

The healthiness of New Zealand school food environments: a national survey

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Among OECD countries, New Zealand (NZ) has the second-highest prevalence of childhood obesity.¹

Almost one-third of New Zealand children (29.6%) have overweight or obesity, within which significant socioeconomic and ethnic inequalities exist.² Across childhood, the consumption of a healthy diet decreases with age, alongside increases in the consumption of processed food, sugar-sweetened beverages (SSBs) and high-calorie fast foods.³ Fruit and vegetable consumption remains below recommended levels.²

Dietary patterns formed in adolescence are correlated with adult health status, while adolescent weight status is also likely to carry into adulthood.⁴ The physical and psychological impacts of an unhealthy diet on children and adolescents are well documented.³ Unhealthy diets have also been linked to poorer in-class behaviour and learning outcomes.⁵

Schools are a key setting to improve dietary behaviours, and longitudinal research notes an association between a healthful school food environment and lower rates of obesity.⁶ Student dietary knowledge and status is influenced by food provision, unhealthy classroom rewards and fundraising practices,⁷ marketing and sponsorship,⁸ and nutrition education interventions.⁹ The strong influence of these variables on the overall healthiness (either via their presence or absence) is recognised by several governments that have enacted strong policies to regulate these areas of school food environments.^{9,10}

In New Zealand, food is typically brought from home and/or bought at school. Previous

Abstract

Objective: To evaluate the healthiness of New Zealand school food environments.

Methods: In 2016, primary and secondary schools were invited to complete a cross-sectional questionnaire. School nutrition policies were analysed using an adapted Wellness School Assessment Tool. Canteen menus were analysed using the National Food and Beverage Classification System, and a sample of menus (n=54) were validated using fieldworker observations.

Results: In total, 819 schools (response rate 33%) participated. Forty per cent had a nutrition policy, and those analysed (n=145) lacked comprehensiveness and contained weak statements. Seventy-one per cent sold food and beverages during the school day. The school food service offered mainly unhealthy items. Many schools (81%) used food and beverages for fundraising with 90% of them using 'less healthy' items. Most had vegetable gardens (80%), included nutrition education in the curriculum (90%), were not sponsored by food and beverage companies (94%) and did not have commercial advertising on school grounds (97%).

Conclusion: New Zealand school nutrition policies are weak, and canteen and fundraising items are largely unhealthy, which undermine other positive efforts.

Implications for public health: This study provides evidence of unhealthy school food environments and supports the need for stronger national-level policy.

Key words: School food; food environment; obesity prevention; food policy

research shows a large proportion of students (58%) patronised school canteens.¹¹ A national policy requiring foods sold in schools to be healthy was rescinded by the National Government in 2009.¹² Such macro-level changes may have discouraged the implementation of school-level policies and practices,¹³ possibly leading to many primary school canteens reverting to being largely unhealthy by offering 'occasional' foods (least healthy foods) daily, instead of the previous recommendation of once a term.¹²

In New Zealand, the monitoring of child and adolescent diets and the environments in which these diets are consumed is weak. Only one comprehensive child nutrition survey was conducted in 2002.¹⁴ Apart from a small-

scale qualitative assessment in early 2016 by the Education Review Office (ERO),¹⁵ only three other national school food environment surveys (Food and Nutrition Environment Survey [FNES] in 2007 and 2009¹²; a school environments questionnaire in 1999¹⁶) have been conducted. This lack of monitoring combined with weak national policies governing these food systems means children may still be exposed to highly obesogenic food environments in schools.

This study aims to present data collected in a 2016 national survey to assess the healthiness of New Zealand school food environments and the strength of school nutrition policies.

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Methods

Previously published literature and consultation, via presentations ($n=3$) and informal discussions ($n=12$) with principals and teachers, public health researchers, public health practitioners from the Ministry of Health, health promotion agencies and public health nurses, informed the survey development phase. A pilot study (primary= 4 , secondary= 4) was then conducted to test the survey format, mode (online) and content. This was complemented with eight one-on-one interviews with survey respondents to gather feedback and make minor modifications such as clarification of language and formatting and layout improvements. Ethics approval was granted by the Human Ethics committee of the University of Auckland (Ref. 012330).

The School-Food Environment Review and Support Tool (School-FERST; see Supplementary File 1) had 41 items over three sections, consisting of primarily closed-ended questions:

- Part A: nutrition policies and programs
- Part B: provision and sale of foods and beverages, including fundraising practices
- Part C: other information (school gardens, nutrition education, sponsorship, commercial advertising, barriers to improving school food environments and examples of practices currently underway to improve food environments).

Schools were also requested to upload a copy of their policy and food service menu, if available.

An adapted version of the Wellness School Assessment Tool (Well-SAT, 2014)¹⁷ was used to assess the strength and comprehensiveness of written nutrition policies. The New Zealand version (WellSAT-NZ; see Supplementary File 2) collapsed the original 78 policy indicators and seven domains to 40 indicators across four domains (nutrition education, nutrition standards, promoting a healthy nutrition environment, and communication and evaluation) for contextual suitability and relevancy to the aims of this study. For each indicator, a score was given: 0=not mentioned, 1=weak statement (vague or suggestive language, actions hard to enforce) or 2=meets/exceeds standards (strong, specific language to indicate action/regulation is required). Comprehensive and strength scores (maximum score out of 100, for each) were

then calculated for each domain and similarly for the overall policy.¹⁷

To analyse school food service menus and items used in fundraising, while ensuring the survey did not become cumbersome, only the most common food and beverages ($n=33$) were compiled into a list (see Supplementary File 3) based on previous surveys¹² and the New Zealand Food and Beverage Classification System (FBCS)¹⁸ for schools. FBCS categorised foods and beverages as 'everyday' (healthy), 'sometimes' and 'occasional' (least healthy), with recommendations that menus primarily consist of 'everyday' items. A portion ($n=54$) of self-reported survey data on food service menus was validated with fieldworker observation methods (photographs).

Recruitment

The study population comprised all operating schools in New Zealand categorised into two types: primary (including intermediate schools; up to age 12) and secondary (including composite schools that offer some combination of primary and secondary school types). The sampling frame included all schools listed in the Ministry of Education's (MoE) school directory in December 2015. Only hospital schools, teen parent units and correspondence schools were excluded due to their unique food environments.

The School-FERST questionnaire was administered via *Alchemer*, an online survey software. In March 2016, eligible schools were emailed an invitation with the survey weblink. Follow-up reminders were emailed two weeks and four weeks after the initial invitation. Subsequent phone follow-ups helped boost response rates until the survey was closed in September 2016.

Data analyses

Statistical analyses were conducted using IBM SPSS Statistics 24; χ^2 tests and descriptive analyses of indicators were calculated and tabulated by school type (primary and secondary), school size (small/medium/large according to MoE student roll cut-offs) and decile (low/medium/high). The details on type, size and decile for each school were obtained via the MoE school directory. In New Zealand, schools are classified by decile, the socioeconomic position of a school's student community relative to other New Zealand schools. Decile 1 schools are the 10% of schools with highest proportion of students

from low socioeconomic communities while decile 10 schools are those with the lowest proportion of these students.¹⁹ As the size of the school was not independent of location (urban versus rural), the location of the school was not included in analyses.

A Kruskal-Wallis test explored differences in the healthiness of school food service menus and items used in fundraising between tertiles of decile. Spearman rank correlation was used to test for correlations between data (food service menu scores via the School-FERST survey and validation methods). A Mann-Whitney U test explored differences in the healthiness of food service menus and fundraising offerings and the presence of a policy, as well as barriers to healthier environments. A significance level of $p<0.05$ was identified for all statistical tests.

Results

A total of 819 schools participated (response rate=33.1%), comprising 647 primary ($RR=79.0\%$; including intermediate schools) and 172 secondary schools ($RR=21.0\%$; including composite schools). The characteristics of responding schools versus all schools is shown in Table 1. Responding schools were more likely to be smaller in size but similar by levels of decile. Respondents included senior management (82%, e.g. principal/deputy principal), teachers (11%) and admin/support staff (3%, e.g. canteen managers). The average time of completion was 33 minutes.

Nutrition policies

Fewer than half of primary (38.5%) and secondary (44.8%) schools had a written food and nutrition policy. Largely weak (suggestive rather than prescriptive language) and narrow-focused (limited detail, not comprehensive) statements resulted in very low scores for the 145 policies submitted for analyses. The total comprehensiveness scores ranged from 0 to 36 ($Median=16.0$), and strength scores from 0 to 18 ($Median=0.0$). 'Nutrition Standards for foods provided and sold' was the highest-scoring domain ($Median=23.0$) followed by 'Nutrition Education' ($Median=20.0$), 'Promotion of healthy school food environments' ($Median=15.0$) and 'Communication and evaluation of nutrition policy' ($Median=0.0$). The median strength scores were 0.0 across all four domains. Policies most commonly

referred to nutrition guidelines without mandating/implementing them, addressed the provision of nutrition education for students/parents and participation in food/nutrition programs, and encouraged teachers to be role models.

School food service menus

A larger proportion of secondary schools ($n=143$, 83.1%) sold food and/or beverages to students during the school day in comparison to primary schools ($n=434$, 67.1%) ($\chi^2(1) = 16.837, p < 0.001$). The type of school food service varied (Table 2), with some schools employing more than one type (e.g. canteen and lunch-order system simultaneously). Secondary schools were more likely to offer a daily food service, while primary schools did so fewer times a week.

In comparison to secondary schools (23.3%), a significantly larger proportion of primary schools (67.5%) offered only milk and water as beverage options ($p < 0.001$). Smaller primary schools were more likely to offer 'occasional' items ($p=0.006$; $M=62.3\%$), in comparison to medium ($M=55.5\%$) and larger ($M=50.0\%$) schools. Figure 1 highlights the top 10 items utilised by the school food service. Although filled rolls were most popular, menus overwhelmingly offered more 'occasional' items in comparison to 'everyday' ones.

Statistical analysis using Spearman's correlation showed a reasonably strong, positive monotonic correlation between the self-reported survey data and the observed validation data ($r_s=0.60, n=53, p < 0.001$). Additionally, there was no significant relationship between having a school food nutrition policy and offering more 'everyday' items on food service menus for primary ($p=0.675$) or secondary ($p=0.322$) schools.

Fundraising activities

Four out of five primary (81.8%, $n=529$) and secondary (80.2%, $n=138$) schools used food and beverages for fundraising activities. Figure 1 depicts the most popular items used in fundraising activities. Sausage sizzles were most popular, after which there is a sharp drop to other items. Hangi (indigenous method of steaming food), water and filled rolls/sandwiches were the only healthy items used to raise funds, with the latter two options probably offered to students during the school day (e.g. Parent Teachers Association fundraising during lunch time to students).

Table 1: Survey respondent characteristics compared with the total survey frame of all schools in New Zealand in 2016.

School type	School-FERST respondents (n=819)	All schools (MoE directory) (n=2,475)	p*
Full and contributing primary schools	618 (75.5)	1,846 (74.6)	
Intermediate schools	29 (3.5)	117 (4.7)	0.019
Secondary schools (Years 7-13/ 9-13)	135 (16.5)	344 (13.9)	
Composite schools	37 (4.5)	168 (6.8)	
Characteristic	School-FERST respondents (n=819)	All schools (n=2,430)**	p*
Primary schools (n=647)			
Socioeconomic position			
Low (Decile 1-3)	196 (30.3)	611 (31.8)	0.654
Medium (Decile 4-7)	254 (39.3)	718 (37.3)	
High (Decile 8-10)	197 (30.4)	595 (30.9)	
School size			
Small	208 (32.1)	535 (27.8)	0.044
Medium	247 (38.2)	730 (37.9)	
Large	192 (29.7)	659 (34.3)	
Secondary schools (n=172)			
Socioeconomic position			
Low (Decile 1-3)	52 (30.2)	159 (31.4)	0.923
Medium (Decile 4-7)	73 (42.4)	216 (42.7)	
High (Decile 8-10)	47 (27.3)	131 (25.9)	
School size			
Small	70 (40.7)	281 (55.5)	0.003
Medium	53 (30.8)	109 (21.5)	
Large	49 (28.5)	116 (22.9)	

Notes:
*differences in the distribution between survey respondents and the survey frame (MoE directory)
**some schools had missing information and were excluded (n=45)

Lower decile schools were more likely to use 'everyday' (healthy) items for fundraising ($p=0.001$), while larger schools were more likely to use 'occasional' items ($p < 0.001$). Those that reported fundraising activities as a major source of profit were not any more likely to use more 'occasional' items in their practices. Secondary schools (41.8%) were 3.4 times ($p < 0.001$) more likely to conduct fundraising activities 'several times a term' than primary schools (17.4%). Primary schools (68.3%) were more likely to fundraise 'once a term' in comparison to secondary schools (55.2%; $p=0.005$).

There was no relationship between having a food and nutrition policy and using more 'everyday' items for fundraising activities for primary ($p=0.887$) or secondary ($p=0.091$) schools.

Other key food and nutrition indicators (Table 2)

Across both school types, food featured in school events (33.7%), celebrations (30.1%), classroom rewards (23.8%) and breakfast

clubs (19.8%). More primary than secondary schools participated in external food and nutrition education programs, with several schools participating in more than one program. The most common food provision programs were Fonterra Milk in Schools²⁰, Kick Start Breakfast²¹ and Fruit in Schools.²² Lower decile schools (46.3%) were more likely to participate in food provision programs than medium (37.5%) and higher (16.3%) decile schools ($p < 0.001$).

Likewise, lower decile schools (39.9%) were also more likely to participate in nutrition education programs in comparison to their medium (36.9%) and higher (23.2%) counterparts ($p < 0.001$). The most common nutrition education programs were Health Promoting Schools,²³ Enviroschools,²⁴ Heart Schools by the Heart Foundation²⁵ and Life Education²⁶ (primary schools only).

For most secondary schools, nutrition education was primarily delivered in lower grades via health and/or physical education classes and subjects like food technology and hospitality. Most primary schools

relied on one-off nutrition programs run by external organisations (e.g. Life Education) or 'incidental' lessons. Primary schools were also more likely to actively use their garden (e.g. via the teaching curriculum and distributing produce to the school community) than secondary schools. Fewer than 3% of all schools reported commercial advertising or sponsorships from food and beverage companies.

Secondary schools reported facing more barriers when implementing a healthier food environment. Additionally, lower decile primary schools (45.5%) were more likely to report barriers than their medium (35.0%) and higher (19.5%) counterparts ($p < 0.001$). Secondary schools without barriers offered more 'everyday' (healthy) items through the

school food service than those with barriers ($U = 1718.5, p = 0.050$).

Discussion

Summary and interpretations

This study measured the healthiness of New Zealand school food environments and found that they remain largely unhealthy. Policies universally lacked comprehensiveness and strength; and the school food service and fundraising practices utilised mainly unhealthy items. These practices undermined other positive efforts such as actively used school gardens, nutrition education and the absence of sponsorship and commercial advertising from food and beverage companies. One-third of the

participating schools reported facing barriers when attempting to improve their food environments.

With the loss of a national policy on healthy school food systems, these findings were not surprising but were very concerning. Only 38.5% of primary schools reported having a written policy, substantially less than those with a written policy in 2009 (56%).¹² Postulating from Australian research, low levels of policy implementation may be attributable to the need for profit, competition from shops in the school vicinity and mixed buy-in from stakeholders.²⁷

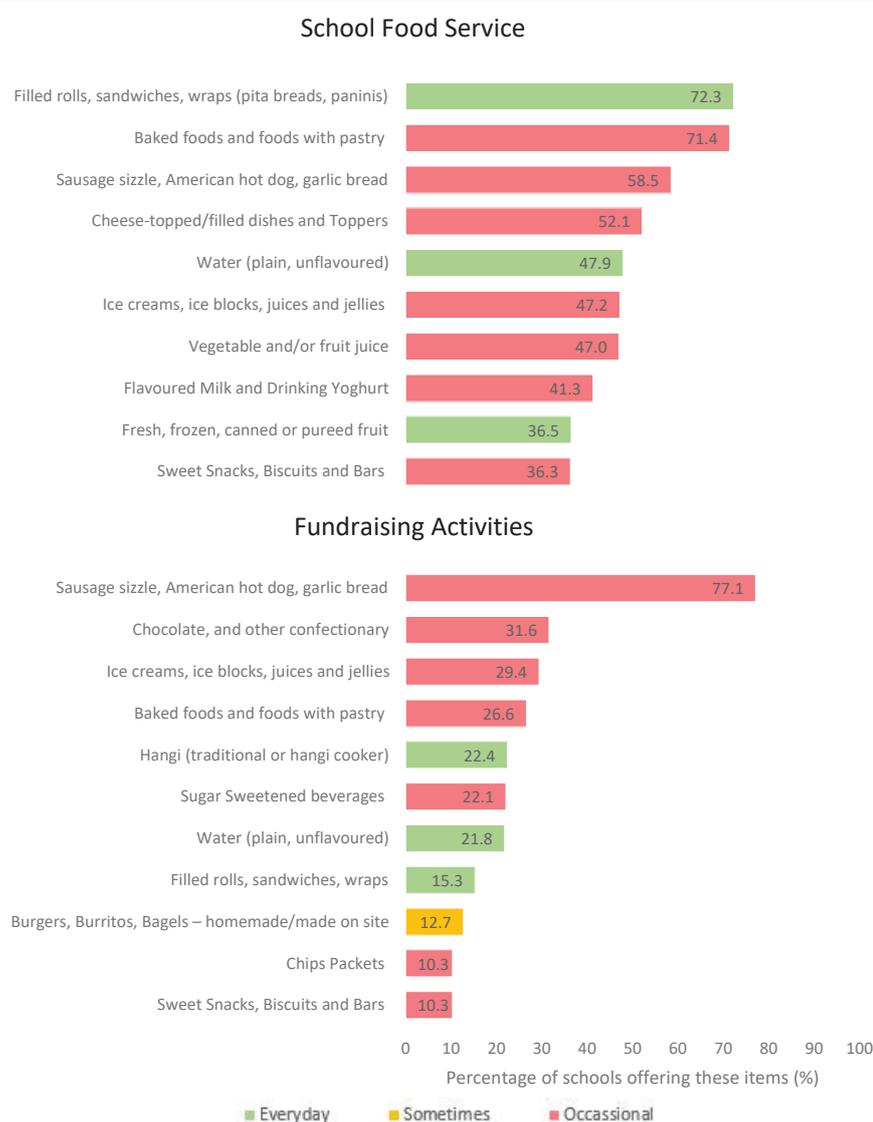
Overall, the nature of New Zealand school-level policies was vague, brief and suggestive rather than prescriptive. Such low scores are in agreement with US studies.⁷ Of concern, several primary schools adopted a generic policy, developed by *SchoolDocs* – an annual subscription to a range of school policies and procedure templates.²⁸ This policy addressed only seven out of 40 indicators across the four WellSAT-NZ policy domains.

A high proportion of schools (90.2%) reported nutrition education in the teaching curriculum. However, a small, qualitative ERO audit found that the impact of nutrition education was limited due to a lack of commitment to the topic, limited capabilities of teachers, and outsourcing to external providers that decreases continuity and limits integration into the curriculum.¹⁵ Further evaluation is important to explore the extent to and manner in which nutrition education is embedded, as previous Australian research suggests success is often impeded due to lack of teacher training, financial resources and support.²⁹

Despite the 'Nutrition standards for foods provided and sold' policy domain being most addressed, there was no relationship between these policies and the likelihood of healthier items in the food service or fundraising activities. School-FERST found the most popular items sold were primarily unhealthy, similar to previous New Zealand¹² and Australian³⁰ research. More than half of all schools reported contracting out the school food service. This results in a service that is often targeted towards generating profits¹⁵ and sometimes leads to principals forfeiting control or overlooking its inclusion during policy development.²⁷

In 2009, FNES found one-quarter of primary schools offered 'occasional' items more than once a day despite recommendations

Figure 1: Healthiness of the most common foods and beverages offered for sale via the school food service and fundraising activities.



to only do so once a term.¹² The previous Fuelled4Life guidelines, retired in February 2020, recommended no 'occasional' offerings. Moreover, this School-FERST survey found only 18 schools (3.3%) in compliance with this, none of which were secondary schools. The New Zealand situation is similar to Australia, where there is no national policy on healthy food in schools. Likewise, in Australia, a national survey found that only 1.5% of Australian secondary schools served only healthy 'green' items.³⁰ Other Australian research also cites a low level of compliance to national canteen guidelines particularly in the absence of monitoring or enforcement.³¹ Fundraising, often with unhealthy food items, has always been popular in New Zealand¹² and continues to be so. Schools need ongoing support to give them the confidence to raise funds without resorting to unhealthy foods.³² Interestingly, School-FERST found lower decile schools less likely to fundraise using unhealthy items. This was also the case in FNES 2009, which found such schools less likely to fundraise using confectionary¹² and might be due to their increased access to subsidies and funding,³³ as well as targeted nutrition initiatives, leading to sustained improvements in policy, food provision and sale, and education.³⁴

Schools located in lower socioeconomic areas are more likely to have a policy, use school gardens, and participate in programs. Yet, they reported more barriers to improving their food environment than their higher socioeconomic counterparts. For primary schools, resistance from parents was most common. Parents typically manage the diets of younger students and perceive the canteen as an occasional 'treat' or 'reward', or to supplement lunch from home.³⁵ Literature also suggests that policies restricting unhealthy items for classroom celebrations, such as birthdays, are often met with resistance from parents.³⁶ This results in weak recommendations that are often not mandated, possibly indicating why only a very small proportion of schools (17.2%) addressed this in their written policies. Conversely, resistance from students and loss of profits were the top two barriers for secondary schools, which parallels the increased autonomy with age. Students cherish their ability to choose between healthy and unhealthy items, and some research indicates resistance towards a nutritionally regulated canteen.³⁷ Schools in Queensland, Australia, reported decreased

Table 2: Other key food and nutrition indicators.

	Primary Schools n (%)	Secondary Schools n (%)	p
Type of school food service*			
Canteen/Tuckshop/Cafeteria run by school	109 (25.1)	66 (46.2)	
Canteen/Tuckshop/Cafeteria not run by school	37 (8.5)	65 (45.5)	
Lunch order-in system	246 (56.7)	12 (8.2)	
Vending Machines	4 (0.9)	17 (12.0)	
Other (eg. The Parent Teachers Association)	98 (22.6)	7 (4.9)	
Actively Used Garden	552 (85.3)	107 (62.2)	<0.001
Nutrition Education included in the curriculum	584 (96.1)	155 (97.5)	0.391
Sponsorship from food and beverage companies	15 (2.4)	5 (3.2)	0.569
Food and Beverage commercial advertising on school grounds	11 (1.7)	1 (0.6)	0.283
Participation in food provision programmes	400 (61.8)	76 (44.2)	<0.001
Participation in nutrition education programmes	371 (57.3)	58 (33.7)	<0.001
Barriers faced when implementing a healthy food environment	200 (30.9)	85 (49.4)	<0.001
Most common barriers faced when implementing a healthy food environment*			
Resistance from parents	132 (66.0)	28 (32.9)	
Convenience & ease of preparation of processed/ready-to-eat items	88 (44.0)	36 (42.4)	
Other (eg. local shops surrounding the school)	57 (28.5)	33 (38.8)	
Resistance from students	56 (28.0)	52 (61.2)	
Lack of infrastructure (eg. cooking space, refrigeration)	50 (25.0)	19 (22.4)	
Lack of choice from chosen school food service provider	28 (14.0)	25 (29.4)	
Loss of profits from lack of sale of healthy foods and beverages	26 (13.0)	41 (48.2)	

Note:

*due to the nature of the question the total score may be above 100%

satisfaction and profits when a healthy canteen strategy was implemented, especially in secondary schools due to more established unhealthy food tastes/preferences of students.³² While fewer than one-quarter of School-FERST secondary schools cited loss of canteen profits as a barrier, statistical analysis did not show a significant relationship between a profit-model school food service and offering more 'occasional' items for sale. The convenience of pre-packaged products also impeded improvement. Lack of infrastructure and resources (financial, staff) hinders meeting nutrition standards.^{35,38} In New Zealand, schools do not require local council registration, food control plans or food safety inspections if only pre-packaged, shelf-stable items are sold.³⁹ This is a barrier to providing healthier whole foods and might reduce motivation to prepare foods on-site, especially for smaller schools. Although only one-third of all schools ran their own food service, it is important to build capacity in this area.

Implications

School-FERST provides evidence for the need for national, mandated healthy food policies to improve child and adolescent health and wellbeing, including mental health and

nutrition inequities. As nutrition outcomes are patterned by socioeconomic status, it is plausible that nationally mandated policies will be pro-equity by having a proportionally greater impact in more disadvantaged schools. Strong national-level policies can stimulate change by mandating and regulating practices to create new default, positive behaviours in response to such guidelines.⁴⁰ Clear, decisive policies also provide a standard against which compliance can be consistently measured while igniting positive change.

Adjacent to strong policy, multiple, simultaneous approaches are required. In New Zealand, nutrition education is sometimes not considered to be 'academic' enough, leading to its limited integration across the curriculum and a shortage of teachers specialising in this area.⁴¹ It is important for ERO to evaluate the state of the nutrition education curriculum, to not only update it and reveal gaps but also to stimulate a culture that values its importance to strengthen the function of other food environment variables. These benefits could extend beyond schools and mitigate the negative influence of external variables such as the local shops. New Zealand studies have shown that these environments within the school vicinity remain largely obesogenic.⁴²

In acknowledgement of their strong influence, the time has come for school food environments to be embedded in routine government monitoring and evaluation to provide vital information for decision-makers on key areas to target to improve school function and nutrition environments. This will also highlight areas where schools need more support in their efforts to improve (e.g. policy development and implementation), while providing the government and MoE with the opportunity to respond (e.g. provision of resources, training to upskill, subsidies, etc). Additionally, when schools are acknowledged for their efforts and achievement, it motivates them to continually improve.⁴³ School-FERST provides the building blocks to assess key food environment indicators, and the extent to which these indicators are met can be readily translated into achievement criteria that signal levels of healthiness.

Strengths and limitations

Built on previous research, School-FERST is a comprehensive, new tool to evaluate New Zealand school food environments. School-FERST was the first New Zealand study to assess the comprehensiveness and strength of school-level food and nutrition policies, leading to the creation of a new tool – WellsAT-NZ. However, the low scores might reflect the severity of the tool, requiring further development and testing. Future research would benefit from a third-party evaluation of policy implementation to offset any response bias from self-reported data.

Data on school gardens, nutrition education and advertising, must be interpreted with caution, for example, school visits often revealed unused gardens and prevalent commercial advertising around school canteens. Food and beverages for classroom rewards, celebrations and school events are also important to capture, but School-FERST was not able to reliably do this. Such practices are highly variable between staff within the same school but were too cumbersome for this study to capture.

As with all large-scale surveys, a low response rate (33.1%) limits generalizability. However, a response rate of 30% is common in online surveys⁴⁴ and in line with an international trend of declining survey response rates.⁴⁵ Future surveys need to be part of government monitoring systems to ensure a high response rate.¹² Additionally, as schools were asked to provide identifiable details (school name and email address) to receive an

individualised report card of the results, there might be an element of social desirability bias in the results.

Conclusion

School-FERST was developed with the goal of motivating improvement and providing a useful template for ongoing, national monitoring of school food environments. Guided by a whole-of-school approach, the present study provided a comprehensive picture of New Zealand school food environments. Overall, these environments remain primarily unhealthy as the most influential variables (policy, food service, fundraising practices) cumulatively undermine positive actions in other parts of the school system. This hinders the ability of schools to play an active role in contributing to the health and wellbeing of students and the wider community, while doing little to alleviate the burden of obesity.

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Supporting Information

Additional supporting information may be found in the online version of this article:

Supplementary File 1: School-FERST Survey 2016.

Supplementary File 2: WellSAT-NZ food and nutrition policy score sheet.

Supplementary File 3: School-FERST menu analysis tool based on the Food and Beverage Classification System for schools.