

RESEARCH ARTICLE

Food menus within New Zealand primary school canteens: Do they meet the guidance?

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Abstract

Issue Addressed: Unhealthy food and drinks are widely available in New Zealand school canteens. The aim of this study was to assess primary school canteen food menus against the newly implemented Ministry of Health 'Food and Drink Guidance for Schools'.

Methods: A convenience sample of 133 primary school canteen menus was collected in 2020 as part of the baseline evaluation of the Healthy Active Learning initiative across New Zealand. A menu analysis toolkit was developed to assess menus in accordance with the Ministry of Health's 'Food and Drink Guidance for Schools' which classifies food items into three food categories: 'green', 'amber' and 'red'.

Results: Most menu items belonged to the less healthy amber (41.0%) and red (40%) food categories. Low decile schools had a lower percentage of green food items (8.6%) and a higher percentage of red food items (48.3%) compared to high decile schools. Sandwiches, filled rolls and wraps were the most commonly available items, followed by baked foods and foods with pastry. Over half of the in-house canteen menu items were classified as 'red' foods (55.3%).

Conclusions: Most school canteens were not meeting the guidelines for healthy food and drink provision outlined by the Ministry of Health. Improving the food environment for children in socio-economically deprived areas needs to be prioritised to reduce inequities.

So What? This study highlights the unhealthy food environments in New Zealand schools and emphasises the need for more robust national policies and mandated school guidance.

KEYWORDS

childhood nutrition, food policy, healthy active learning, menu audit, policy evaluation, school food environment, traffic-light guidance

1 | INTRODUCTION

Childhood obesity and overweight rates in New Zealand are considerably higher than those reported globally,¹ with one in three children aged between 2 and 14 years identified as overweight or obese.² Unhealthy diets, physical inactivity and childhood obesity have strong links with the development of non-communicable diseases,^{3,4} can

negatively influence educational outcomes^{5,6} and have an adverse impact on the psychological well-being of children.^{4,7}

Children's dietary knowledge and food preferences are influenced by various factors, both modifiable and non-modifiable, including the food environment.⁸⁻¹⁰ Schools are an excellent setting to influence children's dietary behaviours since they have the potential to reach almost all children during the first two decades of their lives.¹¹ To

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create healthier school food environments, the government implemented the Food and Beverage Classification System (FBCS) in 2007 as a tool to classify foods as 'everyday', 'sometimes' and 'occasional' and mandated that *only* healthy food and drinks be provided in schools.¹² Due to a change in government in 2009, the responsibility for mandating healthy food and drinks in schools was shifted to the schools' Board of Trustees¹² whose role included planning and acting in the school and community's interests, with a primary focus on student learning, well-being, achievement and progress.¹³ While it was expected that schools would improve the healthiness of the foods provided, many schools faced challenges in implementing healthy food and drink policies due to factors such as cost,^{14,15} time-constraints^{16,17} and lack of resources.^{17,18} Consequently, there was a gradual shift back to unhealthy foods, as highlighted in a recent analysis of school canteens and food providers using the FBCS, which found that many school menus still offer more 'occasional' food items than 'everyday' items.¹⁹

Canteen use has been associated with higher consumption of high-fat and high-sugar foods and beverages in New Zealand primary schools.^{20,21} Previous analyses in New Zealand have shown that many students buy some or most of their food and drink from the school canteen,²² yet, many school canteens and school food providers are not supplying foods that promote healthy eating and nutrition behaviours.^{19,20} The Ministry of Health (MoH) recently implemented the *Healthy Food and Drink Guidance for Schools* in 2020 which supersedes the FBCS²³ (Table 1). The new guidance utilises a traffic-light framework, similar to that used in many Australian states,^{24–26} and has been shown to be easier to understand by the general public.^{27,28}

New Zealand's food provision systems present a unique landscape with schools adopting various approaches, including in-house canteens, outsourcing to external companies or a combination of both. The recent implementation of the traffic-light classification system has allowed a closer comparison of New Zealand and Australian school food provision systems. However, the New Zealand context stands apart from other countries like the United States, which has a National School Lunch Program providing daily low-cost or free meals to children,²⁹ or the United Kingdom,³⁰ Finland,³¹ Sweden³² and Japan³³ operating under a free school lunch model. Meanwhile, countries such as Canada have daily meals provided through organised breakfast and lunch programs and cafeteria services.³⁴

Previous analyses of school canteens in New Zealand have either been conducted in specific regions of New Zealand,³⁵ were conducted more than 10 years ago,^{20,36} or utilise the now outdated FBCS.¹⁹ This study aims to present data collected in 2020 through the national evaluation of the Healthy Active Learning initiative to assess the healthiness of New Zealand school food menus using the Ministry of Health *Food and Drink Guidance for Schools*.

2 | METHODS

2.1 | Healthy active learning evaluation

The Healthy Active Learning (HAL) initiative is a collaboration between the Ministry of Health, Ministry of Education and Sport

TABLE 1 A summary of the Ministry of Health 'Healthy Food and Drink Guidance for Schools'.^a

Green food items	Amber food items	Red food items
<ul style="list-style-type: none"> • Are a good source of nutrition. • Are the basis of a healthy diet. • Are generally lower in saturated fat, salt and added sugar. • Are mostly whole and less processed. • Comes from the four food groups: vegetables and fruit; grain foods (mostly wholegrain and those naturally high in fibre); milk and milk products (mostly low fat); and legumes, seafood, eggs and meat with fat removed. 	<ul style="list-style-type: none"> • Are not part of an everyday diet. • May have some nutritional value. • Are often more processed. • In large serving sizes can contribute to consuming excess kilojoules/calories. • In most categories, foods can be defined by an HSR ≥ 3.5 (except for fish and seafood, poultry and red meat, where an HSR < 3.5 is acceptable depending on the portion size). 	<ul style="list-style-type: none"> • Have poor nutritional value. • Are high in saturated fat, salt and/or added sugars. • Can contribute to consuming excess kilojoules/calories. • Are often highly processed food and drinks. • In most categories, foods can be defined by an HSR < 3.5. Red food items also include sugar-sweetened beverages, confectionery, deep-fried food items and meals that do not contain any vegetables.

Abbreviation: HSR, Health Star Rating.

^aDescriptions as per the Ministry of Health 'Healthy Food and Drink Guidance for Schools'.²³

New Zealand which aims to improve New Zealand students' access to quality physical activity and access to healthy food and drinks. Massey University has been contracted to evaluate the outcomes of the HAL initiative. The evaluation is a longitudinal quasi-experimental mixed methods design which began in 2020.

Ethics approval for the Healthy Active Learning evaluation was granted by Massey University Human Ethics Committee, Northern (NOR 20/07).

2.2 | Data collection and participants

All schools in the regions evaluated by HAL were contacted for details about food available to children pre-COVID or during alert level 1.¹ Schools were asked to provide a menu if available and a series of questionnaire items to elicit greater information about food sold to children via the school canteen, tuck shop, or an external food provider between July 2020 and February 2021. Schools signed up to Ka Ora Ka Ako ('Healthy School Lunches' program by the Ministry of Education) were excluded as these schools were likely to have changed their food provision systems as a result (removal of a school

canteen and/or change of food provider). This program has been evaluated separately.³⁷ Responses to food availability were entered into Qualtrics online survey software. The school menus collected as part of the HAL evaluation achieved a 6.8% response rate, with 133 out of 1943 primary schools providing their school menus.

To provide context for the study, various characteristics related to the schools were collected. School deciles, area and size were obtained from the NZ Ministry of Education's School Directory, while the Equity Index (EQI) was found on the Ministry of Education's 'School and Kura 2023 EQI numbers' document. Deciles (1–10) were ratings used by the Ministry of Education between 1995 and 2022 to assess how many students within the school lived in low socio-economic or poorer communities. The lower the school's decile rating, the more funding it received. Due to a better understanding of the socio-economic factors that impact student learning, the decile system was replaced with the EQI in 2023, which utilises a broader range of variables taking into account more than just the residential neighbourhood where students reside.³⁸ Both measures were included to allow comparison to earlier literature. To determine the schools' deprivation level, the 2018 New Zealand Deprivation Index (NZDep) was used. The NZDep is an area-based measure of socio-economic deprivation in New Zealand based on several census variables where high scores correspond to higher levels of socio-economic deprivation.³⁹ School deciles and NZDep scores were classified as low (1–3), medium (4–6) or high (7–10) depending on their respective scores. EQI was classed as low (≤ 399), medium (400–499) and high (≥ 500). School size was classified as small (≤ 199), medium (200–399) or large (≥ 400) based on the number of students. Due to data collection limitations, the EQI and NZDep scores could not be obtained for all schools.

2.3 | Menu analysis toolkit

Four researchers (three nutritionists and one dietitian) developed a *menu analysis toolkit* to undertake the analysis of all menus collected in the HAL evaluation. The toolkit provides a breakdown of commonly packaged foods and meals/menu items available to purchase within schools. Food providers were categorised as 'main providers' (e.g., Libelle Group, Dee Jays and Go Deli), 'chain providers' (Subway, PitaPit, Hells Pizza, Jesters Pies and Bakers Delights), 'local providers' (sushi and bakery/cafe) and in-house catering. Main providers were contacted by two researchers via email to provide further information and/or a breakdown of composite meals provided on their menus. Where information was not provided, researchers used standard reference recipes sourced from Countdown Supermarkets to classify the meal. Nutrition information from chain providers was sourced where available from company websites. Commercial-sized bakery/café and sushi menu item portion sizes were used when categorising foods from local providers.

In-house catering meals were assessed using standard reference recipes from Countdown Online Supermarkets⁴⁰ and/or Edmonds Cookery Book.⁴¹ Packaged food items were classified based on their

compliance with the guidance with or without the inclusion of either a manual calculation of the *Health Star Rating* (HSR) or, where available, the manufacturers reported HSR. Where food items did not include a specific brand or flavour, for example, rice crackers, a cumulative rating was given based on available products within that category in New Zealand. Ultra-processed foods were defined based on the NOVA classification system and included sweet and savoury packaged snack food items such as biscuits, chips, crackers, confectionery and instant noodles.⁴² Assumptions were created for menu items requiring additional detail to be categorised according to the guidance through discussion and consensus by all four researchers. Primary school menus were coded by two researchers independently, and 10% of those menus were swapped and rechecked to ensure intercoder reliability.

2.4 | Statistical analysis

Statistical analyses were performed using IBM SPSS statistics package version 27 (SPSS Inc.). Descriptive analyses were completed for school characteristics including school type, deciles, EQI, school size, area, region and deprivation level.

Shapiro–Wilk and Kolmogorov–Smirnov tests were used to assess normality. Non-normally distributed data were transformed to obtain normality and parametric tests were used to find significant differences in the percentage of red, amber and green food items within each school characteristic. Levene's test was used to assess homogeneity of the data. Univariate analyses were used for characteristics with more than two groups, and Tukey's honest significance difference (HSD) test was used to find significance between the groups. For characteristics with only two groups, independent *t* tests were used. For data that could not be transformed to obtain normal distribution, the Kruskal–Wallis test was used and post hoc pairwise comparisons or Games–Howell tests were used to determine differences between more than two groups. For non-parametric characteristics with only two groups, the Mann–Whitney *U* test was used. An α value of $p < .05$ was considered statistically significant and all tests were two-tailed.

Box plots were created using the Seaborn Statistical Data Visualisation Library available on Python 3.10 (Python Software Foundation).⁴³ School characteristic data is displayed as median (25th and 75th percentile) in box plots for each characteristic according to the percentage of red, amber and green food items. Bar graphs were created using Excel (Microsoft Office 365) to display the percentage of food groups within school menus and the distribution of red, amber and green food items according to school food provider.

3 | RESULTS

3.1 | Characteristics of New Zealand primary schools

A total of 133 schools provided their school food menus for assessment (Table 2). There were more contributing primary schools for

TABLE 2 Characteristics of primary schools that provided food menus relative to all New Zealand primary schools.

		Schools providing food menus (n = 133), n (%)	NZ primary schools (n = 1829), n (%)
School type	Contributing (years 1–6)	77 (58)	771 (42)
	Full primary (years 1–8)	56 (42)	1058 (58)
Deciles ^a	Low (1–3)	23 (17)	569 (31)
	Medium (4–7)	49 (37%)	548 (30%)
	High (8–10)	61 (46%)	698 (38%)
School size	Small	37 (28%)	990 (54%)
	Medium	51 (38%)	506 (28%)
	Large	45 (34%)	333 (18%)
Area	Rural	30 (23%)	605 (33%)
	Urban	103 (77%)	1223 (67%)
Region ^b	Northland	17 (13%)	105 (6%)
	Auckland	44 (33%)	383 (21%)
	Bay of Plenty	30 (2%)	250 (14%)
	Wellington	23 (17%)	207 (11%)
	Canterbury	18 (15%)	391 (21%)
Equity Index	Low	39 (29%)	-
	Medium	79 (59%)	-
	High	15 (11%)	-
Deprivation	Low (1–3)	38 (29%)	-
	Medium (4–7)	64 (48%)	-
	High (8–10)	31 (23%)	-
Providers ^c	Chain providers	69 (52%)	-
	Local providers	71 (53%)	-
	In-house	26 (20%)	-
	School provider	24 (18%)	-
	Not specified	2 (2%)	-

^aDeciles are ratings used by the Ministry of Education to work out funding for schools. A school decile measures how many of its students live in low socio-economic or poorer communities. A school is given a rating between 1 and 10; the lower the school's decile rating, the more funding it receives from the Ministry of Education.

^bSome regions have been combined with others due to a smaller response rate. Bay of Plenty also contains data from Hawkes Bay, and Canterbury contains Otago/Southland schools.

^cThe total percentage of providers is greater than 100% due to some schools having more than one food provider. Chain providers include Subway, Pita Pit, St Pierre Sushi, Jesters Pies and other commercial 'chain' operators. Local providers include local bakeries, local sushi, local dairies, and other 'local' food sources. In-house provider is considered food provided by the school itself. School providers include contracted companies such as Go Deli, Dee Jays and Libelle Group food suppliers.

years 1–6 (58% of the sample) than full primary schools for years 1–8 (42%). Almost half of all schools came from a high decile (7–10) area (46%), whereas only 17% of schools were from a low decile (1–3) area. Most schools had a medium EQI at 59%. In terms of deprivation, almost half of the schools (48%) were in areas with medium deprivation (NZDep 4–7), and almost a quarter (23%) were in high deprivation areas (NZDep 7–10). Most schools were located in urban areas, accounting for 77% of the total. School size was similarly distributed, with the majority belonging to the medium-sized school category (38%).

There was overlap with school food providers, with some schools having more than one provider. Chain and local providers were the most common, supplying food to over half of schools (52% and 53%,

respectively), while in-house and school providers supplied fewer schools (20% and 18%, respectively).

3.2 | Differences in school menus based on demographic characteristics

In general, most school menus were comprised of amber food items (41%), whereas green food items were a relatively small portion (12.8%), followed by red food items (40%). The percentages of green, amber and red food items within schools according to characteristics such as school type, decile, school size, area, region, deprivation and EQI are presented in Figure 1.

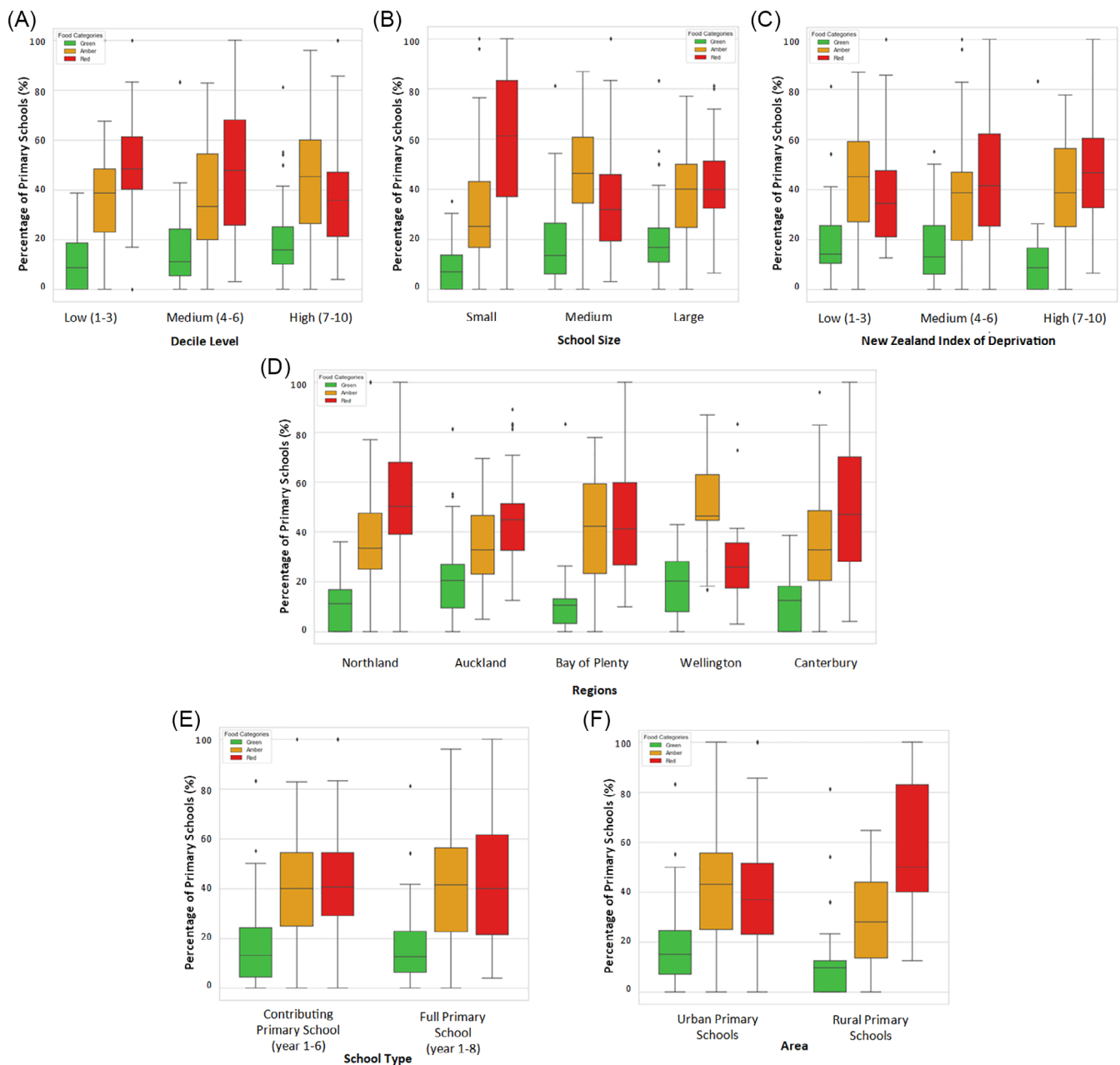


FIGURE 1 Differences in the percentage of green, amber and red foods on school menus based on demographic characteristics. Percentages of green, amber and red food items according to (A) Decile Levels, (B) School Size, (C) New Zealand Deprivation Index, (D) Regions, (E) School Type and (F) Area. Definitions: Deciles (1–10) were ratings used by the Ministry of Education between 1995 and 2022. A school decile measures how many of its students live in low socio-economic or poorer communities. The lower the school's decile rating, the more funding it receives. Data aggregation: Regional data were aggregated for areas with low response rates. Due to low response rates from these regions, data were aggregated for the following regions: 'Canterbury' includes Otago/Southland schools, and 'Bay of Plenty' includes Hawkes Bay schools.

3.3 | School type

There were no significant differences in the percentage of green food items between school type ($p = .902$). Contributing schools did not significantly differ in their percentage of amber food items on school canteen menus compared to full primary schools ($t(131) = .067$, $p = .947$). There were no significant differences in the percentage of red food items according to school type ($t(131) = .625$, $p = .932$).

3.4 | Deciles

Green food items varied by decile ($H^2 = 7.104$, $p = .029$), with low decile schools providing fewer green food items compared to high decile schools (8.6% vs. 15.8%, $p = .028$). No differences were found in the percentage of green food items between low and medium decile schools ($p = .153$) or between medium and high decile schools ($p = .150$). No differences were observed in the percentage of amber

foods across low (38.5%), medium (33.3%) and high (45.2%) deciles ($F^2 = 1.527$, $p = .221$). However, the percentage of red food items differed by decile ($F^2 = 3.340$, $p = .039$), with low decile schools providing a higher percentage of red food items compared to high decile schools (48.3% and 35.8%, respectively, $p = .036$).

3.5 | School size

Green food items varied by school size ($H^2 = 14.736$, $p < .001$). Small schools provided a lower percentage of green food items (7.1%) than medium (13.5%, $p = .007$) and large (16.7%, $p = .001$) schools. No differences were found in the percentage of green food items between medium and large schools ($p = .478$). Amber food items also differed by school size ($F^2 = 5.345$, $p = .006$), with small schools having a lower percentage of amber food items than medium-sized schools (25.0% vs. 40.0%, $p = .004$). However, there were no differences in the percentage of amber foods between small and large schools ($p = .353$), and medium and large schools ($p = .141$). The percentage of red food items varied by school size ($F^2 = 9.629$, $p < .001$). Small schools had a higher percentage of red food items (61.3%) compared to medium (31.6%, $p < .001$), and large (39.8%, $p = .020$) schools. No differences were found in the percentage of red food items between medium and large schools ($p = .221$).

3.6 | Area

Urban schools provided a higher percentage of green food items (15.1% vs. 9.7% in rural schools, $p = .006$) and a lower percentage of red food items (36.90% vs. 50.0% in rural schools, $p < .001$), but had a higher proportion of amber food items (43.0% vs. 28.0% in rural schools, $p = .006$) on their menus.

3.7 | Region

Significant regional differences were observed in the percentage of green ($H^4 = 12.550$, $p = .014$), amber ($F^4 = 2.704$, $p = .033$), and red ($F^4 = 2.929$, $p = .023$) food items in school canteens. Auckland schools offered the highest percentage of green food items (20.4%) compared to Northland (11.1%; $p = .033$), Bay of Plenty (10.4%; $p = .003$) and Canterbury schools (12.5%; $p = .035$). Wellington schools had more green food items (20.2%) than Bay of Plenty schools ($p = .034$). Auckland schools provided a lower percentage of amber food items (32.6%) compared to Wellington schools (46.2%; $p = .015$). Wellington schools had a lower percentage of red food items (25.8%) compared to Auckland (44.8%; $p = .037$), Bay of Plenty (41.2%; $p = .048$) and Canterbury schools (46.9%; $p = .041$). No other significant differences were found between regions for green, amber or red food items.

3.8 | Deprivation

The percentage of green food items varied significantly by deprivation level ($H^2 = 6.980$, $p = .031$). Schools in low-deprivation areas had a significantly higher percentage of green food items (14.2%) compared to high-deprivation areas (8.6%) ($p = .031$). No significant differences were found in the percentage of amber and red food items based on deprivation level ($F^2 = .825$, $p = .440$ and $F^2 = 1.307$, $p = .276$, respectively).

3.9 | Equity index

Significant differences in green food items were found between equity levels ($H^2 = 17.54$, $p < .001$). Schools with low EQI had a higher percentage of green food items (22.2%) than medium equity schools (12.1%, $p = .005$) and high equity schools (6.7%, $p < .001$). No significant differences were found in the percentage of amber and red food items based on equity levels ($F^2 = .592$, $p = .555$ and $F^2 = 2.471$, $p = .088$, respectively).

3.10 | Common menu constituents

Figure 2 illustrates the most common food and beverage items offered on school food menus. Sandwiches, filled rolls and wraps were the most common item (86%), followed by baked foods and foods with pastry (including pies and sausage rolls; 71%). Mixed meals containing ultra-processed food items and/or deep-fried items, classified as 'red' food items, were the third most common food items offered (66%). Both ultra-processed sweet and savoury food items were offered by more than half of schools (55% and 56%, respectively). Sugar-sweetened beverages were just as prevalent as water on school food menus (54% each). Sushi and fruit and vegetables, both considered 'green' food items, were offered by less than half of schools (45% and 41%, respectively).

3.11 | Healthiness of foods and beverages according to food providers

Healthiness of foods and beverages offered in schools according to food providers is illustrated in Figure 3. There was a similar distribution of green, amber and red food items in school menus provided by 'school providers' and 'local providers', each having 22% and 20.6% green food items, respectively, and 44.6% and 43.3% red food items, respectively. In-house providers had a low percentage of green food items on their menus (8.3%) and a high proportion of red food items (55.3%). Chain provider menus were predominantly made up of amber food items (52.2%).

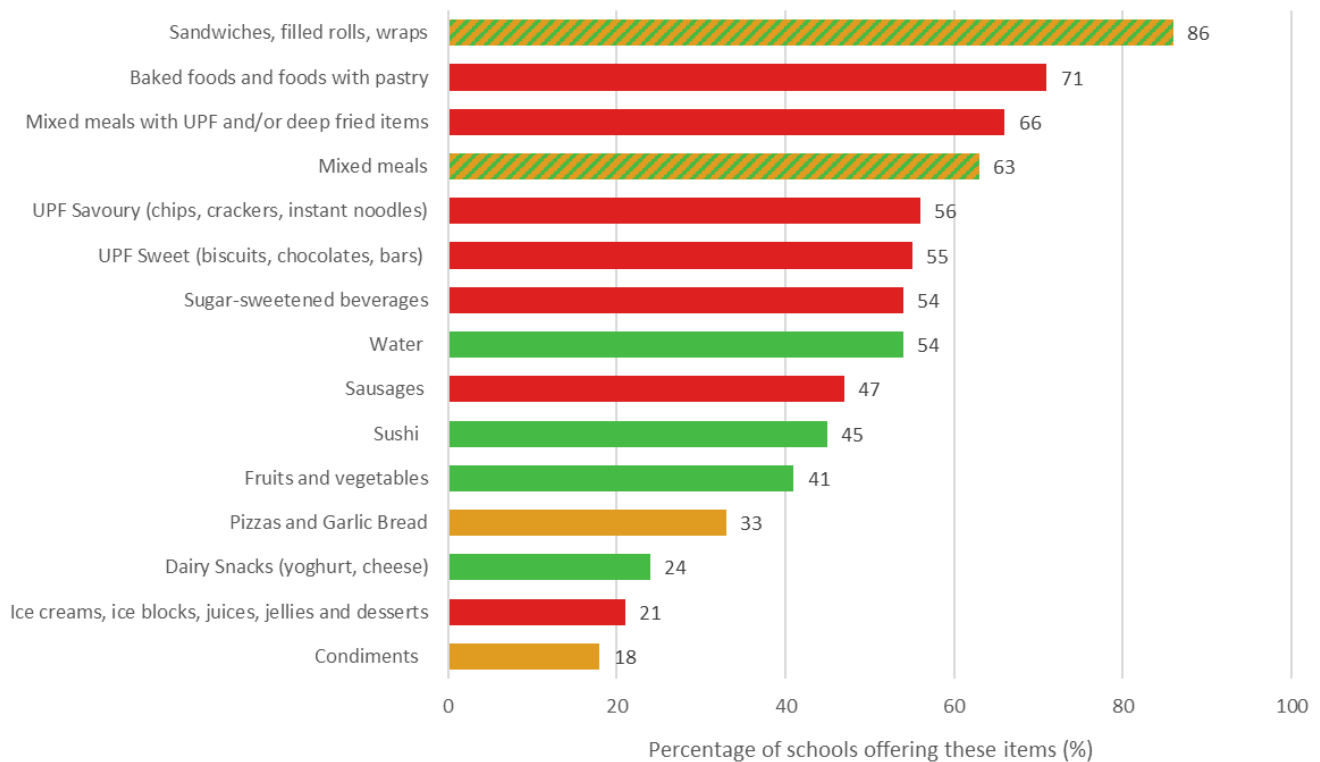


FIGURE 2 Healthiness of the most common menu items available through the school food service according to the Ministry of Health Food and Drink Guidance for Schools. Sandwiches and mixed meals have not been assigned one category due to their split proportion between green and amber depending on the composition of the meal or sandwich. UPF, ultra-processed food.

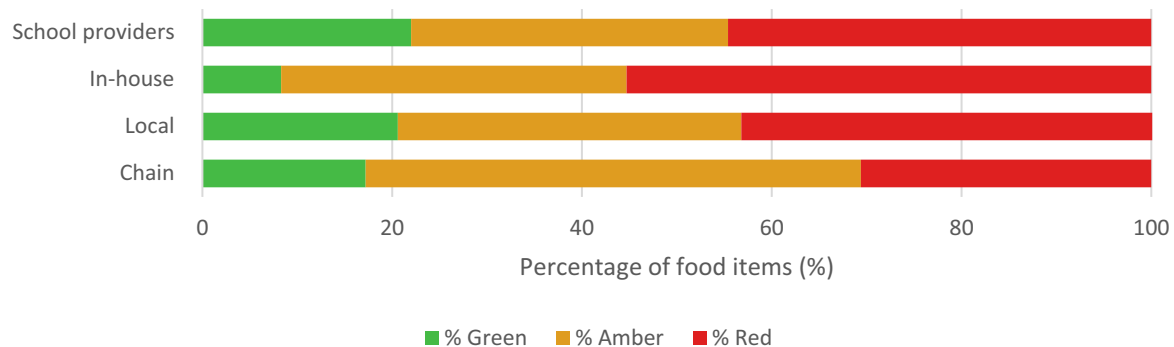


FIGURE 3 Healthiness of foods and beverages offered in schools according to school food providers. Chain providers include Subway, Pita Pit, St Pierre Sushi, Jesters Pies and other commercial 'chain' operators. Local providers include local bakeries, local sushi, local dairies and other 'local' food sources. In-house providers are considered food provided by the school itself. School providers include contracted companies such as Go Deli, Dee Jays and Libelle Group food suppliers.

4 | DISCUSSION

The current state of foods and drinks offered within school canteens, according to the new 'Healthy Food and Drink Guidance for Schools',²³ suggests that school canteens are not meeting the MoH guidance, with the majority of school food and drinks overwhelmingly belonging to either the amber or red food categories. Although the guidance implemented in 2020 is relatively new to schools, the FBSC has been active since 2007 with the provision of guidelines for healthy school food and drinks within schools.¹² Lack of compliance

with non-mandated school food guidelines is not a novel finding and has been reported previously in New Zealand^{19,44} and Australia.^{24,45-48} The issue of non-compliance may be related to the absence of well-defined targets in government school food guidance,⁴⁹ and the lack of robust monitoring or accountability measures for schools that do not adhere to the guidelines.⁵⁰ The current study found the most common items offered on canteen menus were sandwiches, filled rolls and wraps, followed by baked foods and ultra-processed mixed meals. Ultra-processed sweet and savoury food items and sugar-sweetened beverages, considered 'red' food items,

were also prevalent. Sushi, fruit and vegetables, considered healthier 'green' options, were offered by less than half of the schools. Previous analyses on school compliance with healthy food policies have reported several barriers including lack of time and resources,^{14,18} the perceived lack of value,^{16,17} resistance from parents and students,^{16,17} and the abundance of unhealthy foods for sale outside the school.⁵¹

The availability of food items based on various school characteristics has been highlighted in this analysis, in particular the lower percentage of green food items in low decile schools and schools in areas of high deprivation. We observed low decile schools also had a higher percentage of red food items compared to high decile schools. There may be several reasons for these findings including greater access to external food retailers in more deprived areas⁵² and higher density of junk-food advertising^{53,54} which may disincentivise schools to provide healthy food and drinks within school canteens. Deprivation also plays a role in the nutrition preferences of children with evidence suggesting that household food insecurity often leads to the selection of cheap and unhealthy foods.^{2,55,56} Schools may be concerned about loss of profits,¹⁵ limited acceptability of healthier foods by students and parents,¹⁶ and competing interests from external sources.¹⁴ Addressing these barriers is an essential part of reducing inequities in schools in socio-economically deprived areas.

Improving compliance with school food guidelines has been recently explored in some Australian schools and suggests that schools need additional and direct support to successfully implement healthy food and drink policies. For example, in Western Australia, setting clear and quantifiable targets for healthy food options had a positive impact on compliance.^{46,49} Multi-strategy interventions which provide direct support and feedback to schools have also been shown to be effective in promoting healthy eating in schools.^{50,57-59} One study found that this type of intervention was helpful to over 45% of surveyed canteen managers, with menu audit and feedback reports rated as the most beneficial.⁵⁸ In New Zealand, the Heartbeat Award program led to increased sales of healthy food choices and decreased sales of unhealthy items.⁴⁴ Audit and feedback cycles were associated with more schools having healthier menus.^{50,57-59} Multiple contacts are likely required to maximise effectiveness, and the use of telephone and text messaging support can enhance scalability for larger implementation.

This study presents the first analysis of New Zealand primary school food menus against the framework of the updated Healthy Food and Drink Guidance for Schools issued by the Ministry of Health. A key advantage of this study is the utilisation of a canteen menu audit which has been recognised as a reliable means of evaluating canteen compliance with healthy food and drink policies, especially when compared to self-report measures.⁶⁰ These findings offer a significant baseline snapshot of the current school food availability in New Zealand presenting opportunities for future comparative analyses that can provide valuable insights to policymakers. Several limitations should be considered when interpreting the findings of this study. Firstly, the response rate from schools was relatively low compared to the total number of primary schools in NZ, which limits the generalisability of the results. Similarly, low decile schools may be

under-represented in comparison to high decile schools which may influence some of the differences found. Additionally, as the school menus were self-reported, there is a potential for respondent bias or omission of menus/menu items. Furthermore, some menu items lacked detail, and assumptions had to be made on their final categorisation, which may have influenced the results, particularly for mixed meals and sandwich-based lunch options. Finally, given the differences in school food services internationally, the generalisability of the results may be limited to those with similar food service provisions and policies. Therefore, it is recommended that future studies repeat this research with a larger sample size.

5 | CONCLUSION

In conclusion, this study revealed that most school canteens in New Zealand are not meeting the guidelines for healthy food and drink provision outlined in the 'Healthy Food and Drink Guidance for Schools' by the Ministry of Health. This study is one of many highlighting the lack of compliance with government-based school food guidelines and adds to the body of evidence calling for greater action to help schools successfully implement healthy food and drink policies and improve their food provision services. The study also highlighted significant differences in the availability of food items based on various school characteristics, particularly with low decile schools having a lower percentage of green food items and a higher percentage of red food items compared to high decile schools. Addressing these barriers is essential in reducing inequities in socio-economically deprived areas. One potential approach could be to implement well-defined and measurable targets for healthy food options and multi-faceted interventions that provide active assistance and feedback to schools, which could effectively promote healthy eating in schools.

AUTHOR CONTRIBUTIONS

Danika Pillay, Ajmol Ali and Carol Wham conceptualised the study. Danika Pillay and Marsha Piddington created the menu analysis toolkit, coded menus and performed data analysis. Danika Pillay created figures and wrote the manuscript. Ajmol Ali and Carol Wham edited and reviewed the manuscript. All authors approved the final manuscript.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICS STATEMENT

Ethics approval for the Healthy Active Learning evaluation was granted by Massey University Human Ethics Committee, Northern (NOR 20/07).

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ENDNOTE

¹ The Alert Levels were determined by the NZ Government and specified the public health and social measures to be taken to fight against COVID-19. Alert Level 1 was the first and least stringent level in a four-level system.

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