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**Impact of a school meal programme on the dietary intake of
children, aged 9-11 years, in a low decile school in South
Auckland, New Zealand**

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Abstract

Background: The prevalence of the multiple burdens of malnutrition, characterised by the coexistence of obesity and undernutrition, is increasing worldwide, including in New Zealand (NZ). These lead to inadequate growth and development towards adulthood due to associated non-communicable diseases and micronutrient deficiencies. The current food environment contributes towards reduced access to nutritionally adequate meals. Therefore, nutrition programmes, policies and guidelines have been developed by government bodies such as the Ministry of Health and charitable trusts. Feed the Need (FTN), is a school meal programme that provides lunch meals to children in decile one and two schools in South Auckland, NZ.

Aim: The aim of my thesis is to explore the effect of a school meal programme on children's (9-11 years) dietary intake during school hours in a low decile school in South Auckland, NZ. School staff and children's perceptions of the school meal programmes will also be evaluated.

Methods: Eighty-two children completed self-administered food records under supervision for two weeks. FTN meals were offered to all children on alternate days (FTN week) during week one, with FTN meals being absent in week two (non-FTN week). Dependent t-tests, Kruskal Wallis and post-hoc tests were used to analyse energy, macronutrient and micronutrient intake during school hours. Dietary intake for boys and girls during school hours was compared to 40% of the NZ Nutrient Reference Values (NRVs) and the United Kingdom (UK) dietary guidelines. This was to identify whether the children's dietary intake met current recommendations. In addition, dietary intake for all children was compared between food sources including dairy, home, school food programmes, FTN and other food sources. Two focus groups were conducted with school staff and children to identify their perceptions of the school meal programme.

Results: Dietary intake was higher in energy, carbohydrate, dietary fibre, sugars, protein, total and saturated fat, calcium and iron during the FTN week ($p < 0.05$) in

comparison to the non-FTN week. Girls did not meet dietary fibre recommendations during non-FTN week when compared to 40% of the dietary guidelines, whereas boys did not meet dietary fibre recommendations in both weeks. Boys and girls exceeded total fat intake recommendations by 15% and 21% during the FTN week, respectively. Overconsumption of saturated fat intake during the FTN and the non-FTN week was also observed. This is likely attributed to the local food environment, which allows easy access to unhealthy discretionary food items such as crisps, corn snacks, biscuits, cookies and pies. In addition, use of cheap cuts of meat in FTN meals increases their saturated fat content. During the FTN week children consumed food from all sources and did not use one food source as their major food provider. In contrast, during the non-FTN week food from home was the major food source for the children's dietary intake during school hours.

Conclusions: FTN meals add to the children's usual dietary intake and contribute towards the oversupply of energy, total and saturated fat. Modifications of FTN meals are required to reduce the saturated fat content of the meals. To reduce the prevalence of childhood obesity and undernutrition, implementation of school food and meal programmes should accompany interventions that are designed to reduce the intake of unhealthy discretionary foods.

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Abbreviations

Acronym	Full form
AMDR	Average Macronutrient Distribution Range
BMI	Body Mass Index
CVD	Cardiovascular Disease
EAR	Estimated Average Requirement
ECE	Early Childhood Education Centre
EER	Estimated Energy Requirement
FIS	Fruit in Schools
INFORMAS	International Network for Food and Obesity/non-communicable diseases Research, Monitoring and Action Support
MoH	Ministry of Health
NCD	Non-communicable disease
NRVs	Nutrient Reference Values
NSLP	National School Lunch Program
NZ	New Zealand
PEM	Protein Energy Malnutrition
SBP	School Breakfast programme
SES	Socioeconomic status
UK	United Kingdom
US	United States
WHO	World Health Organization
