Acculturation in action: food habits of Vietnamese adolescents

Dian Tranter

University of Wollongong

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A thesis submitted in fulfilment of the requirements for the award of the degree

MASTER OF SCIENCE (HONOURS)

from

UNIVERSITY OF WOLLONGONG

by

DIAN TRANTER, BSc, Dip Nutrition and Dietetics

DEPARTMENT OF PUBLIC HEALTH AND NUTRITION

1997
DECLARATION

I declare that the work described in Acculturation in Action: Food habits of Vietnamese adolescents is entirely my own work. References to the work of others are indicated in the text. This work has not been submitted for the award of any other degree or diploma at any other university.

Dian Tranter
ACKNOWLEDGMENTS

This thesis could not have been completed without the assistance and support of many people.

I particularly want to thank my family, as well as my friends and colleagues, for their patience, tolerance and assistance; and my supervisor Dr Lindsey Harrison for her wisdom, her encouragement and for her confidence in me.

I also want to acknowledge The Health Promotion Unit of the (former) Southern Sydney Area Health Service who originated the project and employed me to carry out the research on which this thesis was based; staff of the Health Promotion Unit who supported the project in various ways; Tinh Tien Le who assisted with the project and gave me valuable insights into the Vietnamese way of life; and of course the schools, students and members of the Vietnamese community who participated in the project. The original project was funded by the NSW Better Health Program.
ABSTRACT

As immigrants move to Australia some changes in dietary patterns are inevitable. However, for some groups there is concern that change away from a traditional diet may lead to poorer health status. The Food and Families study was implemented with Vietnamese adolescents in the Canterbury Local Government Area (LGA) of Sydney in response to such concerns. Aims of the study were to describe the food consumption patterns and to identify health promotion needs relating to the nutrition of Vietnamese adolescents attending school in the Canterbury LGA. Data were collected via a 24-hour diet record, the results of which were compared to results of the National Dietary Survey of Schoolchildren (1985). A Food Habits Questionnaire was used to illuminate the findings of the food intake component.

Results indicated that dietary practices of Vietnamese adolescents were mixed, containing both traditional and non-traditional elements. There was also a mixture of healthy and less healthy practices, many of which were similar to those of other Australian adolescents. While an acculturated dietary pattern was evident, factors determining food intake were complex. Therefore it was necessary to interpret findings within a framework that is broader than usual in dietary studies.

This thesis examines the background to the Food and Families study, and interprets the findings of the study within a sociocultural framework. As a result, evidence is presented that acculturation itself is not necessarily a negative influence nor creates a poor health outcome. The appropriateness of some widely accepted health promotion conventions, especially when applied to nutrition in a cross-cultural context, is also challenged and the validity of some of the evidence on which this and similar studies have been based is questioned. Findings of this analysis have implications for health promotion practice.
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<td>ACHPER</td>
<td>Australian Council for Health, Physical Education, and Recreation</td>
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<tr>
<td>AIHW</td>
<td>Australian Institute of Health and Welfare</td>
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<tr>
<td>BHC</td>
<td>Better Health Commission</td>
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<tr>
<td>BMI</td>
<td>Body mass index</td>
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<tr>
<td>CHD</td>
<td>Coronary heart disease</td>
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<td>CDH</td>
<td>Commonwealth Department of Health</td>
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<tr>
<td>CVD</td>
<td>Cardiovascular disease</td>
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<tr>
<td>FFQ</td>
<td>Food frequency questionnaire</td>
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<tr>
<td>HFA</td>
<td>Health For All (report)</td>
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<tr>
<td>HPU</td>
<td>Health Promotion Unit</td>
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<tr>
<td>IGT</td>
<td>Impaired glucose tolerance</td>
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<tr>
<td>LGA</td>
<td>Local government area</td>
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<td>LOTE</td>
<td>Language other than English</td>
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<td>NESB</td>
<td>non-English speaking background</td>
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<tr>
<td>NHMRC</td>
<td>National Health and Medical Research Council</td>
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<tr>
<td>NIDDM</td>
<td>Non-insulin dependent diabetes mellitus</td>
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<td>NDS</td>
<td>National dietary survey</td>
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<td>NHF</td>
<td>National Heart Foundation</td>
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<tr>
<td>NSW</td>
<td>New South Wales</td>
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<tr>
<td>RDI</td>
<td>Recommended Dietary Intake</td>
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<tr>
<td>SES</td>
<td>Socioeconomic status</td>
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<tr>
<td>SMR</td>
<td>Standardised mortality rate</td>
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<tr>
<td>SSAHS</td>
<td>Southern Sydney Area Health Service</td>
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<tr>
<td>U5MR</td>
<td>Under 5 Mortality Rate</td>
</tr>
<tr>
<td>UK</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>US</td>
<td>United States (of America)</td>
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<td>WHO</td>
<td>World Health Organisation</td>
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CHAPTER ONE

INTRODUCTION

Information about food habits of the population is essential for effective planning and delivery of health services such as health promotion services. The food habits of relatively new and unknown population groups, such as the Vietnamese adolescent community in Australia are of particular interest. However, studies reporting on food habits usually describe tangible aspects such as what foods are eaten, but pay little attention to less tangible aspects such as why foods are eaten. This makes the planning and implementation of appropriate services very difficult, particularly health promotion programs for groups such as immigrants and adolescents who may have special needs.

This thesis originates from a dietary study of Vietnamese adolescents - Food and Families - in which I was involved in the Canterbury Local Government Area (LGA), an inner-metropolitan area of Sydney (see Figures 1.1, 1.2, p13). An important feature of the Food and Families project was that in addition to describing the dietary patterns of the migrant adolescents, the project sought information about the less tangible factors influencing their food habits, therefore enabling the selection of any resulting health promotion activities to be well informed. To my knowledge, the Food and Families project was also the first to document dietary practices of adolescents from a Vietnamese-speaking background in Australia (Tranter et al 1994).
Aims of the Food and Families project

Aims of the Food and Families project were:

- to provide a profile of the food consumption patterns of Vietnamese adolescents in the Canterbury LGA;
- to identify health promotion needs relating to the nutrition of Vietnamese adolescents; and,
- to identify media and community organisations within the Vietnamese community of Canterbury LGA that could support health promotion activities.

Description of the project

The Food and Families project in the Canterbury LGA was funded in 1990 by the NSW Better Health Program. In this program, priority areas for funding were based on the *Health for All Australians (HFA) report* (HFA 1988), where nutrition was considered a priority area for health promotion due to the high incidence of diet-related diseases in Australia. Also in the HFA report, immigrants and adolescents were identified as groups with special health concerns. Within the nutrition priority of the Better Health Program, particular note was made of the higher prevalence of nutrition-related disorders among low income groups and some migrant and refugee groups, and submissions were encouraged to address this issue in communities which 'suffer substantial disadvantage' (NSW Department of Health 1990).
The Food and Families project was devised in response to local concerns that nutrition-related disorders may have been prevalent amongst Vietnamese-Australians in the area. These concerns, expressed by staff from local health and welfare services, were based on the fact that most of the relatively large Vietnamese community in Canterbury LGA were recent refugees, combined with anecdotal evidence of inadequate reported dietary intakes, in particular of total energy, iron and calcium amongst older people (Gano 1990), and a developing trend amongst adolescents toward eating meals away from home and eating ‘junk food’. These concerns were highlighted by literature evidence that with increasing length of residence, migrant communities tend to develop disease profiles similar to those in their adopted country. Therefore it was perceived that this new Vietnamese-Australian population, particularly the young people, may be vulnerable to the development of ‘lifestyle’ diseases, such as cardiovascular disease (CVD), that had been traditionally low in the Vietnamese population.

The Food and Families project was implemented during 1990/1991 by the Health Promotion Unit (HPU) of the (former) Southern Sydney Area Health Service (SSAHS). As little was known about the dietary practices of Vietnamese adolescents, establishment of baseline data was needed so that workers in the area could assess the need for health promotion activities. Two major strategies were used in the project. The first, a dietary survey to determine food consumption patterns and food preparation methods, focused on secondary school students in the Canterbury LGA (Tranter et al 1994,1996).
The second strategy was a community development component to identify support networks within the Vietnamese community of the Canterbury LGA (Le 1992). The project was staffed by a community nutritionist (myself) and a Vietnamese-speaking project officer. It was supported by the research and evaluation officer of the HPU, as well as management of the HPU who had developed the funding submission.

As project officer, I was employed to oversee and implement the dietary component. Although the study had been devised and was funded before my involvement, I had the leading role in modifying its design and then in the implementation. Later it was my role to analyse and interpret the results. One way in which I modified the design of the study was to add some assessment of dietary practices and influencing factors to the collection of dietary intake information. I felt this additional aspect was necessary, as although the nutrition literature abounds with studies which quantify how much people eat and compare this to the intake of others or to recommended intakes, this approach is simplistic in that it ignores the myriad of factors which act both on the individual and in their environment to affect food consumption. I felt this aspect was particularly important considering the unique features of the target group of the Food and Families study - immigrant adolescents who belong to multiple sub-cultures within Australian society ie adolescents, Vietnamese, Australian; and who are also constantly moving between the contrasting environments of a Vietnamese family and an Australian school.
In conducting this research I also tried to address the questions: how typical is this group when compared to Vietnamese migrants in general and to those in Australia in particular? Also, how typical is this group when compared to adolescents in general?

Relationship of the Food and Families project to this thesis

Questions arose from the Food and Families project which could not be addressed within the confines of the funded study. For instance, my analysis showed that the data needed to be considered in a framework that is broader than usual in dietary studies. I also questioned the appropriateness of conventional health promotion approaches for the group studied, and in turn, some of the premises on which cross-cultural nutrition health promotion practice is based. These premises include the widely held tenet that migration and acculturation have negative effects on diet and health, and that maintenance of traditional food patterns is therefore desirable.

I was able to address these concerns by incorporating the project into research for a Masters degree thesis. This thesis therefore builds on a detailed account of the design, implementation and findings of the dietary component of the Food and Families project. To address the questions that arose during the project, I extended the breadth and depth of the literature review to enable examination of the data from sociocultural as well as nutrition perspectives.
Aims of this thesis

Aims of this thesis are:

- to present the Food and Families project;
- to critique the basis for the Food and Families project; and,
- to critique the relevance of conventional health promotion nutrition approaches for adolescent migrant and refugee groups in the light of the findings of the Food and Families project.

As a result of this research, I question the validity of some of the evidence on which this and similar projects have been based, and argue that some widely accepted health promotion conventions may be inappropriate, especially when applied to nutrition in a cross-cultural context in general, and to Vietnamese adolescents in particular.

Structure of the thesis

This thesis is arranged into five chapters. The Literature Review forms Chapter 2. It includes works which examine cultural and sociological as well as clinical aspects affecting food intake and nutrition. I look at a number of factors affecting the transition of foods available for consumption into the health status of individuals, and the health outcomes of a community. These factors include some that are internal to the individual (age, knowledge, food preferences and ethnicity), and others that are external to the individual (advertising and media, food availability, the composition of food and peer influences).
The decision to focus on these factors was made after examination of a number of models describing the interactions between food available, foods consumed, the environment and health outcomes (Pelto 1981, Sims 1981, Edema 1985, Murcott 1985, Baghurst 1990) and with reference to the literature describing food habits of adolescents and of migrants. More recently, Lester (1994) used a similar model in describing the interrelationships between aspects of food choice and health outcomes in the Australian community. While it was not possible to examine all the possible factors that influence food choice in depth, I look at several and have tried to present them holistically, keeping in mind the interrelationships between them.

In the Literature Review I also present background material that informs and illuminates the study - a discussion of relevant concepts such as ethnicity and culture; the background of the Vietnamese people; and the direction of health planning in Australia. In Chapter 3 I review literature on methods for collecting and assessing dietary information and describe the methods used in the dietary component of the Food and Families study. In Chapter 4 I detail the Results of the study.

In Chapter 5, (Discussion), I discuss the results of the study and the study as a whole, but within the cultural and social context introduced by the literature review. In particular, I discuss the factors influencing dietary intake, interpreting the results of the study within a framework that considers their value as evidence for planning health promotion initiatives.
Within this framework I have considered the roles of the political and economic climate within which health promotion takes place, as well as sociological aspects of food consumption. The findings of this analysis are important because of their impact, particularly in a cross-cultural context, on nutrition and health promotion activities. For instance, I argue that if these broader issues are not considered in nutrition and health promotion planning and evaluation, then proposed plans may be inappropriate and outcomes superficial and misinterpreted.

In the remainder of the present chapter (1), I will elaborate on the background to the Food and Families project and this will assist the reader to place the project in the context of the time when it was developed and explain the circumstances surrounding its development. Firstly I describe the relationship between diet and health in general, and for migrants in particular. This is followed by a description of the demographic features of the Vietnamese community in Canterbury LGA. In the final section I will define some of the terms that are used frequently throughout the thesis.

1.1 Background

1.1.1 Diet and health

The need for adequate nutrition for optimum health has long been established. Generally the literature recognises that poor nutrition is related to poor health by either undernutrition or overnutrition. Examples of undernutrition include the intake of insufficient food or types of food resulting in deficiencies of one or more nutrients.
Groups in the population particularly at risk for undernutrition include those with increased needs, such as children and pregnant women, and also those who have limited food choices.

Overnutrition has been linked to the development of chronic or 'lifestyle' diseases such as heart disease, stroke, hypertension, diabetes mellitus and some types of cancer. These are now the leading causes of death in many developed countries. In the 1980s, the Better Health Commission (BHC) reported that these disorders accounted for two-thirds for all deaths in Australia (BHC 1986). The situation was similar in the United States (US) and Canada (Wardlaw and Insel 1990). Although these conditions are multifactorial in origin, diet and nutrition are considered major contributory factors.

Dietary factors related to overnutrition include high energy, fat, salt, alcohol and sugar intakes and low intakes of complex carbohydrate, starch and fibre. The current health problems in Australia related to poor nutrition have been attributed to dietary changes which have occurred over the last century. According to the Commonwealth Scientific and Industrial Research Organisation (CSIRO) (1985), Australian dietary patterns have changed to a lower intake of fruits, vegetables and grains and hence complex carbohydrate and fibre, and a higher intake of fats, sugar, salt and alcohol. Similar dietary changes have been associated with the development of similar disease profiles in other countries.
On an international scale, the prevalence of undernutrition and overnutrition is influenced by the level of development in the population. Although overnutrition now predominates in Australia, undernutrition has been reported in some groups (BHC 1986).

1.1.2 Diet and the health of migrants

Changes in diet have also been implicated in changing disease profiles observed in populations who have migrated. It has been reported both in Australia and overseas, that disease profiles of migrants change and become more similar to those of residents of the host country as their length of residence increases (Powles and Gifford 1990). The differences in disease patterns observed in different ethnic groups have been influential in establishing diet and other lifestyle factors as contributors to the chronic disease patterns typical in Western countries. As migrants frequently come to Australia from countries that have much lower levels of disease related to overnutrition, it is thought that adoption of Australian dietary habits may increase the incidence and prevalence of lifestyle diseases in those communities. In Australia, recent concern has thus focused on the nutritional health of migrants, especially those from non-English speaking background (NESB). The Vietnamese community has been of particular interest in this respect. A relatively new community in Australia, (having mostly arrived since 1978), the Vietnamese people come from an environment where undernutrition is dominant and lifestyle diseases uncommon. Dietary changes consistent with an increased risk factor profile for CVD have already been noted (Baghurst et al 1991).
The observed dietary changes have been related to the increased availability of a larger variety of foods in Australia. Rice and vegetable based diets with small quantities of animal foods (as consumed in Vietnam and other parts of Asia), are thought to be protective against Western style diseases like CVD. The protection is generally attributed to the lower fat content of traditional Asian diets.

As there is a long developmental period for diseases such as CVD and cancer, and they are considered to some degree preventable, the diets of children and adolescents are of particular concern. Habits established then may influence development of these chronic conditions. As adolescence itself is also a time of high nutritional need, more immediate problems relate to adequate nutrition for growth and optimal health in the short term. Consistent with these concerns, a number of nutrition-related health problems and sub-optimal dietary practices have been reported in studies of the young Australian population. These include high levels of overweight, cholesterol and blood pressure and low levels of physical fitness (Australian Council for Health, Physical Education, and Recreation 1987), and the prevalence of anaemia and eating disorders in adolescent girls (Abraham et al 1983, Patterson et al 1987, English and Bennet 1990).

Because of the short time the Vietnamese population has lived in Australia, very little relevant health data are available, and the applicability of findings from surveys such as the National Dietary Surveys (NDS) is unknown.
Consequently, as a subgroup of Australian adolescents, very little is known about the diets of the adolescents from Vietnamese-speaking backgrounds. There is evidence that the dietary patterns of Vietnamese children have become Westernised to some degree (Breakey 1983). In a study of Vietnamese women in South Australia, Baghurst et al (1991) found that those who migrated at a younger age had the greatest adoption of the Australian diet. Assuming that Vietnamese adolescents have changed their dietary patterns to some extent, and have probably adopted some typically Western food habits, it is argued that their risk of developing diet-related health problems may be increased. Adoption of food consumption practices similar to those of adolescents in general may create similar health risks for Vietnamese-Australians, in the development of short term as well as long term dietary problems. It is also possible that Vietnamese adolescents may be at greater risk than their parents for the development of CVD because of their greater exposure to Western culture through environmental influences such as school and television (TV). However, as Vietnamese people have largely arrived in Australia as refugees from a country with a recent history of war and associated hardships such as food shortages, it is also possible that some people may have improved nutrition due to the increased availability of food.

1.1.3 The Vietnamese community in Canterbury

Canterbury LGA is located in the inner western suburbs of the Sydney metropolitan area (Figure 1.1), and at the time the present study was implemented, comprised one of the three districts of the former SSAHS (Figure 1.2).
FIGURE 1.1: Location of Southern Sydney Area Health Service (SSAHS) in the Sydney Region Local Government Authorities

FIGURE 1.2: Enlargement of SSAHS indicating the location of the Canterbury LGA

Adapted from Choucair et al 1990
At that time, the population of the Canterbury district was considered to be one of high need - Canterbury LGA received the largest amount of unemployment benefits in the SSAHS (HPU 1990a), and at the 1986 census, NESB communities made up 40% of the total population (Choucair et al 1990). The Vietnamese community was also one of the most rapidly growing ethnic groups in the SSAHS, with 94% of the Vietnamese-born population having been resident for less than 10 years (Choucair et al), and by 1986, the Vietnam-born community had become the third largest NESB group in the Canterbury district (Ethnic Affairs Commission of NSW 1994).

The population was also large on a statewide scale - the Canterbury LGA, when combined with the neighbouring Bankstown LGA, supported the second largest community of Vietnamese-Australians in NSW. In 1990, of the total of approximately 38,000 Vietnamese residents in NSW, 24% lived in Canterbury-Bankstown. Of this group, 60% resided in the Canterbury LGA (Kirilik 1991). People speaking the Vietnamese language in Canterbury LGA were also predominantly young, with 84% of the community aged less than 35 years and 28% aged 5-19 years (Choucair et al). For these reasons, the Vietnamese community was considered to be of high need within the Canterbury LGA. Other factors which were considered to indicate a high need within the Vietnamese community were that almost half the members of the community in Canterbury LGA were reported to have poor spoken English skills and the community was over represented in low income categories when compared with both the total population of SSAHS and other NESB groups (Choucair et al).
There was also concern that health related problems in general may have been exacerbated by the limited English proficiency of community members, and the availability in the region of few services specifically for Vietnamese Australians (Kirilik).

Data from the 1991 census (Ethnic Affairs Commission of NSW 1994) were consistent with earlier data for both the Canterbury LGA and the Vietnamese population: Canterbury LGA had both the second highest number of people and proportion of the population in NSW who spoke a language other than English (LOTE). Also, Canterbury was the LGA with the third largest population born in Vietnam (with 10% of that population in NSW). In 1991, a total of 4668 Canterbury LGA residents were born in Vietnam, and 3925 spoke Vietnamese (an increase of 6% since 1986) - Vietnam was the third largest birthplace group, and Vietnamese was the fifth largest language group. The Vietnamese population also had a higher proportion of young people when compared with other populations from NESB. For example, in the Vietnam-born population of the Canterbury LGA, 11.6% were in the 0-14 year age group compared with 8.3% for NESB groups as a whole; 21.1% of the population were in the 15-24 year age group, compared with 11.7% for all NESB. In contrast to the Vietnamese population as a whole, it was reported that of younger Vietnam-born people (0-24 years) who spoke a LOTE at home, 91% could speak English well, or very well (Choucair and Nivison-Smith 1994).
1.2 The Food and Families project

As described in the Introduction, the Food and Families project was devised to address health workers' concerns about the health of the Vietnamese community in Canterbury LGA at a time when there was general concern about the health of migrant and refugee communities. Because the Vietnamese community was considered to be particularly disadvantaged, funding was sought and received from the NSW Better Health Program to investigate the nutritional concerns of both adolescents and older people. The project which was implemented in 1990/1991 by the HPU of the (former) SSAHS, was later modified to investigate the needs of adolescents only. The project was implemented with the assistance of the Vietnamese community.

A local advisory committee, made up of representatives from Vietnamese community organisations, education, health and local government oversaw the project. Links were also established (in accordance with funding requirements), with projects involving the Vietnamese community in South Western Sydney Area Health Service. A joint 'umbrella' committee, formed to oversee the projects and to coordinate activities within the Vietnamese community, included representatives from all projects as well as from Vietnamese Community organisations. The umbrella committee later expanded to include other projects in SSAHS and Central Sydney Health Service also involving the Vietnamese community. Links with the Vietnamese community were facilitated by the Vietnamese-speaking project officer. The Food and Families project was approved by the Ethics Committee of the (former) Southern Sydney Area Health Service.
1.3 Definition of terms

As I use a number of terms throughout the thesis that are open to different interpretations, in this section I will define the meanings that are intended. Firstly, for brevity in the context of this study, I have used the term ‘Vietnamese adolescents’ when referring to adolescents from Vietnamese-speaking background. In other instances, the term ‘Vietnamese’ refers to an association with the whole or any part of Vietnam depending on the context of its use. The definition of ‘adolescent’ appears to vary with different sources. For example, the National Health and Medical Research Council (NHMRC) (1995) has used 13-18 years and NSW Health (NSWH) (1995) has used 12-24 years in respective government publications. In this thesis I have used the term ‘adolescents’ when referring to the target group of the study, as all the participants attended secondary school and most were aged 12 years or older. For variety, I have used the general terms ‘youth’, ‘young people’ and where issues may be appropriate to all ages, ‘children’ as alternatives.

I have used the word ‘refugee’ to refer to the subgroup of migrants who have left their homeland under duress, and ‘migrant’ when referring to the more general situation of resettling in a new environment. As the circumstances surrounding refugees’ departure from the homeland and arrival in the adopted country may be very different to those for voluntary migrants, there may be different characteristics in the populations. However, as most of the Vietnamese migrants in the Canterbury population at the time of the present study were refugees, differences are likely to be minimal.
Other ambiguous terms used frequently throughout this thesis are ‘ethnic’, ‘Western’, ‘culture’ and ‘traditional’. These terms all vary in meaning when used by different groups and in different contexts.

I have used the term ‘ethnic’ in the sense of pertaining to an identifiable population, especially to a group who share a common language and ancestry or cultural identity, eg ethnic-Vietnamese, ethnic-Chinese. In popular discourse, ‘ethnic’ often refers to members of a community who are migrants or whose language is not English. This usage is relevant in applications such as ‘ethnic health policy’. The term ‘ethnicity’ also has variable meanings and I discuss this further in Section 2.2.1. In popular usage ‘Western’, when applied to populations from Asian countries refers to practices reported as relatively uncommon in Vietnam but common in countries ‘of the West’ (The Macquarie Dictionary 1991), ie countries like Australia and the US. It also has connotations of being new and in contrast to tradition.

Popular usage of ‘traditional’, and as it appears in nutrition literature, refers to practices from the past which are handed down within a cultural group. In turn, these practices may be classified as authentic or unauthentic. In this context for example, ‘traditional Vietnamese practices’ would include cooking methods and the consumption of foods reported as long-standing within Vietnam. This popular definition is reflected in the dictionary definition:

‘the handing down (especially by word of mouth or by practice), of statements, beliefs, legends, customs etc, from generation to generation’ (The Macquarie Dictionary 1991).
However, this popular view is not shared by contemporary anthropologists who instead emphasise that tradition is a symbolically constructed view of the past, and that therefore judgements about authenticity and inauthenticity are inappropriate (Brady 1995).

'Culture' is another difficult concept which varies with its context of use. In popular discourse, culture is seen as a way of living that often holds some connotations of the past, eg 'Greek culture', 'Vietnamese culture'. Culture has to some extent become synonymous with tradition and the two are often linked by statements such as 'traditional culture' (Brady 1995).

Common usage of culture is also reflected in dictionary definitions eg:

‘the sum total of ways of living built up by a group of human beings which is transmitted from one generation to another; and, a particular stage or state of civilisation as in the case of a certain nation or period’ (The Macquarie Dictionary 1991).

Again, this popular view is not shared by contemporary anthropologists who see culture as a 'contemporary human product rather than an inherited legacy' (Brady 1995). I will address these different interpretations of culture in some detail in Section 2.3.2.

In this thesis I have used the terms 'traditional' and 'Western' and to some extent 'culture', in accordance with their dictionary definitions and consistent with popular usage, as these are the intended meanings in literature I review in Chapter 2.
In conclusion, the Food and Families project was funded to collect information that could be used by health workers to assess the need for nutrition health promotion intervention with adolescents of Vietnamese-speaking background in the Canterbury LGA. This thesis documents the findings of the dietary component of the study but interprets them within a framework which emphasises social and cultural factors. In this chapter I have described the rationale for, and the background to the project. I have shown that the Food and Families project was set in a climate of concern about the nutritional health of all Australians. There was also concern for the possible deterioration in the health of ethnic minority and refugee groups (such as Vietnamese-Australians), especially if their diet changed after migration to become more Western. I have also provided an outline of the structure of the thesis and defined terms that will be used frequently throughout the text.
CHAPTER TWO

LITERATURE REVIEW

As noted in the Introduction, in exploring the dietary intake and food consumption patterns of Vietnamese adolescents in the Canterbury LGA, I have taken into account a number of factors which affect the transition of foods available for consumption, into the health status of individuals and the health outcomes of a community. These factors, which include some that are internal to the individual such as age, knowledge, food preferences and ethnicity, and others external to the individual such as advertising, the composition of food and peer influences, may impact on different levels of this transition. For instance, these factors may impact on food acquisition, foods consumed, nutrient intake, nutrient requirements, as well as on nutrition and health status. In this chapter, I review literature which describes the possible effect of the influencing factors at each of these levels, with particular relevance to the target group, Vietnamese adolescents. The breadth and depth of the Literature Review are an indication of the importance of these issues for the design of health promotion programs. The literature is extensively utilised later in the Discussion chapter where I discuss the findings and critique them within the cultural and social context introduced by this review.
The first section describes current issues in the health and nutrition status of the Australian community (Section 2.1), followed by a discussion of the roles of ethnicity in health (Section 2.2), and culture in food selection (Section 2.3). The last sections deal more specifically with the target group; the health and nutrition of migrants from Vietnam (Section 2.4), and the health and nutrition of adolescents and the influences on their food intake and health outcomes (Section 2.5).

2.1 Diet and health in Australia

It is important to place the present study in the context of current nutrition directions in Australia, as this impacts on the data available, the level of concern and ultimately the likelihood of action in the future. For the present study it is particularly relevant to examine the process by which the nutrition of migrants and adolescents became a priority. In this section, I will provide an overview of the current nutrition concerns in Australia and review data from Australian dietary surveys and interpret these with reference particularly to adolescent and migrant populations. Relevant recommendations for future action and policy directions that have been made will also be described.

The primary diet-related public health concerns at the moment in Australia are chronic, lifestyle-related conditions associated with inactivity and over-consumption of food. As in developed countries generally, health problems identified include cardiovascular disease (CVD), some cancers, non-insulin dependent diabetes (NIDDM), dental caries and osteoporosis (Lester 1994).
Health care costs for diet- and alcohol-related disease in Australia were estimated to be over $3000 million in 1989-90, and may be as high as $17,400 million if indirect costs to industry are included (Lester).

To address the growing concern with diseases related to poor nutrition, dietary goals and targets (Nutbeam et al 1993), dietary guidelines (NHMRC 1992) and a national nutrition policy (Commonwealth Department of Health, Housing and Community Services 1992) have all been developed. Lester (1994) lists many of the reports and reviews describing nutritional concerns in Australia that have been published since 1986. More recently, dietary guidelines for children and adolescents have also been published (NHMRC 1995). The Australian Dietary Guidelines (ADG) are similar to those developed in other countries, such as the US, where similar disease and dietary profiles are present (Commonwealth Department of Health 1987). In general, Dietary Guidelines have been developed to reduce the prevalence of 'diseases of affluence' and recommend a prudent diet that has been likened to many traditional dietary patterns of poorer countries - that is, diets based on cereals with fruit, vegetables, beans and small amounts of meat and animal products (Pellett 1989).

Goals and targets for nutrition in Australia were first released following the report of the Better Health Commission (BHC) of the Commonwealth Department of Health (CDH), which, through its Nutrition Taskforce, reviewed health data and investigated the level of nutrition related disease in Australia (CDH 1987).
The Taskforce review of information about food consumption patterns in Australia indicated the Australian diet (when compared with the recommended guidelines) to be excessive in fat, (particularly saturated fat); refined carbohydrates (particularly sugar); alcohol and salt; and inadequate in complex carbohydrates (and dietary fibre). The adequacy of the intake of some micronutrients especially iron and calcium, was questioned for some population subgroups. Health problems identified which were related to undernutrition included anaemia, anorexia nervosa and osteoporosis. Data were obtained from the national dietary survey of adults conducted in 1983 (English et al 1986, 1987), smaller surveys of population subgroups, as well as reports describing the apparent consumption of food and nutrients in Australia. A later survey of school children (English et al 1988, 1989) provided corroborative evidence.

The Nutrition Taskforce (CDH 1987) recommended a number of targets and strategies to be achieved by the year 2000. These targets and strategies were later incorporated into a number of strategic planning documents, where they provided direction for nutrition action at national (HFA 1988) as well as local levels (HPU 1990b). These targets related to reduction in the incidence and prevalence of obesity; reduction in the contribution of fat, sugar and alcohol to the energy content of the diet of Australians; reduction in dietary sodium; an increase in dietary fibre intake and an increase in the level of breastfeeding. Nutrition was later nominated as a priority issue in the 'Health for All Australians' (HFA) report which also nominated priority population groups including migrants, children and adolescents (HFA 1988).
Targets to reduce differences in health status between advantaged and disadvantaged groups were also set. The National Better Health Program established in 1988, based on the recommendations of HFA, adopted similar priorities and also identified nutrition as one of its five priority areas. The recommendations of the Nutrition Taskforce and the priorities chosen by the National Better Health Program have bearing on the present study as the study was developed and implemented with their direction. The National Better Health Program funded a number of activities which addressed these priorities - the Food and Families project was funded under the scheme.

Although undernutrition has not been widely reported in Australia, a number of groups have been identified as being at particular risk. In some groups, both overnutrition and undernutrition have been found (CDH 1987). In an extensive review of nutrition in Australia, Darnton-Hill and English (1990) cited a number of local studies which have located at-risk groups. Groups identified included the poor, the elderly, Aborigines and some ethnic minority groups. Groups considered 'at risk' are generally those with particular nutritional needs, or those groups and individuals disadvantaged by problems with access to and availability of food, and poor knowledge of food and nutrition. The presence of adverse social circumstances is thought to contribute to indicators of poor health status, including nutrition, identified in disadvantaged groups (Australian Institute of Health and Welfare 1992a). Darnton-Hill and English identified low socioeconomic status as an independent risk factor for poor nutrition.
Additional factors which may contribute to undernutrition in ethnic minority groups include the availability and adequacy of traditional foods (Commonwealth Department of Health, Housing and Community Services 1992) and their nutritional situation before migration to Australia. Undernutrition is widely reported in developing countries (Administrative Committee on Coordination - Subcommittee on Nutrition 1989). As they are the source of many of Australia's migrants. For migrant communities such as the Vietnamese, who have come from countries with a high incidence of malnutrition, the incidence of previous undernutrition may therefore be high.

2.1.1 Current nutrition directions in Australia

Current recommendations for dietary behaviours reflect an ongoing concern with issues of dietary excess (NHMRC 1992), but also reflect contemporary concerns about undernutrition and access and equity issues in food availability (Commonwealth Department of Health, Housing and Community Services 1992, Nutbeam et al 1993). For example, the revised Australian Dietary Guidelines (NHMRC) still promote consumption of a high fibre, low fat diet, but have included specific guidelines for women and girls focusing on calcium and iron intake. In addition, specific target groups (including young people) were included in the 1993 version of the Goals and Targets for Health Promotion (Nutbeam et al). School-based strategies were primarily nominated in the Australian Food and Nutrition policy to make the Australian Dietary Guidelines better known to present and future consumers (Commonwealth Department of Health, Housing and Community Services).
It is noted in the policy that Australian Dietary Guidelines have been more readily implemented in the past by people with higher socioeconomic status but that this opportunity should be extended to all. Therefore a general strategy which addresses communities with a socio-economic and/or geographic disadvantage is included. Migrant groups are noted in the *Food and Nutrition policy* as being at risk for undernutrition if there are difficulties maintaining traditional diets or if traditional diets need supplementation. However, no particular strategies are directed towards migrant groups.

Coronary heart disease (CHD) is still the most common cause of premature death in Australia (Bennett and Magnus 1994). As such, it remains a priority for health promotion (including nutrition) action. In fact most of the current goals and targets for nutrition in Australia listed in the *Better Health Outcomes* document (Commonwealth Department of Human Services and Health 1994) relate to coronary heart disease. Some nutrition goals and targets are also contained within cancer prevention strategies, cancer being the second leading cause of death in Australia. However, data from the National Heart Foundation's (NHF) risk factor prevalence studies from 1980-1989 indicate mixed population trends for CHD risk factors. While dietary behaviours such as excess fat and salt consumption, that are thought to increase cardiovascular risk, have come closer to recommendations, the level of obesity in the population has increased (Bennett and Magnus, Commonwealth Department of Human Services and Health). Similarly, mixed dietary trends are apparent for fruit and vegetable intake.
Lester (1994) reported that fruit intake has increased towards recommended levels, while vegetable intake has moved in the opposite direction. These data do not report trends in food consumption patterns for migrants or adolescents.

Results of Australian dietary surveys have been very influential in the development of nutrition recommendations and policy directions for Australians. As diet quality is often compared with the findings of past surveys, it is valuable to consider their findings and their relevance to the diets of Vietnamese adolescents.

### 2.1.2 Australian dietary surveys

Several population surveys of foods consumed by Australians have been conducted over the last decade including both adult and child groups and both national and state samples (Lester 1994). However, there are a number of limitations in the use of the data. As different surveys have employed different methods for dietary collection and analysis, they are not all comparable with each other. Also, Lester cautions that the results cannot be used to show time trends. In addition, results need to be assessed within an appropriate framework. Dietary intake is only one of a number of indicators used to assess nutritional status and so should not be used on its own to rate dietary adequacy. Factors affecting nutritional status such as individual needs and the bioavailability of nutrients are not taken into account, and may be even more important in cross-cultural comparisons.
The surveys were also not truly representative of the population as a whole in terms of either the groups surveyed or their geographic location.

In the present review, only the data from the National Dietary Surveys (NDS), conducted in 1983 for adults, and in 1985 for children, will be reviewed in detail. These two surveys contained samples relevant to the present study and provided the baseline data for the nutrition targets for Australians (ie Nutbeam et al 1993). Results of the NDS 1983 and 1985, indicated that intakes of some nutrients were excessive and that intakes of some nutrients may be inadequate in some population groups. In these surveys, results of one day’s food intake were compared with the Recommended Dietary Intakes for use in Australia (RDIs) (NHMRC 1991). An intake of 70% of the RDI was established as the lower limit of an 'adequate' intake for the nutrient in question. The surveys were conducted on representative population samples drawn from all states and territories (English et al 1986,1987,1988,1989).

The 1983 NDS of adults aged 25-64 years (English et al 1986,1987) obtained data via 24-hour recall from 6255 men and women living in capital cities. Results of the dietary survey confirmed that relative to dietary guidelines, Australians were overall consuming excess levels of fat, cholesterol, protein and alcohol and insufficient carbohydrate and fibre. Since the previous dietary survey conducted in 1944, the fat content of the diets of Australian males had increased from 32% to 37% of energy content.
Differences were reported in the patterns of food and nutrient intake with age, gender and country of birth. Nutrients considered to be most at risk for low intake were calcium, iron, zinc, and Vitamin A, with women more likely to have intakes less than 70% RDI and lower intakes of food-rich sources of these nutrients. In general, intakes of the food groups declined with age. Differences were more marked in the intake of rice, pasta, fruit juice and soft drink and of fruit and vegetables by women. Distinct food patterns were also observed with country of birth, with marked differences in the patterns of those born in Northern and Southern Europe and Asia. These regional differences will be discussed in Section 2.2.3.1.

The NDS of schoolchildren aged 10-15 years (English et al 1988,1989) obtained data via 24-hour diet-record from 5224 boys and girls attending rural and urban schools. The dietary survey was linked to the Australian Health and Fitness survey conducted by the Australian Council for Health, Physical Education, and Recreation (ACHPER). The ACHPER survey obtained data on fitness, lifestyle aspects and some biochemical and physiological measures (ACHPER 1987). Overall results suggested that there were some concerns about aspects of children’s diets. Particular areas identified were the intakes of iron, calcium and zinc, especially by girls. Those with nutrient intakes less than 70% RDI were more likely to be girls than boys, and older children (12-15 years) rather than younger children (10-11 years). Results of the schoolchildren surveys will be discussed in more detail in Section 2.5.1 and 2.5.2.
In summary, poor nutrition is considered a priority health issue in Australia with both overnutrition and undernutrition identified in the population and some groups considered to be at particular risk. Consequently, guidelines and strategic directions have been established to reduce the incidence and prevalence of diet-related disease. As both young people and ethnic minority groups (migrant groups) had been identified as groups at risk for poor nutrition in Australia, the Food and Families study was set in a health environment where nutrition recommendations that had direct bearing on the target group had been made. Factors affecting the nutritional health of migrant groups and young people are also likely then to affect the nutrition of Vietnamese adolescents. As ethnicity is often considered as a factor influencing health status, in the following section literature relating to health, nutrition and ethnicity will be reviewed which will inform the study of the food habits of Vietnamese adolescents.

2.2 Health and ethnicity

The variation in morbidity and mortality with ethnicity is well documented (eg McMichael 1985a, Webb and Manderson 1990, Bennett 1993, Lester 1994). As discussed in Section 1.1.2, the variability in disease patterns in different ethnic groups has been influential in establishing diet and other lifestyle factors as contributors to the chronic disease patterns typical in Western countries. Differences have been noted by region of residence both within and between countries, by patterns of migration and more recently by environmental changes within a geographic region.
In the last instance, examples are commonly drawn from developing countries and related to 'modernisation' and 'Westernisation'. In Australia, differences between different migrant groups have been noted for the incidence of conditions such as cardiovascular disease (CVD) and stomach cancer (McMichael 1985a).

In the following section, I will review literature which describes patterns of health and illness in migrants in general, and migrants to Australia in particular. This will be followed by a review of health indicators in migrant populations, highlighting the debate as to whether or not migrant groups in Australia are at a health disadvantage. This is followed by a summary of activities in Australia targeted towards migrant groups. In the final sections I will review literature describing dietary changes observed in migrant groups in general and in Australia in particular and the factors implicated. It can be difficult to interpret literature on ethnicity and health because of the variety of categories used in different sources and this can affect both the definition of terms and the representativeness of the sample. As background to this chapter I will firstly examine the inherent difficulties in interpretation of the literature on ethnicity and health.

### 2.2.1 Interpretation of data

The term ethnicity is often used in different ways which affect the interpretation of data. There is also overlap in the literature with studies of migrants and health status.
This is particularly so in countries like Australia, Canada, UK and USA where ethnic minority groups have largely arrived as migrants. As the term 'migrant group' is often used synonymously with 'ethnic group' in Australian literature, and the Vietnamese people are recent immigrants to Australia, literature will be reviewed with that synonymity in mind. In the total Australian population, the application of ethnicity does not completely explain variations in illness, as other confounding variables may be present and ignored. For example, environmental and cultural factors connected with different ethnic groups may influence rates of morbidity and mortality both directly and indirectly. Examples include socioeconomic status, as some ethnic minority groups are known to be over-represented in lower socioeconomic groups (Bottomley and de Lepervanche 1990), and dietary practices, which are known to vary between ethnic groups (Webb and Manderson 1990).

2.2.1.1 Definition of terms

In the literature there are different classifications commonly used for ethnicity and also for health and for illness. Ethnicity is classified usually by country of birth or by language spoken. Differences then arise in the classifications within these categories. For example, 'country of birth' may include people from a variety of ethnic backgrounds. In the case of Australians born in Vietnam, for example, people of both Vietnamese and Chinese origin would be included. On the other hand, classification by 'language' such as Chinese would include people from China itself as well as from many other countries.
In Australia, birthplace is recommended as the primary indicator of ethnicity, to be supplemented if possible with information regarding first language, English proficiency and length of residence (Powles and Gifford 1990). To overcome the problem of small group size which may result from such specific categorisations, overseas-born are often aggregated into larger groups related to geographic region. Accordingly, persons born in Vietnam may be included within the categories of ‘IndoChinese’, ‘south east Asian’ or ‘Asian’ born. Care must be taken with references to these aggregate groupings as variations occur in the usage of the terms. While the term IndoChinese refers collectively to people from Cambodia, Vietnam and Laos, the term Asian has a much broader coverage. In Australia, the term ‘Asian-born’ includes people born in the Middle East and north Africa for mortality and disability differentials, but excludes them and those from north east Asia for illness and reduced activity differentials (Australian Institute of Health and Welfare 1992a). Manderson (1990) notes that the terminology varies with the source of the literature and derives from national patterns of migration.

For instance, in recent Australian literature, the term ‘Asian’ refers mostly to people from south east Asia (SE Asia), in particular the IndoChinese. However, in British literature, ‘Asian’ is most often used to describe people born on the Indian subcontinent, while in North American literature, the term has a different emphasis again, usually referring to people from China, Japan and the Philippines. Both Powles and Gifford (1990) and Manderson (1990) note that descriptors of health and illness also vary with the source of the information.
As concepts of health and illness are culturally influenced, they, and their causative factors, are reported differently by different groups. Consequently, morbidity and mortality data for different ethnic groups may not be a true reflection of the situation. For example, where an illness is not recognised by a particular group it will not be reported, and conversely, medical conditions acknowledged by the group may not be regarded as such by researchers and therefore not observed. Language difficulties would also affect the degree and nature of reporting. The subjectivity of reported incidence data means that morbidity data in particular must be treated cautiously. Mortality data are seen to be less prone to reporter bias (Powles and Gifford 1990), however the cause of death may still be subjective.

2.2.1.2 Representativeness

Aggregated data assume a homogeneity in the sample which can be misleading as differences in morbidity and mortality (relating to factors such as country of birth, class, and language spoken), may be concealed. For example, for Vietnamese people, actual differences between Vietnam-born and China-born may not be evident in data reported for Asia-born. Even when groups are categorised by factors of ethnicity, the possible diversity of a population sample such as the Vietnam-born, with regard to other cultural factors like religion, language and region of origin must be remembered. Manderson (1990) also cautions that in the use of aggregated data, different social characteristics such as gender and socioeconomic status, which influence the living conditions, work and health of different migrant groups are not distinguished.
According to Manderson (1990:xv), because the complexity of backgrounds and health profiles of different migrant groups in Australia have not been reflected in some health literature, 'stereotypic portrayals' whereby different ethnic groups have been depicted by one or two characteristics, have resulted. However, study samples resulting from specification of factors such as country of birth and language spoken can be relatively small and thus not readily amenable to comparisons between groups (Powles and Gifford 1990).

2.2.2 Health indicators of migrants

As mentioned in Section 1.1.2, numerous studies have demonstrated that the health status of migrant groups commonly changes following migration, and that there is a often a shift in disease profiles away from that of the home country and toward that of the adopted country (McMichael 1985a, Powles and Gifford 1990, Webb and Manderson 1990). In this section, I will first review literature which reports on general health changes that have occurred in migrant populations and then describe conflicting views on the status of migrant health in comparison with the rest of the population. This is followed by an overview of activities which address the health of migrants in Australia and their relevance to health promotion practice.

Studies demonstrating changes in health following migration have generally compared levels of disease in migrants and non-migrants from the country of origin with residents of the host country, or, examined changes in morbidity and mortality with duration of residence. The majority of studies are of men. Both positive changes in health and negative changes have been reported.
According to McMichael (1985a:152):

'Migrant groups represent a grand "natural experiment" in which persons make a major and sudden change in their total environment - while their genetic predisposition to specific disease processes remain unaltered'.

That a change in environment can effect rates of morbidity and mortality in population groups was evidenced by the now classic studies of Japanese men who migrated after the second World War. Japanese men living in the US were found to have a rate of coronary heart disease (CHD) higher than their counterparts living in Japan. In turn, CHD risk factors increased in the second (US-born) generation (McMichael 1985a).

In general, migration to Western countries has over time, increased the rates of colon, breast and rectal cancers, as well as CHD in a number of migrating groups, while rates of stomach cancer have decreased. For instance, the rates of breast and colon cancer in Japanese immigrants to the US were found to increase to the level of the US population within one to two generations. Conversely, the rate of stomach cancer dropped after migration. Similar trends have been noted in studies of European immigrants to Australia (McMichael 1985a).

Changes in health status that follow migration are often attributed to the migration process itself, and/or to changes in lifestyle following migration (Powles and Gifford 1990).
Webb and Manderson (1990) report that the change in diet which frequently follows migration may play a significant role in the development of these new disease profiles. For instance, some change in diet after migration is inevitable because of the effects of the different environment - different foods may be available due to climatic differences, economic differences, and differences in the relative cost of food items.

Other factors which may affect the health and nutrition of immigrants include social and cultural factors. Factors include the level of acceptance or rejection by the host community; factors related to socioeconomic status (SES) (eg immigrants may be in groups of lower SES); housing problems; social isolation (eg the absence of an extended community); stress of the culture change itself, and changes in working/leisure time. Helman (1990) notes there may be pressure to acculturate, and the need to be accepted in the new community may be stronger in some groups than in others. He cites adolescents as an example of a group that may have different acculturation experiences to those of other population groups. Helman suggests 'the fit' or 'lack of fit' between the cultural lifestyles of the immigrant and host communities affects changes in health status. He suggests that some migrant communities may adapt more successfully than others and comments that studies of immigrants:

'do not provide enough data on how the cultural practices and worldview of immigrants - and of the host community itself - interact in the migrant situation' (Helman 1990: 265).

Helman considers that some migrant-host community combinations may be better than others.
McMichael (1985a) cautions that factors surrounding the immigration process need to be kept in mind when studying the health of migrants. Firstly, migrants are a selected group on many characteristics which include health related characteristics. For instance, migrants may represent a particular socioeconomic stratum with its own lifestyle characteristics, and the health and psychological status of migrants may therefore be different to those who do not migrate. Australian studies indicate that in the 1960s, the risk of CHD rose in English, Scottish and Italian residents with their increasing residence in Australia. However, further studies of Italian and other migrants from southern Europe indicated that in these groups the risk of CHD was still substantially lower than that of Australian-born (McMichael). The increased risk in the British migrants is considered to represent the health related selective effect, that is the migrants were healthier than their non-migrating compatriots.

Secondly, migration itself entails many stressful events which may affect migrants' susceptibility to illness. A study in Australia by Najman in 1978 which reported an increase in mortality rates of both stroke and CHD of migrant groups with increasing periods of residence, considered the stress of the change itself and adjustment during the post-migration period to be implicated in the increased mortality rates (in Western 1983:287). In relation to CHD, Najman concluded that the greatest increase in risk was associated with the groups which experienced the greatest change in trying to adapt to both new languages and new lifestyles.
Helman (1990) expresses concern that disease-specific risk factors are identified in epidemiological studies but little attention is paid to the cultural factors which may shape the risk-related behaviours. He asserts that cultural beliefs and practices are part of the multi-factorial aetiology of disease, but are difficult to quantify and therefore less attractive to study. Helman considers that the role of cultural factors may be contributory, causal, or even protective, and cites the Japanese migration studies as typical examples. He also notes that many studies have reported stress reactions such as hypertension and mental illness to migration. Migration is considered to be a stressful process, particularly when contrasts are experienced between the two cultures and environments. The situation may be exacerbated when the experience is forced, for example in the case of refugees and when support structures are lost. The term 'cultural bereavement' has been coined for those groups of people who have permanently and traumatically lost their familiar land and culture (Helman 1990:262). Another factor influencing rates of morbidity in migrants is that health behaviour is labelled by the host community and this may then affect reported statistics.

The complexity of the situation, in that many factors affect the health status of immigrants, is recognised by the Australian Institute of Health and Welfare (AIHW). In reporting its findings in the third biennial report, the AIHW commented on the difficulty of separating the combined influences of migration, cultural factors, health selection, occupational status, and socioeconomic status on the health of migrant groups in Australia (AIHW 1992a).
In the literature, two general views are reported regarding the health of migrants to countries like Australia. One, that migrants' health is poorer than that of the host population, and the other that migrants are healthier than the host population.

2.2.2.1 Poorer health status

The view that migrants have poorer health status relates to the structural and behavioural processes affecting health. Factors such as low income, poor social support, poor housing and working conditions have all in themselves been identified as risk factors for poor health (AIHW 1992a). Garrett and Lin (1990) assert that these environmental factors are implicated in the increased morbidity and mortality of ethnic minority groups after their migration to Australia. As an example they note that the majority of immigrants to Australia live in local government areas where there are generally poor health outcomes. Immigrant groups, especially those from NESB, may also have poor language skills which in itself makes access to services difficult (Young 1992a). Because of their lack of English language skills and observed low SES, Vietnamese immigrants to Australia have been viewed as a disadvantaged group.

Historical factors such as the poor health status of residents in countries from which many immigrants to Australia have come may also play a part in this perception. For example, due to the poor health of many Vietnamese refugees on their arrival in Australia because of living conditions both due to the war in Vietnam and en route to Australia, health screening programs were established (Garrett and Lin 1990).
In a review of literature on ethnicity and health in Australia, Easthope (1989) describes two forms of research in this area: one concerned with the incidence of disease using an epidemiological approach; and secondly a problem-centred approach, where the difficulties migrants face in their interactions with the health system are related to their ethnicity. Easthope criticises these two approaches as only being able to explain some variations in illness between ethnic groups. He argues that apart from the variations which can be accounted for by diet and folk models of health, most of the apparent variation in illness can best be accounted for by the immigration experience into Australian society.

McMichael (1985a:160) considers that from the experience of migrants to Australia, particularly those from southern Europe, there are:

'adverse cardiovascular consequences of the lifestyle prevailing in Australia and adopted to varying degrees by different migrant groups'.

The Better Health Commission (BHC 1986) noted an initial health advantage of immigrant groups in Australia but attributed a subsequent decline in health status of immigrants to Australian lifestyle and living conditions. They identified three interrelated factors which may affect the health of newly arrived migrants: social and economic stress, changing dietary patterns and occupational health risks. Consequently, the BHC considered immigrants, and in particular newly arrived immigrants of NESB, as people with special health needs.
An area for which little data are available is the health and mortality experience of Australian-born children of migrants. Young (1992b) considers it likely that this will be affected by a combination of health practices and mortality levels of the parents' homelands and those which prevail in Australia. Young (1990) also suggest that a contributing factor will be the extent of outmarriage to Australian born people. Data do indicate however that children from NESB may be less likely to receive preventive health care (Young 1990,1992b).

2.2.2.2 Health advantage

In contrast to the concern about migrants' poor health status, there is considerable evidence now that the health of some immigrant groups, for some conditions, is superior to that of Australian-born. The AIHW (1992a), in a review of available data on health differentials by country of birth, reported that there were generally lower death rates, lower levels of reported disability, illness, and reduced levels of activity due to illness among overseas-born Australians than among Australian-born people. Possible explanations for the lower rates observed in overseas-born people were cultural and language differences and their effect on reported data. It has also been argued that the selection process for migrants (which favours healthy individuals), contributes to their apparent health advantage (Powles and Gifford 1990). However, there are differences between the different birthplace groups, and in some groups death rates from some conditions are higher than those for Australian-born.
The degree to which migrants to Australia are at a health risk is now widely debated in the literature. Powles and Gifford (1990) after reviewing literature on the health status of Australia’s immigrants, concluded that immigrants are generally not disadvantaged in their health experience, and argue that such ideas are poorly founded. While acknowledging that poor health can be related to a number of factors associated with the migration experience, Powles and Gifford (1990:103) argue that most immigrant groups have succeeded in ‘minimising the health costs of becoming Australian’ with only relatively modest rises in mortality with increasing length of residence. The role of cultural practices such as traditional diet, is highlighted as having a protective effect in maintaining the health advantage of these communities. Young (1992b) argues that although any changes in Standardised Mortality Rates (SMRs) with length of residence of immigrants in Australia tend to be increases, that these are small and that the rates are still significantly lower than for Australian-born. While these increases may represent a convergence to the Australian mortality rate, they may also represent a convergence to the mortality rate of the country of origin which is usually higher than for the birthplace group in Australia.

Bennett agrees (1993:259) that an increase in mortality with increasing residence does not represent a convergence to the Australian-born experience - he suggests (based on data for body mass index - BMI) that such:

‘evidence of acculturation... may simply reflect...a different risk-factor profile on arrival...’.
Young (1992b) comments that writings about immigrant health often highlight the disadvantages, but that analysis of the data demonstrates there are advantages experienced by immigrant groups in survival from some of the major causes of death in Australia.

In summary, it appears that the apparent contradiction, that is, whether or not immigrants to Australia are at an health advantage or a disadvantage depends on the point from which assessments are made. Both views appear to be relevant to the Australian immigrant population at different stages of settlement and to vary with different populations. Where migrants have an health advantage to begin with, this advantage may be reduced by difficulties faced in the settlement process, environmental factors affecting their health and by the adoption of aspects of the Australian lifestyle. Some of the discrepancies in the observed health status of migrants are also likely to be accounted for by differences in reporting by groups, and by real differences between ethnic groups which are concealed by both the complexity of the situation and by the use of aggregated data. The AIHW (1992a) noted that selection effects and diet advantages may actually conceal adverse health effects associated with work or with poorer socioeconomic status in Australia. On balance it appears that for most migrant groups, the protective effect of previous lifestyles and retained practices, maintain an overall health advantage in the area of chronic diseases. There may also be differences in the interpretation of ‘advantage’. For instance Young concedes that despite their lower mortality, there may actually be greater expenditure on health care for people of different birthplace groups because of factors such as language and SES.
Another element in this discussion is that most of the literature in Australia relates only to the first generation of migrants. This is particularly relevant to the present study because of the short time the Vietnamese community has lived in Australia. I will further discuss the position of Vietnamese people in this picture in Section 2.4.4.

2.2.2.3 Activities which address the health of migrants in Australia

Where populations have shown a tendency to assume the typically Western profile of lifestyle diseases, health promotion activities which seek to minimise the increased incidence and prevalence of these conditions in the immigrant population have also emerged. In the 1980s, a number of strategies were implemented to address the perceived health disadvantage of migrants to Australia when compared to Australian-born. Strategies included recommendations made by the Better Health Commission (BHC 1986) such as the development of culturally specific health promotion programs, and the documentation in other government reports and policies of targets relating to aspects of migrant health. Examples of the latter included the following goals in the Health for All report:

'To ensure that the health advantage of immigrants in Australia is not eroded by the adoption of less healthy lifestyles or environments; and to ensure that the special health needs of refugees on arrival in Australia are met' (HFA 1988:20).
Garrett and Lin (1990) argue that these goals, which were the only ones specifically targeted to the NESB in the *Health for All* report, ignored structural determinants of health previously identified as concerns by the Better Health Commission. Also during the 1980s, both federal and state governments released policy documents which addressed social justice issues. Garrett and Lin (1990) note that access of migrants to health services was addressed in NSW Health Department Ethnic Affairs policy and in the Federal Government's *National Agenda for a Multicultural Australia*, (Office of Multicultural Affairs 1989). At a local level, the *Health Promotion Strategic Plan of the SSAHS* (HPU 1990a:20) also identified 'people of NESB' as a priority target group for service provision.

The combination of documents describing the health disadvantage of some migrant groups, and the prevailing government policies, have accorded high priority to strategies which attempt to reduce the inequalities in health status among different groups of Australians. It was against this background that the NSW Better Health program, (jointly funded by the state and federal governments), expressed particular concern 'with the health of disadvantaged groups in our society' when it called for expressions of interest for health promotion and health education programs in 1990 (NSW Department of Health 1990). Many of the programs funded under the scheme (including the present study), were targeted to immigrant groups, particularly those from NESB. The health of immigrants is still a priority for NSW Health (NSWH c1995, NSWH 1996).
2.2.3 Migration and dietary change

The identification of dietary change as one of the factors implicated in changes in health status following migration was part of the rationale for the present study: the hypothesis that Vietnamese people are at increased risk of developing diet-related diseases after migration to Western countries is largely based on anticipated changes in dietary practices. In this section, I review literature which documents dietary changes in migrant groups as a whole, and in immigrant groups to Australia in particular. This will illuminate the review of material describing dietary change in the Vietnamese population which will be discussed in Section 2.4.

Changing dietary patterns are widely described in the literature for a range of migrant situations, populations and ethnic groups. The most common finding from the literature reviewed is that dietary changes do usually occur after migration - changes may be a decline in the use of traditional foods and ingredients, the adoption of new foods, or the modification of traditional foods. However, the extent of change is variable, as are the reasons for change and the likely consequences of change. The studies varied in their methodologies used and the factors examined. In this review I will only examine a sample of the literature which indicates the breadth of the topic and the diversity of findings. Situations examined include migration between countries (Grivetti and Paquette 1978, Nalbandian et al 1981, Hrboticky and Krondl 1984, Harding et al 1986, Karim et al 1986, Kocktürk-Runefors 1990, Lockie and Dickerson 1991, Romero-Gwynn et al 1993, Anderson and Lean 1995).
Also migration within a country, eg from rural to urban areas (Witcher et al 1988) and from highland to lowland areas (Shack et al 1990). Population groups include adults, women and children, and adolescents; and ethnic groups include people from China, India, Mexico, Nigeria, Armenia, Greece and Turkey. Subjects also varied in their migrant status (first second or third generation). Countries in which the studies took place include Sweden, Scotland, Ecuador, New Zealand, the US and Canada. I will review studies of immigrants to Australia in the next section (2.2.3.1).

Nearly all the reports reviewed here indicate that migrant populations have reduced the use of traditional foods and ingredients after migration (Grivetti and Paquette 1978, Nalbandian et al 1981, Hrboticky and Krondl 1984, Karim et al 1986, Kocktürk-Runefors 1990, Romero-Gwynn et al 1993). Nalbandian et al reported that traditional food use by Armenian-Americans decreased and that non-traditional food use increased between the first and third generations. The largest decrease in the use of traditional foods was found to occur between the first and second generations - breakfast patterns were acculturated (sic), ie following a conventional American pattern, by the third generation. The authors assert that the degree of ethnicity in the population was inversely related to the degree of dietary change. Associated ethnic characteristics were decreases in the frequency of traditional given names and language between the first and third generations. The first generation were also older and unlikely to read English. Karim et al studied 62 migrants from India to the US (most of whom had been resident for more than 6 years).
Changed dietary patterns found were for example, a lower prevalence of vegetarianism, a significant decrease in the frequency of consumption of traditional foods and a significant increase in the consumption of some Western foods. There was also a decreased consumption of breakfast. Grivetti and Paquette reported that Chinese migrants in the US claimed to be consuming a staple traditional food (rice) to a lesser extent than when they lived in China. The Chinese migrants also reported changes in snacking and beverage consumption and practices. An intriguing change was the inclusion of foods from other cultures (eg tortillas) that were not traditional in the diet of the host society (the US). Non-traditional foods played major dietary and nutritional roles in the Chinese-American families.

Hrboticky and Krondl (1984), studying first and second generation Chinese adolescent boys in Canada, found the second generation to be more like a matched sample of Canadian boys of British descent in their liking for a selected list of some Western foods eg desserts, fast foods and snacks and beverages. The second generation boys also consumed these foods more frequently than did the first generation. More recently, in a study of Hispanic women, aged 19-44 years living in the US, Romero-Gwynn et al (1993) also reported that the consumption of most traditional foods consistently decreased after acculturation - the diets of second generation women resembled the mainstream American diet. Some new foods had also been adopted.
Despite the reported decline in the use of traditional foods, several studies report that traditional foods were not abandoned after migration (Nalbandian et al 1981, Karim et al 1986, Lockie and Dickerson 1991, Romero-Gwynn et al 1993 Anderson and Lean 1995). Interestingly both Nalbandian et al and Romero-Gwynn et al reported that some traditional foods were still popular in all generations of the populations they studied. Lockie and Dickerson, in a study of 51 Nigerian male students living in Scotland, reported that the students actively sought out traditional foods. Although the students (who were mostly in their 20s) were not permanent migrants, it appears they were not willing to consume only the local foods available in their new environment. Anderson and Lean in a small longitudinal study of women from the Indian subcontinent also living in Scotland, reported that the women (10 years after the first survey) still prepared traditional foods, especially for the evening meal. Convenience foods were however used commonly at other meals. The major change in the 10 year period was the increased use of 'healthier' versions of some foods eg more in line with dietary guidelines.

Neiderud and Philip (1990) compared the diets of Greek immigrant children in Sweden with Greek children in Greece and with Swedish children. In contrast to the other studies reported here, these authors reported that food habits were more similar to those of the Greek rural children than those of the Swedish children. However, some changes were noted, some of which reflected differences in price and the perceived quality of staple foods such as fruit and vegetables. There also appeared to be uptake of sweets and snacks and a change in the type of fat and bread used (more Swedish style).
The young age of the children in this study (mean age was approximately four years in each sample) may have influenced the results - the results would largely have reflected parenting practices which may have been influenced by the parents' own upbringing.

Where traditional dishes have been retained they are often reported to have been modified in some way. Kockturk-Runefors (1990), in commenting on dietary patterns of Turkish immigrants living in Sweden, notes that Swedish ingredients have been incorporated into traditional Turkish dishes, but the dishes have retained their traditional names. A slight variation was reported by Romero-Gwynn et al (1993) in that the Hispanic women in their study had found new uses for traditional foods.

Generally the results of dietary change are reported to be increases in meat, fat and sugar consumption, and decreased starch consumption. Typical was the report of Grivetti and Paquette (1978), that Chinese people after migration to the US, used an increased variety of meats, less seafood and different vegetables. There is a mixture of opinion in the literature as to the healthiness of the observed dietary changes. The emphasis in recent literature is on changes that are considered to be negative (eg Nalbandian et al 1981, Tsunehara et al 1990), where diet is usually related to increases in disease risk. Other studies demonstrate that not all dietary changes are negative (Harding et al 1986, Witcher et al 1988, Romero-Gwynn et al 1993) and in some cases they are overwhelmingly positive (Shack et al 1990).
Nalbandian et al (1981) reported that the nutritional quality of the diet of Armenian-Americans diminished with acculturation. Tsunehara et al (1990) who studied second generation Japanese-American (Nisei) men in the US, found that they had higher protein and fat intakes than men in Japan, and considered their diets to be comparable to those of US men. This change was considered negative because of the higher rates of diabetes and impaired glucose tolerance (IGT) in the Nisei men than the men in Japan. Harding et al (1986), studying immigrants from the island of Tokelau to New Zealand, reported marked dietary changes particularly increased intakes of meat (instead of fish), bread and potato (instead of other starches) and soft drink (instead of coconut juice). This resulted in an increase in cholesterol consumption, a change in the type of fibre consumed but also a decrease in saturated fat consumption. The authors considered that the increased body weight of subjects may have been related to an accompanying decrease in exercise after migration. As well as changes in profiles of the chronic lifestyle diseases, specific changes in migrant health related to nutritional status have also been reported. These reports include higher rates of some nutrient deficiency diseases, for example, rickets and iron deficiency anaemia that have been reported in immigrants from Asia and the West Indies to the UK (Helman 1990).

Positive benefits resulting from dietary change after migration were reported by Shack et al (1990) who found that the nutrient intake of mothers and children who migrated from a highland area to a lowland area of New Guinea improved because of an increase in the nutrient density of foods available.
In this case purchased foods were seen to be an advantage. Similarly Witcher et al (1988) reported that women and children in Ecuador who migrated from rural to urban areas showed positive changes because it enabled increased fruit and protein intakes. Another positive benefit was an increase in time available due to the different cooking fuel available in the city requiring less time for meal preparation. However, dietary changes which the authors considered to be negative, such as increased intakes of biscuits, ice cream and soft drinks, were also reported. Romero-Gwynn et al (1993) also considered some of the changes made by Hispanic women to be healthy eg increased milk, fruit and vegetable consumption. However, these authors considered most changes to be potentially deleterious, resulting in a probable overall increase in fat and sugar intake.

Various reasons for dietary change have been offered. The availability of traditional foods appears to be a factor in determining dietary change. For instance Harding et al (1986), demonstrated a large immediate dietary change related to changes in the availability of food when people migrated from the island of Tokelau to New Zealand. Similarly, the development of nutrient deficiency diseases may be due in part to the different foods available. Helman (1990) suggests that some dietary practices which are appropriate in traditional environments may be problematic when different ingredients or different cultivars are substituted in the new environment. But the opposite may also be true. For example, increases in the availability and quality of foods in the new environment may lead to improvements in diet quality.
Conversely, the lack of availability has not always been the reason for abandonment of traditional practices (Grivetti and Paquette 1978, Karim et al 1986). Grivetti and Paquette suggest that a possible factor for this was that migrants may have been familiar with non-traditional foods from their previous location. These authors note also that some traditional foods had never been consumed in the homeland. Kocktürk-Runefors (1990) comments that changes in dietary practices in the Turkish immigrants to Sweden occurred in different phases depending on who the immigrants were, (males arrived before the females), and was affected by factors such as the money, facilities and skills available. Witcher et al (1988) noted that some changes for the women in Ecuador were dictated by the different fuel sources available. This in turn dictated a different lifestyle. In the study of Romero-Gwynn et al (1993), it was felt that different reasons operated for different foods. One possible reason for dietary change was cheaper price of alternative foods. However, in some cases more expensive items were selected suggesting that other factors, eg convenience, were also operating. In that study, both the second generation Hispanic women and their spouses were more educated, more likely to be working and had also been to their homeland (Mexico) more often than first generation women. However, the effects of these factors were not examined.

Feinleib (1995) commenting on the history and rationale for studies of migrant populations notes that they began in response to a situation of 'natural experiment'. However, he notes that such studies are fraught with potential biases eg self-selection and healthy migrant effects.
Other biases include possible inverted hypothesised effects, (eg migrants may actually be under less stress rather than more after migration); and the persistence of traits established earlier in life. He uses as an example, an early major epidemiological study of the Chamorros people who were living in three locations around the world following the second World War (Reed et al 1970). In that study Reed et al reported that despite massive changes in diet, language, occupation and 'attitudes' (sic), there was little evidence that the changes in sociocultural factors were related to morbidity profiles. Feinleib asserts that migrant studies continue to be pursued as an intellectual challenge.

However, many studies also examine and compare the dietary patterns of different ethnic groups living in the same geographic area. As these different groups usually have different cultural backgrounds, it is likely their traditional food patterns will also be different. Also, some or all of the groups under study may have arrived in the area as migrants at some time. Therefore, it is relevant to look at some of these studies (Harris et al 1988a 1988b, Borrud et al 1989) within the context of the present study. In each of these studies, both differences and similarities were noted in the food habits of the different ethnic groups. Harris et al studied four different ethnic groups of adolescents in south western USA. While some foods eg ice cream and hamburger were universally liked and consumed, other foods eg chicken and potatoes, showed distinct ethnic differences. Differences in consumption due to ethnicity were greater than differences due to age or gender.
Borrud et al studied the food habits of three ethnic groups - adult black, white \textit{(sic)} and Mexican-Americans. Although the three groups were living in the same geographic area, their diets were also found to be different in some respects. In particular, the Mexican-Americans adhered to some traditional patterns but they had increased their consumption of non-traditional local foods eg beef. The diets of the three groups also showed some similarities.

2.2.3.1 Health and dietary change of migrants in Australia

Studies of the food consumption patterns of migrants in Australia have included studies which related to observations of changes in disease profiles, studies which have sought to describe change from traditional diets and studies which have made comparisons with dietary patterns in the country of origin and in Australia.

According to McMichael (1985a), Australia has provided a good opportunity to study disease changes because of migration patterns and the ages of immigrants on arrival. Studies of changes in the prevalence of different cancers in European migrants have been particularly extensive and have been related to food consumption patterns. McMichael reports that before migration, the rates of colon and rectal cancer were comparatively higher in British residents and low in Europeans, while stomach cancer was traditionally higher in Eastern Europeans than in Australians. Studies of immigrants from seven countries where the prevalence of stomach cancer was higher than in Australia demonstrated that the risk of stomach cancer reduced with length of residence in Australia.
Cancer of the pancreas also reduced to a level closer to the Australian rate, as did colon cancer in Scottish immigrants and rectal cancer in British immigrants. Conversely, where cancer rates were lower than Australian rates (eg for colon and rectal cancers), these increased with length of stay. The increased cancer risk was related to changed dietary factors, in particular an increased intake of animal fats and meat, and decreased dietary fibre. For some groups, a change in alcohol consumption from spirits to beer was also associated with increased risk. A greater increase for males than females was taken to relate to greater dietary acculturation in this group, which in turn was associated with general acculturation processes, eg males were more likely to work outside the home. The high rates of stomach cancer were related to diets high in complex carbohydrate, and low in fat and micronutrients such as Vitamins A and C. The diets were also high in pickled and preserved foods. As the rates of stomach cancer were generally greater in lower SES groups in the society, this was considered to be due to differences in food consumption and storage patterns.

The studies by Hopkins et al (1980) of Italian migrants to Perth, support the hypothesis that substantial changes in food habits have occurred toward those of the Australian population. A household survey of 170 Italian migrants reported an increased consumption of meat and animal fat, and decreased intake of starch, fruit and vegetables since moving to Australia. When compared with the diets of 170 Australian-born residents, the traditional Italian diet was reportedly higher in cereals, pulses, vegetables, vegetable oils and wine than the Australian diet.
The diets were also lower in sugar, meat, eggs, milk, cheese, total animal fats and beer. It was noted at the time that vegetable oils, fibre and wine, all relatively high in the Italian diet, were associated with a reduced risk of heart disease.

Similar changes were also noted by Powles et al (1988) who studied 1041 Greek adults, 533 who had migrated to Melbourne, and 488 family members who were still living on the Greek island of Levkada. Respondents were interviewed, measured and a sample completed a diet record which was a combination of written records and photographs of food consumed. Over one-half of the Melbourne group had migrated over 20 years before the study. Notable dietary changes reported were an increase in meat and milk consumption and decreases in olive oil and cheese consumption. However, it was noted that the meat was prepared and eaten in ways that minimised saturated fat intake.

Small studies of Lebanese- and Japanese-Australians provide contradictory evidence regarding the adoption of Australian diet. Hadj (1988) in a study of 20 Lebanese people who had been resident between 15 and 20 years, concluded that diets were changing towards Australian patterns. Data were collected by 24-hour recall and dietary history, and results were compared with nutrition survey data in Lebanon conducted at the time of their migration. Hadj reports that meat had overtaken cereals as the major source of energy in the Lebanese-Australians compared with their compatriots.
Also, similar proportions of cereals, breads, meats and fats were consumed by the Lebanese-Australians and Australians in general. However, sugar consumption was much lower and fruit and vegetable consumption higher in the Lebanese-Australians. The main factors affecting dietary change were considered to be increased income and the relative cheapness of food in Australia. Hadj does not discuss the fat quality of the diets in Australia, the timing of dietary change, nor make any comparison with current diets in Lebanon. By comparison, Horie et al (1988) in a study of 16 Japanese-Australians, found that although non-traditional foods were consumed, indices of Japanese food and beverage consumption improved with length of stay in Australia. This was attributed in part to greater access to traditional Japanese food sources. Interpretation of these studies is hampered by their small sizes and localised samples.

As in the international studies, none of the studies reporting food habits of migrants in Australia have demonstrated abandonment of traditional dietary practices. Some studies which have reported on dietary habits in migrants have found that traditional habits have been retained (Burnley 1985, Powles et al 1988) and even increased with length of residence in Australia (Burnley, Horie et al 1988). Burnley, studied 2600 persons from seven ethnic groups originating in Europe and who settled in Sydney in areas of strong ethnic concentration. He found that traditional diets were maintained in these groups, with at least one-half of all foreign born (sic) reporting that they had no Australian meals, and that in the Italian, Greek and Lebanese samples, at least three-quarters had no Australian meals.
About one-quarter of some groups (Italian, Greek, Yugoslav), had one to three Australian meals per week. There was a trend for greater retention of traditional meals with longer residence and older age. Possible explanations for the retention of traditional foods were the use of ethnic-language radio and newspapers (even where English papers were read). Also, older residents may have had less education in their homelands which in turn may have affected their willingness to adopt external aspects of Australian life and culture. Burnley relates the preference for traditional meals to the preference for staying to live in areas of ethnic minority concentrations. It was also noted in this study that language use remained high in the home. It is suggested that acculturation is slower in areas of ethnic minority concentration because of the maintenance of ethnic identity - the community is also likened to the village situation of the homeland. Burnley suggests that those who have adopted Australian practices such as meals and the use of English language on a daily basis, may have moved to other areas. Noting the findings of Hopkins et al (1980), Burnley suggests that although meal patterns are retained there may have been changes in composition. The interpretation of this study is limited by the lack of data on the length of residence, age of respondents or family situations.

Migration within Australia, notably of Australian Aborigines who have moved to urban areas (and therefore new environments), has also resulted in dietary change. O’Dea (1991) concluded that adoption of Western lifestyle, including diet, by Aborigines is linked to the development of obesity and non insulin dependent diabetes mellitus (NIDDM) in that population.
Dietary changes implicated have been increased fat and energy density, decreased fibre content and potassium/sodium ratio. At the same time there has been reduced energy expenditure.

Prior to 1991, most of the information available on the food habits of Asian-Australians came from the NDS (English et al 1986, 1987). Analysis of food consumption data from the NDS of adults by region of birth indicated that those born in Asia had the highest consumption of cereal foods and soft drinks and that Asian-born women had the lowest consumption of milk. For nutrients, Asian-born men and women had the highest vitamin C and starch intakes of all groups, but for several nutrients were also more likely to have intakes less than 70% of the RDI. For women, the group born in Asia had the highest proportion who consumed less than 70% RDI for calcium, (71% of the group); retinol equivalents (65% of the group) and iron (50% of the group). Asian-born men had the second highest proportion of the population groups who consumed less than 70% RDI for calcium (43% of the group), retinol (35% of the group); and riboflavin (33% of the group). Protein intake for both men and women was comparable with that of men and women born in Australasia. For alcohol intake, women born in Asia had the highest intake of all population groups, whilst men born in Asia had the lowest intake. Closer examination of the data suggests that the situation is even more complex. For instance, although cereal consumption was high, it varied with different types: Asian-born had the highest intake of rice but the lowest intake of breakfast cereal.
Similarly, within the vegetable category, the total percentage consuming vegetables was the lowest of all birthplace groups and potato was consumed least by this group. However, the vegetable group of onions, leeks, shallots and garlic was most frequently consumed by the Asian-born.

From the NDS, assumptions about the dietary intake of Vietnamese people are extrapolated from the data for Asian-born. However, the sample of Asian-born is not necessarily representative of the Vietnamese community as it also included people from a number of Asian countries such as Israel, Kuwait and Turkey, the Indian subcontinent, as well as south east Asia. The total Asian-born sample was made up of 84 women and 102 men who were predominantly in the 25-44 year age group. While the number of Vietnamese people in the sample is not stated, it is likely to have been very small as the number of Vietnamese people living in Australia in 1983 was very small compared with the present population of Vietnamese-Australians.

More recently, a few studies have examined dietary change in immigrants to Australia from Asian countries, although some have been reported since the implementation of the present study (Hsu-Hage et al 1995, Mitchell and Mackerras 1995). Hsu-Hage et al reported dietary change in a representative sample of adult Chinese in Melbourne. Acculturation towards Australian eating patterns was evident amongst those with more education or higher status occupations, the Australian born and those with a longer length of stay. People born in Vietnam were the newest migrants in the group and were considered to show little sign of food acculturation.
Men born in Vietnam consumed more rice, soup and less red meat, green vegetables and snacks than other Chinese participants, while women born in Vietnam consumed more rice and legumes, but less tea and red meat than the other Chinese women. The number of Vietnamese participants is not stated. Mitchell and Mackerras studied food practices of 113 pregnant Vietnam-born women in south western Sydney. Over half (57%) of these women reported that they believed in and followed humoral food habits all or most of the time. Women following traditional practices were more likely to have a lower consumption of hot foods (fats and condiments) and increased consumption of cool foods (fruits and vegetables). Traditional women were slightly younger, had less education and had lived in Australia for a shorter time than non-traditional women. However, these differences were not statistically significant. The authors do not report the age at migration or length of stay of study participants.

Where the timing of dietary change after migration has been considered (Hopkins et al 1980, Rutishauser and Wahlquist 1983, Powles et al 1988) it was felt that dietary changes occurred soon after migration and did not increase with length of stay. These studies were all of migrants from southern Europe. Hopkins et al found that the Italian-Australians reported making their dietary changes more than 10 years prior to the study and most had been resident for more than 10 years. Rutishauser and Wahlquist found little difference in the food consumption patterns of Greek-Australians who had been resident for more than 16 years and those of only a few years.
Powles et al reported that about half of the Greek-Australians made dietary changes within the first year after arrival and that this was similar for short and long stay migrants. This evidence is somewhat at odds with the argument that the amount of change increases with length of stay. If dietary change does occur soon after migration, evaluating dietary change against length of residence may be inappropriate. However, data supporting either view are not well enough described to draw clear conclusions.

In summary, the literature supports the hypothesis that migrants tend to change their dietary patterns as they acculturate into the adopting area. Common changes appear to be a relative increase in animal fats and meat, and a decrease in cereal consumption. The process appears to be complex - it is not uniform across or within migrating groups or over time, and many factors may be involved. It is also not appropriate to assume that traditional patterns are abandoned or that dietary change has negative consequences. In my readings, the positive aspects of dietary change receive much less attention in the literature than do the negative aspects. While change in disease patterns parallels dietary change in some cases, this is not yet demonstrated by most migrant groups in Australia. While some convergence to Australian disease patterns is noted with length of residence and some adoption of the Australian diet, migrants from countries with substantially lower morbidity rates than Australia (for the chronic diseases) appear to have maintained some health advantage over the Australian-born. This may be due in part, as Powles and Gifford (1990) stated, to the retention of traditional practices that are in some way protective.
Where dietary change does occur it may happen early after migration as an adaptive response, and not necessarily increase over time. Dietary change may be greater where community members mix outside the ethnic group (possible effect of acculturation). However, some traditional practices may even increase over time if supports are available, although there may be changes, eg in ingredients, that are not evident without detailed observation. McMichael (1985a) suggests that information gleaned from dietary studies of migrants in Australia will be beneficial in that it may form the basis of dietary advice. For example, where a particular diet type is found to reduce the risk of certain diseases, the eating of that diet type can be promoted to both Australian-born and to migrants alike. In the following section I will review the dietary factors that have been associated with disease risk.

2.2.3.2 Dietary factors implicated

From observations of populations after migration and in developing countries that have become Westernised, dietary changes commonly noted in the literature are: increasing fat, protein, meat and sugar intakes, as well as general increases in the amount of food consumed; and decreases in the intakes of cereals, legumes, fruit and vegetables. Alcohol consumption has increased or altered in type in some groups. At the time the present study was designed, ethnic minority groups in Australia including Vietnamese people were considered to be at greater risk for overnutrition than undernutrition (English 1987). Consequently, the major health problems considered to be of concern for the Vietnamese population in the future are the same as the ones identified for the general Australian population.
These include CVD (including hypertension) obesity, diabetes, and some cancers (eg bowel and breast). Commonly reported physiological markers for these conditions include blood cholesterol, blood pressure, body mass index (BMI) and blood glucose.

It is important to note that other dietary factors have also been implicated in the development of these chronic diseases. For instance, in the development of CVD, while a high fat intake has long been regarded as 'the cause', fat quality, in particular the role of monounsaturates, has been the subject of considerable recent research. Roles for dietary factors which may be protective against atherosclerosis have also been put forward. These factors include dietary fibre, fish oils, antioxidants and accompaniments such as garlic (Nelson 1995). The consumption of a variety of foods also appears to be an independent risk factor (NHMRC 1992). High sodium intake has been linked to the development of hypertension, although roles for other food components eg potassium and alcohol have been described (NHMRC).

Development of obesity has generally been linked to an excess of energy intake over energy expenditure. Obesity may therefore be due to an increase in energy intake, especially from fat, a decrease in exercise or a combination of both (NHMRC 1992). Non-insulin dependent diabetes mellitus (NIDDM) is considered to be a consequence of obesity development in susceptible populations and individuals (NHMRC). The development of some cancers (for example bowel cancer), has also been related to high fat diets, especially when present with a low fibre diet.
However, recent work suggests that starch intake and fruit and vegetable intake are also important dietary factors (NHMRC). Increasingly, phytochemicals (nonnutritive dietary compounds) are seen as physiologically important food components - in particular there is considerable research into the roles of phytoestrogens (which occur in high concentrations in soybeans and soy-based products), in the development of conditions including CVD, cancer and osteoporosis (Knight and Eden 1995). Knight and Eden go so far as to contend that phytoestrogens may be at least partly responsible for the low rate of cancer and heart disease in vegetarian and Asian populations.

To appropriately interpret the findings of the present study, it is important to identify the dietary factors most likely to be implicated. However, much of the literature is conflicting and inconclusive in identifying the dietary components that are associated with the development of chronic diseases. From my readings, it appears that any dietary explanation of the different disease profiles occurring in different population groups, is likely to be far more complex than consumption of a high fat diet - a host of other dietary components may be involved in protective as well as causative roles. These factors may include those listed above such as starches, garlic and phytoestrogens as well as other components as yet unidentified. The factors related to diet and dietary change may also vary depending on the cultural backgrounds of the populations concerned. For diets such as the traditional Vietnamese diet which is considered to be generally low in fat content, changing to a more Western style diet may therefore be much more complicated than simply increasing fat intake as was previously thought.
In summary, literature describing links between health and ethnicity is difficult to interpret because of differences in the ways data are used - for literature relevant to the present study there are variations in the definitions of many of the terms used eg ‘Asian’, and ‘Vietnamese’ as well as problems due to small samples and/or aggregated data. These factors affect comparisons between studies and may well conceal cultural differences within samples. In Australia, much of the health-related activity targeted towards different ethnic groups has been based on the view that migrants are at a health disadvantage. However, more recent data indicate that many migrant communities, including the Vietnamese in Australia, are at some health advantage compared to Australian-born residents, and that these advantages may relate in part to different dietary patterns. That dietary changes occur when migrant groups settle in a new area has been widely reported and has also been widely linked to changes in health status. Although a host of dietary factors have been implicated in the observed changes in diet and disease patterns, the literature tends to concentrate on changes in fat intake and associated rises in CVD. However, the evidence in this area is mixed and there are also reports of positive effects from dietary change. It is evident from the previous section that different ethnic groups consume different foods, so in the next section I will more closely examine the concept of culture and its relationship to food and diet.
2.3 Culture and food

An understanding of how cultural factors affect dietary practices is fundamental to understanding why different food habits exist in different groups and to understanding processes of change in food habits. Also, the nutritional value of foods can be affected by numerous factors in the environment as well as by dietary practices. In this section I will review the relationship between food habits and the sociocultural environment. Firstly I will examine the concept of culture, its acquisition and process of change, and then review the roles of food and different ways that food is classified. I will then link this to changes that may occur in dietary practices and in nutritional status.

2.3.1 Food selection and nutrition

An individual’s nutritional status is intimately related to the foods consumed. However, many factors operate to determine both the foods chosen for consumption and the nutritional value of the food consumed. Numerous models have been proposed to explain the process of food selection. For example, Fieldhouse (1986) describes a food selection paradigm in which the central concepts are food availability and acceptability. According to this paradigm, which is a synthesis of several other models, food availability is determined by physical, political and economic factors. Once the availability of foods is established, the acceptability of foods is influenced by cultural, social and religious factors. After all of these influences have acted, actual food consumption is then determined by factors of individual choice.
In order to discuss the food habits of any society, particularly to make an assessment of their characteristics and their effects on nutrition, it is first necessary to describe the relevant concepts. In this section, major summary texts (Fieldhouse 1986, Bates and Linder-Pelz 1990, Helman 1990) are reviewed to present an overview of the relationship between culture and food. Definitions are given for 'culture' and related concepts, and their relationship to food is described. Descriptions are given of the roles of food in a society and the food classification systems used within a society and by observers of the society. Change in a society's food patterns is discussed and migration is introduced as an influencing factor. These texts were selected for this review because they are available and accessible to nutritionists, most of whom have minimal training in the social sciences.

2.3.2 Culture

As mentioned in the Introduction, there are numerous dictionary definitions of 'culture'. This is also the case in the literature. The following definitions and descriptions have been used by the quoted authors in their discussions of the interaction between culture and health. Each of the authors has also included discussions of food and culture within that framework.

Culture is described by Bates and Linder-Pelz (1990:27) as the:

'distinctive knowledge, habits, ideas, language and ways of living shared by a group of people ...(which)... provides its members with a world view, an ideology, rules for behaviour, a knowledge of what to believe and how to express their feelings'.
Helman (1990:2) refers to culture as:

‘a set of guidelines (both explicit and implicit), inherited by individuals as a part of a society’.

Both sets of authors note that various groups of people eg families, organisations and nations may share a culture, and that within any one society there are likely to be many cultures. For example, groups differentiated within a society on the basis of social class, gender, age, profession, and ethnicity may each have their own subcultures. Consequently, any individual may belong to more than one cultural group. With reference to the present study, the Vietnamese adolescents may therefore not only identify with the Vietnamese cultural group but also with any of the following groups at the same time: adolescents, Australian, family, school, male/female, and other groups such as friends. Each of these groups would have a set of ‘rules’ to guide behaviour and beliefs, however they may not be the same for each group.

Fieldhouse (1986) contains his definition of culture to the context of a society, where generations of families live by similar cultural rules and values. He notes that the terms ‘culture’ and ‘society’ are sometimes used interchangeably. He distinguishes between them, asserting that:

‘"culture" describes patterns of behaviour; (and that) "society" refers to the people who participate in the culture and thus give it concrete expression’ (Fieldhouse 1986:2).
However, these views of culture would be considered simplistic and static by groups such as contemporary anthropologists (eg Brady 1995, Okely 1996). Brady also comments that culture is often associated with tradition in the popular view, and that these terms hold connotations of the past, rather than 'being viewed as the dynamic present and future of peoples' (1995:1490). Consequently, Brady considers that 'culture has become a "thing" that you either have or have lost'. Brady notes in speaking of Aboriginal groups in Australia, that surprisingly, indigenous discourse has adopted a similar viewpoint which is illustrated by regret expressed over 'disappearing lifeways' (Linnerkin 1992 in Brady 1995:1490) and by the popular portrayal of indigenous cultures. She argues that there is a persistent stereotype that 'true' culture does not exist among urbanised people, being exclusive to tradition-oriented groups, and notes that this suggests that the only 'real' Aborigines, (ie who have culture), live in remote areas.

Brady also notes that while Aboriginal groups resist this stereotype they themselves suggest their culture needs preserving, thereby reinforcing the static view mentioned above. Although Brady discusses these issues for Aboriginal-Australians, they would also seem to hold true for ethnic minority groups such as Vietnamese-Australians, in that Vietnamese culture is often conflated with Vietnamese tradition and is seen as characteristic of living in Vietnam. This viewpoint is also encouraged by policy documents which endorse multiculturalism and the ethnic diversity of Australia (OMA 1989, EAC 1993).
Brady asserts that a narrow definition of culture may result in the loss of the notion that people choose the way they adapt from a range of possibilities, according to their wants and needs. Okely (1996) notes that the boundaries of separate cultures are extremely difficult to distinguish, and that place, culture and identity can no longer be viewed as contiguous. She also asserts that all cultures are provisional and are defined by flexible boundaries. Okely reminds readers that previously ‘isolated’ communities, as well as being affected by new contacts and changes, have themselves been affected by changes, eg migration, in their own history. Similarly, Okely notes that when observing differences in far away places, Westerners have in the past often made comparisons with stereotypes of ‘the West’. Ironically, this approach ignores the cultural complexity of the West.

In this thesis, the term ‘culture’ is used to refer to a synthesis of the above definitions, ie a shared world view and learned patterns of behaviour, but with the acknowledgment that this is a dynamic process in which people also make choices. The concept of a cultural group is used similarly to that of Fieldhouse’s society. However, as subgroups including individual families and peer groups each have their own cultures, at times these are also referred to as cultural groups. Several characteristics that have been identified as common to all cultures will be discussed in the following section. These are: that a culture is learned by a process of socialisation; that people of a culture share a system of values but there is individual diversity within cultures; and that culture is not static but constantly evolving (although some elements may be resistant to change).
2.3.2.1 Acquisition of culture

Culture is transmitted between generations, both formally and informally. Most people are on the whole unconscious of their culture, unaware of the 'rules' governing behaviour within their group. The transmission of culture from one generation to another occurs initially through the immediate family, for example from adults to children through the process of socialisation. As a child grows older, exposure to influences outside the family will increasingly introduce new behaviours and values to the child. These may in turn be passed to the family.

The term 'enculturation' refers to the process of taking on the culture of a society from within, for example, by growing up in that society (Helman 1990).

2.3.2.2 Cultural change

According to Fieldhouse (1986), cultural change may be induced by factors such as educational programs or medical intervention, or as a result of changes in the physical or social environment. While recognising a range of influencing factors, this view suggests that cultural change is identifiable and sequential - a view which is very simplistic. Despite this simple approach to causes of change, Fieldhouse notes that the adoption of new behaviours and values will depend on their compatibility with the old ones, and also with the people's desire to take on and maintain the new ones. Therefore choices are made (although this is not stated by Fieldhouse). Food habits are often considered in this category.
As food habits are learnt early in life, they are considered likely to be long lasting, and hence resistant to change - however they are still subject to change.

While changes in the environment, eg due to migration, can precipitate cultural change, people's ability to accept new beliefs and values can also affect cultural change. The term 'acculturation' refers to the process by which groups and individuals adapt to the norms and values of a different culture after contact with the new culture. It is usually a two way process but with one culture dominating (Fieldhouse 1986). A common example is the adoption by a migrant group of aspects of the larger host society. Elements of the migrant group's culture may also be taken on by the host society. Differences in values between the two cultural groups have an effect on acculturation. Adjustment of the minority group to the values of the dominant group will be more difficult where the values of the two groups conflict.

The values of a culture influence the acceptability of the behaviours of individuals and groups within that culture, and hence the ways that individuals and groups interact. It consequently has an effect on the foods that are consumed. Changes in cultural patterns and values in turn affect dietary practices.
2.3.3 Food and culture

Differences in food habits may exist between different ethnic groups, and then between different families and different age groups within an ethnic group. According to Helman, the different practices and beliefs related to food is one way that cultural groups are distinguished from one another. Helman (1990:31) claims that:

'food is an essential part of the way that any society organises itself - and of the way that it views the world it inhabits'.

Although in all cultures the food eaten serves a biological purpose, that is, to provide nutrients to the body, people eat food for many reasons other than to satisfy hunger. Thus, people eat 'in response to both biological and cultural stimuli' (Fieldhouse 1986:1). The foods and dietary practices which fulfil the different roles will vary between cultures.

While simple explanations of the relationship between food and culture are available, this is also problematic in that the complexity of the relationship is missed. In presenting a static and largely ahistorical view, it is not recognised that the environment is constantly changing and that this in turn has implications ultimately for 'products' such as food habits. For instance, the food selection model of Fieldhouse (1986) (see Section 2.3.1), implies that food habits are largely shaped by influences out of the control of the individual. Therefore it would be important to consider the ways in which these external factors affect food habits when considering mechanisms of dietary change.
From this model, it also seems logical that because of the relationship between food habits and cultural and environmental factors, changes in dietary practices may affect other aspects of social life; and also that changes in dietary behaviour may result from changes in the sociocultural environment. However because the model does not enunciate that the physical, political and economic factors would also be constantly changing, the dynamic and fluid relationship between all elements is not taken into account.

Although simplistic, this type of model is important to the present study as it is typical of frameworks used to explain dietary acculturation, and has also informed the environment in which the present study was set. However, I recognise the limitations of this type of model, and will critique this aspect in relation to the findings of the present study in the Discussion chapter.

2.3.3.1 Roles of food

As mentioned in the previous section, food has many roles within any culture and the foods used in the different roles vary between cultures. In any society, food has biological properties as well as numerous social and cultural functions. That is, as well as to satisfy hunger, food can be used to express love and caring; reward or punish; signify social status and wealth; signify relationships, occupation and gender roles; mark important life changes, anniversaries and festivals; and assert religious, ethnic or regional identities. The social uses of food within a society are complex behaviours, and any use of food may have more than one meaning.
The way food is used by individuals within a society is important in expressing identity and membership of social groups (Helman 1990). Helman also notes that the multiple social roles of food means that dietary practices may be difficult to discard.

In different cultures, status may be signalled by actions such as the actual foods chosen for consumption, the way foods are prepared, the time taken in preparation, and the amount of food wasted. Through acculturation processes, foods which have assumed 'high status' foods in one culture may develop the same status in the new culture. Fieldhouse (1986) considers 'status seeking' to be one of the factors which influences changes in the acceptability and hence the consumption of foods. High status may also be conferred upon groups who consume foods that are considered to be prestigious. In addition to signifying belonging to a particular social group, the use of particular foods may also signify belonging to other groups such as an ethnic group or a peer group. Fieldhouse describes food as an 'expression of the search for belongingness' as indicated by Maslow's hierarchy of needs. He illustrates this with the example of contemporary adolescent food choices. Fieldhouse asserts that consumption of 'junk food' is part of a total lifestyle which expresses the identity of that peer group. He also notes that while nutritional concerns may be raised by the adolescents' food choices, peer pressure will remain the dominant force in determining their future food habits.
2.3.3.2 Food classification systems

Only a portion of all the food available for consumption is ever considered acceptable for consumption by any cultural group. Knowledge of which foods are considered acceptable for consumption within a culture is passed through generations by the socialisation process - this may be learned both unconsciously, eg through observation and modelling, and consciously eg through school lessons. According to Fieldhouse (1986:43), these ethnocentric rules of acceptability form part of 'the cultural stability of a society'. Although the foods available to different cultural groups vary, all groups have systems for categorising the available foods. While the foods which appear in the different categories may vary between cultures, the classification systems themselves have common elements when applied across cultures. In the literature, there are numerous classification systems which describe food habits of different cultures. Categories of the different classification systems generally relate to different cultural beliefs and values. Different authors describe different classification systems - two examples are given below.

Helman identifies five types of food classification system and notes that several usually coexist within the same society. His classifications are:

1. foods and non-foods, ie foods which are deemed edible;
2. sacred and profane foods;
3. parallel food classifications, eg hot/cold theories;
4. food used as medicine and medicine as food;
5. social foods (which signal relationships, status, occupation, gender or group identity (Helman 1990:32).
Bates and Linder-Pelz describe seven categories, some of which are comparable with Helman's. They consider that all people classify their foods in terms of:

1. edible and non-edible;
2. the way it is prepared;
3. by group or class ie foods may be suitable for one group to eat but not for another;
4. by place in time eg summer and winter foods, everyday and festival foods;
5. place of eating eg picnic foods and restaurant foods;
6. food taboos;

If applied to the same foodway, many foods would be placed into different categories according to these two systems. However, all available foods would be listed at least once, though neither system would account for all possible uses of each food. For example, there is no equivalent of Helman's 'food as medicine category' in Bates and Linder-Pelz's system. Conversely, the 'eating manners' category in the latter is not included in the former. In addition, both systems include elements of what Fieldhouse describes as cuisine. Fieldhouse lists four components of a society's cuisine. These are: the foods chosen for use (including the meal patterns); preparation methods used; flavour principles and the rules governing meal behaviour.
Fieldhouse (1986) asserts that food classification systems either describe the values placed on foods by a particular society (as in the examples above), or else they prescribe how food choices should be made, eg by observers of the society. He suggests that this approach creates conflict between nutritional classification of foods (which he sees as an example of the latter and not a description of the way foods are used in reality), and values-shaped descriptive classification systems. Fieldhouse's view is again simplistic in that it ignores the impact of the constantly changing environment - in this case the widespread dissemination of information on the nutritional classification of foods (especially in the West), such that this 'scientific view' and actual food have become conflated.

Fieldhouse considers classification of foods by their frequency of consumption within a society is one approach which goes part-way to addressing both needs. In this approach, three categories are generally used to distinguish the frequency of consumption and the importance given to various foods - foods are classified as core foods, secondary foods or peripheral foods. The significance of this classification system is that change is likely to be resisted for core foods (usually cereals and rootcrops), and more readily accepted for the less often used, and less important secondary and peripheral foods. This model is also limited in that reduced consumption of core and staple foods is frequently reported in the literature as one of the first dietary changes that occurs eg in a society undergoing acculturation. However, the importance of these foods is indicated by their often being among the last remnants of a foodway evident.
It is clear from these descriptions that food classification systems are somewhat arbitrary and that those described in the literature are largely attempts to simplify a complex process. However, within a culture, the ways that people both classify and use their available foods can have an effect on their nutrition.

2.3.3.3 Food classification and nutrition

Depending on the foods available to individuals within a culture and the classification of those foods, nutrition can be affected in two ways, necessary nutrients may be excluded; or alternatively, 'dangerous' food items may be encouraged and eaten to excess. The resulting malnutrition can be either undernutrition or overnutrition depending on the circumstances. Helman (1990), includes the overnutrition common in Western societies as an example of the excess consumption of acceptable foods, (which are generally high in fat), and the contribution of these foods to the high rate of diseases such as CVD in the West. Other cultural factors which have an effect on nutrition include beliefs about body size and shape, and the role and function of the body in relation to food. Factors besides cultural factors also greatly influence food use within a society and hence the degree of malnutrition. These include social, political, economic and environmental factors (Helman).

2.3.3.4 Humoral theory

An example of a prescriptive system of food classification is found in the humoral or hot-cold theory. Derived from ancient humoral medicine, a basic tenet of hot-cold theory is that health is maintained by the optimum balance of elements both inside and outside the body.
Such elements may include personal factors such as gender, physiological and disease states, and environmental factors such as the weather. Foods are classified as either hot or cold and prescribed to restore or maintain balance in the individual. This system is of particular relevance to the present study as it is widely practised throughout the world, and is very common in populations with Chinese ancestry, including Vietnamese. However, interpretation of the hot/cold dichotomy is problematic because the categories do not correspond to the physical properties of the food; different cultures may classify the same foods differently; and individuals within the same culture may classify the same food differently. Common examples of hot foods include meat, alcohol and fatty foods; cold foods include fruit and leafy vegetables. Foods may also be classified as tonic, poison, windy, magic and neutral (Manderson and Mathews 1981). In Chinese medical practice, the hot-cold theory is closely tied to the concepts of yin and yang which must be balanced to produce harmony.

There has been concern about the nutritional consequences of the classification of foods according to hot-cold criteria. Application of the hot-cold theory is particularly noticeable during the female reproductive cycle and a number of studies have reported on the ramifications of the hot-cold theory on pregnancy in particular. Foods prescribed and proscribed vary depending on the particular stage of the cycle. For example, during pregnancy and lactation, which are considered warm states, cold foods are prohibited.
There has been particular interest demonstrated when groups who traditionally practise hot-cold theory have migrated to new environments where the practice was unfamiliar. In Australia, several reports were published in the early 1980s when Vietnamese-speaking women first migrated (Mathews and Manderson 1980, Manderson and Mathews 1981, Mathews and Manderson 1981). These studies will be reviewed in Sections 2.4.3.5 and 2.4.5.2.

In practice, the hot-cold food classification has been found to have both positive and negative consequences on nutrition and may in some instances produce physiological changes. It is generally agreed in the literature that negative or harmful practices should only be modified within the context of the traditional system and that prior understanding of the system is essential for successful change.

2.3.4 Changes in food habits

Changes in the foodway of a society can and do occur. However, because of food's multiple roles, it may be hard for members of a society to discard beliefs and practices surrounding food (Helman 1990). Also, as food habits are learned early in life, they become deeply entrenched within individuals and hence resistant to change. When and how change does occur in the food habits of different cultures is dependent on the compatibility of the change with the cultural norms of the group, and the cultural support for change. Acculturation is one mechanism that can alter accepted cultural food habits.
Through contact with the majority culture, a minority group can take on previously unfamiliar foods and practices. Conversely, the larger group may adopt aspects of the minority group’s food culture. There are many reported examples in the literature of both processes. Examples of the former have been reported where relatively small indigenous populations such as Aborigines in Australia, and the Inuit and Indians of North America have come into contact with larger settlement populations; and also where migrant populations have moved to new locations. As described in Section 2.2.3, migrant groups demonstrating change have included groups who have moved to a different region within their own country such as from a rural to an urban area, and also populations who have resettled in a new country such as Italian, Greek, Chinese and Vietnamese people who have settled in countries like Australia. Traditional food practices can be one of the last remnants of a society which has undergone acculturation. Studies of changes in food habits of migrant groups have generally shown the retention of some traditional food practices.

Examples of the host society adopting food practices of minority immigrant groups include the acceptance of ‘ethnic foods’ (such as pizza and kebabs) as part of the mainstream Western diet. Associated industries such as restaurants, cook books and food farming have also been established.

Other factors which can alter cultural food practices include environmental and societal factors such as the media, changes in work patterns and changes in family structures. Change can also be induced by intervention.
A number of factors affect the acceptance of an innovation in a food culture and the speed at which it diffuses through the society. Any new idea or practice is assessed on its relative advantage, its compatibility with existing needs and values, its complexity, whether it can be trialled and its observability (Fieldhouse 1986). The more desirable the innovation, the more likely it is to be adopted.

Other aspects of life that may be influenced by culture include language, religion, body image and dress. However, there are also a number of other factors such as individual, educational and socioeconomic factors which can influence these and other aspects of culture. Helman (1990) notes that culture itself is always affected by other factors, and so at any point in time must be viewed in that context.

Fieldhouse (1986) notes that children can be responsible for introducing new food habits to a society, and these practices may eventually become accepted into the mainstream behaviour of the culture. This stems from the general acceptability for children to deviate somewhat from accepted habits, and that new or strange food practices may be more readily tolerated in that group. Advertising of foods to children relies on this principle and it may also be one way that acculturation of a society occurs.

Where change can be introduced into a food system is also of interest. Although meal patterns vary both between and within cultural groups, the meals themselves need to have a recognisable structure.
Thus, changes in food patterns may need to fit into the confines of the relevant cultural system. For example, less defined snack type meals may be more flexible and open to change than structured eating events.

Changes in food culture can have mixed consequences for the adopting society. Reports of negative effects include the rejection of breast feeding of infants in favour of bottle feeding, (particularly in underdeveloped countries), and the increased consumption of high fat snack foods by immigrant groups to the West. For some groups, there may be a positive effect such as the increased intake of highly nutritious foods after migration. Changes by intervention may also have negative consequences even though their reason for introduction may have been to induce a positive effect. Generally such attempted changes have been incompatible with the values of the society in which change was desired.

Historically, changes in food habits in a society have occurred as outside influences have entered the society. In general, ‘development’, as indicated by an increase in purchasing power, is often accompanied by an increase in the availability and consumption of foods high in protein and saturated fat, and a decrease in the consumption of cereal grains and starches (Harper 1987, Pellett 1989). An increase in the consumption of highly refined foods such as sugar is also common. While this is seen as a negative affect in developing countries (Pellett, McMichael 1991), Harper notes that Western countries such as Australia, the US, Canada and the United Kingdom (UK), which today are considered affluent and developed, have all undergone similar changes in the evolution of their food supply.
Location of the developing society appears to be independent of this type of change. Similar changes have occurred whether the developing society is one which has undergone acculturation from the West 'in situ', for example Australian Aborigines and countries in Asia, or where groups have moved to a more affluent environment, for example Asian people who have migrated to Western countries. Benefits, such as longer life expectancy, may also follow the increased wealth and associated changes in diet and activity in a developing society (McMichael 1991, Pellett).

Observation of the pattern of dietary changes and the concurrent rise in the incidence of 'lifestyle' diseases such as obesity, CVD and diabetes, particularly in developing societies, has given a high profile to nutrition and its role in disease prevention within health promotion planning. The relationship between nutrition and disease and the associated influencing factors was reviewed briefly in Section 2.2.3.2.

In summary, there is a two-way relationship between food habits and culture, ie each has an effect on the other. In the Vietnamese culture, food habits are closely tied to humoral theory, ie there is a relationship between food, body and well being. Culture is also constantly changing, and although food habits are entrenched from an early age they can and do change in response to different influences and needs of individuals and groups. However for new practices to be sustained, they must be easy to implement and desirable. Food has many roles, and this will influence the type and degree of change that is likely.
Food habits can also be passed from the minority to the majority culture, i.e. reverse acculturation. It is also apparent that changes in diet can have 'positive' as well as 'negative' consequences for the adopting culture. For the present study it is important to recognise that people generally belong to more than one cultural group. In the present study, participants will probably belong to at least Vietnamese, Australian, adolescent and family groups and at times there may be others. In the following chapter I will review literature relating to the Vietnamese people, and in so doing identify some aspects of culture that influence their dietary practices.

2.4 Migrants from Vietnam - health and nutrition

In this section I will present the available evidence on the health and nutritional status of migrants from Vietnam. I will also present material describing historical factors such as reasons for migration and the consequences of migration, as these provide a social and cultural background to the present study. This is followed by a description of Vietnamese settlement in Australia and observations on health status. Finally, I review literature on nutrition and dietary habits and practices of Vietnamese people who have migrated to the West.

Between 1976 and 1986 the Vietnamese were the largest group of settler arrivals in Australia of NESB (Cuong and Bertelli 1990), the majority arriving as refugees after the Vietnam war and following the capture of Saigon in 1975. Other countries to which Vietnamese migrated include Canada, the US and the UK (Dalglish 1989).
In Australia, the refugees settled mostly in the eastern states with NSW and Victoria receiving the largest populations. Early arrivals came mostly via resettlement camps in other Asian countries such as Thailand and Hong Kong. Immigrants from Vietnam continue to arrive in Australia but many now come under the Family Reunion scheme, whereby new arrivals are sponsored by family members already settled in Australia.

In the 1986 census, 0.53% of the Australian population reported their country of birth as Vietnam. At that time the Vietnamese group numbered over 83,000 people, the ninth largest of all birthplace groups in Australia (AIHW 1992b). It is important to be aware of the different measures of ethnicity used, as different measures produce different results. Other measures include language spoken, self identity and ethnic strength. For example, when the concept of ethnic strength is used, the Vietnamese population drops to fourteenth place, with 77,000 people and representing 0.47% of the total population (AIHW). The ethnic strength measure counts each person only once and incorporates fractions for people with mixed origin. The young age of the Vietnamese immigrants and the short period of settlement would have allowed only limited mixing of ethnic backgrounds to date. The ethnic strength of the total non-AngloCeltic population represents 26% of the Australian population. Analyses of the census statistics including health data are based on country of birth data.

In 1986, the median period of residence of Vietnamese people in Australia was 5.6 years, making it one of the shortest periods for all immigrant groups.
The median length of residence for all overseas-born was 18.9 years. The median age of the Vietnamese was 26.2 years compared with that of Asian-born of 32.3 years and Australian-born of 27.5 years. However, while the median age was similar to that for Australian-born, the Vietnamese population when compared with the Australian-born was on the whole much younger with a substantially greater proportion in the 15-34 year age group and less in the over 64 age group.

Data from the 1986 census showed that the Vietnamese-born people rated lower than the Australian-born on a number of socioeconomic indicators. These included a higher population of male workers in unskilled occupations, a lower proportion of the population with post-school qualifications, lower median incomes and a greater receipt of unemployment benefits. The Vietnamese population was also one of the birthplace groups with the largest numbers of people with poor English proficiency, especially amongst women. Women from Vietnam also had consistently larger numbers of children than Australian-born women. Later data from the 1991 census indicate that people speaking the Vietnamese language had the highest unemployment rate in Australia.

Data from the 1991 census also indicate that the Vietnamese population had continued to increase in NSW and had reached 49,184 people who were born in Vietnam. This represented 1% of the NSW population. With a 45% increase since 1986, this was the fourth fastest rate of growth of groups from NESB.
People born in Vietnam made up the third largest group of NESB and the fifth largest overall of all birthplace groups in NSW. The Vietnamese language was spoken by 39,451 people (0.7% of the NSW population), an increase of 71% since 1986. As discussed in Section 1.1.3, similar trends were evident in the Canterbury LGA. Of interest was the fact that the other rapidly growing population groups in NSW were also from Asian countries (China, Philippines, Hong Kong and Korea). This has implications for the availability of products and services eg food, churches, that may be similar between the groups. Perhaps related, is that of the religions followed in NSW, the Buddhist religion had the third largest increase in size since 1986. Thirty four per cent of people claiming to be Buddhist were born in Vietnam. In the period 1986-1991 in the Canterbury LGA, there was also rapid growth in other Asian language groups notably Chinese, Philippino and Korean, and an increase of 8% in people claiming to follow the Buddhist religion.

2.4.1 The Vietnamese people

As factors influencing health, welfare and settlement patterns of the Vietnamese population have largely been influenced by their backgrounds prior to migration, it is helpful to examine some of the relevant factors.

In this section some of the factors identified in the health literature as affecting cultural practices of the Vietnamese people will be elaborated. Relevant factors include the history of Vietnam and its impact on ethnicity, religion and factors relating to the migration process.
Much of this material is contained in sociological studies and relates mostly to the first refugees with some reference to later groups. In particular, this section is informed by the works of Dalglish (1989), who studied Vietnamese refugees in the UK and compared their experiences with those in Canada and Sweden, and Lewins and Ly (1985) who reported on the experiences of the first refugees from Vietnam to Australia.

2.4.1.1 Historical background

Prior to 1975, Vietnam was divided into two countries - North and South Vietnam, which were substantially different both culturally and politically. The cultural disparity between the two countries, accentuated by the different politics of the two governments is due largely to different historical influences on the two areas. During its history, Vietnam has had considerable influence from other countries both from the 'East' and the 'West'. Eastern cultural influences were predominantly Confucian and Chinese, with the Chinese influence being stronger in the North and Confucianism stronger in the South. The communist government in the North prior to 1975 was strongly influenced by China. The Eastern influences, which include the Buddhist religion, can still be seen in traditional beliefs and practices. Western influences were predominantly French and American and evident in South Vietnam. The American influence was present during the Vietnam war from 1965 to 1975; the French influence had previously been felt from the 1800s until 1954. Effects of these contacts can be seen in religious and economic aspects as well as some acculturated practices eg food habits.
The population within Vietnam itself is a very mixed one and ethnically diverse. About 12% of the population are minority groups, with about 30 different groups in the North and about 20 different groups in the South. About 2% of the population is ethnic-Chinese (Fraser 1988). Because of its long history of war prior to 1975, economic development had been hindered in Vietnam. Chronic food shortages were also prevalent during this time, particularly in North Vietnam. Since 1975, additional economic, social and political problems have been present. These have included: a rapidly growing population, and the consequences for standards of living and adequate food supply (Fraser); integration of two culturally and technologically disparate nations; and an exodus of refugees from the country (Thayer 1988).

2.4.1.2 Migration history

Migration within Vietnam was already common as a consequence of the long history of war. Internal migration was extensive, particularly from rural to urban areas, and for Chinese and Catholic people moving from the North to the South. Following the Vietnam war, refugees left Vietnam in large numbers after 1975, with the largest number leaving in 1979. Earlier refugees were generally educated and business people who escaped from the South for political reasons, affected by the changed economic climate. Reasons for leaving included the loss of personal freedom, fear of persecution, unemployment and a decrease in the standards of living. Refugees who escaped after 1979 included a high proportion of rural workers and Chinese-Vietnamese.
These differences were due to differences in the patterns of emigration of the ethnic-Vietnamese and Chinese-Vietnamese groups, and between the North and the South. Ethnic-Vietnamese left illegally, many by boat, whereas the Chinese from the South were encouraged to leave. People who left from North Vietnam were Chinese-Vietnamese, and of no particular political or professional group. They left in greatest numbers after 1979, by boat, as an alternative to being taken to the New Economic Zones that had been established in the interior (Dalglish 1989).

Hence the group that has left Vietnam since 1975 is very diverse. A mixture of both migrants and refugees, they have taken with them a range of backgrounds and experiences. However, Dalglish (1989) reports that common elements to all groups have been a long time at war, and a related distrust of those in authority and also between people from the North and from the South. Effects of the war have included low standards of living, separated families and interrupted schooling. Another common feature to people from both the North and the South is the contrast in the way of life for each in the West. Over 1,000,000 Vietnamese have resettled in different countries in particular the US, UK, Canada, Australia and Sweden, with different ethnic group mixes resulting. Most refugees arrived in the West after time in resettlement camps in different parts of east Asia. As different countries took refugees from different camps this had an effect on the final ethnic mix in the adopted countries. For example, most of the refugees in Britain arrived via Hong Kong, were Chinese-speaking and from the North, whereas less than 3% of refugees from Hong Kong during 1975-1981 came to Australia.
About 58% of the Hong Kong refugees in this period went to the US (Dalglish 1989:28). These differences resulted in different socioeconomic and religious groupings and levels of education in the resettlement communities as discussed below.

2.4.1.3 Diversity of the Vietnamese people

Vietnamese people represent a diversity of different ethnic religious and language groups. Major religions are Buddhism, Confucianism, Taoism and Christianity (mainly Catholicism from the French). Buddhism is seen as the dominant religion, with at least 10% of the population having adopted Catholicism (Facer 1985). However, Vietnamese people commonly practise a mixture of religions rather than only one (Nguyen 1991). Consequently, data describing the religious affiliations of Vietnamese people are open to interpretation. The Catholic group is reported as being comparatively well educated and possibly the most Westernised segment of the population in Vietnam. Catholics are more likely to have come from South Vietnam.

Within the two main ethnic groups, ie those of ethnic-Vietnamese and Chinese-Vietnamese descent, there is also diversity relating to language and literacy. For example, different dialects as well as different languages (mostly Vietnamese, Chinese and some French and English) may be spoken, with accompanying varied levels of literacy, both in their own and other languages. The level of education and literacy and types of occupations varied between North and South Vietnam and between early and later refugees.
Refugees originating from the South generally were younger and had higher levels of education and literacy, while the majority of those from the North were generally unskilled. Early refugees were also more likely to be well educated than were the later refugees. Significant numbers of Catholics and Chinese were amongst the early refugees. Fluency in English was common in those who migrated to the US (these were early refugees) whereas only 1% of Vietnamese householders could speak English well before arriving in Australia (Van Nguyen 1985).

Because of the different cultural practices related to age, ethnicity and religion in Vietnamese refugees, it is important to know which group is represented. Dalglish (1989) suggests that information required includes ethnic origin, whether from the North or the South, family structures, occupational and educational backgrounds. She notes that while these types of data were collected for the British refugees, their validity are questionable. Factors affecting the validity of the data relate to the circumstances of collection, namely that it was rushed, professional interpreters were few and lack of cultural knowledge led to inappropriate translations. The Vietnamese concern for authority may also have biased the way questions were answered. Priorities also changed over time in the types of data collected - eg Dalglish reports that it is not known whether early arrivals in the UK were from North or South Vietnam.

Comparative studies between countries of settlement are complicated by these differences.
For example, studies of the first Vietnamese refugees may be of young, well educated, white collar workers and may not relate to groups who migrated to other countries and/or at other times. Some countries, for example Canada and Australia, received refugees of mixed origins, that is from different source countries as well as different socioeconomic groups, while refugees in other settlements, for example in the UK, were more similar to each other.

2.4.1.4 Settlement patterns of the Vietnamese people

Different countries undertook different resettlement approaches for the Vietnamese refugees. In UK, Sweden and Australia, reception centres provided temporary accommodation and orientation programs to facilitate initial adjustment, whereas Canada and the USA settled refugees straight into the community. However, similar problems were encountered in both systems. Common problems were the manifestation of mental health problems such as depression, anxiety and family conflict, which in turn related to language problems and the lack of community support for the refugees in the receiving countries. The diversity of the refugees also made it difficult to establish associations which were relevant to the whole group. For those who had some characteristics in common with groups already resident in the host country, for example, where Chinese communities and religious groups such as Catholic and Buddhist churches were already established, limited support was available. Adaptation to the host society in terms of occupation and related language competence is reported as having been more difficult for the less well educated groups and older age groups.
Language problems related to the unexpected difficulty of learning the host community's language, exacerbated by inappropriate language education programs and low levels of literacy in their own language (Dalglish 1989).

Later refugees had the benefit of established support groups and networks in the host country. However, changed patterns of migration were evident for these groups. Many more of the later refugees were poorer and less well educated, being from peasant and farming backgrounds, as opposed to being economic refugees. Also, a greater proportion of refugees arrived under family reunion strategies which reestablished extended family networks and recreated support networks which were typical in Vietnam - many of the early Vietnamese refugees had arrived in their countries of settlement singly or as groups of individuals, rather than as nuclear families.

2.4.2 The Vietnamese in Australia

As in other settlement countries, the Vietnamese refugees in Australia have come from backgrounds diverse in religion, class, origin and ethnicity. These differences have also led to some internal divisions in the community. However when compared with the settlement population in the UK, the Australian Vietnamese community contained a higher proportion of refugees from South Vietnam and hence more ethnic-Vietnamese. Many Vietnamese refugees in Australia, as in other countries, had been victims of torture and trauma before their arrival here, many had experienced deaths of close family members and geographical separation from others. After settlement, prejudicial attitudes towards IndoChinese immigrants were reported as common (Facer 1985).
A major difference in the refugee population in Australia was that a small number (about 2000) arrived directly by boat from Vietnam. Although the majority, as in the other countries arrived via camps elsewhere in Asia, arrival of the 'boat people' in Australia heightened negative reactions from the general community. These background experiences of course affected settlement processes.

Of the first refugees that arrived in Australia (in 1975), more than 50% had incomplete families, with spouse, parent, or children missing. This early group was comparatively well educated, with 16% having tertiary qualifications on arrival compared with 10% in a later study (1980) in Fairfield NSW. In addition, the first arrivals in Australia had a lower concentration of unskilled workers relative to the 1980 study Lewins and Ly (1985). Lewins and Ly consider the early arrivals in Australia to have been atypical of the general Vietnamese community in Australia. As in the other settlement countries, the way of life in Australia was vastly different for the Vietnamese. This in turn resulted in changes in the community. Education, which was reportedly highly prized in Vietnam, was seen as a high priority for the children in Australia. However, the different styles of education and the language problems were barriers, especially for those arriving as teenagers, many of whom had had their schooling interrupted. Changes in family roles and expectations also resulted from women working outside the home as this had not been customary in Vietnam.
Other changes in family values and practices which occurred after arrival were in occupation, language speaking, and expectations of children. A follow up study, nine years after the arrival of the first refugees, indicated that a mixture of traditional and Australian language practices were in use. Lewins and Ly (1985) noted a significant increase in English speaking, especially by children. Just over half (58%) spoke only or mainly Vietnamese at home, and 13% spoke Chinese. However, in almost a third (27%) of families, English was the language spoken by children with their friends, although Vietnamese was spoken with parents. In some cases, parents' inability to speak English created barriers in communication with younger children. Lewins and Ly report that Vietnamese parents were concerned by changes occurring in their family life in Australia, although they recognised them as inevitable. This concern is illustrated by the perception of their children "slipping from the Vietnamese mode of family life" (Lewins and Ly 1985:62). Australian standards were also perceived as more liberal and resulted in children having 'less respectful' behaviour. Ironically, on another level, it was common for parents to give young children Australian names. Acceptance of changed behavioural standards was reported to be more difficult for the ethnic-Chinese than for the ethnic-Vietnamese who valued the preservation of customs but acknowledged their erosion (Lewins and Ly).

Learning the English language is viewed as a key step in the settlement process in Australia. However, the level of English learning amongst Vietnamese refugees appears to have been variable, as were attitudes towards learning English (Van Nguyen 1985).
Many reportedly found English learning difficult and time consuming, some considered it to be a threatening and unnecessary if living in large groups, while others saw it as beneficial, especially for employment purposes. English learning was generally considered much more important for children than for adults, and it was often expected that children would translate. Facer (1985) notes that as well as great differences in the structure of the English and Vietnamese languages, other ‘paralanguage’ variables (eg, tone, pausing) and social rules accompanying communication (eg touching and gestures) are also very different.

Lewins and Ly (1985) also noted that a knowledge of English was a key factor in determining movement away from the refugee group. The first arrivals reported having more contact with non-Vietnamese than did later arrivals. In occupational movements, Lewins and Ly concluded that class position (middle and working class) in Australia, was related to class position in Vietnam rather than migrant or refugee status. The first arrivals who were generally more educated than later arrivals, were found to be more adaptable in their changed circumstances. The authors believed however, that on the whole, Vietnamese refugees were at a greater disadvantage than that of most non-migrant unskilled workers and specific strategies were warranted in the (re)training of the Vietnamese community. Refugee arrivals in Australia now settle straight into the community but have the benefit of greater support from within the Vietnamese community itself than did the early arrivals. Family reunion has also increased to now be the major arrival category (Kirilik 1991).
In accepting refugees from Vietnam, countries such as Australia have thus accepted a heterogeneous group of people - although they share many pre-migration experiences and the experience of being refugees. However, this heterogeneity is little recognised in the classification of immigrants from Vietnam as 'Vietnamese' and should be considered in a study of the people. Lewins and Ly (1985) see the Vietnamese as being affected by four significant categories simultaneously: Vietnamese population; refugee population; migrant population; and the workforce. They also note that analysis of refugee settlement should focus on both psychological and structural factors. A study of displacement factors and host factors would include the refugees' level of education on arrival, the receiving country's economy at the time of arrival, and the place and type of accommodation. Displacement factors related to the type of flight, and the interplay between 'push' and 'reception' factors; and host factors related to cultural compatibility, population policies, and social receptiveness. In terms of health, it is expected there would be substantial differences in cultural practices and beliefs, in addition to the effects of the different backgrounds and experiences.

In summary, this section describes the diversity of the Vietnamese people, concentrating on factors relevant to the refugee population in Australia. In order to appreciate the enormity of change the Vietnamese have encountered in migrating to Western countries it is helpful to look at some comparative statistics from Vietnam and Australia.
The contrast between Vietnam and Australia is illustrated by data from the World Health Organisation (WHO)(Grant 1992) and summarised in Table 2.1. Differences between the two countries can be seen in their demography, their economics and in various factors affecting health status. Notably Vietnam had a significantly larger population (and greater population density), higher fertility rate, higher death rate and lower life expectancy. In 1990, the population of Vietnam was almost four times that of Australia, with the population aged less than 16 years making up over one-third of the total. By contrast, Australia's under 16 population made up one-quarter of the Australian total and was only one-seventh the size of the Vietnamese under 16 population. Less than half of the eligible group attended secondary school in Vietnam in 1986 compared with over 95% of eligible Australians.

The Under 5 Mortality Rate (U5MR), i.e. the number of children who die before the age of five years for every 1000 live births, is one of the principal indicators used to measure levels of, and changes in, the well being of children (Grant 1992). The hypothesis is that, when a country experiences fewer child deaths, the birth rate will also decrease in the long term, slowing population growth and thereby improving health status and standards of living. Extrapolated from estimates from mid-1980s survey data, Vietnam's U5MR of 65/1000 was over six times that for Australia (10/1000). This has decreased however from 232/1000 in 1960 compared with Australia's 24/1000 in 1960. The steady decline in the U5MR in SE Asia is expected to continue.
<table>
<thead>
<tr>
<th></th>
<th>Vietnam</th>
<th>Australia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total population (1990)</td>
<td>66.7 million</td>
<td>16.9 million</td>
</tr>
<tr>
<td>Population &lt;16 yrs (1990)</td>
<td>27.7 million</td>
<td>4 million</td>
</tr>
<tr>
<td>Births (1990)</td>
<td>2,076,000</td>
<td>246,000</td>
</tr>
<tr>
<td>Total deaths &lt;5 yrs</td>
<td>134,000</td>
<td>2,000</td>
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<tr>
<td>Life expectancy (years)</td>
<td>63</td>
<td>77</td>
</tr>
<tr>
<td>Life expectancy 1960 (years)</td>
<td>44</td>
<td>71</td>
</tr>
<tr>
<td>Fertility rate (1990)</td>
<td>3.9</td>
<td>1.8</td>
</tr>
<tr>
<td>Popn annual growth rate</td>
<td>2.2% increase</td>
<td>1.4% decrease</td>
</tr>
<tr>
<td></td>
<td>(1965-80)</td>
<td>(1980-90)</td>
</tr>
<tr>
<td>U5MR</td>
<td>65</td>
<td>10</td>
</tr>
<tr>
<td>World ranking U5MR (populous countries)</td>
<td>70/129</td>
<td>113/129</td>
</tr>
<tr>
<td>Daily per capita calorie supply (1988) (% requirements)</td>
<td>103</td>
<td>125</td>
</tr>
<tr>
<td>Secondary school (1986)</td>
<td>m=44, f=41</td>
<td>m=96, f=99</td>
</tr>
<tr>
<td>% eligible enrolments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GNP per capita (1987)</td>
<td>$US 240</td>
<td>$US 14,360</td>
</tr>
<tr>
<td>number radios/population</td>
<td>103/1000</td>
<td>1273/1000</td>
</tr>
<tr>
<td>number TVs/population</td>
<td>34/1000</td>
<td>484/1000</td>
</tr>
<tr>
<td>% population urbanised (1990)</td>
<td>22</td>
<td>85</td>
</tr>
<tr>
<td>Area (sq kms)</td>
<td>330,000</td>
<td>7,700,000</td>
</tr>
</tbody>
</table>

adapted from Grant (1992)

There is also a contrast in the geographic distribution of the populations, with the majority of the Vietnamese population living in rural areas compared with Australia's mostly urbanised population. Economic differences include the significantly lower average per capita income in Vietnam (less than 2% of the Australian average) and the lower penetration of radio and TV (less than one-tenth the number of sets than in Australia).
Indicators of the poor health status of the Vietnamese included the observation that 49% of 2-5 year olds had moderate & severe stunting (in 1980-91), and that only half the population had access to safe water. Health services were however available to 100% of the urban population and 75% of the rural population. Thus on arrival in Australia, many Vietnamese people would be faced with a number of contrasts to their previous life - there is a different age ratio in the population, they are likely to be in an urbanised environment where there are higher standards of living with higher incomes, and greater access to TV and radio. These factors are all important when considering influences on lifestyle and diet. The information in this section will illuminate the health status and dietary practices of the Vietnamese people, a review of which follows.

2.4.3 Health of the Vietnamese people

The Vietnamese people have attracted a lot of attention in the health research literature since their arrival in the West. However, the focus of the research appears to have changed over this period as the community has become more established. Early literature concentrated on physical and mental health aspects of the new arrivals. Later reports considered the effects of migration and adjustment, and more recently, literature has been concerned with the long term effects of the lifestyle changes created by migration.

With regard to the literature on diet of the Vietnamese people, a similar historical pattern is evident.
Initially, the literature concentrated on characterising the 'Vietnamese diet', and describing the changes which had occurred in the dietary patterns of the Vietnamese after migration to the West. Recent studies have focused on the examination of risk factor prevalence in the Vietnamese community and the potential role of the Western diet in development of lifestyle diseases. In this section, I will present an overview of the literature from an historical perspective. Firstly, I will present general information about the health of the Vietnamese migrants to Western countries. This will inform the present study by providing additional background information about the context of the study. It will be followed by a review of literature of the food habits and dietary patterns of Vietnamese people.

2.4.3.1 Infectious disease

Early studies of people from IndoChina concentrated on public health screening of refugees. Reported health problems in the US included anaemia, carriage of infections especially tuberculosis (TB), hepatitis and intestinal parasites (Erickson and Ngoc Hoang 1980, Catanzaro and Moser 1982). Psychiatric and dental problems, and thyroid disease were also identified in screening programs (Catanzaro and Moser, Fitzpatrick et al 1987). As these studies were of mixed ethnic groups, the Vietnamese subsample varied in size. Where results were reported by ethnicity, differences were observed between groups. Catanzaro and Moser cautioned that the IndoChinese were not a homogeneous group. They noted that when compared with people from Cambodia and Laos, the Vietnamese group had the lowest incidence of parasites and few haematologic abnormalities.
However, they had the highest rate of TB reactions and comparable levels of hepatitis. In Australia, Christopher et al (1978), in the screening of nearly 3000 IndoChinese in NSW, also found a high incidence of infections such as TB, alimentary parasites and malaria. Although 64% of the sample was from Vietnam, results are not reported by ethnicity or country of birth. More recently Wei and Spigner (1994) found infectious diseases and TB to be present in SE Asian refugees who arrived in the US during 1989, but the prevalence was considerably lower than earlier studies eg Catanzaro and Moser. They also reported that 8% of males had gastrointestinal disease which could result from parasitic infection.

Another issue for SE Asian people (including Vietnamese) following migration to the US, is their involvement in trichinosis food poisoning outbreaks from eating infected uncooked pork (McAuley et al 1992). This population group is considered to be particularly at risk because of traditional food habits. Educational programs have been recommended.

2.4.3.2 Anaemia

Anaemia was frequently reported in early studies of SE Asian refugees and variously related to diet, abnormal haemoglobins (an inherited condition) and to parasitic infection such as hookworm (Christopher et al 1978, Erickson and Ngoc Hoang 1980, Peck et al 1981, Catanzaro and Moser 1982, Barry et al 1983, Craft et al 1983, Brown et al 1986, Fitzpatrick et al 1987).

Reports on the incidence and prevalence of anaemias are mixed.
For example, Peck et al (1981) found a higher incidence of anaemia in children who had been resident in the US for two-six weeks than in those in their first two weeks of residence. These authors conjectured that the increase may be due to difficulties with diet and other lifestyle adjustments in the period immediately following arrival. In later published studies, Carlson et al (1982a) reported that Vietnamese refugees to the UK had adequate haemoglobin levels and no evidence of (iron-deficiency) anaemia. Craft et al (1983) found that over half of a sample of 142 new arrival refugees in Connecticut US, demonstrated some haematologic abnormality, with 18% of the total being anaemic. The authors recommended detailed follow up of cases to determine the cause of anaemia due to the high prevalence of inherited disorders in their own, and comparable studies in the US and in Australia. However, Christopher et al (1978), had reported there was no overt malnutrition in the group of 3000 IndoChinese screened in NSW.

2.4.3.3 Growth

The small size of IndoChinese children (Peck et al 1981, Barry et al 1983, Brown et al 1986, Dewey et al 1986, Hitchcock et al 1986b) and teenagers (Hitchcock et al, Fitzpatrick et al 1987) was also a common finding. Brown et al (1986) found that SE Asian preschool children had a higher prevalence of short stature and poor haematologic measures than other ethnic groups and concluded they were at the highest nutritional risk of the four groups they surveyed. Similarly, from height and weight measurements, Barry et al considered a substantial percentage of the SE Asian children they screened in Connecticut to be potentially at-risk for nutrition-related health problems.
However, as malnutrition was not evident on clinical assessment, and the children were apparently in good health, the authors concluded that:

‘racial-genetic differences may account for abnormal growth curves’


The study of Barry et al is at odds with later studies in the reasons given for the small stature of IndoChinese children. For example, Olness et al (1984) in a study of 1650 children in Thailand also found that IndoChinese children were small when compared with international standards. However, as measurements were within limits for age when compared with reference growth curves for Thai children, the authors believed that the small stature was secondary to nutritional and environmental factors. This conclusion was supported by later studies of refugee children after settlement in Western countries. Dewey et al (1986) found mean heights and weights of SE Asian preschool children to be below national standards, but their rates of height and weight gain to be similar to reference values. They concluded that growth had been adequate after arrival in the US. This finding was supported by Yip et al (1992) who concluded from data collected from over 100,000 Indochinese children in the US, that there had been an increase in a number of growth indices including birth weight, height-for-age and weight-for-age over a 10 year period. Growth status was found to improve within 2-3 years of arrival in the US and that the growth potential of Asian children approximated that of other ethnic groups in the US. In Australia, a longitudinal study of Vietnamese infants found that at 5 years, the difference between median weights and heights of the children compared to Australian centiles was less than at 12 months.
This suggested that some growth enhancement had occurred (Reynolds et al 1988).

Very few studies report the growth of Vietnamese adolescents. Fitzpatrick et al (1987) reported data for 80 SE Asian teenagers in San Diego with a mean age of 14.7 years (range 11-19 years) and of whom 24 were Vietnamese (9 boys and 15 girls). They found that 66% of the male adolescents and 83% of females were less than 50% for weight, height or both, and 14% were in, or below the fifth percentile for height and weight. However, the mean Tanner stage of development was consistent with the mean chronologic age. Although it appears from this study that the majority of adolescents were smaller than reference values, the data are difficult to interpret. It is not actually stated what reference values were used nor what the height and weight measurements were. Results were also not reported by ethnicity. In addition, although the study reviewed data from records collected between 1981 and 1985, the length of residence in the US for participants is not stated.

Hitchcock et al (1986b) collected anthropometric data from 216 Vietnamese children in Perth in 1983-84 as part of a larger study of body size of young Australians (Hitchcock et al 1986a). The Vietnamese group included 26 boys aged 12-15 years and 14 girls 12-14 years, all of whom had been born in Vietnam. Hitchcock et al reported that the Vietnamese children were smaller, lighter and leaner than Australian children at all ages, and more so in older age groups.
The authors concluded that some growth enhancement may have occurred in the younger age groups and considered their results to be similar to those of Monzon et al (1985) in the US. Although the length of residence in Australia for participants in the Perth study is not stated it is unlikely to have been more than six years.

Thus the studies reporting growth of SE Asian children have been generally consistent in the finding of small stature when compared with reference values and with other ethnic groups. However, when the results are reviewed over time, it appears that the gap between measured values and reference values is decreasing. This supports the argument that the reason for the short stature is environmental rather than genetic. Although not discussed to any degree by the any of the authors, the increase in growth may be due to differences in lifestyle factors between IndoChina and Western countries as discussed in Section 2.4.2.1. The studies also do not acknowledge the recent migrant status of many of the SE Asians. Pelto (1991) argues that ethnicity is often a marker for recent arrival, and therefore masks attributes such as poverty and lack of support networks which are common in recently arrived migrants. She consequently criticises the study of Brown et al (1986) as most of the SE Asian sample would have been recent migrants to the US in 1983 at the time of the study. Brown et al had considered the SE Asian children, because of their short stature, to be at highest nutritional risk.

That the poor growth of Vietnamese children results from conditions in Vietnam is further supported by the more recent study of Shoff et al (1993).
This study of young children still living in Northern Vietnam found a high prevalence of height for age deficiency and a high prevalence of suppression of the growth process as measured by incremental growth. The authors also considered the majority of children aged between one and three years to be moderately malnourished. These findings were in contrast to the studies of Vietnamese migrant children.

2.4.3.4 Dental caries

Dental problems have been frequently reported in Vietnamese migrants both in Australia (Christopher et al 1978, Durward and Wright 1989, Plaskett and Lilburne 1992) and overseas (Erickson and Ngoc Hoang 1980, Barry et al 1983, Todd and Gelbier 1990). A number of causes are cited for the high prevalence, and some of these are contradictory. For instance, Christopher et al reported that dental caries was evident in 80% of screened refugees from SE Asia in NSW. Caries was more evident in children, whereas periodontal disease was more apparent in adults. Durward and Wright also found a high rate of dental caries in Vietnamese adolescents when compared to Kampuchean and Australian adolescents. They attributed this to a diet that was high in refined carbohydrates and without the benefits of water fluoridation. The validity of this conclusion is questionable as two of the references cited by the authors (Kaufman 1979, Nguyen et al 1983), and which I review in the next section, state that refined carbohydrates were consumed by the Vietnamese, but not that the Vietnamese diet is high in refined carbohydrates.
Reasons given for the general poor dental health of the IndoChinese adolescents were considered to be a lack of dental services and preventive care in Vietnam, and language and preferential attention to other health priorities after migration. Later, Plaskett and Lilburne in a sample of Vietnamese children in Sydney, found caries to be related to bottle feeding practices and not to sugar intake, or the frequency of eating as recorded in a one day diet diary. Todd and Gelbier (1990) reported a high rate of caries in children's deciduous teeth that increased with the length of stay in the UK, but the rate was less in permanent teeth. Although dietary data were collected as part of this study and reported separately (Todd and Gelbier 1988), no link is made between the two.

2.4.3.5 Obstetric care

The prevalence of gestational diabetes has been reported to be high in IndoChinese women. Doery et al (1989) found the prevalence of gestational diabetes in Vietnamese and Cambodian women to be over seven times the prevalence in Australian-born women, and more than four times the prevalence in migrants from any other country. This finding was supported by Henry et al (1992), who confirmed the presence of gestational diabetes and anaemia as nutritional complications of pregnancy in a 10-year retrospective study of 1123 Vietnam-born women attending an obstetric hospital in Melbourne. The incidence of both conditions was found to be significantly higher in the group of Vietnam-born women than in a comparison group of Australian-born women. Other complications such as established diabetes and pre-eclampsia were significantly lower among the Vietnamese women.
The authors noted though that diabetes mellitus may be a concern in the future for Vietnamese women because of the tendency for women with gestational diabetes to subsequently develop diabetes mellitus. Although Henry et al found that anaemia was more common in the Vietnamese women, it was more likely to result from thalassaemia minor (an inherited condition) than from dietary iron deficiency which was the predominant form in Australian women. However, Ward et al (1981) in a study of 78 pregnancies in Vietnamese women did not find any cases of thalassaemia in this population although anaemia was prominent. They suggested nutritional deficiency or failure to take prophylactic iron therapy as possible causes. Also consistent with other studies, both Henry et al and Ward et al found that infants of Vietnamese women were, on the average, lighter at birth than infants of Australian born-women. Henry et al attributed this finding to the Vietnamese women's smaller stature and the greater proportion of first-time mothers in that group. In contrast to the numerous reports of the large numbers of children in Vietnamese families, Henry et al found similar rates of parity for both Vietnam-born and Australian-born women.

Studies both from the US (Ghaemi-Ahmadi 1992) and Australia (Mathews and Manderson 1980, Manderson and Mathews 1981, Ward et al 1981, Plaskett and Lilburne 1992) report that SE Asian women have lower breastfeeding rates in their new countries than in Vietnam and also less than those in the host nation. In Australia, Mathews and Manderson expressed concern about the reduced incidence of breastfeeding by Vietnamese women in Sydney compared with that in Vietnam.
Ward et al reported a lower incidence of breastfeeding in the Vietnamese women in Adelaide compared with a local control group. These authors, and also Ghaemi-Ahmadi in the US, report the economic pressures of needing to work as a likely reason. Plaskett and Lilburne also reported lower rates and length of breastfeeding in Vietnamese women compared with Anglo-Saxon women in a small Sydney study. However, Reynolds et al (1988) found the rate of breastfeeding to be comparable with that of women in Perth. Differences in these studies may be due to differences in methodology or to real differences in breastfeeding rates between states in Australia. Nevertheless, there seems to be an overall trend to reduced levels of breastfeeding amongst Vietnamese women.

2.4.3.6 Mental health issues

The major other area of concern in studies of early arrivals to the West was mental health problems in adults (Erickson and Ngoc Hoang 1980), young people (Messer and Rasmussen 1986, Fitzpatrick et al 1987) and older people (Die and Seelbach 1988). These were attributed to the effects of the war and later to adjustment to life after migration. Fitzpatrick et al, from a 4 year retrospective study of 105 Indochinese teenagers in California, also noted concern about long term medical problems eg goitre and genetic anaemias. Their concern related to the impact of these conditions on the future development and mental health of the teenagers. The authors also recommended that because of the adolescents' past experiences and the peer pressure associated with 'fitting in', the issues of sexuality and alcohol use in the Indochinese teenagers may need special consideration.
Chung and Kagawa-Singer (1993) reported that psychological distress was still evident in SE Asians even more than five years after migration. In a random sample of 2180 SE Asians, they reported that both pre-migration and post-migration experiences were contributory for Vietnamese people although their level of distress was less than that of Cambodian and Lao people. Vietnamese women were more likely to experience distress than males. Recently, Wei and Spigner (1994) reported that 6% of 198 new arrival Vietnamese refugee women in the US were diagnosed as having ‘mental health problems’.

2.4.3.7 Lactose intolerance

Lactose intolerance is defined as an ability to tolerate a standard dose of lactose without developing diagnostic biochemical changes (Cobiac 1994). A primary deficiency of lactase enzyme resulting in a high prevalence of lactose malabsorption and clinical lactose intolerance has been reported to be high in Asians. In an Australian sample of children aged 5-12 years, Brand and Darnton-Hill (1986) found the prevalence of lactose malabsorption, diagnosed by breath hydrogen test, to be highest in children of Asian origin. Although only a small sample, lactose malabsorption was found in 9 of the 10 Vietnamese children in the group. Previously Anh et al (1977) in the US, reported that lactose malabsorption was present in all of 31 adult Vietnamese immigrants aged 22-63 years.

2.4.3.8 Cardiovascular risk factors

Recent reports that I have reviewed, generally comment on the effects of lifestyle after migration on the health of people from IndoChina.
Most of these reports are from the US (Bates et al 1989, Klatsky and Armstrong 1991, Chen 1993, Wei and Spigner 1994), with small amounts of information coming from Australia (Baghurst et al 1991, Rissel and Russell 1993, Bermingham et al 1996). The available research describes adults and focuses on CVD risk factors, notably cholesterol, blood pressure, and smoking. Findings appear to be conflicting. For instance, Klatsky and Armstrong report the findings of a study of CVD risk factors in 13000 Asian-Americans, of whom 178 were Vietnamese. However the Vietnamese data were not separately reported. They found that cholesterol, when adjusted for BMI differences, was no higher in those born in America suggesting that this relates to rapid dietary changes following migration. Bates et al reported that in a sample of IndoChinese adults in California, blood pressure and blood cholesterol were similar to those for white Americans (sic), and that the Vietnamese subgroup had the highest smoking rates and cholesterol.

In Australia, Rissel and Russell also found that raised blood pressure for Vietnamese adults in south western Sydney was similar to the Australian population and the smoking prevalence in men was substantially higher. However, they found the prevalence of overweight, obesity and cholesterol to be less than those reported for the Australian population. In addition, 26% of the sample was underweight (ie BMI <20).

In one of the very early studies, Barry et al (1983) had detected only one case of hypertension in the sample of 142 SE Asians.
More recently in Australia, Bermingham et al reported that BMI in a group of about 400 newly arrived Vietnamese refugees in Sydney was low (BMI<22) compared to the Australian population, but that females had a tendency to central fat distribution which may be a risk factor for later development of CVD and diabetes.

Wei and Spigner (1994) compared medical records of a clinic sample of SE Asian (n=390, 345 Vietnamese) and Russian (n=353) refugee groups in their first year of living in the US (1991-92). The authors found that 13% of Vietnamese males and 7% females were diagnosed with CVD, risk factors which included smoking; eating pork, fried rice, eggs and foods high in cholesterol. This compared with 25% of Russian females and 15% of Russian males. The authors considered these prevalences to be high, although for Vietnamese females, the prevalence was considerably lower than that for the Russian females. However, these results are problematic as there was no comparison with the general American population, no physiological markers were reported, and apart from smoking, the indicators used are questionable CVD risk factors.

Self-reported weight gain by Vietnamese people since migration is widely reported (Crane and Green 1980, Gardner et al 1983, Todd and Gelbier 1988, Story and Harris 1989, Baghurst et al 1991). However, where BMI has been reported, it has generally been within the healthy weight range (BMI 20-25).
Although the women in the study of Baghurst et al reported weight gains of 4-5kg, their mean BMI was only 21.6 and constant for different lengths of residence in Australia. Bates et al (1989), found that, with an average BMI of 23.7, the Vietnamese subsample in their sample of IndoChinese adults in the US were the leanest. Henry et al (1992) in their study of pregnant women, also found that women born in Vietnam had a significantly lower rate of obesity at 28-30 weeks gestation than Australian-born women. However, the authors noted the percentage of obese Vietnam-born women had increased significantly (from 1.4% to 5.2%), when the first five years of the study were compared with the second five years. Neither the age nor the length of stay in Australia of these women was reported. None of the studies has reported longitudinal data for either weight or BMI.

Bates et al (1989) reported positive correlations with age for blood pressure, cholesterol and BMI for the combined IndoChinese group, but did not find length of residence in the US to be a significant covariate for any of the heart disease risk factors. Although not discussed in their report, Rissel and Russell (1993) present data indicating that the proportion of the sample who were overweight (ie BMI>24.99) did increase with both the age of participants and with their length of residence in Australia, suggesting that age is a confounding factor in weight gain observed in those Vietnamese people of longer residence in countries like Australia. When comparing their subjects by country of birth, Klatsky and Armstrong (1991) found greater adiposity in the US-born than the Asian-born.
They also found that women were less likely than men to be obese, and suggest that this is an acculturation issue related to body image and the Western desire for slimness. Conversely, Bates et al reported that IndoChinese women were heavier on average than white Americans while the men were leaner.

Thus weight gain is not a reliable indicator of CVD risk in the Vietnamese population, as the majority of reports indicate a high prevalence of healthy weight and even underweight. While it is possible that these proportions have changed with increased time after migration, the studies available are all cross sectional in nature and not comparable because of differently defined variables. A major limitation to these studies is that where weight gain has been reported it is not specified whether it is catch-up weight gain because of previous malnutrition, or if it is an increase above healthy weight. Also, as Rissel and Russell (1993) note, the appropriateness of BMI as an index of weight measurement in Asian populations has not yet been established.

While the American studies are generally concerned that CVD risk factors have increased in Vietnamese adults, the findings are not convincing. Apart from the prevalence of smoking which is generally found to be high (but may have been continued from Vietnam rather than adopted), a consistent trend is not apparent in the reports reviewed here. However, the comparability of the studies is reduced because of differences in physiological parameters used and differences in reporting.
Differences between studies that are evident may also be due to different sociocultural factors of the participants. Also, most of the studies report grouped data of which the Vietnamese subgroup may be a small component. The groups vary from 'IndoChinese' to 'Asian-American' and 'Asian-Americans/Pacific Islanders', and all of may include Vietnamese people. Although Kumanyika (1990:90) cautions that:

'vigilance is needed to identify potentially important subgroup differences that may be hidden by summary data',
it is difficult to draw distinctions when subgroup data, eg for Vietnamese, are not reported. Where ethno-specific data are reported, differences are apparent.

In summary, the reports of Vietnamese health status since migration reflect a change from a focus on issues such as infections and mental health problems, to concern about the effects of lifestyle changes that have accompanied migration. Some of these concerns, eg anaemia and dental caries, were considered to be due to traditional dietary patterns, although this does not appear to have been justified in all cases. Similarly, the current concerns about lifestyle-related health issues are related in the literature to diet, but the link is often weak. Unfortunately it appears that much of the concern about the health status of SE Asians and the Vietnamese in particular, may have come from assumptions made in these early research papers. For instance the observed low height for age and weight for age of children were considered signs of chronic and acute malnutrition respectively (Peck et al 1981).
Anaemia was found to be prevalent and iron deficiency postulated as a likely cause although in many cases it was found to be genetic. Similarly, much of the 'evidence' for increasing CVD risk factors in SE Asian refugees appears to have been drawn from observed changes from traditional dietary patterns, and extrapolations from these observations to the experiences of other migrant groups eg Chinese and Japanese. Kumanyika (1990) considers that overgeneralising from sparse or poor quality data, simply because it is the only data identified, is a pitfall that should be avoided. This does not appear to have been the case in data describing the health of Vietnamese migrants.

From my readings, including some cross references in the material reviewed in this section, I suspect that a number of conclusions have been drawn about Vietnamese people from inappropriate sources and these seem to have become accepted as fact. Inherent problems are small sample sizes, the reporting of grouped data (as described above) from which it may not be appropriate to draw conclusions about Vietnamese people, differences in the reporting of variables such as country of birth and ethnicity eg where Vietnamese is stated, it is often not stated whether people are from North or South Vietnam. Other concerns include the use of different cut-off points for physiological parameters, and time differences between studies which may represent methodological differences in testing procedures as well as differences in environment. In addition, observed differences may be due to sociocultural factors other than ethnicity.
2.4.4 Health of Vietnamese people in Australia

Details about the health and dietary status of Vietnamese people in Australia is sketchy. Again, information that is available has often been extrapolated from larger population groups particularly ‘Asian’ and ‘IndoChinese’. Where appropriate, some parallels may also be drawn from studies of Vietnamese migrants in other Western countries and from comparisons with population groups such as the Chinese who share similarities of heritage and environment. Studies of Vietnamese immigrants to Australia have focused on screening observations of new arrivals (Christopher et al 1978), growth of children (Hitchcock et al 1986b, Reynolds et al 1988), mental health, especially of young people (Thornton et al 1986), and obstetric health (Ward et al 1981, Doery et al 1989, Henry et al 1992). More recently skin disorders (McDonald and Georgouras 1992), dental health (Durward and Wright 1989, Plaskett and Lilburne 1992) and heart disease risk factors (Rissel and Russell 1993) have been examined. Some of these studies were reviewed in the previous section.

Mortality data collected during the period of Vietnamese settlement in Australia, indicate that Vietnamese-born have a lower mortality rate than Australian-born, with significantly low standardised mortality rates (SMRs) for the major causes of death in Australia (Young 1992b). The Vietnamese were found to have significantly low mortality from diseases of the circulatory system and from diseases of the respiratory system. However, although the overall mortality from malignant neoplasms was low, there was a significantly high SMR for cancers of the digestive system in males.
Similarly, while the overall mortality from motor vehicle accidents was low, there was a moderate level of mortality from other accidents, poisoning and violence, especially in females. Young found the mortality rate to be consistently low between 1980 and 1989, but levels of significance were only calculated for the 1980-1982 data.

A similar pattern of mortality was found for the SE Asian group of countries as a whole. The mortality rate for deaths from disease of the circulatory system was found to be low in all populations born in Asian countries but a wide variation was found for other conditions, especially different cancers (Young 1992b). Young also points out that the low level of mortality observed for immigrants from Vietnam is present despite their low socioeconomic status and that this is the case for a number of immigrant groups to Australia.

Bennett (1993) who analysed National Heart Foundation (NHF) risk factor prevalence surveys conducted in the 1980s, also reports that cardiovascular standardised mortality ratios for immigrants from SE Asia were all lower than for Australian-born men and women. Notably, standardised mortality rates for CVD for persons born in Vietnam were also lower than reported for persons born in other Asian countries in 1987-1989. Although persons born in SE Asia had a relatively higher prevalence of leisure-time physical inactivity, there was a generally advantageous risk factor profile, eg low BMI and lower blood pressure.
Bennett concluded that for immigrants to Australia overall, there was no evidence that blood lipid profiles were affected by acculturation and that the lipid profiles of Asian-born immigrants:

‘appeared to have played little part in their favourable cardiovascular mortality’ (Bennett 1993:259).

Although Bennett notes that BMI increased with length of residence in Australia for Asian-born, this grouping also included people from the Middle East.

Results of the risk factor prevalence surveys also indicate that persons born in Vietnam have one of the lowest rates of all birthplace groups for CVD mortality and hospitalisation for CVD and stroke for 1986-1989 (NHF 1995). In interpreting the data from the risk factor prevalence surveys, it should be remembered that the Vietnamese sample was small and for some calculations was aggregated into the larger groups of SE Asian and Asian. The Vietnamese population in Australia would also have lived in Australia for only a short time when the data were collected.

Nevertheless, these data do not support the argument that migration to Australia has had a negative impact on the health of Vietnamese people. While this may be due to factors such as reporting differences and insufficient data, or insufficient time for significant differences to develop, there may be a real difference between the anticipated outcome and the reality.
However, the present study was implemented on the premise that there may be future health problems in the Vietnamese population - the results therefore may shed some light on the matter. In the next section, literature describing food habits of Vietnamese people will be reviewed. This will provide the context for comparison of the food habits of Vietnamese adolescents in the present study.

2.4.5 Food habits of Vietnamese people

In this section I review literature describing food habits of people from Vietnam. This literature tends to fall into three categories which also correspond roughly to an historical trend. The three categories are: providing information for health professionals who may not be familiar with the Vietnamese culture; assessing the nutritional quality of the Vietnamese diet; and reporting on dietary changes since migration, and relating this to changing disease risk profiles. A common theme through the literature is the contrast in lifestyles for the Vietnamese people before and after migration, and the health consequences of the different situations. Some authors draw attention to the differences in living conditions, discussing factors such as relative food costs and the availability of food. The majority report on the differences in foods consumed and the potential effects on nutrition and health.

As the change in disease risk profiles remains the major health concern related to food habits of the Vietnamese people, it is necessary to appreciate the types of dietary changes which have occurred since migration.
However, before the extent of dietary change and its effects can be assessed, it is first necessary to look at the traditional dietary habits of the Vietnamese people.

2.4.5.1 The traditional diet

A number of reports contain descriptions of traditional food patterns of the Vietnamese people. However, as the various authors have each presented summaries of 'the typical Vietnamese diet' from their own perspective, the result is a mixture of descriptions. While there are a number of common elements among the descriptions, reliance on any one source gives a narrow view of the Vietnamese diet. To obtain a comprehensive picture of the Vietnamese diet and dietary habits, I found it necessary to examine a wide variety of literature and to combine the various elements of information. Information about dietary practices is also found in recipe books and in geographic/travel type descriptions. In the following section, I review a number of reports to illustrate the types of information available on the Vietnamese diet, and at the same time to establish a feel for the nature of the Vietnamese diet. The descriptions of food practices are drawn largely from interviews with Vietnamese immigrants and typically describe the core foods consumed, the meal patterns and some distinguishing features eg food accompaniments. Much of the information describing dietary practices of Vietnamese people refers to a single Vietnamese diet with variations in dietary practices due to regional differences. Other cultural influences on food habits such as health beliefs and food classification systems are discussed to a varying extent.
One of the first reports in the nutrition literature of Vietnamese dietary patterns was given by Kaufman (1979) based on observations made during an eight day tour of five areas of Vietnam in 1978. This report gave extensive descriptions of the post-war situation as it affected the supply of food and the health status of the Vietnamese people. A simple description of meal patterns was given which included an outline of meals eaten and the major foods consumed in a typical day's menu. During the 1980s, descriptions of the Vietnamese diet emanated from the different countries to which the Vietnamese migrated and were generally provided as part of background information to some other aspect of the Vietnamese diet that was under study. Carlson et al (1982a) and Todd and Gelbier (1988) in the UK and, Breakey (1983) in Australia all tendered descriptions of the Vietnamese diet within the context of other studies. For example, Carlson et al studied 80 refugee 'boat people' on their arrival in the UK to establish what constitutes a Vietnamese diet; to assess whether recommended amounts of nutrients were being met by comparing the diet with the RDIs; and to determine the economic feasibility of the Vietnamese diet in the UK. In addition to interviews, information on foods eaten by the Vietnamese was collected by direct observation of the Vietnamese in the hostel where they lived.

Todd and Gelbier (1988) obtained information from 200 refugee families on dietary habits in Vietnam and Britain. Using a structured questionnaire which contained both open and closed questions, the head of the household was interviewed in the home through an interpreter.
Meal patterns in Vietnam were described and included reported differences between people from rural and urban areas as well as between North and South Vietnam. The authors also commented on the relative high cost of food in Vietnam. In this study, information from the head of the household may have questionable validity and reliability as men may have been less familiar with food matters.

Breakey (1983) reported on the dietary practices of Vietnamese people both before and after arrival in Australia. Information was obtained from key informants including health workers, as well as from refugees themselves. Breakey’s paper provided the first detailed description for health workers in Australia, of Vietnamese dietary patterns and regional variations both within Vietnam and in Australia, and first suggested that dietary changes were occurring in Vietnamese-Australians.

Despite the differences in design, these reports are largely consistent with each other and so important features of the Vietnamese traditional diet are apparent. These features include the importance of white rice with its consumption at the midday and evening meals accompanied by a variety of vegetables; the universal use and distinctive flavour attributes of fish sauce; a preference for pork, poultry and seafood; the widespread use of eggs; the use of tropical fruits as desserts; a preference for fresh foods, the use of lard and peanut oil for frying and a limited use of milk products. Breakfast was described as the least important meal but was more diverse than the other meals.
Breakfast commonly consisted of rice porridge, noodle soup \((pho)\), glutinous rice (Kaufman 1979, Todd and Gelbier 1988) or alternatively French bread, fried eggs and coffee (Kaufman 1979). Kaufman noted that common beverages she observed in Vietnam were tea, with beer and soft drink used frequently. Kaufman did not identify whether this was in North or South Vietnam. However, Todd and Gelbier note that for people from North Vietnam, beer and soft drinks were not familiar foods. Other significant components were the consumption of finely chopped vegetables, the use of chopsticks for eating and cooking and woks for cooking. Kaufman also made reference to the contribution by fish sauce to dietary intakes of protein, iodine and sodium.

Other notable elements of traditional diets were also described. Kaufman (1979) noted that in Vietnam food was usually purchased fresh daily and that home refrigerators were not generally available. Street vendors were common. Cooking was usually done over a kerosene burner or a clay stove and major cooking methods were listed as steaming, stir-frying, deep-fat frying, braising, simmering and charcoal grilling. French and Chinese influences are noted in food habits of the Vietnamese people (Barer-Stein 1979, Stuart 1986). Serving arrangements were described by Carlson et al (1982b) as a tureen of soup and separate platters of meat and vegetables placed on the table with bowls of condiments, each diner having a bowl of rice and using chopsticks to serve themselves small pieces of food from the communal bowls. Soup was added to the rice or drunk separately from the empty rice bowl.
Fried and fatty foods were reportedly unpopular (Breakey 1983). Breakey’s descriptions of the Vietnamese diet included a detailed list of preferred foods and flavours in Vietnam which surprisingly does not include fish sauce.

Differences in beverage consumption were reported between the studies of Todd and Gelbier (1988) and Kaufman (1979) which may have been due to regional differences. Although most of the authors commented that nutritional quality varied with economic status, Todd and Gelbier reported that the consumption of vegetables, meats and seafoods were particularly low in poor areas. Similarly, Kaufman visited both North and South Vietnam, but reported one dietary pattern even though differences were noted between rural and urban areas in food availability. Interestingly, regional differences are reported in descriptive texts (Barer-Stein 1979) and travel guides (Népote and Guillaume 1992).

While these reports provide an overview of ‘the Vietnamese diet’, and can be compared with an overview of for example, ‘the British diet’, the usefulness of an overview is limited by its simplicity. While the dietary pattern described above may be typical, it does not allow for differences in food habits related to different regions of origin or different socioeconomic circumstances and therefore is unlikely to be the only dietary pattern. For example, Carlson et al (1982a) noted their sample to be a mixture of people from both North and South Vietnam and to be a mixture of Vietnamese and ethnic-Chinese. However, the relative proportions of each of these groups were not described.
This report also did not relate the mixture of the sample to any possible differences in food habits. Considering that one of the stated aims of this study was to 'establish what constitutes a Vietnamese diet' (Carlson et al 1982a:107), the description of the diet provided has limited application.

While combining the information from the various reports gives a broader picture of the 'Vietnamese diet', the appropriateness and comparability of the much of the data are questionable. For example, Todd and Gelbier (1988) reported that the refugees in Britain came mostly from North Vietnam and were mostly unskilled farmers and fishermen. The other studies either did not report the cultural mix of the population, or did not consider dietary differences which may have arisen. Despite these limitations, later studies which described traditional dietary practices of Vietnamese people (e.g. Ziegler et al 1989) drew heavily from these earlier reports as well as from cookbook type reports from the 1970s, and US national reports relating to the Vietnamese people in the early 1980s.

2.4.5.2 Factors influencing dietary patterns

Kaufman (1979) commented that major factors affecting dietary intake in Vietnam were the availability and cost of food. Details were provided of food shortages and rationing, and of the high cost of food particularly in urban areas. The situation was observed to be better in the rural areas compared with urban areas as residents grew some of their food, but that the amount of suitable farmland had been reduced by the war.
Mathews and Manderson (1980,1981) in Australia provided insight for health workers into the relationship between health beliefs, health practices and the integral position of diet in Vietnamese culture. They published a number of reports describing dietary practices of Vietnamese women in relation to childbirth. Infant feeding practices were also described. According to humoral pathology, dietary modifications are considered necessary at times to correct physiological imbalances such as those caused by childbirth. These reports were distinguished by their detailed accounts of the Vietnamese classification of foodstuffs according to perceived medical and physiological effects, and the related humoral pathology. The different cultural beliefs relating to the physiological states of pregnancy and the postnatal period were described for the two ethnic groups; ie ethnic-Vietnamese and the Vietnamese-Chinese.

The reports of Mathews and Manderson also demonstrated the important cultural value of food to Vietnamese people. Mathews and Manderson (1981) reported the findings of interviews with 40 women: 15 ethnic-Vietnamese and 25 Vietnamese-Chinese who resettled in Australia in 1978-79. The importance of the cultural value of food was indicated by the finding that all but one woman had observed the relevant traditional practices of confinement and the associated dietary restrictions for the required one month post-partum. Where women had been unable to adhere to dietary rules (largely through hospital experiences) considerable distress was reported.
Mathews and Manderson provided evidence that the nutritional value of the dietary precautions while restrictive, may also have positive elements for the post-partum woman and her infant by ensuring that special attention is paid to the woman's dietary needs. They concluded that in particular, the psycho-social effects of the traditional behaviours are very important for successful transition to motherhood, as well as for future health.

The importance of rice in the Vietnamese diet is commonly described. Carlson et al (1982a:109) described steamed rice as the 'single most important food in the Vietnamese diet', being consumed in two-three meals each day, as snacks by children, and in soup by the sick. It is also reported that food served without rice is only considered a snack and that the question in Vietnamese, 'Have you eaten today?' actually means 'Have you eaten rice today?' (US Department of Agriculture Food and Nutrition Service 1980). This cultural emphasis on rice is consistent with its place as a staple food (Fieldhouse 1986). In a similar vein, Carlson et al comment on the importance of vegetables in the Vietnamese diet as verified by their use in traditional medicine.

Breakey (1983) classified the factors effecting dietary changes after migration into three types; cultural, economic and environmental. Cultural factors included beliefs about food and family influences, economic factors related to income and the relative affordability of food in Australia, and environmental factors included availability of different foods for example due to regional variations in Vietnam and the added differences in Australian climates.
Breakey (1983) referred to the studies by Mathews and Manderson when discussing the cultural influences on the dietary changes of the Vietnamese following migration to Australia. She also gives the example of the introduction to Australian foods and patterns in migrant hostels upon arrival and in hospitals (particularly for maternity patients).

### 2.4.5.3 Nutritional qualities of the diet

The nutritional quality of the Vietnamese diet in Vietnam was considered by Kaufman (1979) and in the UK by Carlson et al (1982a, 1982b). Kaufman related her observations on the foods available in Vietnam to her observations of the nutritional status of the people in Vietnam. Although no data were available that could be used to evaluate the nutritional status of the Vietnamese population, the US study mission to Vietnam considered malnutrition, in particular energy deficiency, to be widespread. This was attributed to food shortages since the war, an increasing population and the high level of physical work required by individuals. The Vietnamese government was quoted as believing malnutrition to be worse in South Vietnam due to greater food shortages there and a higher birth rate. Children with frank malnutrition were observed by the author in a hospital in Ho Chi Minh City (formerly Saigon).

Kaufman commented on the short stature of the Vietnamese people which was considered to be indicative of long-standing nutritional deficiencies. Supportive evidence was cited from military studies in 1971 and 1967.
Associated public health problems were noted as infectious diseases (reported by the Vietnamese government to be the greatest public health problem) and dental problems. The nutritional quality of the available food was considered to be good but concern was expressed about the apparent lack of calcium (especially in the city) due to the lack of dairy products. Although reference was made to the incidence of lactose intolerance in Vietnamese adults, the mission encouraged the use of milk as a dietary supplement for children. Sweetened condensed milk was noted to be used as an infant feed and appeared to not cause symptoms. No mention was made of any observations of signs of calcium deficiency in the population.

Carlson et al (1982a) judged the diet of the Vietnamese refugees living in a British hostel to be adequate apart from a possible lack of calcium and of iron. The findings were based on calculations of group intake from the total amount of food prepared and consumed. The authors considered that although the situation was not equivalent to domestic catering, the diets were representative of the typical Vietnamese diet because the Vietnamese people themselves were involved with the meal preparation. The authors concluded that nutrient intakes may have been higher than calculations suggested by noting that the Vietnamese had not been anaemic on arrival in Britain, despite the finding that the ‘typical’ diet provided about 20% less iron per person than the RDI, and that calcium intake from drinking water, and from the boiling of bones and shell fish for soup stock could not be calculated. Dairy foods from which calcium intake could be quantified were not usually eaten.
Thus the dietary inadequacies which had been considered common in Vietnam did not appear to be the case after migration to Britain. Todd and Gelbier (1988) attributed this to the relative affordability and availability of food in Britain when compared with Vietnam. Breakey (1983) found the situation in Australia to be similar, noting that total energy needs could be met because foods were less expensive than in Vietnam, and a variety of foods could be more easily obtained.

Ziegler et al (1989) in the US, reported the Vietnamese diet to be high in sodium and potassium but naturally low in protein. Crane and Green (1980) in a study of 260 Vietnamese families in Florida judged dietary protein intake to be adequate although nutritional adequacy could not be assessed by the method used. A number of reports expressed concern at the lower nutrient intake from the use of white rice in preference to brown rice (Breakey 1983).

Some studies provide evidence that data on Vietnamese food habits should be interpreted cautiously. Carlson et al (1982b) discussed two limitations: the lack of knowledge of individual nutrient requirements (hence the use of British RDIs for comparison); and differences in nutritional adequacy of the diet which might occur as a consequence of migration. The authors described two paradoxes presented by traditional food habits. These are, firstly, that a change in diet may upset nutritional advantages which have developed over long periods.
As stated by Carlson et al 1982b:164):

'food habits evolve over time to form conventional meals that often combine foods to create a meal which is significantly richer in nutrients than foods eaten individually'.

Secondly, that the retention of food habits may create nutritional problems because of differences in food composition in different localities. Rice is used as an example:

'According to food composition tables, rice in SE Asia (FAO/UN, 1972)..... (contains) 600% more calcium & 380% more iron than rice quoted in British food tables' (Carlson et al 1982b:165).

When applied to the findings relating to the nutritional adequacy of the diets of the Vietnamese, the need for caution can be seen. For instance Kaufman's (1979) concerns about calcium intakes in Vietnam may have been unfounded if the mineral was supplied by alternate dietary sources or food combinations not considered by the author. Similarly, using Carlson et al's (1982a,1982b) own findings relating to iron and calcium intakes in the Vietnamese refugees, the iron levels may have been adequate because of complementary food intakes. However, assuming the iron content of rice to be as different as quoted in the two food tables, then retention of rice eating may result over time in relatively lower iron intakes from that source.
Ziegler et al (1989) suggest similar difficulties are presented by the nutrient content of fish sauce, extensively used as a condiment in Vietnamese cooking. They published a list of foods assessed to be commonly eaten by Vietnamese and categorised by the nutrients of concern in renal disease - protein, potassium, phosphorus and calories (energy). The authors commented on the difficulties encountered in obtaining nutrient data on Vietnamese foods and that a number of different food composition sources had to be consulted. In the light of Carlson et al’s comments, Ziegler et al’s findings for fish sauce are of particular interest. The sauce commonly used by the Vietnamese in the US was obtained from Thailand. However, figures available for the fish sauce from Hong Kong showed that the Hong Kong sauce has 3 times the calories and more than 17 times the protein level of the Thai sauce. Thus, significant differences can be found in the nutritional adequacy of the diet if details such as this are unknown.

Other difficulties noted by Ziegler et al echoed the caution of Carlson et al. These were the presence of multiple ethnic names for food items which made identification difficult, and that many relatively common foods were not found in any nutrient composition tables. Again, significant differences could arise in the calculation of the nutritional adequacy of the diet depending on the figures used. The authors also observed that herbs were frequently used in such quantities that nutritive content would need to be considered. However, the authors reported that few data were available on most herbs at the time. Similarly, Carlson et al (1982a) in Britain had commented on the high contribution of vitamin A from chilli sauce in the Vietnamese diet.
More recently, Baghurst et al (1991) considered the diets of Vietnamese women in Adelaide to be still largely traditional but marginal in a number of vitamins and minerals. The women completed 24-hour diet recalls, which were then compared with RDIs for Australians. However, limitations to this study are the appropriateness of the RDIs for this population, as well as methodology issues relating to 24-hour recalls.

In summary, the main dietary concerns raised for the traditional Vietnamese diet were malnutrition in Vietnam, low calcium and low iron intakes. However, deficiency conditions related to a lack of calcium and iron were not reported in these studies (although anaemias were reported elsewhere - see Section 2.4.3.2). This suggests that apparent diet deficiencies may have been due either to the different perceptions and expectations of the reporters when assessing dietary patterns that differed from their own, or the possibility of different nutrient requirements by Vietnamese people. Interestingly, none of these studies identified goitre and possible iodine deficiencies as a concern as was detected in health screening programs (Fitzpatrick et al 1987).

2.4.5.4 Food consumption patterns after migration

I also review studies from the UK (Todd and Gelbier 1988) and Australia (Breakey 1983, Gardner et al 1983, Baghurst et al 1991). In most cases, the populations studied were immigrants from Vietnam, although Hmong and Cambodian groups were also studied (Story and Harris 1988, Story and Harris 1989, Ikeda et al 1991a). Characteristics of the samples studied varied and included heads of households (Crane and Green), children (Nguyen et al), adolescents (Story and Harris 1988), women (Baghurst et al), and families (Tong, Story and Harris 1989). Two of the studies (Crane and Green and Baghurst et al) were convenience samples, while the others were random or total population samples, although these were limited to a geographic area or school. As there are many similarities in the dietary patterns of people from different parts of IndoChina, where relevant when describing the food consumption patterns of people from Vietnam, I will also describe those of people from other parts of IndoChina.

Most of these studies reported that dietary patterns had changed to some extent following migration and that changes included the adoption of some Western foods. I will discuss this aspect further in the next section. However, it is apparent that traditional patterns, ie dietary patterns similar to those described in accounts of traditional Vietnamese diet (Kaufman 1979, Carlson et al 1982a, 1982b) were also present. These patterns include the widespread consumption of rice, and meats such as pork, the use of traditional accompaniments and cooking methods. Despite being in different host countries, typical diet patterns for IndoChinese migrants were apparent.
These patterns were rice (which was consumed at least daily) as the predominant cereal, with frequently reported animal foods being pork, chicken, beef and eggs. Other foods frequently reported were fruit, vegetables and soft drink (Crane and Green 1980, Tong 1987, Story and Harris 1988, 1989, Baghurst et al 1991, Ikeda et al 1991a). Interestingly, milk, a food reportedly as not widely consumed in IndoChina, was consumed daily by a large proportion of respondents in some studies (Nguyen et al 1983, Story and Harris 1988). However, Tong (1987) reported that milk was consumed less than were other foods.

In Australia, Baghurst et al (1991) compared their findings with those of a comparable sample from the National Dietary Survey of adults (English et al 1986, 1987). Compared with the Australian women, the Vietnamese women ate much larger quantities of rice, pasta, pork, seafood, sauces and poultry and somewhat less bread, milk, cheese, fruit, soft drinks, breakfast cereal, lamb and composite meats (eg pies sausage rolls, bacon, sausages). This difference in foods consumed led to differences in the calculated nutrient intakes for the two groups, with the Vietnamese diets being higher in complex carbohydrate, lower in fat, sodium and refined sugars.

Hung et al (1995:63) also reported fat and salt intakes of Vietnamese adults in the US in a recent large study which sought to 'characterise dietary intake patterns among Vietnamese who have relocated to the US'. However, the only foods surveyed were fruits, vegetables, alcohol, and foods selected as indicator foods for high fat, cholesterol and salt intake.
These indicator foods included pork, beef and fatty meats such as ham and eggs for cholesterol. From the results of their modified food frequency survey which was administered by telephone, the authors reported that there was frequent consumption of the indicator high fat foods, high cholesterol foods, high sodium foods (eg salty foods, instant noodles) and high sodium seasonings (eg fish sauce, soy sauce). However, the authors considered that these practices were offset by 'beneficial' food preparation behaviours such as the use of less saturated cooking oils, trimming visible fat from meat and skin from chicken. For instance, pork fat was reportedly used by only 0.5% of the sample which contrasts with reports of traditional diet and the finding of Ikeda et al (1991a) that 80% of the Hmong women they studied in California used pork lard. On the other hand, Hung et al found that fruit and vegetable intake was less than recommended levels at three serves/day, particularly by respondents who were younger, (ie less than 37 years), or had less education. Alcohol intake was also found to be lower in this population of Vietnamese people than in the general Californian population, especially in women.

Of particular interest in this study was that no association was found between the length of residence in the US and the consumption of 'high fat foods'. The authors did acknowledge that limitations of this study included the validity of the survey instrument for this population, and difficulties for respondents in quantifying food intake over the telephone, especially vegetables which had been consumed in mixed dishes.
Evidence of dietary change

Most of the studies describing dietary change in the IndoChinese population (Crane and Green 1980, Gardner et al 1983, Nguyen et al 1983, Tong 1987, Story and Harris 1988, 1989, Baghurst et al 1991), used questionnaires to establish the frequency of consumption before and after migration and preferences for lists of specified foods. Some studies also obtained data describing current intake by way of 24-hour recall (Tong, Baghurst et al). Two Australian studies (Breakey 1983, Stuart-Fox and Patterson 1989) used different methods to describe dietary change. Breakey’s study, which was one of the earliest reports of dietary change in Australia, was largely descriptive and consisted of anecdotal evidence drawn from a variety of sources. Stuart-Fox and Patterson described dietary change in preschool children, by comparing diet records from children in Australia with diet histories of children who had been preschoolers in Laos.

All of the studies listed above reported some changes in eating habits away from traditional diets. The types of changes noted differed with different foods - some foods increased in the frequency of consumption, others decreased, while for some foods there was no change. Despite different time periods and geographic locations, some of these changes have been surprisingly consistent. However, differences are evident between studies. To illustrate the differences reported between studies, I have compared the findings of Crane and Green (1980) in the US, Todd and Gelbier (1988) in the UK and Baghurst et al (1991) in Australia. In the US, Crane and Green reported increases in a number of foods.
These were milk, soft drink, eggs, beef, fruit, candy and butter or margarine with small increases for potato with smaller increases (that were not statistically significant) for bread and chicken. Baghurst et al in Australia, also reported increases in the frequency of consumption of beef, milk, soft drinks and fruit along with bread, potato, cheese, poultry, ice cream, noodles and pork. By comparison, Crane and Green reported that foods less frequently consumed were fish, tea, rice and fresh vegetables, while no change was observed for pork and coffee. Similarly, Baghurst et al noted a decrease in consumption of fish, prawns, rice and green leafy vegetables.

In the UK, Todd and Gelbier found that almost half of the 200 Vietnamese refugee families studied reported that they ate different foods for their main meals compared with their main meals in Vietnam. How the meals had changed was not described, but new foods which the respondents had started to eat in Britain included butter, cheese, breakfast cereal, bread, chips, instant noodles and some Chinese foods which had been unavailable in Vietnam. The authors compared the findings of this study with those of Crane and Green (1980). Both studies reported that the refugees had tried Western foods but had not altered their eating habits significantly. Both reports also commented on the increased variety and availability of foods in the new country and implied that increases may have occurred in the overall amount eaten. Todd and Gelbier attributed differences that were found in the amounts of milk, soft drink and fish consumed in the two studies to the different socioeconomic status of the settlers in the two areas.
However, this claim is largely unsubstantiated as the results of the two studies were reported differently, and are not really comparable. In addition, although it is likely that the US sample was of a different background to the UK sample, Crane and Green did not describe this aspect of their sample.

The differences that occur between the three studies described above may be related to a number of factors. A major difference was the use of different methodologies used as well as differences in environmental factors (eg the foods available), and in sample characteristics (including the region of origin and length of stay in the new country). For example, differences in methodology, namely the use of different food lists, largely account for differences in the food items reported as increased and decreased - Crane and Green asked about some foods not reported by Baghurst et al (butter, oil, eggs, fresh and canned vegetables, candy, coffee and tea), and similarly, Baghurst et al reported on foods not asked by Crane and Green (prawns, leafy greens, noodles, lamb, cheese and ice cream). Therefore when compared on the list of common foods asked by both studies (fish, rice, fruit, potato, bread, pork, poultry, beef, soft drinks, milk), nine of these ten foods did change in the same direction. On the other hand, the foods reported by Todd and Gelbier were volunteered by respondents. Thus differences in the study findings may be less than first appear.

The possible effects of environmental differences were alluded to by Todd and Gelbier who reported that Britain's cold climate may have influenced both the types and the amount of food eaten by migrants to that country.
They also noted that previous exposure to Western foods may have affected people from North and South Vietnam differently. Where it was reported, the period of residence also varied between studies. For example, the median length of stay for the Adelaide women was 6-7 years (Baghurst et al. 1991), whereas most of Crane and Green's (1980) sample had lived in the US for only 2-4 years. However, these two studies were also conducted about 10 years apart which means there would have been differences in environmental and support factors for these samples both before and after migration. Another difference was in the sex of respondents. Baghurst et al studied 200 females whose mean age was 33 years, whereas Todd and Gelbier's (1988) UK sample was mixed (45% male and 55% female) with 71% aged under 50 years. Crane and Green approached the head of the household who in the Vietnamese family structure is generally male. However, neither the proportions of males and females nor the age range in the final sample were reported. Another probable difference in the samples was that the majority (79%) of the British sample came from North Vietnam (Todd and Gelbier). While the region of origin was not reported in the other two studies, settlement patterns indicate that the majority of immigrants to the US and Australia have come from South Vietnam.

As one of the first published studies of the food habits of Vietnamese people following migration, Crane and Green's study (1980) is widely cited in the literature (Nguyen 1983, Todd and Gelbier 1988, Story and Harris 1989, Ziegler et al 1989, Baghurst et al 1991). However there are several limitations to its generalisability.
For instance, information was obtained via a mailed questionnaire addressed to the head of the household - this person's responses may not have been applicable to other family members, a limitation acknowledged by the authors. Generalisability of the results was also limited by the low response rate (30%). The actual proportion of incomplete questionnaires of those returned was not stated.

Similar patterns of dietary change to those described above were also reported by Gardner et al (1983) in Victoria (Australia) and Tong (1987) in the US for Vietnamese migrants, and by Story and Harris (1989) in the US for Hmong and Cambodian migrants. Typical changes noted in these studies were an increase in the consumption of meat, poultry, soft drinks and some fruits and a decreased consumption of fish, seafood and tropical fruits. Gardner et al reported that dietary changes after migration to Australia reflected the increased availability of beef and poultry and the reduced range of tropical fruits and fish available here. In all these studies, traditional foods such as rice were still eaten, especially at the evening meal.

Crane and Green (1980) also first suggested that children may have adopted Western diet differently to their parents. Nguyen et al (1983) later studied 76 Vietnamese children in Florida and reported a shift from the traditional Vietnamese diet to the American diet. Comparisons were made between groups of children who had lived in the US for more or less than one year; and who were older or younger than six years. The frequency of intake of food groups and 'American' foods, and preferences of 'American' foods were assessed by questionnaire.
The study method appeared to take account of the participants' age and cultural background as mothers of all children were interviewed (as well as the older children themselves) by trained Vietnamese interviewers, and food models were used in the interview to assist where food names were not yet familiar to interviewees. However, few other details of the methodology are given and the term 'American' foods is not defined. Height and weight of the children were measured but not reported.

Results indicated that most of the children drank milk once a day and that meat was consumed at least once a day. Changes were found in some of the types of foods consumed as the period of residence in the US increased - there was a significant increase in the consumption of vitamin supplements and a decrease in the intake of green leafy vegetables (p<0.01) for the younger children, and increased intakes of peanut butter (p<0.001), and sweets such as ice cream, pies and milk shakes (p<0.05) amongst the older children. Also amongst the older children, the longer term residents were reported to prefer American foods more than did the recent arrivals. However, a mixture of traditional and non-traditional foods was said to be eaten by the children, with more than 90% of respondents consuming Vietnamese foods on weekends. The authors reported that most of the families tried to retain traditional practices but the older children were considered to be influenced by the school environment. However, no evidence was provided for this conclusion. In Australia, two studies commented on dietary change in children.
Stuart-Fox and Patterson (1989) claimed that cordials, confectionery, dairy foods and sweetened snack foods had been introduced in the diets of Lao children in Australia. In addition, the children were eating 'Australian' breakfasts and lunches of sandwiches during the week, with the Australian type breakfasts more frequently eaten by children whose parents had lived here the longest. These claims were based on comparisons of diet diaries and histories completed by parents of children brought up in Australia and in Laos. Also in Australia, Breakey (1983) had reported earlier that Vietnamese children demonstrated signs of acculturation, demonstrated by the substitution of bread for rice at breakfast and lunch. Similarly, Gardner et al (1983) reported that children in Victoria were taking sandwiches to school and that changes to an increased consumption of convenience foods at breakfast were most evident among single young people.

Story and Harris (1988) in the US, reported that SE Asian adolescents in grades 10-12 had adopted 'American' food practices but had also retained strong ties to native foods and traditional meal patterns. This was based on the results of a 29 item food frequency questionnaire which indicated widespread consumption of milk and soft drinks, but also daily consumption of rice and a preference for foods such as fruit, meats and soft drinks which were high status foods in SE Asia. As the only reported study of Vietnamese adolescents, this study has been widely cited and its findings were very influential in the development of the present study. However, it should be kept in mind that this study was relatively small and studied adolescents in only one area of the US.
Two studies have considered age as a factor in dietary change (Baghurst et al 1991, Hung et al 1995). Baghurst et al in South Australia, found that while the women's diets were still largely traditional, the younger migrators (sic) reported changes in more food items, and that younger age groups had a greater uptake of, and preference for 'Australian' foods (such as hamburger, pizza, soft drink). However, the effect of age alone was not examined. Although Baghurst et al did not examine children's diets, they reported that the women perceived the pressure from children wanting to acculturate to be a major difficulty in maintaining a traditional diet.

Hung et al (1995) in a study of over 1000 randomly selected Vietnamese adults adds only limited support to any association between age and food habits. They found that younger respondents were more likely to consume beef and fried foods and that people under 37 years of age were less likely to have consumed five or more serves of fruit and vegetables in the previous 24 hours. However the latter finding was also associated with having less high school education. The authors do not make any recommendations based on these findings apart from the possible targeting of programs that encourage fruit and vegetable intake to younger people and to those with less high school education. However, this study did not examine dietary change since migration, nor the quantities of food eaten. Also, as discussed in the previous section, foods on the frequency list were specifically chosen as indicators of fat and sodium content and so results are again not truly comparable with those of earlier studies.
Cooking and shopping practices

A few studies comment on cooking and shopping practices of IndoChinese migrants (Gardner et al 1983, Story and Harris 1988,1989, Ikeda et al 1991a). All of the authors report that the SE Asian migrants' shopping practices had altered from in their homeland. Changes included frequenting both oriental and Western style supermarkets, shopping weekly rather than daily and involvement of other family members besides adult women. Cooking methods were noted by Ikeda et al to mostly be stove top methods including stir-frying, steaming and stewing. These are similar to traditional methods. However, electric rice cookers were sometimes used; nearly all homes had refrigerators which included freezers, and over half had separate freezers as well.

Of particular interest to the present study are the findings of Story and Harris (1988) that 30% Vietnamese teenagers had the major responsibility for meal preparation in the home and one-quarter did most of the shopping. The situation was similar for Cambodian and Hmong youth (Story and Harris 1989).

Attitudes to food

A number of studies (Crane and Green 1980, Gardner et al 1983, Story and Harris 1988, Baghurst et al 1991) have examined attitudes to food of Vietnamese people after migration. These have included attitudes to traditional and non-traditional foods, food preferences and perceptions of healthiness.
Again the methodologies have differed between studies, most notably that the lists of foods have differed, although the majority contained general food items.

Food preferences

Crane and Green (1980) who asked about preferences for both traditional and non-traditional foods found that Vietnamese foods were the most preferred. However, many non-Vietnamese foods had been tried and were also liked, although to a lesser degree. Of the non-Vietnamese foods, even the least liked foods (breakfast cereal and sandwiches), had still been tried by the majority of respondents. A finding of this study which has been frequently cited is that steak was the most popular of the nine American foods, being liked by as many respondents as the most popular Vietnamese dish. By contrast, the second most popular American food (fried chicken) was only as popular as the least liked Vietnamese food.

Story and Harris (1988) used a list of 35 general food items which adolescents ranked by preference. However, results are only reported for the 10 most liked and 10 most disliked foods. The most favoured foods included rice, chicken, steak, fruit, ice cream and soft drink, and the least favoured included cheese, chocolate milk, spaghetti, cereal and pizza. Interestingly in this study, different responses were reported for the three different ethnic groups (Cambodian, Hmong, Vietnamese). Another list of 35 foods were rated for beliefs about health concepts. The foods which were considered to be the ‘most healthy foods’ were rice, vegetables, beef, chicken and oranges.
The authors made no associations between food intake, food preferences and health beliefs. Story and Harris (1989) found that SE Asian adults preferred similar foods to the adolescents with rice, steak, fruit, meat and soft drink nominated as the most preferred of 31 food items. Similarly, cheese, chocolate milk, milk, pizza and breakfast cereal were among the least preferred foods.

The Vietnamese women in Australia studied by Baghurst et al (1991) rated 22 foods on a 5 point scale for both ‘like/dislike’ and ‘healthiness’. As there was a highly significant correlation for the scores on both scales for nearly all foods, the authors felt this supported claims that Vietnamese people believed ‘If I enjoy the taste, and feel like eating a food, my body must need it’ (Baghurst et al 1991:723). Staple foods received the highest scores, takeaway and convenience foods (eg hamburgers, pizza, soft drink, chocolate, breakfast cereals) received moderate scores and meat pies and lamb received the lowest scores. When compared with the findings of Story and Harris (1988), a number of food categories were similar in their relative ranking, although cheese was far more popular with the Australian women than with the US adolescents. When adjusted for other variables, Baghurst et al found that some foods (hamburgers, soft drinks and pizza) were much more popular with younger people and some foods (eg breakfast cereal and fruit), were more popular in those of longest residence. Again, differences between these studies may have been due to differences in the environments of the two samples, differences in the time the studies were conducted as well to differences in the samples themselves.
The only study apart from Baghurst et al to examine food preferences in relation to length of residence was that of Nguyen et al (1983) who found that children who had been resident in the US for longer, preferred American foods more than did recent arrivals. However, as discussed in Section 2.4.5.4, the children in this study were very young, the length of residence was only one year and few details of methodology are available.

The findings of these studies have been fairly consistent in reporting that traditional foods and/or staple foods such as rice and meats (beef and chicken) are the foods most preferred by IndoChinese immigrants. Of note is that some non-traditional foods are generally more popular than others, but most of the non-traditional foods listed had at least been tried by the different samples. The most popular non-traditional foods tended to be foods such as soft drink and ice cream which Story and Harris (1988) noted to be high status foods in Vietnam. Other non-traditional foods (eg milk, hamburgers, pizza, breakfast cereal and bread varied in popularity while lamb and cheese tended to be generally unpopular. However, the results of these studies are highly biased by the food listings used and as such should not be seen as definitive.

**Traditional foods**

When SE Asian adolescents in the US were asked whether they preferred American food or their native food, Vietnamese adolescents (91%) were more likely than Hmong and Cambodian adolescents to prefer traditional foods, the least likely to eat monthly at fast food restaurants (13%), and the least likely (35%) to say they would like their parents to prepare American foods. The greatest desire to adopt American foods was found in Hmong adolescents (Story and Harris 1988). In the study of Hmong and Cambodian families, Story and Harris (1989) reported that adults preferred traditional foods but that children preferred eating both. However, three-quarters of respondents wanted their children to continue eating traditional foods. Maintenance of traditional food habits was also thought to be important by Vietnamese settlers in Victoria, one reason being so that they could be passed on to children (Gardner et al 1983).

Baghurst et al (1991) reported that the South Australian women felt that barriers to maintaining traditional food habits were the pressure from their children to acculturate, and also the cost of Vietnamese foods. At the time of the study, most of the women felt that their diets were mostly traditional and reported no problem with the availability of traditional foods. Interestingly, less than half of the sample (43%) felt they should retain traditional habits - no reasons are given for this. Similarly, it is interesting to note that both Story and Harris (1989) and Ikeda et al (1991a) reported that their samples of IndoChinese women wanted to learn how to prepare American foods.
Thus attitudes to traditional foods were generally positive amongst IndoChinese immigrants, including amongst adolescents. There were strong feelings that traditional diets should be maintained and passed on to children. However, these feelings were not universal and there was also a desire to eat non-traditional foods and to learn non-traditional methods of food preparation.

Healthiness of foods

Other attitudes to food described in the literature were the relative values of Vietnamese and Western foods in the host country, in particular the perceived healthiness and freshness. Differences are evident between the studies as to the perceived ‘healthiness’ of the Vietnamese food compared to the relevant Western diet. However, there seems to be a general perception that Vietnamese food is tastier than Western food but the latter is more plentiful. For instance, Baghurst et al (1991) reported that 80% of the Vietnamese women considered Vietnamese food to be tastier but less fresh than Australian food. However, the women appeared to be uncertain as to the health value of Vietnamese foods compared to Australian foods. Todd and Gelbier (1988) found that respondents considered that food available in Britain was both less fresh and tasty than in Vietnam, and that this contributed to a lower consumption of fruits and vegetables. The quality of the British food was thought to be less than food in Vietnam but was more plentiful, and allowed having enough to eat of everything. Similarly, Story and Harris (1989) reported that the majority of SE Asian adults felt that diets were healthier since migration because food was more plentiful.
Other reasons were an increased variety of food and the availability of refrigeration. Differences may be due to the understanding and different interpretations of the concept of 'health'. For instance, in contrast to the report of Story and Harris, Gardner et al (1983) in Australia reported that one-third of the Victorian sample described Vietnamese meals as 'bad' for having more vegetables than meat (which the authors note is generally thought by health workers to be a positive diet feature), and a third also felt that a 'good' feature of Australian meals was that they were more nutritious. Similarly, half felt that Australian meals were 'good' as they offered more meat, milk, butter and eggs, but over half the sample felt that Australian meals were 'fattening'.

Overall, the attitudes to food expressed by IndoChinese immigrants were that traditional foods were viewed positively and there was some keenness to maintain traditional patterns. However, there is also a willingness to try non-traditional foods and there is some consistency in the general popularity of Western foods. There also seems to be a general perception that the overall diet is healthier since migration, that traditional foods are tastier than Western foods, but concepts of health were variable. It is important to note that the studies reporting these views are flawed in many respects and there is also very little inquiry as to why particular views were held.

2.4.5.8 Nutrient intake

In this section I will describe the nutrient intake of IndoChinese immigrants as reported in the few studies that investigated this aspect of the diet.
Studies reviewed include those of Stuart-Fox and Patterson 1989, Baghurst et al 1991, Ikeda et al 1991a, Newman et al 1991. Groups surveyed in these studies were respectively Laotian children, Vietnamese women, Hmong women, and pregnant women from Cambodia, Laos and Vietnam. Some additional studies which report specific nutrient intakes of interest in heart disease research (eg Rissel and Russell 1993) were described in Section 2.4.3.8. The three nutrient intake studies of adults were all conducted by 24-hour recall. These three studies reported their results differently but reached similar conclusions, considering there to be low intakes of iron, calcium, magnesium and some B vitamins.

Baghurst et al (1991) considered the diets of the Vietnamese women in South Australia to be high in high complex carbohydrate and low in fat relative to the diets of Australian women. The sugar and sodium intakes were also considered to have increased from traditional diets, but were still low when compared with the intake of Australians. However, the authors concluded that the Vietnamese diets were marginal for some vitamins and minerals. For example, their diets were marginally below the RDI for iron, zinc, magnesium and folate, and substantially below for calcium and vitamin E. The authors concluded that the Vietnamese women were at a greater risk for inadequate dietary intake than the Australian women and this would be of greatest concern for women of child-bearing age.

Where the diets of pregnant women were studied, generally more nutrients were considered to be low than for non-pregnant subjects.
Ikeda et al (1991a) reported that in a sample of 205 Hmong women, it was the pregnant women (n=63) who had the lowest energy intakes and also intakes less than 60% RDI for vitamin B6, riboflavin, calcium, iron, magnesium, and zinc. Otherwise, macronutrients were consumed in recommended proportions by both pregnant and non-pregnant women. However, Ikeda et al classified 31% of the sample as 'less adequately nourished', i.e., intakes of two or more index nutrients (iron, vitamin B6, calcium and vitamin A) were less than 50% of RDA. Newman et al (1991) compared the nutrient intakes of 187 pregnant low-income SE Asian in California, with a matched group of non-SE Asian women. The Vietnamese subsample (n=59) was found to have a significantly lower fat, folate, and calcium intake but a higher intake of thiamine, niacin, and selenium than the non-SE Asian women. However, their diets were considered to be more adequate than those of the other SE Asian women, being significantly higher in fat than the diets of Cambodian and Laotian women, and significantly higher in riboflavin, vitamin D and calcium than the diets of the Cambodian women. Nutrients for the Vietnamese women which were less than 80% RDA were vitamins B6, D and E, folate, iron and calcium.

Stuart-Fox and Patterson (1989) reported that diets of Laotian preschool children in Australia were markedly higher in total energy and percentage of fat than for children in Laos. Although a very small sample (31), they also reported that intakes of calcium, carbohydrate and vitamin B had improved in Australia. However, no data are provided in support of this claim and no comparisons are made with Australian standards or reference groups.
The authors express that caution should be taken with respect to increasing fat and sugar intakes in Australia. Breakey (1983) had earlier indicated that the nutrient intake by IndoChinese immigrants to Australia could be increased because of the increased availability of protein foods and total dietary energy.

It is important to note that all of these studies are of women and children and are thus not representative of the population of IndoChinese migrants, although pregnant women and young children are considered to be groups at high risk for poor nutrition in any population. It is also important to note that these studies report 24-hour intakes which are not necessarily representative of usual dietary intake. Also, comparisons with RDIs are only suggestive of dietary inadequacy and need to be further investigated. This situation is exacerbated by the cross-cultural nature of the comparison - Western RDIs may be inappropriate standards for IndoChinese people and food data bases used to provide nutrient values may be inadequate. For instance, Ziegler et al (1989) noted that nutrient data for many foods commonly used by people from SE Asia could not be found when they were compiling their renal exchange list. They also reported from their observations that herbs were used in large enough quantities to be nutrient sources - this is generally not considered when calculating nutrient intake.

Despite these limitations, which are generally not discussed by the respective authors, the results of these nutrient intake studies again show a trend.
The trend shown is that samples of IndoChinese people studied have generally consumed macronutrients in proportions consistent with Western dietary recommendations, but their intakes of vitamins and minerals may be lower than recommended. However, for some nutrients, this intake may be higher after migration than when in IndoChina. It is also important to note that only two studies (Baghurst et al 1991, Newman et al 1991) included comparison groups of non-IndoChinese people. None of the studies included groups in Vietnam for comparison.

In summary, despite the differences in methodology, time and place of the various studies, there are similar trends in the dietary patterns of migrants from Vietnam as well as those from other parts of IndoChina. The findings of the studies reporting food intake, nutrient intake and attitudes to food are fairly supportive of each other. There has been a general trend towards increased consumption of milk, soft drink, eggs, beef and fruit, and decreased consumption of rice, fish and seafood following migration. It is also generally reported that foods such as rice, meat and vegetables are frequently consumed. However, it is important to note that traditional foods are widely consumed, even if less frequently, and are well liked. That these studies are generally supportive of each other suggests that the views expressed and dietary practices reported may be widespread amongst the IndoChinese community.

The studies of all age groups indicate that non-traditional foods have been adopted and are liked by immigrants from IndoChina.
The findings of the study by Baghurst et al (1991) indicate that migration at a younger age may be associated with a greater uptake of some non-traditional foods and this is consistent with results of the studies of foods eaten in younger age groups. However, there is little other evidence at the moment that demonstrates a difference in the intake of traditional diet based on age, or that young people are at more risk of diet-related problems than adults. Similarly, the evidence that dietary changes are more evident in IndoChinese migrants of longer residence in Western countries is weak and conflicting.

It is interesting to compare the results of the nutrient intake studies with the studies describing dietary patterns after migration. The recommendations from the studies describing dietary change have tended to concentrate on probable increases in fat and energy intake, extrapolated from food intake patterns. The emphasis given to this observation has been largely negative, concentrating on accompanying potential health dangers drawn from Western health patterns and associated dietary guidelines. However, analysis data reported here (eg Baghurst et al 1991) show that even after some dietary changes, when compared to Western people, the intake of nutrients such as fat, sugar and sodium by IndoChinese people may still be preferable. Suggestions by Nguyen at al (1983) and Tong (1987) that a composite diet of Western and traditional foods could be balanced and nutritious have not been taken up elsewhere. Similarly, the positive benefits of increased dietary intakes of some nutrients (eg calcium) since migration, as suggested by Stuart-Fox and Patterson (1989), have not been widely reported.
While there are many overall similarities in the findings of the studies reviewed here, there are also a number of differences and inconsistencies. It is important to consider these differences when comparing and generalising results, and to allow for the heterogeneous nature of the IndoChinese population. It appears that early studies of Vietnamese refugees to the West are probably responsible for many of the beliefs and concerns regarding diet and nutrition of migrants from IndoChina and these have not always been substantiated, or corrected, by later studies.

In the context of the present study, most of the reports of dietary practices of IndoChinese immigrants are somewhat dated and do not provide good representation from adolescents. Therefore, to provide additional background and for comparison, in the following section I will consider the diets of adolescents in general, and those in Australia in particular, and examine the factors which may influence the foods they eat.

2.5 Nutrition and health in adolescence

In this section I will review literature relating to the nutritional health of adolescents, the food consumption patterns of adolescents, and factors influencing their food choices.

As mentioned in the Introduction to this thesis, the definition of ‘adolescence’ (eg the age range) is variable and other terms such as ‘youth’ may be used to describe the same life stage. However, Ewen (1983) notes that psychologists, anthropologists, sociologists and biologists all define youth differently.
However there is agreement that it is a transitional stage between childhood and adulthood. There is also general acceptance of a state of youth, which Ewen asserts is recognised by young people themselves and demonstrated commercially.

From a biological viewpoint, adolescence (or youth) can be considered a critical period, largely due to the period of rapid growth which increases the vulnerability to nutritional deficits. While literature is plentiful to support this view, identified nutritional deficiencies have generally been located in subgroups of the adolescent population and specific to a few nutrients. Overall, the view is that adolescents are generally healthy despite a wide range of food intakes, many of which are not consistent with recommended dietary practices (McNutt 1991). However, there is a growing body of literature concerned with the nutrition and lifestyle patterns observed in adolescence. The long period of development for adult lifestyle diseases has focussed attention on the diets of young people. The literature explores the relationship between the health related behaviours practised during childhood and adolescence, and the lifestyle habits and future health status of adults.

2.5.1 Nutritional health of adolescents

2.5.1.1 Growth and development

According to Falkner (1988), the rate of growth in adolescence is second only to that which occurs in the period from conception to two years of age.
In most Western countries, the adolescent 'growth spurt' starts around 11.5 years of age in girls and 13.5 years of age in boys, lasts on average 3-4 years, and accounts for nearly 25% of adult height and 40% of optimal adult body weight. Nutritional needs are thus increased to allow for the increased rate of growth. The RDIs for use in Australia (NHMRC 1991) suggest an increased intake for both boys and girls after the age of 12 years in nearly all of the nutrients for which recommendations are made.

Influences on growth include both genetic and environmental factors. Falkner (1988) considers the single most important influence on size to be maternal height, but notes that the effect of adverse environmental and nutritional conditions can be overwhelming. He illustrates this point with reference to the studies of Martorell in which growth comparisons were made of seven year old boys from different socioeconomic circumstances in various countries. In these studies, increased height within the same racial (sic) group was found to be associated with improved living conditions.

Environmental factors are also implicated when populations who have experienced improvements in socioeconomic conditions and in nutrition have also reported increases in body size. For instance, a general increase in the average height of Western populations has been reported over the past 200 years. Increases in height were still apparent in the 1980s in Australia (Hitchcock et al 1986a, 1986b) and in Holland (Kemper et al 1985). However, a levelling off in height attainment, or the reaching of 'growth potential' has now been assumed in Western populations.
Reported secular changes in the growth of children in non-Western populations such as Eskimo (Peterson and Brant 1984) and Navajo Indian (Sugarman et al 1990) schoolchildren in the US, are considered to be partly the result of improvements in food availability.

The concept of genetic 'growth potential' has been one of considerable discussion in the literature, and is particularly relevant to studies of the Vietnamese population. On arrival in their adopted countries, children of Asian background have repeatedly shown to be small when compared with similar aged children and/or with reference standards and (eg Peck et al 1981). Hitchcock et al (1986a) in the West Australian growth study, noted children from Asian families (not including Vietnamese children) to be over-represented in underweight categories and that Vietnamese children were smaller and lighter than contemporary Australian children. As the parents of Asian children are also often small in stature, the discussion has related to whether the small stature of the children is genetic, or is a result of previous adverse conditions. Reported increases in heights and weights of Asian children some time after resettlement has been suggestive of previous adverse environmental conditions, including poor nutrition. While poor nutrition during adolescence does not compromise adult height, in undernourished populations the tempo of adolescent growth has been found to be slower (Falkner 1988). For adolescents consuming marginal diets, their growth may then be affected if increased requirements over an extended period lead to dietary deficiency, and in turn increase the vulnerability to nutrition related problems.
2.5.1.2 Problems of dietary inadequacy and excess in adolescence

Because of the high nutritional needs in adolescence related to the needs of rapid growth, literature reports of dietary inadequacies in adolescents are common. However, there are also reports of dietary excesses in adolescents. I will describe examples of both.

During adolescence, an increase in appetite generally enables the increase in food intake necessary to meet the increased nutritional needs. However, both food choice and the foods available for consumption determine what food is actually consumed, and therefore whether or not nutritional needs are met. Where the availability of food is not a problem, the appropriateness of food choice is the main cause of concern. In this case, if the increased intake of foods is made up mostly of foods low in nutrient density, nutrient requirements may not be met even if energy needs are met. Alternatively, restricted energy intake can also make it difficult to meet requirements of other nutrients. A tendency for girls in particular to limit food intake and thus compromise nutrient intake has frequently been reported (see Section 2.5.2). Girls are seen to be especially vulnerable to dietary deficiencies because of the need to account for menstruation and future pregnancy (Brabin and Brabin 1992). Minerals are the nutrients most frequently reported to be at risk for adolescents, in particular iron and calcium. Low iron intakes have been reported in both Dutch (Kemper et al 1985) and Australian girls (Truswell and Darnton-Hill 1981, English et al 1989, English and Bennett 1990, Magarey and Boulton 1994b).
English and Bennett report that 9% of a sample of 15 year old girls from the Australian National Dietary survey of schoolchildren (NDS) in 1985 were found to be both iron deficient as measured by biochemical tests, and to have low intakes of iron as assessed by 24-hour record. Iron deficiency in this group was significantly higher than in other groups of both girls and boys. It was concluded that some 15 year old girls were making inappropriate food choices and consequently were not increasing intakes of iron to meet increasing needs. Boys did not have any indices of poor iron status and this correlated with their greater food intake overall. Also from the NDS, proportionately more girls than boys had dietary calcium intakes less than the RDI. Almost half the girls (45%-50%) for all ages 12-15 years, had intakes less than 70% RDI. In contrast, while 51% of 12 year old boys had intakes less than 70% RDI, by 15 years this had reduced to 30% of the sample (English et al 1989). In an earlier study in Sydney of 290, 16 and 17 year olds who kept 4-day diet records, Truswell and Darnton-Hill also reported that girls were more likely than boys to have low iron, calcium and energy intakes. Magarey and Boulton (1994b) reported similar results to the NDS. They found that in a longitudinal study of 230 children in Adelaide at ages 11, 13 and 15 years, micronutrient intakes were higher for boys than for girls, and boys’ intakes increased between ages 11 and 15 years while girls’ intakes decreased. In addition, at 15 years, between one-third and two-thirds of girls consumed less than 70% RDI for calcium, iron, zinc, vitamins A, B6, E and folate, while one-quarter of boys had intakes below 70% RDI for calcium, vitamins B6 and E.
A similar pattern is described for adolescents in the US who participated in the Nationwide Food Consumption Survey in 1987-1988 (NFCS). In a sample of 242 females aged 12-15 years, the average intake of iron was 80% of the RDA (Recommended Daily Allowance), and for calcium, 66% of the RDA (Wright et al 1991). The authors calculated that 77% of the RDA represents the average requirement because of the safety margin built into the RDA figure. Hence a sizeable proportion of this group was at risk for deficiencies of one or both nutrients. Data were collected by 24-hour recall followed by a 2-day food record but no details are given as to the sampling procedure, the percentage of the sample responding, or the reasons for non-participation. Wright et al caution that the low response rate of this survey mean that results cannot be generalised to the rest of the population. However, results were considered to be similar to representative national surveys.

Of increasing concern to researchers is the situation observed in an abundant food supply such as in Western countries, when food choices result in an excess intake of some nutrients, in particular fat, which may be a risk factor for future health disorders. Coronary artery disease is considered to begin in childhood and adult risk factors have been identified in children (Heald 1990). Findings of fat intakes and also sodium intakes above recommended levels have been reported in a number of studies of young people in different parts of the US (Farris et al 1984, Ellison et al 1989, Witschi et al 1990, White and Klimis-Tavantzis 1992) and in Australia (ACHPER 1987, English et al 1989, Jenner et al 1991, Magarey and Boulton 1995a).
A number of medical authorities have issued guidelines and recommendations for children’s diets with a view to the reduction of coronary artery disease prevalence in adults. Recommendations are generally that fat intake should not exceed 30% of energy intake and that no more than 10% of energy should come from saturated fat (Expert panel on blood cholesterol levels in children and adolescents 1991).

In Australia, heart disease risk factors were considered to be too high in children and adolescents in several recent studies. Serum cholesterol levels were considered to be higher than recommended in a subsample of the NDS participants and also in one-third of a sample of West Australian children (Jenner et al 1991) - it has been estimated that 50% of Australian children have elevated cholesterol levels (ACHPER 1987). Results of the NDS indicated dietary fat and cholesterol intakes to be higher than recommended in a number of children (English et al 1989). Magarey and Boulton also found dietary risk factors in a longitudinal study of Adelaide children. They reported (1995a) that the Adelaide adolescents’ dietary fatty acid profile was undesirably high in saturated fats and low in polyunsaturated fats. However, the authors also reported that fat intakes had reduced during the period of the study and had met some of the dietary guideline targets (Magarey and Boulton 1994b).

As will be described in Section 3.1, there are numerous problems in the interpretation of data on dietary adequacy.
Particular factors affecting the studies of adolescents are the age and maturity of the samples and the reference points by which adequacy is determined. 'Intake' data do not allow for availability and absorption of different nutrients; 'availability' largely being determined by the combination of foods consumed, and 'absorption' by individual physiological characteristics. Most study populations have been white caucasian and results may not be generalisable to other ethnic groups. In addition, the data are not always comparable because of differences in collection methodology, and differences in times and place reflecting differences in the types of food available. Further difficulties arise when determining the inherent risk in adolescent diets for future lifestyle diseases. For example, there is controversy as to the role of cholesterol in heart disease, and still much is unknown about the role of dietary fats in adolescent development. Consequently, there may be some 'risk' in stringent application of well founded recommendations. Heald (1990) urges caution in the manipulation of adolescents' diets as the effects during rapid growth are unknown. In a similar vein, White and Klimis-Tavantzis (1992) caution that dietary advice needs to be individualised. They note that although average intakes in their sample of 97 adolescents in Maine were contrary to recommendations, that there was such a wide variation in the mean daily intakes of the nutrients studied, some participants did not need to modify their diets.

2.5.2 Food consumption patterns of adolescents

Truswell and Darnton-Hill (1981) identified and described 10 'features' which distinguished dietary patterns of adolescents from those of other age groups.
These 'features' were missing meals, snacking, eating 'fast' foods, meals that are unconventional in structure and timing, the beginning of alcohol consumption, consumption of soft drinks, consistency of likes and dislikes within cultural groups, the consumption and liking of high energy foods, low intakes of some nutrients and dieting by girls. This list was drawn from a review of a number of studies of adolescent food habits from Europe, North America and Australia, largely prior to 1980 and has been widely cited in the literature. Although the paper is dated, as many of the features listed have frequently been described in other literature I have reviewed throughout this thesis, they would appear to still be relevant.

In Australia, the largest study that described some of the food habits of adolescents was the National Dietary Survey (English et al 1988) and its companion Australian Health and Fitness Survey (ACHPER 1987). Together they provide a picture of the types and quantities of foods consumed, the frequencies of eating breakfast and drinking alcohol by 5224 adolescents aged 10-15 years, during one, 24 hour period. The NDS described differences in intake patterns for boys and girls of different ages. While information on food preferences was not sought, most of the features of adolescent diets noted earlier by Truswell and Darnton-Hill (1981) were present.

Magarey and Boulton (1994a,1995a,1995b) reported the findings relating to food habits from a longitudinal study of adolescents in Adelaide. A number of their findings which related to the types of foods consumed were similar to those from the NDS.
Other findings related to the place where meals were eaten, the frequency of eating, the contribution of different meals and the contribution of snacks to nutrient intake (1995b). The authors made a number of recommendations which they considered would bring adolescent diets in line with dietary guidelines (1995a). These included the inclusion of low fat dairy products, leaner meats, and salt-reduced cereal products.

Meal patterns of adolescents have not been widely reported. Where reported, there tend to be three main meals per day with snacks in between. In both Finnish (Prättälä 1989) and Australian (Magarey and Boulton 1995b) studies, the main meal was eaten at home with the family. However, Story and Resnick (1986) and Prättälä report that eating as a family group can be affected by individual commitments of the adolescents and/or other family members.

Snacking though, as a feature of adolescent diets is widely reported, and has been found to contribute up to one-quarter of daily energy intake (Truswell & Darnton Hill 1981, Magarey and Boulton 1995b). A common concern in the literature is the lower nutrient density of snacks compared with main meals, and the associated consumption of fast foods at those times. However, snacks have also been found to contribute substantial amounts of some nutrients (eg Magarey and Boulton). Prättälä (1989), from interviews with 35 Finnish teenagers, found that snacks such as lollies and hamburgers were often shared with friends and this was the main reason for eating them.
One finding common to a number of studies is meal skipping, especially of breakfast (Fanning et al 1981, ACHPER 1987, Magarey and Boulton 1995b). Eating breakfast is considered beneficial because of its association with lower fat intakes, higher micronutrient intakes, weight control (Leeds 1993) and possible role in improved performance (Lechky 1990). Truswell & Darnton-Hill (1981) in a study of 290, 16 and 17 year olds in Sydney did not report whether meals were missed, but did note that girls were much more likely to have small breakfasts (less than 100kCal) than were the boys. This tendency for girls to either miss breakfast completely or to have foods of low energy content may be related to issues such as dieting which are more prevalent in girls. I describe these issues in Section 2.5.2.1. A consistent finding in studies of adolescents is that girls appear to eat markedly less than boys and are more likely to eat less than their requirements (English et al 1988, Magarey and Boulton 1994a). For instance, in the NDS, food intake increased with age for boys whereas girls’ intake changed little (English et al 1988), and girls were also more likely to consume deficient diets (English et al 1989). Practices such as dieting and skipping meals may contribute to this pattern.

2.5.2.1 Dieting and eating disorders

Dieting and other patterns of disordered eating, such as restrained eating and skipping meals, are commonly described features of female diets, including adolescents’. Crawford and Worsley (1988) reported that twice as many women as men in a South Australian study were likely to be following a weight control diet, and that girls as young as 11 were dissatisfied with their body shape.
Of concern to the present study is that adolescents who are dissatisfied with their body image are considered to be at increased risk for later development of eating disorders, ie anorexia nervosa and bulimia nervosa (Attie and Brooks-Gunn 1989, Richards et al 1990). Eating disorders are responsible for substantial morbidity, and are apparently increasing in incidence and prevalence (O’Dea 1995). As a prevalence of disordered eating patterns may also influence food consumption patterns in adolescents, a brief review of relevant literature is presented in the following section.

Disturbed attitudes to food and eating are reported in several populations, and dissatisfaction with body image is reported more frequently in females than in males (Richards et al 1990, O’Dea et al 1996). In the US, Felts et al (1992) reported that 25% of a sample of 3437 adolescents in North Carolina perceived themselves as ‘too fat’, and 68% of them were trying to lose weight. Similarly, Smith and Krejci (1991) reported that 22% of the females in their mixed sample of 545 whites, Hispanic and Native American youth reported that they were ‘never satisfied’ with their body shape, and half the female participants reported excessive dieting or fasting. Notably, Smith and Krejci found the rate of disturbed eating patterns (assessed as binge eating) to be comparable in all three ethnic groups. Australian reports have also highlighted a growing concern about disturbed eating patterns in adolescents (Biddulph et al 1984, Tienboon et al 1989, O’Dea 1994, O’Dea et al 1996). Tienboon et al found that 41% of girls compared with 14% of boys in a Geelong study of 14-15 year olds (n=213) considered themselves to be overweight, but only 18% were considered to be overweight by measurement.
O'Dea et al (1996) reported that 21% of a sample of 470 young Sydney adolescents were dieting to lose weight and over half the females wanted to be lighter than their present weight. In Queensland, Spillman et al (1994) found that adolescent females reported a greater degree of restrained eating than did males. To illustrate the level of community concern, in 1992, the NSW Department of School Education formed an eating disorders project (Catalano 1992).

Traditionally thought to be unique to ‘white, upper middle-class, college-aged women’ (Smith and Krejci 1991), it is notable that recent studies have demonstrated a prevalence of disordered eating and associated behaviours, in different age groups, socioeconomic groups, and different ethnic groups. Dolan (1991) in a review article cites numerous studies describing eating disorders in nonwhite (sic) populations. The true incidence of eating disorders in different ethnic minority groups is uncertain but is generally accepted to be lower than in the Caucasian population. The growing awareness of the existence of anorexia and bulimia in non-Caucasian populations has led to considerable debate in the literature as to the definitions and causes of eating disorders in these groups. Some researchers suggest that the development of eating disorders is related to the adoption of Western culture (Arya 1991). Other factors suggested are increased socioeconomic status (Osvold and Sodowsky 1993) and a relationship with cultural identity confusions including inter-generational conflict (Bryant-Waugh and Lask 1991, Mumford et al 1991).
Dolan (1991:75) points out that ‘ethnocentric assumptions of Western medical services’ may be limiting the recognition and diagnosis of eating disorders in ethnic minority groups. Therefore, there may be an increase in correct diagnosis of eating disorders as awareness increases. Arya (1991) considers the incidence of true anorexia nervosa will increase in non-Western countries as Westernisation itself increases, and that the finding of anorexia nervosa in immigrants to the West supports the acculturation model of the aetiology of the condition.

To date there have been few reports on the incidence or prevalence of eating disorders or disturbed attitudes to food in SE Asian populations. In the US, three cases of anorexia nervosa in Vietnamese immigrants were described by Kope and Sack in 1987 (cited in Bryant-Waugh and Lask 1991:232). These cases were considered to be stress responses to immigration. Also in the US, Lucero et al (1992) found that of 111 Asian (ie claiming Chinese, Vietnamese or Japanese heritage) under-graduate college women, 1.8% were classified as having an eating problem according to the EAT-26 eating attitudes test. This result suggests a low prevalence of eating disorders amongst the Vietnamese women, especially considering that Caucasian women in the same study were 5.5 times more likely to report eating problems. Also, as the prevalence was considerably lower than that reported for Asian (Indian/Pakistani) girls in Britain (eg Mumford et al 1991), the authors consider that cultural factors may have influenced participants’ responses, and that the results therefore cannot be generalised to all Asian populations.
For the same reason, although not discussed by the author, the true prevalence in the Vietnamese population studied may be different to (e.g., greater than) the result obtained. Another limitation is that the size of the Vietnamese subsample is not stated. In Australia, the sample in O’Dea’s (1994) study of 133, year 8 girls from 2 secondary schools in Sydney, was a multi-ethnic population with girls of Asian background making up approximately 20% of the sample. O’Dea found that the majority of girls reported dissatisfaction with their bodies. Reported behaviours included dieting to lose weight and skipping meals. Again results were not reported separately for the Vietnamese subsample.

Questions raised about an observed tendency toward underreporting in diet surveys (Mertz et al. 1991) suggest that the true prevalence of dietary restriction may be overestimated in those studies. However, Magarey and Boulton (1994a) in a sample of Adelaide adolescents, speculate that as underreporting was particularly evident in girls, it may be due to a preoccupation with body weight and body image. Thus when assessing the dietary patterns of adolescent girls, it is important to consider the existence of distorted body image because of its impact on dietary intake and consequently, on present and future nutritional health. If there is adoption of Western lifestyle factors by migrants from non-Western countries such as Vietnam, concerns with body image may also be adopted, and this may in turn impact on food consumption patterns.
2.5.3 Influences on food consumption patterns of adolescents

Major influences on children's eating patterns are considered to be the home and family, their peers, the school environment and factors in the external environment such as advertising and TV. Each of these factors can impact on food-related knowledge, attitudes and behaviour. Woodward (1985), in a sample of Tasmanian teenagers found indications that influences on food choice were complex and variable between food categories. As the factors influencing food choice need to be considered in the promotion of nutrition to children (Woodward, NHMRC 1989), I will briefly review literature examining each of these factors in the next section.

2.5.3.1 Knowledge

The reported level of adolescents' nutrition knowledge has been variable depending on what was asked. Where an awareness of healthy and unhealthy foods was sought, this has generally been satisfactory (Abraham 1988, Morton 1989, Prättälä 1989, Williams et al 1993). For example, Morton found that most of 185, grade 8 students studied in Adelaide, reported that eating fast food was not advisable, with nearly half identifying fat as the problem. Williams et al found that chips were rated as unhealthy by Tasmanian adolescents, and fruits were perceived as particularly healthy. Similarly, Abraham reported that teenage girls considered fruit, vegetables and low fat foods as 'good' and snack foods and fatty foods as 'bad', while Prättälä reported that Finnish teenagers considered fruit, vegetable and cereal products amongst healthy foods and high-fat foods, French fries and candies were not recommended foods.

However, Worsley et al (1990) in a sample of 807, 15 year old adolescents in New Zealand reported that general nutrition knowledge was poor, although some topics were better known than others. It was considered that students had most likely acquired this knowledge via incidental learning (eg newspapers, magazines) rather than formal nutrition education (eg school). Having nutrition knowledge does not necessarily mean that healthy food choices are made - a discrepancy between knowledge and behaviour has often been reported (eg Story and Resnick 1986, Williams et al 1993). Story and Resnick identified factors that prevented knowledge being acted on included inconvenience, lack of time, taste, and lack of a sense of urgency in dealing with health issues. Some of these may be associated with the effects of other external influences such as television, family and peers.

2.5.3.2 Television and advertising

Television has been linked to nutritional status in three ways - education and modelling through programs and advertisements, establishment of norms regarding body image, and through facilitation of a sedentary lifestyle (Blum 1990). Story (1990) commented that most of the research on the effects of TV have been on young children and not on adolescents.
Story suggests that TV advertising and food programming may have an effect on adolescent food preferences, eating habits, food purchasing practices or body satisfaction. A lack of cross-cultural research on the impact of TV has also been noted (Blum 1990).

Excessive TV viewing has been associated with poorer food choices (Signorielli and Lears 1992, Woodward et al 1992). For instance Woodward et al found that in a sample of Tasmanian teenagers, those who watched commercial TV for more than three hours per day, made less healthy food choices and held perceptions of foods and food norms that were relatively less healthy, compared to those who watched for less than three hours per day. However, the authors were unable to determine whether TV watching contributed to unhealthy food choices or was symptomatic of a generally unhealthy lifestyle.

The effect of food advertising on children and teenagers has been of particular concern because the foods which are the most heavily advertised, especially on television, tend to be the ones which are considered to be less nutritionally desirable (NHMRC 1989, Morton 1991, Signorielli and Lears 1992). That food advertising has influenced children has been concluded from their recall of advertisements (Morton 1989), the food choices they make themselves or request of the people who do the household shopping (Morton 1989), and their language relating to food products (Scarlett 1993). There may also be an influence from shows where food use is modelled by the characters.
Morton (1991) reports that for popular Australian dramas that are likely to be watched by adolescents, on average, one-quarter of each show is made up of food related scenes such as eating, drinking, purchasing and preparation. Branded foods may also be visible. She also reported that shows commonly gave wrong or misleading information, and that while portrayal of meals contained mostly positive nutrition messages, this was less likely for portrayal of snack foods. Gender differences were also apparent in that food preparation was primarily done by females, body image issues were also raised predominantly by females and alcohol was mainly drunk by males. Issues of reality are also raised as characters' physical appearance was usually slim and attractive and perhaps in contrast to that expected from their eating habits (Morton 1989). The foods displayed on Australian TV are also most likely to be Western-type foods.

Also considering the effect on attitude formation, Dietz (1990) argues that TV provides a view of the world that differs substantially from reality and he perceives this as a problem. He quotes the time spent watching TV is second only to sleep time, and per annum is greater than the time spent at school. Dietz considers the prevalence of ideal body sizes on TV is far greater than in reality, thus giving a distorted view, especially when food consumption is frequently involved but not the consequences.

It has been reported that greater amounts of TV watching are linked to obesity.
Dietz (1990) studied both crosssectional and longitudinal data from the NHANES survey in the US and found correlations between TV watching and increased obesity in adolescents and children in the age groups 6-11 and 12-17. Although TV was the strongest influence examined it only accounted for 25% of the increase in obesity. He suggests that the mechanisms may be an increased food intake, particularly through the effect of advertisements. He calculates that small increments over time in the caloric imbalance (50-100 kCals/day) would be sufficient to show an effect and that this could be achieved through a small decrease in energy expenditure and/or a small increase in food intake. TV watching has also been associated with decreased fitness of adolescents (Tucker 1986). Dietz conjectures there may be a role for TV in the development of anorexia and bulimia as well as in obesity.

2.5.3.3 Family

Several mechanisms have been identified by which family influences could influence children's food intake. These include modelling and example of food use and dietary practices, child rearing beliefs and practices (Baghurst and Syrette 1985), providing food in the home and promoting the availability of particular foods (Williams et al 1993). These would in turn be determined by other factors such as cultural background, resources, family size and structure and other beliefs and practices. Other factors such as whether the mother works outside the home may also influence family food purchases and meal patterns (Prättälä 1989, Worsley 1991).
2.5.3.4 Peers

The influence of friends and peers may also affect food choice. These groups may have an effect by influencing the acceptability of foods for consumption in particular settings, eg at school. However, peer usage of foods as an influence is not well documented and the distinction is made that perceived peer use is probably more important than, and often different to their actual use (Perry 1991). Nevertheless, Prättälä (1989) in a study of Finnish teenagers reports that eating particular foods with friends was very important, and that the environment of eating, eg hamburger shop and sharing the food, was often more important than the food. This author also reports that sharing lollies eg at lunchtime, was related to having friends. Spillman et al (1994) found that adolescents participating in focus group discussions identified peers as a factor which reinforced their food choices. In adults, the 'influence of others' has been found to affect food choices in a worksite setting, although the effect was less than that of sensory factors (Dalton 1986).

2.5.3.5 Availability of food

Spillman et al (1994) found that adolescents identified the availability of food at home and at school as an enabling factor (ie allows motivation to be realised) in making food choices. That the availability of food does influence children food choice is a major premise behind the movement towards healthy school canteens (NHMRC 1989), and recently has been adopted by some local councils as a policy and planning measure (eg South Sydney City Council 1995).
In summary, it is evident that the nutritional health of adolescents is variable and is affected by many factors. However, given the widespread nature of the reports and the similarities in findings, there appears to be a trend in the dietary profiles of adolescents living in Western countries. Accepted dietary risk factors for coronary heart disease are reported as prevalent in a number of adolescent populations, as are dietary patterns which suggest marginal intakes of some vitamins and minerals. The two patterns are frequently reported to coexist in the same populations. There is also general agreement in the literature that these observations are related, in that there is a tendency for the increased energy needs of adolescence to be met by the intake of foods high in energy density, but low in nutrient density - hence other nutrients may be lacking in the diet.

There is agreement as well, that adolescence is a life period characterised by identifiable food consumption patterns, particularly snacking and skipping meals. Adolescents have also commonly been shown to have some nutrition knowledge but not to demonstrate the relevant behaviours. Factors which influence the food and lifestyle patterns (including exercise) of adolescents appear to be common to many populations and include media (especially advertising and television), as well as peers, family and the availability of food. Of obvious concern in the literature is the relatively high incidence and prevalence of dieting and eating disorders in adolescent females and the apparent recent increase in non-Caucasian populations.
However, few studies report on any of these characteristics of adolescence in an ethnic minority group. It is therefore relevant in the present study to examine these factors, and to compare them where possible with those of the general Australian adolescent population.

2.6 Conclusion

In this chapter I have reviewed a range of literature relevant to the *Food and Families* project. Sources have included Government reports such as census and demographic data, policy documents, and literature from the disciplines of health, nutrition, sociology and anthropology. Through this review I have identified and examined a variety of factors that could affect the food habits of Vietnamese adolescents in the Canterbury LGA.

Census and related data that I have reviewed describing the demographic and socioeconomic characteristics of the Vietnamese population, show the Vietnamese population in Australia to be comparatively young in age, and in period of settlement, being largely made up of refugees who left Vietnam following the end of the war in 1975. The literature indicates there is a great contrast between the new and original environments of the Vietnamese people.

Literature I have examined describing the concept of culture and its relationship to food habits shows that while food habits are deeply embedded in a society's culture, changes can and do occur.
Changes are especially likely, when, as in the case of Vietnamese people, there is contact with a new and different culture. In cultures such as Vietnamese, where the food system is seen historically as based on humoral (hot-cold) principles, the nutrition and health literature tends to interpret changes to a more Western pattern as both a loss of culture and a loss of tradition. However, through examination of some contemporary anthropological literature, I have shown this view to be narrow and simplistic, firstly as it does not allow for the constantly changing and evolving nature of culture itself, and secondly that the association of culture and tradition in popular thought is an erroneous conflation of concepts. This anthropological view is supported by recent literature and media reports that diet and lifestyle changes are occurring in developing countries like Vietnam, so that the gap between the Vietnamese-Australian food system and that in Vietnam, is likely to be less than generally perceived.

Available health literature in Australia shows that in recent years, concerns for the health of ethnic minority and refugee groups, and for the nutritional health of Australians generally, have been emphasised in influential Australian health service planning documents. From Australian health and dietary studies, I have particularly examined the evidence relating to the health status of Vietnamese-Australians, and have reviewed studies of the dietary patterns of a variety of migrant groups both in Australia and overseas.
From these reviews I have found that some level of dietary change is inevitable after migration, but the degree of change varies both within and between communities, and contrary to the widely accepted belief, does not necessarily result in poorer health status. I also found that the evidence for concerns regarding the health and nutrition of Vietnamese-Australians is weak and conflicting. While the available literature shows that initially there were real health problems in Vietnamese refugee communities around the world, recent data describe a community at considerably less risk at the moment than Western communities for lifestyle diseases such as CVD.

As the present study focuses on the food habits of adolescents, I have also reviewed literature describing the nutritional health of this group, and found that overall, it is considered to be satisfactory. However, there is concern about particular aspects such as excess fat intake, and insufficient intake of some nutrients, in particular calcium and iron. There is also great concern about distorted body image and disordered eating patterns in females. I found that adolescent eating patterns may be influenced by many factors including TV and advertising, the family, peers and the environment, and usually has characteristic features such as frequent snacking and irregular meal patterns. These points should be considered in the design of any food consumption survey concerning this group.

There were several difficulties in the interpretation of the literature reviewed. These difficulties included differences in sampling, for example, Vietnamese people may be included in a range of aggregated samples.
Other difficulties were the lack of detail regarding the origins and history of the Vietnamese populations studied, and the reliability and validity of early studies. Partly due to these inherent problems, it is clear from the literature I have reviewed that inappropriate conclusions have been drawn in the past regarding the nature of health risks in the Vietnamese community.

Therefore the available evidence which has identified the Vietnamese community as one at high risk for nutrition problems leaves a lot to be desired, as do some of the premises on which current health promotion planning is based. I will be taking these issues up again in the Discussion chapter of this thesis, where I will also consider the results of the dietary survey in this light.
CHAPTER THREE

METHODS

In this Chapter I review literature that describes methods of collecting dietary information relevant to both the population and purpose of the Food and Families study and then describe the design and implementation of the study. In the first part of the chapter (3.1) I give overviews of the reasons for collecting dietary information and of the commonly used methods, and review factors which affect the interpretation and uses of dietary data. I will then describe additional methods used to illuminate nutrition research. This is followed by a summary of, and rationale for the methods chosen for the research. As the aim of the research was to investigate the food consumption patterns of a group of adolescents from Vietnamese-speaking background, and to comment on the relationship between their diet and health, I will particularly consider the appropriateness of methods for that purpose.

In the second part of the chapter (3.2), I will detail the methods used in the Food and Families study. This will be followed by descriptions of the implementation process and data analysis techniques. In the final section I discuss limitations of the data obtained in the Food and Families study and review the methods used.
3.1 Methodological considerations

This section is largely informed by extensive and widely recognised reviews of dietary methodology (eg Marr 1971, Block 1982, Bingham 1987, Block 1989) and illustrated by examples from the field. As literature describing food habits derives from many disciplines other than nutrition, for instance sociology and anthropology amongst others, I will also review literature written from a variety of perspectives.

3.1.1 Uses of dietary intake data

Dietary intake data are collected for a variety of purposes. Rutishauser and Wahlquist (1984) list the three main uses of dietary data as the comparison of either food or nutrient intake in two or more groups, the evaluation of nutrient adequacy relative to reference levels, and the study of the relationship between dietary and physiological variables. For studies of the relationship between diet and the long term maintenance of health or the development of disease, it is most relevant that dietary data reflect the long term, habitual or usual diet. However, no one method is suitable in all situations and combinations of methods are often used (Pennington 1988, Mackerras 1991). In addition, factors such as resource constraints may restrict use of the method of choice (Pekkarinen 1970, Rutishauser and Wahlquist).

In recent years, a broader approach to the collection of nutrition and dietary data has been recommended and supported by published studies. For instance, Murcott (1985) and Pelto (1987,1989) identify social and anthropological factors related to food consumption.
They consider information about these aspects to both complement and supplement data on dietary intake. I will examine this aspect further in Section 3.1.9.

3.1.1.1 Methods used for assessment of food consumption

Food consumption may be assessed at population, household and individual levels. At population and household levels, food disappearance data may be used to infer food consumption. At the individual level, dietary histories, food (dietary) frequencies, 24-hour recalls, diet (food) records, weighed intakes and duplicate portions may all be used, although the last two of these are used less often. Food records (as well as weighed intakes and duplicate portions) obtain data prospectively while the other individual methods obtain retrospective data. Food records and 24-hour recall methods assess 'actual' or short term food intake and are sometimes used to infer 'usual' food intake. Usual food intake can be assessed directly by diet history and food frequency methods or by the use of multiple food records or 24-hour recalls.

3.1.1.2 Implications for the present study

In the present study it was initially proposed to compare the dietary data obtained from adolescents from Vietnamese-speaking background, with that of another population group, to evaluate nutrient adequacy and to study dietary factors relative to long term disease development. Thus, methods that both accurately measured nutrient intake and could reflect the usual diet were the most desirable for the purpose.
However, methods chosen needed to be compatible with resource constraints and characteristics of the sample population. Resource constraints were financial (limited budget available for implementation and analysis), staffing (one nutritionist and one project officer), time (total project time was one year) and access (subjects were attending secondary school). Population characteristics which had to be considered were the adolescent age group and their Vietnamese background. Associated cultural factors included food use and literacy. A further consideration was the availability of a comparison group in the form of published results from the Australian National Dietary Survey of Schoolchildren (English et al 1988,1989).

Following is a review of relevant issues considered in the design of this research. These issues include reliability and validity and sources of error in dietary intake methods. The advantages and disadvantages of dietary intake methods are discussed, in particular their ability to represent usual intake.

3.1.2 Reliability, Repeatability and Validity

Appropriate interpretation of dietary intake information depends on the reliability and validity of the methods used (Anderson 1986). Klaver et al (1988:21) define validity as the degree to which a measurement measures what it purports to; and reliability as the extent to which the same method produces the same results when applied repeatedly in the same situation. (They give synonyms for reliability as repeatability, reproducibility, replicability and precision).
The reliability of a method is affected by the variation in intake within individuals from day-to-day; and, changes in the situation such as seasonal variations in food intake. In measuring reliability it is not possible to distinguish between an unreliable method and a situation which has altered (Rutishauser 1988a). Rutishauser notes that this problem is lessened in the measurement of usual intake and in measurement at the group level. The reliability of a dietary method is subject to random errors, which affect the precision of estimated mean intake. Examples include errors in the estimated amount of food consumed, foods omitted and coding errors. Bingham (1987) states that random error can be minimised by increasing the number of observations. The use of instruments with imperfect reliability decreases the ability of the study to detect true associations which may actually exist (Mackerras 1991).

Validity is often assessed by the comparison of one dietary intake method with another more traditional or generally accepted method. Marr (1971) notes that if the tool is repeatable and correlates well with the more traditional method, 'validity' is assumed. However, Klaver et al (1988) point out that this is actually relative or comparative validity. It is generally agreed that the measurement of absolute validity is not possible in the assessment of dietary intake unless food intake is directly observed. However, this is rarely feasible in practice (Anderson 1986, Mackerras 1991). Mackerras points out it is only possible to measure the construct validity of different methods, ie the extent to which the measurement corresponds to theoretical concepts (constructs) concerning 'the phenomenon under study'.
Another aspect of the validity of dietary methods relates to their suitability for the purpose of the study. However, this may be difficult to assess. Rutishauser (1988a) notes that validity is particularly difficult to assess when measuring usual intake because the investigator is hardly ever aware of the real intake. Of relevance here is the use of data on short-term dietary intake in studies of the relationship between diet and biological outcome. As information on 'usual' intake is most often required in this situation, measures of 'short-term' intake may have little validity or reliability (Anderson 1986). To measure validity, some recent studies have included independent markers for different dietary components. Markers have included clinical and biochemical markers of food intake (Bingham 1987, Rutishauser 1988a), eg the use of urinary nitrogen as a marker for protein intake. Rutishauser and Wahlquist (1984) support the development of independent markers such as the scoring of dietary practices.

Validity of any method is reduced by systematic errors which cause bias in the estimation. Systematic error in dietary studies includes the consistent over-estimation or under-estimation of food intake by participants. Systematic error cannot be reduced by increasing the number of observations. Reduction of error in dietary studies would improve both their validity and reliability. Dietary intake methods are also often described in terms of their accuracy. When used to describe dietary measures, Marr (1971:156) cautions that the terms reliability and validity 'imply a degree of accuracy not really proven'.
In a similar vein, Bingham (1987) considers that accuracy means freedom from both systematic and random errors, and goes on to report that there are at least nine sources of error in the measurement of dietary intake. Klaver et al (1988) note that the accuracy of dietary intake studies is also affected by the representativeness of the subjects under study and the representativeness of the period of observation.

3.1.3 Descriptions of selected dietary intake methods

3.1.3.1 Food records

Food or diet records are intended to describe an individual’s current intake. The period for which records are kept is most often 24 hours, 3, 4, or 7 days. Variations occur in the way food is measured and in who does the recording - the subject, or an observer (often a nutritionist). Food may be weighed, or it may be recorded in household measures.

Weighed food records are extensively used because of their perceived accuracy in describing food intake (Bingham 1987). However, Marr (1971) cautions that weighed food records require a high degree of cooperation from subjects, varying degrees of supervision and the process of weighing food may in itself lead to altered food intake. There is also concern that the high degree of cooperation required from subjects means the group is not representative. Bias may be introduced in a number of ways - by only the most able people either taking part in the survey or presenting useable data, and by the food intake being simplified for recording purposes (and therefore atypical of the sample’s usual intake).
The degree of accuracy of the records may also be affected by the level of estimation required in situations where weighing is not possible, for example, when meals are eaten away from home.

**Household measures** may also be used to record food intake. While they may decrease the precision of the measurement of food intake, according to Marr (1971), the level of useable information may be increased because the need for supervision and the need for special equipment is minimal. Although Marr found that in the studies she reviewed, the cooperation rates were similar whether records were kept in household measures or if they were weighed, the highest level of cooperation (95%) was found in the study which had the shortest period of record keeping (for one period of three days).

**Food diaries**, with estimated food intakes or menu information with no weights or measures, provide another variation in the keeping of food records. Menus, which can provide information on food habits, or on the frequency of consumption of specific food items over extended periods (Rutishauser 1988a), have been thought to be useful in epidemiological studies (Marr 1971, Block 1989). Bingham (1994), in a comparison of weighed food records with 24-hour recalls, food frequency questionnaires (FFQ) and estimated diet records, found that individual nutrient values from the 7-day estimated record were closest to those obtained from 16-day weighed records, and that there were no significant differences in average food or nutrient intakes.
3.1.3.2 Advantages and disadvantages of food records

All types of food records have similar advantages and disadvantages. The major advantages are that there is no reliance on memory and detailed information on food intake and food patterns is provided (Rutishauser 1988a, Block 1989).

Disadvantages of food records are the reduced accuracy that may occur if records are kept for more than a few consecutive days and the need for participants to be literate, to have good eyesight and coordination (Marr 1971). Records are also costly to implement because of the need for supervision and the need for experienced nutritionists to code data (Rutishauser 1988a, Block 1989). Recent developments in food record study design which may reduce the level of skill required by participants include the photographing of meals for consumption, the use of tape recorders for reporting food items consumed and the use of portable electronic scales to weigh food items (Rutishauser).

Accuracy of food records can also be reduced by incomplete or incorrect reporting of dietary intake by participants, and errors in the coding and analysis of the data (Bingham 1987). Because record keeping itself may alter dietary behaviour, records obtained even if accurate, may not reflect usual intake (Rutishauser 1988a). Marr (1971) noted that there is a tendency to underreport quantities of food in records. This has recently been highlighted in the literature with a number of studies (eg Mertz et al 1991, Magarey and Boulton 1994a) reporting discrepancies between recorded food intake and measured or calculated energy requirements.
Mertz et al found that 81% of 266 adult volunteers underreported energy intake by an average 18% of calculated needs. Magarey and Boulton, in a study of adolescents, reported a higher incidence of underreporting in girls than boys and which increased with age. Suggested reasons for underreporting include a subconscious reduction in the amount of food consumed whilst recording, and in the case of the adolescents, the effect of concern with body image and the common practice of restrained eating.

3.1.3.3 Recall methods

Diet recalls are commonly used in large scale studies. Most recalls cover a period of 24 hours, although longer periods may be assessed by the diet history or food frequency methods.

Twenty four hour recall data usually reflect the preceding 24 hours and are obtained by interview. Subjects estimate food quantities in household quantities often using aids such as food models or photographs of standard quantities.

Diet histories, first used by Burke (1947), involved an interview to elicit information about the usual consumption of food and drink at specific times of a day, week or year, collected in household measures; a cross-check frequency questionnaire and a three day record. Baghurst and Baghurst (1981) note that because of its labour intensive aspects, the diet history is rarely used in its original form. Modifications may include omission of the food record or of the cross-check (which Burke had considered to be an essential component of the technique when used as a research tool).
Food frequency methods assess the frequency of consumption of a specified range of food and drinks by way of self-completed questionnaire or interview. Food frequencies may be used in qualitative (where information on frequency only is requested), semi-quantitative or quantitative formats. In semi-quantitative questionnaires, information is requested on serving size of some, but not all food items, or subjects are asked to indicate how frequently they consume a specified amount of each food or drink item. In quantitative questionnaires, information is requested on amounts eaten for all items on the questionnaire and comparisons made with standard serving sizes, using photographs or food models of various sizes (Baghurst and Baghurst 1981, Horwath 1990).

A qualitative approach is considered useful for the comparison of groups who might consume widely differing diets, for example people from different cultures, or in the investigation of specific food items in the aetiology of disease (Baghurst and Baghurst 1981). Baghurst and Baghurst consider that quantitative approaches are more suitable where nutrient intake rather than food intake is of concern, or if portion sizes are highly variable in the group under study. There is considerable variation in the design of food frequency questionnaires - in the number of food items listed, the way in which frequency is specified and in the way the amount consumed is described. There is disagreement as to the accuracy of food frequency questionnaires compared with other methods for the quantitative estimation of nutrients (Bingham 1987, Horwath 1990).
3.1.3.4 Advantages and disadvantages of recall methods

Recall methods are commonly used in large scale studies, the major advantage being that they do not interfere with food intake. The major disadvantage of recall methods is their reliance on the respondent's memory. Recall has been shown to be better in younger adults than in older adults, better in women than men, and poor in young children (Baghurst and Baghurst 1981). Baghurst and Baghurst also note that probing has been shown to improve recall. Foods estimated most successfully by recall methods appear to be foods habitually eaten, foods eaten very infrequently or those eaten in association with special events (Anderson 1986).

Food frequency questionnaires have evolved to overcome the disadvantages of the diet history and diet record methods in determining dietary intake in large population studies (that is their being time consuming and requiring highly skilled interviewers or highly cooperative subjects) (Horwath 1990). Horwath lists numerous advantages of food frequency methods. These are the ability to produce high response rates, (including in elderly populations); comparatively low burden to respondents; ability to be administered by non-professionals or to be self-administered; ability to assess usual intake; relatively inexpensive and having standardised results. She also reports that FFQs can be administered quickly to large numbers of people, allow easy analysis of food consumption patterns and can be administered by mail.

The major disadvantage of FFQs is the effect of memory and therefore the ability to estimate foods consumed.
Other disadvantages are their high dependency on the correct selection of foods on the list, the choice of the correct portion size and on the nutrient content assumptions for each food (Horwath 1990). A FFQ relies on the respondent’s self-description of diet, and is therefore limited in its ability to accurately assess the nutrient intake of individuals or groups with dietary patterns different from the food list. Data from a FFQ cannot be used to describe the pattern of intake throughout the day or to describe differences between days, eg between weekdays and weekends. Horwath also notes that FFQs cannot be used to accurately determine absolute nutrient intakes for individuals.

3.1.4 Representativeness of usual intake

In a review of a number of major studies, Block (1982) reports that multiple days are needed to be representative of the usual diet, and they should preferably be non-consecutive, random, in different seasons and over an extensive period of time. She notes that in the studies she reviewed, a large number of days were required to obtain precision in the nutrient estimate for an individual. More time was required for micronutrients than for macronutrients, however time for the latter could still be extensive. Block warns that for some studies the number of days required, particularly to estimate micronutrients, would exceed resources. Implications for study design are that a large number of days needs to be budgeted for, and that sample size calculations and interpretation of results need to take into account the misclassification that will inevitably occur.
Data collected by food frequency methods (diet histories and food frequency questionnaires) are considered more representative of usual intake than the daily methods (food records and 24-hour recalls) - as they cover longer periods of time (periods up to one year) and are less affected by intraindividual variation. These methods may however give a less accurate estimation of intake. Mackerras (1991) asserts that it is not possible to measure usual intake accurately because the currently available methods alter one or other aspect of the food intake that is being measured. She concludes that:

'it is possible to measure either actual intake on a particular day accurately or to measure usual intake inaccurately' (Mackerras 1991:10).

Mackerras also notes that at least two separate methods or occasions of observation are required if it is necessary to know both the usual pattern of food consumption and the exact quantity of each food eaten. Despite these shortcomings, daily methods have been used extensively to estimate the mean intake of a group (Block 1982).

### 3.1.5 Sources of error in dietary studies

Sources of error in dietary studies are varied and numerous. Minimisation of the sources of error is important for the accuracy of data. Conversely, awareness of the sources of error is necessary for the appropriate interpretation of data. As mentioned in Section 3.1.2, errors in dietary studies may be random or systematic.
Random error can occur in the sampling stage of the reference population, and in the reporting of food intake, particularly in the under- and overestimation of the amounts consumed. Systematic errors can also be found in subject selection, in reported intakes and in the information content of food composition tables and databases (Arab 1988). Bingham et al (1988) categorise sources of error according to the stage at which they occur during the dietary study. They categorise the sources of error as response errors, coding errors and errors which occur in the conversion into nutrients.

**Response errors** include the omission of foods eaten or the addition of extra foods, the estimation of the weight of foods or the frequency of the consumption of foods, day-to-day variation and changes in diet. Arab (1988) suggests that estimates of the amounts consumed may be more than 100% inaccurate due to faulty estimation of size, non-measurement of food waste, different water contents of foods, the uptake of fats and spices in cooking and to the loss of water. She also notes that badly recorded data may render dietary records unusable. In her review, Bingham (1987) concluded that errors associated with the estimation of the weights of food are approximately 50%, and those for nutrients around 20%. Bingham found inconsistencies in the results of studies that compared estimated weights of foods with weighed records in that underestimation, overestimation and no difference were all reported in some studies. She also noted the importance of calibrating the measuring devices used to avoid systematic error. The underreporting of large quantities of foods consumed and the overreporting of small quantities of foods consumed are commonly noted in the literature.
The substantial error in recall methods that can result from the omission of food items is also noted. Several authors (e.g., Baghurst and Baghurst 1981:147, Rutishauser and Wahlquist 1984:99) cite the study of Campbell and Dodds (1967) who found that 12-35% of daily nutrient intake was forgotten in reporting.

Response error may be reduced by the use of visual aids. These have been found to assist the quantification of food items where dietary information is collected at interview or where household measures are used for the estimation of food intake. Visual aids which have been used in interviews include pictures, photographs, food models, household measures and utensils, and geometric shapes. However, Bingham (1987) notes that different sizes of the same food model are required to avoid 'direction' of responses and that the accuracy of food models is still uncertain. In food records, the estimation of the size of foods which cannot easily be described in household measures can be improved by the use of graduated graphs or diagrams (Rutishauser 1988b). However, even where visual aids are used, differences of 20-50% have been found in the ability to estimate individual food items. As cumulative errors tend to cancel each other out, the overall error in a day's intake tends to be less. Rutishauser notes that the error over a whole day can nonetheless still exceed 20 per cent.

**Coding errors** occur due to mistakes or difficulties in interpretation in the coding or calculation stage. Errors may occur in the transcription of data and in the selection of the food code.
Others coding errors may occur in the selection of the substitute food where necessary and in differences between the personnel doing the coding. Inter­coder differences in the estimation of nutrients have been found in two studies cited by Bingham (1987). She notes that differences varied between nutrients, and in one study were related to the inadequate description of foods.

Numerous sources of error are present in the conversion of food data to nutrients. These are particularly associated with tables of food composition and include differences which are present between databases due to biological variation of the foods listed, differences in analysis methods used, and differences in the calculation of nutrient content, including differences in the allowances made for food preparation and food processing (Anderson 1986, Paul and Southgate 1988). Comparisons between databases have shown that there is more agreement for some nutrients than for others. Those found to be most similar are energy, protein, fat, vitamins B6 and B12 and minerals such as potassium and phosphorus. Bingham (1987), notes that some nutrients, for example sodium and fibre, cannot be assessed accurately by the use of food tables. Food tables have been found to be most valid when compared with the chemical analysis of foods when they were closely matched to local foods (Marr 1971). However, no method relying on food tables can be truly valid especially with respect to vitamins and minerals because of their highly variable availability even in the same food. As these nutrients are also the most variable in terms of dietary intake, estimation of their intake by food tables is only gross at the individual level.
This situation is compounded where food tables do not apply to local foods, or where commercial food data are lacking.

On the other hand, Paul and Southgate (1988) consider the variability in food composition to be less than the variability in measuring food intakes. Also, the error associated with the use of food tables becomes less important as the number of foods eaten in a day increases (Arab 1988, Paul and Southgate). The point is made that food tables evolve with the changing times and do not have extreme accuracy. However, they are considered in good enough agreement with each other to compare individuals' intake relative to each other, and to compare groups of individuals. Particular difficulties in the use of food tables occur where foods are prepared in different ways to those allowed in the tables or where reported foods are not listed. It is considered essential to allocate figures where data are not available as this creates less error than omitting the figures completely. Substitute figures from similar foods, or figures from other tables can be substituted. Where information is not available, Paul and Southgate recommend that the food be analysed, especially if it is consumed frequently.

Problems may also arise due to changes which occur in the food supply over time. Where changes are reflected in updated editions of food tables, calculated nutrient intakes may be affected if based on older editions of the same tables (Paul and Southgate 1988). Differences will be evident when comparisons are made between calculations based on different sets of tables.
In Australia, new analyses of foods have been conducted over the past 15-20 years (Lewis and English 1992). Also, British food tables which are often used to supply data for foods unavailable in the Australian tables may contain food data calculated differently than those for Australian foods.

Conversion of food data to nutrient data is also affected by estimation of serving sizes and by the use of non-standard measuring equipment (Bingham 1987, Paul and Southgate 1988). Other sources of error in the assessment of food intake are the variability of nutrient content in the foods actually consumed and intra-individual variation in intake. There are also errors in the interpretation of dietary intake data which occur because of the lack of knowledge of the changes to the nutrient content of foods by food processing, and of the bioavailability of different nutrients, including their effects on each other (Arab 1988).

3.1.5.1 Day-to-day variability

Variation in food intake occurs both within and between people. Patterns vary for different foods and nutrients and may differ on weekdays and weekends (Mackerras 1991). Consequently a single day's intake may under- or overestimate usual intake. The larger the sample, the more accurate the group mean is likely to be (Anderson 1986, Mackerras). However, Mackerras cautions that the spread around the mean reflects the spread of daily intakes of individuals and not the spread of their usual intakes. Mackerras also reports that the range of variability in the intakes of different nutrients is related to the patterns of food use within a culture.
Therefore the day-to-day variability in food intake is related to the range of foods available for consumption.

3.1.6 General considerations for dietary surveys

Pao et al (1990) reviewed the rationale for and evaluation of methodologies used in the US national dietary studies conducted between 1975 and 1988. These surveys, which were a combination of diet recall and food record methods, were not conducted with the target group of the present study. However, the authors identified a number of important aspects of dietary surveys relating to improved response rates and quality of data. These aspects included information provided in an advance letter to induce respondents to participate, early introduction of incentives, advance preparation of respondents for reporting tasks, detailed and easy-to-use printed instructions for keeping food diaries, training of interviewers and respondents in the set of measuring devices, motivation of participants to enter foods into diaries immediately after eating when possible. Differences were found in reporting when measuring cups and abstract models were used. It was concluded that cups should be used in the home and models used when the interview was outside the home. Probing by a trained interviewer was important in reducing omissions in reporting. Quality of data was enhanced by the use of trained interviewers and response was enhanced by personal contact with the interviewer. Pao et al also concluded that food frequency data could be used to validate information from food intake reports. They also note that survey methods continue to evolve partly due to changing social, economic and demographic changes.
Hertzler et al (1993) report a range of proficiency in college students' ability to accurately describe foods consumed and the quantities eaten. The authors found that foods most accurately described were whole foods and not mixtures or packaged products, and the amounts most accurately reported were counts, eg numbers of and size. Foods most often reported incorrectly were those that do not hold their shape, and foods most often overlooked were peripheral and less frequently consumed foods. They note that inaccurate descriptions were often ascribed to foods that had different meanings to the interviewer and interviewee, eg orange drink called orange juice.

3.1.7 Assessment of food intake in young people

There are fewer studies in the literature reporting assessment of food intake in young people than in adults. Of those available, many report dietary intake of children younger than the 11-16 year age group accessed by my study. The majority of these reports are also not relevant as data were obtained via parents.

Where attempts have been made to assess food intake from children directly, long term recall methods have not been successful. This has been attributed to the children’s inability to judge the time spans involved (Baghurst and Baghurst 1981). Beal (1967) is quoted (in Marr 1971:136) as saying that girls under 12 years and boys under 14 years were not likely to give reliable histories. Baghurst and Baghurst report similar results for food frequency methods.
Most of the studies I reviewed were consistent with these comments in that they used either 24-hour recalls, or a variant of food record for collecting dietary intake data from young people. Other studies published after my research began confirmed this trend. In studies now available where diet histories and food frequency methods have been successfully used with adolescents (Frank et al 1992, Post and Kemper 1993, Williams et al 1993), the context was largely dissimilar from my research. Food frequency questionnaires were used by Frank et al and Williams et al in studies of large samples, 1108 and 2082 adolescents, respectively. In both cases, FFQs were developed after extensive research with the sample groups. Post and Kemper used diet histories in a longitudinal study of children in Amsterdam over a nine year period.

Randall (1991), notes that five issues need special attention when food frequencies are constructed for use with children. In addition to children's amorphous concept of time as mentioned above, these are that children are likely to interpret questions literally and not include all items within composite foods, children tend to acquiesce to adults and may adopt a response set; probing needs to be specific; and interviews should begin with easy questions and progress to more difficult ones.

Twenty four hour recalls have been used in a variety of settings with young people in Australia and overseas (eg Axelson 1984, Sciberras and Darnton-Hill 1985, Story et al 1986, Hou 1990).
The samples in these studies ranged in age from 10 to 25 years and came from a variety of ethnic and socioeconomic backgrounds. No problems in implementation were reported. However, Axelson who collected two, 24-hour recalls from 540 ninth grade students in 6 US counties, reported the occurrence of intraindividual variation and inaccurate reporting in the sample. Most studies reported the use of trained interviewers to conduct the recall. Story et al, with 277 Cherokee Indian teenagers aged 13-17 years, used self-recorded diet recalls assisted by dietitians. Sciberras and Darnton-Hill and Story et al used food models to assist the estimation of serving sizes. The sample in the study of Sciberras and Darnton-Hill, although younger than my sample, is perhaps closest in characteristics. With a mean age 10.75 years, the sample was drawn from children from grades 5 and 6 attending inner city schools in Sydney. Half of the sample were from NESB, and half from low SES background. Recipes of ethnic foods were collected to assist in the calculation of intake.

Food records have also been widely used with school students (Fanning 1981, Hackett et al 1985, Woodward 1985, English et al 1988,1989). In Australia, Fanning used a 7-day record with year 8 students in Adelaide, and Woodward used 24-hour records with a representative sample of 1055 Tasmanian secondary students. Woodward achieved a response rate of 81 per cent. Both authors obtained height and weight data. Fanning also reported information on food patterns. The largest sample in Australia was obtained in the NDS of schoolchildren aged 10-15 years in 1985.
In this study, 24-hour records in household measures were obtained from over 5000 children in conjunction with a survey of physical health and fitness (English et al). Biochemical measures were obtained on a subsample. In England, Hackett et al obtained five, 3-day records from 400 students aged 11-14 years. The authors concluded this method to be suitable for their sample. They based this conclusion on the lack of decrease in reported energy intake over the three days, which they attributed to a maintenance of participant interest; and that no difference was found between consecutive surveys, and between students interviewed earlier and later in the survey.

Simons-Morton and Baranowski (1991) reviewed a number of studies where observation was used in the assessment of children’s dietary practices. They conclude that the method may be reliable, valid and useful in certain situations but little is known of sources of error and the extent of the influence of the observation. It is generally labour intensive and has only been reported for one meal or one day’s meals at a time.

3.1.8 Assessment of food intake in different cultures

In the initial stages of nutrition research in a particular cultural group, Horwath (1990) recommends open methods of inquiry (as opposed to preformed questionnaires), to identify food consumption patterns and foods making important nutrient contributions. Food frequency questionnaires are not a useful tool in the initial stages of nutrition research as they should be designed to reflect food availability in an area, and foods available to a particular population group (Horwath 1990).
Therefore FFQs are only appropriate once food consumption patterns are known to the researcher.

In the literature I have reviewed, food records and 24-hour recalls are the most frequently used dietary intake methods in cross-cultural situations (Sciberras and Darnton-Hill 1985, Story et al 1986, Smith et al 1988, Webb and Manderson 1990). Where language problems were present they were overcome by interviews being conducted in the participants' language, sometimes using interpreters, and by providing written material such as questionnaires in the participants' first language. Smith et al describe a study of Arab families in Israel where families from two different language groups were interviewed with the assistance of translators. The translators were familiar with the people and had received special training. Dietary methods used were 24-hour recalls and food frequency (times per week of consumption).

Other factors which need to be considered in the assessment of food intake in cross-cultural research include the appropriateness of the design of interviewing tools and procedures used. Hertzler et al (1982) note that a procedure that has cultural specificity may be inappropriate for use with other cultures or cultural subgroups. Typical situations include the specification of meals as this may exclude foods eaten outside of meals; and of meal categories which do not reflect culturally appropriate food combinations and local meanings.
The authors note that where more than one cultural group is part of a research sample the predominant group may influence the survey design and methods which may then be inappropriate for other smaller groups. Such groups may be from different ethnic groups or from different subcultures within a population eg regions, religions, occupation and social class.

Published studies of food intake in Vietnamese people have largely been descriptive. Methods used have included observation (eg Carlson et al 1982a,1982b), structured questionnaires and interviews (eg Mathews and Manderson 1981, Todd and Gelbier 1988), and interviews with key informants (Breakey 1983). Recent Australian studies have included quantitative methods. For example, Baghurst et al (1991) and Rissel and Russell (1993) used 24-hour recalls. Both these studies were conducted with adults. A study of Vietnamese school children in Central Sydney Health Service (Plaskett and Lilburne 1992), and conducted at the same time as my research, used 24-hour records.

3.1.9 Other approaches to collecting information on food intake

In this section I will present information on alternative approaches to the collection of data on dietary intake. Recent literature indicates some change away from the traditional, largely quantitative approaches described in the previous sections. Changes include the modification of traditional dietary intake methods to collect a broader range of data related to food intake such as food patterns and time of consumption, and/or modification in approaches to the analysis of data.
A further body of literature on sociological and anthropological approaches to the measurement of food intake has also developed. As these approaches enhance the quality of data collected and its interpretation, I will describe selected aspects.

### 3.1.9.1 Sociocultural aspects of nutrition

Pelto (1987, 1989) suggests that a better understanding of sociocultural factors in food selection assists in solving nutrition problems. In particular, Pelto recommends the use of ethnographic techniques to improve data quality in food intake measurement, and identifies a number of aspects relevant to cross-cultural and intercultural comparisons. For instance, Pelto (1989) suggests that sources of error in dietary intake studies due to sociocultural characteristics of food use could be reduced if information was obtained on cultural-linguistic features defining ‘food’ and ‘drink’; cultural perceptions of specific foods which may affect their use; descriptions of environments where food is eaten. Pelto lists other potential uses of ethnographic data as the ability to provide information about social and cultural sources of changes in food intake over time, selection of appropriate dietary methods and sampling frames, and ensuring representativeness and the linking of different levels of data (e.g., national, regional, and local). In this context, Pelto (1989:xii) considers ethnography to be:

‘field-based data gathering carried out for the purpose of providing both qualitative and quantitative descriptive information in a community, region or other research site’.

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Typical processes include participant observation, and open-ended and structured interviewing. Aspects of food use that have been examined by ethnographic research and in turn related to nutrition include sociocultural factors in food selection (Messer 1989) and cultural rules for food use (Goode 1989).

Papers delivered at a European conference on measurement and determinants of food habits (Edema 1985, Murcott 1985), also recommended the addition of sociological aspects in nutrition research. A recommendation from the conference stated that nutrition research should include studies on food preferences and food habits and that it was:

‘meaningless even dangerous to attempt to implement dietary recommendations without knowing which food items are preferred by a particular population group’ (Leitzman and Bodenstadt 1985:282).

3.1.9.2 Food patterns and time of eating

A number of authors (Contento et al 1986, Randall et al 1990, Crotty et al 1991) have recently examined patterns of food use. This is in response to the changing evidence relating diet to the development of chronic disease; that is, single nutrients may not be able to account for the complexity of the way diet is associated with risk of diseases such as cancer. Limitations of the single nutrient approach include the potential number of candidate risk factor nutrients, the highly correlated intake of many of the nutrients, the possible large interaction between the nutrients which in itself may influence risk and the presence of toxicants in food.
Randall argues that because foods are consumed in combinations there is simultaneous exposure to multiple factors, both nutrient and non-nutrient, that could impact positively or negatively on disease risk.

Randall et al (1990) consider that examination of patterns of food use, in particular food combinations, may be a more useful predictor of cancer risk than measures of intake of single nutrients, and that differences in dietary patterns between individuals and between groups could confound risk estimation assessed for single nutrients. Randall et al used factor analysis to further analyse food frequency data obtained from over 2000 adults participating in a case-control study of diet and cancer, and found that several dietary patterns were present and related to age, ethnicity and income which in themselves were related to cancer risk. The authors also considered that information regarding food non-use may be important in studies of disease risk and in the design of nutrition intervention programs.

Contento et al (1986) examined patterns of food use in a study of 185 adolescents in the US which was conducted as a needs assessment for nutrition education. They chose to examine food consumption patterns in data collected by 24-hour recalls. Reasons for this choice included the evidence on the non-nutrient contribution of foods to disease, and also their belief that:

'because people eat foods not nutrients that this should be the basis of nutrition education' (Contento et al 1986:175).

Foods consumed were grouped into 33 categories which were reduced to 6 macronutrient-providing groups for comparison with dietary goals.
Crotty et al (1991), in a comparison between a sample of Victorian women and a national sample, found sizeable differences in the types of foods consumed although nutrient intakes were similar. Like Contento et al, Crotty et al consider the food choice information, which they note is lost in nutrient descriptions, to be the more useful in nutrition education.

Other aspects of diet that some authors consider important are meal frequency and the time of day of food consumption. Lennernäs et al (1993) note that these factors may affect the uptake, digestion and metabolism of nutrients. However, where meal patterns are reported, different terminologies have been used that do not necessarily reflect the type of food items or nutrients consumed. These authors divided eating events into seven types (four meals and three snacks) where each eating type reflected the presence or absence of one or more of eight food categories. The different meal types were found to contribute different nutrients and the authors suggest that such a system may be useable in situations where nutrient data are not available. Contento et al (1986) also found time-related data valuable in assisting survey participants to identify potential areas of dietary change, thus increasing the chances of successful nutrition education.

3.1.10 Analysis of dietary intake data

In the literature, results of dietary surveys are reported in a variety of ways. Reported data other than nutrient intake per person include data relating to the frequency of food use and to the percentage of the population consuming particular food items.
In some reports these have been the only data presented, especially where quantities of food have been difficult to establish. For example, Smith et al (1988) reported per cent consuming data related to income and growth patterns of Arab children as measures of modernisation. Salfield et al (1992) who reported the number of portions of foods consumed each day as proportions of staple foods in a sample of 414 Kenyans concluded this method to be quick, relatively cheap and to correlate well with anthropometric and biochemical measures in this population. Some studies such as the Australian National Dietary Surveys reported data on foods consumed as well as nutrient intakes (English et al 1986,1987,1988, 1989).

3.1.11 Implications for the present study

It is obvious from the literature reviewed in this section that a number of factors need to be considered in the choice of method for the assessment of food intake, and that the method chosen is likely to be a compromise between the ideal and the feasible. Limitations imposed by resource constraints and characteristics of the target group are also important considerations. In addition, numerous sources of error are present in any dietary intake method. While information on usual intake is preferred in the examination of links between diet and health outcomes, studies to collect suitable data rely on memory methods, large numbers of respondents or repeated measures.

In the present study where the target group was young people from a non-English speaking background, and little was known of their dietary practices,
these factors were important considerations. From a cultural perspective, the literature indicates that most suitable methods are those based on open inquiry and which do not presuppose food intake patterns. In addition, allowances need to be made for social and linguistic aspects. The available literature also shows that conventional methods do not reflect the complex nature of diet composition and its effect on health, and that broader issues such as food habits and dietary patterns should be considered.

As adolescents, it was considered that the study participants may have minimal experience with, and knowledge of food preparation, and therefore be limited in their ability to describe foods. Methods relying on memory were also of concern given the ages of participants. The resource constraints for this study and the availability of a comparison group in the NDS sample were also significant considerations.

For these reasons, administration of one, 24-hour diet record, augmented by a questionnaire to obtain information on food habits was selected as the most suitable method for collecting dietary data in the Food and Families study. The diet record method would allow collection of information on timing, patterns and other contextual factors eg place of eating, which could illuminate the data on foods and nutrient intake. Given the resource constraints and the ages of the children, diet records in household and estimated measures were considered more appropriate than weighed or photographed records.
Although data on usual intake would not be provided, the estimated group mean would provide a snapshot of typical consumption patterns within this population group for comparison with other Australian adolescents, in particular the National Dietary Survey (NDS). Detailed descriptions of foods consumed would also be provided which would be of benefit in nutrition education strategies. The additional sociocultural and food habit information would illuminate the results of the dietary intake study. A simple FFQ, based on likely food consumption patterns, could be included as a measure of ‘usual’ intake. In addition, anthropometric measures (heights and weights of participants) would be made to support the dietary information collected.

Likely sources of error in the dietary data were considered to be the accuracy of measuring and recording of foods consumed, the conversion to weights of food consumed and the suitability of local food tables. I will describe the study design and its implementation in detail in Section 3.2.

3.2 The Food and Families dietary study

As described in Section 3.1, selection of the methodologies for collecting data in the Food and Families study was based on review of the literature, consideration of study constraints including available resources, and the availability of other comparable data. Methods chosen were 24-hour diet records together with a supplementary food habits questionnaire (FHQ) and measurement of height and weight.
In this section I describe the methods used in the implementation of the Food and Families study. Firstly I will describe the study subjects and detail the instruments used for data collection. This will be followed by a description of the implementation phase of the survey.

3.2.1 Subjects

The target population of this study was 12-16 year old Australians of Vietnamese speaking background. The source population was students in Years 7-10 from Vietnamese speaking backgrounds attending the six secondary schools in the Canterbury LGA. This group of schools comprised two boys' schools, three girls' schools and one co-educational school. The sampling frame was compiled from school enrolments of all students in years 7-10. Students whose enrolment forms identified that they spoke Vietnamese at home were included in the sampling frame (n=221; 145 females, 76 males). All these students were invited to participate in the study and hence became the study population. Inviting all students to participate was the most practical method because of the school situation and the relatively small numbers in the population.

A total of 156 students (92 females, 64 males) took part in some aspect of the dietary survey, representing a response rate of 71%: 63% for females and 84% for males. The size of the study sample differed between the two data collection methods (see Figure 3.1). The Food Habits Questionnaire (FHQ) was completed by 153 students (69% of the study population), and the 24-hour diet record by 134 students (61% of the study population).
The subsample for comparison with the National Dietary Survey (NDS) comprised 94 students (50 females and 44 males), aged 12-15 years, who completed weekday food records that were useable (ie complete and of good quality). This group represented 70% (65% females, 79% males) of the diet record study sample, and 43% of the study population. Non-respondents did not take part in the dietary survey for a variety of reasons, eg parents denied permission, the students forgot, were absent from school, had left the school or could not be contacted at school.

To be able to attend the sample schools, students were considered to be functional in the English language. The study population included students who lived in the Canterbury LGA as well as students who lived outside the district. An unknown number of students living in Canterbury LGA attend schools outside the district, whilst others living outside the district travel in to Canterbury to attend school. The nature and extent of bias from these movements is not known.

3.2.2 Study Design

The survey was crossectional in design and involved two visits to each of the participating secondary schools in the Canterbury LGA. Implementation was by myself (as nutritionist) and a Vietnamese speaking project officer.

3.2.2.1 Instruments

The following instruments were used for data collection:

- 24-hour diet record using household measures (Food Diary);
• self-administered structured questionnaire (Food Habits Questionnaire - FHQ);
• scales (for weighing participants);
• measuring tape and head-board (for measuring participants' height).

Diet Record

As previously described, one reason that 24-hour diet record was chosen as the dietary intake method in this study was so that the NDS sample could be used as a comparison group. For this reason the format for the 24-hour diet record was adapted from the one used in the NDS. The 11-page food diary booklet developed for the Canterbury study contained instruction pages, example practice and record pages, space for recording recipes, and templates for measuring food size. As in the NDS, students were asked to describe: the time food was eaten; the food or drink consumed in as much detail as possible, (including brand name, recipe or other details to identify the food item or items); and the quantity of food eaten. Depending on the food consumed, participants could measure quantity as volume, linear size (measured with ruler or templates provided) and/or the number of pieces eaten. Participants were provided with metric cups and spoons for measuring volume.

For use with the Vietnamese students, the NDS booklet was modified in the format of the instruction and example pages so that they were more simple and culturally appropriate.
Modifications to the instruction pages were adapted from those used in a similar dietary survey conducted with Vietnamese schoolchildren in Central Sydney Health Service (Plaskett and Lilburne unpublished). An extra change in the present study was the addition of columns for recording the details of the context of food consumption, for example, where the food was prepared, and whether the food was eaten when the participant was alone, with friends or with family. Protocols from the NDS were used in the instruction and checking of the dietary records. Copies of the food record diary and instructions are included as Appendix 1.

**Food Habits Questionnaire**

The structured Food Habits Questionnaire (FHQ) was included so that the dietary intake data could be placed into an appropriate cultural context and also to investigate whether findings of previous research were applicable to the study population. The 40-item self-administered questionnaire was purpose-designed to answer specific questions in relation to the study population. Questions related to demography, places of food purchase, food preparation techniques, and the roles of different family members relating to these activities. The questions were prompted by literature findings and the concerns of health workers. Self-assessment of diet concepts including traditionality, food preferences and perceived healthiness of foods were also included. Questions were mostly in multiple choice and rating scales formats.
FIGURE 3.1: Numbers participating in dietary survey

<table>
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<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>&gt;16</th>
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<th>Total</th>
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<td>M</td>
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<td>M</td>
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<tr>
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<td>39</td>
<td>28</td>
<td>33</td>
<td>20</td>
<td>5</td>
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<tr>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number in Group for comparison with NDS</td>
<td>6</td>
<td>9</td>
<td>17</td>
<td>15</td>
<td>10</td>
<td>11</td>
<td>11</td>
<td>15</td>
<td>44</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td>32</td>
<td>21</td>
<td>26</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>94</td>
</tr>
</tbody>
</table>
To complement the Diet Records which measured 'actual' food intake, a short food frequency type questionnaire was included in the FHQ. The food frequency questionnaire measured food intake retrospectively to allow assessment of more 'usual' intake and also acted as a cross-check of the diet records. Two lists of foods were included in the FFQ; the first covered the Five Food Groups and also assessed foods reported as commonly consumed in the NDS survey, while the second assessed frequency of consumption of common Vietnamese foods and dishes. The second list of foods was designed by the project officer and reviewed by Vietnamese speaking members of the advisory committee. A copy of the FHQ is included as Appendix 2.

Figure 3.2 summarises the types of data gathered by the Diet Record and the FHQ.

**Anthropometric data**

Anthropometric data (weight and height) were also collected from participants. Measurements were taken of:

- weight in kilograms, (in school uniform with no shoes), using Salter Electronic Personal self-taring digital scales;

and;

- height in centimetres (to the nearest 0.5 cm) using a metric tape fixed to a wall and an adjustable head board.
FIGURE 3.2: Factors assessed in the dietary survey

Diet Record

- Individual dietary practices
  - Actual food intake
  - Food consumption patterns
    - social context of eating
    - ‘traditionally’ of meals
    - regularity of eating

Food Habits Questionnaire (FHQ)

- Demography
  - country of birth
  - length of stay in Australia
  - religion
  - household structure

- Individual dietary practices
  - usual food intake
  - regularity of eating
  - ‘traditionally’ of meals
  - food preferences
  - perceived healthiness of foods
  - body image

- Household Dietary Practices
  - Traditional practices
  - Food preparation practices
    - family roles
    - methods

  - Shopping practices
    - family roles
    - types of shops frequented
    - location of shops frequented

3.2.2.2 Validity testing of the instruments

Content validity and face validity of the questionnaires were not specifically tested in their development. However, the FHQ was reviewed by members of the project’s advisory committee and also by public health officers with expertise in nutrition research, anthropology and statistics. The format of the diary was tested by four children (two were from Vietnamese-speaking background) who were known to the project team. The children (all aged 9-12 years) kept food records for 48 hours.
The two questionnaires and the data collection methodology were pilot tested simultaneously. A school in a neighbouring locality where a number of Vietnamese students were enrolled was used for the pilot test. Thirty (30) girls from years 7-11 formed the pilot study group. Those with a Chinese-speaking background who had good English skills, or those older than 16 years were not excluded from the group. Only minor revisions were made to the instruments as a result of the pilot test.

3.2.2.3 Data collectors

Generally, data were collected by myself and the bilingual project officer who was an adult female, well-versed in Vietnamese culture and food preparation methods. Both of us were present at the initial information session and the two school visits. The project officer participated in each of the activities and also acted as interpreter. The project officer was trained and supervised in diet interview and measurement technique by me.

3.2.2.4 Data collection

The dietary survey involved three contacts between project staff and participants and took place during October and November 1991. The survey timetable is summarised in Figure 3.3.

3.2.2.5 Ethical considerations

Approval for the project in the first instance was obtained from the Ethics committee of the SSAHS. Support for the project was then obtained from Vietnamese Community organisations in NSW.
Advisory committees formed to oversee the joint Food and Family projects and the local project also provided ongoing support and counsel. Members of these committees represented the Vietnamese community, local government, health and education. Permission to implement the project in the schools was obtained from the NSW Department of School Education, the Catholic Education Office and individual school executives. Schools were visited and students given verbal information in both English and Vietnamese languages. Written information (in both languages), containing a contact number for further information, and a permission note to be returned to school was also distributed to be taken home to families. Students were informed that they were free to withdraw from the study at any time and that all information was confidential.
3.2.2.6 Project promotion

In order to increase awareness, and hence acceptance of the project in the Vietnamese community, the project was publicised through local print media of both languages, relevant health and community agencies and by participation in a number of community events. These events were:

- The launch of the joint Food and Families projects. This event was attended by over 100 community leaders, health and welfare workers. Official guests included the NSW State Minister for Health, and the President of the Vietnamese Community in Australia (NSW Chapter).
- Carnivale, a Vietnamese social festival for the Canterbury and Marrickville LGA’s.
- Vietnamese New Year - a social festival for the whole community held in Cabramatta, the Vietnamese cultural centre of Sydney.

While the effect on participation rates was not able to be measured, networking with the Vietnamese community was also considered important for future health promotion activities. Other publicity opportunities which arose during the project period were an interview on ABC Radio, an article in the Better Health Newsletter (NSW Health 1991b), and a presentation at the NSW Ethnic Health Workers Conference.

3.2.3 Implementation

3.2.3.1 Initial information session

For this session, students identified by school staff as speaking Vietnamese at home were gathered together in each of the schools.
Information about the project was given verbally in both English and Vietnamese and letters to families were distributed to each student. Students were informed of the purpose of the project and what would be required of participants in the data collection process. In each school, one teacher acted as the liaison between the project and students and was responsible for arrangements in the school. In two schools, presentations were also given at staff meetings to explain the project and its implications for the school.

3.2.3.2 First project visit

On the first project visit to schools, participants were instructed in the method of keeping a 24-hour diet record. Instruction sessions were conducted with groups of students in the same school year where possible (up to 30 students) and lasted approximately 40 minutes (one school period). In smaller schools all participating students were instructed together. For all but two groups, translated instructions were given by the Vietnamese-speaking project officer. On one occasion no translation was required; on the other an interpreter translated. In each session, participants were given practice in describing foods and in techniques for estimating food quantities. The food diary booklets and sets of metric measuring cups and measuring spoons were also issued. As a thank you for taking part, each student was given a pen inscribed with the Vietnamese translation of ‘Food and Families’.

In all sessions the need for complete records was stressed and the confidentiality of responses assured.
Instruction sessions were spaced so that all days of the week were covered by at least one group, the day of instruction (and hence recording) being largely determined by availability of each group within the school timetables.

The recording period began at the time of consumption of the first food or drink items after school on the day of instruction, and was completed at the same time on the following day. Weekend recording periods began with the first food consumed in the morning and concluded the same time the next day.

3.2.3.3 The second project visit

The second project visit to each school took place on the first school day after the day of recording and involved three activities:

- checking the diet records for completeness;
- completion of the food habits questionnaire;
- measurement of participants' height and weight.

For these activities, students were released from class in small groups and spent approximately one period with the project team. The three activities were conducted in the one venue which was allocated by each school on the day. The venues varied in size, in the seating available for completing questionnaires and in the type of floor covering in the space where participants could be measured. In each school, the food record books were discussed with participants individually.
Where necessary, additions and/or changes were made to the entries in the food diaries to clarify information provided, and to ensure sufficient detail for analysis (see case studies for example - Appendix 3). Presence of both project officers enabled conversation in either English or Vietnamese as required by the participants. Standard size measures and bowls and pictures of traditional foods (Blacker 1990) were extensively used as models in the assessment of all food records. The FHQ was completed in English unless help with translation was requested.

3.2.3.4 Shopping facilities

Throughout the period of the project, informal observations were made of shopping facilities in the local area and in areas specialising in Vietnamese traditional foods. The types of foods and services available and their apparent compliance with food standards legislation were noted. Where possible, observations were also made of the foods available at the school canteens.

3.2.4 Data Analysis

For all analyses, participants were allocated to groups by sex and their age in years as at 30.6.1991.

The 24-hour diet records were analysed manually by myself according to a specially designed schema. Foods were categorised into 25 groups based on major nutrient content and/or food usage. For major food items, categories chosen were comparable to those used in the NDS. The consumption of foods was scored by how frequently the food was consumed.
In the case of foods which could not be easily quantified such as meats, the frequency of consumption of the food itself was scored, or where estimations could be reliably made from the food diaries, frequency was scored for specified quantities of food, e.g., cups of milk and soft drink, slices of bread. Food consumption was categorised into 6 time periods during the day: before 9am, 9am-12 noon, 12-3pm, 3-6pm, 6-9pm and after 9pm. These periods were largely determined by the standard intervals between school meal-breaks at the participating schools and allowed for foods eaten before school, at recess, at lunch, after school, at the evening meal (dinner) and after the evening meal. Assessment was also made of the meals themselves, i.e., breakfast, lunch, and dinner to allow for those meals which fell outside the relevant time slot. This method allowed direct comparison with ‘per cent consuming’ data from the NDS (English et al 1988).

The diet records were analysed for foods consumed and not for nutrients consumed because of the high degree of estimation that was needed to estimate the amount of each nutrient consumed by each respondent. Records received often contained insufficient detail and recipes were not provided. Quantities of food consumed were calculated for foods where volumes could be reliably estimated from participants’ descriptions. Quantities of meat and fish consumed were not calculated because of difficulties in quantifying original data. However, estimates were obtained utilising a score for frequency of consumption and assuming 50g per consumption.
The decision to analyse for foods rather than for nutrients was made after consideration of the following points:

- the available intake data were not sufficiently detailed for quantities to be accurately determined (generally children did not prepare the food). Amounts eaten for some foods (meat, seafood and cooking fats in particular) were estimates only and recipes were not provided for mixed dishes.
- sufficiently accurate food composition data of 'ethnic' foods consumed in Australia were not available (Webb and Manderson 1990).
- in Health Promotion, foods rather than nutrients are used in nutrition education strategies, thus detailed information about food intake is more relevant.

Additional reasons were that the effect of bioavailability of different nutrients is not taken into account in recommended intake levels and not enough is known about this factor in diets from other cultures (Bender 1989), and that nutrient intake derived from 24-hour diet records is not representative of the usual diet because of the day-to-day variability in the intake of most nutrients (eg Mackerras 1991). In the present study the numbers in the different age groups are not large enough to counteract this effect.

For these reasons, I was concerned that comparison with 'standards' for nutrient intake such as RDIs may lead to wrong conclusions being drawn. Inferences can still be drawn about the intake of major nutrients such as fat, carbohydrate, and calcium from food intake data.
Webb and Manderson (1990:187) also noted that foods, energy and micro-nutrients (vitamins and minerals) may be more important contributors to the large differences in patterns of diet-related disease between immigrant groups than the macronutrients. It is the micronutrients which are particularly difficult to assess for the reasons listed above.

As a proxy measure of diet quality, estimated mean intakes of major food groups were compared with recommended intakes according to the Five Basic Food Group Plan (5BFGP) which is widely used as a teaching and surveillance tool for dietary assessment in both schools and health services. Two versions were used, in the first one slice of bread equated with one half cup of rice (Department of Health, NSW 1987) and in the second, one slice of bread equated with one cup of rice (Commonwealth Department of Community Services and Health 1987).¹

The Food Habits Questionnaire was analysed using the SAS package (SAS Institute Inc 1988), and Epi-Info (Centers for disease control epidemiology program office and World Health Organisation global programme on AIDS 1991). The Chi-square statistic was used to test relationships between variables. Descriptive statistics for the diet record analysis were also calculated using these packages.

¹ Newer food guides eg 12345+ (CSIRO/Anti-Cancer Foundation 1991) and the Core Food Groups (NHMRC 1994) became available after the Food and Families project was completed.
CHAPTER FOUR

RESULTS

4.1 Overview of Results section

In this section I report the results of the Food and Families study. I have grouped the results of the three components of the study (dietary record, food habits questionnaire (FHQ) and anthropometric measures) and included the results of informal observations of food availability during the study period. The results are followed by a description of the limitations of the research.

The results are presented in eight sections. In the first two sections are the demographic data and anthropometric measures. In the next two sections I describe the results of the dietary intake component of the study - dietary practices and foods consumed. These results are then compared with those of the National Children's Dietary Survey in the fifth section. In the sixth section I examine influences on dietary habits. The final two sections explore food supply issues - food supply to the household and the availability of traditional foods. In reading the results the reader will notice that the sample size for each component of the study is different - as discussed in section 3.2, different numbers of respondents completed each of the components of the dietary study. In addition, results reported from the FHQ (total sample n=153), vary in the number of respondents as different numbers of the sample answered each question.
4.2 Demographic characteristics of the sample

Data on the demographic characteristics of the Vietnamese adolescents were collected in the FHQ. Features of the sample described in the following section are age and sex, school year, place of birth and residence, household structure, language and religion.

4.2.1 Age and Sex

The mean age of the sample was 13.9 years (S.D.=1.4), ranging from a minimum of 11 years to a maximum of 16 years. There were more girls (n=89) than boys (n=64) in the sample (n=153).

These results are in keeping with the sampling frame for the study. At the time of the study, more girls than boys were enrolled in years 7-10 in the schools in the Canterbury LGA reflecting the single sex nature of the local schools (three schools were girls' schools). The age range of 11-16 is expected from the participation of students in years 7-10.

4.2.2 School year

There was a fairly even spread of respondents from each school year from years 7-10, with a slight bias towards year 8 students (Table 4.1). Years 7, 9 and 10, each contributed just under one-quarter of the sample, with about one-third coming from year 8.
TABLE 4.1: School year of respondents (n=150)

<table>
<thead>
<tr>
<th>School year</th>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>23</td>
</tr>
<tr>
<td>8</td>
<td>33</td>
</tr>
<tr>
<td>9</td>
<td>21</td>
</tr>
<tr>
<td>10</td>
<td>23</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

4.2.3 Residence

Nearly all of the sample was born in Vietnam (95%, 145). Of those born in Vietnam, two-thirds (67%, 97) came from the city and one-third had lived in the country. The majority (85%) of respondents also replied that they had lived in the southern area of Vietnam (n=109). Smaller numbers responded that they were from northern Vietnam (8%, 9) and central Vietnam (6%, 7) (percentages do not add to 100% due to rounding). Countries of birth for those not born in Vietnam (8) were Australia (3), Malaysia (2), New Zealand (1), Singapore (1) and Taiwan (1).

At the time of the survey, over half the respondents (58%) had lived in Australia for seven years or more, ie arriving before 1985 (n=143). Four-fifths (82%) of the respondents had lived in Australia for at least four years, ie arrived in or before 1987 (Table 4.2). Length of residence in Australia ranged from less than 1 year up to 12 years. These results suggest that most of the children in the sample had come to Australia from an urban part of South Vietnam. Given that the mean age of the sample was less than 14 years, the majority of the sample would have arrived in Australia at a young age.
### TABLE 4.2: Years lived in Australia (n=143)

<table>
<thead>
<tr>
<th>Number of years</th>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 or more</td>
<td>58</td>
</tr>
<tr>
<td>4-6</td>
<td>15</td>
</tr>
<tr>
<td>3 or less</td>
<td>27</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

The association between the time of arrival and respondents' area of origin was not tested.

At all ages, the mean period of residence was longer for boys than for girls (Table 4.3) indicating that girls on the whole would have been older than boys when they arrived in Australia. This suggests that girls have lived for longer periods outside Australia and may have been more influenced by their pre-migratory experiences than were the boys. Conversely, boys on the whole having been resident in Australia from a younger age and for longer periods, may have been more influenced by their post-migratory experiences than have the girls. This trend was more pronounced in the older age groups (15 and 16 years). Although reasons for this are not evident it may relate to refugee departure patterns from Vietnam.

In the Canterbury LGA, the main suburbs where participants (n=144) lived at the time of the survey were Lakemba (40), Punchbowl (36), Campsie (13) and Wiley Park (12). Small numbers of students also lived in Canterbury, Belmore, Riverwood and Roselands (16).
TABLE 4.3: Mean period of residence in Australia (years) by age and gender

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Mean period of residence (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Females (n = 68)</td>
</tr>
<tr>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>13</td>
<td>6</td>
</tr>
<tr>
<td>14</td>
<td>7</td>
</tr>
<tr>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>16</td>
<td>5</td>
</tr>
<tr>
<td>Mean</td>
<td>6</td>
</tr>
</tbody>
</table>

Outside of the Canterbury LGA students came from the neighbouring suburbs of Ashfield, Dulwich Hill, Marrickville and Hurstville (7). Others travelled from Bankstown and surrounding suburbs (14), and some from the western suburbs of Guildford, Merrylands, Villawood and Cabramatta (6).

This means that most of the students lived towards the western end of the Canterbury LGA and clustered around the main local shopping centres which carry Vietnamese foods ie Lakemba and Campsie (see Section 4.9). Most students are also within access of the railway line which connects the larger Vietnamese centres of Marrickville and Bankstown. It is interesting that substantial numbers of students travel into Canterbury LGA to attend school. Many of these students would have long distances to travel involving several connections if travelling by public transport. This has implications for the time spent in travelling and access to food outside of home and school. Those travelling the furthest were mostly attending the Catholic schools.
4.2.4 Household Structure

The majority of respondents (85%) reported that at least five people lived in their household with one-quarter of respondents (24%) reporting that at least eight people lived in the household (n=151) (Table 4.4). Only 10 respondents (7%) reported living in households of 3 or less people.

In the larger households there may be greater pressure on household resources such as finances, food and general living conditions.

Over one-third of the respondents (39%) had people living in the household from outside the 'nuclear family' (n=151). These household members included a grandparent (27,18%), another relative (39,26%) or a friend (6,4%). For over half the respondents (56%), there were at least three or more children (under the age of 18 years) living in the household.

**TABLE 4.4: Number of people living in household (n=151)**

<table>
<thead>
<tr>
<th>Number of people</th>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>24</td>
</tr>
<tr>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td>7</td>
<td>17</td>
</tr>
<tr>
<td>8+</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>***</td>
</tr>
<tr>
<td>Total</td>
<td>*</td>
</tr>
</tbody>
</table>

* Figures do not equal 100 due to rounding
Both Vietnamese and English languages were spoken within the sample but the level of literacy varied.

It was assumed that all respondents would be able to speak the Vietnamese language, as a selection criterion for the study was that students’ school records indicated that Vietnamese was spoken at home. This appeared to be supported by my observations that all students appeared to speak comfortably in Vietnamese during interviews and when groups of students were together. However, there appeared to be a wide range of literacy. When asked if they could read Vietnamese writing, just over half (56%) the respondents (n=146) reported being able to do so. This finding appeared to be supported by three occurrences during implementation of the study. The first two were requests from many of the children for translations into English of the information for families which had been written in Vietnamese (so that they could read it themselves) and of the Vietnamese inscription on the pens they were given as gifts. The third example is that many of the food diaries were completed only in English. On the other hand, some students reported studying the Vietnamese language - it was available as a subject in one of the schools, and also through classes outside school.

I also observed that some students were quite fluent in English while others had considerable difficulty expressing some concepts in English. For example some children were not able to describe their food intake in English and others needed translations for particular items.
To be attending the schools involved, the sample of students in this study was considered by the school system to be 'functional in English'. Some of the more recent arrivals were however attending intensive language classes in English during school hours.

4.2.6 Religion

Most (96%) respondents reported that their family had a religion (n=147). Amongst those who stated that they had a religion, most reported being Catholic (61%) or Buddhist (37%). Two of the schools in the study sample were Catholic schools.

4.3 Anthropometric measures

Mean heights and weights of the sample were compared with those recorded for Australian students (ACHPER 1987). The distribution of height and weight of each age group was found to be similar to the distribution of height and weight for the Australian population (Tables 4.5 and 4.6).

<table>
<thead>
<tr>
<th>TABLE 4.5: Height (centimetres) - Comparison of Vietnamese adolescents aged 12-15 years with National Dietary Survey 1985.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
</tr>
<tr>
<td>Males (n=45) n=6</td>
</tr>
<tr>
<td>Mean NDS</td>
</tr>
<tr>
<td>Males (n=45) n=17</td>
</tr>
<tr>
<td>Mean NDS</td>
</tr>
</tbody>
</table>

249
There was, however, a tendency to be shorter and lighter than the Australian average, particularly amongst the older female respondents.

4.3.1 Body image

As an indicator of a possible predisposition to eating disorders, respondents were asked to rate themselves on a scale of 1 (too thin) to 7 (too fat). Responses clustered around the middle of the scale ('just about the right weight' = 38%). About the same percentage of respondents rated themselves on the thin side (32%) as on the fat side (30%) (n=152).

Body image was not significantly affected by age (r=0.1, p=0.2) nor the number of years lived in Australia (r=-0.06, p=0.5) but was significantly associated with gender (MHχ^2=4.2, DF=1, p=0.04) with females demonstrating more concern about their weight. This is demonstrated in Table 4.7 and Figure 4.1.
When analysed by sex (Table 4.7), females (42%) were three times as likely as males (14%) to perceive themselves on the fat side (ie rated 5-7), and especially in the extreme categories (ie 6 and 7).

On the other hand, males (53%) were twice as likely as females (27%) to consider themselves to be the right weight (ie rated 4). Males were also more likely to consider themselves to be the right weight or too thin, than to be too fat. One-third each of males (33%) and females (31%) perceived themselves as too thin (ie rated 1-3).

Although not tested for statistical significance, these trends are clearly shown in Figure 4.1 when data were aggregated into three categories, 'too thin' (ie rated 1-3), 'just right' (ie rated 4) and 'too fat' (ie rated 5-7).

<table>
<thead>
<tr>
<th>Rating</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too thin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>14</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>17</td>
<td>12</td>
</tr>
<tr>
<td>Just about the right weight</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>53</td>
<td>27</td>
</tr>
<tr>
<td>5</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>Too fat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>*</td>
<td>100</td>
</tr>
</tbody>
</table>

* Figures do not equal 100 due to rounding
4.4 Description of dietary habits (from the FHQ)

4.4.1 Main meal

When asked when they ate the largest/main meal of the day, most participants (93%) reported that it was the evening meal (n=153). The remaining 7% nominated lunch as the main meal.

Irrespective of when the main meal was eaten, most (89%) stated that they ate that meal with other members of the household. Of those whose main meal was the evening meal, 91% ate that meal with other members of the household.
4.4.2 The extent to which traditional eating practices were followed

Traditional eating practices were assessed by three items:

- how often chopsticks were used to eat the main meal;
- how often the main meal was served in large bowls and plates for everyone to share; and
- the respondents' rating of each meal on a seven point scale from 'mostly Vietnamese' to 'mostly Australian'.

Each indicator was tested for association with the number of years lived in Australia. Ratings of the degree to which meals were 'Vietnamese' were tested for gender differences.

Chopsticks were usually or always used to eat the main meal by 82% of respondents (n=152). Only six respondents (4%) reported that they rarely or never used chopsticks for the main meal (Table 4.8). There was no significant correlation between the frequency of using chopsticks and the number of years resident in Australia (r=-0.04, p=0.6).

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
<td>58</td>
</tr>
<tr>
<td>Usually</td>
<td>24</td>
</tr>
<tr>
<td>Sometimes</td>
<td>15</td>
</tr>
<tr>
<td>Rarely</td>
<td>2</td>
</tr>
<tr>
<td>Never</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>*</td>
</tr>
</tbody>
</table>

* Figures do not equal 100 due to rounding
Similarly, 84% of respondents (n=153) reported that the main meal was usually or always served in large bowls for everyone to share and only two respondents (1%) reported that their main meal was rarely or never served in large bowls for sharing (Table 4.9). There was no significant correlation between the frequency of serving from large bowls and the number of years lived in Australia (r=0.08, p=0.4).

Most respondents rated each meal as partly 'Vietnamese' and partly 'Australian'. The exception to this trend was dinner, which was rated as mostly 'Vietnamese'. Food eaten at school (during the morning and at lunch) tended to be rated as more 'Australian' (Table 4.10). There were no significant associations between gender and these ratings at p<0.05 level (Appendix 4.1). However, the degree to which meals were rated as 'Australian' was significantly and positively correlated with the number of years lived in Australia for all meal times except dinner (Appendix 4.2).

<table>
<thead>
<tr>
<th>TABLE 4.9: Frequency of serving the main meal in large bowls for everyone to share (n=153)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
</tr>
<tr>
<td>--------------------</td>
</tr>
<tr>
<td>Always</td>
</tr>
<tr>
<td>Usually</td>
</tr>
<tr>
<td>Sometimes</td>
</tr>
<tr>
<td>Rarely</td>
</tr>
<tr>
<td>Never</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>
TABLE 4.10: Respondent ratings of how 'Vietnamese'/'Australian' each meal is*

<table>
<thead>
<tr>
<th>Meal time</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakfast (n=151)</td>
<td>4.0</td>
<td>2.3</td>
</tr>
<tr>
<td>Morning (n=151)</td>
<td>4.7</td>
<td>2.1</td>
</tr>
<tr>
<td>Lunch (n=152)</td>
<td>4.6</td>
<td>2.2</td>
</tr>
<tr>
<td>Afternoon (n=152)</td>
<td>3.9</td>
<td>2.1</td>
</tr>
<tr>
<td>Dinner (n=153)</td>
<td>1.6</td>
<td>1.1</td>
</tr>
<tr>
<td>After dinner (n=145)</td>
<td>3.7</td>
<td>2.1</td>
</tr>
</tbody>
</table>

* Ratings ranged from 1=mostly Vietnamese to 4=half & half to 7=mostly Australian

Overall, traditional eating practices were followed by nearly everyone at the evening meal, irrespective of their length of residence in Australia. This meal was generally eaten with other household members and perceived by respondents to be a Vietnamese meal. Other meals, particularly those eaten away from home were considered to be more Australian, a perception which increased with increasing time lived in Australia.

4.4.3 Frequency of eating

Because of the concern about meal skipping in adolescents, respondents were asked how often (always, usually, sometimes, rarely or never) they had something to eat at six times of the day: breakfast, during the morning, lunch, during the afternoon, dinner and after the evening meal. Detailed results are presented in Table 4.11.

Breakfast was always or usually eaten by 56% of respondents, rarely or never eaten by 22% of respondents, with another 22% reporting that they sometimes ate breakfast (n=153).
TABLE 4.11: Frequency of eating at different times of the day (percentages of respondents)

<table>
<thead>
<tr>
<th>Time of Day</th>
<th>Always</th>
<th>Usually</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakfast (n=153)</td>
<td>31</td>
<td>25</td>
<td>22</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>Morning (n=152)</td>
<td>19</td>
<td>26</td>
<td>30</td>
<td>16</td>
<td>9</td>
</tr>
<tr>
<td>Lunch (n=151)</td>
<td>52</td>
<td>25</td>
<td>20</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Afternoon (n=153)</td>
<td>29</td>
<td>28</td>
<td>31</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>Dinner (n=153)</td>
<td>80</td>
<td>10</td>
<td>5</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>After dinner (n=150)</td>
<td>23</td>
<td>19</td>
<td>35</td>
<td>17</td>
<td>7</td>
</tr>
</tbody>
</table>

Lunch was always or usually eaten by 77% of respondents (n=151) and dinner was usually or always eaten by 90% of respondents (n=153). Between meal snacks were always or usually eaten by about half the respondents with afternoon snacks more likely to be consumed: morning (45% of respondents), afternoon (57% of respondents), after the evening meal (42% of respondents).

Respondents were regarded as having a tendency to skip a meal if they stated that they 'sometimes', 'rarely' or 'never' ate that meal.

- Whether or not respondents tended to skip breakfast was not significantly associated with the number of years lived in Australia ($W\chi^2=0.01$, DF=1, p=0.9), age ($W\chi^2=0.01$, DF=1, p=0.7) nor gender ($W\chi^2=0.1$, DF=1, p=0.7).

These results indicate that breakfast is the meal most likely to be skipped, with only just over half the respondents (56%) reporting that they ate it on a regular basis.
By contrast, the evening meal was eaten regularly by 90% of respondents. Between meal snacks were routinely eaten by about half the respondents.

4.5 Foods consumed

4.5.1 Food consumption: evidence from retrospective report of foods eaten in the previous week

As described in Chapter 3, a short food frequency questionnaire was included in the FHQ. This consisted of a list of 65 food and drink items (30 ‘Vietnamese’ and 35 ‘Australian’), and respondents were asked to nominate from five options how often they had consumed each of the foods in the previous week. The results are reported below in two forms; how frequently different foods were consumed and the percentage of the sample consuming the food items at least once during the week.

To determine how frequently the different foods were consumed, responses scored a mean rating from 1-5 where:

1= no consumption of the food in the previous week,
2= food consumed 1-3 days in the week,
3= food consumed 4-6 days in the week,
4= food consumed everyday, and
5= food consumed more than once each day.

- Rice received the highest score (3.2), followed by bread (2.8), fresh fruit (2.7) and vegetables (2.7).
Other foods reported as being consumed at least 4-6 times/week were beef (2.2), chicken (2.0), fruit juice (2.2) and green vegetable soup (a traditional Vietnamese dish) (2.1).

- Foods reported as being eaten less frequently tended to be individually named vegetables and traditional foods and snack items such as lollies (1.2), potato crisps (1.2) and soft drink (1.4).

- The foods consumed least frequently were butter/margarine (1.0), chocolate (1.1) and some ‘traditional’ dishes, including braised pork and egg, Vietnamese spring roll (1.1), beef/chicken noodle soup and Vietnamese sweet pudding (1.0).

- Foods receiving scores less than one included pasta (0.9), pizza, hamburgers, hot chips, meat pies and sausage rolls, yoghurt and lamb (0.7) as well as some other traditional foods and dishes. A detailed summary of responses is provided in Appendix 5.

The frequency of eating a selection of food and drink items was tested for sex differences (Table 4.12). These foods were selected because of sex differences observed in the food records and because of their nutritional implications. The list comprised some ‘less healthy foods’ (ie not conforming with dietary guidelines) and milk. Three of these foods - plain milk, flavoured milk and soft drink/cordial showed significant gender differences in their consumption. In each case, these drinks were significantly more likely to be consumed by males than by females (Table 4.13).
TABLE 4.12: Gender differences in frequency of eating particular foods in the previous week

<table>
<thead>
<tr>
<th>Food</th>
<th>Mantel-Haenszel Chisquare</th>
<th>DF</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plain milk</td>
<td>5.5</td>
<td>1</td>
<td>0.02 *</td>
</tr>
<tr>
<td>Flavoured milk</td>
<td>10.1</td>
<td>1</td>
<td>0.001 *</td>
</tr>
<tr>
<td>Ice cream</td>
<td>0.2</td>
<td>1</td>
<td>0.7</td>
</tr>
<tr>
<td>Sweet biscuits or cake</td>
<td>1.2</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>Hot chips</td>
<td>1.3</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>Potato crisps</td>
<td>1.7</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>Soft drink/cordial</td>
<td>10.6</td>
<td>1</td>
<td>0.001 *</td>
</tr>
<tr>
<td>Lollies</td>
<td>1.8</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>Chocolate</td>
<td>0.4</td>
<td>1</td>
<td>0.5</td>
</tr>
</tbody>
</table>

* Significant where p<0.05.

TABLE 4.13: Percentage of males and females who consumed selected foods on at least a daily basis

<table>
<thead>
<tr>
<th>Food</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plain milk</td>
<td>40</td>
<td>28</td>
</tr>
<tr>
<td>Flavoured milk</td>
<td>32</td>
<td>14</td>
</tr>
<tr>
<td>Soft drink/cordial</td>
<td>43</td>
<td>20</td>
</tr>
</tbody>
</table>

There were no significant gender differences in the frequency of consumption for any of the other foods tested.

In the FHQ, a number of foods that were recorded as consumed ‘once a day’ and ‘more than once/day’, eg duck, lamb and some of the more specific Vietnamese dishes, would be extremely unlikely to be consumed so frequently. Therefore, I have reservations about the reliability and validity of some of the results in this questionnaire. There may be several explanations for these results.
For instance participants may have deliberately answered incorrectly or they may have misinterpreted the concepts, eg 'once a day' may have been interpreted as 'once a week' for the least often consumed foods. Therefore, as respondents also had the option of replying 'none', this was taken as a more reliable answer than the frequency of consumption. Consequently, I have also reported the results as the percentage of the sample consuming the foods at least once during the week (i.e. 100% - % replying 'none', see Appendix 5).

The following pattern was found from this analysis (see Table 4.14):

- Foods consumed at least once by over three-quarters of respondents were rice, bread, fruit, vegetables, meats (except lamb), fish and ice cream.

- Various forms of noodles, breakfast cereals, milk, seafood and biscuits were all reported by the majority (at least half) of respondents.

- Popular convenience takeaway type meals: hamburgers, pizza, pasta, pies and sausage rolls, were all consumed by less than half (25-50%) the respondents. However, hot chips were the most popular takeaway food being consumed by at least 50% of respondents.

- Snacks such as lollies, soft drink, chocolate and potato crisps were consumed by over half the respondents.

- Of the dairy foods, ice cream and milk were the most popular, followed by flavoured milk, cheese and yoghurt. Sweetened condensed milk was reported by just over one-quarter of respondents.
• Butter/margarine was reported by just under half the respondents.

• Of traditional meals and dishes; stir fries and green vegetable soup were consumed by the most people, followed by braised and steamed fish, lettuce with meat, and fish sour soup (over 75% of respondents).

• Traditional foods and accompaniments such as gruel, pickled vegetables and fish, coconut juice and Chinese tea, pork buns, glutinous rice and duck were reported by less than half the respondents.

Despite the reservations about the results of the first analysis, the two methods of analysis, ie how frequently the different foods were consumed, and the percentage of the sample who had consumed each food at least once in the previous week, support each other fairly well in the relative consumption of the foods. That is, the foods with the lowest scores, and therefore the lowest average consumption in the week (as assessed by the first method), were also consumed by the fewest people (as assessed by the second method). Conversely, those foods with the highest scores were consumed by the most people.

One food which is notably different is 'hot chips'. This food only received a score of 0.7, indicating that the mean consumption was less than once in the week. However, only one-third (35%) of respondents reported not eating hot chips at all during the week. Therefore, hot chips were eaten by the majority of respondents, but not eaten frequently.
<table>
<thead>
<tr>
<th></th>
<th>&lt;25%</th>
<th>25-49%</th>
<th>50-74%</th>
<th>75-100%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Western foods'</strong> (n=151)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coffee</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Butter</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Margarine</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pizza</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hamburger</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pasta</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cheese</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flavoured milk</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pie</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sausage roll</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yoghurt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soy milk</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lamb</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frozen yoghurt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sweetened condensed milk</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **Vietnamese dishes/foods'** (n=152) |      |        |        |         |
| Coconut juice |      |        |        |         |
| Pickled/salty fish | | | | |
| Gruel          |      |        |        |         |
| Chinese tea    |      |        |        |         |
| Peanuts        |      |        |        |         |
| Rice rolls     |      |        |        |         |
| Jackfruit      |      |        |        |         |
| Pork buns      |      |        |        |         |
| Glutinous rice |      |        |        |         |
| Duck           |      |        |        |         |

| **Specific Vietnamese dishes'** (n=152) |      |        |        |         |
| Chicken & lemon grass | | | | |
| Vermicelli with grilled pork | | | | |
| Vietnamese spring rolls | | | | |
| Vietnamese sweet pudding | | | | |
| Beef/chicken noodle soup | | | | |
| Braised pork & egg | | | | |

* columns in descending order

* a n=150
* b n=144
Of those who did eat hot chips, half reported eating them 1-3 times/week. Interestingly though, just under one-fifth (19%) of all respondents reported eating hot chips at least once/day (Appendix 5).

From both analyses, the foods reported as the most often consumed tended to be staple foods and other foods of high nutritional value: cereals (rice and bread), followed by fruit, vegetables, meats (except lamb) and fish. The least reported food was alcohol. The most frequently reported Vietnamese foods were 'green vegetable soup' and stir fried dishes. Of the 'less nutritious foods', lollies, cake, sweet biscuits and hot chips were the most popular, being consumed by almost 75% of respondents during the week. It is noteworthy that many traditional dishes were consumed by more people than were Western takeaway meals. Similarly, a number of traditional 'snack foods' (eg corn, pork buns) were as popular as non-traditional snacks. Fat sources in the teenagers' diets tended to be from snack foods (biscuits, cake, chips and crisps), and traditional foods rather than from butter/margarine which were consumed by less than half the respondents.

While over half the sample reported drinking milk during the week, it was more likely to be drunk by boys than girls. This may be a concern regarding calcium intake and achievement of bone density, considering the female tendency to osteoporosis in later life. However, boys were also more likely to drink soft drink. This may be a concern for the nutrient density of their diets if it replaces other more nutritious foods.
4.5.2 Food Consumption: evidence from the food diary

4.5.2.1 Nutrient intake

Although it was intended to analyse the food diaries for nutrient intake, it was decided not to proceed with this analysis. This decision was based on the amount of estimation that was required to convert foods to nutrients using food composition tables given the lack of detail in the food diaries, particularly in recipes and in the quantities of snack foods consumed. As enough detail was provided for foods which could be discreetly measured and described such as milk, bread, soft drink and rice, quantities of intake were compared with the Five Basic Food Groups plan (5BFGP). In Australia, this plan is often used in both health and school settings as a teaching tool in nutrition education. Containing information about recommended quantities of basic foods to be eaten for a balanced diet - cereals, fruit and vegetables, dairy foods, meat and its equivalents and fats, the plan can also infer nutrient intake.

4.5.2.2 Quantities consumed: comparison with the Five Basic Food Group Plan (5BFGP)

The respondents’ recorded food intake for one day was compared with the Five Basic Food Groups Plan (Table 4.15). One of the difficulties in the use of the 5BFGP is the number of variations in current circulation. In making the following comparison, two readily available versions with different recommendations for cereal intake were used.
In the first, (Department of Health, NSW 1987), one slice of bread is equated to one-half cup rice, whereas in the second, (Commonwealth Department of Community Services and Health 1987), one slice of bread is considered equivalent to one cup of rice. Fats were excluded from the analysis because of the difficulties in estimating the amount of fat consumed in cooked and processed foods.

Results of the comparison (Table 4.15) indicated that:

- more than the recommended minimum of breads and cereals tended to be consumed, especially by boys (assuming one-half cup of rice is equivalent to one slice of bread);

- servings of ‘meat’ were within the recommended quantities;

- the quantities of ‘dairy foods’ were generally less than the recommended amounts, except for 15 year old boys;

- servings of ‘fruit & vegetables’ were acceptable for girls except for the 15 year age group, but were below recommended levels for boys;

- boys reported a greater intakes of cereals, and milk and dairy foods than did the girls;

- girls reported greater intakes of fruits and vegetables than did the boys.
Overall, the Vietnamese teenagers' diets were above or close to recommended levels of intake, apart from their intake of milk and dairy foods. As these foods are not customary in traditional Vietnamese diets this is not surprising. However, their intake of cereal foods is on the whole considerably higher than recommendations, reflecting their very high rice intake in addition to their bread intake. Of concern here though, is that because of the high rice intake in this group, quite different levels of intake are calculated depending on the 5BFGP used. When used to infer dietary adequacy, different conclusions are reached depending on the level of equivalence given to rice and bread.
This particularly has implications for intakes of carbohydrate and some vitamins especially thiamine, to which breads and cereals are significant contributors.

4.5.2.3 Consumption patterns

Analysis of the respondents' food intake as reported in the food diaries indicated that cereal foods, in particular rice and bread, were the major foods reported eaten at breakfast, lunch and dinner. Other types of foods eaten varied both in the range of foods consumed and the proportions of respondents who reported consuming them (see below).

Food consumption was analysed for sex differences. For simplicity, calculations were made using the mean of 14 and 15 year age groups.

Sex differences were found for a number of the foods consumed (Table 4.16). Overall, girls were significantly more likely than boys to consume snack foods ($\text{MH}_\chi^2=7.12$, DF=1, $p=0.008$) and nuts and seeds ($\text{MH}_\chi^2=5.30$, DF=1, $p=0.03$). Boys were significantly more likely than girls to consume sweet drinks ($\text{MH}_\chi^2=4.31$, DF=1, $p=0.04$). Girls were also more likely than boys to consume fruit, and boys more likely than girls to consume milk, although these differences were not significant. A substantial proportion of both boys and girls reported either missing breakfast or lunch, or eating only foods of minimum nutritional value at those times.
TABLE 4.16: Gender differences in the consumption of selected food groups (mean 14 & 15 year age groups)

<table>
<thead>
<tr>
<th>Food</th>
<th>Males (% of sample who consumed foods)</th>
<th>Females (% of sample who consumed foods)</th>
<th>Mantel-Haenszel Chi-square</th>
<th>DF</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat/fish etc</td>
<td>86 (n=21)</td>
<td>77 (n=26)</td>
<td>0.57</td>
<td>1</td>
<td>0.7F</td>
</tr>
<tr>
<td>Dairy foods</td>
<td>71</td>
<td>62</td>
<td>0.50</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Milk</td>
<td>67</td>
<td>39</td>
<td>3.62</td>
<td>1</td>
<td>0.06</td>
</tr>
<tr>
<td>Fruit</td>
<td>67</td>
<td>92</td>
<td>4.83</td>
<td>1</td>
<td>0.06F</td>
</tr>
<tr>
<td>Nuts and seeds</td>
<td>19</td>
<td>0</td>
<td>5.30</td>
<td>1</td>
<td>0.03F*</td>
</tr>
<tr>
<td>Sweet drinks</td>
<td>57</td>
<td>27</td>
<td>4.31</td>
<td>1</td>
<td>0.04*</td>
</tr>
<tr>
<td>Snack foods</td>
<td>38</td>
<td>77</td>
<td>7.12</td>
<td>1</td>
<td>0.008*</td>
</tr>
<tr>
<td>Sugars/jams etc</td>
<td>33</td>
<td>19</td>
<td>1.19</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>Confectionery</td>
<td>48</td>
<td>31</td>
<td>1.37</td>
<td>1</td>
<td>0.2</td>
</tr>
</tbody>
</table>

F: Fisher-exact values used (2 tailed test)
* Significant where p<0.05

4.5.2.4 Meal patterns

The foods reported as consumed at breakfast, lunch and dinner are presented in Table 4.17. The complete list of foods consumed is contained in Appendix 6.

Breakfast

Breakfast was considered to be foods consumed before 9am. In this time period, bread, rice and breakfast cereal were the most frequently consumed, each reported by about one-quarter of respondents. Protein foods (meats and eggs), were reported as consumed by one-third of respondents. The following sex differences were noted:

- Boys were significantly more likely than girls to consume milk (48% compared with 24%; $\chi^2=5.72$, DF=1, p=0.02).
### TABLE 4.17: Sex differences in the consumption of selected foods at breakfast, lunch and dinner

<table>
<thead>
<tr>
<th>Food</th>
<th>Per cent of sample who consumed foods</th>
<th>Mantel-Haenszel Chi-square</th>
<th>DF</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males (n=44)</td>
<td>Females (n=50)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Breakfast</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cereal</td>
<td>30</td>
<td>20</td>
<td>1.14</td>
<td>1</td>
</tr>
<tr>
<td>Fruit</td>
<td>5</td>
<td>14</td>
<td>2.39</td>
<td>1</td>
</tr>
<tr>
<td>Milk</td>
<td>48</td>
<td>24</td>
<td>5.72</td>
<td>1</td>
</tr>
<tr>
<td>Sugar/jam etc</td>
<td>20</td>
<td>8</td>
<td>3.01</td>
<td>1</td>
</tr>
<tr>
<td>None</td>
<td>9</td>
<td>22</td>
<td>2.88</td>
<td>1</td>
</tr>
<tr>
<td><strong>Lunch</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raw vegetables</td>
<td>25</td>
<td>14</td>
<td>1.81</td>
<td>1</td>
</tr>
<tr>
<td>Fruit juice</td>
<td>14</td>
<td>36</td>
<td>6.09</td>
<td>1</td>
</tr>
<tr>
<td>Sweet drinks</td>
<td>20</td>
<td>4</td>
<td>6.07</td>
<td>1</td>
</tr>
<tr>
<td>Cheese/yoghurt</td>
<td>2</td>
<td>10</td>
<td>2.31</td>
<td>1</td>
</tr>
<tr>
<td>Meat/fish etc</td>
<td>37</td>
<td>58</td>
<td>4.34</td>
<td>1</td>
</tr>
<tr>
<td>Chocolate</td>
<td>5</td>
<td>12</td>
<td>1.65</td>
<td>1</td>
</tr>
<tr>
<td>Take-away</td>
<td>9</td>
<td>0</td>
<td>4.70</td>
<td>1</td>
</tr>
<tr>
<td>None</td>
<td>18</td>
<td>12</td>
<td>0.70</td>
<td>1</td>
</tr>
<tr>
<td><strong>Dinner</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sweet drinks</td>
<td>32</td>
<td>10</td>
<td>6.83</td>
<td>1</td>
</tr>
<tr>
<td>Fruit</td>
<td>18</td>
<td>36</td>
<td>3.67</td>
<td>1</td>
</tr>
<tr>
<td>Milk</td>
<td>25</td>
<td>10</td>
<td>3.69</td>
<td>1</td>
</tr>
<tr>
<td>Snacks/Confectionery</td>
<td>28</td>
<td>14</td>
<td>2.53</td>
<td>1</td>
</tr>
<tr>
<td>Takeaway</td>
<td>2</td>
<td>10</td>
<td>2.31</td>
<td>1</td>
</tr>
</tbody>
</table>

F Fisher-exact values used (2 tailed test)
* Significant where p<0.05

- A greater proportion of boys than girls reported consuming breakfast cereal (30% compared with 20%), bread (23% compared with 18%), sugars or sweet spreads (20% compared with 8%) and added fats (14% compared with 8%). These differences were not significant.

- A greater proportion of girls than boys reported consuming fruit (14% compared with 5%) and water (22% compared with 14%). These differences were not significant.
Other foods consumed in this time period were instant noodles, chips, and confectionery.

Girls were more likely than boys to have either no breakfast (22% compared with 9%), or breakfast of minimal nutritional value, ie snack foods only, although this difference was not significant.

Lunch

Foods frequently consumed between 12 noon and 3pm were bread and protein foods, each reported by about half the respondents. The following sex differences were noted in the foods consumed:

- Boys were significantly more likely than girls to consume takeaway foods (9% compared with 0%; $\chi^2=4.70$, DF=1, p=0.04) and soft drinks (20% compared with 4%; $\chi^2=6.07$, DF=1, p=0.01). Girls were significantly more likely than boys to consume protein foods (meat/fish etc) (58% compared with 37%; $\chi^2=4.34$, DF=1, p=0.04) and fruit juice (36% compared with 14%; $\chi^2=6.09$, DF=1, p=0.01).

- A greater proportion of boys than girls reported consuming raw vegetables (salad on sandwiches: 25% compared with 14%), and milk (5% compared with 0%). These differences were not significant.
A greater proportion of girls than boys reported consuming cheese or yoghurt (10% compared with 6%), and confectionery (16% compared with 5%). These differences were not significant.

Boys were more likely than girls to miss lunch completely (18% compared with 12%). An equal proportion of boys and girls (20%) had a lunch of minimal nutritional value, ie snack foods only.

**Dinner**

The evening meal was consumed between 6pm and 9pm by about two-thirds of respondents (boys 71%, girls 62%), and before 6pm by about one-third of respondents (boys 23%, girls 36%).

Nearly all the respondents (94%) reported eating a Vietnamese type meal, ie rice and a number of vegetable and protein based dishes. Half the respondents (boys 53%, girls 52%) consumed at least two different protein sources eg meat and seafood. Rice was eaten in quantities of between one and five cups.

Of the other foods reported as consumed in the 6pm to 9pm period, the following sex differences were noted:

- Boys were significantly more likely than girls to consume soft drink (32% compared with 10%; $\chi^2=6.83, DF=1, p=0.009$).

- More boys than girls reported consuming milk (25% compared with 10%)
and snacks such as biscuit, cake, chips, confectionery (28% compared with 14%). These differences were not significant.

- More girls than boys reported consuming fruit (36% compared with 18%) and fruit juice (14% compared with 7%). These differences were not significant.

One boy had no food at all in this time period, while one girl reported consuming snacks only.

**Snacks**

Snacks most often eaten on the day of recording differed for boys and girls and between morning (9am-12 noon) and afternoon (3-6pm). In the morning, the most common snack foods for both sexes were convenient items such as potato crisps, ‘Twisties’ etc and chocolate bars (16 reports for boys and 20 for girls). For boys this was followed by sandwiches (13) and soft drink (10). Girls, however, were more likely to eat fruit and vegetables (18) followed by sandwiches (7). Vietnamese foods were only consumed by two boys and no girls in the morning slot.

In the afternoon, boys (12) were most likely to eat takeaway foods (pie, hot chips, fish, chicken, kebab, pizza), fruit (11) and soft drink (9). Girls tended to consume fruit (20) and water (18).
Vietnamese meals or snack items were more commonly eaten in the 3-6 pm time slot, and were reported more by girls than by boys (15 compared with 5). Other snack items reported were ice cream, instant noodles (both reported only in the afternoon), milk and yoghurt, cakes and biscuits, and fruit juice. These were reported a total of less than ten times in either time slot. Interestingly, snacks such as potato crisps and chocolate bars that were so popular in the morning slot, were consumed far less in the afternoon (twice by boys and four times by girls). Cakes and biscuits on the other hand were slightly more popular in the afternoon (nine reports compared with five).

While it is difficult to separate snack times from meal times, in the present study nearly all respondents reported eating on more than one occasion between 3 and 6 pm. The number of different eating occasions (food consumed more than 20 minutes apart) ranged from 0-4 for girls and 1-5 for boys, with a mean of 2.3 for girls and 1.8 for boys.

4.5.3 Comparison of the Diet Record and the Food Habits Questionnaire
Although not strictly comparable, the two methods showed considerable agreement in the frequency of consumption of major food items (Tables 4.14, 4.18, 4.19). Foods most commonly reported in the food records were consistent with those most frequently reported in the retrospective component of the FHQ.
In both surveys the most frequently consumed foods were staple foods: cereals (in particular rice and bread), fruit, vegetables, and meats, fish and seafoods. Foods reported to a lesser extent in both surveys were dairy foods, with girls consistently reporting a lower intake than boys.

Although the order of the popularity of different food items (as in per cent consuming) was not exactly the same in the two methods they were similar when quartiles of the population are compared. For example, fats such as butter/margarine were reported by less than half the sample in both surveys, meat was consumed by over half the sample, and breads and cereals by more than 75% of the sample. Other similarities were milk, which was consumed by more than half the sample except for 15 year old girls (47%) and 13 year old girls (20%), and takeaway foods consumed by less than half the sample except 13 year old boys where it was greater (69%). Both surveys showed that boys were more likely than girls to consume milk and soft drinks.

Foods showing some discrepancy were: fish and seafood, being reported by more than three-quarters of the sample in the FHQ and less than three-quarters in the food record (except 12 year old boys 83%); and confectionery being reported by more than half the sample in the FHQ and less than half the sample in the food record.
4.6 Comparison with the National Children’s Dietary Survey

Per cent consuming data from the food diaries completed by the Vietnamese adolescents in Canterbury were compared with per cent consuming data from the NDS (1985). Major food groups as described in the report of the NDS (English et al 1988) were compared by age groups 12-15 years, and by gender (Tables 4.18-4.20). General patterns of consumption for all age groups are described in the following section. Significance tests were conducted on the mean of the 14 and 15 year age groups and results are reported in Table 4.21.

For some food categories consumption was similar in both the NDS and in this sample of Vietnamese students (Table 4.18). The main similarities were:

- cereals and vegetables where over 80% of all ages consumed these foods on the day of recording;
- meat consumption was also recorded by more than 80% of each age group except 14 year old Canterbury girls (73%);
- vegetable consumption was more widespread than fruit consumption in both groups.

Generally meat consumption tended to be higher in Canterbury boys than the NDS and lower in Canterbury girls than the NDS.
TABLE 4.18: Major food groups consumed by males and females - Comparison of Canterbury Study with the National Dietary Survey by age.

<table>
<thead>
<tr>
<th>Period</th>
<th>Cant 12</th>
<th>NDS 12</th>
<th>Cant 13</th>
<th>NDS 13</th>
<th>Cant 14</th>
<th>NDS 14</th>
<th>Cant 15</th>
<th>NDS 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cereal and cereal products</td>
<td>100</td>
<td>98.4</td>
<td>100</td>
<td>98.1</td>
<td>93</td>
<td>99.3</td>
<td>100</td>
<td>99.3</td>
</tr>
<tr>
<td>Vegetables</td>
<td>83</td>
<td>84.0</td>
<td>82</td>
<td>82.7</td>
<td>100</td>
<td>81.4</td>
<td>83</td>
<td>85.5</td>
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<tr>
<td>Fruits</td>
<td>50</td>
<td>56.0</td>
<td>76</td>
<td>58.3</td>
<td>53</td>
<td>30.7</td>
<td>50</td>
<td>60.2</td>
</tr>
<tr>
<td>Meat and meat products</td>
<td>83</td>
<td>91.9</td>
<td>94</td>
<td>90.2</td>
<td>93</td>
<td>89.6</td>
<td>100</td>
<td>93.6</td>
</tr>
<tr>
<td>Fish, seafood and products</td>
<td>83</td>
<td>8.7</td>
<td>59</td>
<td>11.9</td>
<td>53</td>
<td>9.2</td>
<td>50</td>
<td>11.1</td>
</tr>
<tr>
<td>Eggs</td>
<td>17</td>
<td>17.9</td>
<td>24</td>
<td>20.6</td>
<td>20</td>
<td>20.7</td>
<td>0</td>
<td>19.9</td>
</tr>
<tr>
<td>Nuts and seeds</td>
<td>0</td>
<td>13.7</td>
<td>6</td>
<td>19.2</td>
<td>27</td>
<td>17.6</td>
<td>17</td>
<td>17.9</td>
</tr>
<tr>
<td>Milk and milk products</td>
<td>83</td>
<td>95.7</td>
<td>82</td>
<td>94.1</td>
<td>60</td>
<td>96.2</td>
<td>100</td>
<td>95.8</td>
</tr>
<tr>
<td>Fats</td>
<td>17</td>
<td>77.8</td>
<td>42</td>
<td>78.9</td>
<td>40</td>
<td>82.6</td>
<td>17</td>
<td>83.8</td>
</tr>
<tr>
<td>Sugars/jams/honey/syrups</td>
<td>0</td>
<td>74.4</td>
<td>47</td>
<td>72.6</td>
<td>20</td>
<td>78.1</td>
<td>83</td>
<td>74.7</td>
</tr>
<tr>
<td>Confectionery</td>
<td>33</td>
<td>38.3</td>
<td>47</td>
<td>36.3</td>
<td>47</td>
<td>33.4</td>
<td>0</td>
<td>33.4</td>
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<tr>
<td>Snack foods</td>
<td>50</td>
<td>28.0</td>
<td>47</td>
<td>26.9</td>
<td>33</td>
<td>24.5</td>
<td>50</td>
<td>26.5</td>
</tr>
<tr>
<td>Females</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cereal and cereal products</td>
<td>100</td>
<td>97.9</td>
<td>100</td>
<td>99.0</td>
<td>100</td>
<td>98.5</td>
<td>100</td>
<td>97.2</td>
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<tr>
<td>Vegetables</td>
<td>89</td>
<td>84.1</td>
<td>93</td>
<td>83.7</td>
<td>82</td>
<td>85.6</td>
<td>93</td>
<td>82.4</td>
</tr>
<tr>
<td>Fruits</td>
<td>89</td>
<td>69.2</td>
<td>93</td>
<td>68.4</td>
<td>91</td>
<td>67.6</td>
<td>87</td>
<td>75.2</td>
</tr>
<tr>
<td>Meat and meat products</td>
<td>89</td>
<td>90.1</td>
<td>80</td>
<td>89.3</td>
<td>73</td>
<td>87.5</td>
<td>80</td>
<td>87.3</td>
</tr>
<tr>
<td>Fish, seafood and products</td>
<td>44</td>
<td>11.6</td>
<td>53</td>
<td>12.1</td>
<td>45</td>
<td>13.3</td>
<td>53</td>
<td>11.1</td>
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<tr>
<td>Eggs</td>
<td>44</td>
<td>15.9</td>
<td>27</td>
<td>20.4</td>
<td>9</td>
<td>17.8</td>
<td>47</td>
<td>19.9</td>
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<tr>
<td>Nuts and seeds</td>
<td>11</td>
<td>13.5</td>
<td>0</td>
<td>14.6</td>
<td>0</td>
<td>15.7</td>
<td>13</td>
<td>18.6</td>
</tr>
<tr>
<td>Milk and milk products</td>
<td>67</td>
<td>93.4</td>
<td>47</td>
<td>94.9</td>
<td>73</td>
<td>96.3</td>
<td>60</td>
<td>94.6</td>
</tr>
<tr>
<td>Fats</td>
<td>33</td>
<td>80.7</td>
<td>27</td>
<td>82.5</td>
<td>27</td>
<td>82.5</td>
<td>20</td>
<td>82.9</td>
</tr>
<tr>
<td>Sugars/jams/honey/syrups</td>
<td>33</td>
<td>64.2</td>
<td>20</td>
<td>67.5</td>
<td>18</td>
<td>70.5</td>
<td>20</td>
<td>65.4</td>
</tr>
<tr>
<td>Confectionery</td>
<td>22</td>
<td>47.6</td>
<td>27</td>
<td>42.0</td>
<td>36</td>
<td>45.4</td>
<td>33</td>
<td>35.1</td>
</tr>
<tr>
<td>Snack foods</td>
<td>56</td>
<td>33.5</td>
<td>80</td>
<td>33.7</td>
<td>64</td>
<td>31.6</td>
<td>27</td>
<td>31.8</td>
</tr>
</tbody>
</table>
Conversely fruit consumption tended to be higher in Canterbury girls across all age groups. Consumption of milk and milk products tended to be higher in the NDS, even more so amongst boys. The exception was in 15 year old boys where it was higher in the Vietnamese boys, although this was a very small group (n=6).

Sugars, jams and confectionery consumption tended to be lower amongst the Canterbury students whereas snack food consumption tended to be higher in this group.

Marked differences were found in the per cent consuming fish and seafood which was much higher in the Vietnamese students, and fats which was much lower in the Vietnamese students.

Five food subgroups, of interest because of food acculturation issues, were also looked at (Tables 4.19, 4.20). Generally there was a wider range of consumption in the Vietnamese students than in the NDS with marked differences in the per cent consuming some foods:

- within cereal consumption, the Vietnamese students had substantially higher rice intakes than the NDS with bread intakes more similar to the NDS;

- a lower percentage of Vietnamese students, especially girls, drank milk on the day of recording;
• a greater percentage of Vietnamese students, especially boys, consumed takeaway foods on the day of recording;

• a greater percentage of Vietnamese boys consumed soft drinks on the day of recording.

The 'per cent consuming' a selection of foods (based on observations previously described in this section) was tested for statistical difference between the males and females of the two samples (Table 4.21). Calculations were based on the mean of 14 and 15 year age groups.

Significant sex differences were noted in the consumption of the following foods:

• The Vietnamese girls in Canterbury were significantly more likely than girls in the NDS to have consumed rice, fish/seafood and snack foods.

• Canterbury girls were significantly less likely than girls in the NDS to have consumed dairy foods, milk, fats, and sugars.

• Canterbury boys were significantly more likely than boys in the NDS to have consumed rice and fish/seafood.

• Canterbury boys were significantly less likely than boys in the NDS to have consumed dairy foods and fats.
TABLE 4.19: Food subgroups consumed by males and females - Comparison of Canterbury Study with the National Dietary Survey by age (per cent consuming by age and sex)

<table>
<thead>
<tr>
<th>Per cent consuming each food</th>
<th>12 years</th>
<th>13 years</th>
<th>14 years</th>
<th>15 years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cant</td>
<td>NDS</td>
<td>Cant</td>
<td>NDS</td>
</tr>
<tr>
<td><strong>Males</strong></td>
<td>n=6</td>
<td>n=17</td>
<td>n=15</td>
<td>n=6</td>
</tr>
<tr>
<td>Bread</td>
<td>83</td>
<td>80.0</td>
<td>82</td>
<td>81.7</td>
</tr>
<tr>
<td>Rice</td>
<td>100</td>
<td>7.6</td>
<td>100</td>
<td>8.9</td>
</tr>
<tr>
<td>Milk</td>
<td>50</td>
<td>84.3</td>
<td>82</td>
<td>82.4</td>
</tr>
<tr>
<td>Takeaway foods</td>
<td>33</td>
<td>24.0</td>
<td>69</td>
<td>24.1</td>
</tr>
<tr>
<td>Soft drink</td>
<td>67</td>
<td>25.3</td>
<td>42</td>
<td>22.7</td>
</tr>
<tr>
<td><strong>Females</strong></td>
<td>n=9</td>
<td>n=15</td>
<td>n=11</td>
<td>n=15</td>
</tr>
<tr>
<td>Bread</td>
<td>78</td>
<td>78.9</td>
<td>73</td>
<td>85.2</td>
</tr>
<tr>
<td>Rice</td>
<td>89</td>
<td>9.9</td>
<td>100</td>
<td>6.8</td>
</tr>
<tr>
<td>Milk</td>
<td>56</td>
<td>77.4</td>
<td>20</td>
<td>78.6</td>
</tr>
<tr>
<td>Takeaway foods</td>
<td>44</td>
<td>20.3</td>
<td>20</td>
<td>21.8</td>
</tr>
<tr>
<td>Soft drink</td>
<td>33</td>
<td>23.6</td>
<td>33</td>
<td>22.1</td>
</tr>
</tbody>
</table>

TABLE 4.20: Comparison of Vietnamese adolescents with the National Dietary Survey - food sub groups (per cent consuming; minimum & maximum percentages from analysis by age/sex across all age groups)

<table>
<thead>
<tr>
<th>Per cent consuming each food</th>
<th>Canterbury</th>
<th>NDS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Males</strong></td>
<td>n=44</td>
<td></td>
</tr>
<tr>
<td>Bread</td>
<td>67-93</td>
<td>80-86</td>
</tr>
<tr>
<td>Rice</td>
<td>87-100</td>
<td>8-13</td>
</tr>
<tr>
<td>Milk</td>
<td>50-83</td>
<td>82-86</td>
</tr>
<tr>
<td>Takeaway foods</td>
<td>20-69</td>
<td>24-28</td>
</tr>
<tr>
<td>Soft drink</td>
<td>42-67</td>
<td>23-31</td>
</tr>
<tr>
<td><strong>Females</strong></td>
<td>n=50</td>
<td></td>
</tr>
<tr>
<td>Bread</td>
<td>73-82</td>
<td>79-85</td>
</tr>
<tr>
<td>Rice</td>
<td>89-100</td>
<td>7-14</td>
</tr>
<tr>
<td>Milk</td>
<td>20-56</td>
<td>74-83</td>
</tr>
<tr>
<td>Takeaway foods</td>
<td>20-44</td>
<td>18-23</td>
</tr>
<tr>
<td>Soft drink</td>
<td>7-33</td>
<td>22-27</td>
</tr>
</tbody>
</table>

279
From analyses of the food diaries I found that on the day of recording, the Vietnamese children in the Canterbury study, relative to the sample of children in the National Dietary Survey were more likely to eat rice, fish/seafood, snack foods, soft drinks and takeaway foods; and less likely to eat added fats, milk and milk products and sugars, jams and confectionery.

Significant differences were found in the per cent consuming data from 14 and 15 year old boys and girls in the two samples.

<table>
<thead>
<tr>
<th>Food</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Per cent consuming each food</td>
<td>Mantel-Haenszel Chi-square</td>
</tr>
<tr>
<td></td>
<td>Cant (n=21)</td>
<td>NDS (n=833)</td>
</tr>
<tr>
<td>Rice</td>
<td>94</td>
<td>11</td>
</tr>
<tr>
<td>Takeaway</td>
<td>40</td>
<td>25</td>
</tr>
<tr>
<td>Fish/seafood</td>
<td>56</td>
<td>10</td>
</tr>
<tr>
<td>Dairy foods</td>
<td>71</td>
<td>95</td>
</tr>
<tr>
<td>Milk</td>
<td>68</td>
<td>84</td>
</tr>
<tr>
<td>Fats</td>
<td>41</td>
<td>81</td>
</tr>
<tr>
<td>Sugars</td>
<td>34</td>
<td>75</td>
</tr>
<tr>
<td>Sweet drinks</td>
<td>55</td>
<td>25</td>
</tr>
<tr>
<td>Snack foods</td>
<td>40</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>(n=26)</td>
</tr>
<tr>
<td>Rice</td>
<td>96</td>
<td>8</td>
</tr>
<tr>
<td>Takeaway</td>
<td>28</td>
<td>20</td>
</tr>
<tr>
<td>Fish/seafood</td>
<td>48</td>
<td>13</td>
</tr>
<tr>
<td>Dairy foods</td>
<td>60</td>
<td>96</td>
</tr>
<tr>
<td>Milk</td>
<td>38</td>
<td>81</td>
</tr>
<tr>
<td>Fats</td>
<td>49</td>
<td>83</td>
</tr>
<tr>
<td>Sugars</td>
<td>19</td>
<td>69</td>
</tr>
<tr>
<td>Snack foods</td>
<td>77</td>
<td>33</td>
</tr>
</tbody>
</table>

F Fisher-exact values used (2-tailed test)
* Significant where p<0.05
Where the Vietnamese children’s diets were different to the NDS diets, these differences were both positive and negative. Positive features of the Vietnamese diet were the high consumption of starchy foods, in particular rice, and fish and other seafoods and lower consumption of added fats and sugars. On the other hand, more Vietnamese students were consuming some less nutritionally desirable foods such as snack foods, soft drinks and takeaways and were also less likely to eat dairy foods. Overall, Vietnamese boys’ diets contained both more positive and more negative features than the Vietnamese girls’ diets.

4.7 Influences on dietary habits

Because of the possible influence of many factors on food consumption, information was sought on a number of these which could impact on Vietnamese adolescents. These were food preferences, nutrition knowledge, television viewing and barriers to eating healthy foods. Students were also asked to rate the quality of their own diets and to report the amount of exercise they regularly undertook.

4.7.1 Preferred foods

Respondents were asked, of all the foods available to them, which three they liked the most and which three they liked the least.

For the foods liked the most, 85% of respondents named Vietnamese style foods or dishes.
Frequent responses were: Pho (noodle soup), spring rolls and fried rice as the most liked foods. Of the non-Vietnamese foods listed, the most popular were McDonald’s, pizza, and lasagne (within first choice). Other takeaway foods mentioned included kebabs, Mexican, Italian and spaghetti.

Interestingly, names such as ‘McDonald’s’, and ‘Kentucky Fried Chicken’ were used as descriptors rather than the generic terms hamburger and fried chicken. However, for other foods, general terms such as hot dog, kebabs and Italian food were used. It is also interesting to note that the food category meat/chicken/fish and seafood was almost as popular as takeaway foods.

Foods that were disliked were wide ranging and tended to be specific food items rather than food types. Interestingly, this list included some foods that had also been rated as preferred foods eg pie, spaghetti, sausage roll and lollies/chocolate. Vegetables, meat, chicken and fish and were widely reported as disliked foods. Other items included duck, lamb, cheese, yoghurt, butter, fried foods/fat, cakes and biscuits. Specific Vietnamese foods included bitter melon, rice/noodles, gruel and durian.

For the liked foods, more people volunteered one (151) and two (149) preferences than three preferences (145). For the disliked foods, considerably more people volunteered one preference (146) than two (127), or three preferences (110).
Respondents were asked, of all the foods available to them, which they thought of as 'healthy' and which they thought of as 'unhealthy'. For healthy foods, more respondents volunteered 1 (147) or 2 (145) answers, than 3 answers (134). For unhealthy foods, responses for 1, 2 and 3 answers numbered 141, 127 and 115 respectively.

For 'healthy' foods, nearly all respondents listed foods which could easily be classified into the categories of the 5BFGP eg vegetables, fruit, and rice. Sometimes a cooking method was included, eg boiled or stir fry. The only foods mentioned whose 'healthiness' is frequently debated were pizza (3), hamburger (3), chips (1) and hot dog (1).

The top three 'unhealthy' foods nominated (accounting for a third of all responses) were chocolate, fried foods/foods with fat, and hot chips/chips. In contrast, sugar was only mentioned once (although lollies and sweet foods were mentioned), and salt was not mentioned at all. However, the concept of unhealthiness is open to interpretation and may include foods that have provoked individual reactions eg allergies and food poisoning. It may also represent foods that are not customary for cultural reasons. These reasons may explain the offering of foods such as oysters, pickled fish, mango, lamb and MSG as unhealthy foods.
Although this was a limited test of nutrition knowledge, the Vietnamese students appeared to be aware of which foods are commonly accepted in Australia as healthy/unhealthy. All answers were nominated without any form of prompting and the majority were appropriately classified.

From their answers to the question on unhealthy foods, the students seemed to have a high level of awareness of the fat content of foods as a health issue, but less so of sugar and salt. It is interesting to note that the foods nominated by the group as unhealthy were all widely consumed by the sample.

4.7.3 Television

The daily number of hours of television watched varied from less than two to more than four. More than half the respondents (61%) reported watching television for two hours or more per day; over one-quarter (28%) reported watching TV for more than four hours per day (n=153).

Most of the respondents (80%) reported watching only commercial channels (ie 7,9,10). Non-commercial channels only (ie SBS, ABC, videos), were watched by 5% of the sample.

Commercial television channels, as watched regularly by most of the students may influence food consumption through advertisements for food, and through role modelling in shows that are popular with teenage audiences. From these results it cannot be determined which times and which shows would have been most watched by this sample.
However, assuming children are home from school after 3.30pm, they could be watching television from this time onwards.

4.7.4 Perceived barriers to eating healthy foods

Respondents were asked to choose from a list of possible factors that might make it hard for them to eat healthy foods (more than one option could be chosen).

Nearly half (46%) the respondents (n=153) reported that it was not hard to eat healthy foods (Table 4.22). The most frequently chosen barrier to eating healthy foods was that the respondent did not like them (41%). Friends or family not liking healthy foods were not major barriers (7%, 11 each). Over one-quarter of the respondents (28%) reported that they did not know what healthy foods were.

Respondents who had lived in Australia for seven years or more, were more likely to respond ‘it is not hard to eat healthy foods’ than respondents who had lived in Australia for six years or less (52% compared with 34%).

| Barriers                        | Percentage of respondents *
|---------------------------------|-----------------------------
| It is not hard                  | 46                          |
| I don't like them               | 41                          |
| I don't know what they are     | 28                          |
| Friends don't like them         | 7                           |
| Family doesn't like them        | 7                           |

* More than one answer could be given
These results suggest that the majority of the Vietnamese students are not prevented from eating healthy foods by a lack of knowledge, although this may be more of an issue for those who have lived in Australia for shorter periods of time. The main barrier to eating healthy foods for this group appears to be personal preference or taste.

4.7.5 Perception of quality of own diet

Respondents were asked to rate the foods they usually ate on a scale of 1 (very healthy) to 7 (very unhealthy). Responses tended to cluster around the 'half and half' option with half the respondents (49%) choosing this option (Table 4.23). A greater proportion of students rated their diets on the healthy side (36%) than on the unhealthy side (15%).

This perception significantly varied with the number of years in Australia (r=0.2, p=0.02). As the number of years in Australia increased, the perception of the quality of diet decreased. That is, students who had lived in Australia the longest, considered their diets to be the least healthy.

<table>
<thead>
<tr>
<th>TABLE 4.23: Perception of quality of own diet (n=146)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Quality</strong></td>
</tr>
<tr>
<td>Very healthy</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Half &amp; half</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Very unhealthy</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>
4.7.6 Physical activity

Most (85%) of the respondents reported exercising at least once a week: about half (48%) exercised one-three times a week and one-third (37%) exercised on four or more days a week (n=153). The frequency of exercise was not significantly correlated with age (r=0.04, p=0.6) but was significantly associated with gender (MHχ²=6.5, DF=1, p=0.01) and the number of years resident in Australia (r=-0.2, p=0.003):

- Males tended to exercise on more days per week than did females (Table 4.24). Nearly one-quarter of the girls (23%) exercised on less than one day per week compared with only 3% of boys.
- Frequent exercise was associated with a longer period of residence in Australia (Table 4.25).

<table>
<thead>
<tr>
<th>TABLE 4.24: Frequency of physical activity by gender (percentages, n=153)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of days per week</td>
</tr>
<tr>
<td>-------------------------</td>
</tr>
<tr>
<td>&lt;1</td>
</tr>
<tr>
<td>1-3</td>
</tr>
<tr>
<td>4-7</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TABLE 4.25: Mean number of years resident in Australia by frequency of physical activity (n=153)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of days per week</td>
</tr>
<tr>
<td>--------------------------</td>
</tr>
<tr>
<td>&lt;1</td>
</tr>
<tr>
<td>1-3</td>
</tr>
<tr>
<td>4-7</td>
</tr>
</tbody>
</table>
The weekly number of hours of physical activity varied from one to more than seven. The number of hours of physical activity was not significantly correlated with age ($r=0.04$, $p=0.6$) but was significantly affected by gender ($\text{MH}^2=20.0$, $DF=1$, $p<0.0001$) and the number of years lived in Australia ($r=0.2$, $p=0.02$):

- Males tended to do more hours of exercise than females (Table 4.26). Boys were more likely to exercise for three hours or more per week whereas girls were more likely to exercise for less than three hours per week. Girls were three times as likely to exercise for one hour or less than were the boys (32% compared with 11%).

- A greater number of hours of exercise was associated with a longer period of residence in Australia (Table 4.27).

Thus males tended to exercise more often and for longer periods than did females and were more likely to be exercising at recommended levels.

### TABLE 4.26: Number of hours of physical activity by gender (percentages, $n=151$)

<table>
<thead>
<tr>
<th>Number of hours per week</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 or less</td>
<td>11</td>
<td>32</td>
</tr>
<tr>
<td>More than 1 but less than 3</td>
<td>25</td>
<td>40</td>
</tr>
<tr>
<td>3 to 7</td>
<td>41</td>
<td>20</td>
</tr>
<tr>
<td>More than 7</td>
<td>23</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
TABLE 4.27: Mean number of years resident in Australia by hours of physical activity (n=151)

<table>
<thead>
<tr>
<th>Number of hours</th>
<th>Mean number of years in Australia</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 or less</td>
<td>5.9</td>
<td>3.3</td>
</tr>
<tr>
<td>More than 1 but less than 3</td>
<td>6.3</td>
<td>3.3</td>
</tr>
<tr>
<td>3 to 7</td>
<td>6.8</td>
<td>3.5</td>
</tr>
<tr>
<td>More than 7</td>
<td>8.0</td>
<td>3.4</td>
</tr>
</tbody>
</table>

Low levels of exercise are a concern for achievement of adequate levels of fitness, meeting dietary requirements and achievement of adequate bone density. Increased levels of exercise with increasing residence in Australia may indicate a greater level of familiarity with types of exercise available and/or a greater confidence in participating.

4.8 Food supply to the household

Because of some concern that the Vietnamese teenagers may have a major responsibility in providing food for the family, information was sought on the roles of different members of the household. As another indicator of the maintenance of traditional diets, respondents were also asked to describe family shopping and cooking practices.
4.8.1 Roles of family members

4.8.1.1 Shopping

To determine who does the main food shopping in the respondents' households, they were asked to specify how often they, their mother and someone else did the food shopping. The main shopper tended to be the mother (Table 4.28). Other main shoppers were the father or siblings. Few respondents stated that they were responsible for the main food shopping.

When asked whether or not they ever decided what foods would be bought for their household, nearly two-thirds (62%) responded that they did. However, it cannot be determined from this result whether this decision occurred at the point of purchase or whether the teenagers requested that particular foods be bought.

4.8.1.2 Food preparation

Respondents were asked to state how often they, their mother and someone else cooked and prepared food for the household. The respondents' mothers tended to do the bulk of the meal preparation, although one-third of respondents reported that someone else always or usually prepared food for the household (Table 4.29). Other main food preparers were father, sister and grandmother.

Few respondents stated that they were responsible for meal preparation most of the time.
Thus very few of the Vietnamese teenagers in the sample had more than a minor role, if any, in providing food for their households. The roles of shopping and food preparation were mainly carried out by the mother. Other main food providers were the father, siblings and the grandmother who assisted with food preparation but not shopping. However, the respondents appear to be influential in determining what foods should be purchased.
4.8.2 Shopping practices

The frequency of shopping done by the main shopper was generally once a week or more (Table 4.30). Over a quarter of respondents (28%) reported that main shopping occurred at least twice a week (n=151). The main types of shops where food was bought were the supermarket, Asian grocery shops, fruit and vegetable markets and Asian butchers (Table 4.31).

When asked where they usually went to buy Vietnamese foods, most respondents (90%) nominated Bankstown/Marrickville. Campsie/Lakemba (28%) and Cabramatta (24%) were each nominated by about one-quarter of respondents.

<table>
<thead>
<tr>
<th>TABLE 4.30: Frequency of shopping (n=151)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
</tr>
<tr>
<td>------------------------------------------</td>
</tr>
<tr>
<td>Once a fortnight</td>
</tr>
<tr>
<td>Once a week</td>
</tr>
<tr>
<td>2-3 times a week</td>
</tr>
<tr>
<td>4-7 times a week</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

* Figures do not equal 100 due to rounding

<table>
<thead>
<tr>
<th>TABLE 4.31: Types of shops from which food was bought (n=153)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of shop</td>
</tr>
<tr>
<td>-------------------------------------------------------------</td>
</tr>
<tr>
<td>Supermarket</td>
</tr>
<tr>
<td>Asian grocery shop</td>
</tr>
<tr>
<td>Fruit &amp; vegetable market</td>
</tr>
<tr>
<td>Asian butcher</td>
</tr>
<tr>
<td>Other butcher</td>
</tr>
<tr>
<td>Corner shop</td>
</tr>
</tbody>
</table>

* More than one answer could be given
These results indicate that most of the Vietnamese households sampled prefer to shop frequently. There may be a number of reasons for this which include a preference for freshness, limited storage capacity in the home, difficulties with transport and therefore a need to carry smaller quantities.

That the majority purchased foods from traditional suppliers as well as from conventional supermarkets suggests a strong desire for traditional foods, especially as most were regularly travelling some distance to buy the food for their households.

4.8.3 Food preparation practices

Respondents were asked how often meat, fish and seafoods (Table 4.32) and vegetables (Table 4.33) were cooked by each of a variety of methods.

The most frequently used cooking methods for meat, fish and seafoods tended to be stir fry, soup/braise and steam/boil. Deep frying was used less often with grilling and roasting the least used.

The most frequently used cooking methods for vegetables tended to be steam/boil, soup/braise and stir fry. Deep frying was used less often with grilling and roasting the least used.
TABLE 4.32: Frequency of using different cooking methods for meat, fish and seafoods (percentages of total sample, n=153)

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Usually</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
<th>Missing*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stir fry</td>
<td>18</td>
<td>35</td>
<td>35</td>
<td>6</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Grill</td>
<td>5</td>
<td>12</td>
<td>35</td>
<td>28</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>Roast</td>
<td>3</td>
<td>18</td>
<td>23</td>
<td>24</td>
<td>25</td>
<td>7</td>
</tr>
<tr>
<td>Soup/braise</td>
<td>19</td>
<td>35</td>
<td>31</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Deep fry</td>
<td>12</td>
<td>26</td>
<td>33</td>
<td>17</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Steam/boil</td>
<td>25</td>
<td>25</td>
<td>28</td>
<td>8</td>
<td>8</td>
<td>6</td>
</tr>
</tbody>
</table>

* Missing data may have denoted that the answer was ‘never’

TABLE 4.33: Frequency of using different cooking methods for vegetables (percentages of total sample, n=153)

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Usually</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
<th>Missing*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stir fry</td>
<td>16</td>
<td>36</td>
<td>25</td>
<td>6</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>Grill</td>
<td>3</td>
<td>7</td>
<td>11</td>
<td>20</td>
<td>49</td>
<td>10</td>
</tr>
<tr>
<td>Roast</td>
<td>1</td>
<td>6</td>
<td>14</td>
<td>20</td>
<td>48</td>
<td>11</td>
</tr>
<tr>
<td>Soup/braise</td>
<td>24</td>
<td>32</td>
<td>20</td>
<td>7</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Deep fry</td>
<td>4</td>
<td>15</td>
<td>21</td>
<td>22</td>
<td>28</td>
<td>10</td>
</tr>
<tr>
<td>Steam/boil</td>
<td>31</td>
<td>31</td>
<td>19</td>
<td>9</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

* Missing data may have denoted that the answer was ‘never’

From the dietary records, fried foods (stir fried, deep fried) were consumed by a greater percentage of respondents on the day of recording than foods cooked by other methods (Table 4.34).

- fried foods were consumed at least once on the day of recording by over half the sample (especially in boys);
• soups were consumed by at least one-third of respondents;
• overall, respondents were more likely to consume soups than steamed/braised/grilled foods.

Traditional cooking practices of stir-frying, soups, braises and steaming/boiling of vegetables were the most commonly reported as practised in the households of the respondents. Non-traditional cooking methods of grilling and roasting were only sometimes or rarely used in the majority of households, but were more commonly used for meats than vegetables.

These cooking methods were more likely to be reported as never used than were more traditional methods. The majority of the sample reported eating fried foods on the day of recording although these were not necessarily traditional foods.

| TABLE 4.34: Cooking methods - percentage of sample using at least once during the day by age and sex |
|---------------------------------|----------------|----------------|----------------|----------------|
|                                | 12 years | 13 years | 14 years | 15 years |
| Males                          |          |          |          |          |
| Fried (stir fried/deep fried)  | 83       | 82       | 80       | 83       |
| Soup                           | 50       | 47       | 53       | 50       |
| Steamed/braised/grilled        | 17       | 47       | 33       | 33       |
| Females                        |          |          |          |          |
| Fried (stir fried/deep fried)  | 67       | 73       | 64       | 100      |
| Soup                           | 44       | 47       | 36       | 73       |
| Steamed/braised/grilled        | 0        | 47       | 27       | 40       |
4.9 Availability of traditional foods

4.9.1 Observed shopping facilities

During the period of the project, shops selling 'traditional' Vietnamese foods were concentrated in two shopping centres in the Canterbury LGA: Campsie and Lakemba. Typical food outlets in these centres included Asian grocery stores and butchers, Vietnamese restaurants and bread shops. Shops are spread out along the main street interspersed with non-Vietnamese shops (see Figure 4.2). Bankstown (to the west) and Marrickville (to the east) are larger centres with more varied and more numerous facilities, including more specialty Vietnamese lines and a greater number of community services, eg medical and welfare services, than those available within Canterbury LGA. Bankstown and Marrickville although further away, are easily accessible by public transport being on the same railway line as Lakemba and Campsie. Cabramatta, the major cultural centre for the Sydney Vietnamese population is much further to the west of Canterbury LGA and not directly linked by public transport (commuters must change trains). Most consumers from Canterbury LGA would travel by car when shopping there. These centres all contain a greater concentration of Vietnamese shops and other shops selling foods preferred by the Vietnamese community.

During the project, visits were made to Bankstown and Cabramatta shopping centres on Saturday mornings. Both were observed to be very busy centres with Cabramatta the larger and busier of the two. Vietnamese shops tended to be concentrated in traffic-free mall areas with parking available in nearby streets and in car parks.
Both centres had a very social atmosphere, suggestive of a village market, with tables and seats where many people were meeting and eating. Family groups often appeared to be shopping together with all members carrying heavy bags of goods. These centres contrasted with Campsie and Lakemba shopping centres which were more conventional in design, having the majority of shops sited along a main traffic road. Figures 4.2, 4.3 and 4.4 illustrate the contrasting styles of the Campsie and Bankstown shopping centres. Figure 4.2 shows a street in Campsie shopping centre, where Vietnamese shops are interspersed with non-Vietnamese shops along a main road. Figures 4.3 and 4.4 illustrate the market style of the Bankstown shopping centre. In Figure 4.3 the mall area where people are socialising is clearly visible, while family groups, shopping together and carrying parcels can be seen in Figure 4.4.

FIGURE 4.2: Campsie shopping area
FIGURE 4.3: Bankstown shopping area

FIGURE 4.4: Bankstown shopping area
In all centres, it was observed that many of the available packaged foods carried labelling which was inadequate according to the Food Standards code (NSW Government Information Service 1992). For example, numerous food packets had no use by date and/or no ingredient list. Also storage conditions were often unhygienic, being cramped in older style buildings with loose floorboards and torn floor coverings. Some types of foods which appeared to be perishable (eg contained prawns and eggs) were not refrigerated.

From these observations, traditional foods are readily available to the Vietnamese community of the Canterbury LGA. However, it is interesting to note that the closer centres were actually less preferred by the households of this study sample. Since people were prepared to travel considerable distances to purchase their household food, other factors appear to be important in determining the place of food purchase. It is a concern that storage in a number of the food outlets was unsatisfactory. This may place the Vietnamese community, and other customers of those stores, at increased risk for contracting food borne illness.

It was also interesting to observe that during the period of the study and in the period since, increasing numbers of Vietnamese bread shops and Asian grocery stores opened in localities some distance from the Canterbury LGA. This may indicate some movement of Vietnamese people outside of traditional settlement areas and in turn support the settlement of Vietnamese people in non-traditional areas through the increased availability of appropriate foods.
4.9.2 Schools

All schools had a canteen on the premises although menus were not available. Due to time constraints, it was not possible to undertake an inventory of the canteens or interview staff. However, informal observations indicated that confectionery, snack foods and takeaway foods were readily available. Traditional foods did not appear to be available.

4.10 Limitations of the research

This section describes the precautions that should be applied when interpreting the results of this study and discusses some of the issues faced in its implementation.

The intention of this dietary survey was to describe patterns of dietary practices; not to show causal links or to rank individuals with regard to their nutritional intake - food records kept for only one day are not valid for drawing such conclusions. Therefore the results should not be used to categorise the healthiness of Vietnamese adolescents but to provide a baseline against which future changes in diet can be assessed. As results of the food habits questionnaire were largely supportive of the dietary record, it is felt that the recorded intakes are representative of respondents’ usual food intakes.

Results of this study should also not be used to categorise ‘the Vietnamese diet’, as there may be variations within the group studied related to regional and cultural differences.
There may also be both similarities and differences between different ethnic groups which are not evident from the current study.

Generalisability of this study is limited by its small sample size and the lack of data on the Vietnamese adolescents who chose not to participate. Investigators were aware of a number of reasons for students not participating in the survey. These included permission to take part refused by parents, and students themselves choosing not to participate because they saw it as an inconvenience. Where non-participants were denied permission by their parents to take part in the study, they are perhaps likely to be more traditional than Western in their cultural practices, and may have seen the survey as a distraction from education which is traditionally of high priority; or they may not have understood the intent of the survey. No conclusions can be drawn as to the characteristics of the non-participants. However, given the wide range of dietary practices that were demonstrated by participants and their similarity of demographic features to the source population, it is likely that the study group is representative of Vietnamese adolescents in the area.

However, no comparison was made with other specific ethnic groups. Therefore care should be taken when generalising results beyond the group of Vietnamese adolescents attending school in the Canterbury LGA.
Although comparisons of the dietary intake data were made with data from the National Dietary Survey (NDS), the validity of that comparison may be somewhat clouded by the age of the NDS data - the large changes in both the food supply and in the economic situation since 1985 when the NDS was conducted, may have made these data outdated.

In interpreting the results of the FHQ it should also be recognised that interpretation of many concepts eg physical activity and body image may be culture and gender biased as well as driven by a desire to give 'correct answers'.

Interpretation of anthropometric data should take into consideration the fact that measurements were made with respondents wearing school uniform without shoes. Resulting weight measurements are thus likely to be slightly above true values. No corrections were made as these data were intended to demonstrate trends only.

4.10.1 Discussion of the method

A number of difficulties were experienced in the implementation of this study. Firstly, different response rates were obtained between the schools which I feel was the result of different processes within the schools. All of the schools differed in their organisation both prior to and during the school visits. This was evidenced by the availability of space for interviews and the availability of children within the school during the interviews.
The highest response rates were obtained in the two schools where I had been invited to address a whole school staff meeting prior to starting the interviews. This possibly enabled a smoother operation of the interview schedule as all teachers were aware of the study and its purpose.

A positive feature of the project was the presence of the Vietnamese-speaking project officer. As well as acting as a cultural resource person, she was also able to provide translations and generally assist where communication was difficult. For example, the Vietnamese project officer gave translated instructions in the practice sessions. The advantage of this was apparent when she was unable to attend on two occasions. On one occasion, no translations were given and on the other a professional translator was present. Records kept by students attending these sessions were less complete than those who attended sessions where the project officer was present. The professional interpreter being a male, may have been less familiar with the subject matter for translation than the female project officer. On this occasion, another reason for the difference may have been the time of day the instruction session was given - being a Friday afternoon, the male students were somewhat restless.

As much as possible the protocol from the NDS was followed in the interview, recording and debriefing stages (Commonwealth Department of Health c1985). Departures from the protocol were due to the need for cultural relevance and appropriateness. This included the examples used in the practice session, the measuring equipment and food models used in the debriefing sessions, and the need for translations in Vietnamese.
One aspect that was interesting in the debriefing process was that participants often needed to talk in Vietnamese about their food diary entries, even if the entries had been made in English. The presence of the Vietnamese speaking project officer during the debriefing session enabled this to occur. An advantage of her presence was the greater detail and clarity obtained from those diaries, as her familiarity with Vietnamese foods and cooking methods enabled her to ask more precise questions.

However, this would have also introduced some interviewer bias as the probing by the two interviewers gave different responses. There was also departure from the protocol in the level of probing used.

As the questions asked in Vietnamese often sought information on particular ingredients in mixed dishes, they would be considered leading questions according to the definitions in the NDS interviewers handbook (Commonwealth Department of Health c1985:29). This was necessary as the respondents were not usually involved in meal preparation and had difficulty explaining the details of the evening meal. However, these questions enabled a much more accurate picture of the day's intake to be drawn. An example of the greater detail provided after probing was that one respondent's description of 'rice with fish and vegetables' became 'steamed rice, fried rice, fried fish and stir fried beans and broccoli'. Further examples can be found in Appendix 3.
Errors may also have been introduced into the study by the administration of questionnaires in English where this was the respondents' second language. Bond and Yang (1982) have reported differences in results when bilingual respondents completed questionnaires in both languages. However, as about half the respondents could not read Vietnamese, questionnaires in both languages would have been needed, and this would have introduced new errors. Another source of error may have been translations into English for words and foods that have poor lexical or conceptual equivalence. Hung et al (1995) reported that their sample had difficulties interpreting the word 'vegetable' as it represents two different forms in Vietnamese, (one above the ground and one below). The extent of this type of error in the present study is not known.

Although the survey instruments were not validated to determine the participants' understanding of these food-related concepts, it was felt that the error would have been minimised by the review of the questionnaires by Vietnamese-speaking people. However, that there were differences is indicated by the respondents' difficulty in expressing some dietary concepts in English in the debriefing session as described above.

A major difficulty encountered in completion and interpretation of the food diaries was in the estimation of food quantities. Vegetables, as these were often cooked in mixed dishes and soups, and then served from communal bowls, and fats which were used in cooking were particularly problematic.
These problems are similar to those reported in other studies of food intake by Asian people. Carlson et al (1982b) noted the style of eating at a Vietnamese traditional meal made the assessment of individual food intake difficult and Hung et al (1995) recorded problems with estimating vegetable quantities in mixed dishes. Hertzler et al (1993) have also noted that college students had difficulty estimating portion sizes. Another difficulty in the present study was that identification of particular ingredients, and in some cases the dish itself, was difficult from the descriptions given. Although requested, very few respondents brought recipes from home for the mixed dishes consumed.

Having incomplete data on quantities of some ingredients was a potential problem for nutrient contribution, as Ziegler et al (1989) noted that herbs were used in large enough quantities in some SE Asian dishes to be nutrient sources.

Also problematic here was the suitability and completeness of available food tables. A joint review of dietary records and available food tables was conducted by staff from similar projects in Sydney. Although nutrient data were allocated to the majority of Vietnamese foods and ingredients reported (Mitchell et al c1991), many of these were done by 'best guess'.

Of concern was that some of the foods were very difficult to allocate nutrients to, and some of the data were incomplete. Ziegler et al reported that nutrient data for many foods commonly used by SE Asians could not be found when compiling their renal exchange list.
Analysis and reporting of nutrient intake data had been an original intention of the study. However, because of the difficulties encountered in using the food quantity information reported in the food diaries, I decided not to continue with this aspect of the study. Specifically, this decision was prompted by the incompleteness of the information provided by respondents which meant that a lot of estimation was required to establish the quantities of foods and hence nutrients consumed. Both the reliability and validity of the results of that analysis would have been questionable. Support was also provided by consideration of several aspects related to the purpose of the study and utility of the findings. These aspects were outlined in Section 3.5.

Since that decision was made, a good deal of additional literature expressing caution about the interpretation of food consumption data has been published (eg Mertz et al 1991, Magarey and Boulton 1994a). Specifically, these reports relate to frequent underreporting of intake, particularly by females in record keeping methods (eg Mertz et al) and the questioning of the current focus of nutrient based studies. The latter point has arisen from the move towards Food Based Dietary Guidelines (FBDG). Wahlquist (1995:2) reports that for FBDG to occur, several developments are required. These developments include:

'scientific studies which show that food patterns, food scores, ... and not simply nutrient intakes are predictive of health outcomes and amenable to useful change in their own right; major advances in food science which allow an appreciation of food component complexity and its implications for human biology'.
These reports support my decision.

As a proxy measure for dietary adequacy, intake was estimated and compared with the Five Basic Food Group Plan (5BFGP). The 5BFGP was chosen as a comparison tool because it is commonly used in schools as a nutrition teaching aid (eg Smith and Schmerlaib 1988) with students encouraged to calculate their daily food intake and to estimate the dietary adequacy. It is recognised however that newer food guides have been released since the completion of the Food and Families project.

From the issues encountered during the implementation phase of this study, a number of lessons have been learned with regard to the process of conducting dietary research with Vietnamese adolescents. These include the value of a bilingual member of the project team who is also familiar with traditional foods and customs - even where students can read and write English they may need assistance in their first language; giving verbal translated instructions appears to be an advantage; detailed probing may be required in Vietnamese; students may not be able to accurately describe the ingredients and preparation of mixed dishes and cannot be relied on to bring information from home; the usefulness of pictures of traditional foods and ingredients to assist probing about food intake. Also, written material needs to be provided in both English and Vietnamese. These principles may be important considerations in any dietary research with young people from an ethnic group different to that of the investigator (with adjustment for language).
Other important aspects learned from the implementation of the present study have implications for research or any similar activity conducted in a school setting.

These aspects are magnified where multiple schools are involved. Difficulties identified include restrictions posed by school timetables, especially where students need to be withdrawn from different classes at different times; not all students may come and there may be many valid reasons for this, eg unaware of place and time, on excursion etc; and the differences between schools in their operation and facilities that can be provided for the activity.

These difficulties appeared to be less where all staff in the school had been addressed to explain the research and therefore maximise their participation and cooperation, and where there was one key person in the school who facilitated the administration, eg timely reminding of students and teachers affected by the study.

Despite the difficulties discussed above, and the resulting limitations placed on the study’s findings, the process chosen for the study’s implementation appeared to be appropriate. Respondents in the study appeared happy to participate, and actively encouraged friends to take part. In one case, a girl who had not wanted to take part changed her mind after being persuaded by friends to stay for the briefing session. The readiness to take part may have been because it involved time away from lessons, but from comments made there also seemed to be a genuine interest in the study.
CHAPTER FIVE

DISCUSSION

The Food and Families study was prompted by health workers' concerns that the adolescents of Vietnamese-speaking background who lived in the Canterbury LGA and had adopted Western dietary patterns may have a lower quality diet, and develop future health problems related to their diet. Anecdotal reports, (which were supported by literature from the US), that Vietnamese adolescents had the major role in preparing food for their families, exacerbated these concerns. The primary goal of the present study was therefore to determine the need for a nutrition intervention that would address these concerns and be targeted to Vietnamese adolescents in the Canterbury LGA.

This discussion focuses on the results of the study directly related to determining that need. Additional data collected as background information will be referred to where relevant. Since the need for a nutrition intervention with Australian-Vietnamese adolescents was considered in the light of findings from studies of similar cultural groups - Vietnamese migrants and Australian adolescents, factors that have been found to influence dietary practices in those groups are also discussed. The study on which this thesis was based was also the first to my knowledge to document dietary practices of adolescents from Vietnamese-speaking background in Australia (Tranter et al 1994).
In terms of dietary intake, there were seven major findings of the study which I will discuss in turn in this chapter. The most striking finding was the mixture of traditional and Western dietary practices reported by the adolescents. Other findings were that the adolescents had a minimal role in food purchasing and preparation; that the adolescents' diets contained a number of positive as well as some negative qualities; and that there was potential negative impact of the dietary practices on health in the short term, but ironically the impact of diet on the long term health of the adolescents was likely to be somewhat positive. The sixth major finding was that the influences on the adolescents' diets were somewhat mixed. The seventh major finding was that some nutrition education strategies are inappropriate for this group.

Although original concerns relating to the adoption of Western dietary patterns and the future health of the Vietnamese adolescents were not fully supported by the findings of the study, other issues, including the immediate health impact of dietary practices such as skipping meals and a high prevalence of dissatisfaction with body image amongst girls, emerged as very important.

The results of this study provided limited support for the need for a nutrition intervention targeting Vietnamese adolescents. However, although the sample studied was relatively small, I feel the results are noteworthy in demonstrating the complexity of food habits.
In particular, the present study demonstrates that the acculturation process for food habits is far more complex than commonly portrayed in the nutrition literature. It is clear that the group of Vietnamese adolescents studied is subject to both acculturating influences and traditional influences at the same time. As these influences can be both conflicting and complementary, it is enlightening to consider the impact of social and cultural factors on the adolescents' food habits.

Therefore, in discussing the results I have particularly explored this aspect. Consequently, I challenge a number of premises on which cross-cultural nutrition health promotion practice is based. For example, I question the widely held tenet that the effects of migration and acculturation are negative. I also explore the impact of common terms such as 'cultural appropriateness' on health and nutrition recommendations. I believe that these findings have significant implications for health promotion practice.

5.1 Dietary patterns of Vietnamese adolescents

The results of the present study clearly indicate that the Vietnamese adolescents in Canterbury LGA were eating a mixture of traditional and Western foods and also following both distinctly traditional (e.g., meal formats) and more Western dietary patterns. This suggests that while Western dietary patterns have been adopted, traditional Vietnamese patterns have been retained as well. However, each was associated with specific places and times.
In this section I will provide an overview of the adolescents’ dietary patterns and this will form the basis of more detailed discussion in later sections. Initially I will discuss the evidence for the traditional and Western dietary patterns observed, and also describe other aspects of the adolescents’ diets including meal patterns, snacks, places of eating and food preferences. Lastly I will compare these patterns with those of other migrants from Vietnam. In Section 5.2, I will then examine the quality of the adolescents’ diets and compare this to recommended intakes and the diets of other Australian adolescents.

5.1.1 Maintenance of traditional diet

In the Canterbury LGA, it was apparent that the Vietnamese adolescents were more likely to eat traditional foods and follow traditional practices at home than when they were away from home. Examples from the home included the style and presentation of food, the types of food eaten and the way it was prepared. The main evening meal, (where indicators of traditional practices were the use of chopsticks, the serving of food in communal bowls for sharing and the consumption of rice and traditional dishes), was widely reported as being a traditional style meal. Serving of food from a communal bowl and eating with chopsticks was reported by over 80% of respondents. Rice was eaten by nearly everyone, with one (metric) cup being the smallest amount reported as eaten at one time. These observations were supported by adolescents’ own perceptions of how Vietnamese or Australian their meals were - the evening meal was rated as ‘mostly Vietnamese’ by nearly everyone in the sample.
No one rated the evening meal as 'mostly Australian'. Supportive evidence for the maintenance of traditional diet was provided by the majority of respondents reporting that traditional cooking methods such as stir-frying were used in the home, and that food purchases were made from centres where Vietnamese food was available, and in particular from Asian grocery stores and Asian butchers. Traditional foods were also eaten by nearly everyone in at least one meal on the day of recording - for a few respondents, some non-traditional foods such as pizza were eaten, but this was in addition to traditional foods. The adolescents also indicated a strong liking for traditional foods (see Section 5.1.5).

5.1.2 Adoption of Western diet

Examples of the adoption of non-traditional dietary patterns included the reported consumption of foods such as breakfast cereal, sandwiches (especially at lunchtime), takeaway foods and snack items such as ice cream, chips and soft drinks. In the Canterbury study, respondents mostly ate rice only at the evening meal - bread and breakfast cereals were more commonly eaten at lunch and breakfast and probably replaced the rice which would have been eaten at those times in a traditional Vietnamese diet. Although French bread was a familiar food in parts of Vietnam (Kaufman 1979), it was consumed far less than was rice. Breakfast cereal is not reported at all as a food commonly consumed in Vietnam. More detail on the adoption of Western foods can be found in Sections 5.1.3 and 5.1.6.
5.1.3 Meal patterns

It was obvious that there was no standard meal pattern for the adolescents in this study. There was enormous variation in the types of food eaten throughout the day, and in the amounts of food eaten. However, there were some general trends in the types of foods eaten at each meal and in boys' patterns compared with girls' patterns. While most respondents consumed three meals on the day of recording and snacks in between meals, a number of children did not. The children who were missing meals and also having meals of poor nutritional quality, were therefore going long periods of time with little substantial to eat (see also Section 5.4.1).

Overall the diet records supported the participants' self reports (in the FHQ) that breakfast, and particularly lunch, were more 'Australian' meals than the evening meal which was distinctly Vietnamese. Of the associations tested, for types of food eaten and the length of stay in Australia, the only relationship found was that adolescents who had lived in Australia for longer, were significantly more likely to perceive their own diets (apart from the evening meal) to be less Vietnamese and more Australian. This suggests that acculturation does not occur evenly for all dietary aspects.

5.1.3.1 Breakfast

For breakfast, boys were more likely than girls to consume foods of higher energy content, and foods of both high and low nutrient density.
Foods where major differences were found in consumption between boys and girls were milk, which was consumed significantly more by boys (48% compared with 24%; $\chi^2=5.72, DF=1, p=0.02$), and breakfast cereal, fats and sugars which were all consumed by a greater proportion of boys. On the other hand, fruit and water were consumed by more girls. Bread, rice and meat/fish were all eaten by about one-quarter of both boys and girls. These results are not dissimilar to those of Magarey and Boulton (1995b) who reported from the different nutrient densities of sugar, folate, iron and vitamin C consumed by Adelaide adolescents, that girls were more likely to have eaten fruit juice and toast, while boys were more likely to have had cereals to eat.

In the present study, Vietnamese foods were commonly eaten for breakfast. For example, over one-quarter each of girls and boys, reported eating a rice-based dish. However, snack foods such as instant noodles, chips, and confectionery were also commonly consumed before 9am, and at times were the only foods eaten. As girls were more likely than boys to have had either no breakfast (22% compared with 9%), or breakfast of minimal nutritional value ie snack foods only (although this difference was not significant), their nutrition would seem to be more compromised by their breakfast routines than is the boys’.

5.1.3.2 Lunch

Again for lunch, boys were more likely than girls to consume foods of higher energy content, and foods of both high and low nutrient density.
The foods most commonly eaten at lunchtime were bread and protein foods (most often eaten together as sandwiches), each reported by about half the respondents. The differences between the sexes in their lunch consumption patterns again suggested a sizeable nutritional difference between boys and girls. Boys were significantly more likely than girls to consume takeaway foods such as hot dogs ($M \chi^2 = 4.70, DF=1, p=0.04$) and soft drinks ($M \chi^2 = 6.07, DF=1, p=0.01$). However, they were also more likely to eat raw vegetables ie salad on sandwiches, although these differences were not significant (25% compared with 14%).

On the other hand, girls were significantly more likely than boys to consume protein foods (meat/fish etc) (58% compared with 37%; $M \chi^2 = 4.34, DF=1, p=0.04$) and fruit juice (36% compared with 14%; $M \chi^2 = 6.09, DF=1, p=0.01$). That is, while sandwiches were the most common lunch, girls' sandwiches were more likely to have a protein filling accompanied by fruit juice to drink, while boys' sandwiches would often have salad filling and would be accompanied by soft drink. The most common protein fillings were salty meats (eg Chinese sausage/pork roll, ham, devon) and fried eggs. A small number of children (4) had sandwiches filled with chocolate spread or jam. Only five children, who were not new arrivals, had a rice or noodle based dish for lunch. Girls were more likely than boys to eat confectionery.

These findings indicate that at least on schooldays, Vietnamese adolescents are eating a Western-style lunch, although fillings are commonly Vietnamese-style (eg pork roll and fried egg).
However, the nutritional quality was variable. While girls' lunches tended to be more 'wholesome', they were also of mixed quality. A substantial number of children (20%) also only had snack foods (crisps etc) for lunch. In contrast to breakfast, boys were more likely than girls to miss lunch completely although this difference was not significant (18% compared with 12%). As most students appeared to be taking their lunches from home, it is very interesting that these were predominantly of Western style. This may be more convenient, but perhaps is also more socially acceptable with peers. Therefore, acculturation has obviously occurred for the lunch meal at school.

5.1.3.3 Dinner

The very high proportion of respondents reporting in the FHQ that they had a Vietnamese-style meal in the evening was supported by the diet records - in the food diaries 94% of respondents reported that they ate a meal of rice and a number of vegetable and protein based dishes which could be classified as Vietnamese-style. Perhaps surprising, considering reports that Vietnamese meals contain only small amounts of protein, was that about half the respondents (boys 53%, girls 52%) consumed at least two different protein sources, eg meat and seafood in the evening meal. As at lunchtime, boys were more likely than girls to have extra foods of lower nutritional quality. For instance, boys were again significantly more likely than girls to consume soft drink (32% compared with 10%; $\chi^2=6.83$, DF=1, $p=0.009$), while a greater proportion of girls than boys reported consuming fruit (36% compared with 18%) and fruit juice (14% compared with 7%), although these differences were not significant.
The timing of the evening meal was also interesting. Whereas the majority of the sample consumed their evening meal between 6pm and 9pm, about one-third of respondents (boys 23%, girls 36%) consumed this meal before 6pm, and snacks after 6pm were not always consumed. Considering that breakfast was the meal most likely to be missed, or to be of low nutritional quality (especially for girls), this makes a long period of time that some children could be going with little to eat.

5.1.3.4 Snacks between meals

In the present study, about half the respondents reported in the FHQ that they always or usually ate snacks between meals or after the evening meal, with after school being the most popular time. This distribution was supported by the food diaries where only three students (one boy and two girls) reported having nothing to eat between 3pm and 6pm, whereas ten boys and seven girls reported eating nothing between 9am and 12 noon. However, on the day of recording, nearly all students reported eating something during both these time slots. It is not known whether this was an unusually high proportion on that day or if there was a tendency for underreporting on the FHQ for the frequency of snack eating. Nevertheless, the finding that snack consumption between meals was common is consistent with recent studies of both SE Asian and other young people. Ikeda et al (1991a) reported that 62% of Hmong children in their sample in California ate between meals every day. Scarlett (1993), in a study of primary aged children in Sydney reported that 90% ate something at school recess and 80% reported eating something after school and before the evening meal.
The snack foods most commonly reported by the Canterbury adolescents tended to be non-traditional foods and a mixture of 'healthy' and 'less healthy' choices. As in the meal choices, boys were more likely overall to choose the 'less healthy' options (potato crisps, soft drink, and takeaway foods). However, a slightly greater proportion of boys than girls also consumed sandwiches. Girls tended to consume a greater mixture of foods - potato crisps were popular, but girls also far more often reported consuming fruit and water than did the boys. The most popular foods eaten at recess by the Canterbury adolescents are consistent with Scarlett's results (1993) for primary children where crisps and fruit were also the most frequently consumed items. However, confectionery appeared to be less popular with the Canterbury adolescents than with the primary children, and sandwiches more popular.

The different types of foods consumed in the morning and afternoon time slots suggest an influence of environmental factors, with easily packed and carried foods - crisps, fruit and sandwiches eaten between 9am and 12 noon (school recess), and foods requiring more preparation or care (including Vietnamese foods and takeaway foods) eaten between 3pm and 6pm (after school). Social factors such as peer acceptance may also be important. In addition, social factors may have influenced the gender differences observed - more girls consumed foods (fruit and water) consistent with low energy eating patterns; and boys were more likely to gather with friends after school to eat takeaway foods.
When considering acculturation as a factor in the choice of snacks, it is interesting to note that the crisps eaten at school recess were usually brought from home and of the small multipack variety. This indicates that the crisps are purchased in bulk with the family shopping. Also interesting to note is that between meal snacking may be a recent development for Vietnamese adolescents. Story and Harris (1988) in their study of SE Asian youth in the US, reported that this was not a traditional practice, and only 20-25% of their sample snacked in the evening or afternoon compared with about half US teenagers. Also different to the findings of the present study was that the most commonly reported snacks by the SE Asian adolescents in the US were leftover rice and soft drink.

Numerous studies report that between meal snacks are important contributors of dietary energy (eg Truswell and Darnton-Hill 1981) but are variable in the content of other nutrients. The results of the present study would appear to fit this pattern. Snacks appeared to make a greater energy contribution for boys than for girls, which may also be explained by physiological differences. However, girls were likely to eat on more occasions in the afternoon suggesting they were perhaps hungry from eating less during the day.

5.1.4 Place of eating and sharing meals

Respondents indicated that most meals were eaten at home or at school. From the food diaries, 91% of respondents reported eating the evening meal at home with their families.
These findings are consistent with the results of studies of groups of both SE Asian (Ikeda et al 1991a, Story and Harris 1989, and 'Australian' backgrounds (Magarey and Boulton 1995b). Ikeda et al reported that 79% of the Hmong families in California ate together in the evenings. Magarey and Boulton reported that Adelaide adolescents ate most of their meals at home (70%) or at school (21%). Accordingly, 70% of meals were eaten with immediate family and 23% with school friends. However, Story and Harris note that in SE Asia it was customary for families to eat all three meals together whereas in Australia, only the evening meal was eaten together.

While the finding that a large majority of the Canterbury adolescents ate their evening meal at home with the family is not surprising given the age of the sample, it was at odds with anecdotal reports received prior to the study. These reports suggested that at night, children were eating away from their homes and families. Although there were some instances (indicated in the food diaries) of respondents going out at night, these were exceptions. Only one boy reported going out with friends (which was after dinner) and drinking alcohol (wine cooler). While this behaviour may have been underreported, it is still likely to have been isolated.

However, when looking at the earlier time period of 3-6 pm, about one-quarter of the Canterbury boys reported buying takeaway foods on the way home from school (see Section 5.1.3.4). As the foods purchased at that time were non-traditional and were eaten in the company of friends, perhaps this was the behaviour that had sparked concern.
5.1.5 Food preferences

When respondents were asked, 'Of all the foods available to you, which three do you like the most?' the number of Vietnamese foods nominated was surprising. The most favoured items were Pho (noodle soup), spring rolls and fried rice. That Vietnamese foods were the most frequently nominated was particularly notable as the names were volunteered by the adolescents - the answers were not directed in any way. Similarly, Crane and Green (1980), Story and Harris (1988) and Baghurst et al (1991) found that traditional foods were preferred to Western foods by SE Asian migrants and that rice dishes were especially popular. While results of the present study are not strictly comparable with these earlier studies because of the methodologies used to determine food preferences, (in the other studies food lists were used rather than an open-ended question), there were also strong similarities in the preferred non-traditional foods.

For the Canterbury adolescents, the most popular non-Vietnamese foods listed were Mcdonald’s, pizza, and lasagne (within the respondents’ first choice). It is also interesting to note that the food category meat/chicken/fish and seafood was almost as popular as takeaway foods, supporting that while takeaway foods are popular with the Vietnamese adolescents, the popularity is not overwhelming. Crane and Green found that steak, fried chicken, French fries and pizza were popular, while Story and Harris found steak, chicken, fruit, ice cream and soft drink to be highly preferred foods. Baghurst et al found that fruit, fish, prawns, chicken, beef and pork were well liked and that soft drink, hamburgers and pizza were most popular with younger women.
That the adolescents used names such as ‘McDonald’s, and ‘Kentucky Fried Chicken’ as descriptors rather than the generic terms ‘hamburger’ and ‘fried chicken’ suggests that these terms were better known, perhaps due to their commercialism. In contrast, other foods were named in generic terms eg hot dog, kebabs and Italian food. This finding is consistent with that of Scarlett (1993) who found that primary aged children in Central Sydney tended to describe foods by their brand names.

It is enlightening to consider the results of the present study and other studies of Vietnamese adolescents (Story and Harris 1988) in the context of food preferences of adolescents in general. For instance, Harris et al (1988) in a study of four different ethnic groups in the American south west, found that over 60% of their sample for all ethnic groups preferred foods such as hamburgers and soft drink. In reporting their results, Harris et al considered their mixed ethnic groups to have similar favourite foods to American youth in general, eg a liking for pizza, soft drink, steak, ice cream, spaghetti. Therefore, the food preferences noted in the present study are not peculiar to Vietnamese youth or even Australian youth - influences must be present that transcend regional and cultural boundaries.

It is also enlightening to consider that the list of most popular non-traditional foods amongst the Canterbury group is an international one, containing foods originally from Italy, the Middle East and the US. This should be remembered when defining terms such as ‘Western diet’ and will be discussed further in Section 5.6.
When asked, about the foods they liked the least, the adolescents' answers tended to be more specific and wide ranging than for their preferred foods. Interestingly, this list included some foods that had been rated by some respondents as preferred foods eg pie, spaghetti, sausage roll and lollies/chocolate. This demonstrates the individual nature of food preferences. However, vegetables, meat, chicken and fish were widely reported as disliked foods. Other items included duck, lamb, cheese, yoghurt, butter, fried foods/fat, cakes and biscuits. Specific Vietnamese foods included bitter melon, rice/noodles, gruel and durian. Similarly Baghurst et al (1991) found that lamb and yoghurt were not popular with the Vietnamese women in South Australia and that fruit was more popular than vegetables. Story and Harris (1988) also found that sweet foods such as cakes, biscuits and lollies were not well liked by the SE Asian adolescents in the US - these foods did not rate highly with the Canterbury adolescents, and were less frequently reported as consumed than savoury foods in the food diaries.

The differences in the way the adolescents answered the question about food likes, compared with the way they answered the question about dislikes, suggest they may think differently about the two aspects. For instance, disliked foods may conjure up distinctive memories of specific unpleasant occasions. Also interesting was that more respondents could name three foods that they liked than three foods that they disliked. While this may have been due to respondent fatigue or difficulties comprehending the question, the second question may also be more difficult to answer.
In this and the preceding sections I have described the overall dietary patterns reported by the Vietnamese adolescents in the Canterbury LGA. In the next section (5.1.6) I will compare these with those of other migrants from SE Asia.

My research has demonstrated that a range of dietary patterns are evident in the Vietnamese Community in Canterbury, and that while some acculturation has obviously occurred, traditional foods and practices are still important to the adolescents. Because of the variety in dietary patterns reported by the adolescents, it is apparent that many different factors are influencing their food consumption and food choices. I will discuss this aspect further in Section 5.6.

5.1.6 Comparison with other Vietnamese migrants

The diets and dietary practices reported by the Vietnamese adolescents in Canterbury LGA were on the whole similar to those reported in other studies of groups of people who have migrated from Vietnam and other IndoChinese countries to Western countries (Tong 1987, Story and Harris 1988, 1989, Baghurst et al 1991, Ikeda et al 1991a). Similarities include the types of foods consumed, food preferences, and food preparation and shopping patterns. Striking similarities are evident in the foods reported as frequently consumed by the Canterbury adolescents - for both Western and typically Vietnamese style foods - and the foods reported as frequently consumed in other studies (Story and Harris 1988, 1989).
When asked how often in the previous week they had consumed each of the foods on a list of both Western and Vietnamese foods, more than 75% of Canterbury respondents reported consuming bread, rice, vegetables, fruit, beef, chicken, pork, seafood, fruit juice and ice cream. Some Vietnamese dishes (egg/rice noodles, stir fried meat/fish, green vegetable soup, fish sour soup, lettuce with meat and braised pork) were also selected. Similarly, Story and Harris (1988) found that rice, bread, chicken, fruit and oranges/orange juice were eaten at least weekly by more than 75% of their sample of SE Asian adolescents in the US. Other foods reported by at least 50% of respondents in both the studies of Canterbury and US adolescents, were fish, beef, vegetables, ice cream, cakes, biscuits, milk and soft drink. Also similar were the foods most frequently reported by heads of households from Cambodian families in the US (Story and Harris 1989) - chicken, pork, rice, soft drink, fresh fruits and vegetables. Pork, chicken and beef were also the most frequently eaten meats by Vietnamese immigrants to Washington (Tong 1987), and Hmong families in California (Ikeda et al 1991a).

In Australia, Baghurst et al (1991) found that foods eaten in the largest quantities by Vietnamese women were pork, fish/seafood, poultry, beef, fruit, rice, milk, soup and soft drinks. Differences between the different studies may be explained by differences in the ethnic groups, the different lengths of stay of each group in their adopted country, their different environments as well as the use of different methodologies in the studies concerned.
There are also similarities in the foods reported as most often eaten in the present study with foods reported in other studies as being eaten more often following migration. Although the Canterbury adolescents were not asked to compare their food intake before and after migration, it is interesting to note the similarities again between studies. For instance, Baghurst et al (1991) found that the foods commonly reported as increased after migration by the South Australian women were beef, bread, milk, soft drinks, potato, poultry, fruit, ice cream and pork. These foods were all eaten in the previous week by over half the Canterbury respondents. Other authors (Crane and Green 1980, Gardner et al 1983, Todd and Gelbier 1988) have also reported increased consumption of some of these foods after migration.

As many of the foods eaten by the Canterbury adolescents are not considered traditional foods, these findings indicate that the Canterbury adolescents have adopted some Western food habits. Conversely, foods reported by Baghurst et al (1991) as being eaten in Vietnam and in Australia (although to a lesser extent) - fish, prawns, rice and green leafy vegetables - were still eaten by the majority of the Canterbury sample. This suggests that the Canterbury adolescents have also retained some traditional food habits, a finding supported by a number of other observations previously discussed. This dual dietary pattern has also been found in many other studies, including those of young people (Crane and Green 1980, Tong 1987, Story and Harris 1988, 1989, Baghurst et al).
It is helpful to look at a few illustrations of the similarities and differences in the consumption of Western foods by Canterbury adolescents and by other migrants from SE Asia. Foods which are widely reported enough to compare to some degree include bread and breakfast cereals, milk and soft drinks.

As discussed above, rice, bread and breakfast cereals were all widely consumed by the Canterbury adolescents. Similarly, Tong (1987) reported that rice was still consumed at least once a day by Vietnamese people in Washington, but was either replaced or supplemented by bread at lunchtime and by cereals at breakfast; Story and Harris (1988) reported that bread was eaten at least weekly by about three-quarters of the sample of SE Asian adolescents (and daily by 35%). In Australia, Stuart-Fox and Patterson (1989) reported that Lao preschool aged children in Brisbane had an Australian breakfast and 55% had sandwiches for lunch with traditional foods being eaten in the evenings and on weekends. Breakey (1983), Gardner et al (1983), and Stuart-Fox and Patterson also reported that sandwiches were eaten at lunchtime.

In contrast, Crane and Green (1980) found sandwiches to be unpopular, and Ikeda et al (1991a) reported that bread was only consumed to a limited degree by heads of Hmong households in California. In these cases, bread and sandwiches may have been less familiar foods - the Vietnamese group studied by Crane and Green were relatively newly arrived adults in the US prior to 1980, while the Hmong people come from the mountain areas of Laos and may not have been exposed to the same influences as the Vietnamese people.
Other American studies apart from Tong's, comment very little on bread consumption. There are a number of possible explanations for these differences. One reason for different findings is likely to be the different methodologies used - most of the American studies used a modified form of food frequency questionnaire which generally did not include bread or sandwiches. On the other hand, the Australian studies and Tong's, tended to use open methods of inquiry such as food recalls or food records to describe meal content. Another reason in the studies of young people, may be the different school lunch systems between Australia and the US - in the US where a hot lunch is generally provided at school, bread may be less commonly eaten.

Over half the Canterbury adolescents had eaten breakfast cereals in the previous week and 30% of boys and 20% of girls reported eating them on the day of recording. Breakfast cereals were also reported as consumed in Australia by Stuart-Fox and Patterson (1989) in their study of Lao pre school children, and in the US by Ikeda et al (1991a) in the Hmong children in California. Story and Harris (1988) report that breakfast cereal was eaten at least weekly by nearly half the sample of SE Asian adolescents (and daily by 20%). According to Todd and Gelbier (1989), breakfast cereals had also been adopted in the UK. None of these studies indicate the degree of consumption. Conversely, studies of adults reported that breakfast cereals were not liked (Crane and Green 1980, Baghurst et al 1991). Baghurst et al did find however that breakfast cereals were liked significantly more by those who had lived here longer.
Similarly Stuart-Fox and Patterson found that Australian type breakfasts were more common where the parents of the preschool children had lived here the longest.

Other foods for which comparisons can be best made are soft drink, ice cream and takeaway foods. While there are some differences in the relative consumption of these foods between studies, there are a number of general similarities. In the Canterbury study, soft drinks were consumed by at least half the sample in the previous week and by over 40% of the sample on the day of recording. Of the takeaway foods, hamburgers and pizza were reported as being eaten by less than half the Canterbury adolescents in the previous week, and were nominated as the most like food by only 11 respondents. These findings are consistent with those of Story and Harris (1988) who found in their study of SE Asian adolescents in the US, that soft drink was the most frequently consumed snack food, being consumed at least weekly by three-quarters of the sample (30% daily). Also in that study, ice cream and soft drink were chosen as the best liked food by over half the Vietnamese respondents. However, pizza and cereal were disliked by about one-quarter of the sample. These findings are also consistent with those of Baghurst et al (1991) who found that hamburgers, pizza and soft drink, were only moderately liked overall, but were more popular with younger respondents and those who had migrated at a younger age. By contrast, Tong (1988) and Ikeda et al (1991a) reported infrequent consumption of soft drink in their samples.
Instant noodles, which are not a traditional food, were widely consumed by the Canterbury adolescents. Their consumption was also reported by Gardner et al (1983), Todd and Gelbier (1989) and Baghurst et al (1991). Interestingly, Magarey and Boulton (1995b) also commented on the popularity of instant noodles in their study of Australian adolescents in Adelaide.

In terms of meal patterns, the types of foods eaten at breakfast, lunch and dinner by the Canterbury adolescents were very similar to those reported by Vietnamese families in Victoria, especially the young people and school children (Gardner et al 1983). Gardner et al also noted the consumption of ‘convenience foods’ such as instant noodles, bread, eggs/bacon and biscuits at breakfast, sandwiches at lunch, and rice, soup and meat dishes with fish sauce for the evening meal.

The extent that the Vietnamese adolescents in Canterbury consumed Western type foods suggests considerable exposure to Western food habits and consequent acculturation. On the other hand, consumption of traditional foods and the continuation of many traditional food practices was also widespread. These findings were also in keeping with a number of other studies. Therefore the Canterbury adolescents appear to be very similar to other groups of SE Asian migrants to Western countries in the their overall dietary patterns - the types of foods consumed, the extent of their consumption and in their food preferences.
This similarity is greatest with young people and supports the finding of Baghurst et al (1991) that age was a dominant influence on food preferences and on the extent of dietary change after migration. It has not been determined in the present study whether this is a cohort or secular effect.

It is clear from the present study that increased consumption of Western foods after migration does not necessarily mean abandonment of traditional food habits. I think this is an important point which has often been overlooked in the studies of migrants to Western countries. Although increased consumption of foods such as bread and breakfast cereals seem to denote significant lifestyle change for Vietnamese people, other foods such as beef and chicken, are likely to have been incorporated into traditional dishes. While it may be intriguing that both Western and traditional dietary patterns coexist, a number of explanations are possible and are quite logical when the various influencing and environmental factors are considered. This will be discussed in Section 5.6. It is also important to note that similar mixed dietary patterns have been reported in other populations who have migrated to Western countries eg Chinese-Americans (Grivetti and Paquette 1978), Armenian-Americans (Nalbandian et al 1981), and Mexican-Americans (Romero-Gwynn et al 1993). This suggests that at least some of the reasons for dietary change are common across cultures and geographic boundaries. It is important to recognise that both dietary patterns are present together, and not that Western patterns have totally replaced traditional ones. The implications of this finding are critical when considering the adolescents’ future health and wellbeing and I will elaborate upon this further throughout this discussion.
5.2 Shopping and food preparation practices

An area of local concern addressed by this study was the role of Vietnamese adolescents in food provision, i.e. household shopping and food preparation duties. If Vietnamese youth were responsible for these tasks, then the nutrition of their families would largely be determined by the young people's knowledge, skills and motivation in nutrition. However, the results indicated that very few adolescents (less than 15%,23) claimed to have the major responsibility for food provision (i.e. always or usually responsible for shopping or cooking).

The finding that the adolescents' role was minor is in contrast to the widely touted finding from the American studies of Story and Harris (1988, 1989). These reports claimed that SE Asian adolescents had a significant role in the provision of food and hence the nutrition for their families. Story and Harris (1988) found that 45% of their sample of Vietnamese, Cambodian and Hmong adolescents reported usually preparing the evening meal. They also found that 52% of the combined sample helped with grocery shopping although this was lower in the Vietnamese group (30%). In comparison, about 40% of the Canterbury adolescents reported having some role with the family shopping, although most of this group reported having that responsibility only sometimes. In the Canterbury study, the responsibility for food provision was most often the role of adult females, with some assistance from other family members, including husbands. Other studies of SE Asian migrants (Gardner et al 1983, Story and Harris 1989, Ikeda et al 1991a) also showed that women had the major role with assistance from their husbands.
A number of explanations for the different findings for the Canterbury adolescents and the adolescents studied by Story and Harris are possible. One reason may be the different length of time since migration for the two samples. The adolescents in the American study had lived in the US for 5 years or less, whereas the majority of the Canterbury adolescents had been resident for a longer period (at least 4 years) and some for as long as 12 years. Also, at the time of the American study, the Vietnamese population as a whole had lived in the US for a relatively short time. This means there may have been fewer shopping facilities where the Vietnamese language was spoken, and shopping may have been done by children who possibly had better language English skills than their parents. There may also at that time have been relatively fewer adults in the population, as parents in refugee families often migrated separately, sometimes years later. In addition, many children were unaccompanied by adults and may at times have been fending for themselves.

At the time of the present study, workers in the Canterbury LGA believed that many Vietnamese children in the area did have a role in food provision, particularly in food preparation. However, these anecdotal reports were not supported by the study findings. This strongly suggests that adolescents were not therefore responsible for the nutrition of their families. Possible explanations for the difference between the anticipated and actual results might be that children who did the shopping and food preparation may not have participated in the survey.
If they did participate, they may not have answered the question correctly, due either to misinterpretation, or to not wanting to admit having this role. It may also be that the anecdotal information was out-of-date. Students who participated in the study usually came from families where both parents and sometimes other adults were present. Earlier reports indicate that a number of unattached and detached Vietnamese youth (having migrated without their parents) lived in the Canterbury LGA (Heffer et al 1983).

At the time of the present study, shopping facilities where the Vietnamese language was spoken were also accessible to the Canterbury population and most respondents reported shopping there. These centres may have been less accessible earlier. Supermarkets, where the majority of the sample reported doing some shopping, would require little use of language once shoppers were familiar with the types of goods available.

Observations of shopping activities during the project in two of the main cultural centres frequented by the Canterbury families were consistent with the adolescents’ reports. It was observed that although there were many children shopping, they were usually accompanied by adults, and often whole families (including adult males) appeared to be shopping together. Children were observed assisting in the shopping - not doing the shopping on their own, supporting the survey findings. As the cultural shopping centres were generally some distance from the main areas of residence, and the shops were then some distance from either car parks or public transport - participation of a number of people helped to carry the parcels.
Most of the Canterbury respondents reported that shopping was done weekly. This is in contrast to traditional patterns in Vietnam where food shopping is done daily in the local market (Kaufman 1979). The move away from daily shopping in Australia may be due to several factors. These include a lack of suitable venues that are close enough to home, the availability of refrigerators so that food can be kept longer, and less available time for women who may be working. As it is traditional practice for women to be responsible for food provision in Vietnam (Gardner et al 1983), the involvement of other family members appears to be a new situation. Gardner et al also reported a greater involvement of men and families in shopping in Australia and noted a relationship with the need for weekly rather than daily shopping, the lack of easy public transport and the need therefore for a car and extra help. Ikeda et al (1991a) report that 68% of Hmong women in California shopped with their husbands. Perhaps another benefit of men shopping may be some assistance with language when shopping in non-Asian stores - men who work may be more fluent in the English language than women who may not be working.

Another aspect of shopping reported in common with other studies is the use of both Western style supermarkets and Asian food shops. In the present study, 89% reported that their families shopped in supermarkets and 86% reported shopping in Asian food shops, indicating that a high percentage shopped in both. In the US, Crane and Green (1980) Story and Harris (1989) and Ikeda et al (1991a) also reported that SE Asian families shopped at both large supermarkets and in oriental markets or grocery stores.
As so many families of the Canterbury respondents were shopping in Asian stores, it appears there is little trouble in accessing traditional food. This supports Baghurst et al's (1991) finding that only 8% of the sample in South Australia had trouble locating traditional food. One puzzling aspect of the shopping situation for the Canterbury families is their willingness to travel long distances to do the shopping. In the Canterbury study, the majority of respondents reported travelling to centres in neighbouring suburbs such as Bankstown and Marrickville rather than local centres for their weekly shopping.

More surprising was that a quarter of respondents reported shopping at Cabramatta, which is a very large centre, but a long distance from the respondents' homes. I did not ask why this centre was chosen but a number of explanations are possible - Cabramatta is a major Vietnamese cultural centre that includes many shops and services besides food shops - for instance, there are many restaurants and areas for socialising, it more closely resembles a market atmosphere than do the local suburban centres, food available may be perceived to be fresher, food may be cheaper. If one of the reasons is that the food is considered to be fresher, it is interesting that families will travel such a long way - food can then only be purchased weekly because of the distance. Freshness of food appears to be an important consideration for Vietnamese people, as it is frequently mentioned in the literature as a criterion used to rate food (eg Todd and Gelbier 1988, Baghurst et al 1991).
Baghurst et al reported that reasons given by Vietnamese women in Adelaide for their relatively low level of consumption of fruit and vegetables were cost, and concern with the food’s freshness.

Cooking practices reported in the Canterbury study provide additional evidence that traditional dietary practices are practised in the home. The most frequently reported cooking techniques for both meats and vegetables were stir-frying, soups and braises and steaming/boiling. Ikeda et al (1991a) also reported that stove top cooking methods were the most frequently used by Hmong families in California. As in the current study, the California women also reported eating meals of traditional foods and served in traditional fashion.

In summary, my research in the Canterbury LGA does not support any concern that family nutrition might be jeopardised by young people having responsibility for food purchasing and cooking. Conversely, the involvement of young people shopping with their families in the cultural centres would probably enable them to learn more about traditional Vietnamese food practices. Shopping at the cultural centre suggests a great commitment to the maintenance of traditional practices in these families, but at the same time an accommodation of Western practices in the use of a car and probably home storage facilities such as refrigerators.
5.3 Diet quality

5.3.1 Comparison with the Five Basic Food Group Plan (5BFGP)

When compared with the Five Basic Food Group Plan (5BFGP), the diets of the Vietnamese adolescents in Canterbury were generally above, or close to recommended levels of intake. However, their intakes of milk and dairy foods, and for boys, the intake of fruits and vegetables were less than recommended. On the other hand, the intake of cereal foods was considerably higher than recommendations, reflecting the very high rice consumption in addition to bread. The present study differs from most other food consumption studies of adolescents in that very few studies compare dietary intake with food guides such as the 5BFGP. Two studies of young people where such a comparison was made, are those of Dugdale and Lovell (1981) and Contento et al (1986). Although neither of these studied Vietnamese adolescents, the results of the present study were similar to the results of both of them in that the milk and dairy foods group was the least consumed. In addition, Dugdale and Lovell found that cereals was the most consumed food group by 145 primary aged children in a 24 hour period in Brisbane. Contento et al, who compared high school students’ diets with the US modified basic four food groups, also found fruits and vegetables to be low in four of the five school groups.

As dairy foods are not customary in traditional Vietnamese diets, the relatively low intake of these foods is not surprising. However, calcium intake was highlighted in the most recent dietary guidelines for Australians and recommendations developed for girls and women (NHMRC 1992, 1995).
Consequently, the intake of milk and dairy foods has been encouraged as a means of increasing calcium consumption (NHMRC 1995). However, the role of milk as a major source of calcium is questionable for this group. The role of milk will be further discussed in Section 5.5.1.4.

When the diets of the Vietnamese boys and Vietnamese girls in the present study were compared with each other, the boys' diets were closer to the recommended intakes for all the major food groups excepting fruits and vegetables, for which girls' intakes were closer to recommendations. Based on this observation, boys were also more likely to be meeting requirements for most nutrients especially energy. Smith and Schmerlaib (1988) note that eating to recommended levels of the 5BFGP provides only 5000 kJ of food energy, which is insufficient for adolescents aged 11-15 years - girls require at least 7700 kJ and boys at least 8700 kJ (NHMRC 1991). Given that the Vietnamese adolescents only just met recommended intake levels (apart from cereal intake), it is highly unlikely that energy needs were met by consumption of core foods. At least some of the additional energy required would have been provided by the additional foods such as confectionery, soft drinks and snack foods that were also eaten, particularly by the boys. However, this is not apparent when intake is compared to the 5BFGP.

It is a common finding in other studies that adolescent boys tend to eat more food overall and therefore are more likely to meet requirements. Girls on the other hand tend to restrict their eating (Truswell and Darnton-Hill 1981, English et al 1988, Magarey and Boulton 1994a).
The finding in the present study that girls consumed more fruit and vegetables is also consistent with this pattern, if these foods are perceived as 'slimming or non-fattening' foods and therefore considered suitable to eat in larger quantities. Most of the additional foods such as soft drink and confectionery eaten by the boys are of low nutritional density. Therefore, the boys' diets contained both more positive features and more negative features than did the girls' diets. A difficulty in assessment of the Vietnamese diets according to the 5BFGP was an anomaly in the recommended intakes of the 'Breads and Cereals' group. Specifically this relates to the equivalence of bread and rice given in different versions of the 5BFGP commonly available. In the present study, the version was chosen where one slice of bread equates with one-half cup cooked rice (Department of Health NSW 1987). Caution is needed if using a version where one slice of bread equates with one cup of cooked rice (eg Commonwealth Department of Community Services and Health 1987), or two-thirds cup (eg Smith and Schmerlaib 1988). This results in a severe underestimate of the amount of rice actually eaten and thence the nutrients provided, particularly energy. Recommended intakes of other food categories may then be in excess of requirements.

Consequently, when used to infer dietary adequacy, in particular the intake of carbohydrate, fibre and some vitamins such as thiamine (major nutrients derived from this food group), different conclusions are reached depending on the level of equivalence given to rice and bread.
For instance in the present study, where one cup of rice equals one slice of bread, 15 year old girls consumed an average five serves of cereals; where one-half cup of rice equals one slice of bread, they consumed an average seven serves of cereals. In the first example, the quantity of cereals was only just above recommended levels (at least four serves) compared to the second which was substantially above recommendations. In general, the larger the volume of rice deemed equivalent to one slice of bread, the larger the discrepancy in the calculated amount when a large volume of rice relative to bread was eaten and the more serious the problem of obtaining reliable estimates of nutrient intake.

5.3.2 Comparison with the NDS

The results of the present study were also compared with those of the National Children’s Dietary Survey (NDS), (English et al 1988). Both of the surveys used 24 hour-diet records and included the same age groups. Comparison of the present survey with the NDS was one of the aims of the present study. Similarities found between the two surveys were the widespread consumption of cereal foods, vegetables, and fruit; and that boys were more likely than girls to consume milk and takeaway foods.

A number of differences were also noted between the findings of the two surveys. In comparison with the NDS, the Vietnamese adolescents were significantly more likely to eat fish and seafood, and less likely to eat added fats, dairy foods (especially the girls), confectionery and sugars than the children in the national survey.
Cereals (predominantly rice) were also eaten in greater quantities by the Vietnamese. Conversely, there was also a higher overall consumption of snack foods, soft drinks and takeaway foods by the Vietnamese boys. Consumption of these foods may increase fat, sodium and sugar intakes, lower the intakes of some nutrients eg calcium, and compromise overall nutrient density.

These broad comparisons suggest that the Vietnamese diets are likely to be lower in total fat than the diets of other adolescents because of the low intake of added fats, and the extensive use of fish and seafood. However, this would be offset to some degree by the higher intake of takeaway foods. Similarly, the primary use of rice as a cereal source would probably mean a lower sodium intake than for the Australian adolescents who mainly consumed bread. This would be enhanced by the lower intake of added fats (eg butter and margarine which also contribute sodium), but also offset by the use of snack foods and takeaway foods which tend to be high in sodium. Overall, the Vietnamese diets are probably closer to Australian dietary guidelines for fat and sodium content than are those for other Australian adolescents.

As calcium intake was considered low in the NDS due to the low dairy intake, this would suggest that Vietnamese children, especially the girls (since they consumed less milk than did the boys), are particularly at risk for low calcium intake by these criteria.
Nearly 30% of girls (12-15 years) from the NDS were also considered to have a low iron intake. Breakfast cereals and bread, in addition to meat sources, were major contributors of iron in the NDS. However, rice would have contributed more iron in the Vietnamese diets than it did in the NDS. As Vietnamese girls ate less of all of these foods than did the boys, they are also likely to have obtained less iron than the boys. Unfortunately their iron needs are higher (NHMRC 1991).

Differences in the types of foods consumed between the present survey and the NDS are likely to result in part from the different ethnic composition of the two groups. This ethnic difference is reflected in the present study, directly by the higher intakes of rice, fish and seafood, and indirectly by the lower intakes of added fats (through different bread consumption patterns) and milk. The higher consumption of snack foods, takeaway foods and soft drink by the Vietnamese adolescents may represent a real increase over the intake of other Australian adolescents, or considering that the NDS data are six years older, the findings of the present study may be more representative of contemporary intakes. Therefore, on the basis of these data, it is not appropriate to consider the diets of the Vietnamese adolescents in Canterbury LGA as more or less adequate than the diets of other Australian adolescents, as measured by the NDS. It would be interesting to compare the results of the present study with results of the 1995 National Dietary Survey. There are also a number of similarities between the present study and other studies of young people, both in the types of foods consumed and in the practices followed.
For instance, Magarey and Boulton (1995a) reported similar findings to the NDS. These included diets being low in milk and dairy foods, and that participants obtained most of their complex carbohydrate from cereal sources. They also noted that lunchtime was the meal which contributed most sodium in a day as the most common food consumed was sandwiches. From the foods consumed in the present study, these findings are also probable but cannot be confirmed as nutrient data were not analysed. Conversely, a major difference between the studies is likely to be in the sources of fat. Magarey and Boulton (1995a) reported that meat, eggs, fats and oils and dairy foods were the major contributors of fat in the diets of Adelaide adolescents, each contributing 16-20% of the fat intake, whereas fish and poultry contributed only 4%. Related to this was a fatty acid profile considered to be undesirably high in saturated fats and low in polyunsaturated fats. Because the fish consumption was relatively high in the diets of the Vietnamese adolescents, the foods contributing fat are likely to be different and the resultant fatty acid profile improved. As one of Magarey and Boulton's recommendations for improvement to the Adelaide adolescents' diets was to increase fish consumption, in this regard the diets of the Vietnamese adolescents may be considered preferable.

Overall, the positive dietary aspects of the Vietnamese diets contained both similarities and differences to the diets of other Australian adolescents. While there were some areas of concern in the Vietnamese diets these were however, on the whole similar to concerns expressed in other studies about the diets and associated health behaviours of Australian adolescents.
These behaviours, which could affect health in the short term are discussed in Section 5.4. The potential longer term effects of dietary practices on the health of the Vietnamese adolescents are complex and are discussed in Section 5.5.

5.4 Short term impact of diet on health

Several behaviours reported in the present study could affect the health of the Vietnamese adolescents in the short term. These include the skipping of meals (especially breakfast), concern about body image, and reported low levels of exercise. In this section I will discuss each of these in turn.

5.4.1 Skipping meals

Skipping meals was prevalent in the Canterbury study, with breakfast the meal most likely to be missed. Skipping meals is a concern because of the resulting potential reduction in nutrient intake. Skipping breakfast in particular may have an adverse effect on performance (Lechky 1990) as well as nutritional consequences (Leeds 1993). From the food diaries, 30% of girls and 14% of boys in the Canterbury study did not report eating breakfast, or only ate foods of minimal nutritional value before 9am on the day of recording. This finding was supported by the FHQ where nearly half the sample (44%) reported that they did not always or usually eat breakfast. However, from the FHQ, skipping breakfast (ie sometimes, rarely or never eaten) was not significantly associated with age, gender nor the length of residence in Australia.
While these figures cannot be strictly compared with those of other studies, there is considerable similarity in that missing breakfast was a widespread occurrence in the 12-15 year age group. In the Australian Health and Fitness Survey (ACHPER 1987) conducted in tandem with the NDS, over 10% of the total sample, and a quarter of 14 year old girls reported eating breakfast less than four times a week. Magarey and Boulton (1995b) reported that breakfast was the most frequently missed meal and that girls (12% of 15 year olds), were more likely to miss breakfast than were boys (7% of 15 year olds). They also found that the number of adolescents missing breakfast increased with age, with over 90% of children aged 11 eating breakfast every day but less than 80% of 15 year olds eating it every day. Fanning et al (1981) reported that 25% of 143 Year 8 children in an Adelaide high school keeping 7-day diaries, missed breakfast entirely on 1 to 4 days of the school week. They considered this to be a conservative estimate as a greater number would have had a breakfast of insufficient nutrition. Truswell & Darnton-Hill (1981) in a study of 290, 16 and 17 year olds in Sydney did not report whether meals were missed, but did note that girls were much more likely to have small breakfasts (<100kCal) than were the boys. They also reported that girls were also more likely to have low iron, calcium and energy intakes. In the present study, it was the girls who were likely to eat foods of low energy value such as fruit and water.

In the Canterbury study, reasons for skipping breakfast were not sought, but for some children time in the morning may have contributed because of the substantial distances they were travelling to school.
Where meals were not skipped, the nutritional quality of food eaten in those periods was also an issue. For instance, foods eaten before school included chips and lollies and in some cases these were the only foods eaten. Although differences were not significant, the greater tendency for girls than boys to miss breakfast on the day of recording in the present study is consistent with numerous other reports as discussed above (eg ACHPER 1987, Magarey and Boulton 1995b). On the other hand, boys in the present study, were more likely to miss lunch. As boys were more likely to do exercise than were girls, skipping lunch may be related to activities eg sport taking up lunchtime. Magarey and Boulton found that girls in the Adelaide study were more likely than boys to miss all meals. Factors contributing to the difference may include sample characteristics and differences between the studies in the way they were conducted. The present study was undertaken in the school setting. As the majority of the schools were single sex schools, this may have influenced activities undertaken at lunchtime. The sample in the Adelaide study was taking part in a longitudinal study over many years in a family setting and was not of Vietnamese background.

It is the widespread nature of meal skipping that is interesting in the adolescent age group - the Vietnamese adolescents in Canterbury are indeed similar in this respect. However, it is not known whether this would also be the case in Vietnam or whether it is an adaptive behaviour. It is worrying that girls in particular were more likely to miss breakfast and were also more likely to report eating foods of low energy density (fruit, juice and water).
Although the foods the girls reported eating are 'healthy' it is also possible that the girls may not be eating enough for adequate nutrition. O'Dea et al (1996) from a study of Sydney adolescents of mixed ethnic background reported that girls were more likely than boys to skip meals (especially breakfast), and that they consciously ate only low energy foods, and drank water before meals as weight control practices. When these results together are looked with the Canterbury girls' perceptions of body image, it also supports the possibility that these girls are restricting food intake. This will be discussed further in Section 5.4.2.

5.4.2 Body image

Another aspect of the girls' diets which was particularly worrying was their reported dissatisfaction with body weight, especially their perception of 'fatness'. Nearly half (42%) of the girls rated themselves as 'too fat' although this finding was not borne out by height and weight measurements. Girls were three times as likely as boys (14%) to rate themselves as 'too fat' and this difference was significant ($\chi^2=4.2$, DF=1, p=0.04).

The results of the present study are consistent with several other studies of adolescents as dissatisfaction with body weight amongst girls in mixed ethnic groups has previously been reported (Tienboon et al 1989, Smith and Krejci 1991, O'Dea 1994). Particularly relevant to the present study, O'Dea found that the majority of girls in a sample of 133, year 8 girls in Sydney, reported dissatisfaction with their bodies.
Of this group, 20% were from an Asian background. Reported behaviours in that study included dieting to lose weight and skipping meals. In Australian studies of both boys and girls, Tienboon et al reported that 41% of 14 & 15 year old girls in a Geelong sample considered they were overweight compared with 14% of boys, and that 69% of girls but only 27% of boys wanted to lose weight. Similarly, Spillman et al (1994) found that girl participants in a study in Brisbane scored significantly higher than boys on a restrained eating scale.

Dieting behaviour was apparent amongst the participants in the present study (although no questions on specific weight control activities were asked). When interviewed about their dietary intake, a number of girls reported 'being on a diet'. One reason for this trend appeared to be upcoming end-of-year school formals. Other possible explanations include the general culture of dieting that is present in the adolescent age group, and the fact that this survey was conducted at the end of spring/beginning of summer which is the traditional 'diet season'. Of additional concern was that these girls' 'diets' were not particularly nutritious. For example, one girl had her full Vietnamese meal at night but ate only potato crisps and chewing gum during the day at school.

The results of the present study are in contrast to the sample of Hmong home-makers in California where 60% of the women reported that their weight was 'just right', only 15% reported being 'too fat' and 25% 'too thin' (Ikeda et al 1991a).
The difference is possibly due to the age difference in the two samples, the mean age of the Hmong women being 29 years, (and therefore the different pressures on the two groups), experiences and traditional beliefs. Ikeda et al report that the women were more likely to consider thinness rather than fatness as unhealthy. However, they do not state the period of residence or the average weight for their sample and both of these factors may have contributed to their finding.

It is a very important finding of the present study that concerns about body image appear to be highly prevalent in the Vietnamese population. While distorted views of body image, preoccupations with obesity, and attempts to lose weight are recognised as possible precursors for the development of the eating disorders anorexia nervosa and bulimia (Attie and Brooks-Gunn 1989, Richards et al 1990), this has been assumed to occur most often in Anglo-Celtic cultures. The prevalence of eating disorders in Asian girls has previously been thought to be low (Dolan 1991). The apparent change indicated by the present study may be related to the adoption of Western culture - it is consistent with the hypothesis that the prevalence of eating disorders is related to the acculturation of the population toward Western lifestyle and values. It also suggests that other ethnic minority groups in Australia may also be at risk.

If the disturbance of body image is a new phenomenon in the Vietnamese culture, it is particularly worrying that this attitude has been adopted in a relatively short period of time.
It will be very important to monitor this trend in the future, as demonstration of an increase in numbers may signify an increase in the incidence and prevalence of eating disorders in this population. Eating disorders are a serious public health issue, having a high rate of complications and being costly to both the sufferers and to the community. Treatment is complex, and appropriate services for adolescents are few, especially for people from NESB. Current management strategies may also need to be evaluated for their appropriateness. In addition, there are implications here for health promotion in tackling the factors connected with causing eating disorders and doing so in an appropriate way.

To determine if the finding of the present study is characteristic of other populations from Vietnamese and other ethnic minority backgrounds, it will be important to compare the results of the present study with findings of other surveys. In NSW, the Department of School Education has surveyed 1200 students as part of an eating disorders project. That sample would be ideal as a comparison group. However, results have not yet been released. At a local level, in the time since the completion of the present study, schools in the Canterbury district have in fact expressed concern about the number of cases of disordered eating and related behaviours detected in the school population. In response to this concern, health staff have conducted surveys and implemented education programs for students and teachers (D. Maloney pers comm). Results from that project will also be important for comparison with results of the present study.
5.4.3 Exercise

Lack of exercise has been identified as a risk factor in the long term for the development of a number of diseases. These include obesity (NHMRC 1992), cardiovascular disease (CVD), non-insulin dependent diabetes mellitus (NIDDM), some cancers (Schechtman et al 1991) and osteoporosis (NHMRC 1992), and in the short term for fitness and wellbeing. In the present study, girls were less likely than boys to exercise, and to exercise for shorter periods - almost one-quarter (23%) of girls reported that they exercised on one day or less per week, and one-third (32%), exercised for less than one hour at each occasion of exercise. Boys tended to exercise more often and for longer periods than the girls and to exercise at the recommended levels for cardiorespiratory fitness. The girls' reported level of physical activity was below recommended levels. Recent guidelines for adolescents recommend participation in at least three sessions of moderate to vigorous activity per week lasting 20 minutes each session, as well as daily moderate activity of around 30 minutes duration (Sallis and Patrick 1994).

The finding that teenage boys were more active than teenage girls however is not unique to the Vietnamese community. Similar findings have been reported in other communities both in Australia and overseas (Kemper et al 1985, ACHPER 1987, Smith et al 1992). In the Australian National Health and Fitness Survey (ACHPER), boys were found to be more active than girls at all ages from 12-15 years. In the present study the frequency and duration of exercise did increase with increasing periods of residence in Australia.
This may indicate a greater familiarity with the types of exercise available and/or a greater confidence in participating. As the level of exercise was assessed in the present study by self-administered recall with an unvalidated question, these results should be interpreted with some caution (Sallis 1991). However, as the subjects were adolescents rather than children and the results consistent with those of a range of other studies, they would seem to be credible. Therefore, it is likely that the Vietnamese adolescents in Canterbury, especially the girls, have lower than recommended levels of fitness and this may have some bearing on their health status in both the short and the long term.

5.5 Long term effects of dietary change on health

Despite apparent changes from traditional patterns, the diets of the Vietnamese adolescents in Canterbury LGA still tended to be in line with current dietary guidelines (NHMRC 1992). When compared with recommended amounts, particularly desirable aspects were the adolescents' relatively high intake of complex carbohydrates (from cereals), and the relatively low intake of fats. These features are also in keeping with characteristics of traditional diets. However, because of the complexity of the mixed dietary patterns the adolescents are now eating, and because knowledge in the area of risk factors for disease is still evolving, it is difficult to tell what effects, if any, the dietary changes may have on the adolescents' health in the long term. Concern about the future health risk of Vietnamese people is fuelled by reports of changing risk factor profiles in migrants from Asian countries as well as in Asian countries themselves.
These changes in disease patterns changes have largely been attributed to dietary changes associated with Westernisation. As a result of dietary changes, the risk of developing particular disease states may be affected in any of three ways - positively, negatively or remain unchanged. Changes in nutrient intake may be responsible for these changes in disease risk that occur as foods are added to, and/or removed from the diet and result in an increase, decrease or no change in the intake of individual nutrients. For example, diet quality may be improved where dietary change increases nutrients that were previously deficient, or decreases those that were previously in excess. Conversely, diet quality may be adversely affected if nutrients that were previously adequate are either increased to excess, or decreased to become deficient. Disease risk may also alter if changes in the total diet affect the bioavailability of nutrients or the presence of non-nutrient dietary factors.

When reporting the dietary changes experienced by Vietnamese people after migration, most of the literature has predicted a negative effect on the population's future health, particularly a potential increase in the incidence and prevalence of heart disease. Other 'diseases of affluence' that have not been common in Vietnam, (eg diabetes and some cancers), also have the potential to increase. Interestingly, an aspect of Westernisation that is rarely discussed is the possibility of any health advantage that may also result from dietary changes. Although the results of the present study indicate that the Vietnamese adolescents have made changes away from traditional diets, I do not think that all of these changes should be thought of as 'negative'.
In the following sections I will look at these changes and their effects and in particular consider look at ‘positive’ outcomes. In Section 5.5.1, I will discuss the dietary changes that have occurred, and in Section 5.5.2, I will discuss the possible consequences of these changes on the development of a number of health conditions. In section 5.5.3, I will consider the overall impact on the health of the Vietnamese adolescents.

5.5.1 Dietary changes

Dietary change among Vietnamese adolescents in Canterbury LGA is indicated by the relatively high intake of foods not described as part of traditional Vietnamese diet, and evidence of a range of dietary practices that are not consistent with reported lifestyle patterns in Vietnam. As discussed in previous sections, these differences have been determined by comparison with reports of both traditional dietary patterns and Western dietary patterns. Although it was not possible to collect nutrient data on the foods consumed, nonetheless it is possible to say that the number and types of changes evident in the adolescents’ diets would have resulted in substantial changes in the nutrient content. In this section I will discuss the dietary changes and the possible effects on the adolescents’ intakes of fat, sodium, sugar, calcium, energy, protein, fibre and iron and also other food components eg phytochemicals.

5.5.1.1 Fat intake

In traditional Vietnamese diets, fat intake is generally considered to be low. The major food sources of fat would include fatty meats such as pork,
(although meats in general are eaten in small amounts), and fried foods (mainly stir fried). In the adolescents' diets these foods were still frequently consumed. However, the consumption of additional fat sources such as snack foods like potato crisps, hot chips and ice cream, milk (low fat milk was not widely consumed), and probably larger serves of meat than in traditional diets, may have increased their fat content above that of traditional diets. These foods are all widely consumed by other adolescents in Australia. On the other hand, added fats such as butter and margarine were not as widely consumed by the Vietnamese adolescents as they are in the Australian population. Thus the Vietnamese adolescents may have higher fat intakes than if they were eating truly traditional diets, but it is likely to be lower than that of other adolescents. The types of fat may also be different because of the high intake of fish and seafood.

5.5.1.2 Sodium intake

As with fat intake, new food sources of sodium have been added to the diets of Vietnamese-Australians. These foods include snack foods, bread, breakfast cereal and the high protein sources such as milk and meats. It is commonly believed that the Vietnamese diet is high in sodium because of the frequent consumption of salty condiments such as fish sauce and MSG. However, traditional staple foods such as rice, vegetables, fruits and small serves of meat are not rich sources of sodium. The results of the present study suggest that the sodium content of the adolescents' diets is higher than in traditional Vietnamese diets, but lower than the diets of other Australian adolescents.
Baghurst et al (1991) found this to be the case in their study of Vietnamese women in South Australia. Despite the consumption of high sodium foods, the sodium intake of the Vietnamese women was slightly lower than that for Australian women of similar backgrounds.

5.5.1.3 Sugar intake

Absolute amounts of sugar consumed cannot be calculated from the present study. However, when compared with the NDS, the percentage of Vietnamese adolescents consuming sugary foods (sugars, jams and syrups and confectionery), on the day of recording, tended to be lower. On the other hand, all groups of Vietnamese adolescents (except 14 and 15 year old girls) consumed more soft drink. The finding of lower sugar intake is interesting as there has been some concern about the prevalence of dental caries in the Vietnamese community and its possible relationship to sugar intake (Durward and Wright 1989). However, my results are consistent with those of a study conducted at the same time and in a neighbouring locality. In that study, Plaskett and Lilburne (1992) found that sugar intake was lower in a sample of Vietnamese primary children than in their non-Vietnamese classmates. Baghurst et al (1991) found that despite uptake of foods such as soft drinks in younger age groups, and the consequent increase in refined sugar intake, it still remained at a relatively low level and less than the intake of sugar by Australian women.

5.5.1.4 Milk and calcium intake

Milk was consumed by over half the sample of Vietnamese adolescents on the day of recording.
Boys in particular consumed up to two cups of milk at one meal (breakfast). This finding was surprising in that it is often stated that milk is not widely consumed by Asian people (usually ascribed to a high incidence of lactose intolerance). However, my finding of widespread milk consumption is consistent with findings from other studies of Asian migrants both in Australia (Baghurst et al 1991, Stuart-Fox and Patterson 1989) and in the US (Story and Harris 1988) - in each of these studies milk was reported to be consumed in increased quantities after migration.

Because of the widespread consumption of milk, it is important to consider its nutritional contribution. In Australia, milk is the major contributor of calcium and is also a rich source of protein, fat, sodium and riboflavin. Therefore an increased consumption of milk compared with traditional diets, may lead to an overall increase in the intake of all of these nutrients (particularly if traditional sources are not reduced). Traditional dietary sources of calcium may include calcium leached from animal bones (Rosanoff and Calloway 1982) and different cultivars of plant foods to those available in Australia (Carlson et al 1982a). It was not possible in the present study to determine the intake of calcium from the traditional sources. How much these sources contribute to calcium intake is dependent on the continued use of traditional ingredients and preparation methods, and on the consumption of those foods. It is assumed from the present study that such food sources in Australia would be not be higher than in traditional diets.
On the other hand, adequacy of calcium intake may become an issue for the Vietnamese in the future if traditional dietary sources of calcium are reduced and not replaced with new sources. Milk consumption by the Vietnamese adolescents in Canterbury was lower than by participants in the NDS. As in the NDS survey, milk intake in the present study was significantly lower in the Vietnamese girls than the boys. This may mean their intake of calcium in particular is also lower. These findings are consistent with the finding of Baghurst et al (1991), that calcium consumption was lower in Vietnamese women than in the Australian population.

5.5.1.5 Energy and protein intake

As the average intake of meat and equivalent foods in the Canterbury study was close to recommended levels for Australians (according to the 5BFGP), and milk was also widely consumed, it is likely that there was sufficient protein in the diets of the Canterbury adolescents, and probably more than in traditional diets. This is consistent with the findings of Breakey (1983) and Baghurst et al (1991) who reported that the diets of Vietnamese-Australians increased in protein content after migration to Australia. These authors attributed the increase to the lower relative costs and higher availability of high protein foods in Australia. They also reported an apparent higher energy intake in Australia than in Vietnam because of the increased availability of food in general.
Reports of higher energy intake after migration are strongly supported in the present study by the finding that the height and weight of the participants in the Canterbury study were higher than that of other Vietnamese children in earlier studies (Hitchcock et al 1986).

5.5.1.6 Fibre intake

By Australian measures, the fibre content of traditional Vietnamese diets appears to be low. Although cereals and vegetables are an integral part of the Vietnamese diet, white rice which is a staple food, is not considered a significant fibre source. However, although knowledge in this area is incomplete, rice is known to be a significant source of resistant starch which is thought to have similar effects to dietary fibre (Muir and O'Dea 1993). In the present study, rice was consumed by nearly everyone on the day of recording, in quantities of up to five cups per serve - this was significantly higher than reported in studies of Australian adolescents. However, it cannot be determined from my results whether total rice consumption is lower than in traditional diets. I expect that it was lower, as rice was generally only eaten once/day, whereas it would be more likely to be eaten two-three times/day in Vietnam. However, replacement of rice by foods such as bread and other cereal products will have altered the quantities and types of both fibre and starch in the final diet. Although the consumption of both rice and bread is common to other studies (eg Tong 1987, Baghurst et al 1991), there is as yet no literature to my knowledge that has examined the effects of the mixed cereal diet.
Iron intake is another intriguing aspect of the Vietnamese diets. Carlson et al (1982a, 1982b), in their study of early refugees to the UK, were concerned about their sample’s low calculated iron intake which was unsupported by clinical measures. Other reports were conflicting in the reported incidence of iron deficiency anaemia (e.g., Erickson and Ngoc Hoang 1980, Craft et al. 1983). None of the early diet reports distinguished between haem iron and non-haem iron and the differences in their bioavailability and absorption - haem iron was likely to be low in traditional diets that contained only small serves of meat/fish and large serves of rice (Hallberg et al. 1977, 1983). However, non-haem iron would have been present in many of the plant foods such as cereals and vegetables. One factor known to affect the absorption of non-haem iron is meal composition. Some components e.g., vitamin C and meat/fish, enhance absorption while others e.g., phytates, and tannins, inhibit absorption (Hallberg et al. 1983).

From my study, it is apparent that foods that are excellent vitamin C sources, e.g., chillies, are often consumed with the main meal - a combination which may have enhanced iron absorption from the plant foods in traditional diets and limited the incidence of iron deficiency anaemia. Hallberg et al. (1983) noted that good iron absorption can be obtained from rice-based meals when enhancing factors are present in the meals. They also found that in a variety of Asian-type meals tested, the iron content of meals was higher than expected due to contamination with soil, and that the iron bioavailability was higher than in a sample of Western-type meals.
With Westernisation of the Vietnamese diet and larger serves of meat/fish being eaten, iron absorption from the main meal is likely to be higher than it was previously. However, depending on the foods combined there may still be some concern at other meals. For example, at breakfast, as girls were more likely than boys to have eaten fruit, their iron absorption from non-haem sources, such as bread and cereals, may have been better, although smaller quantities may have been present initially. Similarly, the lunchtime sandwich meal would have produced a range of iron absorption dependent on the meat/fish, fruit/vegetable combinations eaten (Hallberg and Rossander 1982).

5.5.1.8 Other dietary factors

Recent research has been enlightening in the area of non-nutrient dietary components and their role in the aetiology of different diseases; a number of foods and food components have been identified as having a protective role against the development of some of the major Western diseases. Some of these foods are present in traditional Vietnamese diets and were frequently eaten by the Canterbury adolescents. Therefore, the Vietnamese adolescents are likely to have more of these components in their diets than do other adolescents.

For example, fish was one of the traditional foods still eaten in large quantities by the Vietnamese adolescents in Canterbury (relative to other adolescents).
In dietary recommendations for Western populations, an increase in habitual fish consumption is actively encouraged as long term fish intake has been associated with anti-inflammatory effects and a lower heart disease risk (Nelson 1995). Another area of considerable research interest at the moment is the phytochemical content of foods. In particular, phytoestrogens (which derive from a variety of foods including soy products), appear to be in higher concentrations in Asian diets than in Western diets. Postulated roles for phytoestrogens include lowering the risk of some cancers and possibly CVD (Knight and Eden 1995). As foods known to contain these compounds were consumed by the Vietnamese adolescents, their intake may be above that of other Australian adolescents. Similarly, other foods, including garlic, chillies, onions and ginger, which are also becoming recognised for their beneficial and protective health roles (Nelson 1995), were all consumed by the Vietnamese adolescents on the day of recording.

The protection provided by any of these foods would depend on the quantities still eaten following Westernisation of the diet, and perhaps on other conditions not yet identified, eg food combinations and environmental factors.

5.5.2 Health effects

In this section I will discuss the effects of dietary changes on the development of CVD, obesity, non-insulin dependent diabetes mellitus (NIDDM), cancer, growth patterns, lactose intolerance and osteoporosis.
5.5.2.1 Cardiovascular disease

From the present study, because of the mixture of positive and negative dietary aspects, it is difficult to assess the degree of risk for the Vietnamese adolescents in developing heart disease. When compared with other adolescents, on the whole their fat and sodium intakes appear to be lower, they have a higher fish intake and may well have a higher intake of other beneficial dietary components such as soy, ginger, garlic and chillies. These factors may give them a health advantage over their peers. Some researchers have suggested that low iron stores may also be protective against heart disease (Stadtman 1992). If found to be valid, this claim may also have some relevance to Vietnamese people following traditional diets of lower iron content. Because they may have experienced more dietary change than their parents, and will have eaten that way for a longer period, it is possible to speculate that the Vietnamese adolescents may have a higher risk for the development of heart disease and hypertension than do their parents.

However, research in this area is scant because of the relatively short period of residence of Vietnamese people outside Vietnam. Also, the research that is available only describes adults and is conflicting. For instance, Klatsky and Armstrong (1991) report the findings of a study of CVD risk factors in 13000 Asian-Americans, of whom 178 were Vietnamese. Although the Vietnamese data were not separately reported, these authors found that cholesterol when adjusted for BMI differences, was no higher in people born in America.
Similarly, Bates et al (1989) reported that in a sample of IndoChinese adults in California, blood pressure and blood cholesterol were similar to those for white Americans, although the Vietnamese subgroup had the highest cholesterol and smoking rates. By contrast, Rissel and Russell (1993) reported that Vietnamese adults in south western Sydney had lower prevalences of raised blood pressure, overweight and high blood cholesterol than did the general population. However, smoking prevalence in men was substantially higher.

While the American studies suggest that risk factors for heart disease have increased in Vietnamese adults, the Australian studies (Baghurst et al 1991, Rissel and Russell 1993), indicate that dietary patterns and measured risk factors are not yet a concern (apart from smoking which is high in both countries and may have been continued from Vietnam rather than adopted). These differences may relate to differences in the Vietnamese populations in the US and in Australia and/or the types and extent of dietary and other lifestyle changes experienced by the two groups. Implications for the adolescents are that if there has been greater adoption of Western diet in the US than in Australia, then this may indicate that continued or greater dietary change than at present in Australia may increase their CVD risk in the future.

5.5.2.2 Obesity

A negative aspect to higher energy and protein intakes for the Vietnamese people is the increased risk of obesity, itself a risk factor for conditions like CVD and non insulin dependent diabetes (NIDDM).
There are reports of weight gain amongst Vietnamese adults after migration (Gardner et al 1983, Todd and Gelbier 1988, Baghurst et al 1991), and an increased incidence of overweight individuals in some Vietnamese groups (Henry et al 1992). However, as yet, no studies have demonstrated a sustained weight gain to morbid levels in the Vietnamese community. Where body mass index (BMI) has been reported, it has generally been within the healthy weight range (Bates et al 1989, Baghurst et al 1991, Rissel and Russell 1993). Although the women in the study of Baghurst et al reported weight gains of 4-5kg, their mean BMI was well within the healthy weight range at only 21.6, and was constant with different lengths of residence in Australia. Rissel and Russell reported that the prevalence of overweight in their sample of Vietnamese adults was lower than that of the Australian population. In addition, more than a quarter were considered underweight (BMI<20). Bates et al (1989) found that the Vietnamese subsample in their sample of IndoChinese adults in the US were the leanest, with an average BMI of 23.7.

One factor which is often misleading in the reporting of weight gain is that it is usually not specified whether it is catch up weight gain because of previous malnutrition, or if it is an increase above healthy weight. Baghurst et al (1991) note that we cannot tell yet whether weight gain in Vietnamese individuals is a temporary phenomenon or one which will increase or decrease with acculturation. Rissel and Russell (1993) also note that the appropriateness of BMI as an index of weight measurement in Asian populations has not yet been established.
Although not discussed in their report, Rissel and Russell (1993) present data indicating that the proportion of the sample who were overweight (ie BMI>24.99) did increase with both the age of participants and with their length of residence in Australia. This suggests that age is a confounding factor in weight gain observed in those Vietnamese people of longer residence in countries like Australia. When comparing their subjects by country of birth, Klatsky and Armstrong (1991) found greater adiposity in the US-born than in the Asian-born. They also found that women were less likely than men to be obese, and suggest that this is an acculturation issue related to body image and the Western desire for slimness. Conversely, Bates et al (1989) reported that IndoChinese women were heavier on average than white Americans while the men were leaner.

Also likely to be a contributing factor to weight gain is lack of exercise. However, although decreased exercise by Vietnamese people since migration is noted in some reports, there is little discussion in the literature of the extent of its association with observed weight increases. Baghurst et al (1991) did note that in the 70% of respondents who reported gaining weight since migration, that this was significantly associated with self-reported decreases in exercise and increases in food consumption.

The implications here for the adolescents are that increased energy intake over their exercise levels may increase their rate of obesity in the future.
Vietnamese adolescents in Canterbury LGA are probably consuming more energy than have earlier groups of adolescents as evidenced by their larger body size (see Section 5.5.2.5). However, they as adults in the future may also need to eat more energy than have previous generations of Vietnamese adults. Whether or not this will translate to obesity will depend on both the composition of their diet, (in particular the fat content), and their exercise levels. If the fat intake increased above the current level and exercise decreased, obesity may be a consequence. From results of the present study, it is the girls who are more at risk of low exercise levels. However, they also have the lower energy intakes at the moment and appear to be ‘weight conscious’. Literature is conflicting as to possible trends in the adult population. Obesity is apparently not a major health issue for Vietnamese adults in Australia at the moment.

5.5.2.3 Diabetes

Factors associated with development of non-insulin dependent diabetes mellitus (NIDDM) include a high energy and high fat intake, development of central obesity and relative physical inactivity (Wellborn 1994). If continued Westernisation of Vietnamese diets led to a higher prevalence of these elements in the Vietnamese population, prevalence of NIDDM may also increase. There is evidence of an increase in diabetes incidence and prevalence in a number of populations that have become Westernised, both after migration and in their countries of birth. For instance recent reports describe an increasing incidence and prevalence of NIDDM in China (Li and Deng 1995).
This increase is thought to be related to increased energy intake and decreased exercise. Wellborn has referred to diabetes as a 'major epidemic' looming in the Asia-Oceania region related to urbanisation, modernisation or 'Coca-Colonisation'. Recent research also suggests that for some groups, Westernisation has resulted in diets of a higher glycaemic index (GI), which in itself may be a risk factor for development of NIDDM (Brand Miller 1995). While this association has not been made specifically for Asian diets, it is interesting to speculate on the possibility - some types of rice and Chinese noodles have a lower GI than many of the foods eaten as substitutes in a Westernised diet, eg white bread, many types of biscuits and breakfast cereals (Foster-Powell and Brand Miller 1995).

Wellborn (1994) notes that migrants from Asia in Australia are considered at high risk for the development of NIDDM. In addition, Chinese people are considered to have a high susceptibility to NIDDM (Wellborn). There is a large element of common ancestry between the Chinese and Vietnamese populations.

Therefore, Vietnamese people may be at an increased risk of developing NIDDM. The cumulative evidence suggest that there is a genetic predisposition towards the development of NIDDM, and that the risk will be heightened with adoption of Western lifestyle factors. Gestational diabetes is reportedly already highly prevalent in the Australian-Vietnamese population (Doery et al 1989), and gestational diabetes is associated with the development of NIDDM (Thomas 1994).
Also, Bermingham et al (1996) noted a tendency toward abdominal obesity in Vietnamese migrants. This predisposition towards diabetes may relate to a higher level of insulin resistance similar to that described for Australian Aborigines (O'Dea 1991). This relates to the 'thrifty gene' concept which suggests that some populations have evolved to be able to store food well in times of abundance, in turn enabling survival in times of food deprivation. Further research is needed to determine if this is the case for the Vietnamese population. As discussed in the previous section, it does not appear that the 'negative' behaviours of high fat intake, and low exercise levels have become established in the Vietnamese population at this point of time. However, Vietnamese adolescents may be at real risk for development of diabetes (again more so than their parents), if their diets and lifestyles continue to change.

5.5.2.4 Cancer

Apart from cancers of the digestive system in males, the prevalence of cancer in the Vietnamese population has been low (Young 1992b). This has been attributed variously to the low fat intake, low meat intake and to the presence of protective factors such as phytoestrogens in traditional diets. Hence change away from traditional diet towards Western diet may increase the incidence and prevalence of some cancers (by increasing negative factors or decreasing protective factors). A rise in the incidence of breast, bowel and prostate cancers has been reported in populations who were previously consuming traditional type diets but whose diets have become Westernised (McMichael 1985a).
The adolescents' relatively low fat intake, as with the other lifestyle diseases, may place them in good stead for the future. However, because they probably have a higher meat intake than in traditional diets, and they are consuming a different mix of fibres and starches from the different cereals, fruits and vegetables eaten here, they probably have a higher intake of some negative factors and a lower intake of some positive factors compared to traditional diets.

Conversely, it is possible that dietary change away from traditional diets may lower the risk of digestive cancers for the Vietnamese population. Some of these cancers are thought to be associated with the consumption of pickled and preserved foods (Campbell et al 1992). In Australia, the availability of refrigeration and the use of substitutes may reduce the consumption of the implicated foods. In the present study, although pickled vegetables and fish were reported as consumed by at least half the sample during the week, it is not possible to tell whether this is different to a traditional dietary pattern. Overall, whether or not the adolescents' cancer risk is higher or lower will depend on the particular cancer, the total composition of the diet and on individual factors.

5.5.2.5 Growth patterns

Vietnamese adolescents in the present study appear to be taller than earlier groups of Vietnamese teenagers and now appear to be only slightly smaller than other Australian adolescents (ACHPER 1987).
When the data are compared with earlier reports of heights and weights of Vietnamese young people in both Australia (Hitchcock et al 1986b) and the US (Barry et al 1983, Fitzpatrick et al 1987), the apparent increase in body size has been substantial (although not tested for statistical significance). For instance, when compared with data from the study of Vietnamese children aged 5-14 years in Perth (Hitchcock et al), there has been a relatively large increase in average height and weight of the boys and a smaller increase for younger girls (12 and 13 years). Older girls (14 years) were similar size but slightly shorter and lighter in the Canterbury study.

When compared with the mean heights and weights of the 12-15 year age groups as described in the Australian Health and Fitness Survey (ACHPER 1987), the mean heights and weights of the Canterbury adolescents tended to be less, but well within one standard deviation for the corresponding age groups. Additionally, when plotted on NCHS charts, the mean heights and weights for all ages fell between the 25th and 75th centiles. Although many individual measurements fell below the 50th centile these were generally proportional with height. Older girls (14 and 15 years) in the present study tended to be shorter and lighter when measurements were compared with data for Australian girls.

An explanation for the greater body size of the Canterbury adolescents compared with the Perth adolescents in the earlier study may be their length of time of residence in Australia.
As over half the adolescents in the Canterbury study had lived in Australia for over seven years, they have been exposed to higher standards of living and had access to the food supply for a considerable part of their growing years. As the Perth study was conducted seven years prior to the Canterbury study, the observed increases suggest that a secular increase in body size has occurred in Vietnamese adolescents during their period of residence in Australia. Further support for this hypothesis is the observation that the older Canterbury girls who had lived in Australia for a relatively shorter period, were also the shortest and lightest when compared with their Australian peers. It is of note that the older girls in the Canterbury study were the group most like the Perth adolescents.

These results refute the widely held belief that Vietnamese children are 'small in stature'. They also support the theory that Vietnamese children in Western countries are moving towards their genetic growth potential and do not have, as described by Barry et al (1983), 'abnormal growth curves' (sic) attributable to 'racial-genetic differences' (sic). Numerous studies have demonstrated that children have increased growth when in situations of improved socioeconomic conditions and improved nutrition (Harper 1987). The finding also supports anecdotal reports from health workers that Vietnamese children had been 'getting taller' since their arrival in the Canterbury area. It also justifies the workers' decision to discontinue the use of Asian growth charts for anthropometrical records, and to use National Centre for Health Statistics (NCHS) charts as they would use for other children.
5.5.2.6 Lactose intolerance

My finding of widespread milk intake was surprising given that lactose intolerance is reported as highly prevalent in the Vietnamese community. However, literature reports on lactose intolerance and maldigestion (Scrimshaw and Murray 1988 and Cobiac 1994), indicate that there is a poor correlation throughout the world between milk intake and lactose intolerance either diagnosed or presumed on ethnic background. Cobiac in her recent extensive literature review on lactose intolerance, cited a number of factors that may explain the finding in the present study. Possible explanatory factors include a greater tolerance of lactose by children than by adults, that the acceptance of symptoms is culturally determined and that the symptoms of lactose maldigestion may be reduced by other food components eg fibre. Cobiac also reports that full fat milk is better tolerated than low fat milk, and that chocolate milk is better tolerated than plain milk.

Therefore, in the present study, possible factors relating to the apparent tolerance of milk include that milk may not have been consumed in large enough quantities to precipitate symptoms, or the symptoms may not be considered severe enough to limit consumption. As diagnosis of lactose intolerance in adults is made after consumption of 50g lactose load (equivalent to one litre of milk) (Scrimshaw and Murray 1988), two cups of milk (500 mls), equivalent to half the diagnostic load, may not produce severe symptoms. Symptoms that are present may also be less pronounced as most milk was taken at meals, especially breakfast when cereals were also consumed, and the milk at school was often flavoured milk.
Tadesse et al (1992) reported that Hong Kong-Chinese children demonstrated a high prevalence of clinical lactose intolerance after ingesting lactose but not after drinking milk.

Adaptation to milk intake, where the symptoms of maldigestion may reduce with continued milk feeding although the diagnosis of lactose intolerance remains, has also been widely reported (Cobic 1994). As most of the Canterbury sample has lived in Australia for several years, perhaps milk intake is better tolerated now than in the past. Similarly, perhaps the greatest milk consumers had also lived in Australia for longer periods and the few who drank soy milk (which would not contain lactose) may have been the ones more severely affected by lactose intolerance. It is possible that the children who drink milk now, may develop symptoms of lactose intolerance as adults.

These findings support Cobic’s (1994) suggestion that because of their likely continued milk intake, future study of lactose intolerance in second and third generation Vietnamese-Australians should be undertaken, as it may help determine whether dietary lactose has any effect on the activity of the lactase enzyme. They are also consistent with the findings of Scrimshaw and Murray (1988) who document that milk consumption may be influenced more by factors including availability, social attitudes, nutrition education and other cultural factors than by the relative ability to digest lactose. In particular, these findings challenge the widely held tenet that milk is not tolerated by members of the Vietnamese community.
Osteoporosis

Because of its anticipated role in the development of osteoporosis, calcium intake is of current public health concern - a dietary guideline has recently been devised particularly for women and girls (NHMRC 1992, 1995). As the Vietnamese adolescents had a lower milk, and probably lower calcium intake than other Australians, it would appear that they are more at risk for the development of conditions like osteoporosis. This is highlighted in the recently released *Dietary guidelines for children and adolescents* (NHMRC 1995), where it is noted that children who are genetically predisposed to primary lactase deficiency, (and this includes many children from SE Asia), are at risk for calcium deficiency.

However, research in this area is scant and contradictory. Not enough is known about the development of osteoporosis, especially in different ethnic groups. Also, although it is often argued that increased calcium intake increases bone density, there may be some distinction between calcium intake and the intake of dairy foods. Kushi et al (1995) report that the epidemiologic evidence for a protective role of dairy products against fractures is not strong. One of the determining factors may be the associated intake of other nutrients, e.g. animal protein, which is known to increase calcium excretion. In a recent review, Kushi et al, in examining the health advantages of Mediterranean diets, conclude that increased milk consumption was actually associated with an increase in fracture rates and suggest that low to moderate milk intakes are beneficial. A similar situation may exist in the Vietnamese community.
Dietary changes the Vietnamese adolescents are making, eg an increase in dairy food consumption (and overall increase in animal protein and sodium intake), may actually increase their calcium requirements. Depending on the role of genetic and lifestyle factors, this may increase rather than decrease their risk of developing osteoporosis in the future.

5.5.3 Impact of dietary change

The dietary changes which the Vietnamese adolescents are undergoing, and which I have described in the preceding sections, demonstrate the complexity of dietary habits. In discussing the dietary changes and their possible health effects, I have shown that this is also complex. However, the usual interpretations of acculturated dietary patterns tend to be simplistic, and have to some extent been misleading. This has important implications for actions that might be taken to 'improve' health. In this section I want to draw out the complexities of the adolescents' diets, and to question the appropriateness of some of the health plans based on previous dietary studies of Vietnamese migrants.

There are two paradoxes relating to the dietary changes noted in the present study of Vietnamese adolescents. Firstly, given the diet-related disease profile of the Asian and Western cultures there is a tendency to classify all traditional eating patterns as 'healthy', and non-traditional or Western eating patterns as 'unhealthy'. As demonstrated by the present study this is not true - the adoption of non-traditional eating patterns has meant the adoption of healthy foods and dietary practices as well as less healthy ones.
Examples of healthy foods that have been adopted include breakfast cereals, milk and bread. Although these have to some extent replaced rice and other staple foods, they are themselves recommended foods in the Australian diet. Replacement of some other traditional foods may also give the benefit of reducing the cancer risk for some individuals. Even the use of instant noodles, which is considered by some to be a Western and negative influence (because of the association of using convenience and non-traditional foods), has good points as well as less good points for a population that may be prone to diabetes - although instant noodles can be relatively high in fat, they have recently been found to have a relatively low glycaemic index (Foster-Powell and Brand Miller 1995). The observed mixed dietary pattern represents a complex nutritional situation for the adolescents, further complicated by the balance and combination of traditional and non-traditional elements. Where 'less healthy' foods such as soft drinks and high fat snack foods and takeaway foods have been adopted, the negative effect of these foods in the long term may be somewhat offset by this group's continued high consumption of traditional foods such as rice and fish, and condiments such as chillies, garlic and ginger.

The second paradox is that while some dietary changes, such as increased intakes of foods that are high in protein (and usually also high in fat) and energy, may have possible negative effects, they are likely to have positive effects as well. The much publicised negative consequences include increases in the lifestyle diseases such as obesity, CVD and NIDDM.
Increased meat intakes and lower fruit and vegetable intakes that are typical of these dietary changes, may also increase the rates of some cancers, eg bowel and breast cancer. However, the benefits of increased intakes of protein and energy for the Vietnamese community include improved general nutrition and health, as indicated by the increased growth of children. Increased intakes of fat and protein (and therefore higher food energy intakes) are associated with a lower likelihood of malnutrition and its poor health consequences. Increased fat and protein intakes are known to be associated with increasing wealth in a population (Pellett 1989), and this in turn is associated with improved living conditions such as increased availability and accessibility of food, available clean water and sanitation. Harper (1987) and McMichael (1991), note that these types of dietary change accompanying ‘development’, are also associated with health benefits such as increased life expectancy, reduced infant mortality and reduced rates of nutritional deficiency and infectious diseases. Increased growth of children is an indicator of these changes (Harper).

Because of the different socioeconomic conditions between Vietnam and countries like Australia, migration from Vietnam to Australia is usually accompanied by increased wealth. This is likely in turn to mean rewards such as longer life expectancy and lower infant mortality rates. However, this aspect of the Vietnamese community’s migration to Australia and other Western countries is rarely mentioned.
There has been such a focus on preventing future health problems for Vietnamese people, the health gains made since their migration tend to be overlooked - literature from only 10 years ago was detailing the high incidence of infection and trauma experienced by the refugees. Harper notes that the state of health in Western nations in the early part of this century resembled that in many of the less-developed countries today.

For those concerned about development of lifestyle diseases in the Vietnamese population in general, and the future health of Vietnamese youth in particular, the results of the present study lend some support for that concern. Because of the dietary changes reported, it is possible that the current generation of adolescents is more likely to develop Western-style disease patterns than are their parents, and with continued dietary change the risk may be higher for the next generation. From the present study, the types of food patterns reported by the Vietnamese adolescents are consistent with those in studies where increased physiological risk factors have been measured when compared with those of people following a more traditional lifestyle (Hopkins et al 1980, Powles et al 1988). However, they are also consistent with recent reports that Vietnam-born people have a lower health risk than that of Australian-born (Baghurst et al 1991, NHF 1995). Therefore, the adolescents' risk of developing diseases of affluence may be lower than commonly believed.
While there is concern about the future health risks of groups like Vietnamese adolescents, the difficulty is in determining the cut-off point between improvement and detriment to the population's health. However, not all researchers would agree that an increase in the incidence of chronic diseases is preventable. For instance, Rose (1989) notes that CHD may relate to childhood poverty. He states that:

'Possibly every newly rich country has to go through its epidemic of CHD' (Rose 1989:S175).

Similarly, Harper (1987) does not accept that there has been an 'epidemic' of chronic diseases in the Western world, and argues that these claims derive from inappropriate reporting of statistics. Harper also argues that statements about epidemics of heart disease and cancer are anomalous with history, and with the excellent state of health of populations in industrialised countries (indicated by measures such as longer life expectancy and reduced infant mortality). Following the argument then that apparent higher rates of conditions like heart disease are inevitable by-products of improved standards of living, (including improved nutrition), migration for the Vietnamese people should eventually lead to increased rates of CVD. But it will also to benefits such as lower infant mortality and longer lifespans.

Because of the emphasis that has been placed on preventing future health problems, Vietnamese people are often encouraged to maintain their traditional dietary patterns. While I recognise that 'traditional diets' may be protective against conditions such as heart disease, their wholesale promotion is a contradictory and potentially worrying situation.
For instance, it ignores the fact that traditional diets may not always have been very nutritious, as evidenced by some of the health problems experienced in Vietnam. Even in Australia, Baghurst et al (1991) noted that the largely traditional diets of Vietnamese women, were marginal for some vitamins and minerals. Also, promotion of traditional diets does not necessarily take into account the different environments between the two countries - many traditional practices may not be feasible in Australia. Differences in lifestyle, available foods, even cooking equipment and fuel sources would have necessitated some changes to traditional practices. Some may be more amenable to modification than others. I will return to this aspect in Section 5.6.7. In promoting traditional diets, it is also worrying that nutritional benefits other than their being low fat, are rarely considered. This narrow approach is particularly concerning for diets such as the Vietnamese, where so many foods and dietary practices are different to a typical Western diet. However, with the growing interest in the area of 'therapeutic nutrition' that considers elements of the whole diet and not just isolated nutrients (Nelson 1995), this may improve. This approach may also explain some of the discrepancies in research findings regarding the role of fat in the aetiology of heart disease.

As it is recognised that many different diet combinations are compatible with infant survival, appropriate rates of growth and development, and long life expectancy (Harper 1987), identification of positive elements within traditional diets may make it easier to promote those beneficial aspects.
While this may resolve the dilemma posed where promotion of traditional diets *per se* is not appropriate, the question then arises as to whether traditional diets need to be consumed *in toto* to afford the same protection. Further research is needed on this point.

I feel that one of the major difficulties created by such concentration on future health risk, is that more immediate health problems may be overlooked. The present study provides evidence that there are some health concerns for the Vietnamese adolescents in Canterbury that have the potential to seriously effect their health and wellbeing in the immediate future. As discussed earlier, these concerns, which include meal skipping and girls' concern about body image, do warrant attention.

However, before deciding on any intervention to promote health and nutrition, it is clearly important to consider the appropriateness and feasibility of any proposals. I believe this has not always been the case with recommendations for the Vietnamese community (and possibly other ethnic minority groups). It is of course, also important to consider the different factors that influence dietary practices. In the next section I will discuss the influences determined in the present study to have some impact on the diets of the Vietnamese adolescents in Canterbury LGA.

5.6 Influences on dietary practices

Factors known to influence dietary practices include physical attributes such as age and sex, personal factors such as knowledge, attitudes and beliefs.
Other factors include environmental factors such as peers, family, school, culture and social norms. Most of these factors were considered in the present study and are discussed in the following section. Factors that appeared to be important in influencing the diets of the Vietnamese adolescents in Canterbury LGA were advertising, television (TV), peers, family and the availability of food. Associations of some practices with the participants' sex and the length of time spent in Australia were also apparent and are discussed within the context of other aspects.

5.6.1 Knowledge

The Vietnamese adolescents did demonstrate some nutrition knowledge through their ability to correctly name 'healthy' and 'unhealthy' foods. However, this knowledge did not appear to greatly influence their food intake. As the top three unhealthy foods nominated were chocolate, fried/fatty foods and hot chips/chips, the adolescents appeared to be particularly aware of dietary fat as a health issue. Healthy foods nominated were staple foods eg fruit, vegetables and rice.

The types of foods nominated by the Vietnamese adolescents as healthy and unhealthy foods are consistent with those reported in other studies (Abraham 1988, Morton 1989, Prättälä 1989, Williams et al 1993). For example, Morton (1989), found that most of 185, grade 8 students in Adelaide, reported that eating 'fast food' was not advisable, with nearly half identifying fat as the problem.
Williams et al found that chips were rated as unhealthy by Tasmanian adolescents, and also in keeping with the present study, fruits were perceived as particularly healthy. Similarly Abraham reported that teenage girls considered fruit, vegetables and low fat foods as 'good' while snack foods and fatty foods were seen as 'bad', while Prättälä reported that Finnish teenagers considered fruit, vegetable and cereal products amongst healthy foods and high fat foods, French fries and candies were not recommended foods.

A telephone survey of a national random sample of 407 US children (aged 9-15) in 1991, also indicated an awareness of nutrition principles in that group (International Food Information Council 1992). Similar to the present study, knowledge included a recognition of the importance of fruit and vegetables and that diet is related to future health. Also, Santich (1994) in a sample of 49 Australian-born women, found that the foods most frequently nominated as good foods and bad foods were similar to those nominated as healthy and unhealthy foods by the Vietnamese adolescents. Santich also reported that the good foods nominated were thought of as healthy foods.

Although a knowledge of healthy and unhealthy foods is not a complete measure of nutrition knowledge, it does indicate a general awareness that would be a useful framework for decision making. However, even the level of knowledge demonstrated was not always reflected in the dietary behaviours reported in the present study.
The discrepancy between knowledge and behaviour is not a new finding in adolescents (Story and Resnick 1986, Williams et al 1993). Williams et al (1993:161) suggest that:

‘nutrition awareness would seem to be ... a "necessary but not sufficient condition" for healthy food choices’.

In the present study, as nearly half the respondents indicated that it was not difficult to eat healthy foods, knowledge did not seem to be a barrier. As perceived lack of difficulty in eating healthy foods was inversely related to length of residence in Australia, it may have been more of an issue for newer arrivals. However, over one-quarter of respondents indicated that it was hard to eat healthy foods because they did not know what they were. This answer may reflect some general confusion about nutrition issues, or may reflect cultural differences, especially in those who have lived in Australia for a shorter time. A number of barriers to adolescents eating nutritiously have been identified (Story and Resnick). These include inconvenience, lack of time, taste, and lack of a sense of urgency in dealing with health issues. As almost one-half of respondents in the present study indicated that they did not eat healthy foods because they did not like them, personal preference or taste appears to be a major barrier. Other reasons such as inconvenience and lack of time are also plausible given the times that particular foods were eaten on the day of recording.

Although not specifically requested in the present study, it is relevant to consider the sources of nutrition information for adolescents.
Incidental learning (newspapers, magazines) and media have been considered to be sources of information in studies of adolescents who demonstrated basic levels of knowledge not dissimilar from the present study (eg Worsley et al 1990). From the respondents' perceptions of healthy and unhealthy foods in the present study, these sources of information may also apply for Vietnamese adolescents. The consistencies with the types of responses from the various studies described above suggest a level of common knowledge across different age and population groups such as would be acquired through schooling or media exposure of common issues. Interestingly in the present study, cultural awareness was also demonstrated in the naming of rice as a healthy food. It was not determined whether there was gender bias in the foods named.

Therefore from the results of the present study, knowledge did not seem to greatly influence the adolescents' food choices. It was not within the scope of the present study to examine why nutrition knowledge was not translated into healthy behaviours - this is an area for further investigation. However, there does appear to be room for improvement in the area of nutrition education, especially as it relates to the use of non-traditional foods and the adoption of Western lifestyle. As the adolescents did not always apply their nutrition knowledge when choosing foods, other factors are obviously more influential in determining food choice. Some of these will be discussed in the following sections.
5.6.2 Advertising

The effect of food advertising on children and teenagers has been of concern because the foods which are the most heavily advertised, especially on TV, tend to be the ones which are considered to be less nutritionally desirable (NHMRC 1989, Morton 1991, Signorielli and Lears 1992). In the present study, the naming of preferred non-traditional foods by the brand or trade name eg ‘McDonald’s’ and ‘Kentucky Fried’ rather than the generic terms ‘hamburger’ or ‘fried chicken’ suggests that as both these foods are heavily promoted towards young people through advertising, the brand names have become better recognised by the Vietnamese young people than the food types. In addition they hold some prestige value to be considered highly favoured foods. Scarlett (1993) reported similar responses in a sample of multi-ethnic primary school children in Sydney. Morton (1989) reports that grade 8 Adelaide children could recall advertisements accurately, particularly those for breakfast cereals and takeaway food.

Of concern is the fact that both Kentucky Fried and McDonald’s are high in fat content and as such not recommended for frequent consumption. (The frequency of their consumption was not investigated here.) It was also not investigated here whether advertising actually influenced food purchasing and consumption patterns. However, when asked whether they ever decided what foods would be bought for their household, nearly two-thirds of the Vietnamese adolescents responded that they did. It cannot be determined from this response whether the decision was made at the point of purchase or whether parents were requested to buy certain foods.
As the adolescents had only a minor role in food purchasing, it is assumed that they referred mainly to requesting parents to make specific food purchases. From other reports, it is highly likely that these requests would have been influenced by TV watching. Morton (1989) reported that Grade 8 children in Adelaide, especially boys, reported trying to persuade parents to buy advertised products. Similarly, Ikeda et al (1991a) reported that Hmong children in California consumed breakfast cereals which they had requested or had seen in TV advertisements.

5.6.3 Television

Television has been linked to nutritional status in three ways - education through programs and advertisements, establishment of norms regarding body image and through facilitation of a sedentary lifestyle (Blum 1989). Television watching has been associated with obesity through increased food consumption especially of high fat snack foods, and/or decreased exercise (Dietz 1990). In the present study, the majority of children reported watching commercial TV for at least two hours a day, and some watched for over four hours. During this time they would have been exposed to numerous food advertisements and may also have watched shows where food use was modelled by the characters. The time spent watching commercial TV by the Canterbury sample was consistent with the results of other studies (Morton 1989, Woodward et al 1992). Woodward et al found, in a random sample of 2082 Tasmanian teenagers from years 7 to 10, that the median amount of TV watched was 3 hours per day.
It has been reported that greater amounts of TV watching are associated with poorer food choices (Signorielli and Lears 1992, Woodward et al 1992). Woodward et al found that those who watched commercial TV for more than three hours per day, made less healthy food choices, and held perceptions of foods and food norms that were relatively less healthy compared to those who watched for less than three hours per day. Foods consumed more often by the high TV watchers included ice cream, meat pie, steak, sausages, hot chips, potato, butter, non-polyunsaturated margarine and soft drink. Foods consumed less often included low fat milks, breakfast cereal and orange juice. The authors were unable to determine whether TV watching contributed to unhealthy food choices or was symptomatic of a generally unhealthy lifestyle.

The results of my study cannot be strictly compared with those of Woodward et al (1992), in that the food consumption data were not correlated with TV watching in the present study. However, there are a number of similarities in the concerns raised. For example, Western foods that were consumed by over 80% of the Canterbury sample in the week covered by the FFQ, included three of the foods eaten more often by the 'high TV watchers' in the Tasmanian study. These foods were ice cream, hot chips and soft drink. The other foods that were more often consumed in the Tasmanian sample, eg meat pie, steak, sausages, potato, butter and non-polyunsaturated margarine, were either not widely consumed in the Vietnamese sample or else not assessed directly.
However, if increases in the intake of these foods do occur in the future, this would represent a strong shift towards Western food patterns. Based on the results of Woodward et al, these increases may be more likely in those who watch TV the most.

In addition to the influence of advertisements as discussed in the previous section, there may be an influence from TV shows where food use is modelled by the characters. Morton (1991) reports that for popular Australian dramas that are likely to be watched by adolescents, on average, one-quarter of each show is made up of food-related scenes such as eating, drinking, purchasing and preparation. Branded foods may also be visible. She also reported that shows commonly gave wrong or misleading information and that while portrayal of meals contained mostly positive nutrition messages, this was less likely for portrayal of snack foods. Gender differences were also apparent in that food was mainly prepared by females, body image issues were also raised predominantly by females, and alcohol was mainly drunk by males. Issues of reality are also raised as characters’ physical appearance was usually slim and attractive and perhaps in contrast to their eating habits (Morton 1989). The foods displayed on Australian TV are also most likely to be Western-type foods. The implications for Vietnamese adolescents are that they are exposed to, and probably influenced by a series of images both through advertisements and TV shows which portray ‘Western’, and in particular, ‘Australian’ lifestyle. Given the high rate of concern about body image in the Vietnamese girls in the present study, there may be a link to television viewing.
While learning about different aspects of ‘Western culture’ may have positive effects, it may also give a biased view of food-related practices. For example, while the heavy advertising of foods like soft drinks, chips, confectionery, takeaway and convenience foods may increase the desirability of these foods it does not explain where they fit into a ‘healthy’ Australian diet.

Blum (1989) notes there is little research on the influence of food advertising and food programming on adolescent food choices and that there is little cross-cultural research on the impact of television. As well as additional research and increased understanding of youth by the TV industry, Blum recommends that critical viewing skills need to be developed and parents need to be responsible for their children’s viewing. These recommendations are particularly interesting with reference to a population group like the Vietnamese in Australia. As both parents and children alike are relatively new to Australia, they have little background by which to assess the appropriateness and relevance of TV viewing content, and parents in particular may be hampered by language difficulties.

Although not examined in the present study, it is interesting to speculate on the role of TV for Vietnamese parents. I am assuming that parents would have had some exposure to commercial TV, as televisions appeared to be available in at least the majority of households, and turned on for at least two hours per day. Crane and Green (1980) reported that of 79 SE Asian heads of households in the US, only 8% did not watch TV, and 22% watched at least 20 hours per week.
While the advertising and display of foods on TV may provide information on the availability of foods, it is not necessarily done in a way that informs the appropriate use of the foods in the Western diet pattern. For example, the most advertised and therefore high profile foods, tend to also be those with several negative nutritional qualities, ie high in fat, sugar and salt. There are implications here for the types of messages received by people from other countries about the Australian diet and how these messages are interpreted. It is also likely that adolescents do not have the same viewing schedule and/or preferences as their parents, and this may influence their perceptions of lifestyle, including food use and food norms, differently.

Television therefore appears to be a strong acculturating influence. A positive aspect of TV watching would be assistance in learning about Western social norms and language. However, without role modelling in the home, these images may be distorted in their interpretation. Another effect of TV watching could be decreased exercise. As children were watching TV for at least two hours a day, this would limit the amount of exercise possible, and could therefore contribute to a lower fitness level in the long term. If there is a TV effect related to decreased exercise, this effect would also relate to sitting to watch videos, video games and computers. In the Canterbury study, information was not sought on these activities which are now more popular, and so perhaps have a greater effect than at the time of the study.
5.6.4 Family

Family influences on the Vietnamese adolescents were apparent in their food consumption patterns at home, particularly at the evening meal which was reported by nearly every one as a traditional meal in several respects. This meal was also generally eaten at home with family members. Traditional foods were also eaten at breakfast by a large proportion of the adolescents. The use of Vietnamese shopping centres and specialty food shops suggests that parents encourage the availability of traditional foods in the home.

These results are broadly consistent with those of other studies of adolescents from a variety of backgrounds. Story and Resnick (1986) reported that adolescents valued sharing family meals although schedules sometimes made this difficult. In Australia, Williams et al (1993) found adolescents' perceived use of particular foods by their parents to be strongly linked to their own use of those foods. Williams et al suggest this was related to the availability of food in the home, as well as to parental example and advice. Of interest in the study of Williams et al was that the Tasmanian adolescents perceived their parents to consume similar snack foods, and not just main meal items, to the ones they consumed themselves. However, relationships between parents and children for food preferences are equivocal (Borah-Giddens and Falciglia 1993). Patterns in the Australian-Vietnamese population have not yet been described.

Several ways have been identified that families influence children's food intake.
These include modelling and example of food use and dietary practices, child rearing beliefs and practices (Baghurst and Syrette 1985), providing food in the home and promoting the availability of particular foods (Williams et al 1993). These would in turn be determined by other factors such as cultural background, resources, family size and structure and other beliefs and practices. Other factors such as whether the mother works outside the home may also influence family food purchases and meal patterns (Prättälä 1989, Worsley 1991). The extent of these influences in the Vietnamese population has not been investigated.

Adolescent eating patterns in the present study were quite different when they were away from home, where family influences would also be less strong. Initial anecdotal reports that prompted this study were that caregivers of Vietnamese adolescents were concerned about the children eating non-traditional foods. This was interpreted by health workers to mean that the children were eating 'junk food' that was bad for their health. While the findings of this study support that the adolescents are not eating a fully traditional diet, other conclusions can be drawn besides the impact of 'junk food'. For instance, it is likely that the parents were actually concerned about the diminution of traditionality rather than the adoption of unhealthy food habits. This has been frequently reported as a concern of Vietnamese family elders after migration (Lewins and Ly 1985).

Family influences appear to effect the Vietnamese adolescents' food habits particularly by promoting and supporting the use of traditional foods.
However, this effect is variable when the adolescents are away from home. This is not surprising given the age group of the study. There are though many intriguing aspects of the family influence on food habits that remain to be explored. These include relationships between parent and child food use and preferences, and whether there are differences between more traditional and less traditional families.

5.6.5 Peers

The influence of friends and peers on food choices of the adolescents in the present study is suggested by them bringing Western style foods rather than traditional foods from home for eating at school. However, peer usage of foods as an influence is not well documented and the distinction is made that perceived peer use is probably more important than, and often different to their actual use (Perry 1991). Dalton et al (1986) reported that the influence of significant others, eg peers, was one factor in determining adult food choices in a worksite canteen but less so than taste. In contrast, Williams et al (1993) found that perceived peer use of particular foods was not important in adolescent food choices. However, similar to Dalton et al, hedonic factors such as taste, were considered to have been important for this age group. Prättälä (1989) in a study of Finnish teenagers reported that eating particular foods with friends was very important, and that the environment of eating, eg hamburger shop and sharing the food, was often more important than the actual food. The author also reports that sharing lollies eg at lunchtime, was related to having friends. In the present study, participants often reported eating a few lollies at lunchtime or between classes.
Lollies may have been shared amongst friends. Similarly, the eating of hot chips after school may have been a shared experience taken as much for the experience as for the food.

When they were asked about whether their friends’ not liking healthy foods was a barrier to their own consumption of healthy foods, the adolescents in the present study replied that it was not. This suggests that other factors such as taste and convenience may be more important. These factors have been identified as important in other studies (Story and Resnick 1986, Williams et al 1993). However students were not asked about this directly.

Dalton et al (1986) hypothesise that subjective norms ie ‘what others think I should do’ are influential in determining how closely intention is actually related to food choice behaviour. Perhaps in the case of Vietnamese adolescents, peer influences operate at this level - ie ‘should I eat Vietnamese food or Western food?’ Taste may be more important for specific foods within these categories. That peer influences are operating at some level is strongly suggested by the consistency in general eating patterns of adolescents and young people from a variety of backgrounds and cultures.

The adolescents’ reported behaviour is not surprising when compared with explanatory models of behaviour theory (Rosenstock et al 1988). For instance the behaviour is consistent with Social Learning Theory (SLT) (or social cognitive theory). This has as its basic tenet that behaviour which is rewarded is more likely to be repeated than one which is not.
For Vietnamese adolescents who are wanting to be accepted by the majority peer group, demonstration of social behaviours acceptable to that group would facilitate acceptance and therefore be rewarded. These behaviours might include dieting in girls and the consumption of chips and soft drinks or drinking alcohol. Conversely, SLT may also be applicable when in a Vietnamese environment and traditional practices may be more acceptable.

5.6.6 Availability of food

An area of current interest in nutrition is how the availability of food can determine food choice. In the case of the Canterbury adolescents, the differences in the reported dietary practices between at home, and away from home, are probably in part determined by the different foods available in the different environments. For instance, traditional foods were predominantly both available and consumed in the home. On the other hand, more Western-style foods such as snack foods and takeaway foods, were readily available in both the schools and in the nearby shopping centres that most of the adolescents would pass through on their way to and from school.

Of the Western foods, the less nutritionally desirable ones, eg soft drink and hot chips, were more likely to be consumed at school and before and after school, suggesting that they were purchased at those venues. Therefore the types of foods available to the Vietnamese young people do appear to have influenced their food choices. Similarly, Prättälä (1989) reported that Finnish children ate whatever was available whether at home, school or in shops.
One of the concerns prior to the commencement of the present study was the perceived lack of traditional foods available in the local area. However, it was observed during the course of the study that a variety of traditional foods was available in both the immediate local area of the participants and in nearby larger centres. It may be that this anecdotal information was true earlier in the settlement phase in the area, but may be outdated with increased availability of traditional food due to the increased population in the area from Vietnam and other SE Asian countries. Another possibility is the changing location of the Vietnamese population within the Canterbury LGA. While initially located toward the eastern end of the LGA, the Vietnamese population is now concentrated towards the western end. However, culturally specific facilities as well as health and local government facilities are still located to the east. This may have created the impression that suitable facilities were not available, whereas the opposite may actually be the case - people living in the western end are very close to the larger centre of Bankstown where even more services are available. Despite the apparent availability of traditional foods in the area, participants' families also seemed prepared to travel long distances to obtain traditional foods.

There is currently considerable argument from a health promotion perspective that the maintenance of traditional food habits should be encouraged. For this to occur, appropriate foods and resource materials need to be available. However, consumers of foods from many of the traditional food outlets both inside and outside Canterbury LGA are disadvantaged by breaches of food standards (NSW Government Information Service 1992).
Examples included foods not meeting labelling standards (lack of ingredient listing and use by date), perishable foods that were not refrigerated, and the poor physical condition of a number of stores, eg loose floor coverings and cramped storage conditions. Potential problems for consumers of foods purchased from these outlets range from a lack of information as to the contents of some food packets, to a greater risk of food-borne infections. There have been reports of food poisoning episodes traced to \textit{B.cereus} in the Canterbury LGA (G. Longmuir pers comm), caused by inappropriate cooling of cooked rice. Although this would pertain mostly to Asian restaurants, it may indicate a general lack of awareness of Australian food hygiene standards. Council officers have been active in implementing education programs for food service operators that address issues such as maintaining the culturally appropriate taste and presentation of food in ways which also comply with the food laws.

Whether or not food hygiene and safety issues have an impact on the purchasing patterns or the health of the Vietnamese people is not known. However, an impact on the community’s general health could potentially affect sales, and therefore the availability of traditional foods. Although food poisoning is a notifiable condition to public health authorities, if symptoms are experienced they may not be considered an issue by the Vietnamese community and so not reported to doctors. In order to maintain traditional dietary patterns in the future, an important aspect will be to ensure that the local supply of traditional food is reliable and safe for consumption,
particularly as consumers may become more discerning as they become more accustomed to Australian legal requirements and expectations.

In this section I have shown that a variety of factors influences the dietary habits of Vietnamese adolescents. It is also apparent that these influences are not unique to this community - the Vietnamese adolescents are similar to other adolescents in that TV and their environments appeared to be especially powerful. That different behaviours were reported by the adolescents when in different settings is consistent with theoretical models such as Social Learning Theory.

5.7 Acculturation

A major but less tangible influence on the food habits of the Canterbury adolescents was 'culture'. As this seemed to embrace many of the other influencing factors, and has many implications for health promotion practice, I will discuss it separately from the other influences. In this section I will address issues relating to both the dietary acculturation of Vietnamese adolescents in particular, and of Vietnamese-Australians in general.

The mixture of both traditional and non-traditional foods consumed, and other food related behaviours reported in the present study, demonstrates that acculturation has occurred in the Vietnamese community. It also demonstrates that the Vietnamese adolescents in Canterbury LGA are largely bicultural in their dietary habits. These are important findings because of their potential consequences.
As discussed in section 5.5 it is usually assumed that adoption of Western diet is problematic and therefore should be minimised. However, I have argued that some dietary acculturation is inevitable, and that there are possible positive effects which are often ignored. In this section I will explore these aspects further. I will examine factors that influence dietary acculturation from both 'little picture' (local), and 'big picture' (national and international) perspectives.

5.7.1 The little picture

Many factors determine the acculturation of dietary habits, eg the backgrounds of the minority and majority cultures, the social norms, the foods involved, the age groups and their environments. In the previous sections, I have shown that TV, advertising, friends, the food environment as well as personal factors, all appear to affect the adolescents' food habits. That the adolescents in the present study had adopted a bicultural approach to food habits is not surprising considering the length of time they have lived in Australia and that they have been attending school here in that time. Other studies of migrant adolescents have found that a bicultural response to their environment was the most satisfactory. According to Goodenow and Espin 1993:176:

'The outside demands of schooling and the inner imperatives of adolescence make total resistance to acculturation an unlikely choice for teenagers'.
For the Vietnamese adolescents in Canterbury, various cultural factors would be operating simultaneously - expectations of family, teachers, the larger peer group as well as their own expectations, eg a desire to conform to the larger peer group. While these factors would be operating on many other issues in addition to food habits, food habits may be one of the more flexible and easier to adjust.

Although traditional dietary practices were most evident in the homes of the adolescents, that the home diet was not fully traditional indicates that some acculturation has occurred there. This is consistent with the many reports that migration brings forced changes, eg due to differences in climate and economics, as well as voluntary dietary changes. Forced changes would include the availability of new and different technology eg cooking fuels, and the need for different lifestyles eg work and school patterns. For refugee migrants in particular, these changes would have been dramatic. Some changes may be a pragmatic response to the new environment, eg men shopping because transport is required. Other changes may be in response to new and valuable opportunities that are provided. For instance, the reported increase in beef and poultry consumption, at the same time as decreased fish and seafood consumption probably relates to the availability and relative cost of these foods. The availability of refrigeration and less reliance on seasonal foods would also have had an effect.

Figures 5.1 and 5.2 clearly indicate the degree of acculturation that has occurred within the Vietnamese community.
FIGURE 5.1: Cultures meet at Carnivale

FIGURE 5.2: Cultures meet at Carnivale
These photographs, taken at Carnivale, a celebration of Vietnamese 'culture', actually depict a meeting of 'cultures'. In both photographs, an accommodation of Western culture is evidenced by the use of equipment such as gas stoves for preparing traditional foods. However, both photographs also show that soft drinks are highly available and are actually provided by the community. In Figure 5.1, the soft drinks are ironically placed next to the containers of 'traditional' food! Figure 5.2 demonstrates the bicultural situation of the young people as some are dressed traditionally for a competition, others are in Western dress.

The finding that food habits of the Vietnamese adolescents in Canterbury were on the whole similar to those of other Vietnamese migrants (in particular young people) to Western countries, suggests that factors influencing dietary change amongst Asian migrants are not unique to this group. Interestingly, the adolescents' food habits in the present study were also largely similar in the types of foods and practices adopted by other non-Vietnamese migrant populations around the world eg Mexican-Americans (Romero-Gwynn et al 1993), Armenian-Americans (Nalbandian et al 1981), Canadian-Chinese (Hrboticky and Krondl 1984), and American-Chinese (Grivetti and Paquette 1978). This suggests that acculturating influences cross geographic and cultural boundaries and are unlikely to affect one community in isolation. An aspect that is argued strongly in the literature and in health promotion documents, is that increasing residence and exposure to the new culture will result in deterioration of diet quality for groups like the Vietnamese.
However, there is considerable evidence that this is not always the case. For example, Wahlquist and Hage (1992) have investigated food acculturation and body fatness in Melbourne Chinese adults, some of whom were born in Vietnam. Their results indicate that a higher acculturation index (reflecting a greater proportion of Australian foods) was less likely to be associated with body fatness if the food intake was varied, and this was more likely to occur in people who were educated, professional or had a longer length of stay in Australia. It is interesting to speculate therefore on the future of the adolescents in the present study because of their age of migration. There is also some evidence from studies in other ethnic groups that most dietary changes occur soon after migration (eg Powles et al 1988) or between the first and second generation. However, other literature indicates that dietary changes continue to occur and the diet resembles that of the adopting country by the third generation (eg Nalbandian et al 1981). Some studies have also shown an increase in the use of traditional foods over time (Horie et al 1988). It should also be remembered, that increasing length of residence and length of stay in a new environment can represent an age factor and cohort effect, rather than simple exposure to the new culture.

At the moment the Vietnamese adolescents who had lived in Australia the longest, perceived their diets to be the most Australian, but also to be the least healthy. While the decreasing traditional content of the diet with increasing residence for this group is likely to be a real effect, whether there is truly a decrease in quality would depend on the actual foods consumed. This was not determined in the present study.
That the adolescents had this perception though, does suggest that they believe the Vietnamese diet to be more healthy than the Australian diet. The extent of this perception within the Vietnamese community in Canterbury LGA is not known, but it is consistent with anecdotal reports such as the initial concerns about diet quality that prompted this study. However the actual nature of this perception is an area for further research - the definition of 'less healthy' may be culturally bound and therefore interpreted differently by each group involved. The perception of unhealthiness may also be caught up in the media-type interpretation that Western food equals 'junk food'.

The impact of exposure to the new culture may depend on a variety of factors such as the migrant culture concerned, the age and other socio-cultural characteristics of the migrants, the stage and extent of settlement of that ethnic community in the adopting country, the circumstances of migration and the similarity between the cultures of the minority and majority cultures concerned. For the Vietnamese community in Australia, all of these factors would seem to be relevant. The cultures are dissimilar in many respects, and the Vietnamese community itself is a heterogeneous group on many points. For example, the type of migration has been different for many groups (some were refugees, some voluntary), they have arrived at different stages and therefore different strengths of Vietnamese settlement in Australia, they are from different socioeconomic groups that may accommodate the new culture differently, and from different religious groups who may settle differently depending on the infrastructure for that group.
For the adolescents in Canterbury, most are from refugee families who would have been forced to make changes after migration. However, the community is now well established in the area. They also mostly follow Buddhist and Catholic religions, both of which have strong infrastructures in the community. This suggests that the adolescents in the present study are part of the Vietnamese community at a time when it would have developed strong networks and community links. Although the adolescents now demonstrate eating habits that are partly non-traditional, they could increase the proportion of traditional food in the future. However, the heterogeneity of the group should be remembered and this is likely to result in a mixture of changes and correspondingly, a mixture of health effects.

As discussed in section 5.6.6, maintenance of traditional diet is facilitated by the availability of foods and resources, and this appears to be the case for the Vietnamese in Canterbury. Kocktürk-Runefors (1990) describes three stages for the establishment of dietary practices in a new cultural environment. With the example of Turkish migrants to Sweden, he characterises the first phase as difficulty in maintaining traditional food habits because of the lack of infrastructure and resources, necessitating dietary adaptation. The second phase occurred when demand increased, eg with the arrival of additional people and skills, and was associated with assertion of the ethnic identity. The third phase occurred as children grew up and brought home new tastes, behaviours and attitudes. Traditional dishes still had traditional names and were thought of as traditional but contained many non-traditional ingredients. Consequently the nutrient composition altered.
Looking at the Vietnamese community in Canterbury, this model well describes the processes that have occurred and is enlightening to the concerns held by many health workers. From the results of the present study, the Vietnamese community in Canterbury appears to be between the second and third stages - it is possible to eat a traditional diet because foods are available, but children are now at school, mixing with other cultural groups, watching television and changes are being introduced to the family. Consequently, dietary patterns and most likely nutrient composition has altered. Early concerns about the lack of traditional foods may relate to the first stage, when the ethnic group was new in the area. Concerns about the community's future health would relate to both the first and third stages, when non-traditional foods are introduced and the diet changes accordingly. However, diet quality and health outcomes would be determined by the types of changes made.

Ironically, maintenance of traditional practices may be assisted in the long run by the incorporation of Asian dietary features into Australian dietary patterns - reverse acculturation. The extent of this phenomenon is illustrated by references to 'Asianisation of the Australian palate' in the popular press (Ripe 1993:8, Cadzow 1994). There is evidence in Sydney of a dramatic increase in the numbers of Asian restaurants since the 1980s and the incorporation of Asian ingredients and dishes into non-Asian restaurants and menus. In addition, Asian techniques such as stir frying are widely used in non-Asian homes, and Asian flavours and ingredients are increasingly available at all retail levels.
Similarly, recipes and information about specialty Asian foods such as vegetables and condiments, are widely available in newspapers, magazines and on television. Acceptability of Asian food is thought to have been enabled by Australians’ familiarity with Asia through travel. The publication of numerous guides to ethnic restaurants also indicates an interest in food from other cultures. While some would argue this interest is tokenistic in terms of maintaining cultural diversity, it may serve to increase the social acceptance of other cultures’ food habits as well as ensuring the availability of skills and ingredients.

However, the availability of traditional foods does not mean these foods will be eaten. Grivetti and Paquette (1978) found that first generation Chinese-Americans did not eat a number of traditional foods that were available in the area just as some were not eaten in China. They also ate foods from other ethnic groups eg Mexican. Similar results were found in the present study. Just because dishes were typically Vietnamese, did not mean they were consumed frequently. A number of typical Vietnamese dishes were eaten infrequently by the adolescents - perhaps they are more expensive, more time consuming, for special occasions or not liked. It is also a salient point that when categorising food as non-traditional, many ‘Western’ foods, especially those that are grouped as takeaways, eg pizza, pasta, tacos, have ‘ethnic’ origins and are truly international foods.

Some studies have indicated that Vietnamese people believe there should be some acculturation after migration.
For instance, Baghurst et al (1991) reported that 47% of the women in their sample believed that Vietnamese people should eat more Australian foods. Conversely, other studies reported family concern where children were moving away from traditional practices (Lewins and Ly 1985). In the present study, acculturation of some families was evidenced by the children having non-traditional first names. Whether there were differences in the diets of those with and without traditional names was not investigated.

Language has also been identified as an acculturating influence. In a sample of first and second generation Chinese adolescent boys in Canada, Hrboticky and Krondl (1984) found that language acculturation was a similar strength influence to being born in Canada for acculturated food habits. Nutrition knowledge also increased with greater language acculturation. In the present study, where language skill was varied but nearly all participants were first generation, the ability to speak English may have had an effect on both the foods eaten and on nutrition knowledge. This aspect was not examined.

Despite the substantial dietary acculturation that was evident in the present study, rice was maintained as a commonly eaten food. This finding which was consistent with many other studies (Tong 1987, Story and Harris 1988, Baghurst et al 1991), is also consistent with the classification of rice as a core food in the Vietnamese diet. Fieldhouse (1986) points out that core foods are more resistant to change while less important secondary and peripheral foods are more readily changed.
5.7.2: The big picture

Maintenance of traditional dietary patterns may also depend on other factors in the larger environment. Within the Australian context, maintenance of cultural and linguistic diversity, including traditional practices such as diet, are encouraged by the Federal Government's multicultural policy (Office of Multicultural Affairs 1989). The policy also embodies a commitment to the English language. Therefore, there is inherent conflict in the maintenance of one's first culture and the compulsory learning of English, (which is in reality necessary for survival outside of that culture). People of NESB are forced to some degree to become bicultural. There is considerable criticism of the multicultural policy - some argue that it is divisive and will only allow the strongest cultures to survive (Rimmer c1991).

It is also important to recognise that the definition of 'traditional' practice changes as culture constantly changes to accommodate new circumstances. Therefore any definition of 'traditional' relates only to a particular point in time and place. For instance, it is difficult to say what foods are non-traditional in the Vietnamese culture because of the multinational influences (especially French and American) in Vietnam's history. Where do French bread and soft drinks fit in? Migrants themselves may also have different interpretations of 'traditional' depending on their own backgrounds and when they left Vietnam. They may experience a 'time warp', remembering traditional practices in their homeland at the time they left, and not allowing for changes that have occurred there since.
This is thought to explain some of the conflict experienced by young people who display new behaviours in the adopting country, when in reality, differences from the homeland may be less than perceived by their parents (Bottomley 1992). To illustrate this, van Esterik (1992), in describing changes in cuisine in Thailand, notes that 'fast foods' such as McDonald's, Kentucky Fried Chicken, Pizza Hut and donuts, are now all available in Bangkok. She estimates that 70% of customers are teenagers (although more for socialising than food consumption).

It is also necessary to consider the influence of the macro-economic and political environments. Changing cultural food habits has particular significance for developing countries like Vietnam that are noted to have 'Westernising' dietary patterns. Pelto and Vargas (1992) note that many small communities now have access to the rest of the world. A part of this change is a process they describe as 'delocalisation', where there is a growth of dependence on commercially distributed sources of food. With increasing trade and travel between Vietnam and Western countries, it is difficult to see that this will decrease in the short term. Associated with increasing tourism for example, is an increased availability of Western commodities within Vietnam. In addition, through collaborative trade efforts, countries in SE Asia are also developing their own infrastructure to sustain these changes. For instance, food processing facilities have been built which will make products such as soft drink and instant noodles even more available and accessible in the region (Branegan 1993).
Ironically, Australian wheat and other food products are also being exported to Asia specifically in response to the changing dietary patterns there. Furthermore, Australian research is in progress to develop a wheat specifically for the instant noodle market (Wahlquist 1996)! Therefore, maintenance of traditional practices in Australia may require simultaneous strategies in Vietnam and in SE Asia generally.

Also of significance here is the new free-market economy in Vietnam. Wolffers (1995) reports that Western pharmaceuticals, despite their expense are now highly prized in Vietnam. In particular they are used as a political statement and any discouragement to their use is seen as ‘old-fashioned state control’ (Wolffers 1995:1331). Similarly Western medicine in general is valued. It is interesting to speculate on the Vietnamese community’s views on traditional diet compared with Western diet in this context. Particularly in Australia, where food choice is enormous, perhaps ‘traditional’ is also seen as ‘old-fashioned’. I will come back to this aspect in Section 5.8.1.

Thus there are a number of cultural factors influencing the diets of the Vietnamese community as a whole and of the adolescents as a subgroup. The adolescents are exposed to all of the general acculturating influences affecting their families, as well as those operating through their own peer and social networks. As the adolescents are moving constantly between the Vietnamese culture and the larger Australian culture, it may be more stressful for them to exhibit dietary patterns that are different to those of the culture they are in at the time.
Considering additional macro-influences, their adoption of bicultural dietary practices may be the most successful response. Whether or not this was stressful or created conflict in their families was not examined in the present study.

When the findings of the present study are considered in conjunction with those of earlier studies where traditional diets were found to be marginal in nutritional quality (eg Baghurst et al 1991), it is clear that efforts to maintain traditional Vietnamese diet itself may not be either acceptable or appropriate for the adolescents, and possibly not for the Vietnamese community as a whole. Fostering a bicultural approach that encourages the best of both lifestyles in general, and dietary patterns in particular, may be a more appropriate solution. Groups like Vietnamese adolescents who have grown up in a bicultural environment may also find this to be an advantage in the future with the increasing contact between Australia and Vietnam. While biculturalism would therefore appear to have positive aspects, these are not often described in the literature, and rarely with respect to diet. The lack of respect given to biculturalism is at odds with that given to the trait of bilingualism which is revered and sought after. There appears therefore to be a great need for research in this area and for the development of strategies that foster biculturalism and its acceptance, especially with respect to diet.

In summary, this study demonstrated that the diets of the Vietnamese adolescents in Canterbury LGA were extensively acculturated, but that the degree of acculturation varied in time and place.
Dietary practices at home were far less acculturated than those outside the home. The degree of acculturation was also not uniform throughout the sample. It is important to recognise this variability in acculturation - it is obviously far more complex than usually implied. Factors which may increase the acculturation process of Vietnamese adolescents include their English language proficiency and more generally their degree of exposure to the Australian culture eg through school, peers and television. Factors which may reduce the degree of acculturation include an identifiable Vietnamese community which then enhances the visibility of traditional practices and the availability of traditional foods, and family influences. However, families may also desire and indeed encourage some aspects of acculturation. Identification of the relative effects of these influences, as with influences on dietary behaviour in general, has implications for health promotion in both assessing the need for intervention and in the choice of appropriate interventions, ie which behaviours are targeted for maintenance or for change.

5.8 Implications for health promotion

One of the objectives of the Food and Families study was to determine the need for a health promotion intervention targeting the nutrition of Vietnamese adolescents in the Canterbury LGA. In this section I will address this question specifically, but will also discuss the implications of the findings of this study to health promotion and nutrition interventions in general. The findings of the study affirm that there are numerous and varied influences on the diets of the Vietnamese adolescents in Canterbury LGA.
As I have argued in the previous section, some of these influences are acting on the community as a whole, from a national and even international level. Local health promotion programs can have little effect on these influences, but there is a need to recognise their impact. In this section, I will focus on the local level where health promotion programs can be directed to have an impact.

That Vietnamese adolescents in Canterbury did appear to have some nutrition knowledge, which was not always applied when in making food choices, reflects the importance of other factors in determining actual food choice (as discussed in section 5.6). These influences are important to consider in health promotion interventions, even though the relative effects of each is unknown. The striking similarities in the concerns regarding the diets of the Vietnamese adolescents in the Canterbury LGA and of other Australian adolescents suggest that these influences are likely to be similar for all Australian adolescents. However, the fact that the Vietnamese adolescents are moving back and forth between very different cultural environments at home and at school adds a further dimension. At the same time, the variation evident within the group is a reminder that any single approach is likely to be inappropriate.

From the results of the present study, there is no justification for a nutrition intervention specifically targeting Vietnamese youth. In the following sections I argue that such an intervention could in fact be counter-productive.
The results do indicate however, that there is a general need for health promotion for adolescents to develop an awareness of the relationship between diet, lifestyle and future health. There is also a need for general food and nutrition information within the Vietnamese community. In both instances, the results of the present study have relevance in the planning of any future programs.

In promoting health and lifestyle to young people, interventions need to recognise the fact that the adolescents' diets, as demonstrated in the present study are not all bad. Ideally, health promotion activities would aim to maximise the adolescents' healthy dietary practices and minimise the less healthy ones. Different strategies may however be necessary for different subgroups of the population. Utilising general health promotion planning principles, the most appropriate strategies should be matched to the relevant identified needs and target groups. For instance, the limited use of Western foods in the homes of Vietnamese families suggests that strategies should take into account the limited modelling of the use of Western foods these adolescents would have received from their families, and the educative role they themselves have in the home. Similarly, the differences identified in dietary practices of girls and boys suggest that education strategies need to be targeted to address these differences.

It is assumed in the context of the present study that any health promotion program would be targeted to an audience of mixed cultural backgrounds.
Consequently, cultural appropriateness would be a priority consideration in the planning process. The concept of cultural appropriateness is a guiding principle of health services generally (National Health Strategy 1993), and is now well entrenched in health promotion dogma. However, its application tends to be subjective and narrow. Typical responses include translated resource material or provision of ethnospecific services. In addition, for nutrition services, ‘culturally appropriate’ may be interpreted as promotion of traditional foods. There is also not usually any allowance for the evolving nature of ‘culture’. In the following sections I will elaborate on how these interpretations impact on health promotion nutrition programs in general, and those targeted to the Vietnamese community in particular. Considering that the Vietnamese adolescents in the present study are members of at least three different cultural groups - Vietnamese, Australian and adolescent, their ‘present cultural framework’ as described by Romero-Gwynn et al (1993:12), should take all of these into account, not just their ethnicity.

To inform the development of health promotion nutrition programs, I will look particularly at three aspects: dietary recommendations, nutrition education and modification of the food environment.

5.8.1 Dietary recommendations

Any dietary recommendations made for Vietnamese-Australians, as with any group, need to be appropriate to that group. While it is generally acknowledged that food has important social and emotional dimensions which are in themselves important for good health (NHMRC 1991),
recommendations usually only reflect a physiological perspective, ie, food as a source of nutrients. Unfortunately, from the consumer’s perspective, dietary recommendations which only consider food as a mixture of nutrients may at times be in conflict with the other dimensions.

This point is well illustrated by the findings of the present study and has important implications for dietary recommendations for Vietnamese people. For instance, the recommendation that Vietnamese people should be encouraged to maintain traditional food habits (in order to minimise the risk of developing chronic degenerative diseases), only represents a nutritional viewpoint - it does not acknowledge the presence of adopted foods in the current diets of Vietnamese people, and the possible social and emotional significance of these foods. Given the backgrounds of Vietnamese people, these social and emotional aspects are important to consider. For example, as many Vietnamese-Australians experienced great difficulties, including food deprivation, prior to migration, the relative abundance of food in Western countries may represent a food security not previously experienced. A resistance to restrictive health messages because of this type of experience has been identified by health workers counselling refugee clients with diabetes (Arkles 1997). Many Vietnamese migrants also perceive Western food as healthier (as assessed by the difference in size between Vietnamese and non-Vietnamese children). Use of Western foods for some people may then represent a conscious attempt to demonstrate status and to improve health.
As the Vietnamese population is a minority group within the Australian population, another role for Western foods is the expression of cultural belonging. This is particularly important to consider for young people who generally have a strong need to ‘belong’ as part of their process of identity formation. The use of specific foods, and practice of particular behaviours, may be considered necessary for peer acceptance. Such behaviours may therefore be functional and adaptive - reducing felt conflict and focusing social support and a group identity. The significance of the social and emotional dimensions of food intake may therefore be of greater consequence for young people because of the needs of adolescence itself.

As discussed in Section 5.7, another reason for the use of Western foods may be necessity - traditional foods may be unavailable, inaccessible or inappropriate for use in the new environment. Therefore changes may again be an adaptive response, and conversely, previous behaviours may be mal-adapted to the new environment. Messer (1989) notes that this historical perspective should be included in any evaluation of food habits. She notes that the adaptive process will affect dietary intake in a variety of ways. For instance, Messer reports that relative unavailability of one particular ingredient, eg spices, may lead to reduced intake of another food, eg a staple food, with which it is usually eaten. The involvement of sensory factors in this way may even be a physiological response. Of course factors such as the price, convenience and taste of different foods are also important considerations - some Vietnamese people may prefer Western foods!
Consequently, for many Vietnamese people, maintenance of traditional food habits may create considerable stress and conflict - it may mean changing new behaviours that are already entrenched and have strong social and emotional overtones. For some people, it may be too late for 'maintenance', reversion may be necessary, or even a whole new way of eating. When the principles of the acculturation of food habits are considered, social and emotional factors are implicit in the process. If as Fieldhouse (1986) suggests, new foods and practices most likely to be adopted are the ones that are desirable and can be supported, then the new food habits that have been introduced into the Vietnamese culture are fulfilling some need. Their removal may therefore be difficult.

It is ironic that social and emotional aspects are acknowledged as important in determining food choice, but not addressed in dietary guidelines and recommendations. This is especially so when describing the Vietnamese diet, when so much has been written about the complexity of their food classification and selection systems, and it is well recognised that foods are vested with particular properties not necessarily related to their nutritional qualities. It may also be significant that in the formulation of dietary recommendations, the views of the target group as to their appropriateness are rarely sought.

This approach may change in the future with the move towards Food Based Dietary Guidelines (FBDG), a World Health Organisation initiative which plans to re-orient dietary guidelines from nutrients to foods (Wahlquist 1995).
Included in the 'Cyprus declaration' and describing this paradigm shift in dietary guideline thinking, were statements that:

'FBDG are developed in a cultural context, recognising the social, economic and environmental aspects of foods and eating patterns; that dietary guidelines need to be positive and encourage enjoyment of appropriate dietary intakes; and that various diets and food patterns can be consistent with good health' (Wahlquist 1995:1).

As Vietnamese-Australians appear to have a health advantage over other Australians at the moment, it would seem prudent to enable those who wish to maintain that advantage to do so. However, it is important that this happens in a way that minimises the potential stress and conflict. That is, dietary advice where given should take into account the social, emotional as well as the physiological dimensions of food consumption. As different subgroups of the population such as adolescents, males and females, will have different needs relating to each of these aspects, careful targeting is also required. As it is recognised that traditional diets per se can still be associated with health and nutrition problems, it may be best to identify positive elements of the diet and promote those. In an acculturated dietary pattern, positive elements of each of the contributing diets can be emphasised.

Therefore, for nutrition health promotion services to be culturally appropriate for Vietnamese adolescents, a range of strategies targeted to different groups would be required.
Before maintenance of traditional dietary patterns is actively encouraged, adolescents' interpretation of 'traditional foods' and their views on the acceptability of traditional foods, should be sought. Different groups of adolescents will identify differently with the cultural groups eg Vietnamese, Australian, adolescent. Within individuals this identification may also vary with circumstances. From the bicultural dietary patterns evident in the present study, encouragement of adolescents to maintain traditional dietary patterns could create a great deal of conflict - while it may be acceptable to eat traditional foods at home and on specific occasions, it is unlikely to be generally acceptable in the peer group.

Romero-Gwynn et al (1993) recommend for the Mexican-American population, that healthy food traditions are identified and supported, but also that there is acknowledgment of the adoption of new foods, and discussion of the options available. They argue that there is a need to approach nutrition education from the audience's perspective and their present cultural framework. I feel this is equally important in the population of Vietnamese-Australians in general, and of Vietnamese adolescents described in the present study, in particular. While the need for this type of approach has been acknowledged to some degree for dietetic services (Terry 1994), its application to nutrition health promotion services is little discussed. It will also be more difficult to account for the diversity of cultural frameworks encountered in a group setting.
On the other hand, if Western foods are acknowledged as a significant and substantial component of their diets and will probably remain so, other approaches, such as education as to the appropriate use of new foods can be considered.

5.8.2 Nutrition education

Many authors have recommended nutrition and health education for migrants from SE Asia (Ikeda et al 1991b, Winder et al 1991). While many of the Western foods commonly eaten may be similar in use to traditional equivalents, they have little nutritional similarity. For some of these new foods, children would not be able to learn their appropriate use through modelling in the home as would be more likely in homes where the foods are familiar. Although a considerable amount of modelling is likely to be observed in the popular media such as TV, this is often out of context and liable to give a biased view. Consequently, nutrition education for the Vietnamese community in general should be considered so as to increase familiarity with the appropriate use of new foods. Williams et al (1993) argue that where parental and child food use are similar, health education targeted at the whole community may also be of benefit to adolescents. This may also have some value in the Vietnamese community in promoting appropriate use of Western foods and modification of traditional foods. Collaboration with groups such as Vietnamese community organisations, the Buddhist church and Adult Migrant Education Services would facilitate this process. Appropriate vehicles could be Vietnamese media and education packages and programs for new arrivals.
Practical demonstration, eg cooking lessons, may also be appropriate. However, it should be remembered that literacy levels are varied, and young people in particular may not be able to read material written in Vietnamese.

Because of the different dietary patterns of girls and boys in the present study, nutrition education can be targeted specifically to each sex. In particular, concerns for girls which can be addressed to some degree in an education context were body image dissatisfaction and skipping meals. However, because these concerns are not specific to the Vietnamese community, it is not appropriate to specifically target that group. Ethnospecific services in that sense may serve only to marginalise and alienate the group. It would also not allow for the broader social determinants of those behaviours.

As previously discussed (Section 3.1.9), nutrition education requires knowledge of food patterns. From the present study, distinct patterns were identified for boys and girls which would enable targeting of strategies. For example, strategies to increase milk consumption would be best aimed at girls in particular, and consumption of fruit and vegetables at boys. Strategies can also be chosen which impact more than one behaviour. For instance, promotion of breakfast cereal to girls would encourage the eating of breakfast as well as milk consumption. Similarly, promotion of fruit and fruit juice to boys could also decrease soft drink consumption. Promotion of exercise would also be appropriate (especially for girls), given the population’s potential predisposition to NIDDM.
As evident in the present study and reported in other literature, food choice is influenced by numerous factors, and programs need to take these into account. Perry (1991) recommends that health education programs for adolescents should focus on three levels - environment, personality and behaviour. In keeping with these recommendations, Story and Resnick (1986) suggest a number of features for nutrition education programs for adolescents. These include that adolescents learn and have the opportunity to practice skills necessary to make dietary changes, that interventions focus on individual factors that may affect nutrition and health behaviour such as developing a more positive body image, and at the level of environment focusing on the types of food available at school. From the findings of this study, these actions also seem relevant for Vietnamese adolescents.

However, modifying one area of health behaviour in adolescents may increase another behaviour which may have even more serious consequences (Plant and Plant 1992). As discussed in Sections 5.6.5 and 5.8.1, 'unhealthy' behaviours perform some function for the individual. These aspects need to be considered in a balanced approach.

Implementation of nutrition education activities for adolescents in the 12-15 year age group is generally the responsibility of schools. However, the level of nutrition education that Vietnamese children receive in school is variable and its relevance questionable. While it is compulsory to study health related subjects in NSW schools, the extent and effectiveness of nutrition education depends on factors within each school.
Although the findings of this study indicated that adolescents were aware of some nutrition issues, it was not determined if this information was obtained from school. Relevance for Vietnamese adolescents, and possibly for adolescents from other backgrounds, would be enhanced where multicultural issues are also incorporated so that dietary differences can be explored and differences accepted. This may also have a role in facilitating the maintenance of traditional dietary practices and promoting positive associations of different ethnic groups with their own backgrounds.

A significant finding from the present study that affects nutrition education practice in schools, is that the use of the Five Basic Food Groups Plan (5BFGP), a common nutrition teaching aid (eg Smith and Schmerlaib 1988), is questionable for students from a Vietnamese background. Using this tool, students are encouraged to calculate their daily food intake and estimate dietary adequacy. Because of its use in schools, the 5BFGP was chosen as a proxy measure for dietary adequacy in the present study. However, due to the high rice intake in the Vietnamese group, quite different levels of intake were calculated depending on the 5BFGP used (numerous plans are in circulation and there is little accord in the quantities of bread and rice deemed to be equivalent - see Section 5.3.1). In addition to the problems created by the differences in the quantities of rice considered equivalent to bread in the different versions, the contribution of nutrients to the diet by such large quantities of any one food is not taken into account. The contribution of the milk and dairy group to calcium intake is also of questionable validity.
Consequently, the nutrient content of the diet may not be as well described as it might be for typical Western dietary patterns. The 5BFGP also does not take into account traditional foods and practices such as humoral practices typical in Vietnam. In addition it underestimates energy requirements for adolescents.

These difficulties suggest that the 5BFGP in its current form may also be unsuitable for use with other ethnic groups where traditional food patterns are so different from Western style. Another issue is that when such large intakes of one food type (such as rice) are recorded, the nutrient contribution will be altered accordingly. This may then lessen the actual requirement of foods from some other groups. Problems which may arise in the use of the 5BFGP as a dietary evaluation tool include people having their diets classified as inadequate by the over-estimation, or perhaps more seriously the under-estimation of some nutrients. This may be more or less serious dependent on the version of the 5BFGP in use. Similarly, Stowers (1992) reported that the American Basic Four system was inappropriate for many ethnic groups and recommended development of food guides to account for cultural differences in food habits.

Newer food guides eg the 12345+ Food and Nutrition Plan (CSIRO/Anti-Cancer Foundation 1991) and the Core Food Groups (NHMRC 1994) have become available in Australia since the Food and Families study was undertaken. These kinds of developments are still in progress with additional food guides based on the Core Food Groups currently being prepared.
These newer guides are likely to be more appropriate comparison tools than was available at the time of the study. Given the problems raised in this study, the multicultural mix of many of Australia's schools, and the utility of the food guide approach for nutrition teaching in that setting, use of newer and more appropriate food guides would seem an imperative. However, there is likely to be a time lag before the new guides are in widespread use. This means that where the 5BFGP is still being used, it will continue to discriminate against students from some ethnic backgrounds, in particular those consuming large quantities of rice.

5.8.3 Food environment

A third strategy which can encourage dietary change, and one which is currently favoured in the health promotion context, is modification of the types of foods available in the environment. It is clear from the results of the Food and Families study that the environment has a substantial influence on the adolescents' food intake. Therefore, where the food environment can be modified to increase the range of healthy food choices available, this may result in the consumption of more nutritionally desirable foods by young people. In the present study, the major environments influencing the adolescents weekday food intake were school, home, and the shops on the way home from school. At the moment there is considerable interest from public health nutritionists regarding the quantity and quality of takeaway foods in neighbourhood shopping centres. Some local councils have implemented food and nutrition policies to ensure consumers' access to a wide range of nutritious foods (eg South Sydney City Council 1995).
Whether such action is desirable in the Canterbury LGA requires investigation.

As food eaten at school is a substantial component of students' daily intake, school canteens have been identified as a priority area for nutrition activity in NSW (Martin and Macoun 1996). As a learning and modelling environment, the school is well placed to provide supportive conditions to facilitate change and to develop in students the personal skills needed to make healthy food choices.

For the Vietnamese adolescents in Canterbury LGA, changing the environment outside the home is only likely to have any impact on the intake of Western foods, it is not likely to increase traditional food intake. It should again be remembered that the consumption of Western foods is of social not just nutritional consequence.

An aspect of the food environment which does warrant urgent attention is the safe storage and handling of foods in some of the Asian food stores frequented by Vietnamese people. This is an area where joint action between the health service and local government will be valuable. Participation of the Vietnamese community will also be important, so that perceived cultural values of the food are maintained and so that consumers can become more aware of food safety concerns and regulations and therefore become advocates for change.
Chen et al (1992) have demonstrated that community ownership of health programs has had positive outcomes for a SE Asian community in the US.

Changing environments is appropriate if it promotes a greater range of food choice. However, the actual choice of food is still dependent on the many other factors such as taste, preferences, peer influences and advertising as have been previously discussed.

5.9 Conclusions

Adolescents from Vietnamese-speaking backgrounds attending school in the Canterbury LGA have undergone considerable dietary acculturation - they are in a state of transition between traditional and non-traditional dietary patterns. Retention of traditional patterns was strongest in foods prepared for the household while non-traditional foods were more evident outside the home environment. The range of dietary patterns reported demonstrates the complexity of food habits in general and the acculturation process in particular. It is important to note that acculturation has not meant abandonment of traditional dietary practices or indeed 'Vietnamese culture'.

The adolescents' diets also contained elements of both healthy and less healthy practices. Although presently showing some positive features in accordance with Australian Dietary Guidelines, points of concern relate to the co-existence of dietary practices known to be associated with development of health risk.
From the results of this study it is not possible to determine the degree of risk for the future development of the Western pattern of diet-related diseases in Vietnamese adolescents. Results did indicate that the sample of Vietnamese adolescents in Canterbury have adopted some dietary behaviours which may increase their risk above that of people consuming a traditional Vietnamese diet. For example, behaviours increasing the risk include the adolescents' intake of snack foods and takeaway foods which have higher fat contents than do many traditional foods.

However, because there is some retention of traditional dietary patterns, the risk may be somewhat lower than that for Australian adolescents in general. The results of the Food and Families study are consistent with recent reports that the health status of overseas-born Australians is on the whole better than that of Australian-born residents. While there was genuine concern in the past about the poor health status of immigrants to Australia, recent analysis of health data indicates there has been a maintenance of the apparent health advantage enjoyed by immigrants, particularly related to cardiovascular disease. Original concerns, especially for the Vietnamese community, derive largely from inappropriate interpretation of data and the promulgation of erroneous conclusions.

Of concern for the Vietnamese adolescents however, is the finding that some of the dietary behaviours that are present may develop into health problems in the short term. These behaviours included the skipping of meals, the consumption of snacks of poor nutritional quality, and dieting.
These behaviours are common to other adolescents, and suggest that the influencing factors are operating at a peer level. Also of concern is that these problems may be overlooked while the focus is on prevention of long term health problems.

Particularly striking were the paradoxes inherent in the dietary changes experienced by the adolescents. Firstly, although increased protein and energy intakes are considered responsible for the potentially negative changes in disease profile, they are probably also responsible for the increased growth of the adolescents after migration and their longer life expectancy. A second paradox was the adoption of healthy dietary patterns as well as less healthy ones. Therefore acculturation itself is not necessarily a negative influence nor create a poor health outcome. As it is neither possible nor necessary to prevent some Westernisation of the Vietnamese diet, the role of acculturated dietary practices should be acknowledged. This is difficult while there is limited recognition of the social and emotional roles of food when providing dietary guidance.

Nevertheless, it is important that the Vietnamese community has access to information about food and nutrition, so that Western foods can be appropriately incorporated into the diet. This is especially important within the current environment where food advertising is dominated by fast food products. Similarly the community needs access to information about and the application of safe food handling practices in commercial food centres.
So that appropriate information can be provided to communities such as the Vietnamese who are moving between two cultures, further research into the effects of cross-cultural dietary patterns should also be encouraged.

Specific nutrition interventions for Vietnamese adolescents are not warranted on the basis of the results of this study. However, the need for health promotion strategies which address the nutrition concerns of all adolescents is supported. In particular, strategies could address the development of personal skills of adolescents in making healthy food choices, and changing the environment to facilitate the making of healthy food choices. The Vietnamese adolescents demonstrated some nutrition knowledge but this was not related to reported behaviour. Major influences on their dietary practices appeared to be television and their personal environments. Health promotion strategies for the adolescents are probably best approached through the school and community environments.

Of major importance when determining health promotion priorities however, is a need to recognise that the definitions of terms such as ‘traditional’ and ‘culturally appropriate’ are subjective and vary in time and place. Also, local dietary patterns are affected by macro-influences such as trade and travel. These issues have implications for health promotion practice. It should also be recognised that Vietnamese adolescents are essentially bicultural and that there are numerous positive aspects of biculturalism that should be promoted.
From this research there are many unanswered questions especially regarding the determinants of dietary habits in groups undergoing acculturation. In particular, there is great potential for qualitative dietary research. This study has only scratched the surface. Other areas of potential areas of fruitful research will be in the area of dietary patterns and disease patterns other than heart disease. At the moment, very little is known about the mechanisms of the relationship between diet and disease, and even less about the disadvantages and possible advantages of different dietary combinations. This is particularly the case with traditional diets where little is known about possible health benefits besides a low fat content. Research into sociocultural factors determining food habits ie why foods are eaten, not what is eaten, is especially needed in cross-cultural situations.

In this thesis I have argued that much of the evidence on which cross-cultural nutrition interventions are based is flawed and consequently that conventional health promotion nutrition programs may be inappropriate. Therefore, as well as describing the dietary practices of Vietnamese adolescents in Canterbury LGA, this study has shown that there is a need to continually question received wisdom and to continue to question both practice and theory. In so doing there is a greater likelihood that planned interventions will be based on sound evidence.
5.10 Recommendations

Several areas for further action have emerged from this study. Not all are possible within the resources of the Area Health Service alone and will require collaboration with other sectors and research groups.

Recommendations for the Area Health Service:

1. As part of the Area’s overall ethnic health strategy, links developed with Vietnamese Community Organisations as part of the ‘Food and Families’ project should be maintained. Further collaborative efforts can then be explored with regard to the provision of appropriate and accessible information on health and nutrition to community members. In particular, food and nutrition services should be available to the Canterbury District to provide support to migrant communities, including the Vietnamese, as they come to terms with their new food environment.

2. There should be greater collaboration with food inspectors and environmental health officers of Canterbury Council and the Health Department to ensure availability of safe and appropriate traditional foods in the Canterbury LGA for the Vietnamese and other ethnic communities.
General Recommendations:

It should be remembered that the data on which these recommendations are based apply to Vietnamese adolescents attending school in the Canterbury LGA. Generalisability to other groups is unknown.

3. All adolescents and children require appropriate nutrition education to minimise the health risks, in the short term as well as the long term which result from poor eating habits. In particular, girls' perceptions of body image should be addressed promptly. Within the context of nutrition education the diversity of food cultures in Australia can be examined. The value of traditional food patterns can also be promoted but should recognise the limitations of this approach and acknowledge the students' present cultural framework. It is not appropriate to provide education to the Vietnamese group specifically.

4. The 'Five Basic Food Groups Plan' guide in its current form is not an appropriate dietary assessment tool for people of non-Australian backgrounds who enjoy rice as a staple food. Modified and appropriate plans should be made available in schools as soon as possible.

5. Information on health and nutrition as it relates to appropriate incorporation of 'non-traditional' foods and maintenance of a healthy diet is required for immigrants from non-English speaking backgrounds, including the Vietnamese.
This should be made available through community organisations and be in a form suitable for new arrivals.

6. The application of food legislation (including food labelling) as it relates to traditional foods and outlets for traditional foods needs to be addressed.

7. A data bank of foods commonly consumed in 'traditional' Asian diets needs to be developed. The growing numbers of migrants from Asia in Australia and the lack of suitable data and resources limit both education efforts and the conduct of cross-cultural research.

Recommendations for Research:

There are many areas for future research identified by this study. These include:

8. Research into the effect of food combinations on nutrient intake and metabolism which will enhance future interpretation of research results.

9. Changing dietary patterns and the impact on conditions such as lactose intolerance, osteoporosis and diabetes.
10. Further research into factors influencing food choice during cultural integration so that interventions can be appropriate and effective. Indicators of acculturation for investigation include the use of non-traditional first names, the extent of English language use.

11. The impact of a bicultural dietary response and the effects of biculturalism in general.

12. The impact of the macro-economic and political environment on dietary acculturation.
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APPENDIX 1: Food diary

The food record book is included here in the format it was issued to study participants.
FOOD RECORD BOOK

NAME: ____________________________

SOUTHERN SYDNEY AREA HEALTH SERVICE
CANTERBURY COMMUNITY HEALTH SERVICE
39 Thirroul Parade, Campsie, N.S.W. 2194
1. Read the instructions carefully

2. Write down every food and drink that you put into your mouth.

   Do this for one whole day - starting from when you get home from school until the same time the next day.

3. Don’t forget to bring your record book back to school on the next school day.

This record book has been modified with the kind permission of the Commonwealth Department of Health.
3. **MEASURE** how much you eat and drink

Measure it *after* it has been served

* Use special measuring cups and spoons
  - measure as **level** not heaped

* Use the circles (page 11) to measure round things like apples, tomatoes, biscuits .......

  ![Diagram of a circle with measurement circles](image)

  put the edge of the round food on the black dot and look down from the top to see the size

* Use your ruler (page 11) to measure how long and wide and thick foods are:

  ![Diagram of a ruler and measuring cake and bread](image)

  * If you don’t eat everything that you have measured then write down what is left over and measure it too.
<table>
<thead>
<tr>
<th>Time</th>
<th>Food Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.00pm</td>
<td>Lemon cordial drink, made with water</td>
</tr>
<tr>
<td>5.00pm</td>
<td>Hot potato chips, fried</td>
</tr>
<tr>
<td>6.30pm</td>
<td>Soup - Bok choy, prawns, pork mince</td>
</tr>
<tr>
<td>6.40pm</td>
<td>Boiled rice, white</td>
</tr>
<tr>
<td>6.40pm</td>
<td>Chicken, stir-fried with skin on, baked in onions, lemongrass &amp; chillies</td>
</tr>
<tr>
<td>8.00pm</td>
<td>Orange</td>
</tr>
<tr>
<td>7.00am</td>
<td>Rice bubbles, Kettles, whole milk</td>
</tr>
<tr>
<td>11.00am</td>
<td>Cake, plain</td>
</tr>
<tr>
<td>12.30pm</td>
<td>Peanut butter sandwich, Tip Top white bread</td>
</tr>
<tr>
<td>12.30pm</td>
<td>Kraft peanut butter</td>
</tr>
<tr>
<td>12.30pm</td>
<td>Flora margarine</td>
</tr>
<tr>
<td>4.00pm</td>
<td>Coca-Cola</td>
</tr>
</tbody>
</table>

Follow the instructions on page 2 to describe your food and drink.
| Date: ___________ | Dato: ___________ |

Follow the instructions on pages 3 and 11 on how to measure what you eat and drink.

<table>
<thead>
<tr>
<th>Amount eaten</th>
<th>Rec. No.</th>
<th>Time</th>
<th>Food code</th>
<th>Weight</th>
<th>Where</th>
<th>Who</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 cup + ½ cup</td>
<td>01</td>
<td></td>
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<tr>
<td>20 chips each 6cm x 1cm x 1cm</td>
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<td></td>
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<tr>
<td>1 cup</td>
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<td>1 cup + ½ cup</td>
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<td>1 cup + 1 cup</td>
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<td>1, size D</td>
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<td>1 cup</td>
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<td>½ cup</td>
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<tr>
<td>1 piece 5cm x 4cm</td>
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<td>2 slices each 11cm x 1cm x 1cm</td>
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<tr>
<td>2 tablespoons</td>
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<tr>
<td>2 teaspoons on each slice of bread</td>
<td>12</td>
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<tr>
<td>1 can 375 ml ½ cup left</td>
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</tbody>
</table>

Do not write in these columns.
# 24 Hour Food Record

- Only use a blue or black pen to write.

<table>
<thead>
<tr>
<th>1. Tick</th>
<th>2. Tick</th>
<th>Where food was prepared</th>
<th>Who food was eaten with</th>
<th>Follow the instructions on page 2 to describe your food and drink.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Home</td>
<td>From home</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Away from home</td>
<td>Friends</td>
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<td>Family</td>
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<td></td>
<td>Alone</td>
<td></td>
</tr>
</tbody>
</table>

- Write down the time you start eating each food.
- Write down AM or PM.

<table>
<thead>
<tr>
<th>3. Time</th>
<th>4. Name, type, brand, cooking method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Follow the instructions on pages 3 and 11 on how to measure what you eat and drink.

<table>
<thead>
<tr>
<th>Amount eaten</th>
<th>Rec. No.</th>
<th>Time</th>
<th>Food code</th>
<th>Weight</th>
<th>Where</th>
<th>Who</th>
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</thead>
<tbody>
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<tr>
<td>Where food was prepared</td>
<td>Who food was eaten with</td>
<td>3. Time</td>
<td>4. Name, type, brand, cooking method</td>
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<td>Home</td>
<td>Away from home</td>
<td>Friends</td>
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</tbody>
</table>

Follow the instructions on page 2 to describe your food and drink.
Follow the instructions on pages and on how to measure what you eat and drink.

<table>
<thead>
<tr>
<th>Amount eaten</th>
<th>Rec. No.</th>
<th>Time</th>
<th>Food code</th>
<th>Weight</th>
<th>Where</th>
<th>Who</th>
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<tbody>
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<td>5 2</td>
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</tbody>
</table>
REMEMBER...

- If your food is cooked, measure it cooked, not raw.
- Measure the food after it is served.
- If you do not eat all the food you first served out, measure and write down how much of each food is left.
- There is no need to measure left over cores, peel or fish bones.

Measure your food using:

Cups and spoons
- Use the special cups and spoons to measure liquid foods and foods like cereal, sugar, stews, rice and vegetables.
- Only use the special cups and spoons provided.
- Measure as level, never heaped.

Circles
- Use the circles to measure foods which are shaped like a ball for example apples, tomatoes, oranges, round bread rolls.
- Put one edge of the food on the black dot, look down from the top and choose which is the closest fit.
- Round flat foods like hamburgers and biscuits may also be measured using the circles or by measuring how wide it is across with your ruler. You also need to measure the thickness of these foods with your ruler.
APPENDIX 2:  Food Habits Questionnaire
"FOOD & FAMILIES"

SURVEY

This survey asks about the foods you eat and some of your ideas about food.

It is not a test, there are no right or wrong answers. What we want to know is what you eat and what you think about the foods you eat.

For most questions tick or circle the best answers for you, follow the instructions on each page.

Your answers will not be given to anyone else.

Thank you very much for helping in this survey.
FOOD HABITS QUESTIONNAIRE

Please answer the following questions.

1. Today's date _______/_______/1991

2. What year of school are you in? [ ] 7 [ ] 8 [ ] 9 [ ] 10

3. What sex are you? [ ] Male [ ] Female

4. What is your date of birth? _______/_______/19____

5. In what country were you born? __________________

6. If you were not born in Australia, in what year did you come to Australia?____________

7. When your family lived in Vietnam where did they live for the longest time?
   1. [ ] In the city 2. [ ] In the country

8. Can you tell us the name of the province where they lived?
   __________________________

9. Does your family have a religion?
   1. [ ] YES 2. [ ] NO
      ↓

10. Can you tell us what it is?
    1. [ ] Catholic 2. [ ] Other Christian
    3. [ ] Buddhist 4. [ ] Other (Specify)
11. How many people are there altogether living in your household?
1 2 3 4 5 6 7 8 or more

12. How many people including yourself are under 18 years old?
1 2 3 4 5 6 7 8 or more

13. Place a tick next to these people if they live in your household:
1. [ ] Mother  2. [ ] Father
3. [ ] Grandparent/s  4. [ ] Brother/s
5. [ ] Sister/s  6. [ ] Other relative/s
7. [ ] Friend/s

For the following questions place a tick next to the answer that is right for you

14. When do you eat the largest/main meal of the day?
1. [ ] In the morning (breakfast)
2. [ ] In the middle of the day (lunch)
3. [ ] In the evening (dinner)

15. Do you eat the main meal of the day with other members of your household?
1. [ ] YES  2. [ ] NO

16. At home do you eat with chopsticks for your main meal?

<table>
<thead>
<tr>
<th>Always</th>
<th>Usually</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

484
17. For your main meal how often are the foods served in large bowls and plates for everyone to share?

<table>
<thead>
<tr>
<th>Always</th>
<th>Usually</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
</table>

18. How often do you have something to eat at the following times of the day?

<table>
<thead>
<tr>
<th>Time of Day</th>
<th>Always</th>
<th>Usually</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Breakfast</td>
<td></td>
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<tr>
<td>2. During the morning</td>
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<tr>
<td>3. Lunch</td>
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<tr>
<td>4. During the afternoon</td>
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<tr>
<td>5. Dinner</td>
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</tr>
<tr>
<td>6. After the evening meal</td>
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<td></td>
</tr>
</tbody>
</table>

19. Would you say the foods you eat at the following times of the day are mostly Vietnamese, mostly Australian, or somewhere in between?

<table>
<thead>
<tr>
<th>Time of Day</th>
<th>Mostly Vietnamese</th>
<th>Half &amp; Half</th>
<th>Mostly Australian</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Breakfast</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. During the morning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Lunch</td>
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<tr>
<td>4. During the afternoon</td>
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<tr>
<td>5. Dinner</td>
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<tr>
<td>6. After the evening meal</td>
<td></td>
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</tr>
</tbody>
</table>

485
20. Of all the foods available to you:
   What are the foods or dishes that you like the most?
   1. ____________________________
   2. ____________________________
   3. ____________________________

21. What are the 3 foods or dishes you dislike the most?
   1. __________________________________
   2. __________________________________
   3. __________________________________

22. What are 3 foods or dishes you think of as healthy?
   1. __________________________________
   2. __________________________________
   3. __________________________________

23. What are 3 foods or dishes you think of as unhealthy?
   1. __________________________________
   2. __________________________________
   3. __________________________________

24. On a scale of 1-7 would you say the foods you eat are:

<table>
<thead>
<tr>
<th>Very healthy</th>
<th>Half healthy and half unhealthy</th>
<th>Very unhealthy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
25. What makes it hard for you to eat healthy foods?
Tick all that apply.

1. Friends don’t like them
2. Family doesn’t like them
3. I don’t like them
4. I don’t know what they are
5. It is not hard

Think about the foods eaten in your household
Place a tick next to the answer that is the best for your household

26. Who does the main **food** shopping for your household?

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Usually</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I do</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>2. Mother</td>
<td></td>
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<tr>
<td>3. Someone else (Specify)</td>
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</tbody>
</table>

27. How often does the main shopper in your household usually go shopping for food?

1. Once/week
2. Once/fortnight
3. 2-3 times/week
4. 4-7 times/week
5. Other (specify)
28. From what types of shops is the food bought? Tick all that apply

1. [ ] Supermarket 2. [ ] Asian grocery shop
3. [ ] Fruit & Vegetable market 4. [ ] Asian Butcher
5. [ ] Other butcher 6. [ ] Corner shop
7. [ ] Other (specify)

29. If you and your family wanted to buy Vietnamese foods which shops would you usually go to?

1. [ ] Campsie/Lakemba 2. [ ] Bankstown/Marrickville
3. [ ] Cabramatta 4. [ ] Other (specify)

30. Do you ever decide what foods will be bought for your household?

1. [ ] YES 2. [ ] NO

31. Who does the cooking or preparing of food for your household?

<table>
<thead>
<tr>
<th>I do</th>
<th>Mother</th>
<th>Someone else (Specify)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
<td>Usually</td>
<td>Sometimes</td>
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</tbody>
</table>
32. **In what ways are meat, fish and seafoods cooked in your household?**
    Tick all that apply

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Usually</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Stir fry</td>
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<tr>
<td>2. Grill</td>
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<tr>
<td>3. Roast</td>
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<td>4. Soup/braise</td>
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<td>5. Deep fried</td>
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<tr>
<td>7. Steamed/Boiled</td>
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</tbody>
</table>

33. **In what ways are vegetables cooked in your household?**
    Tick all that apply

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<tr>
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<th>Always</th>
<th>Usually</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
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<tbody>
<tr>
<td>1. Stir fry</td>
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<td>2. Grill</td>
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<td>3. Roast</td>
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<td>4. Soup/braise</td>
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<td>5. Deep fried</td>
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<td>6. Steamed/Boiled</td>
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</tbody>
</table>

34. **On a scale of 1-7 would you say that you are**

<table>
<thead>
<tr>
<th></th>
<th>Too thin</th>
<th>Just about the right weight</th>
<th>too fat</th>
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</thead>
<tbody>
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<td>3</td>
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<td>4</td>
<td>5</td>
<td>6</td>
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<td>7</td>
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</tbody>
</table>
Physical activity includes such things as fast walking, bike riding, skipping, jogging, swimming, ball games, tennis, table tennis soccer etc.....

35. How many days a week do you do some physical activity?
   1. [  ] 4-7 days    2. [  ] 1-3 days
   3. [  ] Less than once a day

36. If you add up all the time you spend on physical activity what does it come to?
   1. [  ] 1 hour or less each week
   2. [  ] More than 1 hour but less than 3 hours each week
   3. [  ] 3 to 7 hours each week
   4. [  ] More than 7 hours each week

37. On average how many hours of TV do you watch each day?
   Please tick one
   1. 2 hours or less
   2. 2-4 hours
   3. More than 4 hours

   What channel do you mostly watch? _______________

38. Can you read Vietnamese writing?
   1. [  ] Yes    2. [  ] No
39. Think about the foods you eat and place a tick in the column that is right for you.

In the last week how often have you eaten the following foods?

<table>
<thead>
<tr>
<th></th>
<th>More than once a day</th>
<th>Once a day</th>
<th>4-6 times</th>
<th>1-3 times</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Fish</td>
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<tr>
<td>2. Other Seafood</td>
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<tr>
<td>3. Beef</td>
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<tr>
<td>4. Pork</td>
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<tr>
<td>5. Lamb</td>
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<tr>
<td>6. Chicken</td>
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<tr>
<td>7. Plain milk</td>
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<tr>
<td>8. Flavoured milk</td>
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<tr>
<td>9. Sweetened Condensed milk</td>
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<tr>
<td>10. Soy milk</td>
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<tr>
<td>11. Cheese</td>
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<tr>
<td>12. Yoghurt</td>
<td></td>
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<tr>
<td>13. Frozen yoghurt</td>
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<tr>
<td>14. Ice cream</td>
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<tr>
<td>15. Bread</td>
<td></td>
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<tr>
<td>16. Rice</td>
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<tr>
<td>17. Breakfast cereal</td>
<td></td>
<td></td>
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<tr>
<td>18. Sweet Biscuits/cakes</td>
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<td></td>
<td></td>
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<tr>
<td>19. Savoury biscuits/crackers</td>
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<tr>
<td>20. Pasta</td>
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<tr>
<td>21. Meat pie/sausage roll</td>
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<tr>
<td>22. Pizza</td>
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<tr>
<td>23. Hamburger</td>
<td></td>
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<tr>
<td>24. Hot chips</td>
<td></td>
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<tr>
<td>25. Potato crisps</td>
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<tr>
<td>26. Potato</td>
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<tr>
<td>27. Vegetables</td>
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<tr>
<td>28. Fresh fruit</td>
<td></td>
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<tr>
<td>29. Fruit Juice</td>
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<tr>
<td>30. Soft drink/cordial</td>
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<tr>
<td>31. Alcohol like beer or wine</td>
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<tr>
<td>32. Coffee</td>
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<tr>
<td>33. Chocolate</td>
<td></td>
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</tr>
<tr>
<td>34. Lollies</td>
<td></td>
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</tr>
<tr>
<td>35. Butter/Margarine</td>
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</tr>
</tbody>
</table>
Think about the foods you eat and place a tick in the column that is right for you.

In the last week how often have you eaten the following foods?

<table>
<thead>
<tr>
<th>1. Egg/rice noodle, fried/soup (mì xào/nước, hủ tiếu)</th>
<th>More than once a day</th>
<th>Once a day</th>
<th>4-6 times</th>
<th>1-3 times</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Stir fried meats/seafoods (thit/đồ biên xào)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Fish/prawn sour soup (canh chua cá/tôm)</td>
<td></td>
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<tr>
<td>4. Braised pork (thit heo kho)</td>
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<tr>
<td>5. Braised pork and egg (thit kho trứng)</td>
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<td></td>
</tr>
<tr>
<td>6. Braised fish (cá kho)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>7. Green vegetable soup (canh cải)</td>
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<td></td>
</tr>
<tr>
<td>8. Chicken in lemon grass with chillies (gà xào xả dĩ)</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>9. Steamed/fried fish (cá hấp/chIÊN)</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>10. Lettuce with meat (sả lách Trần thít)</td>
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</tr>
<tr>
<td>11. Instant noodles (mì gói)</td>
<td></td>
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</tr>
<tr>
<td>12. Beef/chicken noodle soup (phở bò/gà)</td>
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</tr>
<tr>
<td>13. Glutinous rice (xôi nếp)</td>
<td></td>
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</tr>
<tr>
<td>14. Vermicilli and grilled pork (bún thịt nướng)</td>
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<tr>
<td>15. Vietnamese spring rolls (chả giò)</td>
<td></td>
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</tr>
<tr>
<td>16. Gruel (cháo)</td>
<td></td>
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</tr>
<tr>
<td>17. Vietnamese bread roll (bánh mì thịt)</td>
<td></td>
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</tr>
<tr>
<td>18. Pork buns (bánh bao)</td>
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</tr>
<tr>
<td>19. Rice rolls (bánh cuốn)</td>
<td></td>
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<tr>
<td>20. Corn (bắp)</td>
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</tr>
<tr>
<td>21. Peanuts (đầu phồng)</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>22. Duck (vịt)</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>23. Jackfruit (mũi)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24. Watermelon (đuá hấu)</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25. Vietnamese sweet pudding (chè)</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>26. Coconut juice (nước dừa)</td>
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</tr>
<tr>
<td>27. Chinese tea (trà tâu)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28. Mung beans/bean sprouts (đậu xanh, gia)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29. Pickled/salty fish (mắm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30. Pickled vegetables (đa chua/cải)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX 3: Case studies

Examples of the dietary intake on the day of recording for three respondents are summarised below. These examples demonstrate the mixture of foods consumed by the group surveyed.

<table>
<thead>
<tr>
<th>Time</th>
<th>Food consumed</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.45pm</td>
<td>2 cups hot chips, 1 cup water, 1 cookie</td>
</tr>
<tr>
<td>5.30pm</td>
<td>1 cup vermicelli, 5 spring rolls, 1 cup of orange juice</td>
</tr>
<tr>
<td>6.00pm</td>
<td>1 cup of ice cream, 1 piece of mango</td>
</tr>
<tr>
<td>8.30pm</td>
<td>2 cups milk, 1 fairy cake</td>
</tr>
<tr>
<td>7.30am</td>
<td>2 cups orange juice, 1 cup of Coco Pops, 1 cup milk</td>
</tr>
<tr>
<td>10.45am</td>
<td>1 apple, 1 pack Twisties, 1 pack of chicken chips, 1 pack of M&amp;M chocolates</td>
</tr>
<tr>
<td>1.10pm</td>
<td>1 hot dog with sauce and pickles, 1 bottle of apple juice</td>
</tr>
</tbody>
</table>

Example 2 - boy 15 years

<table>
<thead>
<tr>
<th>Time</th>
<th>Food consumed</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.00pm</td>
<td>3 pieces rockmelon</td>
</tr>
<tr>
<td>4.30pm</td>
<td>2 bread rolls with Spam and lettuce</td>
</tr>
<tr>
<td>4.50pm</td>
<td>1 pack of instant noodles</td>
</tr>
<tr>
<td>5.00pm</td>
<td>1/2 chicken with 1 cup of hot chips</td>
</tr>
<tr>
<td>6.30 pm</td>
<td>2 1/2 cups rice with fish (fried) and vegetables</td>
</tr>
<tr>
<td>7.00pm</td>
<td>4 pieces of Kentucky Fried chicken</td>
</tr>
<tr>
<td>9.00pm</td>
<td>3 cartons (x 250mls) of orange juice</td>
</tr>
<tr>
<td>10.00pm</td>
<td>2 bottles of West Coast cooler</td>
</tr>
<tr>
<td>7.00am</td>
<td>2 cups Cornflakes, 1 cup milk, 2 teaspoons sugar</td>
</tr>
<tr>
<td>7.30am</td>
<td>2 slices toast with vegemite and butter</td>
</tr>
<tr>
<td>10.50am</td>
<td>2 ham sandwiches with butter</td>
</tr>
<tr>
<td>1.20pm</td>
<td>4 ham sandwiches with butter</td>
</tr>
<tr>
<td>3.30pm</td>
<td>1 pack of hot chips</td>
</tr>
</tbody>
</table>

This respondent stated this was a usual day for him.
Example 3 - girl 14 years

1.45pm 1 salad roll
4.00pm 1 pack of crisps
5.30pm 1 cup of rice, 1 chicken leg (fried), 1 cup of soup, salad, 1 cup of water
6.45pm 2 1/2 cups Pho (beef noodle soup)
7.30pm 1/2 cup ice cream, 1 apple, 1 orange

11.00am 2 choc-chip biscuits, 1 apple
1.20pm 2 slices of bread and butter, 10 potato crisps, water

This respondent claimed she was on a diet and does not eat breakfast because of the long distance she travels to school.

Probing of respondents

Probing of respondents after completion of the food diaries resulted in some quite important changes to a number of the records which would have ultimately affected the apparent quality of the diet. Changes made to the diet records included addition of unrecorded items and modifications to the information recorded about actual food items and/or cooking methods.

Examples included:

- rice with fish and vegetables became steamed rice, fried fish and stir fried beans and broccoli;
- 1 hot chip became 1 packet of hot chips equivalent to 2.5 cups;
- one chicken leg became 1 drumstick fried with salt and sugar and eaten with the skin on;
- king prawns fried in salt became king prawns stir fried in salt, oil and fish sauce.

Examples of omitted food items include: carton of orange juice, can of soft drink, soup, spread on bread, chips.
APPENDIX 4: Significance tests: Ratings of the degree to which meals are 'Australian' by gender and by number of years lived in Australia

APPENDIX 4.1: Ratings of the degree to which meals are 'Australian' by gender - results of Chi-square tests

<table>
<thead>
<tr>
<th>Meal time</th>
<th>MH$\chi^2$</th>
<th>DF</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakfast</td>
<td>2.3</td>
<td>1</td>
<td>0.1</td>
</tr>
<tr>
<td>During the morning</td>
<td>2.7</td>
<td>1</td>
<td>0.1</td>
</tr>
<tr>
<td>Lunch</td>
<td>0.1</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>During the afternoon</td>
<td>1.3</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>Dinner</td>
<td>0.2</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>After the evening meal</td>
<td>0.2</td>
<td>1</td>
<td>0.7</td>
</tr>
</tbody>
</table>

APPENDIX 4.2: Ratings of the degree to which meals are 'Australian' by number of years lived in Australia - results of correlation tests.

<table>
<thead>
<tr>
<th>Meal time</th>
<th>r</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakfast</td>
<td>0.41</td>
<td>0.0001</td>
</tr>
<tr>
<td>During the morning</td>
<td>0.36</td>
<td>0.0001</td>
</tr>
<tr>
<td>Lunch</td>
<td>0.19</td>
<td>0.03</td>
</tr>
<tr>
<td>During the afternoon</td>
<td>0.31</td>
<td>0.0002</td>
</tr>
<tr>
<td>Dinner</td>
<td>-0.01</td>
<td>0.9</td>
</tr>
<tr>
<td>After the evening meal</td>
<td>0.25</td>
<td>0.004</td>
</tr>
</tbody>
</table>
APPENDIX 5: Results from the FHQ - Frequency of eating particular foods in the previous week

<table>
<thead>
<tr>
<th>Food</th>
<th>More than once a day</th>
<th>Once a day</th>
<th>4-6 times</th>
<th>1-3 times</th>
<th>None</th>
<th>Mean rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>90</td>
<td>0.3</td>
</tr>
<tr>
<td>Coffee</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>13</td>
<td>78</td>
<td>0.5</td>
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<tr>
<td>Sweetened condensed milk</td>
<td>3</td>
<td>8</td>
<td>1</td>
<td>15</td>
<td>73</td>
<td>0.5</td>
</tr>
<tr>
<td>Frozen yoghurt</td>
<td>3</td>
<td>9</td>
<td>5</td>
<td>13</td>
<td>70</td>
<td>0.6</td>
</tr>
<tr>
<td>Duck</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>14</td>
<td>70</td>
<td>0.6</td>
</tr>
<tr>
<td>Lamb</td>
<td>3</td>
<td>10</td>
<td>6</td>
<td>11</td>
<td>70</td>
<td>0.7</td>
</tr>
<tr>
<td>Soy milk</td>
<td>5</td>
<td>7</td>
<td>6</td>
<td>16</td>
<td>66</td>
<td>0.7</td>
</tr>
<tr>
<td>Glutinous rice</td>
<td>4</td>
<td>10</td>
<td>4</td>
<td>18</td>
<td>65</td>
<td>0.7</td>
</tr>
<tr>
<td>Jackfruit</td>
<td>3</td>
<td>11</td>
<td>3</td>
<td>21</td>
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<td>0.7</td>
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<td>Yoghurt</td>
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<td>7</td>
<td>17</td>
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<tr>
<td>Meat pie</td>
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<td>11</td>
<td>7</td>
<td>19</td>
<td>62</td>
<td>0.7</td>
</tr>
<tr>
<td>Sausage roll</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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<tr>
<td>Peanuts</td>
<td>3</td>
<td>9</td>
<td>5</td>
<td>21</td>
<td>62</td>
<td>0.7</td>
</tr>
<tr>
<td>Cheese</td>
<td>1</td>
<td>11</td>
<td>6</td>
<td>23</td>
<td>59</td>
<td>0.7</td>
</tr>
<tr>
<td>Hamburger</td>
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<td>10</td>
<td>5</td>
<td>26</td>
<td>58</td>
<td>0.7</td>
</tr>
<tr>
<td>Pizza</td>
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<td>7</td>
<td>26</td>
<td>56</td>
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<tr>
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<td>17</td>
<td>9</td>
<td>37</td>
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<tr>
<td>Pork buns</td>
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<td>11</td>
<td>7</td>
<td>16</td>
<td>63</td>
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<td>4</td>
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</tr>
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<td>Chinese Tea</td>
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<td>7</td>
<td>20</td>
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</tr>
<tr>
<td>Vermicelli &amp; grilled pork</td>
<td>2</td>
<td>13</td>
<td>8</td>
<td>20</td>
<td>57</td>
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</tr>
<tr>
<td>Pasta</td>
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<td>10</td>
<td>9</td>
<td>17</td>
<td>58</td>
<td>0.9</td>
</tr>
<tr>
<td>Pickled/salty fish</td>
<td>5</td>
<td>12</td>
<td>8</td>
<td>19</td>
<td>57</td>
<td>0.9</td>
</tr>
<tr>
<td>Gruel</td>
<td>5</td>
<td>11</td>
<td>9</td>
<td>18</td>
<td>57</td>
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<td>Chicken in lemon grass &amp; chillies</td>
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<td>13</td>
<td>9</td>
<td>24</td>
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<td>Coconut juice</td>
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<tr>
<td>Food</td>
<td>Number of times eaten in the previous week (percentages)*</td>
<td>Mean rating*</td>
<td></td>
<td></td>
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<tr>
<td>-----------------------------</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>More than once a day</td>
<td>Once a day</td>
<td>4-6 times</td>
<td>1-3 times</td>
<td>None</td>
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</tr>
<tr>
<td>Flavoured milk</td>
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<td>3</td>
<td>17</td>
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<td>19</td>
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<td>11</td>
<td>7</td>
<td>26</td>
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<td>15</td>
<td>11</td>
<td>26</td>
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<td>Vietnamese sweet pudding</td>
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<td>12</td>
<td>28</td>
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<td>1.0</td>
</tr>
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<td>24</td>
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<td>8</td>
<td>30</td>
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<td>19</td>
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<td>8</td>
<td>29</td>
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<td>19</td>
<td>11</td>
<td>26</td>
<td>36</td>
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</tr>
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<td>Steamed/fried fish</td>
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<td>32</td>
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<td>18</td>
<td>13</td>
<td>30</td>
<td>31</td>
<td>1.4</td>
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<td>20</td>
<td>12</td>
<td>31</td>
<td>30</td>
<td>1.4</td>
</tr>
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<td>Sweet biscuits, cake</td>
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<td>23</td>
<td>14</td>
<td>29</td>
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</tr>
<tr>
<td>Instant noodles</td>
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<td>16</td>
<td>13</td>
<td>22</td>
<td>34</td>
<td>1.5</td>
</tr>
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<td>16</td>
<td>12</td>
<td>32</td>
<td>28</td>
<td>1.5</td>
</tr>
<tr>
<td>Food</td>
<td>Number of times eaten in the previous week (percentages)*</td>
<td>Mean rating*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------------------------------------------------------</td>
<td>--------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>More than once a day</td>
<td>Once a day</td>
<td>4-6 times</td>
<td>1-3 times</td>
<td>None</td>
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<tr>
<td>Plain milk</td>
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<td>18</td>
<td>13</td>
<td>17</td>
<td>36</td>
<td>1.6</td>
</tr>
<tr>
<td>Breakfast cereal</td>
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<td>25</td>
<td>15</td>
<td>16</td>
<td>35</td>
<td>1.6</td>
</tr>
<tr>
<td>Fish/prawn sour soup</td>
<td>12</td>
<td>18</td>
<td>12</td>
<td>30</td>
<td>28</td>
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</tr>
<tr>
<td>Ice-cream</td>
<td>11</td>
<td>21</td>
<td>17</td>
<td>28</td>
<td>23</td>
<td>1.7</td>
</tr>
<tr>
<td>Egg/rice noodle</td>
<td>15</td>
<td>18</td>
<td>13</td>
<td>32</td>
<td>22</td>
<td>1.8</td>
</tr>
<tr>
<td>Seafood (other than fish)</td>
<td>13</td>
<td>23</td>
<td>15</td>
<td>28</td>
<td>21</td>
<td>1.8</td>
</tr>
<tr>
<td>Stir fried meats/seafod</td>
<td>11</td>
<td>24</td>
<td>17</td>
<td>32</td>
<td>15</td>
<td>1.8</td>
</tr>
<tr>
<td>Fish</td>
<td>13</td>
<td>30</td>
<td>9</td>
<td>36</td>
<td>13</td>
<td>1.9</td>
</tr>
<tr>
<td>Pork</td>
<td>11</td>
<td>29</td>
<td>17</td>
<td>25</td>
<td>19</td>
<td>1.9</td>
</tr>
<tr>
<td>Chicken</td>
<td>15</td>
<td>29</td>
<td>15</td>
<td>25</td>
<td>16</td>
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</tr>
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<td>Green vegetable soup</td>
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<td>26</td>
<td>16</td>
<td>21</td>
<td>17</td>
<td>2.1</td>
</tr>
<tr>
<td>Fruit juice</td>
<td>27</td>
<td>24</td>
<td>11</td>
<td>17</td>
<td>21</td>
<td>2.2</td>
</tr>
<tr>
<td>Beef</td>
<td>17</td>
<td>31</td>
<td>21</td>
<td>22</td>
<td>11</td>
<td>2.2</td>
</tr>
<tr>
<td>Vegetables</td>
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<td>27</td>
<td>19</td>
<td>11</td>
<td>9</td>
<td>2.7</td>
</tr>
<tr>
<td>Fresh fruit</td>
<td>39</td>
<td>27</td>
<td>15</td>
<td>10</td>
<td>10</td>
<td>2.7</td>
</tr>
<tr>
<td>Bread</td>
<td>36</td>
<td>27</td>
<td>21</td>
<td>15</td>
<td>3</td>
<td>2.8</td>
</tr>
<tr>
<td>Rice</td>
<td>57</td>
<td>23</td>
<td>9</td>
<td>7</td>
<td>4</td>
<td>3.2</td>
</tr>
</tbody>
</table>

* Ratings were scored as follows:
  4 = >7 times per week
  3 = 7 times per week
  2 = 4-6 times per week
  1 = 1-3 times per week
  0 = 0 times per week

# The position of the mean on the 5 point scale is indicated by the vertical line of dashes

Acknowledgment to C. Spooner, Research and Evaluation Officer HPU, SSAHS for assistance with this analysis.
APPENDIX 6: Results from the Diet Record

APPENDIX 6.1: Gender differences in major foods consumed at breakfast

<table>
<thead>
<tr>
<th>Breakfast</th>
<th>Per cent consuming each food</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males (n=44)</td>
<td>Females (n=50)</td>
<td></td>
</tr>
<tr>
<td>Bread and Cereal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bread</td>
<td>23</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Rice</td>
<td>27</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>Breakfast cereal</td>
<td>30</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Instant noodles</td>
<td>11</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Vegetables (cooked, raw)</td>
<td>5,9</td>
<td>6,4</td>
<td></td>
</tr>
<tr>
<td>Fruit</td>
<td>5</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Fruit Juice</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td>14</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Coffee</td>
<td>5</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Sweetened drinks</td>
<td>7</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Milk/Dairy foods</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milk</td>
<td>48</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Other dairy</td>
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<td>4</td>
<td></td>
</tr>
<tr>
<td>Protein foods</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meat/fish</td>
<td>23</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Egg</td>
<td>7</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Snacks</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Fats</td>
<td>14</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Chips</td>
<td>0</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Confectionery</td>
<td>10</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Sugar/jam/sweet spread</td>
<td>20</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>No breakfast</td>
<td>9</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Minimal breakfast</td>
<td>5</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX 6.2: Gender differences in major foods consumed at lunch

<table>
<thead>
<tr>
<th>Lunch</th>
<th>Males (n=44)</th>
<th>Females (n=50)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bread and Cereal</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bread</td>
<td>52</td>
<td>56</td>
</tr>
<tr>
<td>Rice</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Other - cake/biscuit</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td><strong>Vegetables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-cooked</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>-raw</td>
<td>25</td>
<td>14</td>
</tr>
<tr>
<td><strong>Fruit</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>14</td>
</tr>
<tr>
<td><strong>Fruit Juice</strong></td>
<td>14</td>
<td>36</td>
</tr>
<tr>
<td><strong>Water</strong></td>
<td>16</td>
<td>18</td>
</tr>
<tr>
<td><strong>Sweetened drinks</strong></td>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td><strong>Cordial/ice block</strong></td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td><strong>Milk/Dairy foods</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milk</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Cheese/yoghurt</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Ice cream</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td><strong>Protein foods including eggs/nuts</strong></td>
<td>37</td>
<td>58</td>
</tr>
<tr>
<td><strong>Fats</strong></td>
<td>14</td>
<td>20</td>
</tr>
<tr>
<td><strong>Snacks</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chips</td>
<td>14</td>
<td>10</td>
</tr>
<tr>
<td>Confectionery</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>-chocolate</td>
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<td>12</td>
</tr>
<tr>
<td>-sugar</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Sugar/sweet spread</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td><strong>Takeaway foods</strong></td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td><strong>No lunch</strong></td>
<td>18</td>
<td>12</td>
</tr>
<tr>
<td><strong>Minimal lunch</strong></td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>
APPENDIX 6.3: Gender differences in major foods consumed at dinner

<table>
<thead>
<tr>
<th>Dinner</th>
<th>Males (n=44)</th>
<th>Females (n=50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meal eaten 3pm-6pm</td>
<td>23</td>
<td>36</td>
</tr>
<tr>
<td>Meal eaten 6pm-9pm</td>
<td>71</td>
<td>62</td>
</tr>
<tr>
<td>Meal eaten 9pm-Midnight</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>No meal</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Snacks only</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

| Vietnamese type meal                       | 94           | 94             |
| ≥2 protein serves                         | 53           | 52             |
| Other                                      | 5            | 6              |

Foods consumed (6-9pm)

<table>
<thead>
<tr>
<th>Food</th>
<th>Males (n=44)</th>
<th>Females (n=50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soft drink</td>
<td>32</td>
<td>10</td>
</tr>
<tr>
<td>Juice</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>Ice cream</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Fruit</td>
<td>18</td>
<td>36</td>
</tr>
<tr>
<td>Milk</td>
<td>25</td>
<td>10</td>
</tr>
<tr>
<td>Bread/noodles</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Water/tea</td>
<td>28</td>
<td>30</td>
</tr>
<tr>
<td>Snacks - biscuit/cake/chips/confectionery</td>
<td>28</td>
<td>14</td>
</tr>
<tr>
<td>Pizza/nuggets etc</td>
<td>2</td>
<td>10</td>
</tr>
</tbody>
</table>