeting teenage girls from schools in areas of social and economic disadvantage. Detailed methods have been published elsewhere.¹⁸

The participants were recruited from government secondary schools located in low-income communities [based on the Socioeconomic Index for Areas (SEIFA)] in the Hunter and Central Coast regions in New South Wales, Australia.²⁰ SEIFA is a measure of relative socioeconomic disadvantage of geographical areas, determined by education, employment, occupation-related skills and economic resources such as assets, income and expenditure. Schools were eligible to participate if located in areas with an allocated SEIFA index of ≤ 5 (bottom 50%). Girls were selected from Year 8, the second year of high school in Australia, and included if identified by their teachers as being disengaged from physical education classes and/or not participating in an organized team or individual sport. Approximately 30 girls from 12 schools were recruited (n=357).

Data were collected at each school. Written consent was obtained from school principals, parents and participants. Ethics approval was given by the University of Newcastle Human Research Ethics Committee and the New South Wales Department of

Education and Training Human Research Ethics Committee. A portable stadiometer was used to obtain height measurements to the nearest 0.1cm and weight was measured to the nearest 0.1kg using portable digital scales. Body Mass Index (BMI) was calculated for each participant as weight (kg) divided by height (meters) squared and then ranked into underweight, healthy, overweight or obese categories according to the Cole cut-points.^{21, 22} These were selected as they are derived from international data sets and represent the paediatric equivalent cut-points of adult BMI at <18.5, 25 and ≥ 30 kg/m² and were used to categorise the students as BMI <18.5 underweight, ≥ 25 overweight and ≥ 30 obese. BMI z score was created using U.S. reference data.²³ Physical activity was assessed using accelerometers and reported elsewhere.^{19, 24}

Participants completed the Australian Child and Adolescent Eating Survey (ACAES, version 1.2), a 120 question semi-quantitative food frequency questionnaire (FFQ) previously validated in nine to 16 year olds to estimate dietary intake data over the previous six months.²⁵ The ACAES includes 15 supplementary questions related to eating behaviours, such as eating while viewing television, regular breakfast habits, number of dairy foods consumed daily and snacking occasions. Food serves are based on age group specific portion sizes derived from unpublished data in the 1995 National Nutrition Survey, and 'natural' food portions for items such as fruit.²⁵ Nutrient intakes were derived from the questionnaire responses using FoodWorks (professional version 3.02.581, 2004, Xyris Software, Brisbane, Australia) and the following databases without modification (Australian AusNut, All Foods, Revision 14 and AusFoods, Brands, Revision 5, 1999 Food Standards Australia New Zealand, Canberra, Australia). Diet quality was measured using the Australian Recommended Food Score (ARFS), a validated measure of diet quality that aligns with national dietary guidelines.²⁶

For the purposes of this analysis, only individuals with complete data sets (height, weight, date of birth, completed FFQ) were included (n=356). Inaccurate dietary reporting was defined based on the methods of Field et al. with 24 reporters of <500kcal/day (2,090kJ) or >5000kcal/day (20,900kJ) per day removed before analysis as implausible (n=332 included).^{27, 28}

Statistical analysis: Individual questions from the FFQ were aggregated into core and energy-dense, nutrient-poor food groups, defined according to the Australian Guide to Healthy Eating (AGHE), and used to derive food group total energy values and percentages.²⁹ To determine differences in energy contributions by weight status, a Kruskal-Wallis equality of populations rank test was used at a statistical significance level of 5% as data were non-parametric. Fishers exact Chi squared Test was used to test equality in groups with dichotomous data. The statistical program used was Stata/IC (version 11.0 for Windows, 2009, StataCorp LP, USA). Data are reported as median (interquartile range) unless otherwise indicated.

RESULTS

Participants were 13.7 (13.4-13.9) years old, with 98% born in Australia and 99% speaking English at home. Most participants identified their cultural background as Australian (86%), inclusive of 11% Aboriginal and Torres Strait Islander (ATSI); small proportions identified as European (10%), Asian (1%) or other (3%).

Table 1 summarizes the anthropometric characteristics of the participants according to weight status. The number of participants meeting minimum core food group recommendation intakes and self-reported general eating habits are shown in Table 2. Only one of the 332 adolescent girls met all core food group recommendations.

Participants were most likely to meet the daily serve recommendations for meat and vegetarian alternatives (69.3%) and least likely to meet the recommendations for dairy and breads/cereal servings (15.7% and 5.7% respectively). Participants reported low intake of dairy foods (0.6 (0.1-2.5) serves per day) and fruit (0.5 (0.2-2.0) pieces a day). Based on the ARFS, participants had poor diet quality with a mean of 24 (17-33) points scored from a maximum of 73. Almost equal percentages (median (IQR)) of energy were obtained from core (53.4% (45.4-62.8%)) and energy-dense, nutrient-poor foods (46.6% (37.2-54.6%)), with no statistically significant difference by weight status group ($P>0.05$). Core food group intakes and energy-dense, nutrient-poor foods as a percentage of total energy (% energy) are summarised in Table 3 and indicate that takeaways (10% (7-14%)), confectionery (7% (4-11%)) and pre-packaged snacks (7% (4-11%)) account for a high percentage of total energy intake. The macronutrient distributions were protein 17% (15-19%), carbohydrate 50% (46-55%) and fat 34% (30-37%). Saturated fat contributed 15% (13-17%) of total energy, with 12% (10-13%) from monounsaturated fat and 4% (3-4%) from polyunsaturated fat.

In regards to weight status, there was no statistically significant difference ($P>0.05$) in the percentage of girls meeting healthy eating recommendations, in any eating behaviours or in % energy from food groups with the exception of % energy from meals with no vegetables ($P=0.02$) in core foods.

DISCUSSION

This study highlights that the majority of adolescent girls from schools in low income communities in Australia do not have eating patterns that meet the AGHE recommended daily servings of each core food group.²⁹ As hypothesised, a high

1 proportion of their energy comes from energy-dense, nutrient-poor foods, however
2 contrary to our hypothesis these dietary patterns did not vary with weight status.

3 The contribution of energy from core foods in this low income population (54%)
4 is lower than that reported by Rangan et al. (62%) in adolescents of similar age in their
5 analysis of the 2007 Australian National Children Nutrition and Physical Activity Survey
6 data that included all income levels and males.³⁰ Rangan et al. found the proportion of
7 energy from core foods in a National representative population sample of 2-16 year old
8 Australian children had increased from 59% (per capita) in 1995 to 65% in 2007.³⁰ This
9 suggests that eating habits in this SEP female population are much poorer than the
10 pooled National data suggest.

11 Core food group intakes overall were poor, with no significant difference by
12 weight status category. Similar to our findings, an online study by Savige et al. found
13 that only 37% of adolescent girls ate fruit on a daily basis.³¹ This is of concern, as
14 findings from Project EAT suggest that fruit intake decreases even further later in
15 adolescence.¹² However, the percentage of participants reporting consumption of four
16 or more serves of vegetables per day (29%) was higher than that reported by Scully et
17 al. where only 20% of 12-13 year olds met this target.³² One reason for low vegetable
18 intake was highlighted in Table 2 where the majority of girls reported vegetable
19 consumption with their evening meal 3-4 times a week or less.

20 Few girls met intake targets for dairy foods and breads and cereals, although
21 more girls met recommendations for meat and substitutes. This is consistent with 2011
22 Cancer Council of Australia data, which found little difference in the proportion meeting
23 dietary intake recommendations by weight status category.³³ This mismatch between
24 intake and adherence to core food intake targets increases the risk of diet related
25 chronic diseases such as osteoporosis and CVD.

Dairy intake for Australian girls in this age group has been identified as a concern with only 11% of 12-13 year old and 18% of 14-16 year old girls in 2007 meeting the Australian estimated average requirements (EAR) for calcium, with a mean intake of 792mg/day.³⁴ Our study found that 43% of girls were meeting their EAR of 1050mg for calcium, with a median intake of 946mg and similar to that found in Project EAT (997mg/day).³⁵ This is surprising, given that the participants reported less than one serve of dairy products per day.

Takeaway foods were the most commonly consumed energy-dense, nutrient-poor dietary sub-group (Table 3). It is noteworthy that the majority of girls reported having takeaway foods less than once a week in the general questions, yet the analysis found that approximately 10% of their daily energy intake came from takeaways and fried foods. This may indicate misperceptions as to what items are considered 'fast foods', or that consumption of these foods outside main meal times is not considered an eating away from home occasion. Alternatively it may indicate that foods similar to takeaways, such as chicken nuggets and chips or pizza are being routinely prepared and consumed at home. Data from the 2009/10 National Secondary Students' Diet and Activity (NaSSDA) survey found 34% of girls in a similar age group consumed takeaway at least once a week, with a higher frequency (40%) for lower SEP groups.³³ NaSSDA also found lower SEP groups were more likely to consume larger quantities of sweetened drinks and that this increased steadily with age.³³

Girls in the current study ate breakfast a median of 3.5 days per week, which is consistent with Delva et al. who found that adolescents from low SEP backgrounds ate breakfast less frequently than those of middle and high SEP.¹⁵ This is of concern, as skipping breakfast is associated with increased risk of weight gain between adolescence and young adulthood.³⁶

Overall, strategies are required to increase adolescent girls' intake of the core foods such as fruit, vegetable, dairy, breads and cereal. This should include improving the nutritional value of regularly consumed snacks. In addition, a greater emphasis could be placed on encouraging water as a preferred beverage and substitution of energy-dense, nutrient-poor snacks for those derived predominantly from core foods.

In terms of aims for nutrition education programs for this particular group of female adolescents, decreasing energy-dense, nutrient-poor foods and increasing core food intake is of major importance as a strategy to prevent development of diet-related chronic disease. Assistance with making nutrition-related decisions may be useful, such as choosing higher nutritional value snacks from core food groups, managing portion size and controlling eating occasions. Creating home and school environments where the easiest snack decision is a more nutritional one may be addressed through school education programs or engagement with parents. Emphasis may include reducing sweetened drinks, packaged snacks and confectionery intake and replacing with water, dairy, fruit, vegetable and wholegrain cereal serves. Hart et al. found improving fruit and reducing energy-dense snacks assisted in reducing BMI status in overweight teenagers.³⁷ Those from the healthy weight range need to be encouraged to increase core foods, whilst decreasing frequency of energy-dense, nutrient-poor foods, to improve the nutrient intakes in this population group, thereby decreasing the risk of chronic disease.³⁸

A limitation of this study was the narrow sampling frame, as all participants included were initially selected based on criteria for non-engagement in physical activity. This may reflect a selection bias for poor diet as risk factors such as poor diet and low physical activity levels cluster in adolescents.³⁹ A level of misreporting of energy intake was expected as low income, higher BMIs and females are associated with

misreporting.^{40, 41} This was demonstrated to occur as shown by the difference between weight status groups in reported daily kilojoules per kilogram of body weight (see Table 1). Participants in the underweight category were more likely to over-report energy intake and those in the obese category were more likely to under-report. In an effort to adjust for this, the data were reported as percentage of total energy intake.

In summary, core food intake was lower and high energy, low nutrient food intake was much greater than national recommendations for this group of low SEP adolescent females. There is a need to replace energy-dense foods with more nutrient-dense options. Dietary patterns by weight status category were consistent, with similar proportions of energy being derived from core foods and all adolescents needing to improve the nutrient density of their dietary intakes. Therefore we recommend nutrition programs that aim to improve intakes of core foods and decrease intakes of energy-dense, nutrient-poor foods are urgently required. Nutrition education should ideally focus on encouraging **breakfast and** snacks from core foods groups for those from lower socio-economic backgrounds.

1 **Acknowledgement Page**

2 **[Removed for blind review]**

3 **References**

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Table 1: Baseline demographics, number and proportion of adolescent girls (n=332) from low socioeconomic schools by weight status categories ^a.

	Underweight	Healthy	Overweight	Obese	All
	n (%)	n (%)	n (%)	n (%)	n (%)
	7 (2.1)	188 (56.6)	92 (27.7)	45 (13.6)	332 (100)
← Median (interquartile range) →					
Weight (kg)	38.4 (35.5-41.6)	50.6 (46.1-54.2)	64.5 (59.9-67.8)	81.5 (76.6-89.4)	55.1 (49.0-65.9)
Height (m)	1.60 (1.51-1.63)	1.59 (1.56-1.64)	1.61 (1.56-1.64)	1.63 (1.6-1.68)	1.61 (1.56-1.64)
BMI (kg.m⁻²)	15.6 (14.9-15.9)	19.8 (18.4-21.0)	24.9 (23.8-26.0)	30.6 (29.4-32.8)	21.7 (19.5-25.1)
BMI z score	-1.06 (-1.37- -0.9)	-0.09 (-0.48-0.24)	1.12 (0.78-1.42)	2.67 (2.23-3.38)	0.3 (-0.23-1.26)
kJ/kg/day	286 (209-433)	164 (129-229)	126 (84-171)	97 (68-126)	147 (102-204)

^a Weight status is derived from adult limits for underweight (<18.5 kg/m²), overweight (≥25 kg/m²) and obesity (≥30 kg/m²) as defined by Cole et al. at age specific levels.^{21,22}

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Table 2: Number (%) of girls meeting or exceeding minimum recommendation of daily servings of core food and results from self-reported eating behaviour questions in the Australian Child and Adolescent Eating Survey in adolescent girls (n=332) from low socioeconomic schools by weight status categories.						
	Underweight	Healthy	Overweight	Obese	All	P Value
	7 (2.1%)	188 (56.6%)	92 (27.7%)	45 (13.6%)	332 (100%)	
CORE FOOD GROUPS ^a	← Girls meeting or exceeding core food recommendations ^b n (%) →					
Fruit	1 (14.3)	44 (23.4)	23 (25)	11 (24.4)	97 (23.8)	0.98
Vegetables	1 (14.3)	51 (27.1)	28 (30.4)	15 (33.3)	95 (28.6)	0.70
Meat & substitutes	7 (100)	134 (71.3)	64 (69.6)	25 (55.6)	230 (69.3)	0.08
Dairy	1 (14.3)	34 (18.1)	10 (10.9)	7 (15.6)	52 (15.7)	0.43
Breads & cereals	1 (14.3)	11 (5.9)	3 (3.3)	4 (8.9)	19 (5.7)	0.27
EATING BEHAVIOURS ^c	← Median (interquartile range) →					
Breakfast (days per week) ^d	6.0 (3.5-6)	3.5 (1.5-6.0)	6.0 (1.5-6.0)	3.5 (1.5-6.0)	3.5 (1.5-6.0)	0.17
Vegetables (days per week) ^e	5.5 (3.5-5.5)	3.5 (3.5-5.5)	5.5 (3.5-5.5)	5.5 (3.5-5.5)	3.5 (3.5-5.5)	0.24
Takeaway (days per week) ^f	0.5 (0.5-1.5)	0.5 (0.5-1.5)	0.5 (0.5-1.5)	0.5 (0.5-1.5)	0.5 (0.5-1.5)	0.94
Television (days per week) ^g	1.5 (0.5-7.0)	1.5 (0.5-3.5)	1.5 (0.3-6.3)	3.5 (0.5-5.5)	1.5 (0.5-5.5)	0.31
\$AUD for snacks (\$ per week) ^h	7.0 (1.0-7.0)	3.5 (1.0-7.0)	3.5 (1.0-9.5)	3.5 (1.0-7.0)	3.5 (1.0-7.0)	0.85
Fruit (pieces per day) ⁱ	0.5 (0.2-1.0)	0.5 (0.2-1.0)	0.5 (0.5-1.0)	0.8 (0.2-2.5)	0.5 (0.2-1.0)	0.75

Table 2: Number (%) of girls meeting or exceeding minimum recommendation of daily servings of core food and results from self-reported eating behaviour questions in the Australian Child and Adolescent Eating Survey in adolescent girls (n=332) from low socioeconomic schools by weight status categories.

	Underweight	Healthy	Overweight	Obese	All	P Value
	7 (2.1%)	188 (56.6%)	92 (27.7%)	45 (13.6%)	332 (100%)	
Snacks (snacks per day)^j	1.5 (1.5-3.5)	1.5 (1.5-3.5)	1.5 (1.5-3.5)	1.5 (1.5-3.5)	1.5 (1.5-3.5)	0.47
Dairy (dairy serves per day)^k	0.6 (0.6-2.5)	0.6 (0.1-2.5)	0.6 (0.1-1.0)	1.0 (0.6-2.5)	0.6 (0.1-2.5)	0.07
Sweetened drinks (glasses per day)^l	2.5 (0.5-2.5)	1.0 (0.5-2.5)	1.8 (0.5-2.5)	1.0 (0.5-2.5)	1.0 (0.5-2.5)	0.68
ARFS^m	24 (20-29)	24 (17-33)	25 (17-34)	25 (19-31)	24 (17-33)	0.94

^a P value obtained by Fisher's exact Chi-square test

^b Food servings per day based on self-report data compiled from relevant questions in the Australian Child and Adolescent Eating Survey and compared to minimum daily food group serving recommended in the 1998 Australian Guide to Health Eating for 12-18 year old girls (fruit 3, vegetables 4, meat or substitutes 1, dairy 3, breads or cereals 4).

^c P value obtained by Kruskal-Wallis equality of populations with ties for non-parametric data for significance between group rankings.

^d How many days per week do you usually have something to eat for breakfast?

^e How many times a week do you eat vegetables with your meal at night?

^f How often do you eat takeaway foods? E.g. Chinese, fish and chips, hamburger and chips/fries, pizza? (days per week)

^g How many times a week do you eat your meal at night in front of the television (TV)?

^h How much money are you given each week to buy food, including snacks and drinks?

ⁱ How many pieces of fruit do you eat? (per day)

Table 2: Number (%) of girls meeting or exceeding minimum recommendation of daily servings of core food and results from self-reported eating behaviour questions in the Australian Child and Adolescent Eating Survey in adolescent girls (n=332) from low socioeconomic schools by weight status categories.

Underweight	Healthy	Overweight	Obese	All	P Value
7 (2.1%)	188 (56.6%)	92 (27.7%)	45 (13.6%)	332 (100%)	

^j How many times a day do you eat snacks?

^k Add up how many times a day you have a glass of milk, a tub of yoghurt or a slice of cheese.

^l Add up how many glasses of soda or cordial you have each day (*all types*).

^m Australian Recommended Food Score; measures variety in dietary intake. Score range: 0 – 73.²⁶

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Table 3: Percentage energy from core and energy-dense, nutrient-poor food groups in adolescent girls (n=332) from low socioeconomic schools. ^s						
	Underweight	Healthy	Overweight	Obese	All	P Value^a
Food group	← Median (interquartile range) →					
Core foods	50.6 (48.2-57.4)	53.7 (45.2-63.4)	52.8 (45.2-62.6)	53.6 (45.3-62.4)	53.4 (45.4-62.8)	0.96
Energy-dense, nutrient-poor foods	49.4 (42.6-51.8)	46.3 (36.6-54.8)	47.2 (37.4-54.8)	46.4 (37.6-54.6)	46.6 (37.2-54.6)	0.96
Core food groups^b						
Vegetables	3.9 (2.3-4.3)	4.5 (2.7-8.7)	4.9 (3.1-8.4)	5.7 (3.0-9.3)	4.9 (2.9-8.5)	0.20
Fruit	4.2 (1.8-7.8)	5.7 (2.7-9.4)	5.4 (3.3-9.5)	6.3 (3.1-10.4)	5.6 (2.8-9.4)	0.66
Meat	13.5 (10.1-17.1)	12.5 (8.9-19.1)	14.4 (9.8-19.8)	11.2 (6.7-15.1)	12.8 (8.7-18.9)	0.06
Meat alternatives	0.7 (0.5-2.8)	1.1 (0.4-1.9)	1.2 (0.5-2.4)	0.7 (0.3-1.4)	1.1 (0.4-2.0)	0.18
Grains and cereals	14.6 (12.6-20.4)	12.9 (7.8-18.0)	12.9 (8.7-18.7)	14.3 (9.8-20.5)	13.0 (8.5-18.8)	0.52
Dairy	6.9 (2.6-15.4)	9.0 (4.1-15.1)	8.3 (4.7-13.2)	10.3 (6.7-16.6)	8.9 (4.8-15.0)	0.33
Combinations of core foods						
Meals with vegetables	6.0 (5.0-10.2)	6.4 (3.9-10.4)	7.6 (4.9-10.4)	5.7 (2.9-9.3)	6.7 (4.1-10.2)	0.21
Meals with no vegetables	3.6 (1.4-5.3)	3.9 (1.6-6.5)	2.9 (1.2-6.2)	2.2 (0.5-3.9)	3.4 (1.2-6.1)	0.02*
Energy-dense, nutrient-poor food groups						
Sweetened drinks ^c	8.7 (4.7-10.6)	5.9 (2.8-11.3)	6.9 (3.8-10.8)	8.1 (3.6-11.3)	6.4 (3.2-11.1)	0.59

Table 3: Percentage energy from core and energy-dense, nutrient-poor food groups in adolescent girls (n=332) from low socioeconomic schools.^s

	Underweight	Healthy	Overweight	Obese	All	P Value ^a
Food group	← Median (interquartile range) →					
Packaged snacks ^d	7.4 (5.7-15.4)	6.9 (4.2-11.2)	6.6 (4.2-11.2)	6.3 (3.2-9.8)	6.8 (4.0-10.7)	0.48
Confectionery ^e	10.0 (9.4-16.1)	6.7 (3.7-10.5)	6.7 (4.2-11.5)	7.8 (5.6-14.5)	7.0 (4.1-10.9)	0.07
Baked sweet products ^f	5.1 (3.5-11.0)	4.9 (3.0-8.3)	5.4 (3.1-8.2)	4.8 (3.1-7.8)	5.0 (3.1-8.3)	0.84
Takeaways and fried foods ^g	7.9 (3.6-11.5)	10.0 (6.7-13.5)	9.5 (7.1-14.4)	9.3 (6.5-12.1)	9.8 (7.0-13.6)	0.85
Spreads and sauces ^h	2.6 (0.7-3.4)	1.2 (0.7-2.1)	1.4 (0.9-1.8)	1.5 (0.6-2.5)	1.3 (0.7-2.1)	0.56
Fatty meats ⁱ	1.3 (0.7-1.6)	1.2 (0.6-2.2)	1.5 (0.7-2.7)	1.2 (0.8-1.9)	1.2 (0.7-2.3)	0.23
Miscellaneous ^j	0.2 (0.1-1.3)	0.3 (0.0-0.9)	0.4 (0.1-0.7)	0.4 (0.0-0.6)	0.4 (0.1-0.8)	0.68

^s Percentage energy has been calculated as a percentage of total energy and reported as median (interquartile range) as data for these values are highly skewed. Therefore compilation of food groups are unlikely to match total values.

* p<0.5

^a P value obtained by Kruskal-Wallis equality of populations with ties for non-parametric data for significance between group rankings.

^b Foods contributing to core foods were aligned with the Australian Guide to Healthy Eating ²⁹

^c Comprised of beverages such as soft drinks, fruit juice based drinks and cordials

^d Comprised of foods such as biscuit/spread combinations and snack noodles and bars

^e Comprised of foods such as ice-creams and frozen yoghurts, chocolates and lollies

^f Comprised of foods such as cakes, pastries and sweet biscuits

Table 3: Percentage energy from core and energy-dense, nutrient-poor food groups in adolescent girls (n=332) from low socioeconomic schools. [§]						
	Underweight	Healthy	Overweight	Obese	All	P Value [‡]
Food group	← Median (interquartile range) →					
^g Comprised of foods such as pies, pizzas, hamburgers, potato chips and crumbed chicken and fish						
^h Comprised of spread and sauces such as mayonnaise, jam, honey, vegemite and tomato sauce						
ⁱ Comprised of foods such as sausages, salamis, bacon and devon						
^j Incorporates foods with no clear category such as clear soups, tea and coffee						

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