Intermediate and Secondary School Food Environment in New Zealand: Lunch Food and Drink Menu Assessment

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ABSTRACT

Introduction: The combination of food insecurity and the increase in nutrition-related obesity among adolescents in New Zealand creates a need for collaborative action to improve the food environment. The school environment is ideal for encouraging a healthy lifestyle; however, the healthiness of food available to intermediate and secondary school students (years seven-13) is unknown. This study assessed how food and drink menus from a convenience sample of schools align with the Ministry of Health Food and Drink Guidance for Schools.

Methods: New Zealand intermediate, composite, senior, and secondary schools' (years seven-13) food and drink menus were collected in 2020. Menus were classified using the traffic light criteria ('green', 'amber', and 'red'). A toolkit was developed by three nutritionists and one dietitian (with trained staff support) to aid with menu classification. Menu quality was evaluated against school characteristics and policy use.

Results: Of the school menus assessed (n=60), 3.3% met the recommendation for the provision of 75% 'green' items. 'Red' items were the main contributors (mean=53.6%). Schools with high socioeconomic status (deciles 8-10; 14.3%; p<0.05) and of small school size (<749 students; 14.1%; p<0.025) were associated with a higher proportion of 'green' items. Community (19.3%) and in-house school (25.9%) food providers provided a lower percentage of 'amber' items than school providers (39.3%; p<0.001). In-house school providers (64.6%) had a greater percentage of 'red' items than contracted school providers (48.2%; p<0.017). Community providers had the highest proportion of 'green' items (16%; $p>0.017$).

Conclusion: The food available in schools (years seven-13) tended to be unhealthy. A national nutrition policy could improve the school food environment, especially in schools with large populations and of low socioeconomic status.

So what? Menu quality is a complex socioeconomic issue, and additional support should be considered in intermediate and secondary schools to improve equitable outcomes within school food environments.

Keywords: adolescents, food availability, intermediate school, lunch menu, New Zealand, policy, secondary school

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LIST OF ABBREVIATIONS

BMI – Body mass index

BMIz – Body mass index z score

HAL – Healthy Active Learning

HSR – Health Star Rating

NCD – Non-communicable diseases

NSW – New South Whales

NZ – New Zealand

RCT – Randomised controlled trial

SES – Socioeconomic status

SPSS – Statistical Package for the Social Sciences

T2DM – Type II diabetes mellitus

UK – United Kingdom

CHAPTER 1: INTRODUCTION

1.1 Background

There are significant biological and social changes throughout adolescence. Nutrition, and more importantly, a balanced approach to what we consume, is one mechanism that can help individuals smoothen this period of rapid change. Nutrition is essential for growth and overall well-being and strongly influences one's health trajectory (Neufeld et al., 2022; Norris et al., 2022; Patton et al., 2016). The rate of obesity has increased in New Zealand and is most prevalent among Māori and Pasifika (Ministry of Health, 2021). The complications of nutrition-related obesity can result in non-communicable diseases, including cardiovascular disease, type II diabetes, cancers, and premature mortality (World Health Organization, 2020). Obesity also impacts the psychological, where children and adolescents were found to have a lower health-related quality of life and additional psychological difficulties such as eating disorders (Anderson et al., 2017).

The current food and nutrition guidelines for young people (aged 2-18 years) encourage eating various foods from all food groups (Ministry of Health., 2012). Young people and parents/caregivers are recommended to choose food products low in saturated fat, sugar, and salt. Furthermore, fluid intake should limit fruit juice or fizzy drinks, opting for water or low-fat milk. These recommendations are encouraged for optimal nutrition during childhood and adolescence, supporting the energy required for activity, growth, and maintaining a healthy body. Recent survey findings highlight that children and young adults living in areas of high neighbourhood deprivation were likelier to consume fast food, sugary beverages than those living in lower deprivation areas. They also consumed less fruit and vegetables (Ministry of Health, 2003, 2017; Ministry of Health., 2012). Previously New Zealand European/Other children were likelier to meet nutrition requirements and less likely to be overweight or obese than Māori and Pasifika children (Ministry of Health, 2003).

Body mass index (BMI) was used to determine obesity prevalence in New Zealand, which can be influenced by dietary intake and physical inactivity. Dietary intake is not solely dictated by the individual. It is simultaneously influenced by environmental and societal factors, including a lack of supportive policies within the education setting, the healthcare industry, urban planning, and marketing (World Health Organization, 2018). These factors can influence an individual or population's access to healthy food. Adolescents with food insecurity are more

likely to be overweight than food-secure adolescents (Utter et al., 2018). Urban design influences dietary intake as it impacts the food that is locally accessible; an example is where unhealthy food outlets were more prevalent in high versus low socioeconomic deprivation areas (Sushil et al., 2017). Food insecurity and obesity is a complex and interrelated issue, however, is significantly impacted by healthy food being accessible and available.

The environment impacts food accessibility and availability, yet behaviour influences dietary intake. As dietary behaviour is established through childhood and continues into adulthood, it is essential to address healthy eating and increase exposure to healthy food and beverages whilst adolescents are susceptible to behavioural change (Mikkilä et al., 2005; Movassagh et al., 2017). Therefore, implementing a food and nutrition policy that focuses on increasing the accessibility and availability of healthy food may contribute to healthful dietary habits following into adulthood.

Encouraging adolescents to lead healthy lifestyles is a more effective and long-lasting solution than pushing them to lose weight (Golden et al., 2016). On average, 50% of 12 to-18-year-olds purchased lunch from the school canteen or tuckshop at least once a month, creating an ideal environment and opportunity to implement nutrition initiatives (Ministry of Health, 2012; Utter et al., 2007).

Promoting nutrition and physical activity was found to be lower in secondary schools than in primary schools (Education Review Office., 2016). The New Zealand secondary school's food environment has been assessed by analysing nutrition policies and conducting survey responses from staff. Findings suggest that food policies do not support the current food environment, and schools report challenges with building a healthy eating culture (Chote et al., 2022; D'Souza et al., 2022). Most nutrition initiatives have focused on primary schools in New Zealand, providing great insight into how beneficial initiatives can be when focusing on increasing the consumption of free fruit or free milk to low-decile primary school students (Ashfield-Watt et al., 2009; Marsh et al., 2018). Research has also indicated that time and resource constraints hinder a healthy environment in New Zealand primary schools (Walton et al., 2010). Comparatively, there has been little effort in supporting secondary schools to create a healthy food environment, and there is minimal information on the food sold to students.

Research on New Zealand secondary schools has primarily focused on the external food environment and food advertisements (Brien et al., 2022; Clark et al., 2014; Day et al., 2015; Huang et al., 2020; Pearce et al., 2007; Vandevijvere et al., 2018; Vandevijvere et al., 2016).

Food outlets have been shown to cluster around schools, with evidence suggesting that a higher percentage of fast-food outlets are in socio-economically deprived urban areas. High amounts of junk food advertisements near schools have also been a concern.

There has been a recent lack of nationwide initiatives or government-driven policies focusing on healthy eating for adolescents in New Zealand schools. Also upsetting is that New Zealand has made minimal progress in implementing nutrition policies that support a healthy food environment compared to the international benchmarks (Mackay et al., 2022).

A nutrition initiative, Healthy Active Learning (HAL), was formed in collaboration between Sport New Zealand, the Ministry of Health, and the Ministry of Education (Sport New Zealand, 2020). The shared goal was to improve the well-being of children and adolescents. This is part of a multi-strategic approach to promoting a healthy lifestyle among young people through encouraging positive behaviour and beliefs surrounding fruit, vegetables, and physical activity. Healthy Active Learning plans to promote healthy eating, drinking, and quality physical activity by supporting a more nutritious food and drink environment with improved access to staff training and resources (e.g., physical activity equipment and a food policy toolkit) (Sport New Zealand, 2020). One aspect of the initiative was to work with the Ministry of Health to improve the quality of food sold to students in New Zealand schools by implementing a food and drink policy. The development of the 'Food and Drink Guidance for Schools' alongside a toolkit may help stakeholders (i.e., principals, school staff, catering companies, and parents) build a supportive school food environment that ensures healthful practices and food availability.

The Ministry of Health's Healthy Food and Drink Guidance for Schools was developed in 2020 (Ministry of Health, 2020). This guidance tool was created to be user-friendly and categorises food and drink on a three-tier nutrition scale. Food and drink that is available to students will either be categorised as 'green', 'amber', or 'red'; this does not include food and drink brought in by students. The recommendation is that the food available in schools comprises 75% 'green' items, with no 'red' items available for purchase. 'Green' items are nutritious, contributing to a well-balanced diet, whereas 'red' items have poor nutritional value, are highly processed and are high in saturated fat, salt, and added sugar. 'Amber' consists of food and drink that are not part of the everyday diet but have some nutritional value and are often more processed than 'green' items.

While studies have been undertaken to support nutrition initiatives within primary schools and the surrounding food environment, the focus on intermediate and secondary schools has fallen short. However, these are the years when adolescents are exposed to new and different health problems and are susceptible to changes in dietary patterns (Patton et al., 2016). Therefore, as the 'Food and Drink Guidance for Schools' has already been developed, it is essential to understand the current school food environment. More importantly, of interest is how it compares to the proposed guidance so that recommendations and initiatives can be designed to address shortcomings in New Zealand intermediate and secondary schools.

1.1.1 Scope

This research is a subsection of a longitudinal quasi-experimental, mixed-method study focused on the Healthy Active Learning (HAL) initiative, which aims to improve the well-being of children through supporting healthy eating, drinking, and quality physical activity.

A baseline assessment of school food and beverage menus against the Ministry of Health's Healthy Food and Drink Guidance for Schools will be conducted for composite (years zero-13), intermediate (years seven-eight), secondary (years nine-13), and senior schools (years seven-13) as part of the Healthy Active Learning initiative.

The findings will focus on what food and drinks are currently available to New Zealand adolescents within the education setting and explore the relationship of menu quality with school characteristics and policies.

This study will explore New Zealand schools' current food and drink environment before implementing the Healthy Active Learning initiative and using the Ministry of Health's food and beverage policy. This research will help evaluate the change in food availability during the HAL initiative and potentially support the need for extending or expanding the HAL initiative in secondary schools. This research may assist with directing future public health policies and nutrition initiatives targeted at intermediate and secondary school students. Finally, the findings may also be used for education, contributing to the advocation for change within the school food environment.

1.2 Aim and objectives

1.2.1 Aim:

Focusing on schools with adolescents, the aim is to assess how food and drink menus align with the Ministry of Health Food and Drink Guidance for Schools.

1.2.2 Objectives:

1. Determine the proportion of ‘green’, ‘amber’, and ‘red’ items contributing to composite, intermediate, secondary, and senior (years 7-13) schools’ food and drink menus.
2. Assess how schools’ food and drink menus align with at least 75% of food items in the green zone.
3. Determine if the schools with food policies/other practices have a higher proportion of food in alignment with the green zone of the classification system.
4. Assess the contributing proportion of ‘green’, ‘amber’, and ‘red’ items against school descriptive characteristics.

1.3 Thesis structure

This thesis contains four chapters, as well as appendices and references. Chapter one is the introduction chapter that introduces the topic and outlines the background, scope, and justification for assessing food and drink menus of schools with adolescents in New Zealand. This chapter includes the study aims, objectives and researcher contributions. Chapter two consists of a literature review of current research on adolescent nutrition, public health initiatives and the use of the traffic light system internationally for guiding food and drink availability in school canteens. Chapter three is the manuscript comprising the empirical data collected as part of this thesis; the chapter consists of an abstract, introduction, method, results, discussion, and conclusion section. The manuscript has been formatted for the Health Promotion Journal of Australia. Chapter four is the conclusion to the thesis; the strengths and limitations of the study are identified, and recommendations for future research and informing of policies are included.

1.4 Researcher contribution

Table 1.1

Researcher's Contributions to Thesis Study

Contributors	**Research contribution**
Shannon Green	Principal researcher – thesis author Research study proposal, literature review, methodology development, cleaning and analysis of data, results formulation and subsequent discussion, thesis manuscript preparation
Professor Carol Wham	Primary academic supervisor Provided supervision for the classification of the menus, including the development and design of the school toolkit, thesis chapter writing, and manuscript preparation
Professor Ajmol Ali	Academic supervisor Provided supervision for the classification of the menus, including the development and design of the school toolkit, thesis chapter writing, and manuscript preparation
Dr Hajar Mazahery	Statistical support Provided support and supervision with conducting the statistical analysis of data and interpretation of results
Danika Pillay	Associate Researcher Aided with the methodology, including the method of classifying school food and drink menus and the development of the school menu toolkit

Table 1.1 *(continued)*

Contributors	Research contribution
Marsha Piddington	Associate Researcher Aided with the methodology, including the method of classifying school food and drink menus and the development of the school menu toolkit
Olivia Hall	Associate Researcher Aided with the methodology, including the method of classifying school food and drink menus and the development of the school menu toolkit

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Nutrition influences an individual's health trajectories throughout life and plays a pivotal role in the developmental stages of adolescence (Patton et al., 2016). Ensuring adolescents meet their nutritional needs is crucial for optimal health and well-being. Childhood obesity is a growing public health concern as it has significant implications for health and well-being (World Health Organization, 2020). Nutrition initiatives in a community setting have been associated with a greater reach and long-lasting impact than those at an individual level (Lakerveld et al., 2012; McLeroy et al., 2003). As such, to improve adolescents' well-being, schools have been identified as a prime environment for nutrition initiatives. This literature review will critically evaluate the literature on food availability in schools and will attempt to understand adolescents' overall health, nutrition recommendations and influences on dietary habits. This section will also review the nutrition initiatives and programmes in schools and discuss the proposed Ministry of Health's Food and Drink guidance for schools' policy (Ministry of Health, 2020). Finally, the review will critique studies that have assessed school menu quality in Australia; this will help with developing a robust research design. This review aims to provide a comprehensive overview of the importance of healthy food availability in promoting healthy dietary habits among New Zealand adolescents.

2.2 The health of adolescents in New Zealand

2.2.1 Nutrition-related obesity health outcomes

Based on body mass index (BMI) data, the most recent New Zealand Health Survey 2020/21 revealed that one in three (34.4%) adults over the age of 15 and one in eight (12.7%) children are obese (Ministry of Health, 2021). Although BMI is a poor indicator of body fat, it is a cost-effective method to identify widespread weight trends influenced by dietary intake and physical inactivity (Nuttall, 2015). This is of concern due to the risk factor that childhood obesity has for developing non-communicable diseases (NCDs): cardiovascular disease, early onset of type II diabetes (T2DM), and premature mortality (World Health Organization, 2020).

The number of individuals living with T2DM is rising in New Zealand, with an increase in diagnoses for young adults (25 to 34 years) (Algoblan et al., 2014; Te Whatu Ora Health New Zealand, 2023). The early onset of T2DM is related to increased morbidity and mortality compared to those with a later start of T2DM of similar age to type 1 diabetes (Best Practice

Advocacy Centre New Zealand, 2022). These statistics are interesting as a Western dietary pattern during adolescence may increase the risk of T2DM in later life (Malik et al., 2012).

2.2.2 Health inequity in New Zealand

Obesity prevalence is significantly higher among Māori and Pasifika, whereas the T2DM rate is highest amongst Pasifika, the South Asian population, and Māori. Young adults living in low socioeconomic areas are prone to obesity and NCDs. Thus, young Māori and Pasifika people with high socioeconomic deprivation are more vulnerable to health disparities due to experiencing a disproportionate burden of obesity and T2DM (Ministry of Health, 2021; Te Whatu Ora Health New Zealand, 2023). Health inequity persists for Māori and is linked to socioeconomic deprivation (Clark et al., 2018). When considering the impact of obesity in New Zealand, there is a need to understand that health inequities are greater for Māori and Pasifika people.

An individual or population's social determinants and ethnicity greatly influence health outcomes. Employment status, education level, income, gender, and ethnicity may act as barriers to the individual receiving adequate health care, resulting in significant health disparities compared to different social groups (World Health Organization, 2018). As a result, being overweight or obese is not a choice for many when income, education, and ability to access healthy food are restricted.

2.3 Nutrition throughout adolescence

2.3.1 Physical changes

Adolescence can be defined as physical changes between pubescence and the completion of changes; typically, rapid biological and social changes occur from 10 to 19 years old (Neufeld et al., 2022; Norris et al., 2022). During this period of growth, the prefrontal cortex consolidates and matures to prepare for adulthood, playing a central role in behavioural control and reflective thinking (Gogtay et al., 2004; Sharma et al., 2013). This development is influenced by nutritional intake, learning, social experiences, sleep, and heredity (Sharma et al., 2013).

2.3.2 Nutrition recommendations for adolescents

The current food and nutrition guidelines for adolescents aged 10-19 recommend eating from all food groups and encourage young people and parents/caregivers to choose food products low in saturated fat, sugar, and salt (Ministry of Health, 2012). The fluid recommendation is to

consume water or low-fat milk, limiting fruit juice or fizzy drinks because of the high sugar content. The recommendations aim to promote optimal nutrition during childhood and adolescence, supporting the energy required for activity and development.

2.3.3 Adolescents' current food intake

The last national nutrition surveys published were the Adult Nutrition Survey 2008/09 and the Children's Nutrition Survey, 'NZ Food, NZ Children' 2002 (Ministry of Health, 2003; University of Otago & Ministry of Health, 2011). Both nutrition surveys are outdated and do not accurately represent the current dietary intake of adolescents. Ministry of Health survey data estimated that two-thirds of children (aged 10-14) consumed at least two servings of fruit daily, and approximately half met the vegetable intake guidelines (three servings a day) in 2015/16 (Ministry of Health, 2017). Similar findings were reported in the 2018-2020 'Children's Dietary Habits' report (Ministry of Health, 2022) where less than 50% of children (aged 2-14) met the combined daily fruit and vegetable recommendation, and children living with food insecurity were less likely to meet the recommendations than food-secure children (Ministry of Health, 2022).

The current food climate in New Zealand consists of a Westernised diet, with an abundance of energy-dense food high in saturated fat and sugar (World Health Organization, 2021). Within the last decade, it was estimated that high-fat, sugar, and salt food and drinks make up around 20 percent of the total intake for 5-14-year-olds; this implies healthy food is displaced with options containing little nutritional value (Ministry of Health, 2012). According to the New Zealand Childhood Obesity Programme Baseline Report 2016/17, fast food consumption gradually increased from 2012/13 and was highest amongst Māori and Pasifika children (78.6%; 81.7%) (Ministry of Health, 2017). It was estimated that 72.1% of children aged 10-14 years old consumed fast food at least once in the past week (Ministry of Health, 2017). In addition, Māori and Pasifika children (aged 10-14 years) had the highest intake of fizzy drinks per week compared to Asian, European/Others. Living in areas of high neighbourhood deprivation was also associated with increased fizzy drink intake (Ministry of Health, 2017).

The more recent 'Children's Dietary Habits' report estimated that just over half of children (55.7%) consumed takeaway food at least once a week (Ministry of Health, 2022). Survey findings consistently highlight that children and young adults living in areas of high neighbourhood deprivation are likelier to consume fast food, sugary beverages, and less fruit

and vegetables than those living in low neighbourhood deprivation areas (Ministry of Health, 2017; Ministry of Health, 2022).

2.4 Determinants of adolescent dietary habits

Understanding the factors that influence dietary habits can be used to guide the development of nutrition-based initiatives. A common theme among studies is that dietary behaviour changes through childhood to adulthood and, therefore, a critical period for establishing healthful dietary habits (Appannah et al., 2021; Lake et al., 2006; Neufeld et al., 2022; Von Post-Skagegård et al., 2002; Winpenny et al., 2018). International studies have used longitudinal methods to identify the predictors of change: socioeconomic status (SES), lifestyle changes, gender, education, location, and parental influence. However, as New Zealand has different cultural norms and levels of societal support, the extent of these influences on dietary habits may vary. During adolescence, there is a transition from primary dependence on parents/caregivers to more independence over decisions and responsibilities related to food choices (Neufeld et al., 2022). However, the extent of autonomy is influenced by the sociocultural and economic contexts of the individual (Patton et al., 2016). A social cognitive and ecological theory suggests that individual, social environment, community environment, and societal influences contribute to dietary habits (Story et al., 2002).

Individually, the reasoning behind choosing specific foods is influenced by personal beliefs, nutrition knowledge, or taste preferences. Focus groups in the UK identified that high school students typically understand what is associated with a healthy balanced diet (i.e., energy); however, their perception and beliefs influenced their food choice (Calvert et al., 2020). Students perceived unhealthy food as convenient and cheaper, and the cost barrier impacted their perception of what is available and accessible to them; thus, avoiding healthy food due to the perception that it is more costly (Calvert et al., 2020). This links to the student environment, as these students were influenced by family and peers regarding food decisions. There was a sense of social acceptability towards unhealthy food choices among peers, which negatively affected food choices. As adolescents decide on food intake, they are susceptible to their environment and peers' views of food. This impacts their self-perceptions and evaluations of foods (Higgs, 2015).

The physical environment is the community setting where the availability and accessibility of healthful food impact an individual’s food choice on a local level. Societal influence is the wider scale influence on food availability and accessibility. This is affected by broader forces

such as food industry practices, government policies, and media (i.e., unhealthful food advertisements). A lack of supportive policies within the education setting, healthcare industry, urban planning, and environment also impacts individuals' dietary intake (World Health Organization, 2021). An example is where unhealthy food outlets are more prevalent in areas of high socioeconomic deprivation, which can limit affordable and healthy food choices (Sushil et al., 2017). As of 2012, 11.6% of secondary school students were aware that their parents often worry about having enough money for food (Fleming et al., 2013). Adolescents with food insecurity may be motivated to make positive changes to their eating habits; however, the environment in which they live or the school they attend may make access to healthy food choices more complicated than those living with financial security.

Dietary habits are a complex social issue influenced by numerous factors. Developing community-based health promotion initiatives focusing on social, cultural, and environmental factors is promising in driving a long-lasting impact on an individual's dietary behaviour (Edelstein, 2017). Considering the factors above may improve long-term nutritional habits, as food behaviour established throughout youth may continue into adulthood (Mikkilä et al., 2005; Movassagh et al., 2017).

2.5 The school food environment

2.5.1 Overview

In 2008, state-integrated schools were required only to sell healthy food and beverages on school premises; however, the following year, with a change in government, the rule was abolished (Tolley, 2009). Since 2009, no regulations or policies controlled what food was to be sold to students at school; the only requirement is that the food available and provided is safe and registered with the Food Act (2014) (Ministry of Education, 2023a). During this period, schools referred to the National Administration Guidelines (NAGs), which were in place until 2023. The guidelines required each school board of trustees to "promote healthy food and nutrition for all students" (Ministry of Education, 2022b, p. 8). Nearly two-thirds (62%) of secondary schools self-reported doing well with promoting food, nutrition, and physical activity in 2016; however, this was significantly lower than in primary schools (74%) (Education Review Office., 2016). These findings indicate that NAGs did not have a tangible impact on all secondary schools' nutrition promotion. A possible explanation is that they are merely guidelines and not enforced through regulation.

New Zealand has made little progress over the past three terms of government (nine years) with implementing policies compared to international benchmarks (Mackay et al., 2022). These findings demonstrate that health and well-being may not be prioritised within many secondary schools in New Zealand, which creates missed opportunities for some students to learn healthy behaviours.

2.5.2 Food available in New Zealand schools

New Zealand primary and intermediate school canteens have been found to provide high-fat, sugar, and salt food items, and older students were observed to frequently consume these items compared to prioritising fruit and vegetable intake (Carter, 2004; Utter et al., 2007). However, whether this scenario relates to intermediate and secondary schools currently is difficult to determine. A study that assessed the nutrition climate and food availability in primary and secondary schools where school principals provided survey responses concluded that the food available in schools remains mainly unhealthy. Secondary schools faced more challenges in building a healthy food culture as students were likelier to resist healthful changes (Chote et al., 2022). The limitations of this study were that it focused on one region and thus could not be generalised at a national level.

A qualitative study conducted in Australia found that students did not believe the school to be supportive in helping make healthy food choices due to the high availability of unhealthy options and the high cost of nutritious options (Ronto et al., 2021). Students suggested that schools reduce unhealthy options, introduce compulsory nutrition education, and strict food and beverage policies. Without conducting a study focused on students' views in New Zealand, it can be expected that high school students in New Zealand may have similar beliefs and that student resistance may not be a barrier.

From the above studies, it can be assumed that school canteens sell a high proportion of junk food, but the motivation behind this remains unclear. An Australian study assessed the cost differences in healthy and unhealthy food sold in primary school canteens. Unhealthy meals were more affordable for students than healthy meals (Wyse et al., 2017). Due to the comparable demographics across the two countries, we can likely confirm that similar cost patterns would occur in New Zealand canteens. Furthermore, a study conducted in the early 2000s in New Zealand primary schools identified pies, juice, and sausage rolls as the most purchased items on the menu (Carter, 2004). This may be due to how readily available they were compared to filled rolls which were the most expensive item (Carter, 2004). The cost

difference and availability of unhealthy options have been an ongoing issue and are not supportive in helping adolescents make informed choices.

The dilemma is that the school canteen may be a student's only opportunity to access a healthful lunch if their home environment is not supportive. Older children are more likely to purchase their food from a canteen than younger children; however, Māori and Pasifika students with greater socioeconomic deprivation were likelier to buy from the canteen than other students (Utter et al., 2007). This highlights that vulnerable communities are most impacted by the unhealthy options available at schools. Schools cannot expect students to have high health literacy on what food is healthy and balanced; therefore, there should be a responsibility shared between the school and the provider to ensure well-balanced meals are available.

Currently, the evidence leans towards schools having an unhealthy food environment; however, there is limited research which is a concern as nearly half of 12-18-year-olds purchase lunch from the school canteen (Ministry of Health, 2012; Utter et al., 2007). Without exploring the nutrition environment in secondary schools, adolescents may miss out on public health policies designed to support a healthy school environment.

2.5.3 The external food environment

The surrounding external food environment also impacts a student's choice, especially if they can buy food before school or leave during school hours to purchase food. There are no policies or regulations regarding what food can be sold near a school. Food outlets have been shown to cluster around schools, with evidence suggesting that a higher percentage of fast-food outlets are in central urban areas of high socioeconomic deprivation (Day et al., 2015; Pearce et al., 2007). These local-based studies are further supported by a 2016 nationwide spatial analysis of retail environments around schools (Vandevijvere et al., 2016). With a growing population and a society that is becoming busier, there is potential that the proportion of accessible food outlets will increase. Although urban planning impacts what is available, one study investigated how the food environment influences student food choices in Otago, New Zealand (Clark et al., 2014). The environment played a minor role in the adolescents' diet quality. Boys were more likely to make better food choices when more options were available, which contradicts the previous idea that many unhealthy options would lead to students choosing said options. However, this study's findings were limited to the seventh largest town in New Zealand and consisted mainly of New Zealand European/Other ethnicity (90%), thus may not represent the wider population.

Promoting food near schools is also an issue in the New Zealand nutritional landscape. According to a nutrient profile model, it is suggested that junk food advertisements within a 500m radius of New Zealand schools should not be permitted (Vandevijvere et al., 2018). Studies indicate significantly more junk food advertisements, such as for sugar-sweetened beverages and fast food, surround schools in areas of high socioeconomic deprivation than schools in lower socioeconomic deprivation areas (Brien et al., 2022; Huang et al., 2020; Vandevijvere et al., 2018). The food environment surrounding schools has been extensively researched. Communities living in high socioeconomic deprivation are impacted the most by the promotion and provision of junk food to school students, emphasising the need for regulation and policies.

2.6 Nutrition initiatives and programmes within New Zealand schools

Six New Zealand nutrition initiatives have been reviewed to help understand the impact on dietary habits (Table 2.1). School initiatives included increasing access to healthful food or were nutrition-focused teaching skills and providing education. Evaluations have demonstrated the benefits of increasing the accessibility of healthy choices to primary school students at low-decile schools. The initiatives in the review have predominantly targeted primary schools, with little-to-no focus on secondary schools. More costly initiatives, requiring greater resources and time from external providers, were regionally based. Nation-wide initiatives prioritised schools that experienced more significant socioeconomic deprivation by increasing food availability. Large-scale food providers with government funding or established in a partnership tend to have a greater impact on improving food security for students. When focusing on nutrition knowledge and skill alone, this did not improve a child's nutritional intake potentially, as it did not address food insecurity. Regular evaluations were a strength and contributed to the extension of programmes and improvement in outcomes. Robust evaluations consisted of measuring health outcomes to help better understand the influence of the intervention on well-being. Overall, the consensus is that nutrition initiatives positively impacted students' well-being and should be encouraged as improvements were observed in nutritional intake, nutrition knowledge, attitude, behaviour, and concentration.

Table 2.1

Nutrition Initiatives and Programmes in New Zealand Schools

Initiative	Provider	Year	Intervention	Evaluation/outcomes
Fruit in Schools	Ministry of Health	2005-present[†]	A nationwide food provision initiative focused on low-decile schools that provide free pieces of fruit to primary and intermediate school students every school day.	A RCT pilot study based in Auckland primary schools initially observed that fruit intake increased by 0.39 pieces/schools in the intervention group ($p<0.05$) but was not sustained six weeks post-intervention (Ashfield-Watt et al., 2009). Recent evaluation findings as per principals' response (Watts, 2018): • 80% reported students having a reduced stigma towards fruit. • 85% reported fewer students were hungry. • 96% said it promoted positive attitudes among students about eating fruit and vegetables. • 91% said it led to a sense of equality between students regardless of family circumstances. Most principals reported improvements in students' general health and engagement. The initiative was successful as it met a need, provided variety, and was consistent and reliable (Watts, 2018).
KickStart Breakfast	Fonterra, Sanitarium, and the Ministry of Social Development	2009-present[†]	The national free breakfast programme provides weetbix and milk every school day, including all schools.	2018 evaluation: Uptake was highest amongst primary schools and kura (Moira Wilson, 2018). The programme positively impacted students' concentration levels (74.8%) and health and well-being (75.6%). Students were significantly less likely than their peers to have hospital outpatient visits for dental surgery—limited ability to conclude due to confounding variables.

Table 2.1 *(continued)*

Initiative	Provider	Year	Intervention	Evaluation/outcomes
Milk in Schools	Fonterra	2013-2020‡	A food provision initiative that provides a free 200mL serving of low-fat UHT milk to primary school students every school day.	Over two years, the proportion of Auckland primary school students (aged 7-9) meeting the New Zealand guidelines for milk and milk product consumption increased (72%; 94%; p<.001) (Marsh et al., 2018). Most students consumed the milk provided (73%), and 96% liked the taste of the milk supplied. Of the parental responses, 72% believe the programme positively impacted their child's health, but only 26% would be more likely to offer milk at home. Milk intake did not affect BMI scores. This evaluation did not explore the impact of increased milk consumption on health outcomes.
Project Energize	Waikato District Health Board and the Regional Sports Trust (Sport Waikato)	2004-2020§	A region-wide whole-school programme focused on supporting primary schools to improve nutrition and physical activity by facilitating school changes and accessing regional initiatives. The programme was a preventative approach to improve childhood obesity. Financed by the Waikato District Health Board and delivered by Sport Waikato, who employed "energisers" to work with their local schools.	Evaluation of control group (schools with no initiative) versus intervention (Project Energise schools) findings: Over two years, there was a reduced rate of rise in systolic BP in older children and reduced accumulation of body fat in young children (Rush et al., 2012). At the subsequent evaluation, children participating in *Project Energize* BMI was 3% lower than children in the same area three years previously (Rush et al., 2014). Obesity and overweight were lower by 31% and 15% for younger and older children, respectively (age, sex, ethnicity, SES, and school cluster effects were accounted for). The strengths identified were a well-trained and knowledgeable workforce focused on improving equity (supporting Māori staff working with Māori students) (Rush et al., 2016). The programme had regular evaluations to help improve the initiative.

Table 2.1 *(continued)*

Initiative	Provider	Year	Intervention	Evaluation/outcomes
Garden to Table	Charitable Trust	2008-Present†	A curriculum-linked food education programme that supports kura, primary, and intermediate schools throughout NZ. The programme includes gardening, cooking, and academic learning, focusing on teaching skills and improving well-being.	No association was observed between the programme and children's fruit and vegetable variety or consumption. However, children had an improved score for attitude and knowledge regarding gardening and cooking. There was no difference in self-efficacy, cooking, or gardening-related behaviour (Dickinson & Gregory, 2013; Wakefield, 2013). A recent school principal survey highlights: 86% of parents cooked something new at home since their child participated in 'Garden to Table', and 42% had grown something new at home (Garden to Table Trust, 2021).
Ka Ora, Ka Ako: Healthy School Lunch	NZ Government	2020-Present†	A food provision initiative that aims to reduce food insecurity by providing free nutritious lunches every school day. Schools and kura that face the most significant socioeconomic barriers in New Zealand are eligible. This initiative is part of the NZ Government's *Child Youth and Well-being Strategy*.	A pilot study focused on primary and intermediate schools across Hawke's Bay and Bay of Plenty regions within the first few months (Pierce et al., 2021). Those with insufficient food experienced greater food security and mental well-being improvements (6.2%) and would likely benefit from the long-term benefits. They also reported a 20% gain in fullness over those with sufficient food. Hunger was trending down but was not eradicated among participating students within 2-3 months. 3.8% (SD = 3.4) were fuller than those not receiving the school lunch. Students participating, on average, consumed 0.88 (SD = 0.24) more vegetable items and 0.52 (SD = 0.28) fewer snacks and sweet items at lunch every day. Small benefits for quality of life and physical and emotional functioning. No clear benefits regarding school attendance.

Note: †present as of 2022. ‡This programme was discontinued as Fonterra prioritised expanding the Kickstart initiative. § programme ceased in the Waikato region due to a budget cut from the Waikato District Health Board; the programme was extended and continues with Sport Northland and Counties Manukau Sport. Abbreviations: Randomised controlled trial (RCT), body mass index (BMI), body mass index z score (BMIz), systolic blood pressure (systolic BP), socioeconomic status (SES), New Zealand (NZ). Definitions: 'Kura', Schools where lessons are conducted in Te Reo Māori.

2.7 Building a healthy nutrition climate

Understanding the enablers and barriers to building a supportive nutrition climate needs to be addressed to develop initiatives and policies in the education setting. Schools that reported doing well in promoting food, nutrition and physical activity had effective leadership and a clear vision for student well-being (Education Review Office., 2016). This involved well-planned programmes and active student involvement surrounding decision-making and working with the school and family. Furthermore, the participation of stakeholders is associated with viewing nutrition as an integral part of the school rather than independent of the school due to effective communication for feedback and support (Drummond & Sheppard, 2011; Nathan et al., 2011; Ronto et al., 2020). A study in Australian primary schools reported that schools with active communication strategies and staff training had a greater uptake in the proposed fruit and vegetable break initiative than schools that did not communicate the purpose with parents (Nathan et al., 2011).

A thriving nutrition climate was associated with schools that made amendments to reduce the 'unhealthy' items sold to students (Education Review Office., 2016). A study on New Zealand high-school students found that a healthy food and drink environment within schools was positively associated with higher student fruit and vegetable intake. This research used students' self-report questionnaire responses and national survey data, and background characteristics was accounted for (i.e., SES, age, sex, ethnicity) (Cvjetan et al., 2014). A limitation was the confounding variable of other health promotion initiatives occurring and self-report bias. In saying this, it was insightful to have students' views to help conceptualise the effects of a healthful environment on a diet (Cvjetan et al., 2014). Limiting unhealthy options to reduce student choice at a canteen supports the idea of role-modelling healthy food throughout the whole school. Especially as encouraging a healthy lifestyle is a more effective and sustainable method to address obesity than focusing on weight loss measures (Golden et al., 2016). However, there is value in pairing this with nutrition education, as education alone is not successful when the school environment contradicts the teaching provided (Hoppu et al., 2010).

One challenge staff faced with implementing a nutrition policy in Australian school canteens was maintaining profit (Ronto et al., 2020). Switching to policy-compliant healthy food options had a negative financial impact, resulting in a loss of staff due to budget cuts. There were also challenges with sourcing volunteers/staff who had policy knowledge and could prepare suitable

meals (Ronto et al., 2020). Schools that provided additional resources and support to address the loss of profit and increased need for skill and knowledge were significant predictors of what was believed to influence change in quality. Without help, canteens struggled to adapt their menus to be policy-compliant (Drummond & Sheppard, 2011).

2.8 Healthy Active Learning initiative

A joint initiative between the Ministry of Health, the Ministry of Education and Sport NZ launched in 2019 called Healthy Active Learning (HAL). The HAL initiative motives align with the Child and Youth Foundation strategy, with a shared goal to improve the well-being of children and adolescents by addressing health disparities and barriers of poverty (Sport New Zealand, 2020). To achieve this, HAL plans to use community-based intervention within the education setting to reach students and encourage well-being to be an integral part of the school. This initiative will take place over five years (2020-2025) and plans to create a healthy and active learning environment by supporting a more nutritious food and drink environment, improving access to quality physical activity, and providing staff training and resources (i.e., physical activity equipment and food policy toolkit). Sport NZ will offer a physical activity workforce to primary and intermediate schools from 2020-2025 over two phases; however, secondary schools will not be included in this part of HAL (Sport New Zealand, 2020). Of interest to this thesis is the relationship between HAL and the Ministry of Health, which aim to support schools, early childhood education, and kura (schools predominantly taught in Te Reo Māori) to adopt healthy food and water policies to create a healthier environment.

Improving the quality of food sold to students in New Zealand schools is part of the multi-strategic approach to encourage positive behaviour and beliefs towards fruit and vegetables among school students. Health advisors will work with primary and intermediate schools and their teachers regarding implementing the policy and how to support students.

2.9 Healthy food and drink guidance for schools

The Healthy Food and Drink Guidance for schools was developed by the Ministry of Health and published in 2020 (Ministry of Health, 2020). The purpose of this tool was to help support kura and schools in providing students with healthier food and drink options. As mentioned, there were no regulations regarding what is allowed to be sold to students; therefore, this tool may help schools create a supportive nutrition climate. By creating a healthy food environment within the school, students can access healthy food and drinks irrespective of SES. This can

potentially support students in developing healthy food and drink preferences (Ministry of Health, 2020). Developing a tool available in Te Reo Māori and English encourages equity and will help all education centres create a healthier food environment for the students and families. This policy will ensure that children and adolescents are offered various food from all food groups. Businesses will be restricted from selling high-fat, salt, and added sugar products to students. This will be New Zealand's first time putting into practice a policy of this style. Before this, fewer than half of secondary schools had a food and drink policy, and they were primarily weak, with suggestive language and narrow-focused statements (D'Souza et al., 2022).

The guidance tool consists of a three-tier classification system of categorising food and drinks with colour codes – 'green', 'amber', and 'red'- aiming for schools to provide 75% of 'green' items. Green is the ideal category as it represents a good source of nutrition. The remaining 25% should be food and drink in the 'amber' zone. Amber refers to food and drink that would not be a part of the everyday diet, have some nutritional value and are often more processed. Food and beverages to avoid within schools would be anything that classifies as 'red' items; these have poor nutritional value and are high in saturated fat, salt, or added sugar.

2.10 Traffic light for nutrition guidance

The Australian Government funded a nationwide food and beverage policy, 'The National Healthy School Canteens', in 2008 (Australian Government Department of Health., 2014). The policy has the same categories nationally ('green', 'amber', 'red') but varies by state in recommending either at least 50% or 75% of the menu being comprised of 'green' items. Table 2.2 focuses on studies conducted throughout Australian schools using the traffic light guidance method to classify school canteen menus. As Australia has a similar demographic to New Zealand, these studies may help identify a methodology that can be used to help replicate and evaluate a similar policy in New Zealand schools.

The use of a food and drink policy improved menu quality among schools. Most studies coded the menu items, then calculated each category's contributing proportion and compared it to the guidance. Studies with a method to improve inter-rater reliability (i.e., coded menus jointly and then independently) and addressed poor menu quality (i.e., assumption list) had more robust reliability. The schools that had support in implementing the policy were more likely to achieve a policy-compliant menu, and students were less likely to purchase high-fat items. However, the cost of healthful food was an ongoing issue, with unhealthful options being the cheapest.

Secondary schools were also less likely to meet the guidelines than primary schools. Some studies included cost, purchase history, and implementation strategies as a variable, which identified factors that interfered with the success of a policy-compliant menu. However, it was more challenging to observe outcome improvement when studies did not have a baseline or control group to compare with.

This format's strength is that professionals with qualifications and knowledge of nutrition guidelines have designed the traffic light tool and have already categorised food into the corresponding groups. Categorising food on a colour scale is engaging and helps to provide guidance as it readily associates food with a three-tier level of nutritiousness. Using the same policy throughout Australia has allowed more reliable and efficient ways to evaluate food availability and compare progress. The limitation of this tool is that it does not address barriers of financial cost, nor is there a multi-strategic approach to implementing policy-compliant food.

Table 2.2

The Use of the Traffic Light Criteria to Assess Menu Quality in Australia

Author & Purpose of Study	Sample and Method	Relevant Findings	Strengths & Limitations
Woods et al. (2014) Assess the compliance of school canteens with their state or territory guidelines.	• Primary schools (*n*=184), secondary schools (*n*=79). • School menus collected from online government school websites. • Classified menu items†. • Assessed the proportion of menus that adhered to state guidelines. • Calculated the average cost of regular hot pies and a main meal salad.	Compliance with state guidelines: • 62% of schools in Western Australia. • 3-35% of schools from other jurisdictions. Secondary schools offered a higher proportion of 'red' items than primary schools (*p<0.05).* Pies were significantly cheaper than salad.	**Strengths** • Examined compliance rates by states. • Assessed cost differences across menus between one chosen healthy item and an unhealthy item. **Limitations** • The sample was limited to online menus by government schools. • Unable to determine how often food options were available. • No baseline measure available. Could not determine a change in menu quality since policy implementation. • No school characteristics were assessed as a variable (i.e., SES). • Query reliability as menu assessment is limited to one researcher (dietitian student). • No method to explain the process of classifying menus with a lack of detail.

Table 2.2 *(continued)*

Author & Purpose of Study	Sample and Method	Relevant Findings	Strengths & Limitations
Wyse et al. (2017) Describe the price of Australian school canteen foods according to their nutritional value.	• NSW primary school canteen menus (n=70). • School canteens that contained 'red' items. • Food and beverage menu[§]. • Baseline RCT of an intervention to increase compliance with canteen policy. • Classified menu items with the corresponding 'green', 'amber', and 'red' and organised them into food groups. • Pricing information was extracted from each food group. • Cost[‡] was calculated and assessed against each food group item classification.	Significant findings (p<0.0001) • Main meals: 'green' was more expensive than 'amber items. • Hot meals: 'green' was more expensive than 'red'. • Non-meals (drinks/snacks): 'amber' was more expensive than 'green'. Cheapest Products (p<0.0001) • Frozen snacks: 'green'. • Drinks and snacks: 'red'. • Sandwiches: 'amber'.	**Strengths** • An in-depth overview of pricing variations. • The assumption list was developed by experienced professionals (dietitians) to aid with menu classification. • Contacted schools for additional information when insufficient detail. **Limitations** • The differences between high and low-socioeconomic schools were not assessed. • Limited scope, focused on price and not adherence to policy guidance. • Secondary schools were not included.

Table 2.2 *(continued)*

Author & Purpose of Study	Sample and Method	Relevant Findings	Strengths & Limitations
Wolfenden et al. (2017) Assess the effectiveness of a multi-strategic intervention to increase the implementation of a state-wide healthy canteen policy. Assess the impact of student's canteen purchases on nutritional intake and school's canteen revenue.	• NSW Primary schools. • Control group (*n*=30), intervention group (*n*=27; multiple strategies to support policy implementation). • Food and beverage menu[§]. • RCT (12-14 months). • Classified menu items[†]. • Measured energy[‡], total fat[‡], and sodium[‡] per student purchase via direct observation (20% of the schools). • Collected nutrition quality information and canteen revenue/profit breakdown.	6/9 strategies were implemented[‡,] and 45% of canteen managers found each intervention component helpful. Intervention schools were more likely to have a menu without 'red' or 'banned' items ($p<0.01$) and have at least 50% of menu items as 'green' than the control group ($p<0.01$). Findings were significant across all subgroups (deprivation score, school size). No difference was observed in small-sized schools with >50% 'green' items on the menu across intervention vs control. Student purchases from intervention schools were significantly lower in total fat (*p=0.03)*. No difference in canteen profits over time between groups.	**Strengths** • Findings highlight strategies' value in increasing menu quality, especially the multi-strategic approach. • RCT can measure change over time and reduce confounding variables with a control group. • Focused on student dietary intake by observing purchases rather than using national survey dietary intake records. **Limitations** • Observation day was limited to one day of observation and represented 20% of the sample. This may not accurately represent a day-to-day pattern and be influenced by confounding variables (weather, purchasing a 'treat'). • Students were aware of researchers observing purchases; this may have caused social desirability bias. • Limited to primary schools. • Limited to one state and 27 intervention schools. • Minimal canteen revenue information was provided.

Table 2.2 *(continued)*

Author & Purpose of Study	Sample and Method	Relevant Findings	Strengths & Limitations
Clinton-McHarg et al. (2018) Classify the foods and beverages on school canteen menus by the traffic light criteria and describe the proportion of these items purchased by students. Examine the association between food and beverage availability on canteen menus and student purchases.	• NSW government primary schools (*n*=50). • Sample from RCT intervention group. • Food and beverage menu[§]. • Classified menu items[†]. • Assessed the proportion of menus that adhered to state guidelines. • Included input from school principals, canteen managers, and students (telephone interviews). • One-day observation in schools of student purchases.	The average proportion of 'green', 'amber', and 'red' was 47.9%, 47.4%, and 4.7%, respectively. The average proportion of 'green', 'amber', and 'red' purchased by students was 30.1%, 61.8%, and 8.1%, respectively. Unhealthy options were more favourable than 'green' to students. The rate of 'amber' purchases was much higher than 'green' items. As green items increased, so did purchasing. For most purchases to be 'green', the study recommended a menu comprising>70% 'green' items rather than 50%.	**Strengths** • Trained researchers reported students' purchases. • Observational data and rigorous canteen menu assessment. • The sample was used in a previous study by Wolfenden et al. (2017). This was helpful in evaluating differences/changes. • School characteristics (SES, size, location, environmental characteristics) were included to help control confounding variables. • Independently audited by two dietitians. • Contacted schools for additional menu information. • Discrepancies were resolved through consensus or with a third dietitian's opinion. **Limitations** • One-day observational data did not account for confounding variables impacting choice (i.e., weather) and social desirability bias. • Limited to primary schools.

Table 2.2 *(continued)*

Author & Purpose of Study	Sample and Method	Relevant Findings	Strengths & Limitations
Myers et al. (2019) Assess compliance of Western Australian school canteen menus with the policy a decade after its introduction.	• Primary schools (*n*=101), secondary schools (*n=25*), and combined schools (*n*=10). • School menus collected from online government school websites. • Classified menu items†. • Assessed the proportion of menus that adhered to state guidelines. • Comparison between groups (metropolitan and regional schools; primary and secondary school).	The average proportion of 'green', 'amber', and 'red' was 70%, 28%, and 2%, respectively. Most of the sample (84%) met >60% 'green' items and excluded 'red' items (52%). Half (48%) of the schools met all three traffic light targets. Primary schools were more likely to meet the requirements than Secondary schools and have a higher proportion of 'green' items than secondary schools (72% vs 64%; *p*<.001). Secondary schools had a higher proportion of 'red' items than primary schools (6% vs 1%; *p*<.001). Primary school menus were more likely to be colour coded than secondary schools.	**Strengths** • Compared primary schools to secondary schools. **Limitations** • The sample was limited to menus that were available online, thus limited menu detail available. • Not necessarily generalisable to all government schools as the sample was 17% of schools within the state. • Schools with other food-related initiatives were excluded. These initiatives should also follow the policy; however, it was out of scope for this study.

Table 2.2 *(continued)*

Author & Purpose of Study	Sample and Method	Relevant Findings	Strengths & Limitations
Haynes et al. (2021) Assess the nutritional quality of Australian secondary school canteen menus.	• Secondary schools (*n*=244). • Sample from the two most recent waves of the National Secondary Students' Diet and Activity surveys. • Canteen menus from 2012-13 and 2018. • Food and beverage menu[§]. • Classified menu items[†]. • Assessed proportion of menus that adhered to state guidelines. • Pricing of each menu item and promotional strategies recorded. • School characteristics included (location, SES, population size of school).	School menus had 89.1[‡] items. 98.5% of menus included 'red' items, and 49% contained >50% 'green' items. Large schools had lower odds of meeting the guidelines than small schools. Medium schools (relative to small schools) and those in the least disadvantaged areas (relative to most disadvantaged) had a lower odd of offering sugary drinks. 'red' items[‡] were significantly cheaper than 'green' items[‡], and many schools supplied products of poor nutritional quality (i.e., meat pies, sugary drinks, sweet baked goods). Most (89.8%) menus were available daily. Discretionary product categories declined between 2012-2013 and 2018 (insignificant).	**Strengths** • The sample focused on secondary schools. • Brief menu audit methodology. • An independent survey agency administered surveys. • Inter-rater reliability was established between researchers (coded menus jointly and independently). • The use of survey waves to compare changes over time. • Used national sample and applied population weighting to estimate the nutritional quality of the menus. • Focused on how often items were available and contribution to each food category (i.e., cold meals, hot meals). **Limitations** • The response rate for the survey for 2012–2013 (21%) and 2018 (8%) was low, but it was still a large sample.

Note: Classified menu items[†] with the corresponding 'green', 'amber', and 'red', calculated percentage of each category. [‡]Mean/Average. [§]School provided a recent copy of their food and beverage menu. Abbreviations: New South Whales (NSW), socioeconomic status (SES), Health Star Rating (HSR)

2.11 Summary

Obesity among adolescents is rising and is a concern due to its association with the increased risk of mortality, T2DM, and cardiovascular disease. With an increase in food insecurity and nutrition-related comorbidities, there is a need for collaborative action to improve the food environment. As dietary habits established through adolescence may follow into adulthood, developing nutrition initiatives to improve well-being is vital. Building a robust nutrition initiative involves understanding the influences on dietary behaviour, which is explained through the social-ecological theory (Story et al., 2002). Focusing nutrition initiatives within the school environment is ideal for a preventative approach, as it is a crucial environment where students form new relationships and learn outside their homes.

Studies suggest the school food environment remains relatively unhealthy, yet the extent of this is unknown. Little to no literature has focused on intermediate and secondary schools' food environment, and nutrition initiatives have predominantly targeted primary schools. The findings have been successful when focused on increasing access to healthy food; however, providing nutrition education on its own has little to no impact on food intake due to the barrier of food insecurity. These findings have revealed that intermediate and secondary schools may be missing out on the opportunity to improve students' well-being. Using a government-designed food and drink policy is promising as it will focus on all schools whilst accommodating all health literacy levels. The traffic light method to categorise the food available in schools is a simple and replicable technique. It has been successfully used in Australia to help improve menu quality, allowing monitoring and evaluation to occur at a national level. In summary, a policy on its own may limit unhealthy food. Yet, the literature also encourages additional support (i.e., communication strategies and resources) to promote health equity among schools.

There is a current gap in the literature regarding food availability in intermediate and secondary schools. Therefore, it would be challenging to measure the change in food availability once a policy has been implemented. Conducting a baseline study will be beneficial long term to see the level of influence a policy has on food availability. It may also provide evidence for public health strategies to re-focus their attention on intermediate and secondary schools.

CHAPTER 3: RESEARCH MANUSCRIPT

Intermediate and Secondary School Food Environment in New Zealand: Food and Drink Menu Assessment

The following chapter is a manuscript prepared for the *Health Promotion Journal of Australia*. This journal's abstract should not exceed 250 words, and the original long research article should not exceed 6000 words.

3.1 Abstract

Issue addressed: Nutrition-related obesity is rising among adolescents in New Zealand. The school environment is ideal for encouraging a healthy lifestyle; however, the healthiness of food available to intermediate and secondary school students (years seven-13) is unknown. This study assessed how food and drink menus from a convenience sample of schools align with the Ministry of Health Food and Drink Guidance for Schools.

Methods: New Zealand schools' (years seven-13) menus were collected in 2020. Menus were classified using traffic light criteria. A toolkit was developed by three nutritionists and one dietitian (with trained staff support) to aid with menu classification. Menu quality was evaluated against school characteristics and policy use.

Results: Of the school menus assessed (n=60), 3.3% met the recommendation for the provision of 75% 'green' items. 'Red' items were the main contributors (mean=53.6%). Schools with high socioeconomic status (deciles 8-10; 14.3%; $p<0.05$) and small school size (<749 students; 14.1%; $p<0.025$) were associated with a higher proportion of 'green' items. Community (19.3%) and in-house (25.9%) food providers provided a lower percentage of 'amber' items than school providers (39.3%; $p<0.001$). In-house providers (64.6%) had a greater percentage of 'red' items than school providers (48.2%; $p<0.017$).

Conclusion: Food available in schools (years seven-13) tends to be unhealthy. A national nutrition policy could improve the school food environment, especially in schools with large populations and low socioeconomic status.

So what? Menu quality is a complex socioeconomic issue, and additional support should be considered to improve equitable outcomes within school food environments.

3.2 Introduction

During adolescence, nutrition is essential for optimal development and can influence an individual's health trajectories (Neufeld et al., 2022; Norris et al., 2022; Patton et al., 2016). In New Zealand, obesity has increased among adolescents, with around one in eight children and one in three adults (aged 15 years and over) obese, especially amongst Pasifika, Māori, and individuals living in socioeconomically deprived areas (Ministry of Health, 2021).

Nutrition-related obesity complications can result in non-communicable diseases (NCDs), including cardiovascular disease, type II diabetes, and premature mortality (World Health Organization, 2020). The psychological impact of obesity and disordered eating amongst adolescents is also of concern as it may contribute to lower health-related quality of life and psychological difficulties (Anderson et al., 2017). Obesity is an ongoing challenge for public health; however, encouraging a healthy lifestyle among adolescents is more effective and sustainable than encouraging weight loss (Golden et al., 2016).

Schools are an ideal environment to implement nutrition initiatives as children and young people aged six to 16 years attend school five days a week, and half of 12 to-18-year-olds purchase lunch from the school canteen or tuckshop (Ministry of Health, 2012). School food policies focusing on increasing the accessibility and availability of healthy food may contribute to healthful dietary habits progressing into adulthood (Movassagh et al., 2017). Recently there has been no nationwide initiative or government-driven policies focusing on healthy eating for adolescents. Furthermore, within the last decade, New Zealand has made little progress in implementing nutrition policies that support a healthy food environment compared to international benchmarks (Mackay et al., 2022).

Healthy Active Learning (HAL) is a collaboration between Sport New Zealand, the Ministry of Health, and the Ministry of Education. HAL aims to improve the well-being of children and adolescents through healthy eating, drinking, and quality physical activity. Over five years (2020-2025), HAL aims to create a healthy and active learning environment by improving access to quality physical activity and supporting a more nutritious food and drink environment with the use of staff training and resources. Improving the quality of food sold to students in New Zealand schools is part of the multi-strategic approach to encouraging positive behaviour and beliefs surrounding fruit and vegetables. One focus of HAL is to improve food environments within the education setting by promoting healthy food and water-only policies. Developing the 'Food and Drink Guidance for Schools' alongside a toolkit may help key

stakeholders (i.e., principals, catering companies, teachers, and parents) implement a policy to support healthful practices and healthy food availability.

The Ministry of Health's Healthy Food and Drink Guidance for Schools was developed in 2020 for providers to use as a tool in menu development (Ministry of Health, 2020). This guidance tool uses a traffic light method of classifying food; and recommends school food and drink menus are composed of 75% 'green' items, with the remaining items being classed as 'amber', with no 'red' items available for purchase. 'Green' items are less processed and lower in saturated fat, salt, and added sugar. 'Amber' consists of food and drink that are not part of the everyday diet but have some nutritional value and are often more processed. 'Red' items have poor nutritional value, are highly processed and are high in saturated fat, salt, and added sugar. It is currently up to each school to determine the food and drink available for students; this includes the optional choice of designing and implementing a policy to encourage various healthful food and drink options for children and adolescents. This study will use a convenience sample of intermediate and secondary schools as part of the HAL initiative. The aim was to assess how school food and drink menus align with the Ministry of Health Food and Drink Guidance for Schools.

3.3 Methods

3.3.1 Data collection and participants

New Zealand schools were recruited to participate in the HAL initiative. The data collected will be used for a longitudinal quasi-experimental, mixed-method study that includes an assessment of food availability in schools. Baseline data were collected from July 2020 to February 2021 in Auckland, Bay of Plenty, Canterbury, Gisborne, Northland, and Wellington. School contact details were obtained from these selected regions via the website "Education Counts" (Education Counts, 2022), and an email was sent to all schools explaining the initiative with an invitation to participate. The sample included composite schools (years zero-13), intermediate schools (years seven-eight), senior schools (years seven-13) and secondary schools (years nine-13) willing to participate, irrespective of socioeconomic status of the school, gender of students, or "public/private" school.

Schools that had signed up for Ka Ora Ka Ako (a free school lunches programme) or had received food donations were excluded.

The first phase of the HAL initiative provided physical activity support and education resources to primary and intermediate schools; however, this does not include secondary schools. Schools within this sample may not participate in other aspects of the HAL initiative. Ethical approval for the HAL study was granted by the Massey University Human Ethics Committee (NOR 20/07). It was extended to this study as it is a subsection of HAL and did not require additional data collection from schools.

3.3.2 Menu and food policy collection

Schools were invited to provide a digital copy of their most recent food and drink menu via email. At the same time, schools were asked to identify if they have a current nutrition policy and to provide a copy of their school nutrition policy if applicable. A follow-up questionnaire was sent to participating schools to collect additional details to assist with the classification of menu items regarding product details and cooking processes (e.g., type of bread, milk, dairy, and packaged snack products available, the use of deep-fried food, availability of confectionary, use of vegetables) (see Appendix B - Questionnaire).

All information was collected by the Massey University research team and uploaded onto a secure online database, Qualtrics Software (Qualtrics, 2022).

3.3.3 Menu item classification

The school menus were assessed for adherence to the 'Healthy Food and Drink Guidance for Schools' (Ministry of Health, 2020).

The method used in this study was based on a quick menu audit response adapted to suit the New Zealand school food and drink guidelines (Reilly et al., 2016). A subset of four school menus from each researcher's data set was jointly coded between the four researchers (one dietitian and three nutritionists). The remaining menus were coded independently. To refine the protocol and establish interrater reliability, researchers would have fortnightly meetings to discuss difficult menu items. They would seek input from other trained staff if a consensus could not be formed. Each menu item was coded as 'green', 'amber', or 'red'. Items with insufficient information for a decision, and in-between categories, were given the benefit of the doubt and coded the better-quality rating. The methodology adopted in this study was based on methods used in Australia (Haynes et al., 2021; Wyse et al., 2017).

The food product, the main ingredients, and the following food group to which they belong were determined. In some instances, the cooking process and quantity of ingredients also

decided whether an item was ‘amber’ or ‘red’. The menu items were the unit of analysis, and the odds of items being classified as 'green', 'amber', or 'red' was examined and reported as a percentage. Meals (ingredients from at least two food groups) and sandwiches were determined by coding the main ingredients against the traffic light guidance, calculating the total contribution of ‘green’, ‘amber’, and ‘red’ items, and then classed accordingly.

3.3.4 School menu analysis toolkit

The four researchers developed a menu analysis toolkit to help encourage consistency and reliability in assessing the school menus. The toolkit included an assumption list, health star rating of packaged foods, recipe database of meals, and compilation of food provider menu items (see Appendix B - Table 6.2-6.7).

Assumptions were created for menu items requiring additional detail to be categorised. A consensus between all researchers was based on the interpretation of the guidance, relevance, and relatability to the providers. The Health Star Rating (HSR) was used to classify packaged food items and was collected from local supermarket websites or calculated manually (Commonwealth of Australia, 2020). The recipe database consisted of easy-to-make recipes from online resources to replicate commonly seen meals on school food menus. Food included in the HSR and recipe databases helped estimate the average classification of packaged food products or recipes when brand names or specific meal details were not specified.

One section of the toolkit included a list of menu items by food providers that were categorised as per the traffic light criteria. Chain providers’ ingredients and meat portions were accessed through online websites. School providers were contacted for additional information and menu detail. The average portion sizes and ingredients for commercial-sized bakery/café items were collected from the NZ Food Composition database (Version 01, 2021) via FoodWorks (Version 10) to classify items sold by community providers (Xyris Pty Ltd, 2022). All information gathered was coded and stored in the toolkit. When food providers did not provide sufficient information, researchers used the information compiled on the toolkit resource to classify the meal or snack item.

3.3.5 School characteristics

Table 3.1 shows how the school characteristics were categorised and where the information was collected (February-August 2022).

Table 3.1

School Characteristics Definition, Categorisation Process, and Data Collection

School Characteristic	Definition and Categorisation method	Categories	Information collected from
Food Provider	*The business entity that supplies food to schools*. Community: local providers that provide to the community (e.g., sushi, bakery, café). Chain provider: providers with multiple chains who sell to the public and schools throughout New Zealand (e.g., Subway, PitaPit, Hells Pizza, Jesters Pies, Bakers Delights) In-house provider: business located within the school and sells only to the school (e.g., canteen/tuckshop). School providers: providers whose business is focused on supplying school lunches to schools (e.g., Libelle Group, Deejays, Go Deli	1. Community provider 2. Chain provider 3. In-house provider (canteen/tuckshop) 4. School provider	Menus provided in data collection and stored on Qualtrics (2022).
School Decile†	*A score to represent the school's student's SES on a scale of 1-10. On a scale from 1 -10, one being schools with the highest proportion of students from low socioeconomic communities and 10 with the least number of students from low SES.* School decile was initially based on previous research categorisation of 1-3, 4-7, 8-10 (Rush et al., 2014; Yoong et al., 2015).	1. Low to medium decile, 1-7 2. High decile, 8-10	Education Counts (2022).
School Deprivation Score	*A measure of socioeconomic deprivation based on income, education, employment, housing, and access to transport in the geographic area. On a scale from 1 -10, one being least deprived, ten being most deprived.* Used the same method as school decile but related it to deprivation score instead.	1. Least deprived, 1-3 2. Medium deprived, 4-7 3. Most deprived, 8-10	NZ Deprivation Score for 2018 from the Environmental Health Intelligence New Zealand (n.d.).

Table 3.1 *(continued)*

School Characteristic	Definition and Categorisation method	Categories	Information collected from
School Population Size	*The total number of pupils attending the school.* Three categories are based on previous literature (D'Souza et al., 2022). The division of groups was based on the mean, median, and range of data with a similar distribution of schools.	1. Small population 1-749 students 2. Medium population 750-1499 students 3. Large population >1500 students	Education Counts (2022).
School Year Group	*The varying year groups that a school will teach.* Categorised into the corresponding school type listed on "education counts", which was accessed online.	1. Composite school (years 0-13) 2. Intermediate school (years 7-8) 3. Secondary school (years 9-13) 4. Senior school (years 7-13)	Education Counts (2022).
Region of Schools	*A geographical area in New Zealand.* Categorised into the regions that HAL Phase One targeted.	1. Auckland 2. Bay of Plenty 3. Canterbury 4. Gisborne 5. Northland 6. Wellington	Education Counts (2022).
Urban Area	*A region characterised by high population density and developed infrastructure (urban area) versus sparsely populated areas with undeveloped infrastructure (rural area).* Categorised to represent the form of food swamps and deserts: rural environment and main urban area.	1. Major and secondary urban area 2. Minor and rural area	Education Counts (2022).

Note. †School decile was categorised into three groups; however, the low decile sample was too small for statistical analysis: thus, low decile (1-3) and medium decile (4-7) were merged to establish a larger sample set for analysis. Abbreviations: Socioeconomic status (SES).

3.3.6 Statistical analysis

Descriptive analyses were used for Table 3.1 school characteristics. The breakdown of schools' total percentage of 'green', 'amber' and 'red' items contributing to the food and drink menu was reported. School region, food policy, and food questionnaire results were also reported as a frequency and percentage (see Appendix A - Table 6.1).

Schools had multiple menus from different food providers as part of their full menu. The food provider menus and their corresponding percentage of 'green', 'amber', and 'red' items were assessed individually to explore the variation in food providers. If the food provider was not transparent on a menu, the menu was removed from the analysis.

Normality was explored using Kolmogorov-Smirnov (K-S) or Shapiro-Wilk (S-W). Normally distributed data was reported as a mean and standard deviation (SD). If the null hypothesis of a normal distribution was rejected, a log10 transformation was completed on the dependent variable ('green' and 'amber' items). The K-S and S-W test was conducted on log-transformed data to determine parametric or non-parametric testing. Geometric mean and 95% confidence interval were reported for parametric data. Non-parametric data was written as a median and 25-75th percentile. Levene's test was used to assess the homogeneity of the data.

One-way ANOVA was used for parametric characteristics with more than three groups; an Eta-squared point estimate (η^2) was reported for the effect size (deprivation score, school year group, school population size, and food provider). An Independent sample t-test was used to compare one group to another when assessing the mean score; Cohen's d point estimate was reported for effect size (school decile and urban area). The exception was a Kruskal-Wallis (K-W) test for non-parametric data comparing the medians of more than one group; effect size was reported as η^2 (e.g., Food providers and 'green' or 'amber' items). A Mann-Whitney test was then used to determine if there was a significant difference between one group and the reference group. Reference categories were selected by a categorical variable that had no overlap with another group and was the largest category. Small, medium, and large η^2 effect size values are 0.01, 0.06, and 0.14, respectively. Cohen's d effect size values are 0.2, 0.5, and 0.8 for small, medium, and large effect sizes, respectively. A *p*-value <0.05 indicated statistical significance, and all tests were two-tailed.

A multiple regression analysis was completed to explain the effect that school year group, school population, deprivation score of school, school decile, and urban area had on the percentage of 'green', 'amber', and 'red' items. Since schools with higher deprivation scores

would tend to have lower deciles, a correlation matrix was completed between the two variables. To avoid multi-collinearity, deprivation score was removed from the model as a statistically significant correlation was identified (Pearson correlation: -.435; $p<.001$). The school population was tested as a dummy variable in the model as more than two sub-groups explained the outcome on the percentage of 'green', 'amber', and 'red' items. Statistical analysis was completed using SPSS Version 29 (IBM Corporation, 2022)

3.4 Results

3.4.1 School menu classification

In phase one of the study, there were responses from 67 schools, and seven were excluded that did not provide a copy of their food and drink menu during data collection. A total of 60 schools were assessed against the Ministry of Health food and drink Guidance for schools (Ministry of Health, 2020). This sample represented 8% of New Zealand schools within this age range (intermediate, composite, senior and secondary schools). The sample included 12 intermediate schools, seven composite schools, 24 secondary schools, and 17 senior schools. Of the 60 schools, 13 responded to the questionnaire, and one school provided a copy of their school food and drink policy.

School menus had a mean of 53.4 (SD=31.9) items available for purchase. The mean percentage of 'green' items was 13.5% (SD=17.8), 'amber' 32.9% (SD=16.2), and 'red' 53.6% (SD=18.9). From the sample of 60 menus assessed, two (3.3%) met the recommendation of at least 75% of 'green' items. Six schools (10%) had no 'green' items on their menu. Moreover, 58 (96.7%) school menus contained 'red' items; of these menus, six (10.3%) had no 'green' items.

3.4.2 School characteristics and menu classification

Table 3.2 shows the breakdown of school characteristics and the association with the percentage of 'green', 'amber' and 'red' items contributing to school food and drink menus. School region was not assessed as the sample distribution was insufficient; Gisborne and the Canterbury region were both limited to one menu within the sample. The total percentage of contributing 'green' items to a menu differed significantly between deciles; high decile schools had a significantly higher percentage of 'green' items on their food and drink menus ($p=0.028$). Schools with a population of >1500 pupils significantly had a lower average total percentage of 'green' items compared to schools with fewer students (1-749 pupils; $p=0.022$). Community ($p<0.001$) and in-house ($p=0.003$) providers provided a lower percentage of 'amber' items

contributing to school menus than school providers. In-house providers had a higher percentage of ‘red’ items contributing to school menus than school providers (p=0.003). No significant difference was observed for deprivation score, urban area, and school year group.

Table 3.2

Associations Between the Percentage of 'Green', 'Amber', and 'Red' Food and Drink Items and School Characteristics.

School Characteristics	Percentage of 'Green' Items	Percentage of 'Amber' Items	Percentage of 'Red' Items
Decile			
Low to medium decile 1-7 (*n*= 36)	8.9 (7.0, 11.2)	5.1 ± 16.2	55.7 ± 17.9
High decile 8-10 (*n*= 22)	14.3 (9.6, 21.4)	28.8 ± 15.8	50.2 ± 20.1
P-value	**0.028**	0.152	0.277
Cohen's d	0.641	0.393	0.297
Deprivation Score			
Least deprived 1-3 (*n*= 18)	11.7 (7.4, 18.5)	25.7 (17.2, 38.5)	55.9 ± 21.4
Medium deprived 4-7 (*n*= 26)	10.3 (7.6, 14.0)	30.3 (25.2, 36.5)	54.1 ± 19.2
Most deprived 8-10 (*n*= 16)	10.0 (6.4, 15.6)	37.3 (29.4, 47.5)	50.4 ± 16.2
P-value	0.830	0.170	0.700
η^2	0.007	0.064	0.012
Urban Area			
Major and secondary urban area (*n*= 49)	11.3 (8.9, 14.3)	32.3 ± 16.5	52.6 ± 19.7
Minor and rural area (*n*= 11)	7.7 (4.8, 12.5)	35.4 ± 15.7	58.2 ± 15.0
P-value	0.201	0.569	0.381
Cohen's D	0.496	0.191	-0.294
School Year Group			
Composite school (years 0-13) (*n*= 7)	14.9 (4.4, 51.1)	23.8 ± 20.9	52.8 ± 34.1[†]
Intermediate school (years 7-8) (*n*= 12)	13.7 (7.5, 25.3)	35.9 ± 16.6	42.7 ± 18.6[†]
Secondary school (years 9-13) (*n*= 25)	8.8 (6.7, 11.5)	35.6 ± 15.4	54.8 ± 16.0[†]
Senior school (year 7-13) (*n*= 16)	10.1 (7.2, 14.1)	30.2 ± 14.8	60.3 ± 11.8[†]
P-value	0.277	0.294	0.105
η^2	0.074	0.064	0.103
School Population Size			
1-749 students (*n*= 26)	14.1 (9.3, 21.3)	33.2 ± 17.9	47.3 ± 20.6
750-1499 students (*n*= 23)	9.4 (7.5, 11.7)	30.8 ± 15.3	58.6 ± 17.4
>1500 students (*n*= 11)	6.9 (4.3, 10.9) [‡]	36.2 ± 14.9	58.1 ± 14.5
P-value	**0.042**	0.665	0.073
η^2	0.117	0.014	0.088
Food Provider			
Community provider (*n*= 12)	16.0 (8.7 – 71.0)	19.3 (3.4 – 29.3) [§]	47.4 ± 28.9
Chain provider (*n*= 11)	7.7 (3.1 – 22.2)	52.0 (35.0 – 70.0)	38.9 ± 22.7
In-house provider (*n*= 17)	7.4 (6.2 – 11.1)	25.9 (18.0 – 30.9) [§]	64.6 ± 12.6[¶]
School provider (*n*= 31)	10.9 (3.6 – 17.1)	39.3 (28.1 – 52.9)	48.2 ± 13.4
P-value	0.129	**<0.001**	**0.003**
η^2	0.040	0.261	0.187

Note. Significance $p<0.05$ (in bold). Mean ± SD for normally distributed data. Geometric Mean (95% CI) for the back-transformed log10 data. Median (25th-75th percentiles) for non-parametric data. [†]Assumption of Homogeneity violated. [‡] LSD multiple comparison to reference group of 1-749 pupils (p=0.022); p-value adjusted for Bonferroni correction ($p \leq 0.025$). [§]LSD multiple comparisons to reference group of school provider; community providers compared to reference group ($p<0.001$)*;* In-house compared to reference group *(*p=0.003); p-value adjusted for Bonferroni correction ($p \leq 0.017$). [¶]LSD multiple comparison to reference group of school provider; in-house compared to reference group (p=0.004); p-value adjusted for Bonferroni correction ($p \leq 0.017$). Abbreviations: η^2, Eta-squared.

3.4.3 Multiple regression analysis of menu classification and school characteristics

Table 3.3 shows the results of the multiple regression analysis, which tested the relationship between four independent variables (school year group, decile, urban area, and population size) and the proportion of 'green' items. The model was statistically significant (p=0.004) and accounted for 30.4% of the variance in the proportion of 'green' items (R^2=0.304). On average, as the school decile increases by one score, there is a 21.6% increase in the proportion of 'green items' on school menus (p=0.015). Additionally, schools with larger populations (>1500 students) had approximately 36% fewer 'green' items than smaller schools, on average (p=0.01). The comparison between medium-sized schools and small schools and their effect on the proportion of 'green' items was not statistically significant (p=0.039). Furthermore, school year group (p=0.293) and urban area (p=0.427) did not have a statistically significant impact.

No significant results were observed between the tested variables and the percentage of 'amber' and 'red' items (p>0.05).

Table 3.3

Percentage of 'Green' Items by School Characteristics

Change in % of 'green' items	**Coefficient (β)**	**s.e.(B)**	**Standardised B**	**95% CI B**	**R^2**	**P-value**
Log10 Total Percentage of 'Green' items						
Model					0.304	**0.004**
School Year Group	-0.060	0.056	-0.158	-0.173, 0.053		0.293
School Decile	0.216	0.085	0.318	0.045, 0.388		**0.015** †
Urban Area	-0.118	0.147	-0.121	-0.413, 0.178		0.427
Medium Population‡ (750-1499 pupils)	-0.201	0.095	-0.298	-0.392, -0.010		0.039
Large Population‡ (>1500 pupils)	-0.357	0.132	-0.387	-0.623, -0.091		**0.010**§

Note. Significance p<0.05. †School decile (8-10) significantly has a greater total percentage of 'green' items contributing to a school menu. ‡Dummy Variables; reference group small population (<750 pupils). §Correction for multiple comparison, significance p <0.025); Schools with >1500 students significantly have lower proportion of 'green' items than schools with <750 pupils.

3.5 Discussion

This study assessed the food and beverage available in schools against the Ministry of Health Food and Drink Guidance. Of the sample assessed, 3.3% of schools met the recommendation for the provision of at least 75% of 'green' items. While 90% of schools had menus consisting of 'green' items, almost all schools offered 'red' items (96.7%). Of the schools that contained 'red' items, 10.3% had no 'green' items on the menu. On average, the New Zealand school menus in this study comprised 13.5% 'green' items and 32.9% 'amber' items, with the most significant contributor being 'red' items (53.6%). As the study depended on the school toolkit to classify menus without detail, this may have overestimated the quality of school food and beverage menus as items were assigned to the more 'healthier' classification when between ratings.

The quality of food and drink menus within this cohort of schools was a concern as 'red' items were the most significant contributors, suggesting that many menu items may contain highly processed food. We observed that packaged snack foods, confectionary in baking, sugar-sweetened drinks, and combo deals (served with the above items) were large contributors to the proportion of 'red' items. Schools are a prime environment for nutrition initiatives, and selling a high proportion of unhealthy food should be discouraged. Supporting a healthy food environment also contributes to health equity as it helps address food insecurity by ensuring all students have access to nutritious meals, regardless of their socioeconomic status. A recent Australian study using a similar methodology assessed canteen quality in secondary schools and found on average, each school menu was comprised of 50% 'green' items, nearly four times the amount of this study's results (Haynes et al., 2021). Australia has had a recommended national policy since 2008, which has proven beneficial in improving menu quality within schools (Australian Government Department of Health., 2014; Clinton-McHarg et al., 2018; Haynes et al., 2021; Myers et al., 2019; Woods et al., 2014). The National Administration Guidelines (NAGs) in New Zealand previously required each school board of trustees to "promote healthy food and nutrition for all students" (Ministry of Education, 2023b). However, this was merely guidance. Therefore, the menus within this sample were possible of poor quality due to schools not being obliged to provide healthy food and drinks nor have specific guidance on how to create a healthy menu.

We found High decile schools (8-10) had a geometric mean (M_g) of 14.3% 'green' items and were more likely to have a higher proportion of 'green' items on their menu than low to medium

decile schools (1-7; M_g= 8.9%; p=0.028). High decile schools may have a health-conscious environment, with supportive stakeholders (parents, staff, sponsors) and funding contributing to nutrition education and awareness (Ronto et al., 2020). Studies in Australia found that high decile schools had a healthier menu in comparison to low decile schools (Haynes et al., 2021; Yoong et al., 2015). Low-quality menus associated with low school decile may be due to cost or lack of nutrition knowledge (Ronto et al., 2020). There may be concerns about decreased profit and revenue from stocking healthy options as these items may be out of budget for the providers, especially if the perception is that these items will not sell well to students (Drummond & Sheppard, 2011). Limited nutrition knowledge may also influence menu quality if stakeholders and providers lack awareness of the nutritional recommendations for adolescents. For example, stakeholders may encourage juice due to the fruit content, yet the sugar content is high and not recommended within the New Zealand Ministry of Health guidance.

Adolescents living in socioeconomically deprived areas are more likely to experience food insecurity and develop NCDs than those who live in the least socioeconomically deprived areas (Ministry of Health, 2017; Ministry of Health, 2021). Thus, the concern of low-medium decile schools with a low proportion of 'green' items. Schools with a low decile (1-3) may have different needs to achieve a healthy nutrition climate so students can have equitable health outcomes. Future research could include a larger sample of low decile schools, and explore the perceived barriers associated with creating a policy-compliant menu.

We found the number of students attending a school had an impact on menu quality, with smaller schools (<750 students) having a higher proportion of 'green' items (M_g=14.1%) compared to larger schools (exceeding 1500 students) (M_g 6.9%) (p=0.022). This pattern was observed in Australian high schools, where smaller schools were more likely to offer mainly 'green' items than larger schools (Haynes et al., 2021). However, contrary to this, a previous study conducted in Australian primary schools identified larger schools as having a greater capacity to implement healthy canteen initiatives due to having access to more resources (Yoong et al., 2015). It is difficult to come to a definitive conclusion about school size's impact on menu quality. One possible explanation for this discrepancy is that the studies used different methods for evaluating menu quality and had a variation in sample size and demographic characteristics.

Multiple regression analysis confirmed that school decile and population size had a statistically significant effect on the proportion of 'green' items. The model for both 'amber' and 'red' yielded no significant results. The sample size may have caused statistically insignificant effects due to reduced statistical power or increased sampling error. G*Power software (Version 3.1.9.7) was used to calculate an estimated sample size (Faul et al., 2020). A total of 124 menus would be needed to produce an actual power of 0.8 (see Appendix A – Figure 6.1). A larger sample could not be collected for this study as the sample was initially compiled in 2020 as part of the HAL baseline study before the school implemented the food and drink guidance. Using a larger sample typically improves the stability and reliability of the model, and as such, future studies with a larger sample size could further explore these issues.

There was no relationship between the type of food providers and the proportion of 'green' items, possibly due to the large diversity among independent providers. However, the proportion of 'amber' items ($p<0.001$; $\eta^2=0.261$) and 'red' items ($p=0.003$; $\eta^2=0.187$) varied significantly amongst food providers with moderately large effect sizes. The reference group, school providers, comprised approximately 44% of the sample. School providers (39.3%) had a more significant proportion of their menu as 'amber' compared to community providers (19.3%) and in-house providers (25.9%) (p <0.001). School providers (48.2%) also had a significantly lower percentage of 'red' items than in-house providers (64.6%) (p=0.003). These findings suggest that school providers have a more extensive customer base and therefore have the resources and training to provide a relatively healthy menu that is cost-effective. In-house providers (e.g., canteen/tuckshop) who lack the resources, training, and education to develop a nutritious and profitable menu may resort to providing food that is likely to sell but with poor nutritional value (Drummond & Sheppard, 2011; Ronto et al., 2020).

One of this study's objectives was to determine if schools with food policies had a high proportion of 'green' items. One school provided a copy of their policy, and their menu comprised 19.1%, 38.3%, and 42.6% for 'green', 'amber', and 'red' items, respectively. The significance of policies on the outcome of 'green' items could not be determined because of an inadequate sample size. The school with a policy (19.1%) had a higher proportion of 'green' items than the average menu (13.5%), implying an overall better-quality menu than most schools. This may be due to food and drink policies typically having a robust culture around healthy eating (Chote et al., 2022). However, this policy's menu quality fell short of the recommended 'green' items, which aligns with a recent national-level study that revealed school policies in New Zealand remain relatively inadequate and require further strengthening

(D'Souza et al., 2022). Therefore, intermediate, and secondary schools may benefit from the Ministry of Health's food and drink policy as experts designed it to be easily adapted and used by schools (Ministry of Health, 2020). For future research, conducting a partial qualitative assessment to understand schools' menu development process utilising the policy could be beneficial.

The implementation of the Ministry of Health Food and Drink Guidance for schools and encouragement of using the Healthy Food and Drink Toolkit would be a step towards a healthier food environment. However, further support may be needed to achieve health equity as secondary schools face more challenges with healthy food environments and less nutrition promotion than primary schools (Chote et al., 2022; Education Review Office., 2016). A healthy environment should go beyond what food is sold to students and be an integral part of a school system; this includes how nutrition is taught within the school, how teachers role model food, and the use of food in fundraising (Drummond & Sheppard, 2011). Providing appropriate support would require assessing the barriers to promoting a healthful environment (i.e., funding, knowledge, skills, and accessibility to healthful food) (Drummond & Sheppard, 2011; Ronto et al., 2020).

Encouraging schools to work towards adopting the Ministry of Health's Food and Drink Guidance is recommended to encourage healthy food availability in schools. There is potential for a mandatory policy to be successful as it puts responsibility onto the schools to provide healthful options. However, support from a nutrition promotion workforce would be required to assist schools in meeting the requirements for 75% 'green' items.

There were a few limitations within this study. The sample consisted of schools willing to participate, which may not accurately represent the quality of food sold at schools nationwide as participating schools were interested in receiving input and support. Low and medium decile schools were merged as the low decile sample was small.

The overall small sample size in this study is a further limitation and may have affected the statistical power of the analyses and, thus, the validity of the results. The quick menu audit was more time effective; however, due to the lack of detail from schools and low response rate, this may not accurately represent what schools provided to students daily.

3.6 Conclusion

In summary, students' socioeconomic status, access to providers, and school size impacted menu quality within this convenience sample of New Zealand schools. Irrespective of school characteristics, school menus appear to remain mainly unhealthy with minimal ‘green’ items. To the author’s knowledge, this is the first New Zealand-wide study that has attempted to quantify compliance between intermediate and secondary school canteen and government-proposed school food and drink policy guidance. This national-level study has highlighted that New Zealand intermediate and secondary schools have the potential to create a healthier food environment for their students with the implementation of the Ministry of Health Food and Drink Guidance for Schools policy. Due to the low response rate, lack of detail provided in school menus, and the use of the quick menu audit, caution is advised when interpreting the results of this assessment. However, the findings indicate that school menu quality is a complex social issue influenced by systemic issues. Socioeconomic status, access to affordable healthy food, and nutrition education may hinder schools from building a healthy food environment. Addressing these underlying system factors may improve equitable access and availability of healthy food and beverage options within schools.

CHAPTER 4: CONCLUSIONS AND RECOMMENDATIONS

4.1 Summary of findings and main results

This study assessed how food and drink menus align with the Ministry of Health Food and Drink Guidance for Schools (Ministry of Health, 2020). This was a subsection of the longitudinal quasi-experimental, mixed-method study, Healthy Active Learning (HAL), at baseline in 2020. This study assessed the current food environment and explored food availability within intermediate, composite, senior, and secondary schools (years 7-13 schools).

The development of a school toolkit to conduct a quick menu audit helped to provide an overview of the current school food environment in New Zealand. We found that most schools are not meeting the guidance recommendation of at least 75% 'green' items with no 'red' items for sale. Schools were likelier to sell 'red' items than 'green' items, with 'red' items being the most significant contributor to a menu. The mean proportion of 'green', 'amber' and 'red' items were 13.5%, 32.9%, and 53.6%, respectively. School regions could not be assessed due to the limited sample collected in Canterbury and Gisborne.

School decile and population size impacted the contribution of 'green' items, where high decile schools (8-10) were more likely to have an increased contribution of 'green' items compared to low to medium deciles (1-7). Schools with less than 750 students were likelier to have a menu with a high contribution of 'green' items than schools with an excess of 1500 students. Urban area, NZ deprivation score and school year group had no impact on the outcome of 'green' items. No relationship was observed between the proportion of 'amber' or 'red' items with school year group, population size, deprivation score, school decile, and urban area. This was potentially due to the sample size being too small to detect a meaningful difference.

Menus were divided into the corresponding food providers rather than schools, and 71 menus were assessed. The reference group for multiple comparisons was school providers. The findings revealed that school providers had more 'amber' items on their menus than in-house providers and community providers. School providers also had a significantly lower proportion of 'red' items on their menu than in-house providers.

One of the study's objectives was to look at the policies that schools have provided and assess if schools with policies have a more significant proportion of 'green' items. A conclusion could not be formed as only one policy was submitted. The school with a policy did have a slightly

higher percentage of ‘green’ items than the mean; however, this still contributed to less than 20% of the menu.

The majority of schools had a reasonably high proportion of ‘red’ items, irrespective of food providers and school characteristics. The findings further support the need for a national policy designed by experts to help guide schools.

4.2 Strengths

The main strength of this study included being one of the first nationwide studies to assess the food available within schools with adolescents using quantitative measures. This is important as nutrition initiatives have previously focused on primary schools, with efforts to improve food availability among primary-aged students in low-decile schools (Marsh et al., 2018; Rush et al., 2014; Watts, 2018). Intermediate and secondary school-aged students appear to have little research or initiatives focused on their school food environment, despite being prone to new or different health problems and lifestyle changes (Patton et al., 2016). Previous studies in secondary schools have focused on providing an overview of barriers to building a supportive nutrition climate and the assessment of food and drink policies (Chote et al., 2022; D'Souza et al., 2022). The food available for purchase or food advertisements surrounding secondary schools has also been researched extensively (Clark et al., 2014; Day et al., 2015; Huang et al., 2020; Maher et al., 2005; Pearce et al., 2007; Vandevijvere et al., 2018; Vandevijvere et al., 2016). This explorative study identified factors that may need attention when designing and implementing an initiative to address healthy food availability in schools.

The methodology of conducting a quick menu audit using a school toolkit helped assess menus cost-effectively and timelessly. Reviewing and adopting the successful methods used in Australian studies has contributed to building a more robust methodology (Haynes et al., 2021; Reilly et al., 2016; Wyse et al., 2017). The developed toolkit helped classify menu items in this baseline study. This included an assumption list developed by four researchers (three nutritionists and one dietitian). The assumption list included a set of rules to help classify menu items without detail to encourage validity within the method. Assumptions were based on a group consensus on categorising ingredients/menu items when the interpretation of the guidance tool was unclear. The health star rating database, the recipe database, and the classification of the chain providers database were also beneficial in helping classify menus.

A school toolkit was created to encourage reliability amongst researchers to reduce the possibility of human error when assessing menus with a lack of detail. Furthermore, researchers jointly coded a handful of menus at the beginning of the study to ensure the four researchers had similar interpretations of menu items before assessing their sample independently. This process increased the inter-rater reliability of the study. The four researchers had regular meetings within the first month of classifying menus to review any questions and strengthen the school toolkit.

A further strength of the study design was the inclusion of the following school characteristics: school decile, population size, school year groups, deprivation score, urban area, and food providers. It seemed reasonable to assess if these factors impacted New Zealand schools' menu quality because significant results were also found in similar Australian studies (Haynes et al., 2021; Yoong et al., 2015). Without the inclusion of these variables, it would be unclear why most schools within this study had poor menu quality. Using school characteristics helped inform what schools may struggle with implementing the policy (i.e., low to medium decile).

4.3 Limitations

One significant limitation of this study was the small sample size of 60 schools (intermediate, composite, secondary, and senior schools), representing 8% of the nation's total schools within these categories. School characteristics were organised into categories. However, some categories had to be merged (i.e., decile); otherwise, statistical testing could not occur (i.e., region). This limited the ability to conduct a comprehensive baseline overview. Including a larger sample of low decile schools could have helped to distinguish if there was a difference in menu quality between low, medium, and high deciles.

A statistical power calculation was completed to determine the sample size. However, as the data was collected in 2020, the researcher was limited to the sample already collected as this was a subset of a larger study. A G*Power (Version 3.1.9.7) calculation was conducted to estimate an ideal sample size for a mixed-design longitudinal study (Faul et al., 2020). This calculation considered three-time points where menus will be assessed, and the highest level of categories within the variables tested is four (i.e., school type). Considering this, the ideal sample size is estimated to be around 124 schools, double this study's sample size. The limitation of having a lack of statistical power may have resulted in failing to detect a meaningful difference leading to inaccurate results. There was also an increased risk of sampling error and unreliable estimates of parameters. Overall, the study has limited

generalisability to the New Zealand school population, restricting the ability to draw meaningful conclusions.

A third limitation was the possibility of a lack of protocol adherence during the data collection phase. In some instances, schools within the same region had the same menu. It was challenging to identify if these schools had the same provider or if there was an error with the organisation of menus in the corresponding school's folder. It was assumed that the schools contracted to similar providers resulted in the same menu.

This study focused on assessing menus provided by schools. Most of the time, the menu did not include a breakdown of the ingredients used within each product. This resulted in limited detail, requiring the researchers to design and use a toolkit to help classify menus. The researchers could not reach out to schools for further detail, especially as the menus provided were from 2020 and the analysis was conducted in 2022. The author of this study reached out to multiple school providers for their menu breakdown as school providers contracted out to a large portion of schools. Only one provider was willing to provide a breakdown of their ingredients which was used to help with classification. All other menus were classified based on the information supplied and relied heavily on the school toolkit developed by the four researchers.

This study focused on the school food and drink menus, and assessing these menus were limited to interpreting a snapshot perspective of the school food environment. Although menus were evaluated and classified, other factors were not assessed in this study which could have helped to provide a better insight into the food environment. These factors included: the cost of food, student purchase history, and frequency of how often menu items are for sale (i.e., daily, weekly). This study assessed what the schools provided but did not elaborate on the costs of 'green' items versus 'red' items. In some instances, schools with predominantly 'red' items stated that their menu was an occasional option, indicating that it was viewed as more of a treat than a daily option. There is room to explore these additional factors in future studies as these can influence a student's choice.

4.4 Use of findings

This study's findings helped provide an overview of the school food environment with adolescents. The school food environment, especially in secondary schools, has previously been an area avoided, creating a gap in the literature. Unfortunately, intermediate, and

secondary school students may miss out on an opportunity to improve their dietary habits through a supportive school nutrition climate. These results helped indicate that socioeconomic status and population size are associated with school menu quality. This study has identified an opportunity for future research to explore the association of these school characteristics with funding, time, education, or available resources, which could lead to interventions focused on improving menu quality.

Nutrition-influenced obesity can result in non-communicable diseases, comorbidities, and mortality in adulthood. Providing children and young adults with a supportive environment for healthy options is important to help provide an environment that supports growth, development, and overall well-being. As reported in chapter three, school menus currently consist primarily of 'red' items, typically high-saturated fat, sugar, and salt. This research is beneficial and will help provide evidence to support the need for creating targeted interventions that help with promoting healthy food environments within schools.

Sport NZ and the Ministry of Health could use these results to support the need for policy implementation. However, they may also be used for future HAL initiative evaluation. The findings of this baseline study may be used to assess the effectiveness of implementing the food and drink policy under the guidance of HAL. Future evaluation of the initiative's long-term success can also use this baseline study to evaluate the progress over time. The results from this study have identified some characteristics that may interfere with schools successfully adapting their menu to meet the guidance recommendation of menus consisting of 75% 'green' items. Therefore, the findings of this study may help appeal for additional funding for extra resources and training to help low to medium decile schools, schools with large populations, or schools with in-house catering adapt their menu to align with the guidance.

This study included classifying food providers' menus (i.e., Libelle Group, Go Deli, and Deejays). The classification of their menu may be used in their company's evaluation to help identify areas of improvement. This includes identifying the ingredients and menu items that need adaptation to reduce the proportion of 'red' items and increase the proportion of 'green' items (i.e., remove confectionary or flavoured drinks).

Overall, the findings of this study advocate for change as the food available to students was mostly unhealthy. This pushes for a greater need for robust nutrition standards within adolescents' school environments. When advocating for change within schools, the results of

this study can be used to educate the stakeholders (staff, parents, and students) on the importance of health and wellness in schools.

4.5 Future directions and recommendations

Conducting a baseline assessment that explored the current food environment has provided an overview of the current situation in schools with adolescents. As part of the HAL initiative, schools will have the opportunity to implement the policy used within this study in their schools. Future studies should be conducted to review the policy implementation's effectiveness and its long-term effects' success.

For future studies, incorporating qualitative aspects into future evaluations will be beneficial to identify the challenges that schools face when adapting the policy to their current food environment. A qualitative subsection of this study will help gain feedback on the Ministry of Health Food and Drink Guidance for Schools' clarity and address any barriers impacting schools from adapting their food environment to align with the guidance tool. This will help to identify where additional support may be needed to ensure all schools find implementing the policy achievable.

Future research could look into other factors influencing student choices, including the cost of food items and student purchase history. Further exploring these factors will help future research identify additional factors affecting the success of creating a healthy food and drink environment within schools besides school characteristics. One of the questions sent to schools asked how often their menu is available to students. It would be interesting to explore this in the future, mainly the frequency of how often ‘red’ items are for sale compared to ‘green’ items (i.e., daily, weekly). This will be useful for guiding modifications to the Ministry of Health's food and drink policy to help create a healthier nutritional environment for students.

Reassessing the school characteristics and food providers with a larger sample size (i.e., 124 schools) may help provide more meaningful findings. A larger sample size will mean that the school characteristics can be categorised as planned and not merged. School regions could also be assessed as food accessibility, and availability vary throughout New Zealand. The expansion of HAL in phase two, and now that COVID-19 has settled down, may mean that reaching out to more schools is more accessible to researchers.

Finally, a future direction could also incorporate a cultural aspect into this study. New Zealand is bicultural, and health inequity persists among Māori and Pasifika communities (Ministry of

Health, 2021). Including a section that assesses parents, students, and staff's thoughts on whether the food meets cultural preferences could lead to a school food environment that supports well-being among all students, as ‘healthy’ eating looks different in each culture. A school menu may meet the guidance recommendation of 75% ‘green’ items; however, it is also essential to acknowledge the cultural diversity in schools and provide food that recognises students’ cultural preferences.

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APPENDICES

Appendix A: Supplementary results

Distribution of sample assessed

Table 6.1

Distribution of sample between sub-categories and represented as a frequency and percentage

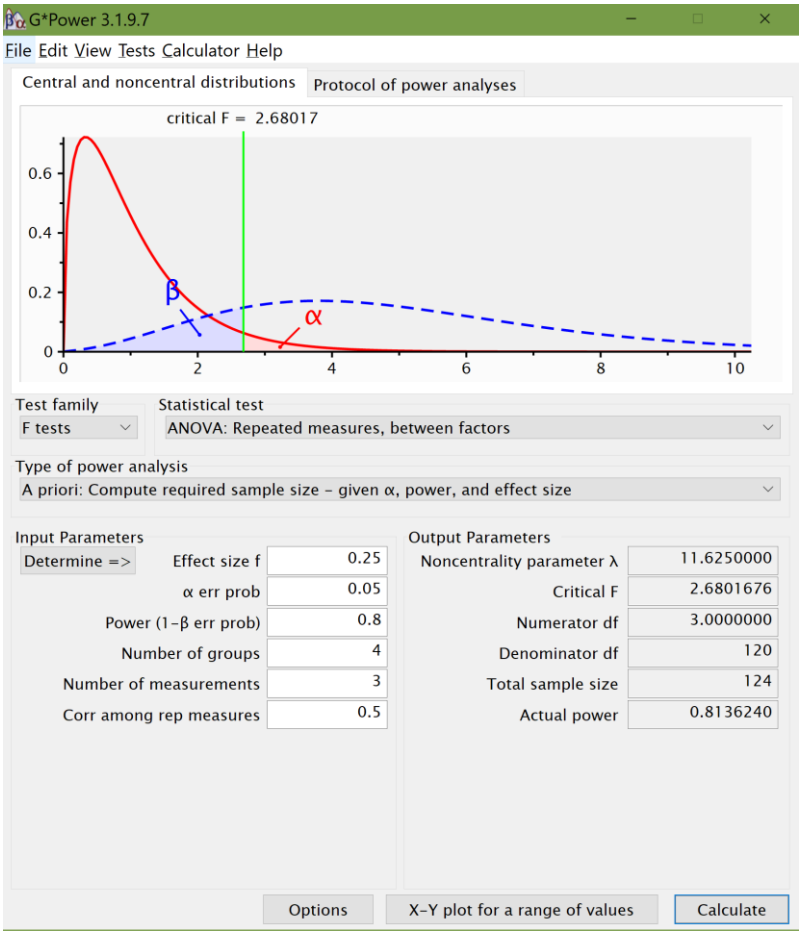
Variable	Sub-category	Schools *N (%)*	Total menus *N*
Region	Auckland	35 (58.3%)	60
	Bay of Plenty	8 (13.3%)	
	Christchurch	1 (1.7%)	
	Gisborne	1 (1.7%)	
	Northland	10 (16.7%)	
	Wellington	5 (8.3%)	
School Decile	Low to medium decile 1-7[†]	36 (62.1%)	58[‡]
	High decile 8-10	22 (37.9%)	
New Zealand Deprivation Score (2018)	Least deprived 1-3	18 (30%)	60
	Medium deprived 4-7	26 (43.3%)	
	Most deprived 8-10	16 (26.7%)	
Urban Area	Major and secondary urban area	49 (81.7%)	60
	Minor and rural area	11 (18.3%)	
School Year Group	Composite school (years 0-13)	7 (11.7%)	60
	Intermediate school (years 7-8)	12 (20%)	
	Secondary school (years 9-13)	25 (41.7%)	
	Senior school (year 7-13)	16 (26.7%)	
School Population Size	1-749 students	26 (43.3%)	60
	750-1499 students	23 (38.3%)	
	>1500 students	11 (18.3%)	
Food Provider	Community provider	12 (16.9%)	71
	Chain provider	11 (15.5%)	
	In-house provider	17 (28.3%)	
	School provider	31 (43.7%)	

Note. The table includes a breakdown of the sample that was not already explained in the manuscript. [†] Low decile (n= 4), medium decile (n= 32). [‡]Of the schools that provided a copy of their food and drink menu, two schools were not included in assessing decile as decile could not be found online.

G*Power calculation

Figure 6.1

Estimated Sample Size



Appendix B: Supplementary methods

Questionnaire

Sent to schools for menu details during data collection phase.

1. What type of bread do you use? (e.g. white, wholemeal, wheatmeal, multigrain, wholegrain) If available, please give the brand.

2. What type of milk do you use most within the lunch service? (e.g. light blue top, green top, yellow top, dark blue top, primo, calciyum).

3. Do you use low fat or reduced-fat dairy products (e.g. reduced or low-fat yoghurt, reduced fat cheese such as Edam)

4. Do you sell any deep-fried foods?

5. If you sell sushi, does this include deep-fried ingredients?

6. Do you sell confectionery (e.g. boiled sweets, toffees and caramels, fudge, fondants, gums (including sugar-free gums), pastilles and jellies, chocolate, fruit leathers, yoghurt-covered items, candied fruits and nuts, and compound chocolate)?

7. Do you add vegetables to any of the following? (please specify: burgers/wraps/hot foods/sandwiches/sushi)

8. Do you sell packaged snack foods? What types? (list or take photos)

9. Is your lunch order system available daily?

School Toolkit

All information was stored in Microsoft Excel, including a detailed breakdown of how each item was categorised (i.e., ingredients and exact Health Star Rating). A summary of the school toolkit can be found below.

Assumption list

Table 6.2

Assumption List for Intermediate and Secondary Schools.

N	Assumption	Reasoning
Vegetables		
1	Where the percentage of vegetables in a vegetable product is unavailable, the percentage is equal to the most similarly labelled product on the countdown website with this information available.	Ingredient quantities are likely to be similar. Countdown was used as it is a common supermarket that provides product details online. This supermarket will be used for other justifications (consistency).
2	Mixed vegetables, roasted vegetables, vegetable platters, and salad in burgers, wraps, and sandwiches are equivalent to three vegetables (i.e., three ingredients) when ingredients are not stated.	Based on the commonality observed in supermarket frozen vegetable products and general recipes.
3	All creamed corn has a HSR ≥ 3.5.	based on the HSR database average.
4	Potato wedges and fries, oven baked from frozen, have a HSR ≥ 3.5.	based on the HSR database average.
5	All potato wedges, fries, and kumara fries are oven baked unless the questionnaire specifies deep-fried.	Most school menus that responded to the questionnaire stated that their fries were not deep-fried. Food and drink menus commonly had 'oven-baked fries' listed.
6	Vegetables are defined as a culinary form.	The culinary form is defined as 'of or relating to the kitchen or cooking'. This is relevant to the assessment as the menu comprises culinary techniques. This would allow the produce tomato to be classed as a vegetable.
Fruit		
7	Where the percentage of fruit in a vegetable product is unavailable, the percentage is equal to the most similarly labelled product on the countdown website with this information available.	Ingredient quantities are likely to be similar. Countdown was used as it is a common supermarket that provides product details online.
8	Canned fruit, when used as an ingredient in meals, is in natural juice that has been drained.	This assumes that draining the liquid maintains the texture and palatability of the meal.

N	Assumption	Reasoning
9	Fruit salads and fruit platter contain three fruits when ingredients are not stated.	This is to maintain consistency with assumption #2.
Breads and Crackers		
10	All bread (including pizza bases, pitas and wraps) is plain (white) unless stated otherwise.	White bread generally costs less (as per Countdown site).
11	Plain bread is defined as containing less than 25% wholemeal flour/wholegrains and no dried fruit.	Based off average bread ingredients as per Countdown website.
12	Plain, wholemeal, wholegrain, wholewheat, wheatmeal and multigrain breads are served with a standard spread.	Assumed this would be the common amount as foodservice providers likely budget a standard spread per serve.
13	Fruit bread is served with margarine.	Assume bread would have a spread.
14	All wholemeal, wholegrain, wholewheat and wheatmeal breads have ≥ 5g fibre and < 450mg sodium per 100g.	As per Foodworks analysis (27/04/22).
15	All wholemeal, wholegrain, wholewheat, and wheatmeal wraps are amber.	Based on the average Fibre and Sodium content.
16	White pita bread is amber for schools.	Based on Foodworks analysis (27/04/22).
17	Multigrain bread and crackers without a brand/recipe stated contain the following whole grains: kibbled rye and wheat (no pumpkin or sunflower seeds).	Based on average ingredients used among brands.
18	Pastry has a HSR of ≤ 3.5 (unless stated to be filo pastry which has a HSR of ≥ 3.5).	Based on HSR database average.
19	All fruit toast meets the amber category.	Based on average fruit toast nutritional breakdown.
Breakfast Cereals		
20	Weetabix and Porridge have a HSR ≥ 3.5 and ≤ 15g sugar per 100g.	Based on HSR database average. Based on Foodworks analysis (27/04/22)
21	All muesli (including bircher) has HSR of ≥ 3.5.	Based on HSR database average.
22	All muesli (including bircher) contains dried fruit and/or nuts and/or seeds.	Most muesli contained these items on the Countdown website.
23	Are served with milk unless otherwise stated.	Assume cereals would be served with milk as that is the classic way of preparing cereal.
Other Grains		
24	Rice is white unless otherwise stated.	Versatile and more affordable option.
25	Grains are plain and unflavoured unless otherwise stated.	Assume standard version would be used as it is more versatile and that menus would state otherwise.
26	All noodles (I.e, chicken or beef) are classed as flavoured noodles which is red unless ingredient list is specified.	Consensus based on interpretation of the guidance – assume '2 minute' style noodles.
Milk		

N	Assumption	Reasoning
27	Milk is full fat (dark blue top) and unsweetened unless otherwise stated.	Standard version used by foodservice companies. Assume menus would state if a lite version were used.
28	Plant milks (soy, rice, almond and oat) are fortified with added calcium and B12.	Based on commonly used brands in New Zealand.
29	Coconut milk without a brand stated is unfortified.	Based on commonly used brands in New Zealand.
Milk Products		
30	Are full fat unless stated otherwise, except for yoghurt (excluding Greek) which is assumed to be reduced fat.	Assume standard products were used which are typically the full-fat version.
31	Are unflavoured unless stated otherwise.	The more versatile option.
32	All yoghurts (reduced fat and regular) have a HSR ≥ 3.5.	Based on HSR database average.
33	School aged+ children are served 1 pottle of yoghurt (125g) where not otherwise stated.	Based on average pottle size – information received from Countdown website.
34	All custard products have a HSR ≥ 3.5.	Based on HSR database average.
35	Cheese is bakery blend where cheese type is not stated (category amber not considering portion sizes).	Consensus between researchers with external professional input who had experience in assessing menu quality.
36	Cheese is 'pizza blend grated' where cheese type is not stated (category amber not considering portion sizes).	Consensus between researchers with external professional input who had experience in assessing menu quality.
37	Feta is the 'creamy' not 'crumbly' type where not otherwise stated.	Consensus between researchers of what would be commonly used.
38	The amount of cheese in sandwiches and meals does not exceed 40 g for schools.	Consensus between researchers with external professional input who had experience in assessing menu quality.
39	All ice cream products have a HSR < 3.5.	Based on HSR database average.
40	All brie and camembert have a HSR <3.5 based on HSR database.	Based on HSR database average.
Fish and Seafood		
41	Tuna is canned and unflavoured unless otherwise stated.	Plain tuna would commonly be used in meals as its more versatile.
42	All frozen fish (including crumbed) has a HSR ≥ 3.5.	Based on HSR database average.
43	All canned fish (including flavoured) has a HSR ≥ 3.5.	Based on HSR database average.
Poultry (chicken and turkey)		
44	Fresh or frozen poultry with the fat removed is used in meals/sandwiches unless otherwise stated.	Gives the opportunity for meals to be classed as ‘green’, especially as poultry tends to be a good source of protein and can assume the skin would not be kept on.
45	All fresh and frozen poultry (including chicken nuggets and schnitzel) has a HSR ≥ 3.5.	Based on HSR database average.

N	Assumption	Reasoning
46	All smoked, shredded, and roasted poultry has a HSR ≥ 3.5.	Based on HSR database average.
47	All luncheon has a HSR < 3.5.	Based on HSR database average.
Red Meat (beef, lamb, pork)		
48	The fat has not been removed from meat if item is from a chain or community provider (otherwise it has).	Consensus that these providers would not usually remove the fat for the public.
49	The fat has not been drained from mince if item is from a chain or community provider (otherwise it has).	Assume providers would not drain the fat as it is not a common cooking method.
50	All processed/dried meat products meet amber based on nutrition assessment of Jack Links 600kj/packet (50g) or <300kj/stick (12g) and Biltong 550kJ *.	Based on HSR database average.
51	All shaved ham & pork has a HSR < 3.5.	Based on HSR database average.
52	All pork ribblet has a HSR < 3.5.	Based on HSR database average.
53	All meatballs have a HSR of < 3.5.	Based on HSR database average.
54	All burger patties have a HSR of < 3.5.	Based on HSR database average.
55	Red meat schnitzel has a HSR ≥ 3.5.	Based on HSR database average.
56	All salami and bacon products have 'visible fat'.	Due to high fat content.
57	The average portion size of red meat in a school meal is ≤ 120g.	Consensus between researchers with external professional input who had experience in assessing menu quality.
58	The average portion size of red meat in a school sandwich is ≤ 50g.	Consensus between researchers with external professional input who had experience in assessing menu quality.
Eggs		
59	Eggs prepared any style (scrambled, poached, fried, boiled) are green.	Based on guidance interpretation.
Mixed Meals		
60	Additional items including Salt, Stock, Raising agents, Herbs, Spices, Zest, Cornflour, Vinegar are not counted as ingredients in mixed meals.	Items do not add much nutrition to meal and unlikely for menus to provide that much detail.
61	Salads are served without dressing in ELS (exception of coleslaw, assumed to be made up with mayonnaise).	
62	Burgers contain 1 x protein, 1 x condiment, 1 x plain bun, 1 x low-fat cheese, 3 x vegetable items.	General burger recipe.
63	Nachos are not served with sour cream unless specified by the ingredient list or photo of meal. If sour cream is an add on, then list it as an 'extra'.	Menus typically stated if the nachos had sour cream or listed it as an extra. Made a consensus that this would relate to all menus unless otherwise stated.

N	**Assumption**	**Reasoning**
64	Nachos contain corn chips unless otherwise stated.	Based on classic nacho recipe.
65	Assume 'lunchbox', 'munchbox' are 'Red'.	Based on menus that provided a breakdown of what was included in a combo deal. Flavoured drinks and snack food was commonly added which would make the item an automatic 'Red'.
66	All Salads Consist of 4 x vegetable, 1 protein, 1x dressing.	Fair to assume salads would contain 1 x extra vegetable than mixed vegetables. Allows the opportunity for salad to be classed 'green' as dressings are 'amber' items.
67	Assume the protein used in salads are classed as 'green' unless otherwise stated.	Salads are generally a good lunch option that is well-balanced. There is potential for more vegetables to be included and therefore, assuming the protein 'green' will change the classification of 'amber' to 'green' as this should be an item commonly seen on menus.
68	All burgers are classed as 'amber' if the ingredient list is not specified, assume protein does not exceed allowed 'mixed meal' quantity.	Fair to assume in-between classification without detail provided.
69	Pizzas are likely to be plain with no vegetables except Tomato, which is expensive. Therefore, unlikely pizza has vegetables unless specified. Assume no vegetables.	Pizzas do not commonly have vegetables on them except for the vegetable product 'tomato sauce'. Fair to assume no vegetables as the pizzas are made for children and vegetables are expensive.
70	Assume all soup are 'amber' if no details are provided.	Soup ranges from red (cream base) to green based upon recipe database. Assume all soup are amber as the cream content is probably minimal and tend to be on the healthier side of meals, containing vegetable.
71	If curry is not specified, class as 'amber'. If the type of curry is listed, then base classification off the recipe database or the ingredients the provider lists.	Curry can range in classification depending on the usage of cream, or if the coconut milk use is 'lite'. This is based off a 'Thai green curry', giving benefit of the doubt that vegetables are used and no 'red' ingredients.
72	Assume all dumplings are 'amber' unless the protein/ingredient has been stated.	This is the classification inbetween chicken dumplings and pork dumplings.
Sandwiches and Wraps		
73	Contain a single serving of vegetable oil spread unless another spread/sauce is stated (except burgers, which contain a sauce instead).	Fair to assume sandwiches would contain a spread.

N	Assumption	Reasoning
74	Contain three vegetables if made by the school/ELS and two vegetables if made by children.	Aligns with the above statement of 'three vegetables', assumption #2.
75	Sandwiches are all amber if the ingredients are not specified (i.e., choose your own fillings).	Fair consideration, cannot assume that the protein/bread would be all 'green'.
76	Toasted sandwiches have no vegetable unless the ingredients are specified.	Based off common toasted sandwich recipe and based on photos provided on school provider menus (i.e., Go Deli).
Sushi		
77	Sushi includes sushi rolls and onigiri.	Sushi was not defined and therefore, consensus that sushi includes both rolls and onigiri as similar ingredients.
78	Katsu/crumbed items are deep fried.	Based off local sushi providers recipes.
79	Green sushi is made of mostly green ingredients, all other sushi is amber (i.e., processed meat, cream cheese). Sushi containing deep-fried products is red.	Fair consideration instead of categorising all sushi as 'red' as the quantity of processed meat and cream cheese would not be large. Deep-fried is 'red' as that aligns with the deep-fried food group within the guidance.
80	Teriyaki chicken on rice is not served with vegetables unless the ingredient list or an image states otherwise.	Based off local sushi providers recipes.
Fats, oils, and spread		
81	Vegetable oil has been used as an ingredient in mixed meals except for baked or air fried meals.	Assume vegetable oil is used and quantity falls into a standard serve so a meal is not automatically classed as 'red'. This seemed a fair consideration when menu have not provided detail.
82	≤ 10g of spread is used in sandwiches and meals.	
83	Spreads are vegetable oil based unless stated otherwise.	
Sauces and Dressings		
84	Are not reduced fat, salt or sugar unless stated otherwise.	Standard form of a sauce/dressing is commonly used and would assume a menu would state if it's the reduced fat form.
85	Are served on the side (exception: chains e.g. pita pit and subway).	To be classed as amber, product should be served on the side. This seemed a fair consideration.
86	Include gravy.	Gravy was best suited to this category.
Sweet Condiments		
87	Are served in portions less than ≤ 1 tablespoon (15g).	Assumed a standard serve
88	Include honey and sugar.	Both add flavour to food and are sweet
Packaged Snack Food		
89	HSR and kJ per packet content are as defined by the packaged snack food database.	This database includes the HSR, and Kj per packet for common items found on Countdown website. The average

N	Assumption	Reasoning
		classification for each category was calculated. Referring to this database will increase consistency.
90	If brand name is not stated, the product falls into the average category for that snack item in the snack foods database.	This represents the average classification of an item, which would be likely.
Confectionary		
91	Includes jelly.	Jelly falls under confectionary due to its high sugar content.
Baked Items		
92	Portion sizes of baked items are as defined by the portion size database unless portion size is provided.	Based on Food Works software average portion sizes – refer to database for consistency when categorising menu items.
93	Wholemeal flour and wholegrains are not contained in baked items unless stated otherwise.	Common baking method is to use standard or self-raising and not wholemeal.
94	Fruit or vegetables are not contained in baked items unless stated otherwise.	Based on common baking recipes.
95	The following baked items contain icing: buns, cakes, cupcakes, doughnuts, Afghan cookies, slices (exception: oat based slice/muesli slice), lamingtons.	Based on common baking recipes.
96	Family sized' pies baked inhouse with a protein source and vegetables are treated as mixed meal instead of baked item. These are assumed to be made with pastry unless stated to be Potato top, Shepherds, Cottage or Fish pie.	Based on menus differentiating when a pie is not the typical bakery style pie (i.e., mince and cheese).
97	All muesli bars and slices contain either dried fruit and/or whole nuts or seeds and/or are hard to chew.	Most muesli bars contained these items on the Countdown website.
98	All savoury scones contain at least one vegetable.	Based off popular recipes from google.
99	All bliss balls contain over 30g of dried fruit.	Assessed average dried fruit contribution on popular bliss ball brands from Countdown.
100	Anzac biscuits contain coconut which is a fruit.	Based off common recipes online.
101	Slices, cakes, and cupcakes have confectionary or no fruit unless otherwise specified.	Based off common recipes online.
102	Samosas are deep fried.	Based off the common cooking process.

Abbreviations. Health Star Rating (HSR), Kilojoules (Kj).

Health Star Rating database

Table 6.3

Category of each packaged product based on the Health Star Rating and/or sugar and/or Kilojoules per packet.

Food Item	Brand	Rating	Justification	Guidelines
Plain Rice Cracker	No Brand	Red	Average HSR of food group	*"Breads and Crackers'" Amber: Refined crackers/crispbread w/ HSR ≥3.5*
	Countdown	Red		
	Fantastic	Red		
	Peckish Thins	Red		
Flavoured Rice Cracker	No Brand	Red	Average HSR of food group	*"Breads and Crackers'" Amber: Refined crackers/crispbread w/ HSR ≥3.5*
	Ceres Organic	Amber		
	Peckish Thins	Red		
Brown Rice Cracker	No Brand	Green	Average HSR of food group	*"Breads and Crackers'" Green: Wholegrain/wholemeal w/ HSR ≥3.5*
	Ceres Organic	Green		
	Countdown	Green		
Whole Grain Cracker	No Brand	Green	Average HSR of food group	*"Breads and Crackers'" Green: Wholegrain/wholemeal w/ HSR ≥3.5*
	Arnotts: Salada	Red		
	Arnotts: Vita Weat 9 Grain	Green		
	Arnotts: Vita Weat Original	Green		
	Arnotts: Vita Weat Sesame	Green		
	Huntly & Palmers: 8 Grains	Green		
	Huntly & Palmers: Sesameal	Red		
	Huntly & Palmers: Sesameal 5 Grain	Red		
	Huntly & Palmers: Sprouted Rye	Green		
Thin & light crackers	No Brand	Green	Average HSR of food group	"Breads and Crackers" Amber: Refined crackers/crispbread w/ HSR ≥3.5
	Arnotts: Cruskits Corn	Red		
	Arnotts: Cruskits Original	Green		
	Ceres Organics: Brown Rice Cakes Original	Green		
	Huntly & Palmers: Litebread Mixed Grain	Red		
	Huntly & Palmers: Litebread Original	Amber		
	Real Foods: Corn Thins	Green		

Food Item	Brand	Rating	Justification	Guidelines
	Sunrice: Quinoa Thin Rice Cake	Green		
Other Crackers	No Brand	Red	Average HSR of food group	*"Breads and Crackers" Amber: Refined crackers/crispbread w/ HSR ≥3.5*
	Countdown: Garlic Crackers	Red		
	Countdown: Plain Water	Red		
	Griffins: Meal Mates Original	Red		
	Griffins: Snax Original	Red		
	Huntly & Palmers: Cream Cracker	Red		
	Huntly & Palmers: Somerset	Red		
	Nairns: Scottish Oat Cakes	Red		
	Ritz	Red		
	Rutherford & Meyer: Rice Wafer Cracker	Red		
Croutons/Breadsticks	No Brand	Red	Average HSR of food group	*"Bread and Crackers" Amber: Refined crackers/crispbread w/ HSR ≥3.5*
	Grissini: Bread Sticks	Red		
	Hansells: Bread Croutons Plain	Red		
	Hansells: Soup &Salad Crouton Herb	Red		
Bread Products	No Brand	Amber	Average HSR of food group	*"Breads and Crackers" Green: Other bread products w/ <5 g fibre and ≥ 450 mg sodium/100g*
	Golden Bakery: Crumpets	Amber		
	Quality bakers: Muffin Splits	Amber		
	Tip Top: Oatilicious	Amber		
	United: Bao Steamed Buns	Amber		
Fruit Bread	No Brand	Amber	Average HSR of food group	*"Breads and Crackers" Green: Other bread products w/ <5 g fibre and ≥ 450 mg sodium/100g*
	Vogels	Amber		
	Tip Top	Amber		
	Burgen	Amber		
	Quality bakers	Amber		
Fruit Products	Fruit Hitz	Amber	Average HSR of food group	*"Fruit" Amber: Fruit products with an HSR of ≥ 3.5*
	Countdown Peach cups (in Juice)	Amber		
	Fruit Crush Ups	Amber		
	Pure NZ Apple Chps	Amber		
	Annies Fruit Bars	Amber		
	Watties Fruit Squirtz	Amber		

Food Item	Brand	Rating	Justification	Guidelines
Pastry	No Brand	Amber	Average HSR of food group	*"Breads and Crackers" Green: Other bread products w/ <5 g fibre and ≥ 450 mg sodium/100g*
	Edmonds: Flaky Puff Pastry	Amber		
	Edmonds: Savory Short Pastry	Amber		
	Timos: Filo Pastry	Green		
Packaged iceblocks / popsicle	No Brand	Red	Average HSR of food group	*"Packaged Snack Foods" Amber: HSR ≥ 3.5 AND kJ ≤ 800*
	Juicies (assorted flavour)	Amber		
	Kiwi Crushies: Wildberry	Amber		
	Twisted: Pink lemon twist plant based iceblock	Amber		
	Streets: Calipo	Red		
	Streets: Cyclone	Red		
	Tiptop: Fruju pineapple crush iceblock	Red		
	Tiptop: Lemonade iceblock	Red		
Packaged Snack Food	No Brand	Red	Average HSR of food group	*"Packaged Snack Foods" Amber: HSR ≥ 3.5 AND kJ ≤ 800*
	Healtheries:Potato Stix Roast	Red		
	Healtheries: Rice Wheels Sour Cream & Chives	Red		
	Healtheries: Oven baked Twirls	Red		
	Harvest Snaps: Pea Snacks Original Salted	Red		
	Pop'n'Good: Light and buttery popcorn 25g	Red		
	NZ Kettle Korn: Sweet and Salted Popcorn	Red		
	Sweet as Popcorn: Sea Salt	Amber		
	NZ Kettle Korn: Sea Salt Popcorn	Amber		
	Countdown: Salted pretzel twists	Red		
	Le Snak: Cracks N Dip Cheese	Red		
	Frooze balls: Snack Balls Fugetastic	Red		

Food Item	Brand	Rating	Justification	Guidelines
	Tom & Luke: Snackaballs Peanut Butter	Red		
	Countdown: Fruit salad in juice cup	Amber		
	Countdown: Peaches in juice cup	Amber		
	Countdown: Jelly fruit cup	Red		
	Pams: Jelly fruit cup	Red		
	Mexicano Corn Chips: Unflavoured	Red		
	Mexicano Corn Chips: Flavoured	Red		
	Go nuts: Corn chips Tasy Cheese/salsa	Amber		
	Go nuts: Corn chips all flavour 150g packet	Red		
	Doritos: Cheese supreme 45g	Red		
	Countdown: Cassava vegetable crisps original	Red		
	Arnott's: Shapes 70g (assorted flavour)	Red		
	Sunny Hill: Kumara chips (original) 40g	Red		
	Pringles, single serve, 53g	Red		
	Pita Crisps	Red		
	Mother Earth Fruit Sticks	Amber		
	Fresher: Chip packet (assorted flavour)	Red		
Seaweed	Ceres	Green		
	Nishin: Sweet seaweed	Red		
Muesli Bars	No Brand	Red	Average HSR of food group	*"Baked Items" Amber: Muesli bars w/ a HSR ≥3.5*
	Countdown: Yoghurt Muesli Bars	Amber		
	Countdown: Chewy muesli	Amber		
	Countdown: Nut bar	Red		
	Countdown: Oven baked fruit filled bars	Red		
	Countdown: Oaty Slice Chocolate Chip	Red		
	Fibre one: Muesli bar	Red		
	Flemings: Chewy muesli	Red		

Food Item	Brand	Rating	Justification	Guidelines
	Kellogs: Nutrigrain cereal bar	Red		
	Kellogs: LCM cereal bar	Red		
	Mother Earth: Wellbeing sustain muesli bar	Amber		
	Mother Earth: Baked Oaty Slice	Red		
	Mother Earth: Fruit sticks/vege fruit sticks	Amber		
	Nature Valley: Crunchy oats and honey	Red		
	Nestle: Cereal bar	Red		
	Nice & Natural: Protein nut bar	Red		
	Tasti: Snak logs	Red		
	Tasti: Milkies muffin bar	Amber		
	Tasti: Protein bar muesli bar	Red		
	Tasti: Mega nuts	Red		
	Tasti: Frutsies	Red		
	Tasti: Made Simple muesli bar	Amber		
Muesli	No Brand	Amber	Average HSR of food group	*"Breakfast Cereals" Green: Wholegran cereal and porrige w/ HSR ≥3.5 and ≤15g sugar/100g Amber: HSR ≥3.5*
	Ceres Organics: Blueberry/LSA bircher muesli	Green		
	Ceres Organics: Cacao Almond Macadamia Bircher	Amber		
	Ceres Organics: Original Bircher	Green		
	Chantal organics: Swiss Bircher muesli	Amber		
	Countdown: Natural Muesli	Amber		
	Countdown: Toasted Muesli	Amber		
	Macro organic: Natural Muesli	Green		
	Moore Wilson's: Highland Muesli toasted	Amber		
	Sanitarium: Cluster crisp	Amber		
	Sanitarium: Light n tasty	Amber		

Food Item	Brand	Rating	Justification	Guidelines
Corn Flakes	No Brand	Red	Average HSR of food group	*"Breakfast Cereals" Amber: HSR ≥3.5 Red: Cereals w/ HSR <3.5*
	Countdown: Cornflakes	Amber		
	Hubbards: Cornflakes	Red		
	Kellogs: Cornflakes	Red		
	Pams: Cornflakes	Red		
	Skippys: Cornflakes	Amber		
Rice Pops	No Brand	Red	Average HSR of food group	*"Breakfast Cereals" Red: Cereals w/ HSR <3.5*
	Countdown: Rice pops	Red		
	Hubbards: Rice pops	Red		
	Sanitarium: Ricies	Red		
Cereals	No Brand	Red	Average HSR of food group	*"Breakfast Cereals" Red: Cereals w/ HSR <3.5*
	Kellogs: Coco pops	Red		
	Kellogs: Fruit Loops	Red		
	Kellogs: Nutri Grain	Red		
	Kellogs: Sultana Bran	Red		
	Nestle: Milo cereal	Red		
Fries, Wedges, Hashbrowns	No Brand	Amber	Average HSR of food group	*"Vegetables" Amber: Vegetable products w/ HSR ≥3.5*
	Birds eye: Golden crunch crinkle fries	Amber		
	Birds eye: Seasoned fries	Amber		
	Mccain: Beer batter Fries Steak Cut	Amber		
	Mccain: Beer batter wedges	Amber		
	Mccain: Pub style wedges	Amber		
	Mccain: Shoestring fries	Amber		
	Super oven golden chips	Amber		
	Watties: Original wedges	Amber		
	Watties: Tempura wedges	Amber		
	McCain Hashbrowns Golden	Amber		
	McCain Quick Cook Hashbrowns	Amber		
	Watties Classic Hashbrowns	Amber		
Creamed Corn	No Brand	Amber	Average HSR of food group	*"Vegetables" Amber: Vegetable products w/ HSR ≥3.5*
	Countdown: Creamed corn	Amber		
	Edgell: Creamed corn	Amber		

Food Item	Brand	Rating	Justification	Guidelines
	Watties: Creamed corn	Amber		
Pickled Vegetables	No Brand	Red	Average HSR of food group	*"Vegetables" Amber: Vegetable products w/ HSR ≥3.5*
	Countdown: Sundried tomatos	Red		
	Countdown: Gherkin	Red		
	Delmaine: Olives pitted green	Red		
Yoghurt Individual Pottles/Pouches	No Brand	Green	Average HSR of food group	*"Milk Products" Green: Low/Reduced Fat w/ HSR ≥3.5 Amber: Full fat w/ HSR ≥3.5 Red: HSR <3.5*
	Anchor: Calci yum yoghurt range	Green		
	Anchor: Uno yoghurt range	Green		
	EasiYo: Natural Yoghurt	Amber		
	Fresh n Fruity: Flavoured yoghurt range	Green		
	Meadow Fresh: Creamy berries yoghurt	Green		
	Moogurt: Suckies yoghurt kids range	Green		
	The Collective: 'Suckies' yoghurt range	Green		
	Yoplait: Viguer classic chocolate yoghurt	Red		
Youghut Tubs	No Brand	Green	Average HSR of food group	*"Milk Products" Green: Low/Reduced Fat w/ HSR ≥3.5 Amber: Full fat w/ HSR ≥3.5 Red: HSR <3.5*
	Yoplait: real fruit range	Amber		
	Yoplait: lemon	Green		
	Yoplait: natural sweetened	Green		
Cheese	No Brand	Amber	Assumption '31' Type of cheese blend	*"Milk Products" Green: Low/Reduced Fat w/ HSR ≥3.5 Amber: Full fat w/ HSR ≥3.5 Red: HSR <3.5*
	Countdown: Colby	Amber		
	Countdown: Mild	Amber		
	Mainland: Crumbly Feta	Amber		
	Mainland: Tasty	Red		
	Mainland: Parmasen	Green		
	Mainland: Mozzarella	Green		
	Smart Choice: Cheese cafe bakery blend grated (Bidfood)	Green		
	Ornelle:Camembert	Red		
	Thomas dux: Brie	Red		
	Galaxy: Creamy feta	amber		

Food Item	Brand	Rating	Justification	Guidelines
	Southern Range: Cheese pizza blend grated (Bidfood)	amber		
Custards	No Brand	Amber	Average HSR of food group	*"Milk Products" Green: Low/Reduced Fat w/ HSR ≥3.5 Amber: Full fat w/ HSR ≥3.5 Red: HSR <3.5*
	Meadow Fresh: Custard vanilla	Amber		
	Anchor: Custard Vanilla Thick & Creamy	Amber		
	Alpro: Soya Custard Vanilla Dairy Free	Amber		
Iced Milk Product	No Brand	Red	Average HSR of food group	*"Milk Products" Green: Low/Reduced Fat w/ HSR ≥3.5 Amber: Full fat w/ HSR ≥3.5 Red: HSR <3.5, Frozen desserts.*
	Moosie	Red		
	Twisted: Licks iceblock (Mango)	Red		
	Twisted: Frozen yoghurt minis (chocolate + vanilla)	Amber		
	Twisted: Frozen yoghurt minis (assorted flavour)	Red		
Fish Cakes	No Brand	Green	Average HSR of food group	*"Fish and Other Seadfood" Green: Processed fish with HSR ≥3.5 Amber: HSR of <3.5, ≤ 50 g in sandwiches, rolls, wraps or salads, ≤ 120 g as a meal*
	Leaderbrand: Fish cakes	Green		
	Birdseye: Salmon cakes	Green		
	United: Fish cake hoki hash	Green		
Fish Fingers	No Brand	Green	Average HSR of food group	*"Fish and Other Seadfood" Green: Processed fish with HSR ≥3.5 Amber: HSR of <3.5, ≤ 50 g in sandwiches, rolls, wraps or salads, ≤ 120 g as a meal*
	Sealord: Fish fingers	Green		
	Birdseye: Fish fingers	Green		
	Shore Mariner: Fish fingers	Green		
	Sealord: fish bites classic crumb	Green		
	Captins choice: Fish fingers	Green		
Smoked Fish	No Brand	Green	Average HSR of food group	*"Fish and Other Seadfood" Green: Processed fish with HSR ≥3.5 Amber: HSR of <3.5, ≤ 50 g in sandwiches, rolls, wraps or salads, ≤ 120 g as a meal*
	Sealord: Fish fillet chunk style smoked	Green		
	Countdown: Tuna smoked	Green		
	John West: Tempers Tuna Naturally smoked	Green		

Food Item	Brand	Rating	Justification	Guidelines
	Sealord: Sensations Salmon Smoked Flavour	Green		
	Countdown: Salmon naturally smoked	Green		
	United: Hoki cold smoked	Amber		
	Smokey: Kawahi smoked	Green		
Smoked Chicken	No Brand	Green	Average HSR of food group	*"Poultry" Green: Processed poultry with HSR ≥3.5 Amber: HSR of <3.5, ≤ 50 g in sandwiches, rolls, wraps or salads, ≤ 120 g as a meal*
	Countdown: Smoked chicken breast	Green		
	Brinks: Smoked chicken breast	Green		
Chicken Nuggets	No Brand	Green	Average HSR of food group	*"Poultry" Green: Processed poultry with HSR ≥3.5 Amber: HSR of <3.5, ≤ 50 g in sandwiches, rolls, wraps or salads, ≤ 120 g as a meal*
	Leader: Chicken nugget battered	Green		
	Leader: Chicken nugget tempura battered	Green		
	Southern range: Chicken nugget battered	Amber		
	Tegel: Chicken nugget battered	Green		
Chicken Luncheon	No Brand	Amber	Average HSR of food group	*"Poultry" Green: Processed poultry with HSR ≥3.5 Amber: HSR of <3.5, ≤ 50 g in sandwiches, rolls, wraps or salads, ≤ 120 g as a meal*
	Huttons: Ham & Chicken luncheon	Amber		
	Southern range: Luncheon roll chicken	Green		
	Tegel: Chicken luncheon	Amber		
Chicken Pattie	No Brand	Amber	Average HSR of food group	*"Poultry" Green: Processed poultry with HSR ≥3.5 Amber: HSR of <3.5, ≤ 50 g in sandwiches, rolls, wraps or salads, ≤ 120 g as a meal*
	Leader: Chicken pattie coat Southern Style	Amber		
	Southern range: Chicken burger pattie	Amber		
	Tegel: Chicken pattie crunchy	Green		
	Tegel: Chicken pattie grilled	Green		
	Tonys: Southern style chicken burger patties	Amber		
Chicken Tenders	Tegel: Take outs Southern style chicken tenders	Green	Average HSR of food group	*"Poultry" Green: Processed poultry with HSR ≥3.5*

Food Item	Brand	Rating	Justification	Guidelines
	tegel: crispy crumber tenders	Green		*Amber: HSR of <3.5, ≤ 50 g in sandwiches, rolls, wraps or salads, ≤ 120 g as a meal*
	Tegel: Tandori chicken tenders	Green		
	Rangitikei: Thai style tenderloins	Green		
	Waitoa: Original free range chicken tenders	Green		
Chicken Schnitzel	No Brand	Green	Average HSR of food group	*"Poultry" Green: Processed poultry with HSR ≥3.5 Amber: HSR of <3.5, ≤ 50 g in sandwiches, rolls, wraps or salads, ≤ 120 g as a meal*
	Smart Choice: Chicken schnitzel	Green		
	Tegel: Chicken schnitzel	Green		
	Tonys: Chicken schnitzel	Green		
	Watties: Chicken schnitzel	Green		
Shaved Red Meat	No Brand	Amber	Average HSR of food group	*"Red Meat" Green: Processed meat with HSR ≥3.5 Amber: HSR of <3.5, ≤ 50 g in sandwiches, rolls, wraps or salads, ≤ 120 g as a meal*
	Countdown: Shaved ham	Amber		
	Hellers: Shaved champagne ham	Amber		
	Hellers: Shaved pork	Amber		
	Southern range: Ham Shaved Leg	Green		
Meatballs	No Brand	Amber	Average HSR of food group	*"Red Meat" Green: Processed meat with HSR ≥3.5 Amber: HSR of <3.5, ≤ 50 g in sandwiches, rolls, wraps or salads, ≤ 120 g as a meal*
	Angel Bay: Gourmet meatballs	Amber		
	Angel Bay: Meat balls beef part cooked	Amber		
	Countdown: Beef & pork meatballs	Green		
	Hellers: Pork meatballs	Amber		
	Leader: Meatballs beef cocktail flame grilled	Amber		
	Leader: Meatballs beef premium school	Green		
Burger Patties	No Brand	Amber	Average HSR of food group	*"Red Meat" Green: Processed meat with HSR ≥3.5 Amber: HSR of <3.5, ≤ 50 g in sandwiches, rolls, wraps or salads, ≤ 120 g as a meal*
	Angel bay: Beef burger 100g part cooked halal	Amber		
	Countdown: Prime NZ Beef burger patties	Amber		
	Hellers: Burger Patties Angus	Amber		
	Leader: Hamburger pattie fast cook	Green		

Food Item	Brand	Rating	Justification	Guidelines
	Pacific Gold: Beef burger pattie raw	Amber		
	Rocket: Beef Burger Patties NZ	Green		
Misc. Red Meat Products	No Brand	Amber	Average HSR of food group	*"Red Meat"* *Green: Processed meat with HSR ≥3.5* *Amber: HSR of <3.5, ≤ 50 g in sandwiches, rolls, wraps or salads, ≤ 120 g as a meal*
	Countdown: Corned beef	Amber		
	Tonys: BBQ pork ribblet	Amber		
Falafel	No Brand	Amber	Average HSR of food group	*"Legumes"* *All legumes 'green';* *Defined guideline: processed legume products defined as 'green' if 75% or more. 'Amber' if HSR ≥3.5*
	Dannys	Red		
	The cool gardener	Amber		
	Turkish kitchen	Red		
	Lisas: Middle Eastern mix	Amber		
	Lisas: Mediterranean mix	Amber		
	Wild chef	Amber		
Meat Alternative Patties	No Brand	Amber	Average HSR of food group	*Defined guideline: 'Meat Alternative' Amber if HSR ≥ 3.5*
	Bean supreme: Vegetarian burger patties	Amber		
	Beyond meat: Beyond burger pattie	Amber		
	Leader: Burger pattie vegetarian pre cooked	Red		
	Linda McCartney's: Vegetarian patties	Amber		
	Plan*t: Smoky Chipotle burger patties	Red		
	Polaris: Pattie Vege Burger	Amber		
	The Alternative meat co: Burger pattie veggie	Amber		
	Vegie delights: Smoky BBQ burger patties	Amber		
Chicken Alternatives	No Brand	Amber	Average HSR of food group	*Defined guideline: 'Meat Alternative' Amber if HSR ≥ 3.5*
	Frys: Vegetarian burgers meat free chicken style	Amber		
	Plan*t: Chicken burger patties plant based	Red		
	Quorn: Vegetarian meal meat free soy pieces	Amber		

Food Item	Brand	Rating	Justification	Guidelines
	Sunfed: Chicken free chicken original	Amber		
Mince Alternatives	No Brand	Amber	Average HSR of food group	*Defined guideline: 'Meat Alternative' Amber if HSR ≥ 3.5*
	Bean Supreme: Whole Food Mince	Amber		
	Bean supreme: Wholefood mince	Amber		
	Plan*t: Ground mince plant based	Red		
	Quorn: Vegetarian meal meat & soy free mince	Amber		
	Sunfed: Bull free beef	Amber		
	Vegie Delights: Casserole Mince Vegetarian	Amber		
	Vegie Delights: Meat alternative Nutmeat	Amber		
Vegetarian Sausages	No Brand	Amber	Average HSR of food group	*Defined guideline: 'Meat Alternative' Amber if HSR ≥ 3.5*
	Bean Supreme: Vegetarian sausages	Amber		
	Linda McCartney's: Vegetarian sausages	Amber		
	The Alternative Meat Co: Vegetarian sausages	Amber		
	Tonzu: Vegan sausages	Amber		
	Vegie Delights: Vegetarian hot dogs	Amber		
Hummus	No Brand	Amber	Average HSR of food group	*"Legumes" All legumes 'green';* *Defined guideline: processed legume products defined as 'green' if 75% or more. 'Amber' if HSR ≥3.5*
	Countdown: Original Hummus	Amber		
	Greater Hummus: Roasted Garlic Humms	Amber		
	Just Hummus: Garlic & Lemon	Amber		
	Lisa's: Original Hummus	Amber		
	Obela: Hummus Smooth Classic	Green		
	Turkish Kitchen: Hummus Traditional	Amber		
Gaucamole	No Brand	Green	Average HSR of food group	*Defined guideline: "Dips" defined as 'green' if 75% or more*
	Countdown : Creamy guacamole dip	Amber		
	Obela: Guacamole	Green		

Food Item	Brand	Rating	Justification	Guidelines
				dairy/FVNL. 'Amber' if HSR ≥3.5
Dips	No Brand	Red	Average HSR of food group	*Defined guideline: "Dips" defined as 'green' if 75% or more dairy/FVNL. 'Amber' if HSR ≥3.5*
	Lisa's: Feta & Spinach	Red		
	Obela: Tzatziki	Red		
	Turkish Kitchen: Fresh spinach & feta	Red		

Abbreviations. Health Star Rating (HSR), Fruit, vegetable, nut, and legumes (FVNL).

Recipe database

Table 6.4

Recipes Used to Classify Menus for In-house Food Providers or Other Providers who Lacked Menu Detail.

Menu Item	Rating	Menu Item	Rating	Guidelines
Bean burger patties	Amber	Teriyaki Chicken Rice Ball	Red	*"Mixed Meals" Green ≥ 75% 'green' ingredients Amber No 'red' ingredients Red Contains 'red' ingredients OR does not contain any fruit or vegetables*
Beef Nachos (no sourcream)	Red	Pork fried rice	Amber	
Butter Chicken	Red	Chicken Kebab on Rice	Amber	
Casserole/stew	Amber	Chicken fried rice	Amber	
Cheese (Bechamel) sauce	Amber	Smoked chicken and spinach fettucine	Red	
Chicken and avocado wraps	Amber	Pesto and tomato pasta salad	Amber	
Chicken and vegetable pie	Amber	Mushroom and spinach fettucine	Red	
Chicken noodle soup with corn	Green	Pork and prawn dumpling (fat visible)	Red	
Chop suey	Green	Chicken thai fried noodle	Green	
Corn fritters	Amber	Pizza bread	Amber	
Cottage pie	Amber	leek and potato soup (no cream)	Amber	
Fish pie (mashed potato top)	Green	chicken and vegetable soup	Green	
Fried rice (Vegetarian)	Green	tomato soup (no cream)	Amber	
Frittata	Amber	Leek and potato soup creamy	Red	
Homemade ham pizza	Amber	pumpkin soup	Red	
Jacket/Baked potato	Green	pasta salad	Amber	
Lasagna	Amber	Feta and spinach roll	Amber	
Macaroni cheese (Amber only if vegetables included)	Amber	Chicken and vegetable dumpling	Green	
Mashed potato	Amber	Coconut chia pot	Amber	
Meat loaf	Amber	Vietnamese spring rolls	Amber	

Menu Item	Rating	Menu Item	Rating	Guidelines
Mexican burrito bowl	Green	Chicken chilli (curry)	Amber	
Mouse trap	Red (no vegetable)	Vegetable lasagne	Amber	
Pasta salad	Amber	Mushroom pizza	Amber	
Pizza scrolls	Amber	Chicken pizza	Amber	
Pork bun	Red (fat visible meat)	Hawaiian Pizza	Amber	
Pork fried rice	Amber	Vegetarian stir fry noodles	Amber	
Pumpkin and kumara soup	Green	Rice Ball (Plain)	Red	
Roast (Chicken)	Green	Japanese Curry	Red	
Savoury mince	Amber	Meatlovers Pizza	Red	
Spagetti bolognese	Green	Chicken japanese curry with rice	Red	
Stirfry (Chicken)	Green	Chicken afridatta on rice	Green	
Thai Beef Salad	Amber	Onigiri (Teriyaki/Tuna)	Red	
Thai chicken noodle salad	Green	Seaweed Inari	Red	
Toasted sandwich (Cheese)	Amber	Springrolls (spring roll)	Red	
Tuna pasta bake	Amber	Teriyaki Chicken Donburi	Amber	
Vegetable soup with pasta	Green	Berry Fluff / Ambrosia	Red	
Vegetarian quiche	Amber	Chicken curry	Red	

Chain providers

Table 6.5

Classification of Chain providers' menu items

Chain	Menu Item	Rating	Justification	Guideline
Hells Pizza	Black Pizza	Red		"Mixed Meals" Green ≥ 75% 'green' ingredients Amber No 'red' ingredients Red Contains 'red' ingredients OR does not contain any fruit or vegetables
	Blue Pizza	Red		
	Chicken Tenders W/ Garlic Mayo Dip	Red		
	Green Pizza	Amber		
	Red Pizza	Red		
	Slaw Salad + balsamic dressing	Green		
	Slaw salad + Caesar dressing	Green		
	Wedges w/ Sour Cream	Red		
	Yellow Pizza	Amber		
Jesters Pie	All	Red	All exceed portion guide for pies	"Baked Items" Red: Exceeds portion guide, Pies ≤ 140g
Bakers Delight	Apple & Custard Scroll	Red		"Baked Items" Amber: Contains wholemeal flour, grains/fruit or vegetables. Red: Exceeds portion guide, has confectionary or icing
	BBQ Pizza	Red		
	Berry Scroll	Red		
	Cheese & Bacon Savoury Rolls	Red		
	Cheesymite Scroll	Red		
	Chocolate Croissant	Red		
	Finger Bun: Hundreds & Thousands	Red		
	Finger Bun: Rasberry Icing	Red		
	Ham, Salami, Caramelised Onion Pockets	Red		
	Hawaiin Pizza	Amber		
	Mediterranean Pizza	Red		
	Spinach, Feta, Pesto (Vege) Pockets	Amber		
Subway	Vegetarian	Amber	6 INCH 'Choose Your Own - Bread & GF Wrap (Based off 'avaerage' Subway w/ 3 salad options, cheese & sauce)	"Sandwhiches and Wraps" Green: Prepared w/ only green ingredients Amber: Prepared w/ green and amber ingredients. Red: Contains red ingredients
	Tuna & Mayo	Amber		
	Buffalo Chicken	Red		
	Chicken and Bacon Ranch Melt	Red		
	Chicken Classic	Red		
	Chicken Strips	Amber		

Chain	Menu Item	Rating	Justification	Guideline
	Chicken Teriyaki	Amber		
	Three Pepper Chicken	Amber		
	Turkey, Sliced	Amber		Meat servings are based upon processed meat with a HSR <3.5, Must not exceed 50g. All bread is amber, 3x vege, 1 x protein listed, 1 x spread/condiment, 1 x cheese. Serving of meat based on https://www.subway.com/~/media/New_Zealand/Documents/Nutritionals/NZ-Nutritional-Summary.pdf
	Bacon, Streaky	Amber		
	Leg, Ham	Amber		
	Meatball Marinara	Red		
	Italian BMT	Red		
	Pepperoni	Red		
	Pizza Melt	Red		
	Pork Riblet	Red		
	Pulled Pork	Red		
	Roast Beef	Amber		
	Salami	Red		
	Steak, Diced	Red		
	Omelete	Amber		
	Veggie Patty	Amber		
	Falafel	Amber		
	Vegetarian	Amber	FOOT LONG Choose Your Own - Bread & GF Wrap (Based off 'avaerage' Subway w/ 3 salad options, cheese & sauce).	
	Tuna & Mayo	Amber		
	Buffalo Chicken	Red		
	Chicken and Bacon Ranch Melt	Red		
	Chicken Classic	Red		
	Chicken Strips	Amber		
	Chicken Teriyaki	Amber		
	Three Pepper Chicken	Amber		
	Turkey, Sliced	Amber		
	Bacon, Streaky	Amber		
	Leg, Ham	Red		
	Meatball Marinara	Red		
	Italian BMT	Red		
	Pepperoni	Red		
	Pizza Melt	Red		
	Pork Riblet	Red		
	Pulled Pork	Red		
	Roast Beef	Amber		
	Salami	Red		
	Steak, Diced	Red		
	Omelete	Amber		
	Veggie Patty	Amber		
	Falafel	Amber		
	Vegetarian	Amber	WRAP Choose Your Own - Wrap (Based off 'avaerage' Subway w/ 3 salad options, cheese & sauce)	
	Tuna & Mayo	Amber		
	Buffalo Chicken	Red		
	Chicken and Bacon Ranch Melt	Red		
	Chicken Classic	Red		
	Chicken Strips	Amber		
	Chicken Teriyaki	Amber		

Chain	Menu Item	Rating	Justification	Guideline
	Three Pepper Chicken	Amber		
	Turkey, Sliced	Amber		
	Bacon, Streaky	Amber		
	Leg, Ham	Amber		
	Meatball Marinara	Red		
	Italian BMT	Red		
	Pepperoni	Red		
	Pizza Melt	Red		
	Pork Riblet	Red		
	Pulled Pork	Red		
	Roast Beef	Amber		
	Salami	Red		
	Steak, Diced	Red		
	Omelete	Amber		
	Veggie Patty	Amber		
	Falafel	Amber		
	Vegetarian	Amber	MINI Choose Your Own - (Based off 'avaerage' Subway w/ 3 salad options, cheese & sauce)	
	Turkey, Sliced	Amber		
	Leg, Ham	Amber		
	Roast Beef	Amber		
	Chicken Strips	Amber	Salad bowl (Based off average salad w/ 4 vege options (green), sauce (amber), and protein (amber)) = mixed meal average 66% green items	
	Ham	Amber		
	Salami	Red		
	Beef strips	Amber		
	Tuna & Mayo	Amber		
	Vegetarian	Green		
	Apple & Custard Danish	Red		"Baked Items" Amber: Contains wholemeal flour, grains/fruit or vegetables. Red: Exceeds portion guide, has confectionary or icing
	Apricot & Custard Danish	Red		
	Boysenberry & Custard Danish	Red		
	Chocolate Chip Cookie	Red		
	Chocolate Chip Cookie w/ MnM's	Red		
	Double Chocolate Chip Cookie	Red		
	Oatmeal Raisin Cookie	Red		
	White Chip Macadamia	Red		
	Ultimate Cheesy Garlic Bread Toastie	Red		"Mixed Meals" Green ≥ 75% 'green' ingredients

Chain	Menu Item	Rating	Justification	Guideline
	Ultimate Chicken & Pepperoni Cheesy Garlic Bread	Red		Amber No 'red' ingredients Red Contains 'red' ingredients OR does not contain any fruit or vegetables
Pita Pit	Black Bean Pattie	Amber	PETITA (Wholemeal, Plain + GF) 'Choose Your Own (Based Off a 'Regular' Pita Pit w/ 4 Veg, Sauce & Cheese)	"Sandwhiches and Wraps" Green: Prepared w/ only green ingredients Amber: Prepared w/ green and amber ingredients. Red: Contains red ingredients "Red Meat + Poultry" Green = Meat w/ fat remove, Mince w/ drained fat, Fresh or Frozen Poultry w/ fat removed OR Processed w/ a HSR >/= 3.5 Amber = Processed w/ a HSR of <3.5 and </= 50g in a sandwich Red: Meat where fat is not removed, Processed meat that does not meet Amber criteria
	Feta & Quinoa Rosti	Amber		
	Garden Vege			
	Kumara & Lentil Rosti	Amber		
	Falafel	Amber		
	Ham	Amber		
	Beef / Grilled steak	Amber		
	Bacon (fat visible)	Red		
	Grilled Lamb	Amber		
	Cabanossi Sausage	Amber		
	Eggs	Amber		
	Prawns	Amber		
	Chicken	Amber		
	Chicken - Teriyaki	Amber		
	Chicken Tenders	Amber		
	Marmite	Amber		
	Vegemite	Amber		
	Black Bean Pattie	Amber	REGULAR (Wholemeal, Plain + GF) 'Choose Your Own (Based Off a 'Regular' Pita Pit w/ 4 Veg, Sauce & Cheese)	
	Feta & Quinoa Rosti	Amber		
	Kumara & Lentil Rosti	Amber		
	Falafel	Amber		
	Ham	Red		
	Beef / Grilled steak	Amber		
	Bacon	Red		
	Grilled Lamb	Amber		
	Cabanossi Sausage	Red		
	Eggs	Amber		
	Prawns	Amber		
	Chicken	Amber		
	Chicken - Teriyaki	Red		
	Chicken Tenders	Red		
	Marmite	Amber		
	Vegemite	Amber		
	Black Bean Pattie	Green	SALAD BOWL Salad Bowl Based off 'regular'	
	Feta & Quinoa Rosti	Green		

Chain	Menu Item	Rating	Justification	Guideline
	Kumara & Lentil Rosti	Green	bowl, mixed meal w/ 4 Veg (Green), 1 Sauce (Amber), 1 Toppings (Green) + Protein	
	Falafel	Green		
	Ham	Amber		
	Beef / Grilled steak	Amber		
	Bacon	Red		
	Grilled Lamb	Amber		
	Cabanossi Sausage	Amber		
	Eggs	Green		
	Prawns	Green		
	Chicken	Green		
	Chicken - Teriyaki	Amber		
	Chicken Tenders	Amber		
	Brownie	Red		"Baked Items" Amber: Contains wholemeal flour, grains/fruit or vegetables. Red: Exceeds portion guide, has confectionary or icing
	Cookie	Red		
	Cookie Baked Choc Candy	Red		
	Ginger Crunch	Red		
	Grilled Wedges	Red		"Deep fried foods" All Red
	Loaded Pita Chips: Chicken	Amber		"Mixed Meals" Green ≥ 75% 'green' ingredients Amber No 'red' ingredients Red Contains 'red' ingredients OR does not contain any fruit or vegetables
	Loaded Pita Chips: Falafel	Amber		
	Loaded Wedges	Red		
	Pita Chips w/ Aoli Dipping sauce	Amber		

Community providers

Table 6.6

Classification of Community Providers' Menu Items.

Store	Menu Item	Rating	Guidelines
Sushi (Onigri + Sushi Roll)	Chicken	Green	"Sushi" Green: Prepared w/ mostly green ingredients. Amber: Other Sushi Red: contains deep-fried ingredients
	Chicken & Avocado	Green	
	Tuna	Green	
	Tuna & Avocado	Green	
	Avocado	Green	
	Teriyaki Chicken	Amber	
	Teriyaki Chicken & Avocado	Green	
	Cream cheese + pineapple	Amber	
	Chicken Katsu	Red	
Bakery/Cafe	White Sandwhich: Chicken & Vegetable	Amber	"Sandwhiches and Wraps" Green: Prepared w/ only green ingredients Amber: Prepared w/ green and amber ingredients. Red: Contains red ingredients
	White Sandwhich: Chicken	Amber	
	White Sandwhich: Ham & Vegetable	Amber	
	White Sandwhich: Ham	Amber	
	White Sandwhich: Vegetable	Amber	
	Wholegrain/Brown Sandwhich: Chicken & Vegetable	Amber	
	Wholegrain/Brown Sandwhich: Ham & Vegetable	Amber	
	Filled Roll: Chicken & Vegetable	Amber	
	Filled Roll: Ham + Veg	Amber	
	Pie: Mince & Cheese	Red	"Baked Items" Amber: Contains wholemeal flour, grains/fruit or vegetables. Red: Exceeds portion guide, has confectionary or icing
	Pie: Mince	Red	
	Pie: Steak & Cheese	Red	
	Pie: Steak	Red	
	Pie: Bacon & Egg	Red	
	Pie: Mini Mince	Red	
	Sausage Roll	Red	
	Spinach Quiche	Amber	
	Ginger bread man	Red	
	Raspberry Lamington	Red	
	Chocolate Lamington	Red	
	Creamed Donut	Red	
	Hot Chips	Red	"Deep fried foods" All Red
	Battered Hot Dog	Red	
	Chicken Nuggets	Red	

Portion guide

Table 6.7

Portion Guide for Commercial and Home-made Baked Items.

Item	Guidelines for amber category	Average Serving	Category
Commercial Baked Items			
Scones	≤ 100g	65-85g	Amber
Cake	≤ 100g	113g	Red
Loaf	≤ 100g	101g	Red
Muffin	≤ 100g	163g	Red
Waffle	<100g	90g	Amber
Pancake	≤ 100g	1 (68g)	Amber
Crumble	≤ 100g	100g	Amber
Banana bread	≤ 100g	110g-140g	Red
Slices (14)	≤ 80g	80g	Amber
Slice with filling (e.g. caramel)	≤ 80g	90g	Red
Pikelet	≤ 40g	1 (25g)	Amber
Biscuit (plain sweet)	≤ 40g	≤ 3 (34g)	Amber
Custard Square	<80g	115g	Red
Biscuit flavoured (shortbread, fruit filled, choc chip, anzac)	≤ 40g	≤ 2 (34g)	Amber
Small Pastries	≤ 60g	45g	Amber
Pie	≤ 140g	171g	Red
Quiche	≤ 140g	135g	Amber
Homemade Baked Items			
Muffin	≤ 100g	Regular: 163g, Small: 110g	Red
Shortbread biscuit	≤ 40g	Regular: 39g, Small: 12g	Amber
Plain uniced biscuit	≤ 40g	Regular: 15g, Small: 7.5g	Amber
Brownie	≤ 100g	Regular: 98g	Amber