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family food environment: barriers to acquiring affordable and nutritious food in new zealand households

CLAIRE SMITH, ASSOCIATE PROFESSOR WINSOME PARNELL
AND DR RACHEL BROWN
DEPARTMENT OF HUMAN NUTRITION, UNIVERSITY OF OTAGO, DUNEDIN

BLUE SKIES REPORT NO 32/10
FEBRUARY 2010

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Families Commission
Public Trust Building
Level 6, 117-125 Lambton Quay
PO Box 2839
Wellington 6140

Telephone: 04 917 7040
Email: enquiries@nzfamilies.org.nz
www.nzfamilies.org.nz

ISSN 1177-3952 (Print)
ISSN 1177-8261 (Online)

ISBN 978-0-478-34918-4 (Print)
ISBN 978-0-478-34919-1 (Online)

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ACKNOWLEDGEMENTS

This report would not have been possible without the co-operation and support of the families that gave up their time to participate in the Family Food Environment Survey.

A big thank you to Andrew Gray (Department of Social and Preventive Medicine, University of Otago) for statistical advice. Thank you also to Sabrina Goh, Elizabeth Tuckey and Tracey Little, who worked as interviewers on the survey.

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OVERVIEW

This report is split into six sections:

1. Executive summary
2. Rationale and objectives
3. Introduction and context – with specific reference to New Zealand research to outline what we already know about aspects of the family eating environment and food insecurity
4. Methods and measurements
5. Results
6. Discussion and conclusions – results will be interpreted and discussed in the context of other research and literature

ABBREVIATIONS AND GLOSSARY OF TERMS

BMI	Body Mass Index. An indicator of body fatness calculated from the formula weight/height ² . In New Zealand a BMI of 25–30 for New Zealand Europeans and others and a BMI of 26–32 for Māori and Pacific people is classified as overweight. A BMI >30 for New Zealand Europeans and others and >32 for Māori and Pacific people is classified as obese (Wilson, Russell, & Wilson, 2001)
CNS02	2002 National Children’s Nutrition Survey
FFES	Family Food Environment Survey
Food insecurity	Limited or uncertain availability of nutritionally adequate and safe foods or limited ability to acquire acceptable foods in a socially acceptable way
GIS	Geographic Information System
HSC	Health Sponsorship Council
NHANES	United States National Health and Nutrition Examination Survey
NNS97	1997 New Zealand National Nutrition Survey
NZDep	The New Zealand Index of Deprivation combines nine variables from the New Zealand census that reflect eight dimensions of material and social deprivation. It provides a score for each mesh-block within New Zealand. The mesh-blocks are geographical units defined by Statistics New Zealand. The scores apply to areas rather than individuals. The New Zealand Index of Deprivation is updated after each census and includes NZDep91, NZDep96, NZDep01 and the most recently released NZDep2006 (Salmond, Crampton, & Atchinson, 2007)
NZSEI	New Zealand Socio-economic Index. A classification according to occupational class
OECD	Organisation for Economic Co-operation and Development
Ready-to-eat food	For the purposes of this research, this means food that does not require any further preparation apart from reheating. It can be eaten in the home or at the premises where purchased (excluding ready-to-eat food bought from the supermarket)
WC	Waist Circumference

EXECUTIVE SUMMARY

The Family Food Environment Survey (FFES) is a cross-sectional survey of 136 New Zealand families living in Dunedin and Wellington with one or more children aged between five and 18 years. The aim of the FFES was to describe environmental and behavioural factors with respect to access to food, purchasing food and meal-planning and patterns, and to examine how they differ by socio-economic status and their relationship to food security.

Income has been used as an indicator of socio-economic status, with households being categorised into three income groups based on annual household income after tax: low (<\$30,000), medium (\$30,000 to \$69,999) and high (>\$70,000). The household member mainly responsible for food preparation was interviewed.

Food insecurity is defined as “limited or uncertain availability of nutritionally adequate and safe foods or limited ability to acquire acceptable foods in a socially acceptable way” (Holben, 2006, p. 447). It has been measured in this survey by validated indicator statements previously used in national nutrition surveys.

Demographic predictors of household food insecurity in this group were low household income, government benefits as the main source of income and single-parent households. In the low-income group, 47 percent of households reported that food ran out in their household because of a lack of money ‘often’ or ‘sometimes’.

The low-income group purchased fewer types of vegetables per week on average (5.9) than the high-income group (7.8). Low-income groups were more likely to agree with the statement “buying more fruit and vegetables than we already do would be difficult on our budget” and disagree with the statement that “fruit and vegetables are affordable in the shop where we usually do our food shopping”.

Overall use of ready-to-eat food was similar across the socio-economic spectrum; high-income households, however, were more likely to go to restaurants (mean 1.2 occasions per month) and cafes (3.5) compared to low-income households (1.6 times a month for cafes and 0.3 for restaurants).

Access to food shops and ownership of basic kitchen amenities was not an issue for households in this study, even those reporting food insecurity. Approximately one hour was spent by family members on food preparation and cleaning up for main meals every day. The low-income group did not differ from others in terms of behaviour such as budgeting for food, planning and eating meals as a family.

The factor with the most impact on food security for New Zealand families included in this survey was economic. In particular, there was a strong association between food insecurity and low income for those receiving government benefits. The relaxation of economic constraints in these households may be the most effective way to reduce food insecurity. The social and economic determinants of food insecurity, such as income, housing and the cost of food, must be considered in any interventions to address this issue.

1. RATIONALE AND OBJECTIVES

Food insecurity is associated with poor nutritional outcomes, and it was reported in half of households in the 2002 National Children's Nutrition Survey (CNS02) (Parnell, Wilson, Mann, & Gray, 2005). Both physical and economic access to food have been described as important influences on food-purchasing practices and choices.

In New Zealand, households with children have the highest rates of food insecurity (Russell et al, 1999). The home and family environment is an important setting for shaping both adults' and children's eating. Food choices are not just based on decisions by individuals, but are also influenced by the family context and decisions in the household (Ricciuto, Tarasuk, & Yatchew, 2006).

Before appropriate strategies and interventions can be developed – in particular, for lower socio-economic groups – it is important that we have more information about households' food acquisition and consumption. Factors that affect these things may or may not be outside the control of the household. Health-promotion activities that take these factors into consideration may be more successful.

The aim of the FFES was to describe environmental and behavioural factors of New Zealand families with children aged five to 18 years in the cities of Dunedin and Wellington with respect to access to food, buying food, meal planning and patterns, and to examine how they differ by socio-economic status (including income) and their relationship to food security.

2. INTRODUCTION AND CONTEXT

This section will first introduce the concept of food insecurity. It will examine associations between socio-economic status and household food insecurity, and body size and food intake. The second part will discuss some environmental explanations for these associations in the context of the family eating environment. The focus will be on New Zealand research where it is available. The research questions generated culminating in the FFES will be listed in boxed text within the document.

Socio-economic status and health

Socio-economic status refers to a person's overall standing or position within a system of social stratification (Salmond, Crampton, King, & Waldegrave, 2006). There are different methods of measuring socio-economic status, including income, occupation and education-based methods. There are also measures of socio-economic deprivation concerned with the consequences of social stratification rather than with the stratification itself (Salmond et al, 2006). One such example is the New Zealand area-based Index of Deprivation (NZDep). New Zealand research examining the effects of socio-economic status on health often uses this index.

Many health outcomes have been measured against socio-economic status, but the different concepts and measurements of socio-economic status make it difficult to compare studies. The socio-economic measures used may only be relevant to a particular culture or country. It is clear, however, that socio-economic factors play a large part in determining health. The life expectancy of males living in the most deprived areas of New Zealand is 8.9 years lower compared to those living in the least deprived areas, and for females the difference is 6.6 years (Ministry of Social Development, 2007).

In particular, nutrition and diet are known to be risk factors for chronic diseases. An unhealthy diet has been calculated to be the top cause of chronic disease, causing 8,500 deaths in New Zealand per year. It has been estimated that an increase in one serving per day (80 grams) of fruit or vegetables for the New Zealand population would reduce mortality from ischaemic

heart disease by 9.9 percent and ischaemic stroke, oesophageal cancer and stomach cancer by 6.2 percent (Tobias et al, 2006).

Dahlgren and Whitehead (2006) have developed a model which frames the individual in a series of layers. This model is useful for describing determinants of health as it highlights the impact of the wider social environment on individual lifestyle. The major determinants of health are described as a series of four layers. The inside layer represents the individual: their age, sex and genetic characteristics that influence health and cannot be changed. The second layer represents personal behavioural factors and the interaction with peers and social and community networks that influence lifestyle and choices. In the third layer are working conditions, food supply and access to goods and services that affect a person's ability to maintain their health. Overlaying all of these things is the structural environment, and economic, cultural and environmental influences. Interventions to improve health and nutrition can be targeted to make changes to the different layers (Dahlgren & Whitehead, 2006).

2.1 Food insecurity

In developed countries we are surrounded by an abundance of food choices. For some people, however, even in developed countries, food and access to food is not a given. In order to capture the experiences of those people lacking all the food they need, and to monitor health consequences, researchers have developed methods for measuring the extent of food insecurity within populations. Food insecurity is defined as "limited or uncertain availability of nutritionally adequate and safe foods or limited ability to acquire acceptable foods in a socially acceptable way" (Holben, 2006, p. 447). The opposite of being food insecure is to be food secure and ideally we would hope that this is attainable for all members of a given population.

Food insecurity is does not only refer to inadequate amounts of food. It also occurs when people have limited food choices and feel anxious and stressed about how to acquire the food they need for both themselves and their families. The questions researchers ask relating to food insecurity may differ between populations as experiences can be varied (Coates et al, 2006).

Food insecurity has been measured at the household level and individual level, in various ways ranging from a single-item question to a multi-item questionnaire. Two national nutrition surveys have measured food insecurity in households in New Zealand: the National Nutrition Survey (NNS97) and the National Children's Nutrition Survey (CNS02). Eight food-security indicator statements were developed from five main themes, including food insecurity, food adequacy, coping strategies, alternative sources of food and cultural issues, to measure food insecurity at the household level (Parnell, Scragg, Wilson, Schaaf, & Fitzgerald, 2003; Russell et al, 1999). The eight indicator statements were originally developed from focus group research to ensure they reflected the experiences of New Zealand households faced with difficulties in accessing food (Parnell, Reid, Wilson, McKenzie, & Russell, 2001). They are listed in full at the end of this report (Appendix A).

The degree of food insecurity experienced by households or individuals can vary, from very severe (never having enough food to eat, or going hungry) to less severe (worry and anxiety surrounding food acquisition). Responses to the eight indicator statements can be used to classify people or households into three groups: full or almost full food security; moderate food security; and low food security (Parnell, 2005).

2.1.1 Food insecurity in New Zealand

In 1997 nearly 30 percent of New Zealand households reported some degree of food insecurity (Parnell, 2005), and in 2002 nearly half of all households with children reported some degree of food insecurity (Parnell, 2005). Recent price rises for basic food items, particularly dairy and wheat-based foods, and increases in the cost of living could make food security an even more pertinent issue. In the year to June 2008 food prices rose by 8.2 percent, with milk increasing 22 percent, cheese 62 percent, bread 15 percent and fruit and vegetables by nine percent (Statistics New Zealand, 2008).

Some New Zealanders are more likely to report being food insecure than others. Younger adults (those aged 19 to 24 years) were more likely to experience food insecurity, and prevalence of food insecurity decreased with increasing age in NNS97 (Parnell, 2005).

Households living in more deprived areas (measured by NZDep96 and NZDep01) are more likely to report

food insecurity, as are Māori and Pacific households (Parnell et al, 2003). The longitudinal Pacific Islands Families Study found that 43.6 percent of Pacific Island families either 'sometimes' or 'often' run out of food (Rush, Puniani, Snowling, & Paterson, 2007). Larger households and those with more children are more likely to experience food insecurity (Parnell, 2005).

Information collected by food banks provides some further insights into food insecurity among New Zealanders. The main users of food banks in New Zealand are beneficiaries, low-income workers, females, sole parents with children, ethnic minorities, people living in deprived areas, young adults and single people (McPherson, 2006).

Reasons for food bank use include:

- > income that is inadequate for meeting basic expenses such as food, rent and utilities
- > increase in need for fuel and electricity, particularly in the South Island during winter
- > housing costs – mortgage repayment and rent increases
- > debt
- > health and medical costs
- > gambling
- > childcare costs (Wynd, 2005).

Adverse life events or periods of transition can also potentially affect a household's living standards; examples of such events are marriage break-ups, job loss or redundancy, illness or major injury and house burglary (Jensen, Krishan, Hodgson, Sathiyandra, & Templeton, 2006).

For the FFES we were interested in measuring food insecurity not only to determine the prevalence but also to examine food security status against demographic, behavioural and environmental factors.

Research questions for the FFES

What is the prevalence of food insecurity?

What socio-demographic factors (including home ownership, receiving government benefits, gender, age, household size) are associated with food insecurity?

2.1.2 The relationship between socio-economic status, food insecurity and obesity in New Zealand

In New Zealand over one-third of adults are overweight and 17 percent are obese (Russell et al, 1999); furthermore, over one-fifth of New Zealand children are overweight and 9.8 percent are obese (Parnell et al, 2003). The relationship between body weight, socio-economic disadvantage and food insecurity is as yet not thoroughly understood. It is apparent that the relationship between obesity and socio-economic status may change depending on the subgroup or population.

The 2002/03 New Zealand Health Survey analysed the relationship between three socio-economic indicators (education, household income and neighbourhood deprivation) and body mass index (BMI) and waist circumference (WC). For non-Māori females, a lower level of education, lower household income and living in a deprived area were all associated with higher body fat. The relationship between body-fat measurements and socio-economic indicators was not as strong for non-Māori males and Māori females. For Māori males, however, the trend was in the opposite direction, with more body fat being associated with higher education and household income and living in a more affluent area (Ministry of Health, 2006).

A workplace survey in Auckland carried out between May 1988 and April 1990 among adults aged 40 to 78 years examined cardiovascular risk factors (including BMI and waist-to-hip ratio) by socio-economic strata including household income, level of education and the occupation-based New Zealand Socio-economic Index (NZSEI) (Metcalf, Scragg, & Davis, 2007). BMI was found to increase as household income and level of education decreased. NZSEI classes 5 and 6 (machine-operators, labourers, market-orientated agricultural and fishery workers) had the highest BMI and waist-to-hip ratios (Metcalf et al, 2007).

Extreme obesity in New Zealand children is more prevalent in the most deprived areas (measured by NZDep01) than in the least deprived areas (Goulding et al, 2007). Māori and Pacific Island children were significantly more likely to be overweight or obese than New Zealand European and other children (Goulding et al, 2007). Adult females living in more deprived areas were more likely to be obese or overweight than those in the least deprived areas. The same, however, was not found for males (Russell et al, 1999).

2.1.3 BMI and food insecurity

Food insecurity has been shown to be associated with being overweight or obese independent of other socio-economic factors. Mean BMI is lower for New Zealand adults – male and female – from fully food-secure households (28.7) compared to the moderate (29.2) and low food-secure households (29.5) (Parnell, 2005). There are no differences, however, in the BMI of New Zealand children from food-secure and food-insecure households (Parnell, 2005).

Findings from these New Zealand national surveys are similar to those from other developed countries. Women from the United States NHANES III (National Health and Nutrition Examination Survey) who were marginally food-insecure and food-insecure without hunger were more likely to be overweight or obese (Wilde & Peterman, 2006). Those who were food-insecure with hunger were more likely to be overweight but not more likely to be obese. For men, being marginally food-insecure was associated with being obese (Wilde & Peterman, 2006). The 1994 Continuing Survey of Food Intake by Individuals in the United States found that food insecurity was related to being overweight in women but not men. Women experiencing hunger, however, were 61 percent less likely to be overweight than those who were fully food-secure (Townsend, Peerson, Love, Achterberg, & Murphy, 2001).

The relationship between BMI and food insecurity is not simple, and evidence suggests it could be modified by ethnicity, age and the economic circumstances of the country. The association between obesity and food insecurity changes with the level of food insecurity, with those experiencing mild to moderate food insecurity being more at risk of obesity. However, those with the most severe food insecurity – that is, experiencing hunger and skipping meals – may be more at risk of being underweight. A Finnish study has shown the risk of being underweight or obese to be higher among the food-insecure than among the food-secure (Sarlio-Lahteenkorva & Lahelma, 2001). In Trinidad food insecurity is strongly associated with being underweight, but not overweight or obese (Gulliford, Mahabir, & Rocke, 2003).

2.1.4 Socio-economic status and food and nutrient intakes

One of the most frequently used markers of a healthy diet is fruit and vegetable intake. Although other

food groups have also been shown to be associated with socio-economic status, fruit and vegetables are commonly promoted as part of a healthy diet in New Zealand and other developed countries. Research indicates, however, that when resources are limited it is fruit and vegetable intake that is compromised.

Analysis of a national dietary survey among adults (16 to 64 years old) in the United Kingdom using seven-day diet records showed that a higher percentage of participants receiving government benefits or classified as manual social class were in the lowest quartile for fruit and vegetable intake (Billson, Pryer, & Nichols, 1999).

A meta-analysis of fruit and vegetable intake from 11 dietary surveys in Europe showed fruit and vegetable intake was lowest for those with less education and a lower occupation status (Irala-Estevéz et al, 2000).

In New Zealand surveys (NNS97 and CNS02), participants living in the most deprived areas were less likely to meet dietary guidelines for fruit and vegetable intake than those from the least deprived areas (measured by NZDep96 and NZDep01) (Parnell et al, 2003; Russell et al, 1999).

2.1.5 Food insecurity and food and nutrient intakes

Adults with food insecurity in NNS97 were less likely to report eating five servings of fruit and vegetables per day, and one serving of beef or veal per week. This reflects results from the 24-hour diet recall, which also show lower intakes of vitamin B6 and vitamin C in those with food insecurity (Parnell, 2005). Furthermore, children from households in CNS02 with food insecurity had lower intakes of sucrose, lactose, vitamin A, B carotene, vitamin B12 and calcium, indicating lower intakes of fruit, vegetables and dairy foods (Parnell, 2005).

Data from NHANES III have been used to determine the relationship between food insufficiency and diet (Dixon, Winkleby, & Radimer, 2001). A household was determined to be food-insufficient if they 'sometimes' or 'often' did not have enough food to eat. Adults who were food-insufficient reported consuming significantly fewer milk products, fruits or fruit juices, vegetables, salty snacks and desserts or sweets than those from food-sufficient households. Serum concentrations of vitamin A and carotenoids were lower in those with food insufficiency (Dixon et al, 2001).

A national survey in Canada compared the prevalence of inadequate intake of nutrients among adults and children from food-secure and food-insecure households. Adult males and females from food-insecure households had a higher prevalence of nutritional inadequacies. Among children, however, there were few differences between those from food-secure and food-insecure households (Kirkpatrick & Tarasuk, 2008).

School-aged children in Ireland who reported food poverty were less likely to eat fruit and vegetables than those who did not. Food poverty was indicated when children responded 'always', 'often' or 'sometimes' to the question: "Some young people go to school or to bed hungry because there is not enough food at home. How often does this happen to you?" (Molcho, Gabhainn, Kelly, Friel, & Kelleher, 2007).

Food insecurity has been shown to independently predict poorer nutrient intake and food choices (Parnell, 2005). It is clear that food insecurity is a concern for many New Zealand families; and furthermore, it can be used as an indicator of other health risks (Parnell, 2005). Emerging evidence suggests that food insecurity may act as a risk factor for diabetes in adults and poorer health and life satisfaction among children (aged 10 to 17 years) (Molcho et al, 2007; Seligman, Bindman, Vittinghoff, Kanaya, & Kushel, 2007).

2.2 Family food environment

There are many theories explaining the links between socio-economic status and obesity. It has been suggested that contributing behavioural practices such as poor food management, meal planning, cooking skills and diet are important at an individual or family level. Furthermore, increasing knowledge, skills and motivation are often thought as important for reversing these behaviours.

The home and family environment is an important setting for shaping both adults' and children's eating. Food choices are not just based on decisions by individuals, but are also influenced by the family context and decisions in the household (Ricciuto et al, 2006). A recent review of international literature suggests that aspects of the family eating environment such as shared family meals, television viewing during meals, parental modelling of eating behaviours, family interaction, self-efficacy, work-family spill-over, parental feeding styles, availability of food and accessibility of

food probably affect food habits (Brown, Scragg, & Quigley, 2008).

Having the appropriate resources and capacity to acquire and consume food is important for determining food security. It can be affected by financial resources, distance and transport to shops, knowledge, cooking skills, food preferences, cooking and storage facilities, time, mobility and social support (New South Wales Centre for Public Health Nutrition, 2003). It would be difficult for one research survey to attempt to examine and unravel all these factors. The current study aims to examine some factors thought to affect food insecurity across different income groups. These quantitative data (refer to research questions) will provide some useful background important for the development of appropriate interventions across the socio-economic spectrum in New Zealand.

2.2.1 Purchasing food

Food purchasing and consumption patterns are a combination of economic access (affordability) and physical access (availability) (New South Wales Centre for Public Health Nutrition, 2003).

The cost of healthier food compared to the cost of unhealthy food has been considered a barrier to healthy eating in low socio-economic groups. An economic explanation given for the association between socio-economic status and obesity is that energy-dense foods are less expensive than healthier, less energy-dense foods (Drewnowski, Monsivais, Maillot, & Darmon, 2007). Energy density (calories per weight) is a function of water content, meaning that in general foods with a lower water content (which are less perishable) are more energy-dense than fresh foods with a higher water content – for example, fruit and vegetables. Low-cost diets have been found to be more energy-dense, yet nutrient-poor (Andrieu, Darmon, & Drewnowski, 2006). In terms of cost per calorie, sugar, butter and chocolate are the least expensive items. Data from the French National Survey on Individual Food Consumption showed that a higher intake of vitamin C was associated with increased diet costs, and a more energy-dense diet was associated with lower diet costs (Drewnowski et al, 2007).

In Canada, household income has explained the greatest variation in food expenditure. Higher income is associated with purchasing more from all food groups, with purchase of fruit and vegetables the most responsive to increases in income (Ricciuto et al, 2006).

In Turrell et al's study of 1,000 households in Brisbane, people with lower income purchased fewer types of fruit and vegetables, and less frequently, than those with a higher income (Turrell, Hewitt, Patterson, Oldenburg, & Gould, 2002). Household income was more likely than area-level socio-economic status to be driving food purchasing (Turrell et al, 2002).

Australian women from low socio-economic groups were more likely to name the cost of healthy food as a barrier to healthy eating than women from mid or high socio-economic groups (Inglis, Ball, & Crawford, 2005).

In New Zealand the Health Sponsorship Council (HSC) has undertaken a large qualitative research project exploring healthy eating, smoking and gambling in the context of New Zealand families and whānau. The first phase has included 12 focus groups, 18 family or whānau groups, 48 in-depth interviews with parents and 10 interviews with children from different ethnic groups. This provides some useful insights into the eating environment of New Zealand families (TNS New Zealand Ltd, 2007).

Filling stomachs as cheaply as possible was considered by some HSC participants to be more important than healthy eating. Fruit and vegetables were perceived as being high-cost. Other families, however, felt that healthy eating including fresh fruit and vegetables was a cheaper way of eating, and felt this cheaper cost was a facilitator to eating healthily (TNS New Zealand Ltd, 2007).

Price and availability of healthier food may or may not be determined by area of residence. This may vary not just between countries, but also between areas within a country. For example, access to food may be more difficult in remote areas of Australia than in cities. In Queensland, remoteness of shops greatly affects food prices, with remote shops selling fruit, vegetables and legumes at prices 20 percent higher than inner-city shops (Harrison et al, 2007).

In London, smaller convenience shops have higher prices for staple food items compared to large supermarkets (Donkin, Dowler, Stevenson, & Turner, 2000). Access to large supermarkets with cheaper prices may be a particular concern for people who do not own cars in some countries (Dowler, 2001).

Geographic Information System (GIS) software is increasingly being used to show variation in the price and availability of food locally and nationally (Donkin

et al, 2000). One New Zealand study has examined the association between travel time to supermarkets and convenience stores and the ability to meet recommended daily servings of fruit and vegetables (Pearce, Hiscock, Blakely, & Witten, 2008). The study mapped 661 supermarkets and 3,681 convenience stores. Using data from the 2002–03 New Zealand Health Survey of 15,529 adults, the travel time to the nearest supermarket and convenience store for each participant was calculated. No associations were found between access to supermarkets and convenience stores and meeting the recommended daily intake of fruit and vegetables. Those participants who had the best access to convenience stores, however, were less likely to meet vegetable recommendations (Pearce et al, 2008). Proximity to shops may therefore not be an issue for access to fruit and vegetables in New Zealand.

For the FFES we were interested in collecting information on where households shop for food and how frequently they shop, and whether these shopping habits change with socio-economic and food-security status. Furthermore, we were interested in the variety of fruit and vegetables usually purchased by households in different income groups and of varied food-security status.

Research questions for the FFES

How frequently do households shop for food, where do they shop for food, how much time does it take to travel to food shops and how do they travel to food shops?

Does this differ by income group or household food-security status?

How many different types (canned, frozen and fresh) of fruit and vegetables are purchased by households?

Does this differ by income group or household food-security status?

2.2.2 Kitchen resources

In order to prepare safe and nutritious food it is important that kitchens have the necessary equipment. Food access and management may be severely restricted if basic facilities such as ovens, fridges and possibly a freezer are not available. Furthermore, factors such as adequate areas for dry-food storage are

also important. Buying in bulk is one strategy frequently used by low-income mothers to stretch their food dollar (Wiig & Smith, 2008). This strategy, however, is dependent on having adequate storage space available.

2.2.3 Home-grown food

Having easy access to fresh produce, either from their own garden or from friends' or family's gardens, made it easier for families in the HSC study to incorporate fruit and vegetables into their diets (TNS New Zealand Ltd, 2007). Two overseas studies, one in the United Kingdom and one in the United States, have shown that adults who have access to fruit and vegetable gardens eat more fruit and vegetables (Billson et al, 1999; Devine, Wolfe, Frongillo, & Bisogni, 1999).

Community gardens and home gardens have been embraced by some health promoters as a potential solution to food insecurity. We are not aware of any New Zealand research, however, on how many households already grow some vegetables or fruit and the impact this has on their nutrient intake.

For the current research we were interested in whether households had limited cooking and storage facilities, and if this affected their food security. We were also interested in whether city dwellers grew their own vegetables and fruit trees.

Research questions for the FFES

Do households have adequate facilities for cooking and storage of food? Does this differ by income group and household food-security status?

What proportion of households grow fruit or vegetables for eating? Does this differ by income group and household food-security status?

2.2.4 Meal planning and preparation

Meal planning and preparation, time scarcity and the use of ready-to-eat and convenience foods are all interrelated and influenced by family dynamics and roles.

Time scarcity is defined as “a person’s perception or feelings of not having enough time to do all they want or need to in a day” (Jabs et al, 2007, p.).

Perception of time scarcity may have major implications for food selection and preparation. Behavioural strategies adopted to cope, such as eating faster,

grazing, multi-tasking (by watching television and eating at the same time, for example) could be positive or negative in terms of food choices.

In the United States, time spent in meal preparation, cleaning up after meals and food shopping for both non-working and working women decreased between 1985 and 1999 (Rose, 2007). In 1965 non-working women spent 10.9 hours per week in meal preparation; by 1999 they were spending 7.9 hours per week (Rose, 2007). Working women spent 5.6 hours in meal preparation in 1985 and 4.5 hours by 1999 (Rose, 2007).

Time scarcity was mentioned in the qualitative HSC study as a barrier to healthy eating by families. Preparing healthy food is time-consuming, and juggling a number of commitments, such as out-of-school activities, means that convenience foods, including takeaways, are chosen as a time-saving option (TNS New Zealand Ltd, 2007).

When time is constrained, economic resources are important in order to purchase 'convenience' in meal preparation (Rose, 2007). Leung, Miklius, Wanitprapha, & Quinn (1992) using dietary modelling of 895 Hawaiian recipes, demonstrated a trade-off between time and food costs. The diet that cost the least (US\$71.13), while still meeting all nutritional needs, took 28 hours to prepare each week; in comparison, the diet that took only 8.6 hours per week to prepare cost the most (US\$181.86) (Leung, et al 1992).

Two American studies using in-depth interviews of employed females with a low or moderate income have examined the effect of their jobs on their food choices at home and in their workplace. The authors presented a model that emerged from their research, whereby work was described as spilling over onto their ability to make healthy food choices for themselves and their families. Work affected their energy levels and time; other challenges, such as being a single parent, having young children, lack of help with food preparation, health problems in parents or children, children's sporting activities and partners' work schedules, also served to exacerbate the effect of negative work spill-over (Devine, Connors, Sobal, & Bisogni, 2003; Devine et al, 2006). Ready-to-eat food met various needs, such as coping with fatigue, speeding up meal preparation and providing a treat and a relaxed time for the family (Devine et al, 2006).

The amount of time available for food preparation is also a function of the family dynamics, and whether or not one parent is not working and has more time to spend on food preparation may also be an issue (TNS New Zealand Ltd, 2007).

2.2.5 Meal planning and budgeting skills

It is often speculated that poor cooking and meal-planning skills could contribute to lower dietary quality among the most deprived groups. Evidence from the United Kingdom, however, indicates that it is the middle class who spend the least amount of time preparing food. Lower classes are more likely to use cheaper ingredients, minimise wastage and adapt cooking and meal patterns to use cheaper food (Dowler, 1997).

Budgeting behaviour and skills are difficult to investigate, since people may have a series of strategies that are not easily articulated (Dowler, 1997). When money is tight food is often the only flexible expenditure, and evidence suggests that people may make paying bills a higher priority than buying food (Dowler, 2001).

There is evidence that low-income mothers may go without food in times of constrained resources so that their children's dietary requirements can be met (Attree, 2005; McIntyre et al, 2003; Tarasuk & Beaton, 1999).

Research questions for the FFES

How much time is spent preparing and cleaning up for main meals? Does this differ by income group and food-security status?

Does the main food preparer make a shopping list, budget for food and plan meals ahead of time?

Do these behaviours differ by income group or household food-security status?

2.2.6 Ready-to-eat food

The contribution of energy from food prepared outside the home rose in the United States from 18 percent in 1977-1979 to 32 percent in 1994-1996 (Guthrie, Lin, & Frazao, 2002). In 1994-1996 in the United States 12 percent of energy was from fast-food restaurants alone (Guthrie et al, 2002).

A higher density of fast-food outlets in more socially deprived areas has been proposed as one explanation for higher rates of obesity in these areas. A national

study examining this theory in New Zealand using GIS found that travel distance to fast-food outlets (both multi-national and local outlets) showed a socio-economic gradient, with those in the more deprived areas having the shortest distance to travel (Pearce, Blakely, Witten, & Bartie, 2007). Potentially, the high density of fast-food outlets in the most deprived areas is exposing residents to a more 'obesogenic' environment (Pearce et al, 2007). The usefulness of this research is limited, however, because it does not examine actual consumption of food from these outlets.

The 1995 Australian Adult Nutrition Survey showed that higher-income households had a higher energy intake from foods prepared outside the home compared to low-income households. When this was examined by an area-based index of socio-economic status no association was found (Burns, Jackson, Gibbons, & Stoney, 2002).

It has been suggested that although different social classes make similar use of ready-made food, lower social classes are more likely to use the cheaper, less healthy fast-food outlets. Some families in the New Zealand HSC research felt that the increase in the range of pre-prepared healthier food options was empowering as it helped support healthier eating under time constraints. As American qualitative studies have also demonstrated, food-preparers felt the use of ready-to-eat food was liberating and offered a time for the family to relax together (Devine et al, 2003; Devine et al, 2006).

Research questions for the FFES

How frequently is ready-to-eat food purchased by families? Does this differ by income or household food-security status?

Where are families buying ready-to-eat food? Does this differ by income or household food-security status?

2.2.7 Family meals

It is possible that a decrease in 'family meals eaten together' has occurred. Recently in New Zealand, 65 percent of 15-year-olds reported eating the main meal of the day with their parents several times per week. This was the second-lowest among OECD nations (Bradshaw, Hoelscher, & Richardson, 2007). Family meals are believed to be important in the development

of healthy eating choices. They are also important for parental role-modelling and dietary monitoring. Increased frequency of family meals is associated with increased fruit and vegetable consumption in children, adolescents and adults (Boutelle, Birnbaum, Lytle, Murray, & Story, 2003; Campbell, Crawford, & Ball, 2006; Crawford, Ball, Mishra, Salmon & Timperio, 2007; Gillman et al, 2000; Neumark-Sztainer, Hannan, Story, Croll, & Perry, 2003).

Few studies have examined frequency of family meals by socio-economic status. Those that have, however, have found that the most educated group were the least likely to eat as a family more than four times a week (Campbell et al, 2002). Frequency of family meals was highest among families with mothers who were not employed and lowest for families where the mother worked full-time.

Research questions for the FFES

At how many main or evening meals during weekends and weekdays are all household members present, and does this differ by income?

Do adult work schedules or children's activities impede a family's ability to eat main meals together? Does this differ by income group?

In summary, many factors affect the family in terms of healthy eating. We do not have a clear picture of what these factors are in a New Zealand context. The FFES is a formative research attempt to gather some basic information about New Zealand families and the context in which they are eating.

Health-promotion programmes and interventions are often aimed at changing the behaviour of low socio-economic groups. A question that needs to be addressed, however, is whether the family eating environment in these groups is any different from that of their more affluent counterparts. If the overriding barrier to healthy eating is 'access to food' and 'cost of food', then health-promotion activities that do not take these issues into consideration may have less impact.

2.3 List of research questions

1. What is the prevalence of food insecurity?
2. What socio-demographic factors (including home ownership, receiving government benefits,

- gender, age, household size) are associated with food insecurity?
3. How frequently do households shop for food, where do they shop for food, how much time does it take to travel to food shops and how do they travel to food shops? Does this differ by income group or household food-security status?
 4. How many different types (canned, frozen and fresh) of fruit and vegetables are purchased by households? Does this differ by income group or household food-security status?
 5. Do households have adequate facilities for cooking and storage of food? Does this differ by income group and household food-security status?
 6. What proportion of households grow fruit or vegetables for eating? Does this differ by income group and household food-security status?
 7. How much time is spent preparing and cleaning up for main meals? Does this differ by income group?
 8. Does the main food preparer make a shopping list, budget for food and plan meals ahead of time? Do these behaviours differ by income group or household food-security status?
 9. How frequently is ready-to-eat food purchased by families? Does this differ by income or household food-security status?
 10. Where are families buying ready-to-eat food? Does this differ by income or household food-security status?

3. METHODOLOGY

The FFES was a cross-sectional survey carried out in the cities of Dunedin and Wellington. Participants were consenting households (n=136) with at least one child living at home between the ages of five and 18 years.

The primary participant was the person mainly responsible for food provision and preparation. This person was interviewed in their home and answered questions on behalf of the household. Recruitment and participation took place between October 2007 and October 2008.

Ethical approval was granted by the University of Otago Ethics Committee (14 August 2007) and written informed consent was obtained from all participants.

3.1 Recruitment of households

Households were recruited in two separate phases: Phase 1 from October 2007 to January 2008, and Phase 2 from July to September 2008.

3.1.1 Phase 1 recruitment

One thousand households from seven suburbs in Dunedin and five suburbs in Wellington were randomly selected from electoral rolls. The suburbs were selected on the basis of their NZDep01 decile ranking (New Zealand Deprivation Index 2001). NZDep01 combines nine variables from the 2001 census that reflect eight dimensions of deprivation. It provides a deprivation score of 1 to 10 (1 being the least deprived) for each mesh-block in New Zealand (Salmond & Crampton, 2002).

Households were recruited from the Dunedin suburbs of Andersons Bay, Roslyn and Opoho (NZDep01 rating 1–3) and Brockville, South Dunedin, Caversham and Calton Hill (NZDep01 rating 8–10). From Wellington, households were recruited from Ngaio and Seatoun (NZDep01 rating 1–3) and Kilbirnie, Berhampore and Strathmore Park (NZDep 01 rating 8–10).

Randomly selected householders were sent a letter and an information sheet about the survey. If they were not the main food preparer they were asked to pass the letter to the person in the household who was. The letter was followed up by a phone call to check whether the household was eligible to take part and if they would consent to participate. Phone numbers were acquired from the New Zealand White Pages. Attempts

were made to contact households that did not have their phone number listed by door-knocking. A free 0800 number and an email address on the letter were also available for households to initiate contact with the researchers of their own accord.

As previously mentioned, an area-based index of socio-economic status (NZDep01) was used to recruit households into the study. After preliminary data analysis it was clear, however, that there was considerable overlap in terms of income between the low and high socio-economic areas. In particular, those households surveyed in the deprived areas did not necessarily have a low income.

Income was therefore chosen as the primary indicator, with households being subsequently classified into three income groups: high, medium and low. Households in the high-income group had an annual household income (after tax and student-loan repayments) over \$70,000, the medium group between \$30,000 and \$69,999 and low less than \$30,000.

3.1.2 Phase 2 recruitment

To obtain a large enough comparison group for the low-income category, recruitment from the most deprived decile areas was changed. Flyer-drops were carried out in Dunedin suburbs stating that households with an annual income after tax of less than \$30,000 were invited to take part in the survey.

3.2 Measures and instruments

A questionnaire was developed to examine household food access and purchasing habits, food-security status and meal planning. The questionnaire was pre-tested on a convenience sample of 10 Dunedin households to check for clarity and comprehensibility, and amended as necessary.

No previous surveys in New Zealand have covered the scope of this questionnaire. A review of the literature was therefore undertaken to determine family food-environment issues and guide question development. Demographic data and instruments to ascertain food security have been taken directly from previous large New Zealand surveys, as specified in Appendix A, Table 7.1.

The questionnaire was interviewer-administered by a trained interviewer in the household. Information was entered directly onto a laptop computer. Show-cards

were used as an aid to the interview so that participants could choose from categorical options associated with some of the questions. Appendix B contains the questionnaire used for the interview (questions not relevant to this report have been excluded).

3.3 Demographic variables

Highest level of education achieved, gender, total household income, date of birth and occupation of each household member were collected. Information was also collected regarding home ownership and whether members of the household received a government benefit.

3.4 Food security

Food security was measured using eight validated indicator statements (Table 7.1) from NNS97 and CNS02. From their responses to these questions households were classified into one of three groups:

1. Low food security – households that responded affirmatively to statements 5 and 6 and three other statements.
2. Moderate food security – households that responded affirmatively to two or more of the statements.
3. Full or almost full food security – households that provided no affirmative response to any of the eight indices and households that responded affirmatively to one statement only.

These three categories have been validated as an accurate method of assessing the severity of food security (Parnell, 2005).

The specific variables measured regarding kitchen resources, purchasing fruit and vegetables, purchasing of and access to food and meal planning and preparation are listed in Table 7.1.

3.5 Data analysis

Statistical tests were carried out using STATA 10. For all tests, differences between the groups have been considered statistically different if P-values calculated were less than 0.05. To aid the reader, statistically

significant results in the tables have been discussed in the results section. For all the variables measured, the data was analysed by income and by food security status.

Fisher's exact test was used to determine P-values for association between the demographic categorical variables and income group and food-security status (Table 7.1 and Table 7.2).

Differences between income groups in the frequency of affirmative answers to each of the food-security indicator statements were also compared using Fishers exact test. If the P-value indicated a significant difference (<0.05), posthoc analysis was carried out to compare the low income group to both the high and medium income group and also the high income group to the low income group again using Fishers exact tests.

The same method was used to compare differences between income groups for growing fruit and vegetables, food purchasing and access variables, types of shops used and meal planning and preparation variables (Table 4.5, Table 4.9, Table 4.11, Table 4.14).

Food-security status (low or moderate food security versus full food security) was compared using Fishers exact test.

Simple linear regression was used to compare the mean number of types of fresh fruit and vegetables bought per week, and total fruit and vegetables bought per week by income group and food-security status. Reverse helmert coding was used to compare income groups which allowed for the comparison of the low income group to the medium and high income groups, and the medium income group to the high income group.

Kruskal Wallis tests were used to compare the means for the number of types of canned and frozen fruit and vegetables bought per week (Table 4.3, Table 4.4) and also the source of ready-to-eat food (Table 4.7, Table 4.8) between income groups and food-security status. This non-parametric test was used as the data for these variables were not normally distributed.

4. RESULTS

4.1 Description of households

In total 136 households were recruited – 64 in the high-income group, 34 in the medium and 38 in the low-income group. Of the 38 households in the low-income group, 28 were volunteers recruited during phase 2. Of the households recruited during phase 1 from the decile 1–3 areas, 63 percent (contacted and eligible for the study) agreed to take part and in the decile areas 8–10, 56 percent consented.

Table 7.2 in Appendix C gives a description of the 136 households that took part in the FFES by the demographic variables measured. Nearly half of these households (47 percent) were in the high-income group, one-quarter in the medium (25 percent) and just over a quarter (28 percent) in the low-income group. The food preparers for the households were mainly female (85 percent). Eighty-one households were from Dunedin (59 percent) and 55 (40 percent) from Wellington. A higher percentage of low-income households were from Dunedin (74 percent) compared to Wellington (26 percent). The age of the main food preparer ranged from 26 to 71 years. There were no differences between the three income groups for the age, ethnicity and gender of the main food preparer.

The majority of households contained two or more adults (79 percent). Fifty percent of low-income households, however, had one parent. The number of children per household ranged from one to five. Three percent of the high-income group had no qualifications, compared to 29 percent in the low-income group. Fifty-five percent of households in the low-income group received a government benefit as their main source of income.

4.2 Food security

Demographic variables found to be associated with food insecurity included ethnicity, number of adults and number of children in the household, home ownership and having a government benefit as a primary source of income (Appendix C – Table 7.3). Level of education, gender, age and occupation were not found to be associated with household food-security status (Table 7.3).

Seven out of the eight Māori participants experienced food insecurity. One-third of households with low or moderate food security received a government benefit, compared to five percent in the fully or almost fully secure group (Table 7.3).

Approximately 40 percent of households experienced food insecurity (moderate and low food security), with 10 percent experiencing low food security (Table 4.1). The lowest-income group had the highest rate of food insecurity.

TABLE 4.1: Prevalence of level of household food insecurity

Food security status	Total		High		Medium		Low	
	n	% ^a	n	% ^a	n	% ^a	n	% ^a
Full/almost full food security	82	60	54	84	23	68	5	13 ^c
Moderate security	41	30	8	13	10	29	23	61 ^b
Low security	13	10	2	3	1	3	10	26 ^b

^a Percentage within income group

^b Low > med and high

^c Low < med and high

4.2.1 Food-security indicator statements

The number and percentage of households that gave an affirmative response to each of the food-security indicator statements are presented in Table 4.2. Statement 4 was most commonly answered affirmatively, with 82 percent of households with a low income stating that the variety of food they ate was 'often' or 'sometimes' limited by a lack of money. For all statements, the percentage of households with an

affirmative response was highest for the low-income group. In all the income groups some households reported feeling stressed about having enough money for food or providing the food that they wanted for special occasions. Indicators of more extreme food insecurity – relying on others or making use of food banks or food grants (S.5 & 6) – were reported mainly by low-income households.

TABLE 4.2: Affirmative answers to food-security indicator statements, by income group

Food-security indicator statements	Total		High		Medium		Low	
	n	% ^a	n	% ^a	n	% ^a	n	% ^a
All households	136	100	64	100	34	100	38	100
Q1. We can afford to eat properly (sometimes/never)	24	18	5	8	0	0	19	50^b
Q2. Food runs out in our household because of lack of money (often/sometimes)	27	20	3	5	6	18^c	18	47^b
Q3. We eat less because of lack of money (often/sometimes)	26	19	3	5	6	18^c	17	45^b
Q4. The variety of food we eat is limited by lack of money (often/sometimes)	63	46	16	25	16	47^c	31	82^b
Q5. We rely on others to provide food and/or money for food for our household when we don't have enough money (often/sometimes)	13	10	1	3	1	3	11	29^b
Q6. We make use of special food grants or food banks when we do not have enough money for food (often/sometimes)	12	9	1	2	0	0	11	29^b
Q7. I feel stressed because of not having enough money for food (often/sometimes)	38	28	5	8	5	15	28	74^b
Q8. I feel stressed because I can't provide the food I want for special occasions (often/sometimes)	37	27	6	9	5	15	26	70^b

^a Percentage within income group

^b Low > med and high

^c Med > high

4.3 Kitchen amenities

Approximately five percent of households did not have a dining-room table for eating meals at. Less than three percent did not have a fridge, and all households had a freezer. All households had an oven and 96 percent had a microwave. All households had a toaster and areas for dry-food storage. There were no differences in the proportion of households that did not have a dining-room table by income group or by household food-security status.

Fifty-six percent of food preparers listed one or more kitchen resources they did not have that they would like to own. The most common item listed was a food-processor, followed by a breadmaker and dishwasher.

4.4 Fruit and vegetables

4.4.1 Purchased fruit and vegetables

Table 4.3 shows the mean number of types of canned, fresh and frozen fruit and vegetables that households reported buying per week. On average, households reported buying 10.1 different types of vegetables per week and 6.8 types of fruit. Households in the low-income group purchased a significantly lower number of types of fresh vegetables (6.0), canned vegetables and total vegetables compared to the high-and medium-income groups.

There were no significant differences found between the fully or almost fully food-secure households and those with low or moderate food security. In general, the low to moderate food-security group bought fewer types of fresh, frozen and canned fruit and vegetables (Table 4.4).

TABLE 4.3: Mean number of types of fruit and vegetables bought per week, by income group

	Total	High	Medium	Low
Fruit (all)	6.8	7.2	7.1	6.2
Fruit – canned	1.6	1.4	2.0	1.6
Fruit – fresh	4.8	5.2	4.6	4.4
Fruit – frozen	0.4	0.5	0.3	0.2^b
Vegetables (all)	10.1	11.3	10.4	8.4^a
Vegetables – canned	1.4	1.7	1.6	1.4^a
Vegetables – fresh	7.1	8.0	6.8	6.0^a
Vegetables – frozen	1.6	1.7	1.8	1.5

^a Low < high and medium ^b Low < high

TABLE 4.4: Mean number of types of fruit and vegetables bought, by household food-security status

	Total	Fully/almost full food security	Low/moderate food security
Fruit (all)	6.8	7.0	6.4
Fruit – canned	1.6	1.6	1.6
Fruit – fresh	4.8	5.0	4.5
Fruit – frozen	0.4	0.4	0.4
Vegetables (all)	10.1	10.8	9.5
Vegetables – canned	1.4	1.6	1.2
Vegetables – fresh	7.1	7.4	6.7
Vegetables – frozen	1.6	1.7	1.5

4.4.2 Fruits and vegetables grown for eating

Over half of households reported growing some vegetables for eating (57 percent). There were no differences found in the proportion of households that grew vegetables for eating by income or by household food-security status (Table 4.5). A smaller proportion of households grew fruit for eating, and

this was associated with income and household food-security status. Households in the low-income group were less likely to report growing fruit for eating (29 percent) than the high-income group (61 percent). The proportion of households with low or moderate food security that grew fruit for eating was approximately half that of the food-secure households (31 percent versus 59 percent) (Table 4.6).

TABLE 4.5: Fruit and vegetables grown for eating, by income group

	Total		High		Medium		Low	
	n	% ^a	n	% ^a	n	% ^a	n	% ^a
Grow fruit	65	48	39	61	15	44	11	29 ^b
Grow vegetables	78	57	39	61	21	62	18	47

^a Percentage within income group ^b Low < high

TABLE 4.6: Fruit and vegetables grown for eating, by household food-security status

	Total		Fully/almost full food security		Low/moderate food security	
	n	% ^a	n	% ^a	n	% ^a
Grow fruit	65	48	48	59	17	31 ^b
Grow vegetables	78	57	52	63	26	48

^a Proportion within food-security category ^b Low/moderate food security < full/almost

4.5 Ready-to-eat food

On average, households ate ready-to-eat food from any source 13 times per month. The most commonly used source was the school canteen (2.6), followed by cafes (2.4) and fish and chip shops (1.6). Low- and high-income groups had a similar overall use of ready-to-eat food (Table 4.7). The medium-income

group (10.4) had a lower overall use of ready-to-eat food than the high-income group (14.4). Households in the high-income group (3.5) went to cafes more than households in the medium-income group and the low-income group (1.4 & 1.6 respectively). The low-income group had a negligible use of restaurants (0.3 occasions per month) compared to the high-income group (3.5 occasions per month) (Table 4.7).

TABLE 4.7: Mean number of occasions ready-to-eat food used in a month, by income group

	Total	High	Medium	Low
Chain restaurants	1.4	1.3	1.0	1.8
Fish and chip shops	1.6	1.6	1.3	2.0
Local Asian takeaways	0.9	1.0 ^a	0.5	1.0
Cafes	2.4	3.5 ^d	1.4	1.6
Restaurants	0.9	1.2 ^b	0.9	0.3
School canteens	2.6	2.3	1.0	4.4 ^c
Workplace cafe	1.4	1.3	2.6	0.5
Bakery	1.5	1.8	1.3	1.2
Total ready-to-eat	13.1	14.4 ^a	10.4	13.3

^a High > medium ^b High > low ^c Low > medium ^d High > medium and low

Table 4.8 examines the number of occasions that ready-to-eat food was reported per month by household food-security status. Overall use of ready-to-eat food was the same for the two groups.

Low and moderate food-security households reported using the school canteen more than the fully or almost secure group (3.8 and 1.8 occasions per month).

TABLE 4.8: Mean number of occasions ready-to-eat food used in a month, by household food security status

	Total	Full/almost full food security	Low/moderate food security
Chain restaurants	1.4	1.4	1.4
Fish and chip shops	1.6	1.5	1.9
Local Asian takeaways	0.9	0.9	0.9
Cafes	2.4	2.9	1.8
Restaurants	0.9	1.1	0.5
School canteens	2.6	1.8	3.8^a
Workplace cafe	1.4	1.8	0.8
Bakery	1.5	1.6	1.5
Total ready-to-eat	13.1	13.1	13.1

^a Low/mod > full/almost

4.6 Food purchasing and access

Out of all the households, 42 percent agreed with the statement “buying more fruit than we already do would be difficult on our budget”. Agreement with this statement was higher in the low-income group (68 percent) than in the medium- and high-income groups (41 and 25 percent respectively). A higher proportion of households in the low-income group (66 percent) also thought “buying more vegetables than we already do would be difficult” compared to the high-income group (21 percent). A higher proportion of food-insecure households also felt they would have difficulty buying more fruit and vegetables than they already did.

Visiting a supermarket was felt to be ‘easy’ for nearly all food preparers, with no difference in responses found by income groups or by household food-security status.

Food preparers were also asked whether they felt that fruit and vegetables were affordable to them in the shop where they usually bought most of their food. Households in the low-income group were more likely to disagree with this statement compared to the high-income group (Table 4.9). Similarly, food-insecure households were more likely to disagree with these statements than food-secure households.

TABLE 4.9: Food-purchasing and access, by income group

	Total		High		Medium		Low	
	n	% ^a	n	% ^a	n	% ^a	n	% ^a
Buying more fruit than we already do would be difficult on our budget (agree/strongly agree)	56	42	16	25	14	41	26	68^b
Buying more vegetables than we already do would be difficult on our budget (agree/strongly agree)	51	38	13	21	13	38	25	66^c

Visiting a supermarket is easy for me to do (agree/strongly agree)	125	92	60	94	31	91	34	90
Fruit is affordable for me in the shop where I usually do my food shopping (disagree/strongly disagree)	32	24	11	17	6	18	15	40^b
Vegetables are affordable for me in the shop where I usually do my food shopping (disagree/strongly disagree)	24	18	7	11	6	18	11	29^c

^a Percentage within income group

^b Low > med and high

^c Low > high

TABLE 4.10: Food purchasing and access, by household food-security status

	Total		Fully/almost full food security		Low/moderate food security	
	n	% ^a	n	% ^a	n	% ^a
Buying more fruit than we already do would be difficult on our budget (agree/strongly agree)	56	42	21	26	35	65^b
Buying more vegetables than we already do would be difficult on our budget (agree/strongly agree)	51	38	17	21	34	63^b
Visiting a supermarket is easy for me to do (agree/strongly agree)	125	92	76	93	49	91
Fruit is affordable for me in the shop where I usually do my food shopping (disagree/strongly disagree)	32	24	13	16	19	35^b
Vegetables are affordable for me in the shop where I usually do my food shopping (disagree/strongly disagree)	24	18	9	11	15	28^b

^a Percentage within each food-security group

^b Low/mod > full/almost

4.6.1 Types of food shops

All households shopped for food at a supermarket. In addition, one-third shopped at a fruit and vegetable shop. Butchers, fishmongers and dairies were used by

approximately one-quarter of households. Food markets (including farmers' markets and fruit and vegetable markets) were used by 20 percent of households (Table 4.11).

TABLE 4.11: Types of food shops used, by income

	Total		High		Medium		Low	
	n	% ^a	n	% ^a	n	% ^a	n	% ^a
Supermarket	136	100	64	100	34	100	38	100
Fruit and vegetable shop	43	32	20	31	11	32	12	32
Butchers/fishmongers	35	26	15	23	6	18	14	37
Dairy	34	25	18	28	9	26	7	18
Food market	27	20	16	25	9	26	2	5 ^b
Mini supermarket	19	14	9	14	3	9	7	18
Petrol station	10	7	6	9	0	0	4	11
Other	7	5	0	0	4	12	3	8

^a Percentage within each income group ^b Low < med and high

4.6.2 Frequency of food shopping

Most households shopped at a supermarket either weekly (44 percent) or twice a week (38 percent). There were no differences in the frequency of food shopping at a supermarket by income or by food security. On average it took nine minutes to get to a supermarket, with 95 percent of households getting there by car.

Forty-two percent of households that bought from fruit and vegetable shops went there weekly. Travel to the fruit and vegetable shop took nine minutes on average.

The dairy was the only shop to which a large proportion of households (60 percent) walked. On average it took households six minutes to travel to the dairy.

TABLE 4.12: Frequency of food shopping

	Nearly every day		Twice a week		Weekly		Fortnightly		Monthly or less	
	n	%	n	%	n	%	n	%	n	%
Supermarket (n=136)	6	8	52	38	60	44	16	12	0	0
Fruit and vegetable shop (n=43)	1	2	6	14	18	42	10	23	8	19
Butchers/fishmongers (n=35)	0	0	2	6	11	32	10	29	12	34
Dairy (n=35)	0	0	1	9	8	30	6	22	12	44
Food market (n=34)	2	6	5	15	7	41	3	9	12	35
Mini supermarket (n=27)	0	0	3	16	5	26	2	11	9	47
Petrol station (n=10)	0	0	0	0	3	30	1	10	6	60
Other (n=7)	0	0	0	0	30	43	4	57	0	0

TABLE 4.13: Mean travel time to food shops

	Travel time (mins)
Supermarket (n=136)	9.0
Fruit and vegetable shop (n=43)	9.0
Butchers/fishmongers (n=35)	9.3
Food market (n=34)	11.5
Dairy (n=27)	6.0
Mini supermarket (n=19)	5.4
Petrol station (n=10)	4.5
Other (n=7)	4.0

4.7 Meal planning and preparation

Nearly two-thirds of households ‘always’ or ‘often’ made a shopping list before they went food shopping, and 72 percent planned their main meal ahead of time. There were no differences between the three income groups in this respect (Table 4.14). Children’s activities

made it difficult for 24 percent of households to have main meals together, and adult work schedules made it difficult for one-third of households (Table 4.14).

Food-secure households were more likely to plan meals ahead of time (79 percent) than low or moderate food-security households (61 percent) (Table 4.15).

TABLE 4.14: Meal planning and preparation, by income group

	Total		High		Medium		Low	
	n	% ^a	n	% ^a	n	% ^a	n	% ^a
Plan main meals ahead of time (yes)	98	72	43	68	29	85	26	69
Budget for a set amount of money on food each week (yes)	82	60	34	53	26	76	22	58
Make a list before food shopping (always or often)	93	69	43	67	23	67	27	71
Adult work schedules make it difficult to have main meals together (strongly agree/agree)	44	32	24	38	11	32	9	24
Children’s activities make it difficult to have main meals together (strongly agree/agree)	32	24	18	28	6	18	8	21

^a Percentage within income group

TABLE 4.15: Meal planning and preparation, by household food-security status

	Total		Fully/almost full food security		Low/moderate food security	
	n	%	n	% ^a	n	% ^a
Plan main meals ahead of time (yes)	98	72	65	79 ^b	33	61
Budget for a set amount of money on food each week (yes)	82	60	51	62	31	57
Make a list before food shopping (always or often)	93	69	54	66	39	72
Adult work schedules make it difficult to have main meals together (strongly agree/agree)	44	32	28	34	16	30
Children's activities make it difficult to have main meals together (strongly agree/agree)	32	24	21	26	11	21

^a Percentage within each food-security group

^b Fully/almost food secure > Low/mod food secure

4.7.1 Time spent in meal preparation

The median time spent preparing food for the main meal on a week day was 40 minutes; for a weekend day it was 36 minutes. The amount of time spent ranged from five minutes to three hours. The median time spent cleaning up after a main meal during week days and weekends was 20 minutes. There were no differences between the three income groups regarding the amount of time spent in meal preparation and cleaning (data not presented). Similarly, the amount of time spent in meal preparation did not vary by household food-security status (data not presented).

TABLE 4.16: Number of week days all present for main meal

Number of days	n	%
0	6	4
1	4	3
2	4	3
3	11	8
4	22	16
5	89	65

4.7.2 Family meals

The mean number of week days when all household members were present for their main meal was 4.3. Sixty-five percent of households had their main meals together on all five week days (Table 4.16). There were no differences in the mean number of weekend days or week days when all household members were present by income group or food-security status (data not presented). On weekend days 80 percent of all households had their main meal together on both Saturday and Sunday.

TABLE 4.17: Number of weekend days all present for main meal

Number of days	n	%
0	8	6
1	19	14
2	109	80

5. DISCUSSION

Results from this research offer an interesting insight into the habits and behaviour surrounding food purchasing and eating among a sample of New Zealand families. When interpreting the results, however, there are a few limitations to the survey that should be considered.

Income has been used in this survey as a proxy measure of socio-economic status. Initially we planned to use the NZDep to separate the sample into two groups: high and low socio-economic status, based on the deprivation rating of the suburb from which they were recruited. During recruitment and after preliminary data analysis, it was apparent that for the purposes of this survey this would not accurately classify households into two clear socio-economic groups. Households recruited from the more deprived suburbs (NZDep01 deciles 8–10) were not necessarily representative of low socio-economic status, with one-third of them having annual incomes over \$70,000. It was therefore decided to separate the sample into three income groups.

The low-income and high-income groups represent two extremes of New Zealand society. The low-income group in this survey had an annual income after tax and student-loan repayments of less than \$30,000. Over half of this group were receiving a government benefit as their main source of income. The medium-income group, however, contained a range of households and circumstances and is probably less homogeneous than the other groups. To view the income categories used in this research in context, the median family income for one-parent families with children in New Zealand is \$27,400 and for a couple with children the median family income is \$75,600. Wellington City has the highest proportion in the country of families with an annual income over \$70,000 (49 percent) (Statistics New Zealand, 2007).

Recruitment of families for the low-income group was challenging. Many of the households in the low-income group had a mobile phone rather than a landline. Initial contact with these households after they had been randomly selected was therefore difficult, as their phone number was not listed in the White Pages. Contacting the households via door-knocking was time-consuming, and often people were not at

home. To ensure that there were enough households for the low-income group, the method of recruitment was changed with the use of flyers advertising the study in low-decile areas. Twenty-eight low-income households were recruited in this manner. Potentially, these households may have had more of an interest in food and nutrition. For the demographic variables that we measured there was no difference between the low-income households recruited randomly and those that volunteered.

The survey cannot thus be considered representative of all New Zealand families. It is based in two cities and therefore does not include rural families or families from smaller urban towns or cities. It may be that in more rural areas of the country physical access to food shops could be more of an issue. More families recruited were from Dunedin than Wellington. Households recruited into the study were also mainly made up of New Zealand European members, with Pacific and Māori households being under-represented. The survey was restricted to families with at least one child over the age of five. This will have increased the age of the main food preparer, with less than 27 percent being under 40 years old and half of the food preparers aged between 40 and 49 years.

Direct data-capture to laptop computers was utilised, so that different interviewers administered questions in a consistent manner. The survey was carried out between October 2007 and October 2008. During 2008 food prices increased considerably in New Zealand, rising by 8.2 percent from the previous year (Statistics New Zealand, 2008); this may have affected results as more low-income families were surveyed during 2008.

5.1 Food insecurity

The FFES included only families with children. We would therefore expect the prevalence of food insecurity to be higher than that found in the NNS97, which included all types of households. Rates of food insecurity in this study were slightly lower compared to national data for families with children collected in 2002 (Parnell et al, 2003) (Table 5.1). In CNS02 there was a higher proportion of Māori and Pacific households, with these ethnic groups reporting higher rates of food insecurity (Parnell et al, 2003). In the current survey these ethnic groups were under-represented.

TABLE 5.1: Comparison of food-security status to New Zealand national surveys

Survey	Full/almost full food security (%)	Moderate food security (%)	Low food security (%)
FFES	60	30	10
NNS97 (Parnell, 2005)	72	24	4
CNSO2 (Parnell, 2005)	50	38	12

As with national data, food insecurity was found to be associated with age, with the youngest age group (<40 years) having a higher rate of low or moderate food security compared to the older age groups (Parnell et al, 2003; Russell et al, 1999). Reasons for this could include household income being committed to mortgages and to the costs associated with raising children.

Clearly, food insecurity was a major issue for many in the low-income group in this survey. For households relying on government benefits as their main source of income, food insecurity was high (64 percent). In a recent report by Christian Social Services the Presbyterian Support Otago food bank reported that in 2007, 73 percent of its food bank users received government benefits as their sole form of income (New Zealand Council of Christian Social Services, 2008). In this current study 29 percent of the low-income group had made use of special food grants or food banks, and half of this group felt they 'sometimes' or 'never' could afford to eat properly, compared to eight percent of households in the high-income group.

In this study food insecurity was also not limited to those with a low income, and 32 percent of medium- and 16 percent of high-income households reported experiencing food insecurity. Food-insecurity indicator statements capture the stress and worry associated with food insecurity, and clearly this was experienced by all income groups. The results from the FFES are backed by media and food bank reports that budget advisory services and food banks are increasingly being used by middle-income groups (Boucher, 2008; Sloan, 2008). With the economic recession it is likely that this trend will continue.

5.2 Kitchen resources

Most households in this survey had a full range of basic kitchen amenities such as freezers, fridges,

microwaves, ovens, dry-food storage areas, toasters and kettles. Although information was collected regarding whether the household owned the above amenities, we did not find out whether the size of the appliance or equipment was considered adequate for the families' needs. Limited freezer space and food-storage areas may affect the way households can shop for food and limit bulk-buying.

Nearly all households (95 percent) had a table available at which to eat meals. This is encouraging, as recent public health marketing campaigns have been promoting family meals at the table.

5.3 Home-grown food

Growing fruit and vegetables for eating was surprisingly common considering the urban setting (48 percent grew fruit and 57 percent grew vegetables). We did not collect any information, however, on the actual amount of produce that these gardens supplied to the households. We therefore cannot comment on the extent to which these gardens affect nutrient intakes. Low-income households were less likely to grow fruit. This may be because they had smaller garden areas. They were also more likely to rent rather than own the house they lived in. Establishment of fruit trees, for example, can take years. In rental accommodation, landlords rather than tenants often maintain gardens. Home-grown gardens, if efficiently run, may provide cost-effective fruit and vegetables. However, the time and skills involved in maintaining them and the initial cost outlays may be a deterrent for many. Food-insecure households were just as likely as food-secure households to grow some vegetables for eating. Promotion of vegetable gardens may therefore not have a large impact in terms of reducing food insecurity. Future research should determine what impact the fruit and vegetable gardens have on overall nutrient intakes, and the size of the garden and time needed to make significant nutritional gains.

5.4 Food purchasing

5.4.1 Purchased fruits and vegetables

Food preparers were asked whether they used fresh, canned and frozen fruit and vegetables, and the number of different types they bought each week for their household. Lower-income households bought fewer types of both canned and fresh vegetables, meaning there was less variety available to the household. Similar results were noted in an Australian survey also examining the variety of fruits and vegetables consumed – low-income adults consumed a more limited variety of fruit and vegetables compared with high-income adults (Giskes, Turrell, Patterson, & Newman, 2002).

Households in the low-and medium-income groups were more likely than those in the high-income group to agree that buying more fruit and vegetables than they currently bought would be difficult on their budget. Similarly, fruit and vegetables were not perceived as affordable by low-income households in the shop where they usually bought their food. This perceived barrier to purchasing fruit and vegetables represents a major disincentive to increase fruit and vegetable intake.

The question could be raised as to whether the perception among medium- and low-income groups that fruit and vegetables are not affordable is a reality. Research from Massey University calculated the cost to consumers (in 2007) of meeting nutritional guidelines to consume at least five servings of fruit and vegetables per day (Dresler-Hawke, 2007). Results ranged from \$1.13 per day to \$2.12 per day for a family of four, which would equate to \$31.64 to \$59.36 per week. In summer many vegetables were cheaper in their fresh form than frozen or canned; in winter, however, some vegetables, such as tomatoes, corn, beans and spinach, were cheaper in their processed form (Dresler-Hawke, 2007). The New Zealand Household Economic Survey conducted every three years by Statistics New Zealand gathers information on food expenditure in New Zealand households. On average, New Zealand households spend \$156 per week on food, with \$18.40 being spent on fruit and vegetables. For households receiving government benefits (excluding superannuation), \$93 is spent on food per week, with \$9.90 being spent on fruit and vegetables (Statistics New Zealand, 2007). Clearly, to meet the five-a-day recommendations a much larger amount (representing a higher proportion of disposable

income) would have to be spent by most households on fruit and vegetables.

Fruit and vegetables obtained by households by other means, such as bartering, gifts or free-fruit schemes in schools, were not examined in this survey. Furthermore, just because the food was purchased does not mean it was all necessarily eaten. Some households may buy a variety of fruit and vegetables, but there could be some wastage.

In Canada, dietary modelling has been used to show that increases of one serving per day of a nutrient-rich food that was already being eaten by food-insecure women as part of their regular diet reduced the prevalence of nutritional inadequacy by half for most nutrients (McIntyre, Tarasuk, & Jinguang Li, 2007). Dietary interventions, therefore, need not be complicated. One extra serving of vegetables, dairy or meat may go a long way in reducing nutritional differences between food-insecure and food-secure groups.

5.4.2 Physical access to food shops

Access to food shops has been described in other countries as a problem among low socio-economic groups. In the mid-1990s the term ‘food deserts’ was coined in the United Kingdom. This referred to areas that had poor retail access to healthy affordable foods. These areas were characterised by deprivation, poverty and social exclusion (Wrigley, Warm, & Margetts, 2003).

In general, physical access to shops was not an issue for families in this survey. This backs national research using GIS, showing that access to supermarkets and other shops is better in more deprived areas (Pearce et al, 2008). All households used a supermarket, with half of them shopping there more than twice a week. There were no differences found between the income groups in regard to how frequently they went to food shops. The majority of households had access to a car and 96 percent of them used a car to travel to the supermarket. A survey in Sydney found that 79.8 percent of households from three socially deprived areas used a car to access food shops (Nolan, Williams, Rikard-Bell, & Mohsin, 2006).

The percentage of households with a car in this research is more than that in the 2006 census results, which showed that 89 percent of Dunedin households and 86 percent of Wellington households had access to a car. The census result was for all household

types, and it may be that households with children are more likely to have a car. All food shops used by the households in the current study were less than 10 minutes' travel time away. As previously noted, however, this research has been carried out among city-dwellers. Families living in rural areas may not experience such convenience and easy access to the same range of food shops as households in the current study.

Few households in the low-income group used food markets. Food markets may be perceived as a more expensive place to shop; they are also a relatively new method of shopping for city-dwellers and may not yet be a choice for low-income groups.

5.4.3 Ready-to-eat food

A recent large Australian study designed to determine predictors of fast-food consumption found a higher household income to be a predictor of fast-food consumption. In this study one-third of respondents reported a frequency of consumption more than once a week (Mohr, Wilson, Dunn, Brindal, & Wittert, 2007). Another Australian study found higher income was associated with increased energy intake from foods prepared away from the home (Burns et al, 2002). Although not directly comparable, we looked at the number of occasions in a month households used ready-to-eat food.

Ready-to-eat food from any source (apart from supermarkets) was purchased on average 13 times a month. Total ready-to-eat food use was the same for the high- and low-income groups. The medium-income group did use less ready-to-eat food than the high-income group. Restaurants and cafes were used to a much greater extent by high-income households compared with the other two groups. It appears that overall use is similar between the household types despite income, but the source of the ready-to-eat food differs. Eating out at restaurants and cafes is clearly outside the norm and beyond the means of most low-income households. Low-income households and food-insecure households were using the school canteen more than the other groups. The schools in the areas from where participants were recruited offered 'smart-lunch' options that were healthy and cheap. In some schools in the less-deprived areas the school canteen had been closed down.

5.4.4 Meal planning and preparation

Budgeting for food was more prevalent among the medium-income group (73 percent) compared to the high- (52 percent) and low-income groups (58 percent). One explanation as to why the medium-income group was more likely to budget for food than the high-income group is that much of their expenditure could be described as 'fixed'. Fluctuations in food expenditure, therefore, may affect their ability to pay upcoming bills such as mortgage repayments. The need to budget for food is clearly not so much of a priority for those on a higher income. Studies in the United Kingdom have shown that low-income households do not necessarily put aside a set amount to spend on food each week (Dowler, 1997). This is because food expenditure is considered flexible and may have to be restrained or increased depending on other demands on their money that week. Results from this study are consistent with this.

Food-insecure households were less likely to plan meals ahead of time (61 percent) compared to food-secure households (79 percent). Given the insecurity surrounding food acquisition for these households, their ability to plan ahead may be compromised. This is an issue that may warrant further investigation. We cannot be sure, however, whether this practice is a consequence of food insecurity or a potential precursor.

Time spent preparing main meals was approximately 40 minutes a day, and cleaning up took 20 minutes on week days and weekends. There were no differences by income or by food-security status. This indicates that among families in New Zealand similar time is given to food preparation across socio-economic groups. Results are comparable with data from the New Zealand time-use survey (1988–1999) which found that women spent approximately one hour per day on food-preparation and clean-up (Statistics New Zealand, 2001). Cooking from scratch to keep food costs down may not be achievable in reality for most families. The forthcoming time-use survey planned by Statistics New Zealand in 2009–2010 will give further insight into time spent in food preparation and acquisition. It will also provide a more in-depth overview of time allocated to food preparation than can be achieved with the use of a single question.

One-quarter of the households stated that children's activities made it difficult to have main meals together, and one-third stated that adults' work schedules made it difficult to have main meals together. Despite this, 81 percent of families in this survey ate main meals together on four or more week days. For families that were not eating together on all week days, reasons most often included children's sporting activities and cultural pursuits. In addition, some families also had children eating meals with parents who were not living in the

same house. It seems reasonable that not all main meals can be eaten together without trade-offs.

When eligible households did not consent to taking part in this survey, one of the main reasons given was 'lack of time'. We may therefore not have captured information on those households that could be very 'time-poor', and this could have affected the results for eating main meals together, main-meal preparation times and the use of ready-to-eat food.

6. CONCLUSIONS

Further studies among those receiving government benefits and investigations into differences between food-secure and insecure within this group would be valuable. The reasons why food security is a more prevalent issue for families where adults are younger is also a pertinent area to investigate. Given the limited amount of time spent on main-meal preparation across the socio-economic groups, research into the interaction between time scarcity and food choice in New Zealand is important. The time dimension has not traditionally been considered in food and nutrition policy and guidance.

In many respects this research highlights the similarities between New Zealand families across the socio-economic spectrum in terms of behaviour surrounding food acquisition, preparation and eating together. Ready-to-eat foods were used to a similar extent in the low-income and high-income groups and the food-secure and insecure groups. The low-income group did not differ from others in terms of behaviour such as budgeting, planning and eating meals as a family. These findings offer a positive and alternative perspective to counter negative assumptions regarding the behaviour of low socio-economic

groups in New Zealand. The households in this study did not face barriers in terms of physical access to food shops.

Solutions for low socio-economic groups based on education, increasing skills and training in food preparation and nutrition may only make a small impact on food insecurity if the upstream determinants, such as limited income and economic constraints, are not addressed. In a recession it is likely that rates of food insecurity will increase. Those who develop nutritional guidelines and recommendations need to be aware of the economic constraints on many New Zealand families.

This study provides further insights into predictors of food insecurity for New Zealand families. It is reasonable to conclude that the greatest cause of food insecurity for New Zealand families included in this survey was economic in origin. For those families receiving a government benefit, in particular, food insecurity was predominant. Clearly, to enhance food security, relaxation of economic constraints in these households needs to occur. The social and economic determinants of food insecurity, such as income, housing and the cost of food must be considered in any interventions to address this issue.

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APPENDIX A:

Table of variables measured

TABLE 7.1: Variables measured

Part A – provided by the primary food provider on behalf of the family			
Demographics and description of the household	Number of children living at home under 18 years	Ethnic groups from NZ Census categories 2006	
	Number of adults living at home		
	Home rented or owned		
	Age – date of birth		
	Sex		
	Ethnic group		
	Employment status of each household member		
	Description of occupation of each household member		
	Highest level of education of each household member		
	Total annual household income		
	Number of household members receiving income support and types of income support		
	Amenities		Presence in the house of dining tables and chairs, oven, cook-top, microwave, fridge, freezer, dry-food storage areas, toaster, kettle
			Kitchen amenities within the house
			Number of television, DVDs, videos, electronic gaming machines and computers in the household
Fruit and vegetables	Fruit and vegetables grown for eating		
	Types of fruit and vegetables grown for eating		
	Types of fruit and vegetables bought per week for the household		
	Portion of food expenditure spent on fruit and vegetables (from food receipts) (not yet analysed)		

Food purchasing and access	<p>Where households shop for food</p> <p>Frequency of shopping</p> <p>Mode of transport to each shop and length of journey</p> <p>Number of occasions purchase ready-to-eat food per week</p> <p>Types of ready-to-eat food purchased</p> <p>Frequency of consumption of ready-to-eat food per month</p>
Meal planning	<p>Shopping list before shopping</p> <p>Number of household members at main meals during week days and weekends</p> <p>Number of household members at main meals during weekends</p> <p>Adult work schedules make eating together difficult</p> <p>Children's activities make eating together difficult</p> <p>Plan meals ahead of time</p> <p>Usual time (minutes) spent per day preparing main meals and cleaning up after meals on week days and weekends</p>

APPENDIX B:

Family Food Environment Questionnaire

The questionnaire was interviewer-administered with direct data-entry into a laptop using Filemaker Pro7. Showcards were used as an aid to the interview for closed questions.

Section A Household composition

- (1) What is your date of birth?
- (2) Gender?
- (3) Which ethnic group(s) do you belong to? More than one can be selected. (SHOWCARD 1)

SHOWCARD 1

NZ European
Māori
Asian
Samoan
Cook Island Māori
Tongan
Niuean
Chinese
Indian
Other (such as Japanese, Dutch etc)

- (4) What is the name of each household member, their date of birth, gender, ethnicity and their relationship to you?

Section B Household resources

Does your household have the following kitchen resources and equipment? If your household does not have the resource would they like it?

- (1) Table and chairs for eating meals
- (2) Oven
- (3) Cooktop
- (4) Microwave
- (5) Fridge
- (6) Freezer
- (7) Dry-food storage

(8) Toaster

(9) Kettle

(10) Are there any other kitchen/cooking resources or equipment that you do not have but would like to own?

Do you have the following items in your home?

If yes, how many?

(11) Television set

(12) DVD player

(13) Video recorder

(14) Gaming machine

(15) Computer

(16) How many of your computers have dial-up internet connection?

(17) How many of your computers have broadband internet connection?

Section C Food access and preparation

(1) Does your household grow any of your own vegetables for eating?

(2) If yes, what are they?

(3) Does your household grow any fruit for eating?

(4) If yes, what are they?

Do you buy any of the following types of vegetables?

(5) Fresh Yes/No

(6) Frozen Yes/No

(7) Canned Yes/No

If yes, how many of each type do you buy for the household per week?

(8) Fresh

(9) Frozen

(10) Canned

(11) Where do you usually shop for food? You can select more than one place. (SHOWCARD 2)

SHOWCARD 2

Large supermarket

Petrol station

Mini supermarket

Farmers' market

Butchers/fishmongers

Local fruit and vegetable shop

Dairy/corner shop

Other

For each shop selected

(12) How often do you shop there? (SHOWCARD 3)

SHOWCARD 3

Less than once per month

Monthly

Fortnightly

Weekly

Twice a week

Nearly every day

(13) How do you usually get there? (SHOWCARD 4)

SHOWCARD 4

Car

Walk

Bus

Cycle

Taxi

Supermarket courtesy van

Delivered

Other

(14) How many minutes does it take to get there?

Repeat questions for each shop selected.

(15) Do you budget for a set amount of dollars on food each week? (SHOWCARD 5)

(16) Do you make a list before you go food shopping? (SHOWCARD 5)

SHOWCARD 5

Always

Often

Sometimes

Never

(17) The place where I usually do my food shopping has a large choice of fresh vegetables.

(18) The place where I usually do my food shopping has a large choice of fresh fruit (SHOWCARD 6)

(19) Visiting a supermarket is easy for me to do. (SHOWCARD 6)

(20) I think fruit is affordable to me in the shop where I usually buy most of my food. (SHOWCARD 6)

(21) I think vegetables are affordable to me in the shop where I usually buy most of my food. (SHOWCARD 6)

(22) There is a wide choice of food shops in my local area. (SHOWCARD 6)

(23) Buying more fruit than I already do would be difficult on our budget. (SHOWCARD 6)

(24) Buying more vegetables than I already do would be difficult on our budget.

SHOWCARD 6

Strongly agree

Agree

Disagree

Strongly disagree

(25) How often do you and other members of your household purchase ready-to-eat food from the following places per month?

By ready-to-eat food we are referring to food that does not require any further preparation apart from reheating. It can be eaten in your home or at the premises where purchased. We are not interested in ready meals purchased from the supermarket.

Chain restaurants/takeaways, eg McDonalds, Burger King, KFC

Cafes

Fish & chips

Local Asian takeaways (Thai, Chinese, Indian)

Workplace cafeteria

Restaurants

Bakery

Food vendors

School canteen

Pizza takeaways/restaurants

Other

Section D Meal preparation and planning

(1) How many main meals during week days are all household members present?

(2) How many main meals during weekends are all household members present?

(3) Do you have a rule about using phones during main meals?

(4) Adult schedules make it difficult for us to have main meals together. (SHOWCARD 7)

SHOWCARD 7 (Q.4-6)

Strongly agree

Agree

Disagree

Strongly disagree

(5) Children's activities make it difficult to have main meals together. (SHOWCARD 7)

- (6) I often don't think about what to have for dinner/tea until right before dinner/tea. (SHOWCARD 7)
- (7) How much time (mins) do you or other household members usually spend preparing a main meal on week days?
- (8) How much time (mins) do you or other household members usually spend cleaning up after a main meal on week days?
- (9) How much time (mins) do you or other household members usually spend preparing a main meal on weekend days?
- (10) How much time (mins) do you or other household members usually spend cleaning up after a main meal on weekend days?

Section E Demographics

- (1) What is your highest secondary-school qualification and your highest post-school qualification? (SHOWCARD 8). Post-school qualification – equivalent to more than three months of full-time study/training.

SHOWCARD 8 (Q.1-2)

NZ School Cert/National Cert Level 1/NCEA Level 1

NZ Sixth Form Cert/National Cert Level 2

NZ Higher School Cert/Higher Leaving Cert/NZ Bursary of Scholarship/National Cert Level 3/NZ Scholarship Level 4

Other secondary-school qualification

- (2) For each household member older than 15 years, describe their highest secondary-school qualification and highest post-school qualification. (SHOWCARD 8)
- (3) Do you or other household members receive any income support/government benefits? If yes, which of the following? (SHOWCARD 9)

SHOWCARD 9 (Q.3)

NZ Superannuation

Family Support

Unemployment Benefit

Domestic Purposes Benefit

Sickness or Invalids Benefit

Student Allowance

Other government benefits (disability allowance/war pension etc)

(4) Are you currently in paid employment? (If yes, continue)

(5) What is your main occupation?

(6) How many hours do you work per week?

(7) Do you have any other jobs? (Repeat Q.6 if yes)

Repeat for each household member over 15 years.

(8) What is the total household income for the previous 12 months after tax and student-loan repayments?
(SHOWCARD 10)

SHOWCARD 10

100,000+

70,000 – 99,000

50,000 – 69,999

30,000 – 49,999

20,000 – 29,999

20,000 or less

Don't know

Section F Food security

I now want to ask you some questions about particular foods you choose and the buying or gifting of food. We are interested in whether you feel you always have sufficient resources to have the food you need for yourself and the people you live with. We are not concerned with your budget, or how you spend your money, but we are more interested in finding out about how people get the food that they need for their household to eat and share.

(In all questions 'we' refers to the household.)

First of all we know that some people can't afford to eat properly. It's what you think eating properly is — not what I or someone else thinks.

(1) We can afford to eat properly. (SHOWCARD 11)

SHOWCARD 11 (Q.1)

Always

Sometimes

Never

Don't know

We are interested in whether you run out of basics, like bread, potatoes etc, because you do not have enough money. We are not referring to treats or special foods. How often has this been true in the past year?

(2) Food runs out in our household due to lack of money. (SHOWCARD 12)

SHOWCARD 2 (Q. 2-8)

often

Sometimes

Never

Don't know

Now we are interested in whether lack of money leads you to sometimes have smaller meals than you would like or whether there is enough food for seconds or you sometimes skip meals. We eat less because of lack of money. How often has this been true for your household in the past year?

(3) We eat less because of lack of money. (SHOWCARD 12)

Now we are going to talk about the variety of food you eat. By variety we mean the number of different kinds of food you have. The variety of foods we are able to eat is limited by lack of money. How often has this been true for your household in the past year?

(4) The variety of food we are able to eat is limited by lack of money. (SHOWCARD 12)

Some people rely on support and assistance from others for supplying their regular food and we are interested in finding out how many people fall into this group. We rely on others to provide food and/or money for food for our household, when we do not have enough money. How often has this been true for your household over the past year?

(5) We rely on others to provide food and/or money for food, for our household, when we don't have enough money. (SHOWCARD 12)

Also, some people have to rely on other sources of help such as food grants or food banks. We make use of special food grants or food banks when we don't have enough money for food. How often has this been true for your household over the past year?

(6) We make use of special food grants or food banks when we do not have enough money for food. (SHOWCARD 12)

We know that some people get quite stressed and worried about providing enough food even though they don't actually go without. We feel stressed because of not having enough money for food. How often has this been true for your households over the past year?

(7) We feel stressed because of not having enough money for food. (SHOWCARD 12)

We recognise that for some people food and sharing of food with others is important, to the point that they don't have enough food for themselves. In this question we are only interested in social situations that are gatherings within, or outside the household. As a result people may find themselves stressed/whakamā (embarrassed) about their koha (gift) when providing food for others. It is stressful because we can't provide the food we want for social occasions. How often has this been true for your household over the previous year?

(8) We feel stressed because we can't provide the food we want for special occasions. (SHOWCARD 12)

END OF QUESTIONNAIRE

APPENDIX C:

Results tables

TABLE 7.2: Demographic variables by income group

	High income		Medium income		Low income		All	
	n	% ^a	n	% ^a	n	% ^a		%
Total	64	47	34	25	38	28	136	100
Age (years) P=0.436								
<40	14	22	8	24	15	39	37	27
40-49	35	55	18	53	16	42	69	51
50+	14	22	8	24	7	18	29	21
Gender P=0.497								
Female	55	86	27	79	34	89	116	85
Male	9	14	7	21	4	11	20	15
Ethnicity P=0.1280								
NZ European	55	86	31	91	27	71	113	83
Māori	2	3	1	3	5	13	8	6
Asian	1	2	1	3	2	5	4	3
Pacific	1	2	0	0	3	8	4	3
Other	5	8	1	3	1	3	7	5
City P=0.007								
Dunedin	29	45	24	71	28	74	91	67
Wellington	35	55	10	29	10	26	55	40
Number of adults P=0.000								
One adult	4	6	5	15	19	50	28	21
Two adults or more	60	94	29	85	9	50	108	79
Number of children P=0.308								
One	20	31	11	32	16	42	47	35
Two	29	45	20	59	17	45	66	49
Three or more	15	23	3	9	5	13	23	17
Education P=0.004								
Post-school qualification	47	73	23	68	15	39	85	63
School qualification	15	23	8	24	15	39	38	28
No qualification	2	3	3	9	8	21	13	10
Occupation P=0.000								
Professional	41	64	11	32	10	26	62	46
Other	17	27	13	38	9	24	39	29
No in paid employment	6	9	10	29	19	50	35	26
Benefit^b P=0.000								
Recieve benefit	0	0	1	3	21	55	22	16
No benefit	64	100	33	97	17	45	114	84
Home ownership P=0.000								
Rent	9	14	6	18	20	53	35	26
Own	55	86	28	82	18	47	101	74

^a Percentage within income group

^b Government benefit as primary source of income

TABLE 7.3: Demographic variables by household food security status

	Almost/fully food-secure		Low/moderate security		All	
	n	% ^a	n	% ^a	n	%
Total	82	60	54	40	136	100
Age (years) P=0.06						
<40	14	17	23	43	37	27
40-49	47	57	22	41	69	51
50+	20	24	9	17	29	21
Gender P=0.497						
Female	69	84	47	87	116	85
Male	13	16	1	13	20	15
Ethnicity P=0.1280						
NZ European	73	89	40	74	113	83
Māori	1	1	7	13	8	6
Asian	2	2	2	4	4	3
Pacific	2	2	2	4	4	3
Other	4	5	3	6	7	5
City P=0.007						
Dunedin	45	55	36	67	81	60
Wellington	37	45	18	33	55	40
Number of adults P=0.000						
Single parent	8	10	20	37	28	21
Two adults or more	74	90	34	63	108	79
Number of children P=0.000						
One	19	23	28	52	47	35
Two	43	52	23	43	66	49
Three or more	20	24	3	6	23	17
Education P=0.428						
Post-school qualification	54	66	31	57	85	63
School qualification	22	27	16	30	38	28
No qualification	6	7	7	13	20	15
Occupation P=0.114						
Professional	43	52	19	35	62	46
Other	22	27	17	31	39	29
No in paid employment	17	21	18	33	35	26
Home ownership P=0.000						
Rent	10	12	25	46	35	26
Own	72	88	29	54	101	74
Benefit^b P=0.000						
Receive benefit	4	5	18	33	22	16
No benefit	78	95	36	67	114	84

^a Percentage within food security status grouping

^b Government benefit as primary source of income

Blue Skies Research

- 1/06 *Les Familles et Whānau sans Frontières: New Zealand and transnational family obligation*, Lunt with McPherson & Browning, March 2006.
- 2/06 *Two Parents, Two Households: New Zealand data collections, language and complex parenting*, Calister & Birks, March 2006.
- 3/06 *Grandfathers – Their Changing Family Roles and Contributions*, Wilton & Davey, March 2006.
- 4/06 *Neighbourhood Environments that Support Families*, Witten, Penney, Faalau, & Jensen, May 2006.
- 5/06 *New Communication Technologies and Family Life*, Weatherall & Ramsay, May 2006.
- 6/06 *Families and Heavy Drinking: Impacts on children’s wellbeing*, Systematic Review, Girling, Huakau, Casswell, & Conway, June 2005.
- 7/06 *Beyond Demography: History, ritual and families in the twenty-first century*, Pryor, June 2005.
- 8/06 *Whānau is Whānau*, Walker, Ngāti Porou, July 2006.
- 9/06 *Supervised Contact: The views of parents and staff at three Barnardos Contact Centres in the southern region of New Zealand*, Gibbs & McKenzie, August 2006.
- 10/06 *New Zealanders’ Satisfaction with Family Relationships and Parenting*, Robertson, August 2006.
- 11/06 *Korean Migrant Families in Christchurch: Expectations and experiences*, Chang, Morris, & Vokes, October 2006.
- 12/06 *The Role of Whānau in the Lives of Māori with Physical Disabilities*, Collins & Hickey, September 2006.
- 13/06 *New Spaces and Possibilities: The adjustment to parenthood for new migrant mothers*, DeSouza, November 2006.
- 14/06 *New Zealand Cultural Norms of Parenting and Childcare and How These Relate to Labour Force Participation Decisions and Requirements*, McPherson, November 2006.
- 15/06 *Towards a Statistical Typology of New Zealand Households and Families: The efficacy of the family life cycle model and alternatives*, Crothers & McCormack, December 2006.
- 16/07 *The Family Court, Families and the Public Gaze*, Cheer, Caldwell, & Tully, April 2007.
- 17/07 *Fairness, Forgiveness and Families*, Evans, Yamaguchi, Raskauskas, & Harvey, April 2007.
- 18/07 *Managing Multiple Sclerosis and Motherhood: Women’s stories*, Payne, McPherson, & Crerar, May 2007.
- 19/07 *Diverse Forms of Pacific Families and their Financial Decision-making Approaches*, Koloto & Katoanga, September 2007.
- 20/07 *Lifelines: Young New Zealanders imagine family, friends and relationships across their life-course*, Patterson, Peace, Campbell, & Parker, September 2007.
- 21/07 *Older Adults’ Experience of Family Life: Linked lives and independent living*, Breheny & Stephens, November 2007.
- 22/08 *Whānau Socialisation Through Everyday Talk: A pilot study*, Tomlins-Jahnke & Durie, January 2008.
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Families Commission
 PO Box 2839
 Wellington 6140
 Telephone: 04 917 7040
 Email: enquiries@nzfamilies.org.nz

families commission kōmihana ā **whānau**

➤ Giving New Zealand families a voice *Te reo o te whānau*

Wellington office

Public Trust Building, Level 6
117–125 Lambton Quay
PO Box 2839, Wellington 6140
Phone 04 917 7040
Fax 04 917 7059

Auckland office

Level 5, AMI House
63 Albert Street, Auckland 1010
Phone 09 985 4106

Email

enquiries@nzfamilies.org.nz

Commission website

www.nzfamilies.org.nz

The Couch website

www.thecouch.org.nz