

# The price of healthy and unhealthy foods in Australian primary school canteens

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**S**chool canteens, kiosks and other school food outlets make foods available for students to purchase during school hours in countries including Australia and the United States (in the form of 'competitive foods' i.e. foods sold outside of school meals).<sup>1,2</sup> These outlets represent important settings for public health nutrition interventions targeting children, as they are frequently accessed by children and contribute considerably to students' total energy consumption while at school.<sup>3,4</sup> To date, public health policy targeting the school food environment has largely focused on reducing the availability of unhealthy foods from school food outlets.<sup>5,6</sup>

Alternative strategies to promote healthy food purchasing by and for students have received little attention from policy makers. Price is a key determinant of purchase choice in schools;<sup>7</sup> it is easily amenable to intervention,<sup>8</sup> and relative pricing approaches are recommended by the World Health Organization.<sup>9</sup> Despite the potential of pricing strategies, little is known about the current pricing of foods in Australian canteens,<sup>7</sup> particularly the degree to which pricing supports students to make healthy purchases across all menu categories. Therefore, this study was conducted to describe canteen menu prices in a randomly selected sample of primary schools in NSW, Australia. Specifically, the study aim was to describe the price of foods available in primary school canteens according to their nutritional value.

## Methods

This data forms the baseline data set for a randomised controlled trial (RCT) of an

## Abstract

**Objective:** To describe the price of Australian school canteen foods according to their nutritional value.

**Methods:** Primary school canteen menus were collected as part of a policy compliance randomised trial. For each menu item, dietitians classified its nutritional value: 'green' ('good sources of nutrients'), 'amber' ('some nutritional value'), 'red' ('lack adequate nutritional value') and assigned a food category (e.g. 'Drinks', 'Snacks'). Pricing information was extracted. Within each food category, ANOVAs assessed differences between the mean price of 'green', 'amber' and 'red' items, and post-hoc tests were conducted.

**Results:** Seventy of the 124 invited schools participated. There were significant differences in the mean price of 'green', 'amber' and 'red' foods across categories, with 'green' items more expensive than 'amber' items in main-meal categories ('Sandwiches' +\$0.43, 'Hot Foods' +\$0.71), and the reverse true for non-meal categories ('Drinks' -\$0.13, 'Snacks' -\$0.18, 'Frozen Snacks' -\$0.25^).

**Conclusion:** Current pricing may not encourage the purchasing of healthy main-meal items by and for students. Further investigation of pricing strategies that enhance the public health benefit of existing school canteen policies and practices are warranted.

**Implications for Public Health:** Providing support to canteen managers regarding healthy canteen policies may have a positive impact on public health nutrition.

**Key words:** nutrition, schools, public health, students, pricing

intervention to increase compliance with the statewide Healthy Canteen Policy.<sup>10</sup> To participate in the RCT, schools were randomly selected from all Government primary schools (children 5-12 years) within one region of NSW, Australia. School were ineligible if they did not have a canteen, did not sell any unhealthy ('red') foods (i.e. as defined by the NSW Healthy Canteen Policy, 'Fresh Tastes')<sup>11</sup> or if they exclusively enrolled children with specialised needs. A research assistant telephoned schools from April to October 2013 to confirm eligibility, request their current canteen menu, and collect the number of student enrolments. School postcode information was collected to determine rurality and

level of disadvantage. Two trained dietitians independently classified each menu item as 'green' ('good sources of nutrients'), 'amber' ('some nutritional value, but moderate levels of saturated fat, sugar or salt'), and 'red' ('lack adequate nutritional value, and high in saturated fat, sugar or salt') according to 'Fresh Tastes' guidelines.<sup>5</sup> This involved trained dietitians contacting the schools to collect additional information about menu items where the available nutritional information was insufficient (e.g. recipes and yield for canteen-made items, brand and product information for commercial items). In the absence of this information, an assumption list, generated by dietitians experienced in menu classification, was used to classify items.

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Price data was also extracted from the menus. To ensure that prices were compared among items that were reasonable substitutes, another two dietitians independently classified menu items according to the food categories listed within 'School Canteen Buyers Guide 2015'.<sup>12</sup> This guide is supplied to all canteen managers within NSW and classifies more than 700 commonly stocked canteen menu items into the following categories: 'Sandwiches, Burgers, Wraps & Rolls' (e.g. ham sandwich), 'Hot Foods' (e.g. meat pie), 'Drinks' (e.g. flavoured milk), 'Snacks' (e.g. potato chips), 'Frozen snacks' (e.g. ice cream) and 'Breakfast cereal'.<sup>12</sup>

### Statistical analysis

ANOVAs were run using SAS (version 9.3) to determine if, within each food category, there were significant differences between the mean price of green, amber and red items. Post-hoc testing (Tukey's Test) was carried out to determine if, within each food category, there were significant differences in the mean price of i) green and amber foods, and ii) green and red foods. All prices are reported in Australian dollars.

## Results

Eighty of the 124 invited schools returned menus for assessment; eight were deemed ineligible and two schools subsequently declined further study participation, leaving 70 schools that consented. Of the schools that did not return menus: 29 could not be

contacted, nine refused to provide their menu and six had recently closed their canteen. Average student enrolment was 255, with most schools (66%) in a metropolitan area (based on ARIA classification),<sup>13</sup> and schools evenly split (50%:50%) across areas of low and high socioeconomic status (based on SEIFA classification).<sup>14</sup>

The assessed menus included 5,288 items, of which 5,117 had prices listed and were analysed. Items ranged in price from \$0.05 to \$6.00, with a mean price of \$1.89 (sd \$1.22). Within each food category there were significant differences in the mean price of green, amber and red foods. On average across the food categories, green foods were the cheapest within the 'Frozen Snacks' category; amber foods were cheapest in the 'Sandwiches' and 'Hot Foods' categories; red foods were cheapest in the 'Drinks' and 'Snacks' categories. On average, green foods were the most expensive 'Hot Foods', amber foods were most expensive within 'Drinks' and 'Snacks', and red foods were most expensive within the 'Sandwich' and 'Frozen Snack' categories.

In the categories which typically contain the main-meal item ('Sandwiches' and 'Hot Foods'), green foods were \$0.43 and \$0.71 more expensive than amber alternatives, and in the case of 'Hot Foods', green foods were \$0.50 more expensive than red alternatives. In the non-meal categories ('Drinks', 'Snacks' and 'Frozen Snacks') amber foods were \$0.13, \$0.18 and \$0.25 respectively more expensive than green foods. In most categories the

number of red items (banned or restricted from regular sale) was low, representing 1-3% of the category. However, in 'Hot Foods' and 'Snacks', red foods comprised 11% and 15% of the categories respectively, and were on average significantly cheaper than green alternatives.

## Discussion

This study found differences in the pricing of healthy and unhealthy foods in NSW school canteens. Results varied by food category, with green items more expensive than amber items in the main-meal categories ('Sandwiches' and 'Hot Foods'), and the reverse for the non-meal categories ('Drinks', 'Snacks', 'Frozen Snacks'). The findings suggest that current pricing may not encourage purchase of healthy main-meal items by and for students, and are similar to the two previous studies examining canteen food pricing. A 2014 Australian study, for example, compared the average price of a meat pie and salad item from more than 200 online canteen menus and found that the mean cost of a pie was significantly lower than the cost of the healthier salad.<sup>7</sup> Furthermore, a New Zealand study reported the mean cost of 'main choice', 'snacks' and 'drinks' from a sample of 200 primary schools, and found that a healthy item was the most expensive 'main choice' (Filled rolls, \$1.79) which was about 30 cents more expensive than 'pies', a comparative unhealthy choice, and the next most expensive 'main choice' item.<sup>1</sup> The study found little differences between the prices of 'snack' foods, but did identify that fruit was the least expensive item (Fruit, \$0.47).<sup>1</sup>

This study represents the most comprehensive analysis of canteen prices in Australian schools. Findings suggest there is scope to implement pricing strategies to improve public health nutrition within this setting. Although the price of foods is partly determined by the cost of inputs (e.g. ingredients and labour) which may be fixed, pricing strategies may be applied to encourage healthy purchasing without loss of revenue. One potential pricing strategy is to apply a differential mark-up based on the healthiness of the product or to use higher prices for unhealthy items to subsidise price reductions for healthier items.<sup>8</sup> For example, a canteen support organisation previously recommended canteen managers apply a 60% mark up on green foods, and an 80% mark up on amber foods.<sup>15</sup>

**Table 1: Mean price of canteen menu items by Fresh Tastes Classification (Green, Amber, Red).**

Food Category	Classification	N	Mean	Std Dev	Pr<f (ANOVA)
Sandwiches, Burgers, Wraps & Rolls <sup>a</sup> (Sandwiches)	Green	1,374	\$3.00	\$1.01	<0.0001
	Amber	632	\$2.57**	\$0.99	
	Red	14	\$3.43	\$0.65	
Hot Foods <sup>b</sup>	Green	54	\$2.62	\$1.02	<0.0001
	Amber	581	\$1.91**	\$0.93	
	Red	80	\$2.12*	\$0.90	
Drinks <sup>c</sup>	Green	392	\$1.32	\$0.32	<0.0001
	Amber	215	\$1.45**	\$0.31	
	Red	16	\$1.03**	\$0.36	
Snacks <sup>d</sup>	Green	339	\$0.76	\$0.67	<0.0001
	Amber	483	\$0.94**	\$0.35	
	Red	150	\$0.55**	\$0.42	
Frozen Snacks <sup>e</sup>	Green	136	\$0.74	\$0.41	<0.0001
	Amber	375	\$0.99**	\$0.47	
	Red	9	\$1.01	\$0.66	

\* Post-hoc tests indicated significantly different from 'Green'  $p < 0.01$

\*\* Post-hoc tests indicated significantly different from 'Green'  $p < 0.001$

Missing data (either 'Fresh Tastes classification' or 'food category'): a: n=131, b: n=0, c: n=2, d: n=30, e: n=11. As only 11 items were classified as 'Breakfast cereal', they were excluded from the analysis. 186 'Extra' items (i.e. an extra filling for a sandwich or burger) were excluded from the analysis, given they could not be purchased as standalone items and may have changed the classification of the item to which they were added. (70 amber items, mean price \$0.38; n=116 Green items, mean price \$0.60). 61 'meal deals' or 'combos' (i.e. multiple items bundled together for a single price) were also excluded from ANOVA analysis given the classification system (red, green or amber) as there is no way of taking into account multiple items.

## Implications for public health

Given the influence of pricing on consumer choice, the findings of this study suggest that providing support to canteen managers to implement such strategies is warranted and may have a positive impact on public health nutrition.

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