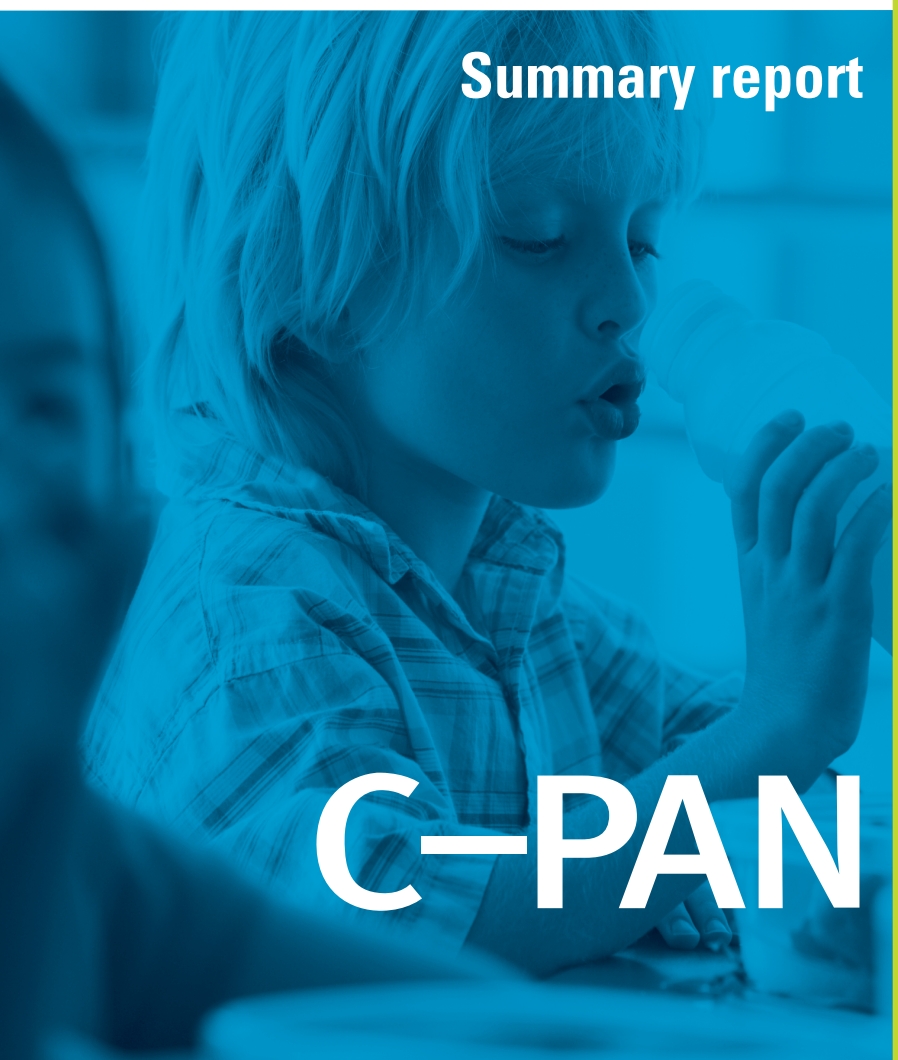
DEAKIN UNIVERSITY AUSTRALIA

Eating behaviours of urban and rural children from disadvantaged backgrounds

Centre for Physical Activity and Nutrition Research



Summary report

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Executive summary

The importance of healthy eating for current and future health of children and adolescents is well recognised, however many children consume diets that are not consistent with dietary guidelines. This places them at risk of obesity and other chronic diseases. Understanding children's eating behaviours and the factors that influence such behaviours is an important step towards addressing these health concerns.

Whilst eating patterns of children and adolescents are known to vary according to socioeconomic position (SEP), and rural populations are known to experience higher levels of socioeconomic disadvantage, little is known about how the eating behaviours of children living in rural areas actually compare to those of children living in urban areas. This study sought to examine any differences in obesity-related eating patterns and behaviours amongst these children. In particular, the study examined intake of fruit and vegetables, beverages of various kinds and non-core foods such as cakes, confectionary and fast foods.

Information was sought via a mailed survey of 559 mothers of children aged 5–12 years.

The study found that a high proportion of children had poor eating behaviours, with only a third of mothers reporting that their children consumed three or more serves of vegetables per day, and two-thirds of mothers reporting that their children consumed two or more serves of fruit per day. Overall, a large proportion (66%) of children consumed whole milk compared to low or reduced fat milk, despite guideline recommendations that reduced fat milk be introduced gradually from 2 years of age. Many children were also regularly consuming high-energy, nutrient-poor foods.

There were no significant differences between children living in urban and rural areas for intakes of vegetables, fruit or fried potato, however children living in rural areas consumed non-fried potato more frequently than

children in urban areas. Consumption of plain milk, flavoured milk, water and fruit juice was also similar amongst urban and rural children.

Some differences were evident in relation to non-core foods and beverages. Children living in urban areas consumed greater amounts of soft drink and fast food compared to children living in rural areas, while children living in rural areas consumed greater amounts of other non-core foods such as cakes, doughnuts and sweet biscuits, and pies, pasties and sausage rolls. These differences may be in part due to availability and accessibility, however further research is required to clarify this.

The findings of this study provide valuable insights into the eating behaviours of children in low socioeconomic areas in urban and rural Victoria. While there appear to be few differences in the intakes of key foods and beverages between these children, there may well be different influences on eating behaviours which would be important to consider in developing and implementing of programs promoting healthy eating. The ongoing research at the Centre for Physical Activity and Nutrition will explore these influences further.

This report describes the key findings of this study. It will be of interest to families; community health organisations; policy makers and health professionals such as dietitians and nutritionists; and other organisations interested in children's health and the promotion of healthy eating.

Background and study aims

1.1 Dietary behaviours and health

There is good evidence that adequate nutrition in childhood is important for healthy development as well as for the prevention of many chronic diseases later in life. However, many children consume diets that are not consistent with dietary guidelines[1]. Data worldwide shows that children have lower than desirable intakes of fruits, vegetables, dairy products and whole grains, but higher than desirable intakes of soft drinks, confectionery and fast foods[2–4].

In Australia, recent data from the National Children's Nutrition and Physical Activity Survey indicate that compliance with existing dietary guidelines is poor[5]. The survey found only 61% of 4–8 year-olds and 51% of 9–13 year-olds consumed adequate serves of fruit, while only 22% of 4–8 year-olds and 14% of 9–13 year-olds consumed adequate serves of vegetables. Compliance with dietary guidelines relating to saturated fat, sugar and salt was also found to be poor, with only 19% of 4–13 year-olds meeting recommendations for saturated fat, 29–33% of children meeting guidelines relating to sugar and no children meeting guidelines relating to salt. Consequently, many children fall short of achieving optimal nutrient intakes for good health and development, and many consume diets that put them that at risk of obesity and other chronic diseases.

1.2 The health impact of socioeconomic status and location

Socioeconomic differentials in health are also well recognised, with those of low socioeconomic position (SEP) being more likely to have poor health, including obesity, compared to those of higher SEP[6]. Similarly, nutrition and physical activity behaviours are known to vary according to socioeconomic position[7,8]. For example, adolescents of lower SEP tend to consume fewer vegetables, fruits, dairy and high-fibre foods, and more high-fat foods than adolescents of higher SEP[9].

Rural populations have been found to experience higher rates of socioeconomic disadvantage, with lower incomes and lower levels of educational attainment[9]. People living in rural areas also face particular challenges which impact upon health, including social isolation and limited access to transport, facilities and services[10]. These influences are reflected in poorer health, lower life expectancy and higher rates of illness and disease[11].

1.3 Understanding eating behaviours in rural and regional populations

Rural populations, including children, remain a significantly understudied population and little is known about their health behaviours, including nutrition. The available data suggests that there are some differences in dietary intake between urban and rural populations, with rural adults having higher intakes of vegetables (predominantly due to higher potato intake) and higher intakes of fats and oils, particularly margarine and dairy fats[12]. More recent data from the National Health Survey is consistent with this, and shows that adults living in rural or regional areas are less likely to consume low fat or skim milk, less likely to consume the recommended number of serves of fruit, and more likely to report food insecurity. They were, however, more likely to consume the recommended number of serves of vegetables[11].

Data comparing eating habits of urban and rural children in Australia is limited to adolescents. One study of 12–15 year-olds conducted in the early 1990's in Tasmania suggested that children living in rural areas had lower consumption of fruits, fruit juice, breakfast cereals, and, low fat milk, and higher consumption of potato, red meat, hot chips, meat pies and soft drinks[13]. A more recent study conducted in Victoria in 2004-2005 comparing 12–15 year-old adolescents living in metropolitan and non-metropolitan areas also showed regional variations in dietary intake[14]. Compared to adolescents living in metropolitan areas, a greater proportion of non-metropolitan adolescents consumed vegetables on a daily basis, and a lower proportion reported consuming fast food and soft drinks every day.

1.4 Study aim

The aim of this study was to describe and compare the obesity-related eating patterns and behaviours of children aged 5–12 living in socioeconomically disadvantaged urban and rural neighbourhoods in Victoria. In particular the study examined intake of fruit and vegetables, beverages and non-core foods, such as foods high in sugar, fat and salt.

Study design and methods

2.1 Study design

This study was part of the baseline phase of the 'Resilience for Eating and Activity Despite Inequality' study (READI), which focused on women and children living in disadvantaged areas of urban and rural Victoria, Australia.

The study involved:

- a mailed survey of women with children aged 5–12 years; and
- reporting of children's eating patterns and behaviours by their mothers using a food frequency questionnaire.

The data collection was conducted between July 2007 and June 2008.

Approval to conduct all aspects of the study was received from the Deakin University Human Research Ethics Committee, the Catholic Education Office and the Victorian Department of Education.

2.2 Study participants

The study involved women aged 18–45 years who were randomly selected from socially and economically disadvantaged neighbourhoods across Victoria, Australia.

The Australian Bureau of Statistics 2003 Census of Population and Housing Socioeconomic Index for Areas (SEIFA)[12] was used to rank all suburbs in urban and rural areas of Victoria according to their SEIFA-derived suburb disadvantage. The suburbs in the most disadvantaged areas within a 200km radius of metropolitan Melbourne with a population of 1,200 people or more formed the selection pool. Participants in the READI study were recruited from 80 suburbs (40 urban and 40 rural) selected randomly from this pool.

Within each of the 80 areas, 150 women aged 18–45 years were randomly identified from the Australian electoral roll (n=11,940). A total of 4,934 women (41%) responded to the invitation to complete a postal questionnaire. Data were excluded for 585 respondents, including: those who had moved from the sampled suburb prior to survey completion (n=571); cases where the person who completed the survey was not the intended participant (n=3); respondents who withdrew their data after completing the survey (n=2); and respondents who were less than 17 or more than 46 years old (n=9). Of the 4,349 remaining eligible women, those with a 5–12 year-old child (n=1,457) were invited to participate in an additional study, with 771 (53%) agreeing to provide information on a child in their family with the next birthday. This analysis was based on 559 children with complete data.

2.3 Mothers' survey

Women completed a survey which assessed a broad range of factors that might influence their children's nutrition and physical activity. The women also completed a survey regarding their own nutrition and physical activity behaviours, and provided sociodemographic information, including their age, education and household income.

Mothers were asked to report their highest educational qualification, which was categorised as low (up to year 10 or equivalent), medium (year 12 and/or a technical or trade certificate/apprenticeship) or high (university/higher university degree).

Household income was categorized as low (AU$0-699/week), medium (AU$700-1499/week) or high (AU$1500+/week). An additional category, 'undisclosed', was included to address the issue of poor response to this question which is common in survey research.

2.4 Children's dietary intake and behaviours

Mothers were asked to report their child's dietary intake and eating habits by completing a food frequency questionnaire. The questionnaire was based on questions used in several previously published and validated Australian nutrition surveys[15–17]. The questionnaire assessed the frequency of consumption of fruit, vegetables, beverages (including milk, water, soft drinks, fruit juice) and a range of non-core foods, that is, high-energy, nutrient-poor foods (potato crisps and salty snacks foods, chocolate and confectionary, cakes and sweet biscuits, pies, fast food and pizza). The questionnaire also asked respondents to report the type of milk usually consumed. This analysis focused on those eating behaviours hypothesised to be important protective or risk behaviours for overweight and obesity[18].

Study findings

3.1 Characteristics of study participants

Table 1 shows the characteristics of the mothers who completed the survey and the age and sex distribution of the children included in the sample.

Almost half of the mothers (49.9% and 48.5% for urban and rural, respectively) were aged 35–40 years and approximately one quarter (23.9% and 26.4% for urban and rural, respectively) had completed university or tertiary education.

There were no significant differences between the urban and rural children with respect to sex, age distribution, mother's age or maternal education levels. The only significant difference was with respect to household income, there being a larger proportion of urban children in the "undisclosed" category. When only those who reported their household income were considered, there were no significant differences.

Table 1. Characteristics of children in the sample of urban and rural children aged 5–12 years

	Urban (n=188) n (%)	**Rural (n=371)** n (%)
Sex		
Male	91 (48.4)	171 (46.1)
Female	97 (51.6)	200 (53.9)
Age		
5–9 years	81 (43.1)	167 (45.0)
9 –12 years	107 (56.9)	204 (55.0)
Mother's age		
18–35	45 (23.9)	73 (19.7)
35–40	63 (33.5)	129 (34.8)
40–46	80 (42.6)	169 (45.6)
Maternal education		
Low	53 (28.2)	93 (25.1)
Medium	90 (49.9)	180 (48.5)
High	45 (23.9)	98 (26.4)
Household income*		
Low	39 (20.7)	82 (22.1)
Medium	70 (37.2)	161 (43.4)
High	37 (19.7)	85 (22.9)
Undisclosed	42 (22.3)	43 (11.6)

**significant difference between urban and rural children*

3.2 Consumption of fruits and vegetables

Key findings:

- **Children living in urban and rural areas did not differ significantly in terms of their consumption of vegetables, fruit or fried potato.**
- **Children living in rural areas consumed more non-fried potato compared to those in urban areas.**

The Australian Guide to Healthy Eating[19] recommends consumption of:

- between one and two servings of fruit and two to four of vegetables each day for children aged 4–7 years;
- one to two servings of fruit and three to five of vegetables each day for children aged 8–11 years; and
- three to four servings of fruit and four to nine of vegetables each day for adolescents (12–18 years).

Table 2 shows the consumption of fruits and vegetables among the children in the sample as reported by their mothers.

Only about one-third of mothers (31.5% and 36% for urban and rural, respectively) reported that their children consumed three or more serves of vegetables per day. Two-thirds of mothers (66.8% and 70.5% for urban and rural, respectively) reported that their children consumed two or more serves of fruit per day.

There were no significant differences between children living in urban and rural areas for intakes of vegetables, fruit or fried potato. The only statistically significant difference was with respect to non-fried potato, with a greater proportion of children living in rural areas consuming three or more serves per week (53.7% compared to 43.2%).

Table 2. Daily consumption of fruits and vegetables among urban and rural children aged 5–12 years

		Urban (n=188) n (%)	**Rural (n=371)** n (%)
Vegetables [1]			
	0–1 serve/day	64 (34.8)	123 (33.3)
	2 serves/day	62 (33.7)	113 (30.6)
	3+ serves/day	58 (31.5)	133 (36.0)
Fried potato			
	< 1 serve/week	73 (39.7)	140 (37.9)
	1 serve/week	60 (32.6)	134 (36.3)
	2+ serves/week	51 (27.7)	95 (25.7)
Non-fried potato *			
	0–1 serve/week	59 (32.2)	77 (20.9)
	2 serves/week	45 (24.6)	94 (25.5)
	3+ serves/week	79 (43.2)	198 (53.7)
Fruit [2]			
	0–1 serve/day	61 (33.2)	109 (29.5)
	2 serves/day	67 (36.4)	151 (40.8)
	3+ serves/day	56 (30.4)	110 (29.7)

**significant difference between urban and rural children*

[1]Does not include fried potato or non-fried potato

[2]Does not include fruit juice

3.3 Consumption of beverages

Key findings:

- **In both urban and rural areas, most children (two-thirds) consumed whole milk rather than low or reduced fat milk. There was no significant difference between urban and rural children in this regard.**
- **Children living in urban and rural areas consumed similar amounts of plain milk, flavoured milk, water and fruit juice.**
- **Compared to children in rural areas, urban children consumed more soft drink.**

The Dietary Guidelines for Children and Adolescents[1] identify that adequate fluid consumption is an integral component of a healthy diet. Water is a good source of fluids as it can hydrate without adding additional energy to the diet. Nevertheless, other drinks such as milks and fruit juices can add variety and valuable nutrients. Excessive consumption of soft drinks and fruit juice can contribute significantly to energy intake and may contribute to overweight and obesity[18].

Table 3 shows the daily consumption of various beverages among the children in the sample, as reported by their mothers.

Approximately one-third of mothers (33.6% and 35.8% for urban and rural, respectively) reported that their children consumed less than one serve of plain milk per day. Approximately one-fifth (21.6% and 19.7% for urban and rural, respectively) reported their children consumed one or more serves of flavoured milk per day.

There were no significant differences between children living in urban and rural areas for intakes of plain milk, flavoured milk, water or fruit juice.

The only statistically significant difference between children living in urban and rural areas was with respect to the consumption of soft drink. A greater proportion of rural children consumed no soft drink (31% compared to 23.8%), and a greater proportion of children living in urban areas consumed two or more serves per day (11.9% compared to 6.2%).

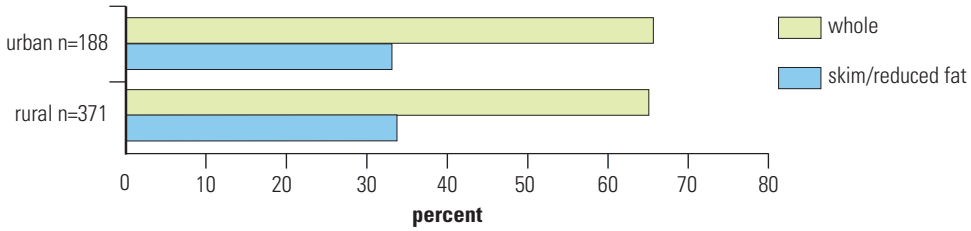
Table 3. Daily consumption of beverages among urban and rural children aged 5–12 years

Beverage		Urban (n=188) n (%)	Rural (n=371) n (%)
Plain milk (including whole milk and reduced fat)	0 serves/day	31 (16.8)	65 (17.5)
	< 1 serve/day	31 (16.8)	68 (18.3)
	1 serve/day	54 (29.2)	102 (27.5)
	2 serves/day	44 (23.8)	103 (27.8)
	3+ serves/day	25 (13.5)	33 (8.9)
Flavoured milk	0 serves/day	60 (32.4)	104 (28.1)
	< 1 serve/day	85 (45.9)	193 (52.2)
	1+ serve/day	40 (21.6)	73 (19.7)
Water	0–2 serves/day	39 (21.1)	72 (19.4)
	3 serves/day	38 (20.5)	54 (14.6)
	4–5 serves/day	68 (36.8)	139 (37.5)
	6+ serves/day	40 (21.6)	106 (28.6)
Soft drink	0 serves/day	44 (23.8)	115 (31.0)
	< 1 serve/day	104 (56.2)	211 (56.9)
	1 serve/day	15 (8.1)	22 (5.9)
	2+ serves/day	22 (11.9)	23 (6.2)
Fruit juice	0 serves/day	29 (15.7)	58 (15.6)
	< 1 serve/day	77 (41.6)	157 (42.3)
	1 serve/day	53 (28.6)	115 (31.0)
	2+ serves/day	26 (14.1)	41 (11.1)

**significantly different between urban and rural children*

The Dietary Guidelines for Children and Adolescents[1] recommend that, after 2 years of age, a gradual introduction of reduced-fat or low-fat dairy foods is appropriate. Figure 1 shows the type of milk usually consumed by children in the sample. Approximately two-thirds of mothers (66.5% and 65.9% for urban and rural, respectively) reported that their children consumed whole milk (rather than low or reduced fat milk). There was no significant difference between urban and rural children with respect to the proportion of children consuming whole milk compared to low or reduced fat milk.

Figure 1. Type of milk usually consumed among urban and rural children aged 5–12 years



3.4 Consumption of non-core foods

Key findings

- **Children living in rural areas consumed cakes, doughnuts and sweet biscuits more often than children living in urban areas. They also consumed pies, pasties and sausage rolls more often.**
- **Children in living in urban areas consumed fast food more often than children living rural areas.**

The Australian Guide to Healthy Eating[19] is based on five core food groups (vegetables, fruits, breads and cereals, meat and alternatives and dairy) and water. Foods or beverages that do not fit into these groups are considered extra or 'non-core'. These foods do not provide essential nutrients and often contain too much added fat, salt and sugars. The Dietary Guidelines for Children and Adolescents[1] recommend consumption of only moderate amounts of sugars and foods containing added sugars. They also recommend limiting the intake of saturated fat.

Table 4 shows the consumption of a range of non-core foods among the children in the sample, as reported by their mothers. Non-core foods include items such as potato crisps or salty snack foods, chocolate and confectionary, cakes and cereal products, pies, pasties and sausage rolls, fast food and pizza.

There were no significant differences between children living in urban and rural areas for intakes of potato crisps or salty snack foods, chocolate and confectionary and pizza. Consumption of these foods was above recommended levels, with just under a third of children consuming crisps 2–4 times per week, and over a third consuming chocolate or confectionary 2–4 times per week.

A number of non-core foods showed statistically significant differences between children living in urban and rural areas. For example, a greater proportion of children living in rural areas consumed cakes, doughnuts and sweet biscuits five or more time per week (18.4% compared to 10.9%). A greater proportion of rural children also consumed pies, pasties and sausage rolls once or more per week (33.2% compared to 22.3%).

A greater proportion of children in living in urban areas consumed fast food once or more per week compared to children living rural areas (30.1% compared to 20.5%).

Table 4. Daily consumption of non-core foods among urban and rural children aged 5–12 years

		Urban (n=188) n (%)	**Rural (n=371)** n (%)
Potato crisps or salty snack foods	0–3 times/month	63 (34.8)	125 (33.7)
	once/week	35 (19.3)	93 (25.1)
	2–4 times/week	55 (30.4)	110 (29.6)
	5+ times/week	28 (15.5)	43 (11.6)
Chocolate or confectionary	0–3 times/month	40 (21.7)	73 (19.7)
	once/week	57 (31.0)	111 (29.9)
	2–4 times/week	63 (34.2)	147 (39.6)
	5+ times/week	24 (13.0)	40 (10.8)
Cake, doughnuts, sweet biscuits *	0–3 times/month	58 (31.5)	84 (22.7)
	once/week	50 (27.2)	103 (27.8)
	2–4 times/week	56 (30.4)	115 (31.1)
	5+ times/week	20 (10.9)	68 (18.4)
Pies, pasties or sausage rolls *	< once/month	50 (27.2)	80 (21.6)
	1–3 times/month	93 (50.5)	168 (45.3)
	1+ times/week	41 (22.3)	123 (33.2)
Fast food *	0–3 times/month	128 (69.9)	295 (79.5)
	1+ times/week	55 (30.1)	76 (20.5)
Pizza	< once/month	62 (33.7)	140 (37.7)
	1–3 times/month	97 (52.7)	196 (52.8)
	1+ times/week	25 (13.6)	35 (9.4)

**significantly different between urban and rural children*

Study conclusions

Improving our understanding of the eating patterns of children and adolescents is vital for the development of strategies to promote healthy eating and improve health. This study sought to describe and compare the obesity-related eating patterns and behaviours of children aged 5–12 living in socioeconomically disadvantaged urban and rural neighbourhoods in Victoria.

Consistent with previous research[5], the study found eating patterns of children in this age group to be generally poor, with consumption of fruits and vegetables being inadequate for a large proportion of the children. In addition, the majority of children were usually consuming whole milk rather than reduced fat (skim or low fat milk), which is an indicator of overall high saturated fat intake[15]. These consumption patterns, together with the regular intake of a range of high-energy, nutrient-poor 'non-core' foods, are consistent with diets that contain too much saturated fat for good health[20].

The study showed few differences in the dietary patterns of urban and rural children. With respect to fruits and vegetable intake, the only difference was a higher intake of potato (not fried) among rural children. This is consistent with existing data in adults that suggest that higher vegetable consumption among rural populations is driven by higher potato intake[12].

With respect to non-core foods and beverages, the study found children living in urban areas consumed greater amounts of soft drink and fast food compared to children living in rural areas. Children living in rural areas, however consumed greater amounts of other non-core foods such as cakes, doughnuts and sweet biscuits, as well as pies, pasties and sausage rolls.

These differences may be due in part to availability and accessibility of various foods, however specific evidence regarding the role of environmental factors in influencing the dietary intake of children and adolescents is currently limited[21]. Existing studies have focused on the influence of food availability in the home, but very few have focussed on the school or neighbourhood environment[21]. Recent research in Victoria regarding fruit and vegetable intake among children

aged 5–6 and 10–12 years found that a greater availability of convenience stores and fast food outlets close to home had a detrimental effect on children's fruit and vegetable intake[22], however there were no consistent associations between availability of fast food stores and actual fast food consumption[23].

The findings of this study provide valuable insights into the eating behaviours of children in low socioeconomic areas in urban and rural Victoria. While there appear to be few differences in the intakes of key foods and beverages between these children, there may well be different influences on eating behaviours which would be important to consider in developing and implementing of programs promoting healthy eating. The ongoing research at the Centre for Physical Activity and Nutrition will explore these influences further.

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