MONASH UNIVERSITY

THESIS ACCEPTED IN SATISFACTION OF THE
REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

ON............. 12 April 2002 ....

[redacted]

for Sec. Research Graduate School Committee

ERRATA

P 53 point 5: "daily" for "at least 3-4 times/week"

P 133 Mean Medication Score for Survivors and Deceased: "40.2" for "40" and "39.8" for "40"

P 162 Table 6.5, Mean Exercise Score for Survivors and Deceased: "4.3" for "4" and "3.7" for "4"

P 192 para 2, 2^{nd} line: delete "consumed"

P 193 last line: "get" for "getting"

P 200 para 2, last sentence: "an" for "a 4%"

P 202 last sentence: "were" for "was"

P 205 para 1, line 3: "14%" for "86%"

P 205 para 1, line 11: "16%" for "84%"

ADDENDUM

P 52 line 9: Comment: The purpose of the 2 questions and exercise score in the FHILL study was to provide a global measure of physical activity rather than fitness levels or a measure of energy expenditure. Therefore, a shortened version (2 questions) was constructed for use in the FHILL study in 1988 and an interviewer rated exercise score was created for the study. Furthermore, there were 7 detailed categories used to describe the exercise level of each subject. Thus, it could be argued that the exercise score encompassed answers to 9 questions. The exercise score has not been previously validated, however, results from this thesis have shown the importance of the exercise score as a predictor of survival.

P 57 para 2: Add: The validation studies for FHILL FFQs are as follows:

Swedes in Sweden: A validation study was performed in a random sub-sample with a 4-day food record and 24-hour urinary collection in 25 subjects. These urine collections were frozen and urinary nitrogen was determined using the Technicon Autoanalyzer Method N-3b. There was an overestimation for protein intake of 15-20% compared with the protein intake calculated from the urinary nitrogen collection. Energy intake by the 4-day record was on average 7.9 MJ, compared to 10.7 MJ by the FFQ method, with a difference of 35%. The ratio of estimated energy intake compared with energy estimates of basal metabolic rate was indicating a high activity level in the population. The proportion and distribution of macronutrients were in good agreement between the FFQ and the food record. Another validation study was conducted in 76 subjects from representative population studies in Göthenburg city (Rothenberg E. Eur J Clin Nutr 1994;48:725-735). It was concluded that the FFQ method well reflected habitual intake of elderly Swedes.

Greeks in Australia and Greeks in Greece: To validate the FFQ, the Minimal Energy Requirements (MER) was calculated for each subject by firstly calculating Basal Metabolic Rate (BMR) using the Schofield equations for the 60+ age group and then multiplying by an activity factor of 1.55 (sedentary lifestyle). The average MERs were significantly different for women from those estimated from the FFQ. It was concluded that there might be a limitation on interpreting data on elderly Greek women due to (Kouris-Blazos, 1994):

- Under-reporting is operating bringing down the means for nutrient intake (actual intake>reported intake) OR
- Negative energy balance is operating in an attempt to lose weight (actual intake = reported intake) OR
- The Schofield equation and the physical activity factor of 1.55 overestimate total energy (actual intake = reported intake)

Urine was also collected from a sub-sample of 21 elderly Greeks in Australia in order to validate the FFQ by comparing protein intake calculated from urinary nitrogen excretion to protein intake calculated from the FFQ. A similar procedure could not be performed in Greece due to technical reasons. Estimated protein intake was calculated using this equation:
Estimated protein intake = (24-h urinary nitrogen (g) + 4g faecal/dermal loss) x 6.25
The average protein intake estimated from the FFQ for men was significantly higher than that estimated from urinary nitrogen.

P 58: Add: It was a challenge to develop methodology that would create a comparison of food-health relationships between disparate cultural groups of elderly people. At the commencement of FHILL study in 1988, the IUNS Committee had decided to describe the food-health relationships of elderly folk in accordance with their culture. In order to make the questionnaire culturally sensitive to the community being studied, the following should be asked for each question:

1. Is the information sought relevant?
2. Is the question feasible and culturally appropriate?
3. What would be the reliability of the question?
4. What would be the validity of the question and answers?

The systematic enquiries methodology previously used by Andrews et al. (1986) in a cross-cultural study was also taken into consideration. The IUNS Committee decided to make the initial appraisal of communities with Rapid Assessment Procedures (RAP) approaches by Scrimshaw and Hurtado (1987) and then, wherever possible, to apply cross-culturally robust food-health methodology on a representative sample of communities.

RAP methodology was useful for probing and checking what study subjects actually do as opposed to what they say they do, although subjects could still deceive observers.

RAP can be used for:

1. background data
2. appropriate questions
3. testing, checking, cleaning, monitoring
4. evaluation, follow-up

The anthropological methods (RAP) were used in order to make suitable adjustments to the 'core' IUNS questionnaire. RAP is also useful for collecting information on food beliefs. Thus, the FFQ used for the FHILL study was designed for cross-cultural purposes. A common protocol was followed by every FHILL centres. The FFQ used for FHILL cohorts (Anglo-Celts in Melbourne, Greeks in Melbourne, Greeks in Greece, and Swedes in Sweden) was based on the FFQ developed for the Australian Polyp Prevention Project (Macrae et al., 1989). There were 50 Greek foods and dishes included in the FFQ. Popular Australian foods were retained in the FFQ so that possible changes in food habits on migration could be observed. Important Swedish food items were added in the Swedish FFQ and every item in the questionnaire relevant for food habits in Sweden was asked for.

The FFQ aimed to discover the variety and quantity of foods consumed over the past 12 months. It is important to review the questions carefully before applying them to a community because there is difficulty in comparing items for studies in disparate cultures. Each question had to be adjusted to the individual populations. Many questions were wholly irrelevant, not feasible or not culturally appropriate.

The limitations of having different length of FFQs are acknowledged, and might result in an over-estimation for a longer food list and under-estimation for a shorter food list. However, different total numbers of food items in the different FFQs (used in different FHILL cohorts) are recognised as a consequence of different foods and dishes consumed in different cultures. For example, there were more types of legumes consumed by elderly Greeks than their Swedes counterpart. Thus, many Greek foods that were not relevant for elderly Swedes were omitted from the FFQ and typical local Swedish foods were inserted.

Furthermore, foods listed in the FFQs were not all consumed by the different elderly cohorts because they were not necessarily culturally relevant. For example, of the 250 foods in the FFQ used in Australia, about 25 "Anglo" foods were rarely consumed by the Greek migrants and about 50 "Greek" foods were rarely consumed by the Anglo-Celts. Similarly, of the 224 foods in the FFQ used in Sweden, about 10 'Greek' foods were rarely consumed. In reality, the actual lengths of the FFQs were similar for each cohort at about 200 foods.

There were 250 food items were included in the FFQs used for Anglo-Celts and Greeks in Australia. On the other hand, the FFQs used for Greeks in Greece and Swedes in Sweden comprised of 190 and 224 food items, respectively.

The FFQ methodology relies on the use of standard portion size to estimate usual intake. The reference portion sizes were different for different cultures.

Anglo-Celts in Australia: The reference portion sizes were obtained from the Australian Polyp Prevention Project (Macrae et al. 1989) - study subjects were mainly of Anglo-Celtic origin.
Greeks in Greece: typical food portions consumed by 60 subjects (average age of 75 years old) residing in Markopoulos in Greece who participated in the Euronut study in 1989 were used as a reference. The food portions were determined using the 3-day food records.
Greeks in Australia: As part of the Anti Cancer Council study "Health 2000", data on typical food servings consumed by Greek migrants living in Melbourne aged 60 and over (M=37, F=26) were collected. Weighed food records for eight days were gathered from participants between 1991-1992.
Swedes in Sweden: The standard portions suggested by Swedish National Food Administration were used as a reference. However, to minimise measurement errors the interviewers called local (Johanneberg area in Gothenburg city) bakeries and restaurants to get information about weights and ingredients.

P 60 item 1: Comment: Potatoes are included as cereals rather than vegetables because starchy roots are combined with cereals in the cereals group based on the McCance and Widdowson food-grouping model that has been published earlier and has been used for this thesis (*Trichopoulou A et al. Diet and overall survival in elderly people. British Medical Journal 1995;311:1457-1460*).

P 203: Add at the end of para 1: Greeks in Greece had the highest mortality risk whilst Greeks in Australia had the lowest risk amongst longevity cohorts. This result was observed using a Cox's model adjusted for age at enrolment, gender, and smoking status. There were several possible explanations for this result:

- Self-rated health score for Greeks in Australia was higher than Greeks in Greece
- Social Activity and Social Network scores for Greeks in Australia was higher than Greeks in Greece
- On average, Greeks in Australia consumed more vegetables, legumes, meat and fish than their counterparts in Greece

In addition, Kouris-Blazos et al. quoted (1999):
First generation Greek-born Australians (GA) is one of the longest-lived populations in the world, despite unfavourable cardiovascular disease risk factors, poor self-rated health and functional disabilities. Possible dietary factors contributing to the longevity of GA include: the proportionately high intake and variety of plant foods relative to animal foods; the tendency to return to the traditional Greek Food Pattern in old age; and the continued high intake of monounsaturated fats, n-3 fatty acids and phytochemicals from the wide variety of plant foods consumed.

P 204 para 2: Comment: The Cox's model described on p204 paragraph 2 referred to individual variable that was tested using Cox's model with diet score. For example: social activity score and diet score, *or* activity of daily living and diet score, etc. If only *two* variables (as mentioned earlier) were tested using one Cox's model, it was found that diet score appeared not to be statistically significant. However, when *all* variables were incorporated into one Cox's model (as shown in Table 8.2), diet score was found to be significant.

SURVIVAL AMONGST LONGEVITY CULTURES: SOCIAL, PHYSICAL ACTIVITY AND NUTRITIONAL DETERMINANTS

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DOCTOR OF PHILOSOPHY

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TABLE OF CONTENTS

SUMMARY

The FHILL mortality follow-up study may be the most comprehensive and representative database available on food intakes, food intake patterns, health, social, and physical activity of longevity cultures around the world. The current study concentrates on examining these factors that may determine survival in later life. Furthermore, the interaction between these factors in predicting mortality is examined in a multivariate analysis using the Cox Proportional Hazard model. In any case, except mentioned otherwise, the Cox's model was controlled for age at enrolment, gender, and smoking status.

There are 785 elderly subjects in this study, from five different cohorts around the world. Four Caucasian cohorts (Swedes in Sweden, Anglo-Celtic in Australia, Greeks in Australia, and Greeks in Greece) and one Asian cohort (Japanese in Japan) participated in the mortality follow-up up to seven years since the commencement of the study in 1988. There were 547 elderly who survived and 147 elderly who died during this period.

The main findings are as follows:

SURVIVAL DETERMINANTS: HEALTH, SOCIAL AND LIFESTYLE

1. Survivors had significantly higher wellbeing, self-rated health, health behaviour, health conditions, medication and total health scores than those who died.
2. Separate Cox models developed to analyse health variables found that better memory, sense of wellbeing, self-rated health, health behaviour, total health and less medication used were significant predictors of reduced risks of death. These results were adjusted for age at enrolment, gender, smoking status, and ethnicity/locality backgrounds.
3. Better cognitive function for Swedes in Sweden was significantly associated with a reduction in the risk of death by 37%. Higher self-rated health and total health scores significantly prolonged survival for Anglo-Celts in Australia. Meanwhile, Greeks in Australia with better health behaviour, health conditions, and total health scores were more likely to survive. A higher self-rated health score was associated with a reduced hazard of death for Greeks in Greece.
4. In general, elderly participants who survived appeared to be significantly more socially active and had better social relations. Moreover, social activities and social networks significantly predicted mortality within longevity cultures. This result was particularly significant amongst Greeks in Greece.
5. Smoking was significantly associated with an increased risk of death by 55%. Other lifestyle factor such as napping was found to be a

significant predictor of death, but only when ethnic backgrounds were not included into the Cox's model.

SURVIVAL DETERMINANTS: PHYSICAL ACTIVITY

6. Survivors had significantly higher ADL and exercise scores. Furthermore, higher ADL and exercise scores were significantly associated with a reduction in the risk of death. These results were based on separate Cox's models adjusted for age at enrolment, gender, smoking status, and ethnicity/locality background.
7. Higher ADL scores were particularly important in predicting mortality for Swedes in Sweden, Greeks in Australia, and Greeks in Greece. In addition, higher exercise scores were significant predictors of mortality for both Greeks in Australia and Greece.

SURVIVAL DETERMINANTS: FOOD INTAKES AND FOOD INTAKES PATTERNS

8. Survivors consumed significantly more vegetables, fruits, nuts, meat and meat products. Interestingly, cereal intake was found to be lower amongst survivors.
9. Within and between longevity cultures, every 20g increase in legume consumption was associated with a reduction in the risk of death. A higher fish intake and a higher monounsaturated to saturated fat ratio were also significantly associated with the protective effects against premature death.

10. Every 20g increase in fish and shellfish intake was significantly associated with a reduction in risk of death for Japanese in Japan. Fruits and nuts intake significantly improved survival amongst Greeks in Melbourne whereas a higher consumption of milk and dairy products were associated with an increased risk of death amongst Greeks in Greece.

11. Caucasian and Asian elderly subjects who had food patterns similar to the "Traditional Mediterranean Diet" (measured with a score) or who had food patterns high in fish and plant food (measured with a Fish and Plant score) had a significantly reduced risk of death by 13%. These results were observed after adjustment for age at enrolment, gender, smoking status, and ethnicity/locality backgrounds. Additionally, these scores were analysed based on three different cut-off points.

AN INTEGRATED APPROACH TO CROSS-CULTURAL SURVIVAL DETERMINANTS

12. Ethnicity/locality backgrounds were shown to be significantly different amongst longevity cultures. Greeks in Greece were used as the reference point in the Cox's model. Relative to the survival of Greeks in Greece, being a first generation Greek in Australia conferred the lowest risk of death. The risk of death was also lower amongst Swedes in Sweden, Japanese in Japan and Anglo-Celts (2nd and 3rd generation) in Australia.

13. Amongst modifiable variables that predicted mortality (e.g diet, ADL, social network score, social activity score, exercise score and smoking status), the plant-based and fish diet score significantly reduced the risk of death, along with the ADL score in a multivariate analysis. This Cox's model was adjusted for age at enrolment, gender, and ethnicity/locality backgrounds.
14. When both modifiable and less-modifiable variables were examined under one Cox's model, memory score, diet score, ADL score, and total health score significantly reduced the risk of death. On the other hand, being male and a smoker were associated with an increased risk of death.
15. Cross-culturally, diet was a more important predictor of survival than social, lifestyle and health variables.

DECLARATION

Phase I (comparative descriptive study) of the Food Habits in Later Life project highlighted the possibility to achieve comparable health in old age in different cultural settings with widely diverge food habits. *Phase II* (mortality follow-up) of the FHILL project aimed to examine prospectively the effect of food patterns, social, physical, health, and lifestyle variables on up to 7 years survival of elderly cohorts. Candidate carried out *Phase II* of the FHILL project in five longevity cultures around the world. Candidate was responsible for mortality data collection, data management, performing statistical analysis, and writing-up this thesis.

This thesis does not contain material, which has been previously submitted or accepted for the award of any other degree or diploma in this or any other university or institution.

To the best of my knowledge, this thesis contains no material previously published or written by other persons, except where due reference or acknowledgment is made.

The author consents to the thesis being made available for photocopying and loan if accepted for the award of the degree.

[redacted]

Irene Darmadi-Blackberry

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PARTICIPANTS OF STUDY

Finally, I deeply thank all participants in the FHILL project for their enormous contribution to the study. Without them this study would not have been possible.

ABBREVIATIONS

ACS	Anglo-Celtic in Australia
ADL	Activity of Daily Living
BMI	Body Mass Index
CHD	Coronary Heart Disease
CI	Confidence Interval (95%)
CRONOS	Cross-cultural Research on Nutrition in the Older Adult Study
CVD	Cardiovascular Disease
D	Deceased
EURONUT	European Action on Nutrition and Health
F	Female
FDBG	Food Based Dietary Guidelines
FFQ	Food Frequency Questionnaire
FHILL	Food Habits in Later Life
GRM	Greeks in Australia
GRS	Greeks in Greece
IHD	Ischaemic Heart Disease
IUNS	International Union of Nutritional Sciences
JPN	Japanese in Japan
M	Male
M:S	Monounsatured to Saturated fat ratio
MAI	Multilevel Assessment Instrument

MONICA	Monitoring Trends and Determinants in Cardiovascular Disease
MRFIT	Multiple Risk Factor Intervention Trial
NHANES	National Health and Medical Examination Survey
OARS	Older Americans Resources and Services
P	Probability
PBD	Plant-based and Fish Diet
Q	Questionnaire
RR	Risk Ratio or Relative Risk
RRa	Response Rate
S	Survivors
SEAMEO	Southeast Asian Ministers of Education Organisation
SD	Standard Deviation
SENECA	Survey in Europe on Nutrition and the Elderly, A Concerted Action
SWD	Swedes in Sweden
TMD	Traditional Mediterranean Diet
TROPMED	Tropical Medicine
WHO	World Health Organization

PUBLICATIONS ARISING DURING CANDIDATURE

JOURNALS

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Wahlqvist ML, **Darmadi-Blackberry I**, Savige GS, Kouris-Blazos A, Trichopoulos D. Age-fitness: how achievable with food? *(in press)*

Kouris-Blazos A, Wahlqvist ML, **Darmadi-Blackberry I**, Trichopoulos D, Jolley D, Trichopoulou A, Steen B, Lukito W, Rothenberg E, Horie Y. Cross-cultural: lifestyle and health determinants of survival in older people. *(to be submitted early 2002).*

Darmadi-Blackberry I, Kouris-Blazos A, Wahlqvist ML, Trichopoulos D, Jolley D, Trichopoulou A, Steen B, Lukito W, Rothenberg E, Horie Y. Cross-cultural: dietary determinants of survival in older people. *(to be submitted early 2002).*

Wahlqvist ML, **Darmadi-Blackberry I**, Kouris-Blazos A, Trichopoulos D, Jolley D, Trichopoulou A, Steen B, Lukito W, Rothenberg E, Horie

Y. Is diet more or less important than social and health factors in survival? *(to be submitted early 2002).*

ABSTRACTS

Darmadi I, Wahlqvist ML, Horie Y, Kouris-Blazos A, Wattanapenpaiboon N, Sugase K, Horie K. Food predictors of later life status in Japanese elderly. *Proceedings of Australasian Clinical Nutrition Society, Brisbane, 1997.*

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Darmadi I, Horie Y, Wahlqvist ML, Kouris-Blazos A,Horie K, Sugase K. Food intake in relation to 88-month survival of elderly Japanese. *Proceeding of 24th Annual NSA Scientific Meeting, Perth 3-6 December 2000;24:274.*

Darmadi I, Horie Y, Tebelis N, Horie K, Sugase K, Trichopoulou A, Trichopoulos D, Kouris-Blazos A, Wahlqvist ML. IUNS Food Habits in Later Life: Dietary predictors of survival amongst elderly

Japanese. *Proceeding of XVII International Congress of Nutrition, Austria, 27-31 August 2001. Ann Nutr Metab 2001;45(suppl 1):417.*

Wahlqvist ML, **Darmadi-Blackberry I**, Savige GS, Kouris-Blazos A, Trichopoulos D. Age-fitness: how achievable with food? *Proceeding of XVII International Congress of Nutrition, Austria, 27-31 August 2001. Ann Nutr Metab 2001;45(suppl 1):413.*

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CHAPTER 1

CHAPTER 1

Introduction

1.1 INTRODUCTION

In 1987, the International Union of Nutritional Sciences (IUNS) subcommittee on Nutrition and Ageing, in conjunction with the World Health Organization (WHO) global program for the elderly, embarked on a program to test key hypotheses in relation to food habits, health status and social variables in the elderly. The elderly were specifically targeted because they were the 'survivors'.

1.2 AIMS

- To determine to what extent health, social and lifestyle variables predict survival.
- To analyze a mortality follow-up study of elderly with respect to dietary predictors of survival.
- To identify protective food patterns amongst these elderly in relation to mortality.
- To analyze whether food or social factors is more important in predicting survival.

1.3 HYPOTHESIS

- Nutrition is more important for survival in later life than social and physical activities amongst longevity cultures.
- Adherence to a varied but traditional food pattern, which have characteristics of the Greek variant of the Traditional Mediterranean Diet circa 1960s, may confer longevity.

1.4 SIGNIFICANCE OF THE STUDY

There is a great deal of concern regarding the aged, given the increasing number of elderly population in the world as life span increases by as much as 25%. This cross-cultural study examined social and food cultures that are disparate from each other because of major variations in dietary patterns and lifestyle and how these may contribute to survival. Participants were amongst longevity cultures that have been followed-up in various parts of the world for over 7 years since the commencement of this cross-cultural study.

1.5 THESIS STRUCTURE

Five IUNS Food Habits in Later Life (FHILL) centres participated in the survival studies, which are the subjects of this thesis. Mortality data were collected from elderly Japanese in Okazaki, Swedes in Sweden, Anglo-Celts in Melbourne, Greeks in Melbourne, and Greeks in Spata, Greece.

The thesis is developed as follows:

Chapters 1,2, and 3 constitute the introduction, literature review and methods used in the study.

Chapter 4 describes the characteristics of each study population.

Results are presented in the following three chapters. Each chapter considers the collective study centres as well as cross-cultural comparisons between them. At the end of each chapter, a discussion and a summary are given.

Chapter 5 describes the health, social, and lifestyle determinants of survival.

Chapter 6 describes the physical activity determinants of survival.

Chapter 7 describes food intakes and food intake patterns determinants in survival.

Chapter 8 describes whether the social, physical, lifestyle, or nutritional variable is more important in determining survival.

Chapter 9 reviews the main findings and provides a general discussion of them along with further research needed in this area.

CHAPTER 2

CHAPTER 2

Literature Review

2.1 INTRODUCTION

There are three approaches which are best in describing the ageing process (Savige et al., 2001):

- *Chronological age:* the time elapsed since one's birth
- *Biological age:* the change(s) that one's body undergoes
- *Societal age:* the expectations of the community, for example retirement at a certain age

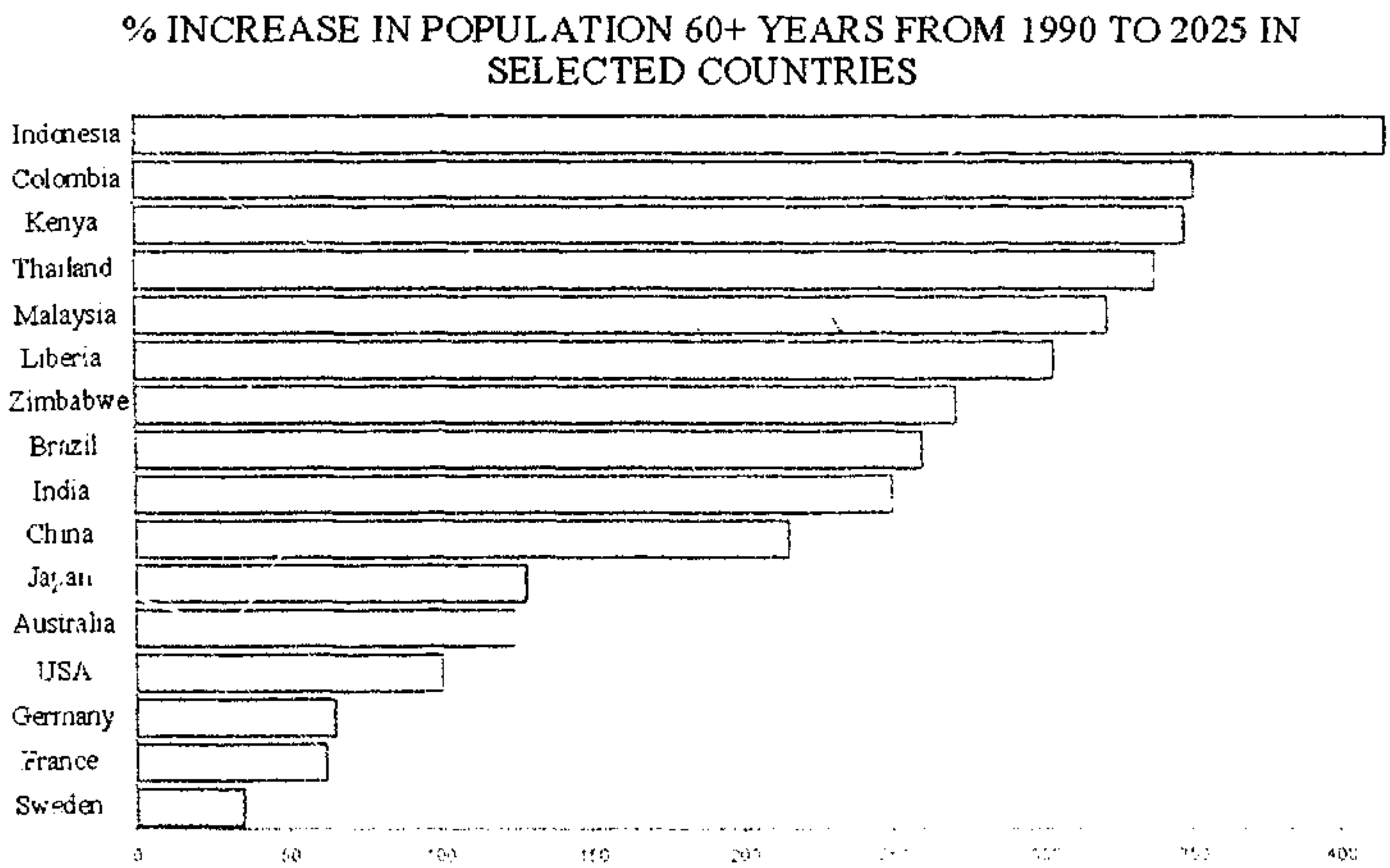
This chapter will review existing literatures on survival in the elderly. Factors that have been documented to predict survival in an elderly population, such as social activity, social network, physical activity, health status, lifestyle, dietary intake, and dietary patterns, will be illustrated further in this chapter.

2.2 POPULATION AGEING AND ITS CONSEQUENCES

A mortality decline over five decades has been documented across several countries such as Japan, UK, Canada, France, Germany, USA and Italy (TUljapurkar S et al., 2000). The number of older people in the world is set to nearly double to around one Billion by 2025 (WHO, see Figure 2.1). The Japanese are well known to be amongst those who have the longest life expectancy in the world (Goldman N and Takahashi S, 1996). This may be due to their traditional diet and lifestyle. Japanese longevity has improved dramatically since the 1960s. In 1994, the Japanese life expectancy was 76.57 for men and 82.98 for women, which is about 10 years longer than in 1965 (1995). At the same time, the Traditional Japanese Food Pattern has been influenced by Western habits. The Japanese National Nutrition Survey in 1995 reported a remarkable increase in consumption of fruits and animal foods such as meat, eggs, milk and dairy products over a 30-year period (1995). These changes are believed to improve the nutritional status of Japanese people, thereby improving their longevity.

Other countries such as Sweden, Australia, and Greece have also experienced an increase in their average life expectancy of their respective populations. This may be attributable to a reduction in the death rates above the age of 70 and an increase in the number of survivors to old age (Wilmoth et al., 2000), rapid economic growth and a better health care system (O'Donoghue et al., 2000), as well as adherence to the traditional Mediterranean diet (Trichopoulou A et al., 1995; Trichopoulou et al., 1995), respectively. Accordingly, increasing longevity now establishes the need for more attention to problems of nutrition and health in the elderly. The life expectancy at birth for men and women in the year 2000 is illustrated in Figure 2.2.

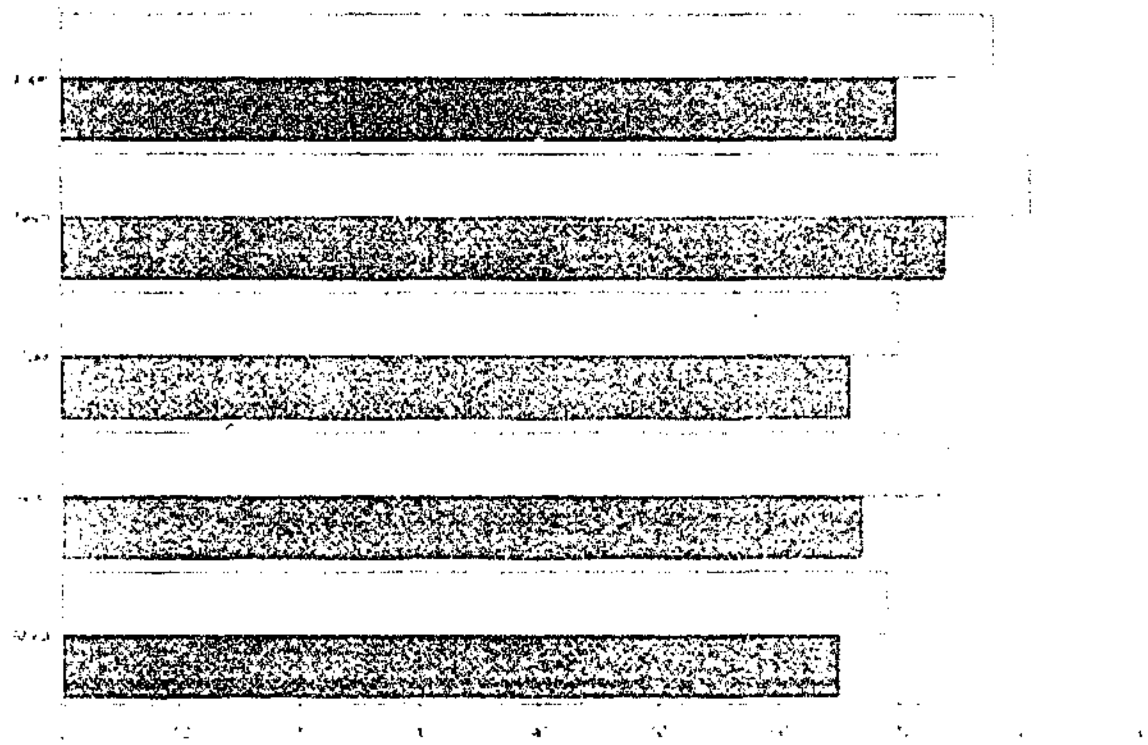
Figure 2.1. Percentage increase in population aged 60+ years from 1990 to 2025 in selected countries#



#reproduced from UN ACC Sub-Committee on Nutrition (SCN) News No.19 December 1999 page 14.

Figure 2.2 Life Expectancy at Birth for Men and Women by UN Region in the Year 2000 (Reproduced from UN ACC Sub-Committee on Nutrition (SCN) News No.19 December 1999 page 29

Life expectancy at birth for men and women by UN Region in the year 2000



Years of age: women ☐ men ▣

[illegible]

Men & women age differently. It varies from about 2 yrs difference between men & women in Africa to 8 yrs in Europe — in very old age women outnumber men by about [illegible]. Research shows this may be partly due to biological factors (e.g., endogenous hormones protect women from ischaemic heart disease until menopause). Other factors are lifestyle & socioeconomic issues i.e., men are exposed to work hazards more often, have more accidents, drink alcohol more excessively and tend to smoke more (although women are now smoking more, especially in developing countries

* From top to bottom: Europe, Northern America, Asia, Latin America and the Caribbean, and Africa

Growing evidence supports the view that good social and nutritional status is an important determinant of better quality of life (Darmadi et al., 1997; Kouris-Blazos, 1994; Savige et al., 2001; Shibata, 1996). However, increasing age is often accompanied by increasing disability and functional impairments; for example, loss of mobility, sight, and hearing (Khaw, 1997). In 1998, Vita et al evaluated the level of health risks in people and their relation to cumulative disability (Vita et al., 1998). Their results supported Fries' hypothesis in 1980 about 'compression of morbidity in later life' (a shorter period of disability and ill health before death) (Fries JF, 1998). Interventions to improve health in later life are required (Khaw, 1997).

Table 2.1. Disability Adjusted Life Expectancy (DALE) of the top 10 nations

NATION	DALE
Japan	74.5
Australia	73.2
France	73.1
Sweden	73.0
Spain	72.8
Italy	72.7
Greece	72.5
Switzerland	72.5
Monaco	72.4
Andorra	72.3

Recently, the WHO released the Disability Adjusted Life Expectancy (DALE), a healthy life expectancy indicator based on the estimates of the number of years to be lived in 'full health' (Mathers et al., 2001). Japan is the top nation with a DALE of 74.5 years. This is followed closely by Australia (73.2) and Sweden (73.0). The Greeks in Greece are also amongst the top 10 nations with a DALE of 72.5 years. Mathers et al estimated a DALE for 191 countries in 1999 and concluded that there was a greater increase in the DALE than the total life expectancy across the countries. As a consequence, a reduction in mortality was followed by a reduction in disability. They also revealed that a longer life expectancy in women was often accompanied by disability.

2.3 PREDICTORS OF SURVIVAL

Several predictors of survival have been recognised. Genetic background, environmental factors (such as pollution, pesticides, housing, social upheaval and war), and personal behaviours have been known to be major factors in predicting survival (Wahlqvist ML et al., 2001). There were three factors that contributed to personal behaviour, namely social, physical, and nutritional. These factors could be modified to achieve healthy ageing and survival. Social factors included social activity and social network, whereas physical factors included activity of daily living (ADL) and exercise. Each of these three factors and other factors that influence later life will be reviewed below.

2.4 SOCIAL ACTIVITY AND SOCIAL NETWORK

Social fitness includes social activity and social network, which may contribute to health and survival in later life. Wahlqvist et al referred to *social fitness* as "the ability to make and maintain satisfying social contacts and networks, behaviours that prevent or protect against social isolation" (Wahlqvist ML et al., 2001). As the number of elderly in the population grows, their interaction and contribution to the society becomes more critical in each community (Wahlqvist et al., 2000).

2.4.1 SOCIAL ACTIVITY

Numerous studies have been published indicating that social activity is a particular issue in elderly people (Bassuk SS et al., 1999; Creecy et al., 1985; Glass et al., 1999; Helm et al., 2000; Hilleras et al., 1999; Kivela et al., 1996; Kobayashi et al., 1994; Kobayashi et al., 1996; Koenig et al., 1999; Nakanishi et al., 1997a; Naylor et al., 2000; Pedro and Barba, 2001; Petersen and Nortov, 1990; Tamakoshi et al., 1995; Wahlqvist ML et al., 2001; Welin L et al., 1985; Yamashita et al., 1993). Horwath has shown that social activity is associated with a greater food intake variety, thus social activity maintains adequate nutrition in the elderly (Horwath, 1987). Others have reported the favourable effects of social activity in improving nocturnal sleep (Naylor et al., 2000), increasing cognitive function (Bassuk SS et al., 1999), increasing feelings of happiness (Graney, 1975), reduced feelings of loneliness (Creecy et al., 1985), and reduced risks of depression (Kivela et al., 1996) (Yamashita et al., 1993), stroke (Kobayashi et al., 1996), and dementia (Kobayashi et al., 1994).

A prospective study by Welin et al followed two cohorts of Swedish men aged 50 years (born in 1923) and of men aged 60 years (born in 1913) for nine years (Welin L et al., 1985). They found in both groups that socially active men tended to live longer than those who never or rarely participated in social activities. The higher the level of social activity the lower the likelihood of premature death after adjusting for age, smoking, blood pressure, cholesterol levels and perceived health which were measured at the commencement of the study. These two cohorts were followed-up for a further 12 years to examine the relationship between social network and social activity and causes of death (Welin L et al., 1992). Results confirmed that cardiovascular, cancer, and other causes of mortality were related to low levels of social activity.

Another prospective study in the USA of 1169 men and 1643 women aged 65 years or older, demonstrated that social activity (for example, outings and going to church), productive activity (for example, gardening), and physical activity (for example, playing sports and walking), are predictors of survival (Glass et al., 1999). Subjects were followed for 13 years since the commencement of the study. Those subjects that were the least socially active were more likely to die prematurely. This result was irrespective of age, sex, race, health, or the level of physical activity or productive activity.

Also, in another US cohort study of 3,851 community-based elderly, it was revealed that frequent participation in religious activities such as prayer, meditation or Bible study, reduced the hazard ratio for those who did not have an Activity of Daily Living (ADL) impairment (Helm et al., 2000). This result was based on 6 years follow-up and controlled for demographic and health variables.

Nakashini et al observed a cohort of community-based elderly Japanese residing in Osaka, Japan, aged 65 years and over for 38 months (Nakanishi et al., 1997a). They found that participation in social activity lowered the hazard ratio after controlling age and sex.

Despite emerging evidence suggesting beneficial effects of social activity in later life, a study performed in Japan by Tamakoshi et al reported a decline in social activity in elderly Japanese over the age of 75 years (Tamakoshi et al., 1995).

2.4.2 Social Network

Several studies have examined the influence of social network and social support within elderly populations (Bassuk SS et al., 1999; Bowling, 1991; Corin, 1982; Ljungquist and Sundstrom, 1996; Orth-Gomer et al., 1988; Rosengren et al., 1998; Seeman et al., 1987; Silverstein and Bengtson, 1991; Steinbach, 1992; Tremethick, 1997; Welin L et al., 1985). While the majority of studies have emphasised that social network, social support or social ties contribute to health and survival in elderly people, few studies challenged the results (Jylha and Aro, 1989; Shahtahmasebi et al., 1992). Grundy et al addressed this unclear relationship and acknowledged that it may due to the different methods and concepts used in each study (Grundy E et al., 1996; Steinbach, 1992). In order to minimise the confounders in assessing social network and social support in social epidemiology studies, Ostergren et al recommended that epidemiological data has to be adjusted for age, gender and social class (Ostergren PO et al., 1995).

Dementia is one of the most common mental health problems amongst elderly people. Fratiglioni et al investigated the risk of developing dementia by examining 1,200 free-living Swedish adults without dementia (at the commencement of the study) over a 3 year period (Fratiglioni L et al., 2000). They found that subjects with limited social network were at greater risk in acquiring dementia.

In the USA, a group of male Harvard students were recruited in 1948 and were followed for 50 years (Vaillant GE et al., 1998). It was shown that men who had good social support tended to be healthier and to live longer, than those with poorer social support.

Another cohort of 4,174 older adults in an Alameda County study (US) were followed for 17 years (Seeman et al., 1987). An earlier result of a nine-year follow-up suggested that social ties lowered the mortality risk in the elderly aged 70 years old at baseline. Likewise, a result from a 17-year follow-up found that premature death was less likely in the elderly aged 70 years and over who were socially active and had good community connections, compared with those who lacked of these social contacts. This result was controlled for age, gender, race, baseline health status, perceived health, depression and health practices. Interestingly, a different nature of social ties was observed within age groups. It was reported that marital status predicted mortality mainly in those aged below 60 years at baseline. In contrast, relationships with close friends and/or relatives were of greater importance in predicting mortality for those aged 60 years and over.

A prospective study of 500 aged men in Malmo, Sweden, revealed that social activity and emotional support reduced the risks of death from all-cause mortality (Hanson BS et al., 1989). It was also noted that there were increased risks of death for those who lived alone and for those who were in a lower social class.

2.5 HEALTH STATUS

The recent decline in mortality as well as a longer life expectancy has created socioeconomic and health consequences worldwide (Manton and Soldo, 1985; Phua, 1987; Wieland and Palsdottir, 1986). Healthy ageing is not only being free of illness but also being independent and the ability to maintain cognitive function, psychological status and social relations. Hence healthy ageing appears to be influenced by environmental and lifestyle factors (Khaw, 1997).

There have been numerous studies examining the health status in the elderly (Grant et al., 1995; Ljungquist and Sundstrom, 1996; Nakanishi et al., 1997b; Petersen and Nortov, 1990; Phua, 1987; Purba et al., 2001; Wieland and Palsdottir, 1986). It has been suggested that a poor health status can lead to undernutrition, resulting from a lower appetite and an inability to source and/or prepare food for their own consumption (Horwath CC, 1989; Savige et al., 2001). It is interesting to note that poor health status was also found to be associated with more skin wrinkling in elderly people from different ethnic backgrounds (Purba et al., 2001). In general, social, mental, physical, and physiological variables can predict health status in the elderly.

One of the limitations of a prospective study of health status in elderly populations is the changing of health status over time. Between 1984 and 1986, Grant et al conducted the Longitudinal Study of Aging in which 4,380 non-institutionalized individuals aged 70 years and over participated (Grant et al., 1995). To investigate the association between self-rated health (excellent or very good, good, fair or poor), a model was developed and adjusted for age, race, education, marital status, body mass index, difficulty performing activities of daily living, social contacts, self-reported stroke, heart disease, cancer, diabetes and recent hospitalization. They found that the risk of death amongst men was relatively constant, whilst a declining trend over time was observed in women. They also established a weak association between self-rated health and survival in men over time might be due to a sudden decline in health before death. On the other hand, the diminishing self-rated health and survival association amongst women might be due to their longer period of declining health before death.

A longitudinal study of 70-year-olds was conducted in Gothenburg, Sweden (Svanborg A, 1996). Three age cohorts of these elderly, born within five-year intervals, were recruited to investigate their health status in relation to survival. It was concluded that prevention of certain disorders and negative functional consequences of aging may be delayed.

A stratified sample of Australians aged 60 years and over were followed between 1981 to 1988 (McCallum et al., 1994). It was found that there were gender differences in using global self-rated health to predict survival.

2.6 WELL-BEING

Well-being refers to the psychological state of being well and happy. The presence of depression is associated with a poor sense of well-being. In general, well-being reflects an individual's life satisfaction.

A study in Japan has shown that social activities stimulate the feeling of well-being in the elderly. The study observed that elderly Japanese who lived in their own homes and were socially active felt satisfied whilst those who lived in the retirement house, exposed to relatively few social stimuli, felt depressed (Yamashita et al., 1993). Another study of 105 Swedish, aged 90 years and over, who were not cognitively impaired, revealed that physical activity was associated with well-being (Hilleras et al., 1999).

The impact of retirement on mental health and social well-being in 178 elderly Japanese was studied (Sugisawa et al., 1999). Subjects were full-time workers aged 60 years and over and were followed for 3 years. After adjustment for baseline health characteristics, it was found that retirement did not effect mental health or degree of social activity. However, the frequency of social contacts that might lead to social isolation appeared to be lessened.

Little research has been done to demonstrate correlation between certain personal health practices and mortality. Through a national representative sample of 2,200 Japanese aged 60 years and over, a six-year prospective study was conducted to investigate the association of six items related to personal health habits, namely cigarette smoking, alcohol consumption, physical exercise, eating breakfast, hours of sleep, and relative weight, with subsequent health status change. Results showed that frequent exercise as well as sleeping for 7 or 8 hours every night maintained mental well-being. However, reduction in mortality risks were not observed (Sugisawa et al., 1998). This result supported previous findings in elderly Americans (Pollak et al., 1990). In contrast, another US study known as "Alameda 7", reported that longevity was associated with maintaining seven daily habits namely having never smoked, drinking less than five drinks at one sitting, sleeping 7-8 hours a night, exercising, maintaining desirable weight for height, avoiding snacks, and eating breakfast regularly (Schoenborn, 1986; Wahlqvist et al., 1995).

Results on the risk of napping in elderly people in predicting survival were not consistent (Bays JC et al., 1996; Bursztyn et al., 1999; Rockwood K et al., 2001; Trichopoulos D et al., 1987). Although Trichopoulos et al reported beneficial effect of having siesta during the day in reducing mortality in men, other authors observed the inverse relation. They reported that having siesta or taking a nap during the day has been associated with impaired night-time sleep, overall tiredness, physical activity deficits, and depressive symptoms. Thus, napping appeared to be protective only in certain cultures such as the Mediterranean men.

2.7 MEMORY

As people age, memory as part of cognitive function tends to decline. Based on a national sample, Liang et al reported that a Japanese elder aged 65 could expect to live a further 14.6 years with the absence of cognitive impairment, and a further 3.45 years with some degree of cognitive impairment throughout their remaining lifetime (Liang J et al., 1996). A prospective study of English people aged 75 years and over residing in Melton, England was conducted in 1981 (Jagger and Clarke, 1988). The 5-year mortality follow-up showed that poor self-perceived health, high disability scores and severe cognitive impairment reduced survival rates.

Alcohol and tobacco use may influence cognitive function, particularly amongst elderly people. To test this hypothesis, a study in California was performed between 1973 and 1975. This prospective study of 18 years examined 1,469 well-educated and free-living elderly. Although smoking was found to be associated with increased mortality in men, no unequivocal conclusion could be drawn on alcohol and tobacco use and cognitive function (Edelstein et al., 1998).

Kelman et al examined mortality risk associated with cognitive impairment and other social and health factors in 1,855 community-based elderly. Throughout a period of 48 months of observation, it was found that cognitive impairment predicts survival. Those who were cognitively intact had the highest survival probability even after controlling for the effects of other health and social covariates (Kelman et al., 1994).

2.8 PHYSICAL ACTIVITY

The role of physical activity in the maintenance of nutritional status for a better body composition, and adequate nutrient intake, is crucial in the elderly. To quote Wahlqvist (2001): "'the ability to have sufficient strength, endurance, range of movement and balance to avoid frailty is known as physical fitness" (Wahlqvist ML et al., 2001). Physical activity and/or physical fitness cover Activities of Daily Living (ADL) and exercise.

There are abundant studies looking into different aspects of physical activity in the elderly population. Higher levels of physical activity and better physical fitness have both been associated with a longer life span, and an improved quality of life (Blair et al., 1989; Karvonen, 1996). This is independent of the effects of cholesterol, body composition, and hypertension. In other words, physical activity can improve life span, even if there are no detectable changes in cholesterol, blood pressure or body fat. Furthermore, Lee et al established that cardio-respiratory fitness was shown to be an important factor of longevity (Lee et al., 1999). This means that fit men, whether lean or obese, had increased longevity. It is also noted that there was a positive association between physical activity and well-being (Hilleras et al., 1999).

Fries suggested that physical activity compresses morbidity in later life (Fries JF, 1996). Pekkanen et al argued that physical activity prolongs life (Pekkanen J et al., 1987). Moreover, Ruigomez et al also reported the adverse effects of smoking and of having a sedentary lifestyle on a 5-year survival of 1,219 non-institutionalized Mediterranean population aged 65 years or over in Spain (Ruigomez et al., 1995). Finally, the 17-year mortality follow-up of the Alameda County (California) Study in the USA revealed that in elderly aged 70 years or over there was an increased risk of death by being male, by being a smoker, and by having less leisure-time physical activity. This result was irrespective of age, race, other behavioural risk factors, socioeconomic and physical health status (Kaplan et al., 1987).

Despite the fact that growing evidence confirms the benefits of physical activity in later life, Branch et al failed to document this. Based on the data from the Massachusetts Health Care Panel Study, they examined elderly people of 70 and 80 years of age and found that mortality was not related to physical activity (Branch and Jette, 1984). Similarly, Woo et al reported that there was no association between mortality and physical activity amongst 2,032 elderly Chinese aged 70 years and over in an 18-month follow-up (Woo J et al., 1998).

2.8.1 Activities of Daily Living (ADL)

Activities of Daily Living (ADL) reflect the degree of difficulty in performing basic daily tasks such as eating, walking, cooking, dressing, and using the toilet. ADL were reported to be correlated with chewing activity in Japanese elderly aged 65 years and over (Miura H et al., 1997). In addition, a higher ADL score (less functional disabilities) has been suggested to be associated with less skin wrinkling in a cross-cultural study of older people (Purba et al., 2001). Thus the level of ADL amongst elderly people may influence their perceptions of health.

In the Honolulu Heart Program, Japanese-American men were followed for 25 years (Rantanen T et al., 1999). It was found that men with weaker grip strength at baseline were more likely to have problems with ADL later in life. This showed that grip strength appeared to be associated with overall muscle strength and mass.

In a five-year longitudinal study of aging, a Danish sub-study within a Nordic comparative longitudinal Research on Ageing study (NORA), the functional ability of men and women aged 75 to 80 was examined (Schroll M et al., 1997). It was revealed that dependency at follow-up in both men and women was related to low physical activity at baseline.

Several other researchers have also examined the changes in functional abilities (or ADL) amongst an elderly population (1983; 1986; Fillenbaum GG and Smyer MA, 1981; Katz S and Akpom CA, 1976; Kouris-Blazos, 1994; Lawton MP et al., 1982; Vita et al., 1998; Wahlqvist et al., 1995). Decline in mortality has led to large increases in the number of older people in the world. It is desirable to maintain functional ability as life span increases. Kaplan et al proposed that preventive measures in delaying risks of chronic diseases could yield higher levels of functioning amongst the aged (Kaplan, 1992).

2.8.2 Exercise

Exercise may improve mood, cognition, body composition (lean mass, bone, fat), sense of balance and proneness to falling, immune functions, and various chronic diseases such as obesity, NIDDM, and cancer (Eriksson K-F and Lindgarde F, 1991; Fiatarone et al., 1994; Schroll M et al., 1997; Thorling EB, 1996; Williams P and Lord SR, 1997). A group of sedentary adults aged between 60 to 75 years were involved either in a brisk walking program, or stretching and toning program for 6 months (Kramer AF et al., 1999). It was found that brisk walking was associated with significant improvements in thinking ability.

In the Nurses Health Study, a large number of women aged between 40 to 65 years who did not have a diagnosis of cardiovascular disease at baseline were followed for eight years (Manson JE et al., 1999). Results showed that women who walked briskly for at least three hours per week had a significantly reduced risk of coronary events by about 30 to 40%. Exercise favourably influenced body fat, blood pressure, and cholesterol. Benefits were also extended to women who started exercising later in life.

There were 707 non-smoking and physically capable retired men of Japanese ancestry aged between 61 to 81 years who were part of the Honolulu Heart Program (Hakim AA et al., 1998). These subjects were followed for 12 years and it was found that men who walked more than two miles (3.2 km) per day had double the survival rates than the group of men who walked less than one mile (1.6 km) per day. It appeared that distance walked was positively associated with survival.

A longitudinal study of 1,042 people aged 65 years and over residing in Nottingham, UK were followed for 12 years (Bath and Morgan, 1998). Lower levels of activity were also associated with an increased hazard of death in both men and women. In addition, the likelihood of using health and personal social services rose 8 years after the initial interview.

2.9 NUTRITIONAL STATUS AND SURVIVAL

The elderly are more vulnerable than their younger counterparts to various nutritional and health problems due to diminished physiological reserve. Morbidity data has shown that ageing is accompanied by various chronic diseases, which are mostly nutritionally-related, such as cardiovascular disease, cancer, and diabetes (World Health Organization, 1998; Campbell AJ and Stanley JC, 1963; Darmadi I and Wahlqvist ML, 2001; Eriksson K-F and

Lindgarde F, 1991; Fiatarone et al., 1994; Horie et al., 1990; Kafatos et al., 1997; Mizushima et al., 1990; Mizushima et al., 1997; Mizushima et al., 1997; Mizushima and Yamori, 1992; Oenzil F, 1993; Osler and Schroll, 1997; Schroll M et al., 1997; Thorling EB, 1996; Williams P and Lord SR, 1997). Thus the importance of nutrition, particularly amongst the aged, is well recognised.

Nutritional status reflects dietary intake along with metabolic processes and interactions. It can be measured in several ways such as dietary assessment, anthropometric measurements, skin fold thickness, and biochemical measures. The outcome from longitudinal studies on the nutritional status of elderly people may indicate the dietary predictors of survival. Several community-based longitudinal studies that examine the relationship between diet and mortality in the elderly are reviewed in the table below.

Table 2. Dietary longitudinal studies in non-institutionalised elderly people

Study population & Reference	Sample & follow-up	Diet measure	Results	Comment
Hawaiian Japanese (McGee D et al., 1985)	Ten-year follow-up of 7,088 men	24-h recall	Fat inversely associated with mortality	Lower cancer and stroke mortality offset higher ischaemic heart disease mortality at higher fat intakes
First National Health and Nutrition Examination Survey (NHANES I), USA (Kant et al., 1993)	Between 7-16 years follow-up of 4,160 men & 6,264 women aged 25-74 at baseline	24-h dietary recalls	Dietary diversity negatively associated with mortality	Adjusted for education, race, smoking status, and dietary fiber intake
Three rural Greeks villages in Greece (Trichopoulou A et al., 1995)	5-year follow-up of 91 men and 91 women aged 70+	Interviewer-administered semiquantitative FFQ	One unit increase in diet score associated with 17% reduction in total mortality	Part of IUNS cross-cultural study on food habits in later life
Five cohorts in Finland, the Netherlands, and Italy (Huijbregts et al., 1997)	20-year follow-up of 3,045 men aged 50-70	Cross-check dietary history	The WHO healthy diet indicator negatively associated with all-cause mortality	Cross-cultural study

Table 2. Dietary longitudinal studies in non-institutionalised elderly people *(continued)*

The US Physicians' Health Study in USA (Albert CM et al., 1998)	11-year follow-up of 20,551 US male physicians aged 40-84	Semiquantitative FFQ	Dietary fish intake associated with reduced risk of sudden death	Control for age, randomized aspirin and beta carotene assignment and coronary risk factors
The Seven Countries Study (USA, Finland, The Netherlands, Italy, former Yugoslavia, Greece and Japan) (Keys A et al., 1986)	15-year follow-up of 11,579 middle-aged men from 15 cohorts	Weighed record method in subsamples	Univariate: all-cause mortality associated with % energy from saturated fats; negatively associated with monounsaturated fats; Multivariate: negative association with ratio of monounsaturated to saturated fats	From 25-year follow-up of 16 cohorts, CHD mortality associated with animal food groups; negatively associated with vegetable food groups, fish, and alcohol (Menotti et al., 1999)
Mosgiel, New Zealand (Fernyhough et al., 1999)	6-year follow-up of 678 adults aged 70 years and over	Self-administered semiquantitative FFQ	No age effect on nutrient intakes	Risk of death was not available

Table 2. Dietary longitudinal studies in non-institutionalised elderly people (continued)

The Study of Men Born in 1913 in Goteborg, Sweden (Strandhagen et al., 2000)	16-year and 26-year follow-up of 792 men aged 54 at baseline	FFQ	Univariate: lower cardiovascular & total mortality with high fruit intakes;Multivariate: lower total mortality with high fruit intakes only in 16-y follow-up	Multivariate analysis adjusted for smoking, hypertension, and cholesterol.
Okazaki, Japan (Darmadi et al., 2000)	55-month follow-up of 43 men & 46 women aged 70+	3d weighed record method	Higher intakes of mushrooms, fats & oils in survivors; Higher intakes of n-3 fatty acids in particular alpha-linolenic acid	Part of IUNS cross-cultural study on food habits in later life
Copenhagen County, Denmark (Osler et al., 2001)	15-year follow-up of 3,698 men & 3,618 women aged 30-70	FFQ	Prudent diet negatively associated with all-cause & cardiovascular mortality	Adjusted for smoking, physical activity, educational level, BMI, & alcohol intake

2.9.1 FOOD PATTERNS AND SURVIVAL

The changes in food supply and globalisation have left the older members of the society as the principal repository of the food knowledge and skills. Thus, there is a growing need to execute studies of food and health among the aged (Oenzil F, 1994; Powles JW et al., 1988; Wahlqvist et al., 1995). One of the possible approaches to the assessment of nutritional quality is by assessing food patterns (Wahlqvist, 1996). This is most likely to be a traditional food pattern of people with longevity and low morbidity through traditional or cultural adaptation.

Few traditional food patterns that were linked to longevity cultures such as Scandinavian, Japanese, and Mediterranean have been known. The Mediterranean Food Pattern, by far, has attracted considerable attention due to the contribution to longevity and health outcomes (Simopoulos AP, Visioli F, eds., 2000; Buzina et al., 1991; de Lorgeril et al., 1994; de Lorgeril et al, 1999; de Lorenzo et al., 1999; de Lorenzo et al., 2001; Garcia-Closas et al., 1993; Gjonca and Bobak, 1997; Helsing, 1995; Kafatos et al., 1997; Kafatos et al., 2000; Keys A et al., 1986; Kouris-Blazos and Wahlqvist, 1998; Kouris-Blazos et al., 1999; Lasheras C et al., 2000; Osler and Schroll, 1997; Rimm and Ellison, 1995; Ruigonez et al., 1995; Trichopoulou A et al., 1995; Trichopoulou et al., 1995a; Trichopoulou and Vasilopoulou, 2000; Woo J et al 2001) . This may be due to the protective effects of plant-based diet along with fish and moderate alcohol consumption.

There are, of course, variations in a classic "Mediterranean Diet" based on geographical differences (Simopoulos AP, Visioli F, eds., 2000; Noah A and Truswell AS, 2001; Wahlqvist et al., 1995). Nevertheless, a study by Trichopoulou et al in older Greeks in Greece has clearly documented the benefits of adherence to this Mediterranean Food Pattern to prolong survival (Trichopoulou A et al., 1995). In general, there are eight characteristics of the Greek variant of the Traditional Mediterranean Diet circa 1960s (Trichopoulou A et al., 1995):

1. high Monounsaturated: Saturated fat ratio
2. moderate ethanol consumption
3. high consumption of legumes
4. high consumption of cereals (including bread and potatoes)
5. high consumption of fruits (fresh and dried) and nuts
6. high consumption of vegetables
7. low consumption of meat and meat products
8. low consumption of milk and dairy products

It was hypothesised that a more varied diet with at least four of these components might have beneficial health effects, whereas a diet with fewer of these components (scored less than 4) might be less healthy. This method has been successfully applied to other non-Mediterranean elderly studies in Denmark, Spain, and China with similar results (Lasheras C et al., 2000; Osler and Schroll, 1997; Woo J et al., 2001).

2.10 CONCLUSIONS

There has been a great deal of interest in the ageing process and its consequences in the world as life span increases. Gaining more knowledge in this area will further expand our ability to have a healthy later life. Most elderly are relatively healthy and live independent in the community, however, age per se is one of the most important risk factors for disability and disease, making bad health more prevalent with increasing age.

The review of literatures in this chapter has concentrated largely on problems as the population aged, several predictors of survival, and traditional food patterns. Most of these studies were performed in a single population and looked into a single factor. There is growing evidence that social and physical variables, in addition to diet, may contribute to healthy ageing. However, information on which one of these variables is more important for longevity is currently unavailable.

Thus this thesis highlights the need for more analytical information and will provide further understanding on how social, physical activity and diet interact in later life. The IUNS Food Habits in Later Life which was started in 1988 provides an opportunity to explore further the implication of these variables cross-culturally amongst well-known longevity cultures in the world namely Japanese, Swedes, Anglo-Celts and Greeks in Australia, and Greeks in Greece. By identifying social, physical, and nutritional determinants of survival, a better understanding on improving health and wellbeing of elderly people can be achieved.

CHAPTER 3

CHAPTER 3

Methodology

3.1 INTRODUCTION

This chapter describes the research methodology used in the study of elderly Japanese in Japan, Swedes in Sweden, Anglo-Celts and Greeks in Australia, and Greeks in Greece.

3.2 STUDY DESIGN

The International Union of Nutritional Sciences (IUNS) Committee on Nutrition and Aging commenced Food Habits in Later Life (FHILL): a cross-cultural study in 1987. Over 2000 participants, aged 70 years and older, were recruited from Australia, Greece, Sweden, Philippines, Japan, and China. The populations of selected 'traditional' towns or communities consisted of approximately 10,000 - 20,000 inhabitants. The town was required to have a population and socio-economical structure comparable to the country profile. The FHILL had a cross-sectional design with a mortality follow-up (Kouris-Blazos and Wahlqvist, 1998; Trichopoulou et al., 1995; Wahlqvist et al., 1997; Wahlqvist et al., 1995b; Wahlqvist et al., 1995a; Wahlqvist and Kouris-Blazos, 1999).

All IUNS centres employed a similar protocol. This protocol included the use of interviewer administered questionnaires developed by Wahlqvist et al to obtain information on health, social, lifestyle, food habits and food intakes (Wahlqvist et al., 1988). The questionnaires were translated into several languages and some local food items were incorporated into the validated food frequency questionnaires (FFQ). All IUNS centres, with the exception of Japan, used the FFQ to gather information on food intakes. A three-consecutive-day weighed food record method, the common method to collect dietary intake in Japan, was used in the IUNS centre in Japan. For comparison purposes, food and nutrient intakes were adjusted to 2500 kcal for men and 2000 kcal for women.

This study was designed to test the key hypotheses of survival in elderly people from different ethnic backgrounds in relation to social and nutritional factors. It provided the opportunity for a prospective (longitudinal) cohort study with a complete follow-up and an indisputable outcome (Kouris-Blazos et al., 1999; Trichopoulou A et al., 1995). A prospective (longitudinal) cohort study is an observational study over an extended period of time of a group of people who have common characteristics that may lead to risk factors for a disease or health effect (Dawson-Saunders and Trapp, 1994). Despite being an observational and non-interventional study, a prospective cohort study is still considered the ultimate method to investigate the causes of a condition, or the risk factors, because it provides strong evidence for possible causes and effects of a cohort that was followed over time. Furthermore, selection and information bias are not vital concerns (Kouris-Blazos et al., 1999; Trichopoulou A et al., 1995).

The limitation of a prospective (longitudinal) cohort study is the length of time required to complete a study. This can make the study costly and can cause problems following-up subjects due to withdrawal from the study or from migration elsewhere. Chance and confounding factors, such as smoking or age, need to be considered, and unavoidable exposure misclassification may lead to attenuating effects (Kouris-Blazos et al., 1999; Trichopoulou A et al., 1995). Thus, the model introduced in this study was controlled for age, gender, and smoking.

3.3 STUDY LOCATIONS

The study location of each centre in this study is described below.

Okazaki-Shi, or Okazaki-City, is a semi-urban area located in the prefecture of Aichi in Japan. Based on 1991 figures, the population was about 310,000 people (approximately equal numbers of men and women), with a population density of 1,352 persons/km^2 (Anonymous, 1992; Ueda, 1993). This figure was well above the nationwide population density of 333 persons/km^2 (Anonymous, 1992; Ueda, 1993). A map of Okazaki and its characteristics can be found in Chapter 4.

Gothenburg, or Goteborg, is an urban area that lies at the centre of Scandinavia. The Port of Gothenburg is the largest in Scandinavia and about half of Scandinavia's industry lies within a 300 km radius of Gothenburg. Gothenburg is Sweden's second largest city after Stockholm with a population over 400,000 people. It is part of the county of Vastra Gotaland which comprises 49 local authorities with a total of 1.5 million inhabitants. Participants in this study resided in the Johanneberg area of Gothenburg City in Sweden, where there was a high proportion of elderly people and where few immigrants lived. A map of Gothenburg and its characteristics can be found in Chapter 4.

Melbourne is an urban area located on the south coast of the State of Victoria in Australia. It has more than 3 million inhabitants, of which 30% are either foreign-born or the children of foreign-born parents. Anglo-Celts comprise about 40% of the total population of Melbourne. There were two elderly cohorts from two different ethnic backgrounds who participated in this study, namely Anglo-Celts and Greeks. A map of Melbourne and its characteristics can be found in Chapter 4.

Greeks in Greece were recruited from three rural areas, namely Spata, Markopoulo, and Paiania, which lies approximately 20km from Athens in the Greek state of Attiki. It was reported in 1991 that there were about 10 million inhabitants in Greece, 14% of which were aged 65 years and over. A map of Greece and its characteristics can be found in Chapter 4.

3.4 SAMPLE SIZE

In each country one or two 'traditional' towns were selected for inclusion in the study of the elderly aged 70 years and older. The IUNS committee on Nutrition and Ageing recommended each FHILL study had between 100-200 participants with a minimum of 60 participants (de Groot LCPGM et al., 1991; International

Union of Nutritional Sciences Subcommittee on Nutrition and Ageing, 1988; Kouris-Blazos, 1994). The IUNS study used the sample size calculation from the Euronut-Seneca Study (de Groot LCPGM et al., 1991; International Union of Nutritional Sciences Subcommittee on Nutrition and Ageing, 1988). Based on this recommendation, a satisfactory number of participants were recruited in Japan (N=89), Sweden (N=217), Australia (N=141 for Anglo-Celts and N=189 for Greeks), and Greece (N=182). The sample size of each centre was above the minimum number recommended by IUNS.

3.5 CHOICE OF ENTRY CRITERIA

To participate in this study, eligible individuals had to be of certain ethnicity (Japanese in Japan, Swedes in Sweden, Anglo-Celts in Australia, Greeks in Australia, and Greeks in Greece) aged 70 years and over. Moreover, individuals had to be able to answer questions independently in each country's language. Psycho-geriatric patients in nursing homes as well as hospitalised or institutionalised individuals were excluded from the study. Only those individuals who met the above eligibility criteria were included in the study.

3.6 ETHICAL CONSIDERATIONS

Ethics approval of the IUNS study of Food Habits in Later Life (FHILL) was obtained from Monash University. In addition, ethics approval from Nagoya City University was acquired for participants in Japan. Informed consent was obtained from Anglo-Celts participants in Melbourne, Australia. Nevertheless, respondents, including their relatives, were given a thorough explanation of the nature of this study before verbal consent was attained. The information given by participants remained confidential.

3.7 POPULATION SELECTION AND RECRUITMENT

Representative samples for epidemiological studies can be obtained through several methods (Kouris-Blazos, 1994):

- Population registers
- Multistage probability sampling in private censuses (Pensabene T and Kabala M, 1986)
- Social network methods in geographically defined and ethnically homogenous areas (Powles JW et al., 1990)
- Electoral rolls
- Telephone directory (Lavrakas PJ, 1987)

The population register method was chosen in Japan and Sweden as it was a reliable and readily available source. The other methods mentioned above were considered unsuitable for these populations because of the high cost, uncertainty in determining a representative sample, and low usage. A total of 140 (73 men and 67 women) people aged 70 years and over were randomly selected from the population register for residents living in semi-urban Okazaki, Japan. A random sample of 340 people aged 70 years and over, residing in the Johanneberg area of Gothenburg City in Sweden, were identified. Letters were then sent requesting their participation in the IUNS study (Wahlqvist et al., 1995a).

Through the use of a telephone directory, elderly people of Anglo-Celtic origin (defined as having both maternal and paternal grandparents from the United Kingdom/or Ireland) and elderly people of Greek ancestry (defined as being born in Greece or having both of their parents born in Greece) were recruited. These elderly were residing in Melbourne, Australia. This method appeared to be suitable in Melbourne since more than 95% of all households are telephone subscribers (Kouris-Blazos, 1994; Kouris-Blazos et al., 1999; Wahlqvist et al., 1995a).

Between October 1998 and June 1990 elderly Greeks residing in three villages in Greece were identified from electoral rolls, and were invited to participate in the IUNS study. A random sample was selected and interviewed until the required sample size was achieved (Wahlqvist et al., 1995a).

3.8 RESPONSE RATE AND REFUSALS

A representative sample depends on the sampling techniques and the response rates. The study samples can be divided into three groups: true random population sample, convenience random sample and non-random sample (Horwath CC, 1989; Kouris-Blazos, 1994). In a true random population sample, all members of the population have an equal chance of being selected in the sample (Babbie ER, 1973; Campbell AJ and Stanley JC, 1963). In contrast, a convenience random sample is prone to selection bias and external validity of the study due to unequal chance of selection (Campbell AJ and Stanley JC, 1963;

Horwath CC, 1989; Kouris-Blazos, 1994). However, a convenience random sample is still more representative of the particular sampling frame over a non-random sample (Horwath CC, 1989; Kouris-Blazos, 1994).

The response rate can be acquired by dividing the number of participants by the sample size after allowing for those people who could not be traced due to change of addresses or who were dead (Horwath CC, 1989; Kouris-Blazos, 1994). A minimum response rate of 60% is necessary to obtain representativeness whilst 70% or above is considered good (Babbie ER, 1973; Horwath CC, 1989; Kouris-Blazos, 1994).

The response rate and refusals at the commencement of the study for each IUNS centre are described below.

A total of 89 elderly Japanese in Okazaki (43 men and 46 women) responded and participated in this study, giving an overall response rate of 64%. Only 8 participants did not complete the questionnaires.

Out of 340 Johanneberg individuals, 286 were eligible to enter the study in Sweden. However, 69 individuals refused to participate in the study giving a response rate of 76%. Thus 217 (73 men and 144 women) people participated, of whom only 188 (66 men and 122 women) completed the validated dietary questionnaires. Moreover, two participants did not complete the questionnaires.

One hundred and forty one Anglo-Celts Melbournians (70 men and 71 women) agreed to participate following telephone contact with an overall response rate of 70%. By similar means, 84% of Greeks Melbournians (94 men and 95 women) that were contacted took part in the study.

A total of 182 elderly (91 men and 91 women) in three Greek villages completed the validated food frequency questionnaires. However, only 104 Greeks in Spata (51 men and 53 women) were interviewed with the IUNS questionnaire. The overall response rate was 89%.

The total response rate was above the desirable participation rate at 60% (International Union of Nutritional Sciences Subcommittee on Nutrition and Ageing, 1988). All participants were neither institutionalised nor hospitalised.

3.9 CONDUCT OF SURVEY AND DATA COLLECTION

The questionnaire used for this study was originally designed in 1988 and tested on the Greeks in Spata (Kouris A et al., 1989; Wahlqvist et al., 1988). Later, this questionnaire was translated into the Japanese and Swedish language. Some minor modifications were then made to incorporate Japanese and Swedish characteristics. The conduct of survey and data collection in each IUNS centre is described below.

3.9.1 JAPANESE IN OKAZAKI, JAPAN

The survey commenced between September and October 1991. During this first month, the interviewer made four home visits to each participant. The first visit was intended to explain the details of the study to participants and to ascertain their participation in this study. Hence, verbal consent was obtained from both participants and their relatives after a detailed explanation had been given. Consent forms were not used in this study as a result of illiteracy and cultural apprehension. Following this, the interviewer guided participants and their relatives on how to use a portable scale (provided to participants for the study) and how to record all dishes and foods eaten. Participants were asked to weigh and record all dishes and foods eaten one day before the second, third and fourth home visits.

The second, third and fourth home visits occurred over three consecutive days. On each consecutive day, the interviewer administered the nutritional section of the questionnaire from recorded data on food consumed the day before. In general, each participant completed a 3-day, 24-hour weighed food record and had their anthropometric measurements taken during these four home visits.

The last home visit took place between September 1991 and May 1992. Participants were asked to answer the non-nutritional section of the questionnaire. It was necessary for the interviewer to administer the questionnaire due to literacy limitations and failing eyesight. Information gathered from the questionnaire was encoded and entered into a computer database. This information remains strictly confidential and assurance was made that each participant would not be identified in the final results.

The FHILL project in Okazaki, Japan, was established in August 1989 by a collaboration between the School of Humanities and Social Sciences, Nagoya City University in Nagoya, Japan; the Faculty of Home Economics, Aichi Gakusen University in Okazaki, Japan; and the Department of Medicine, Monash Medical Centre, Monash University, Australia. There were 89 (43 men and 46 women) elderly Japanese living in Okazaki who participated in this study. The cross-sectional data was collected in 1991. Subjects were then followed-up and mortality data was collected in 1996 and 1999.

Visiting and interviewing elderly Japanese in Okazaki, Japan

3.9.2 SWEDES IN GOTHENBURG, SWEDEN

In Sweden, there were 217 (73 men and 144 women) free-living elderly, aged 70 years and over who participated in the study. Out of 217, only 188 participants (66 men and 122 women), with the mean age of 77 years for men and 78.3 years for women, completed the dietary questionnaires. Moreover, two participants answered only part of the questionnaires. Information on dietary intake was obtained using a validated food frequency questionnaire used by all IUNS centres. In addition, photographs of serving sizes were introduced. Food and nutrient intake were analysed using computer software based on the Swedish Food Composition Tables, details of which have been reported (Rothenberg, 1997). Anthropometric measurements and blood samples were also taken from all participants (Wahlqvist et al., 1995a).

Participants were interviewed at home. The first visit focused on their health and lifestyle. A few days after the first visit, dietary interviews were performed. The dietary interview took one to two hours. A validation study was performed on a random sample of a 4-day food record of 25 participants, and with a 24-hour urinary excretion from 24 participants.

A five-year mortality follow-up was conducted in 1996. Death of 17 men and 29 women were confirmed from the death registry in Sweden.

3.9.3 ANGLO-CELTS IN MELBOURNE, AUSTRALIA

Through the use of a telephone directory, elderly people of Anglo-Celtic origin (defined as having both maternal and paternal grandparents from the United Kingdom and/or Ireland) residing in the Melbourne Metropolitan area were recruited. One hundred and forty one free-living elderly (70 men and 71 women) aged 70 years and over agreed to participate. In addition to the approval by the Human Ethics Committee of Monash Univesity, informed consent was obtained from each participant.

Using a similar protocol as other IUNS centres, information on demography, health, lifestyle, dietary intake, anthropometry and blood samples were collected between January 1990 and December 1992. Nutrient intakes were calculated through an Australian Nutrient Analysis program (NUTTAB 1991) based on 1989 Australian Food Composition Tables (Kouris-Blazos et al., 1999).

In April 1996, death certificates from 14 participants were ascertained from the death registry in Australia. Although causes of death were available, data was too sparse for examination of cause-specific mortality.

3.9.4 Greeks in Melbourne, Australia

The elderly people of Greek ancestry (defined as being born in Greece or having both of their parents born in Greece) were invited to participate in the IUNS study between 1990 and 1992 (Kouris-Blazos, 1994). Based on 1986 census (ABS, 1991), it was reported that 137,640 Greek people lived in Victoria, with 65,515 of these people born in Greece. These elderly Greeks were residing in Melbourne and were identified through the use of a telephone directory. A total of 189 people aged 70 years and over agreed to participate. There were 94 men and 95 women with the average age of 78 years.

The IUNS and food frequency questionnaires incorporated 50 Greek food and dish items. To analyse food and nutrient intake, Australian (NUTTAB 1991) and Greek Food Composition Tables were employed. Blood samples and anthropometric measurements were also collected. Details of the method used have been published elsewhere (Kouris-Blazos, 1994).

Participants were visited in their home where the health, lifestyle, and dietary questionnaires were administered and this interview ranged between 90-120 minutes for the food frequency questionnaire and 30-60 minutes for the health and lifestyle questionnaire. These interviews were followed by anthropometric measurement, blood pressure measurement, and a skin test for participants who did not agree to have their blood tested. A few weeks later, those who were willing to have their blood tested came to the hospital where the tests were performed.

The mortality follow-up was conducted in April 1996. Death certificates of 24 Greek-Australians were obtained from the death registry.

3.9.5 GREEKS IN GREECE

The cross-cultural study in the three rural areas of Spata, Markopoulo, and Paiania in Greece started between June and October 1988 (Kouris-Blazos, 1994). Elderly people aged 70 years and over who claimed to be of Greek ancestry were identified from electoral rolls. A total of 182 (91 men and 91 women) participants completed the validated food frequency questionnaires. Out of 182, there were 104 (51 men and 53 women) participants with the mean age of 77 years for both men and women who completed the IUNS questionnaires. Anthropometric measurements and blood samples were taken from some participants.

Participants who agreed to complete the IUNS and food frequency questionnaires were seen twice. The first visit was made to inform the nature of the study, ascertain verbal consent and complete the IUNS questionnaire on health and lifestyle. These procedures took about 60 minutes. The second visit involved completing a food frequency questionnaire, which took about 90-120 minutes. In October 1988, participants were asked to attend the Spata Community Health Centre on certain days in order to have their blood collected, blood pressure, anthropometric, and skin test measured.

Between April 1993 and January 1994, deaths of 53 participants were ascertained. The relationship between diet and overall survival in this population has been published (Trichopoulou A et al., 1995).

3.10 INTERVIEWER ADMINISTERED QUESTIONNAIRE

The interviewer administered questionnaire used for the International Union of Nutritional Sciences (IUNS) cross-cultural study of Food Habits in Later Life (FHILL) was developed by Wahlqvist et al in 1988 (Wahlqvist et al., 1988) (See appendices for questionnaires). Elderly people aged 70 years and over may have experienced some difficulties with the self-administered questionnaire due to illiteracy and health limitations. Therefore, the interviewer-administered questionnaire was considered more suitable to be applied in elderly people from Japan, Sweden, Australia, and Greece. Some modifications and language translations were made in every centre where it was considered necessary.

Quantitative and qualitative approaches were employed in this questionnaire to obtain nutritional and non-nutritional information. These approaches incorporated questions with coded answers and open-ended questions modified from Rapid Assessment Procedures (RAP) developed by anthropologists, Scrimshaw and Hurtado in 1987 (Scrimshaw N and Hurtado E, 1987). Thus, the questionnaire comprised the following:

- Demography, health and lifestyle questions, and
- Food habits and dietary assessment

3.10.1 DEMOGRAPHY, HEALTH AND LIFESTYLE

A quantitative approach was used to obtain information on demography, health and lifestyle. Questionnaires were given coded answers for scoring purposes.

Numbers in the front of coded answers were then added to calculate scores (See appendix for questionnaire). A higher score was regarded as a better score. Questions from the questionnaire are described as follows:

- **Demography:** Information on age, gender, date of birth, education, rural/urban background, income, living arrangements, past and present employment were collected. These questions were modified from the WHO instrument used in the Western Pacific study (originally taken from the WHO 11 country study instrument) (Anonymous, 1983; Kouris-Blazos, 1994).

- **Memory:** To collect information on memory, 5 questions (MA7-MA10, WB17) were incorporated. Subjects were asked to recall the correct year, month and date when the interview was being conducted, their home address, and whether they became more forgetful on things or names of close friends and relatives. The memory score ranged from 0-5. The memory questions were adapted from the WHO Western Pacific Study by Andrews et al (Anonymous, 1986; Kouris-Blazos, 1994).

- **Well-being:** There were 7 questions (WB11-WB16, WB17A) adapted from the WHO Western Pacific Study included in the questionnaire (Anonymous, 1986; Kouris-Blazos, 1994). Subjects identified whether they had difficulty with sleep, slept too much, worried more than usual, lost interest, were depressed, felt tired, and whether they were happy with their life. The well-being score ranged from 0-7.

- **Self-Reported Health:** This section reported the health status of subjects based upon their "subjective" perception. The validated Multi-level Assessment Instrument (MAI) designed by Lawton et al was used to generate the general health status of the elderly (Kouris-Blazos, 1994; Lawton MP et al., 1982; Purba et al., 2001). This method was believed to be one of the most valid and reliable measures to use on such populations (Fillenbaum GG, 1984; Kouris-Blazos, 1994). The health questions were included in several sub-indices. These sub-indices can be interpreted independently from each other and the entire questionnaire. The scoring system for each sub-index was similar to the rest of the questionnaire. The health sub-indices included:

a. **Self-rated health subindex (score 4-13):** There were 4 questions (H34-H37) used to obtain subjects' opinion on their own overall health, current health status, health problems and health status compared with people their own age.

b. **Health behaviour subindex (score 3-9):** Three questions (H38-H40) were employed to acquire information on medical services used. Subjects were required to inform the frequency of physician visits, days spent in hospital, and days spent in bed because of sickness.

c. **Self-Reported Health conditions subindex (score 25-50):** Questions H41, H42 and H46 were about eyesight, hearing and limbs missing, or handicapped, respectively. Question H43 was comprised of a 23 item check-list on subjects' past health conditions, for example, diabetes, high blood pressure and heart trouble.

d. **Non Index Item (score 1-2):** Question H47C was used to determine whether a subject used a wheelchair.

e. **Total Health Score/General Health Score (score 33-74) =** self rated health + health behaviour + health conditions + non index item.

f. **Self reported medication-use (score 21-42):** Question H44 contained a 21 item check-list of common medicine that people take, such as aspirin and insulin injections for diabetes. The question on self-reported medication use was taken from the Older Americans Resources and Services (OARS) questionnaire (Fillenbaum GG and Smyer MA, 1981; Kouris-Blazos, 1994).

- **Exercise:** There were several questions on exercise (EX84-EX87). However, only two questions, EX84, which deals with the frequency of going out, and question EX86, which deals with the time spent daily doing various activities, were used to determine exercise score. The exercise score (EX86SCORE) was based on answers given from these questions which were then scored by the interviewer. The exercise score ranged from 1-7 (see figure 3.1). The exercise questions and scores were developed for the IUNS study (Kouris-Blazos, 1994).

Figure 3.1 Grading of the Exercise Score

What exercise score would you give the subject from 1 to 7
based on the answer to EX86?

1 = inactive, in bed or seated all day

2 = inactive, seated most of the day

3 = inactive, seated most of day with few hours of pottering

4 = active, walks or gardens (about 1 hour) or does few hours house work at least 3-4 times/week, on feet most of day

5 = active, walks or gardens (about 1 hour) or does few hours housework at least 3-4 times/week, on feet most of day

6 = active, heavy gardening or farming or plays aerobic sport or few hours walking 3-4 times a week

7 = very active, heavy gardening or farming or plays aerobic sport, or walks daily for a few hours

- **Activities of Daily Living (ADL):** Questions ADL83 and EX84 were used to determine subjects' degree of difficulty in performing basic tasks such as using the toilet, eating, walking, cooking and dressing. The degree of difficulty for each of the 14 item check-list was assessed using a 4-point scale. A higher scale resulted in a higher overall ADL score. Therefore, subjects who had no difficulty performing such tasks acquired higher scales, and a higher overall ADL score. The ADL score was measured by adding scales from a 14 item check-list to question EX84, and ranged from 15-62. The unmodified 14 item check-list was taken from the WHO 11 country study questionnaire, and was originally adapted from the validated instrument developed by Katz and Akpom (Anonymous, 1983; Katz S and Akpom CA, 1976; Kouris-Blazos, 1994) . Similar questions were employed in the Euronut-Seneca study of elderly in Europe (Kouris-Blazos, 1994; Osler et al., 1991). The ADL scores were able to predict morbidity in the IUNS study (Purba et al., 2001; Wahlqvist et al., 1997; Wahlqvist et al., 1995b).

- **Sleep:** To investigate the common sleeping pattern in the elderly, 5 questions (SL89A-D, SL89DYes) were included in the questionnaire.

Subjects explained the usual time they went to bed and got up, average number of hours of sleep every night, and whether they took a nap.

- **Smoking:** Past and current smoking status was derived from 4 questions on smoking (SM90A-D).

- **Social activity (time use):** To illustrate the frequency and ways of spending time either alone or with others (social), question SAR92 with a 21 item check-list was used. The frequency for each item was scaled 1-8. Again, the higher the scale, the more active the subject was. To compute the social activity score or time use score, question DC32B on current working status was added to question SAR92. Therefore, the social activity score or time use score ranged from 22-176. The social activity questions were adapted from the Multi-level Assessment Instrument for the elderly (MAI) at the Philadelphus Geriatric Centre in the USA (Kouris-Blazos, 1994; Lawton MP et al., 1982).

- **Social relations (networks):** Twelve questions (SAR93-SAR102) were modified from the Multi-level Assessment Instrument and WHO Western Pacific Study to investigate social networks (Anonymous, 1986; Kouris-Blazos, 1994; Lawton MP et al., 1982). Subjects were asked to provide information on relations with and support from friends and relatives, feelings of loneliness, and respect by other members of the family. The social network score ranged from 12-46.

3.10.2 FOOD HABITS AND DIETARY ASSESSMENT

The following questions on food habits and dietary assessment were obtained. The questions on food habits were as follows:

- Appetite
- Dentition
- Food Avoidance
- Eating Environment
- Eating Out
- Food Purchase
- Storage and Cooking facilities
- Food and Religion
- Fat and Salt
- Cooking Methods
- Alcohol

These questions described dietary habits and practices of elderly people in these communities. The dietary habits and practices might have an impact on their food consumption. In addition, they might be related to cultural and traditional values in the community.

There are several ways to collect information on dietary intake. Food record or food diary, dietary recall, food frequency questionnaire and dietary history are amongst common data collection methods (Pao EM and Cypel YS, 1996). The first method is useful for acquiring current intake whilst other methods are used for past intake.

The 3-consecutive-day 24-hour weighed food record was chosen for the Japanese elderly based on the common dietary assessment method in Japan (1995; Kromhout et al., 1989; Omura T et al., 1987). All foods consumed were recorded and weighed using a portable scale provided by interviewer, prior to each home visit. Any remaining food after each meal was reported. The interviewer visited each subject's home to collect information on food consumed the day before. The interviewer administered questionnaire on food items consumed, the time they were eaten and their weight (in grams). Later, these food items were coded according to the Japanese Standard Food Composition Table and food and nutrient intakes were calculated.

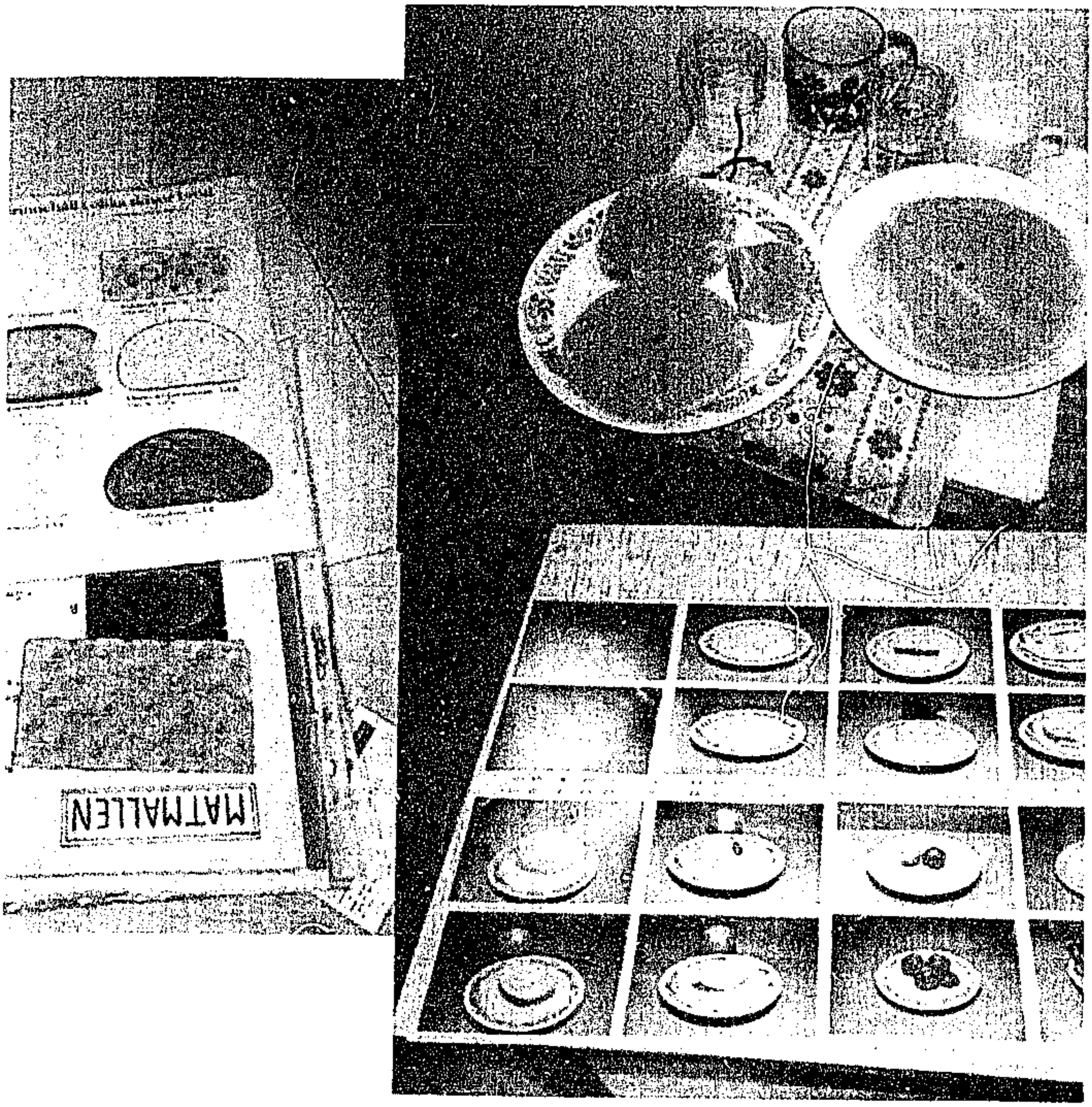
The food record method has its strengths and weaknesses (Pao EM and Cypel YS, 1996). For this study, the 3-day food record method was more feasible because it did not depend on memory, accurate food and nutrient intake measurement, and data on intra- and inter-individual dietary intake variation being made available. Moreover, seasonal intake of foods and nutrients was not evident in Japan (Mori S et al., 1981; Wahlqvist et al., 1994; Wahlqvist et al., 1995c){Mori S, Saito K, et al. 1981 78 /id}. The food intake in Japan was less varied over the year than other IUNS study centres such as Australia, Greece and Sweden where the food frequency questionnaires (FFQ) were administered (Wahlqvist et al., 1994; Wahlqvist et al., 1995c). However, some weaknesses such as literacy, absolute cooperation and changing in habitual eating patterns have been recognised in this method. To overcome these limitations, all subjects and their respective families were given a thorough explanation of the aim of this study and the importance of their support and cooperation.

The validated food frequency questionnaire used in other IUNS centres was tailored to incorporate some traditional dishes (Kouris-Blazos, 1994; Rothenberg, 1997; Wahlqvist et al., 1995a). This questionnaire was adapted from the Australian Polyp Prevention Project (MacLennan R et al., 1990). There were 50 Greek dishes and 33 Swedish dishes being added to the questionnaire.

The portion sizes of the food consumed were recorded in household measures. To facilitate estimation of serving sizes, photographs of small and large portions were also used. The frequency of food consumption was subsequently quantified on a weekly basis. Seasonal variation was taken into account by expressing the approximate number of weeks in which the food items were eaten as a fraction of a year. Intakes in gram/week were calculated by multiplying the serving size (grams) by the weekly frequency of intake. Moreover, these values were translated into gram/day and were adjusted to daily intakes of 2500 kcal (10,460 kJ) for men and 2000 kcal (8368 kJ) for women.

Food frequency questionnaires provide an indication of dietary intakes that can be administered in a simple and less costly way (Pao EM and Cypel YS, 1996). However, this method requires memory of past food patterns and difficulties in quantifying food consumption. Moreover, heterogeneity of population influences the outcome. To overcome these limitations, interviewer-administered food frequency questionnaires have been introduced in the IUNS centres. The populations studied were homogenous and each participant was given a detailed description of food by the means of photos (see below). The interviewers also played a role in obtaining information of seasonal intake of certain foods.

Food photographs and serving size model used in for the Swedish cohort



A. FOOD GROUPS

Based on the recommendations of Davidson and Passmore (Davidson SS and Passmore R, 1979) with the exception of the combination of starchy roots with cereals, food items were grouped into several food groups as follows:

1. **Cereals and starchy roots:** rice, potatoes and starches, noodles, bread, amaranth, oats, barley, wheat, buckwheat, cornflakes, job's tears, sorghum, rye.
2. **Monounsaturated and saturated fats:** Vegetable fats and oils, animal fats, butters, margarines, shortening.
3. **Fruits, nuts and seeds:** all fresh fruits (e.g avocado, apricot, figs, mandarins, olives, oranges, guava, kiwi, strawberries, grapefruit, grapes, plums, pears, cherries, bananas, pineapples, passion fruit, papaya, peach, melon, lemon, lychee, apples), dried fruits, fruit juices, fruit jams, canned fruits, pickled fruit, almonds, hemp seeds, perilla seeds, cashew nuts, pumpkin seeds, Japanese toreya seeds, ginkgo nuts, chestnuts, walnuts, poppy seeds, coconut, sesame seeds, sweet acorn, watermelon seeds, Japanese horse chestnuts, lotus seeds, water chestnuts, pistachio nuts, sunflower seeds, Brazil nuts, hazel nuts, pecan nuts, macadamia nuts, pine nuts, peanuts.
4. **Pulses/legumes:** adzuki beans, kidney beans, peas, cowpeas, broad beans, soybeans (e.g tofu, miso, natto, soy milk), rice beans, chickpeas, scarlet runner beans, lima beans, mung beans, lentils.
5. **Meat and meat products:** animal meats (e.g cattle, beef, veal, whale, sheep, goat), poultry (e.g duck, turkey, chicken, pigeon), processed meat.

6. **Milk and dairy products:** liquid milk, milk powder, evaporated and condensed milk, creams, fermented milk and lactic acid bacteria beverages (e.g yoghurt), cheese, ice cream.
7. **Vegetables:** all vegetables (e.g carrots, pumpkin, cabbages, cauliflower, cucumber, ginger, daikon/Japanese radish, bamboo shoots, onion, tomatoes, corn, eggplant, garlic, horseradish, bean sprouts, lettuce), mushrooms, seaweed.
8. **Alcoholic beverages (ethanol intake):** sake, beer, wine, shocu, whisky, brandy, umeshu.
9. **Fish and shellfish:** fishes (e.g mackerels, salmon, ayu, perch, sardines, char, eel, marlins, barracuda, flounders, whiting, caviar, sharks, tuna, herring), shellfishes (e.g clams, abalone, mussels, oysters, scallops, shrimps, crabs, cuttlefishes, jellyfish, fish paste products).

Food consumed in each food group was calculated in grams per day and was adjusted to 2500 kcal for men and 2000 kcal for women.

B. TRADITIONAL MEDITERRANEAN DIET (TMD)

Until recently, focus on food as a basic approach in developing dietary guidelines had not yet been established. In 1996, Wahlqvist introduced Food Based Dietary Guidelines (FBDGs) which describes several approaches to evaluating nutritional quality (Wahlqvist, 1996). These approaches are:

a. Food patterns: evaluating traditional food patterns of people with longevity and low morbidity,

b. Food variety indices,

c. Nutrient requirements and recommendations, and

d. Use of nutrient densities in establishing and evaluating FBDGs.

A Traditional Mediterranean Diet (TMD) score has been developed and was shown to significantly reduce risk of death in elderly Greeks in Greece and Australia, Anglo-Celts, Danes, Europeans, Spanish, and Chinese (de Groot LC et al., 1996; Kouris-Blazos and Wahlqvist, 1998; Lasheras C et al., 2000; Osler and Schroll, 1997; Trichopoulou A et al., 1995; Woo J et al., 2001). This diet reflected the Greek variant of the Traditional Mediterranean Diet in the 1960s as reported by Keys and his colleagues from the Seven Countries Study (Kafatos et al., 1997; Keys A, 1995; Kromhout et al., 1989). The Greek variant of the TMD in the 1960s was characterised by high consumption of olive oil (as a primary source of fat), high intakes of plant foods (cereals, legumes, vegetables, fruits and nuts), low in animal foods (meat, milk and dairy products) and moderate alcohol consumption.

Accordingly, a similar method was adapted to test the hypothesis that the TMD predicted health and survival of the elderly. As energy intake is a predictor of mortality and is associated with the composition of food intake, food intake in each food group was adjusted to 2500 kcal for men and 2000 kcal for women (Trichopoulou A et al., 1995). These adjustments were also used for comparison purposes with data from other elderly communities. A gender-specific median value was used as a cut-off point and intakes above (vegetables, legumes, fruits and nuts, cereals, and M:S ratio) or below (milk and dairy, meat and meat products, and alcohol) the median scored one. The scores from all food groups were summed into the TMD score, which ranged between 0-8. It was hypothesised that a more varied diet with four or more of these food groups would have a beneficial health and survival effect and would resemble more closely the Mediterranean Diet. These considerations are based on collective epidemiological and biological evidence (National Research Council, 1989; Willet WC, 1994).

The Cox Proportional Hazard regression model was developed and controlled for age at enrolment (5-year intervals), gender (0=female, 1=male), and smoking status (at time of enrolment, 0=non-smoker, 1=smoker). Current smokers at enrolment included those who had stopped smoking within five years and non-smokers included those who had not smoked for more than five years. In order to examine the general predictors of mortality in elderly people from all cohorts, the Cox's model was also controlled for ethnicity/locality (0=Japanese in Japan, 1=Swedes in Sweden, 2=Anglo-Celts in Australia, 3=Greeks in Australia, 4=Greeks in Greece).

The Traditional Mediterranean Diet has eight key features:

1. High consumption of cereals (including potatoes, rice and pasta)
2. High consumption of legumes/pulses (including soy)
3. High consumption of vegetables (including mushrooms and seaweed)
4. High consumption of fruits, nuts and seeds
5. Low consumption of meat and meat products
6. Low consumption of milk and dairy products

7. Moderate consumption of ethanol

8. High Monounsaturated : Saturated fat ratio.

C. PLANT-BASED AND FISH DIET (PBD)

Emerging evidence shows that fish and shellfish consumption is beneficial to survival (Albert CM et al., 1998; Darmadi I et al. 2001; Darmadi et al., 1999). Thus another key feature has been added to the Traditional Mediterranean Diet and is defined as the Plant-Based and Fish Diet (PBD). To test whether adherence to the PBD predicts survival, a PBD score (score range 0-9) was developed based on the TMD score. A similar protocol used to calculate TMD score was employed to assess PBD score.

The nine key figures of the Plant-Based and Fish Diet consisted of:

1. High consumption of cereals (including potatoes and starch)
2. High consumption of legumes/pulses
3. High consumption of vegetables (including mushrooms and seaweed)
4. High consumption of fruits, nuts and seeds
5. Low consumption of meat and meat products
6. Low consumption of milk and dairy products
7. Moderate consumption of ethanol
8. High monounsatured : saturated fat ratio
9. High consumption of fish and shellfish

The Traditional Mediterranean Diet (TMD) and Plant-Based and Fish Diet (PBD) were analysed separately using three different median cut-offs:

- Cohort Specific Median Food Pattern
- Combined Cohort Median Food Pattern
- Greek Median Food Pattern

3.11 ANTHROPOMETRIC MEASUREMENTS

Anthropometric measurements are valuable tools to assess nutritional status (Lehmann AB et al., 1991; Vir SC and Love AHG, 1980). Anthropometric measurements are simple, effective, easy and quick to apply. Several anthropometric indices namely height and weight were measured. These measurements were then computed to obtain body mass index.

3.11.1 HEIGHT

Height measurement was taken at each subject's home or at a study centre. Subjects were requested to stand against the wall on a horizontal surface (e.g. floor or tatami) without shoes, arms and hands hanging relaxed on both sides of the body, heels together, stretching upward to the fullest extent and being encouraged to breath deeply. When the measurement was taken, the subject's back was as straight as they could manage. Height measurement was rounded to the nearest centimetre.

3.11.2 WEIGHT

Weight measurement was assessed following height measurement at the subject's home or study centre. Subjects were weighed in light socks or stockings or bare feet and light clothing on an accurate scale. Subjects were asked to stand on the centre of the platform with their body weight distributed evenly between both feet, unassisted, looking straight-ahead and relaxed. Weight measurement was recorded to the nearest 0.5 kilogram.

3.11.3 BODY MASS INDEX (BMI)

Body Mass Index was calculated as weight in kilograms divided by height squared in metres. BMI has been used widely to assess nutritional status such as overweight, undernutrition, malnutrition and chronic energy deficiency (Ferro-Luzzi A and James WPT, 1996; James WPT et al., 1988; Ravaglia G et al., 1997; Rea IM et al., 1997).

The BMI classification according to WHO is listed below, however this classification appears to be inappropriate for adult Asians (1998; Inoue S and Zimmet P, 2000). Therefore, cut-off points of BMI ≥ 23 kg/m^2 for overweight and BMI ≥ 25 kg/m^2 for obesity have been proposed.

$$\text{Body Mass Index (kg/m}^2\text{)} = \text{Weight (kg)} \ / \ \text{Height}^2 \ (\text{m}^2)$$

Body Mass Index (BMI) classification according to the World Health Organization.

RANGES OF BMI RISK		
Weight Classification	**BMI**	**Risk to Health (Cardiovascular disease, hypertension and diabetes)**
Malnutrition III	<16	Extreme Wasting
Malnutrition II	16 to <17	Severe Wasting
Malnutrition I	17 to <18.5	Malnutrition
Normal Weight	18.5 to 24.9	Low Risk to Health in Younger Adults
Overweight	25.0 to 29.9	Increased Risk
Obesity I	30.0 to 34.9	High Risk
Obesity II	35.0 tc 39.9	Very High Risk
Obesity III	>40	Extremely High Risk

3.12 DATA MANAGEMENT AND STATISTICAL ANALYSIS

The processing and statistical methods applied for analysing the data are illustrated in this section.

3.12.1 DATA MANAGEMENT

Every question on the questionnaires was coded according to the IUNS questionnaires. This was done earlier on the preparation stage of the study. Data collected were then entered into a database (Dbase 3). The files' names were:

OKAZAKI SPATAQMD.dbf = demography, memory, well-being

OKAZAKI SPATAQHT.dbf = health questions

OKAZAKI SPATAQL.dbf = lifestyle, social activity and network questions

OKAZAKI SPATAQF.dbf = food habits and alcohol intake questions

Each Dbase file included subject's code, age, gender, living arrangements and information from all subjects. All Dbase files were transferred to a SAS statistical analysis database using import files data management program (1989). The frequency distribution or cross-tabulation were performed in SAS by PROC FREQ to cross-check the data.

Three new SAS files were created in a SAS directory:

DIETNEW.SD2 = food groups, TMD score and PBD score

SCORE99.SD2 = social scores, physical activity scores, and health scores

SODIET99.SD2 = social scores, physical activity scores, health scores, TMD score and PBD score

3.12.2 STATISTICAL ANALYSIS

Statistical analysis was performed using the Statistical Analysis System (SAS) program for Windows (1989).

PROC FREQ was performed to describe the frequency and percentage of discrete variables. A Chi-square test (PROC FREQ/chi-square) was carried out to test the significant differences for discrete variables.

PROC UNIVARIATE was executed to obtain mean, standard error, range and percentile distribution for continuous variables. A non-parametric Wilcoxon rank sum test was carried out to test the significant differences between survivors and deceased as well as significant differences between centres.

Analysis of variance (ANOVA) was used to analyse differences amongst elderly communities, T-test was used to compare characteristics between selected groups and Spearman test was used to observe the correlation between measured variables.

At all times, the significant level was set at 5% (P<0.05). The significance levels were as follows:

NS, not significant

*, P < 0.05

**, P < 0.01

***, $P < 0.001$

****, $P < 0.0001$

*****, $P < 0.00001$

Common statistical abbreviations such as SD for standard deviation, SEM for standard error of the mean, RR for risk ratio/hazard of death, and N for number of subjects were included.

3.12.3 MORTALITY DATA

For survival analysis, Cox Proportional Hazards procedure (PROC PHREG) was employed to calculate the risks of death from selected variables with all-cause mortality as the outcome. The PHREG procedure performs regression analysis of survival data based on the Cox Proportional Hazards model (Breslow NE and Day NE, 1987; Cox DR, 1972). Dummy variables and strata statements were also created in the syntax.

Relative risk of mortality according to baseline diet and time-independent covariates such as age at enrolment (in 5-year intervals), gender (0=female, 1=male), and smoking status (at time of enrolment, 0=non-smoker, 1=smoker), were calculated by Cox's proportional hazards regression model. This method took both the event of death and the time until its occurrence into account. Current smokers at enrolment included those who had stopped smoking within five years and non-smokers included those who had not smoked for more than five years. In order to examine the general predictors of mortality in elderly people from all cohorts, the Cox's model was also controlled for ethnicity/locality (0=Japanese in Japan, 1=Swedes in Sweden, 2=Anglo-Celts in Australia, 3=Greeks in Australia, 4=Greeks in Greece). Results for cross-cultural comparisons of each FHILL cohort were not controlled for ethnicity/locality since there was no confounding factor from other cohorts. Finally, Kaplan Meier curve was plotted in order to demonstrate the difference in the survival probability between groups.

Finally, other non-intermediate predictors of mortality, such as physical activity, social activity and network, were introduced into the model to test the hypothesis that nutrition is more important to predict survival in later life than social and physical activities.

3.13 SUMMARY

A summary of the methods used in each IUNS FHILL populations in this study is presented in the table below.

Summary of methodology in IUNS FHILL mortality follow-up by community study

Code	Location	Rural or Urban	Ethnicity	Sample Size M	Sample Size F	RRa	Start	Follow-up	S	D	Q	Diet method
JPN	Okazaki, Japan	Semi-urban	Japanese	43	46	64%	1991	1996, 1999	58	31	IUNS	3d 24-h weighed food record
SWD	Gothenburg, Sweden	Urban	Swedes	73	144	76%	1990	1996	139	47	IUNS	Semi-quantitative FFQ
ACS	Melbourne, Australia	Urban	Anglo-Celtic	70	71	70%	1990-1992	1996	127	14	IUNS/mod	Semi-quantitative FFQ
GRM	Melbourne, Australia	Urban	Greeks	94	95	84%	1990-1992	1996	165	24	IUNS	Semi-quantitative FFQ
GRS	Spata, Markopoulo, & Paiania, Greece	Rural	Greeks	91	91	89%	1988-1990	1993-1994	129	53	IUNS	Semi-quantitative FFQ
TOTAL				371	447	77%			547	147		

M=male; F=female; RRa=Response Rates; Start=Commencement of the study; Follow-up=Mortality follow-up; S=Number of Survivors; D=Number of Deceased; Q=Questionnaires used in the study; IUNS/mod=modified from IUNS questionnaires; Diet method=dietary assessment methods used for the study.

CHAPTER 4

CHAPTER 4

CHARACTERISTICS OF STUDY POPULATIONS

4.1 INTRODUCTION

The main objective of this chapter is to illustrate the setting of this study, including general characteristics of the study populations, their history, their cultures, geography, and socio-demographics. Moreover, description on anthropometry and body composition of these populations is discussed. Five longevity cultures around the world participated in the FHILL follow-up mortality study: one Japanese cohort (JPN) residing in Okazaki, Japan; one Swedish (SWD) cohort residing in Gothenburg, Sweden; two Greek cohorts residing in Melbourne, Australia (GRM) and in Greece (GRS); and one Anglo-Celtic cohort residing in Melbourne, Australia. Therefore, there are five cohorts living in four different countries. The characteristics of the study populations are described according to their ethnic backgrounds and/or localities.

4.2 GEOGRAPHY AND CLIMATE

a. Okazaki, Japan

Japan or Nippon means the place/country where the sun rises (Whiterick, 1998). Japan is a mountainous area surrounded by the meeting of three tectonic plates which causes volcanic eruptions and earthquakes

Figure 4.1 Map of Okazaki in Japan

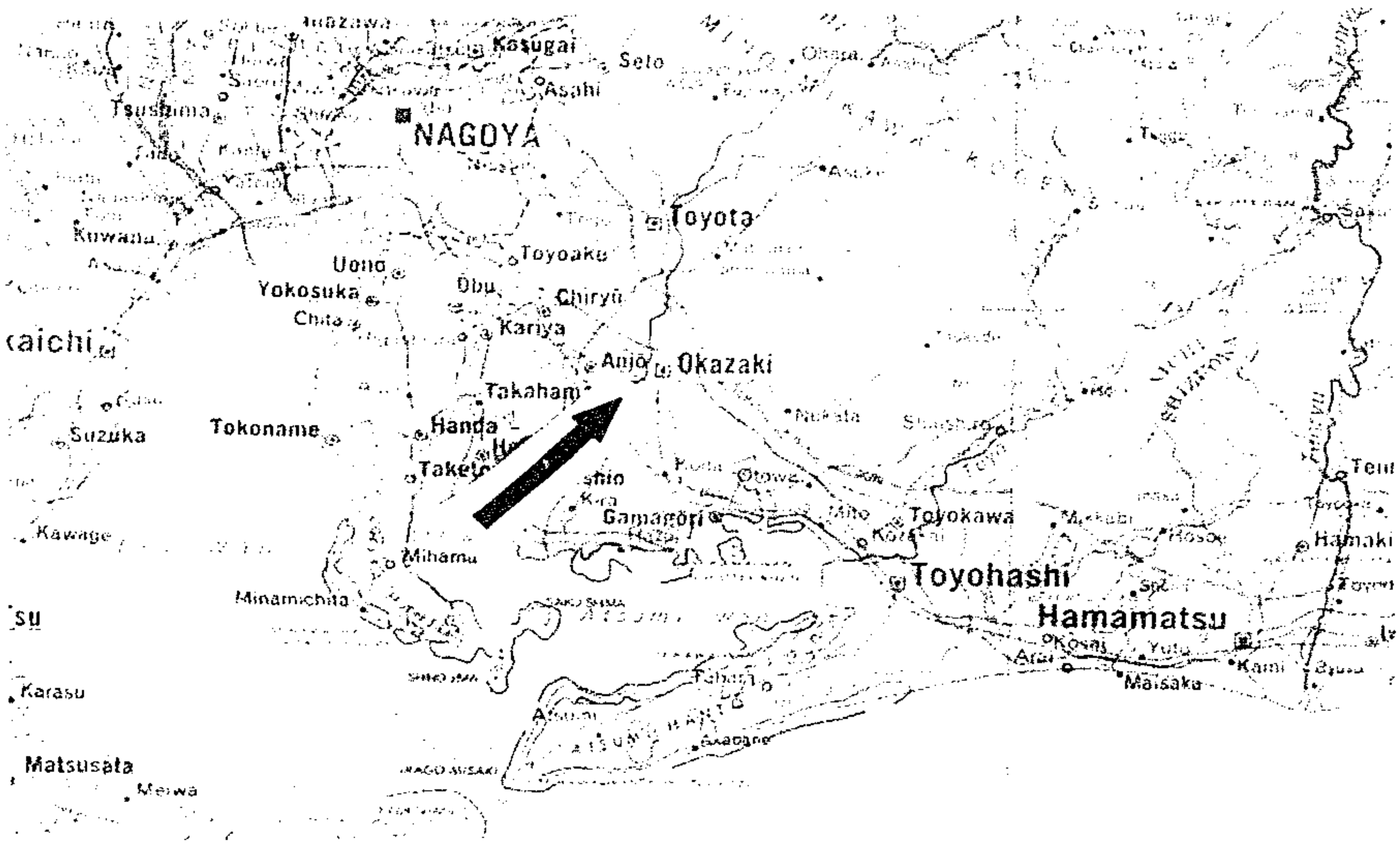


Figure 4.2a Map of Gothenburg, Sweden

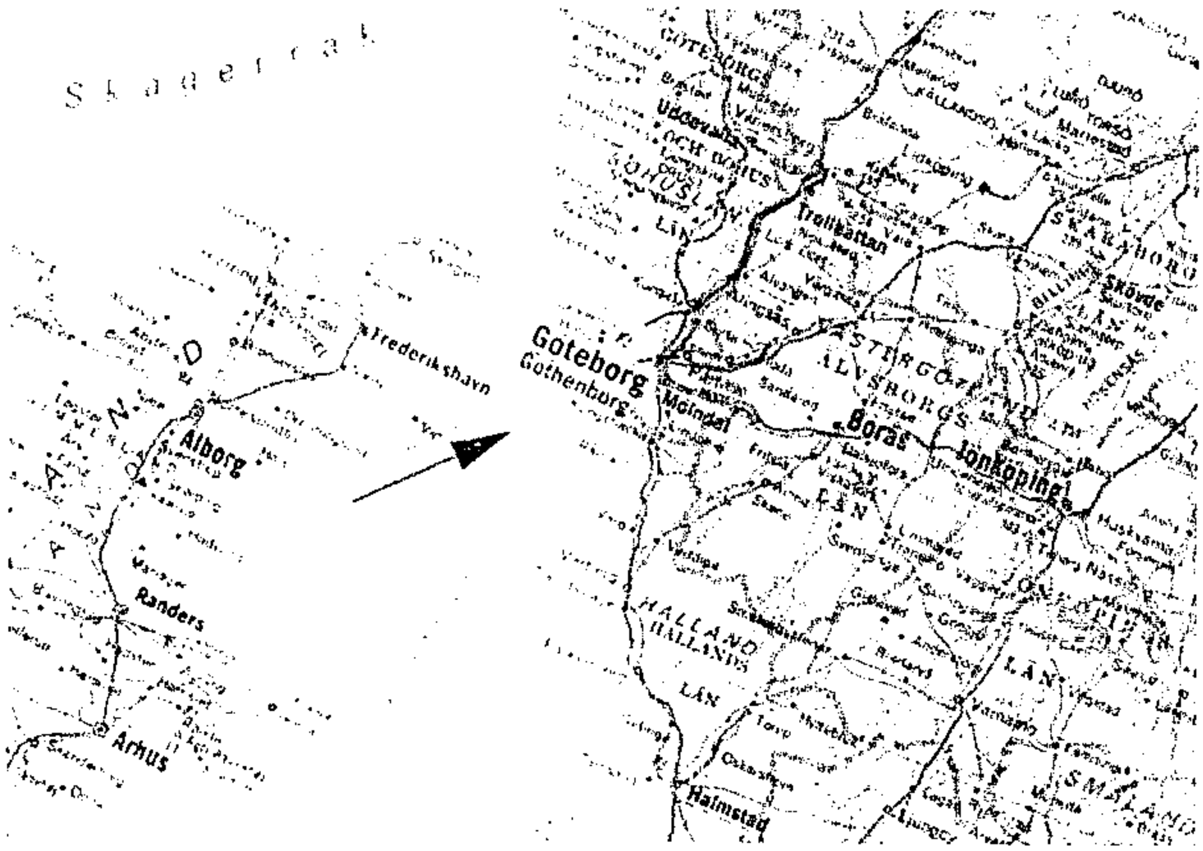
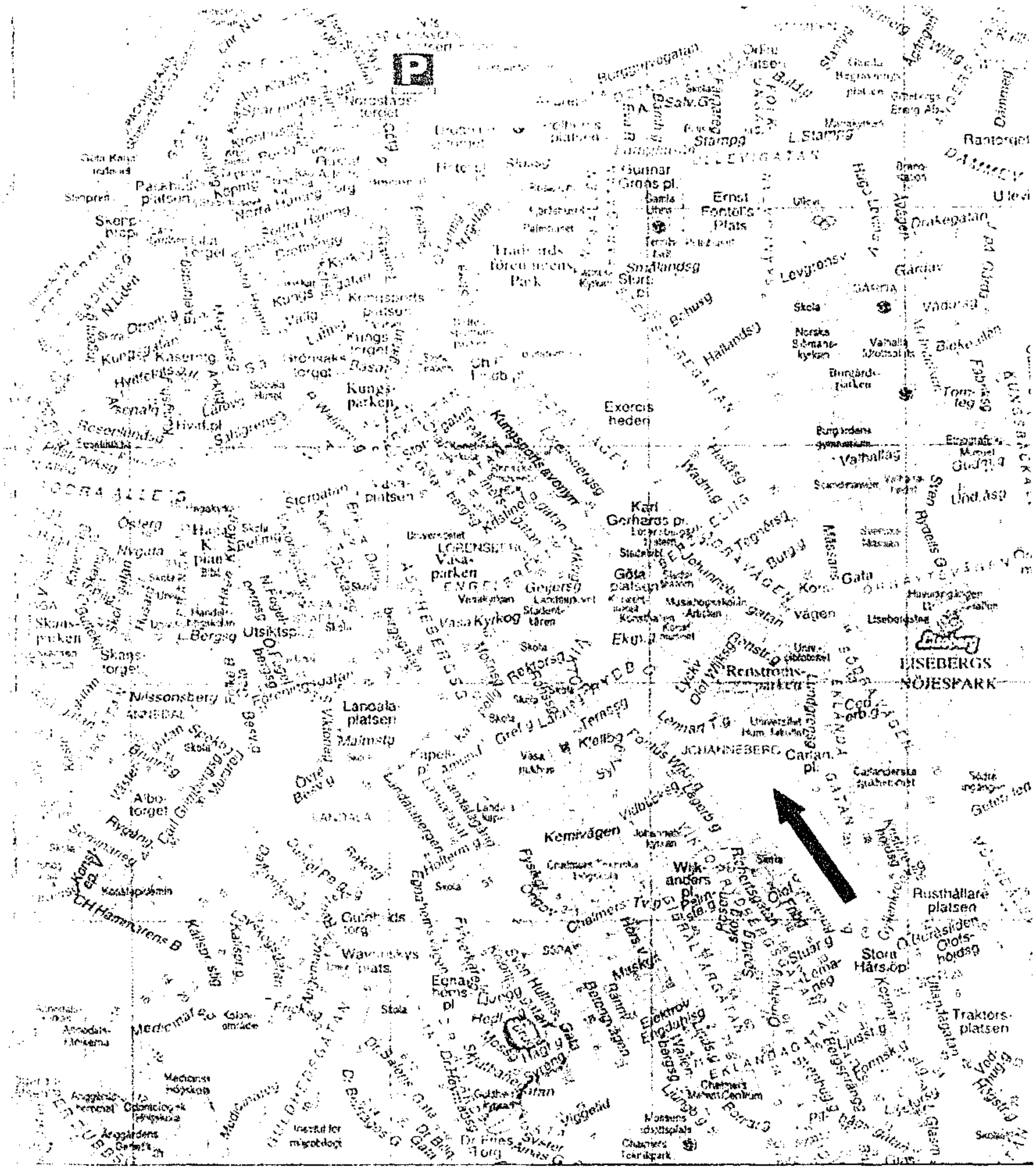


Figure 4.2b Map of Johanneberg in Sweden



(Whiterick, 1998). The Japanese archipelago is located in the Pacific Ocean, off the East Coast of Asia. It is situated between Russia in the north, and Taiwan in the south. There are four main islands namely Hokkaido, Honshu, Shikoku, and Kyushu, which in total comprise of over 6,000 small islands. The area of Japan is 377,812 km^2 with a total population of around 125 million in 1994 (Statistics Bureau, 1995). Honshu Island is the biggest island and comprises approximately 61% of the otal area of Japan.

The climate in Japan ranges from a continental climate in the north, to a humid subtropical climate in the south. There are four seasons in a year, namely spring, summer, autumn and winter. Spring or haru commences around March when the pink cherry blossom (sakura) trees begin to bloom. Summer or natsu is usually quite warm and begins around June. The rainy season or tsuyu happens between mid-June and mid-July. Typhoon or taifu strikes Japan quite frequently around August to September. The changing colors of the leaves (momiji) in September starts the beginning of autumn or aki. The last season is winter or fuyu where snow falls heavily in the north but mild winter occurs in the south.

Okazaki is in the center of Aichi Prefecture and is located in the middle of the long and slender Honshu Island on the coastal side of the Pacific Ocean. There are two main rivers, Yahagi and Oto, which have provided a huge contribution towards the development of Okazaki City. Okazaki's climate is considered mild throughout the year, with an average temperature of 17°C (maximum 38°C, minimum -2.9°C), an average humidity of 76% and an average precipitation of 1,320 mm. The map of Okazaki is shown in Figure 4.1.

b. Gothenburg, Sweden

Gothenburg or Goteborg is the second largest city in Sweden, and has a population of 433,000 inhabitants (Wahlqvist et al., 1995). Located on the Swedish West Coast near 58° north latitude, the city is predominantly land (around 60%) and covers an area of 734 square kilometers. The city of Gothenburg comprises 5% of the total Swedish population. About 19% of the land area of Gothenburg is used for residential housing, whilst about 6% is used by industry and markets.

Sweden is situated within the temperate climate zone and is predominantly a continental or subarctic climate. The city of Gothenburg is situated in the continental zone in the southwest part of Sweden. The temperature in Gothenburg during winter (January) averages around 0°C, whilst the average summer temperature (July) is about 16°C. The monthly average hours of sunlight in January are 20-50, and 250-300 in July. The average rainfalls are about 800-1000 millimetres and on average 10-15 days are foggy. Gothenburg has an average of up to 50 days per year covered by snow, much lower, compared with 250 days in the northern part of Sweden. The map of Gothenburg is presented in Figure 4.2a while map of Johanneberg area is presented in Figure 4.2b.

Figure 4.3a Map of Victoria, Australia

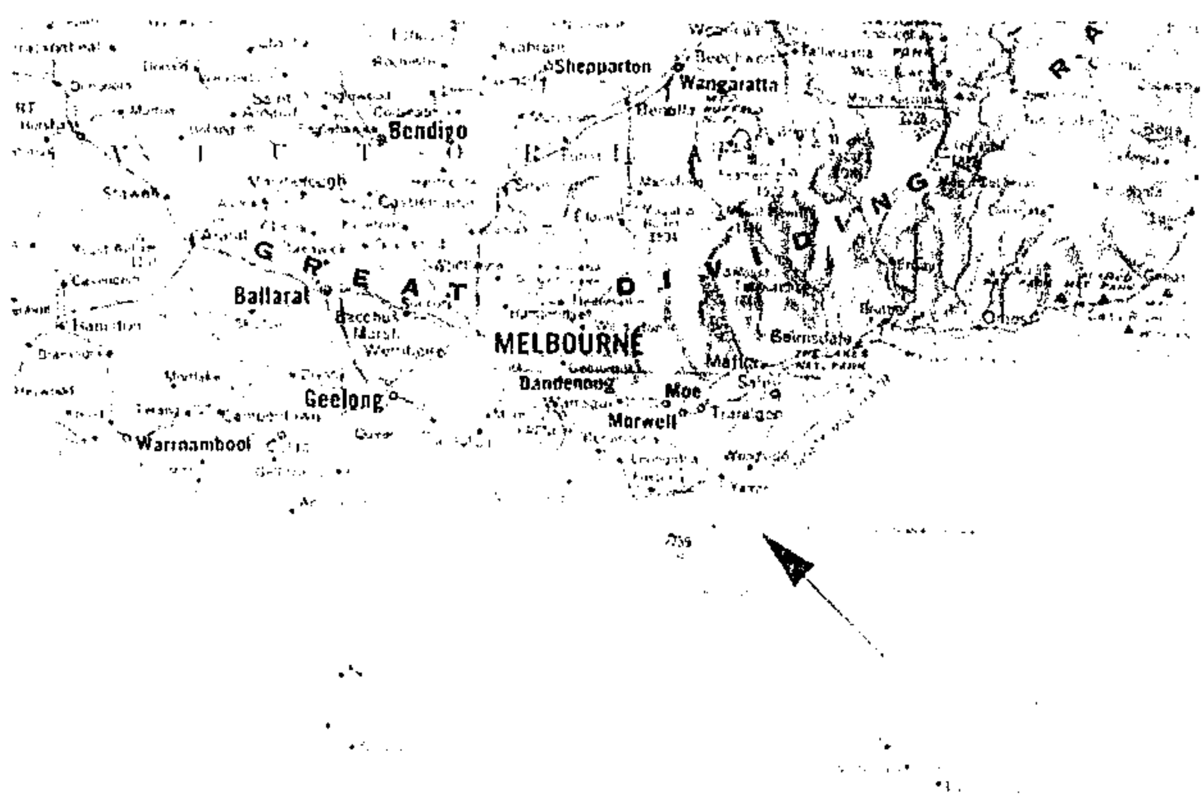
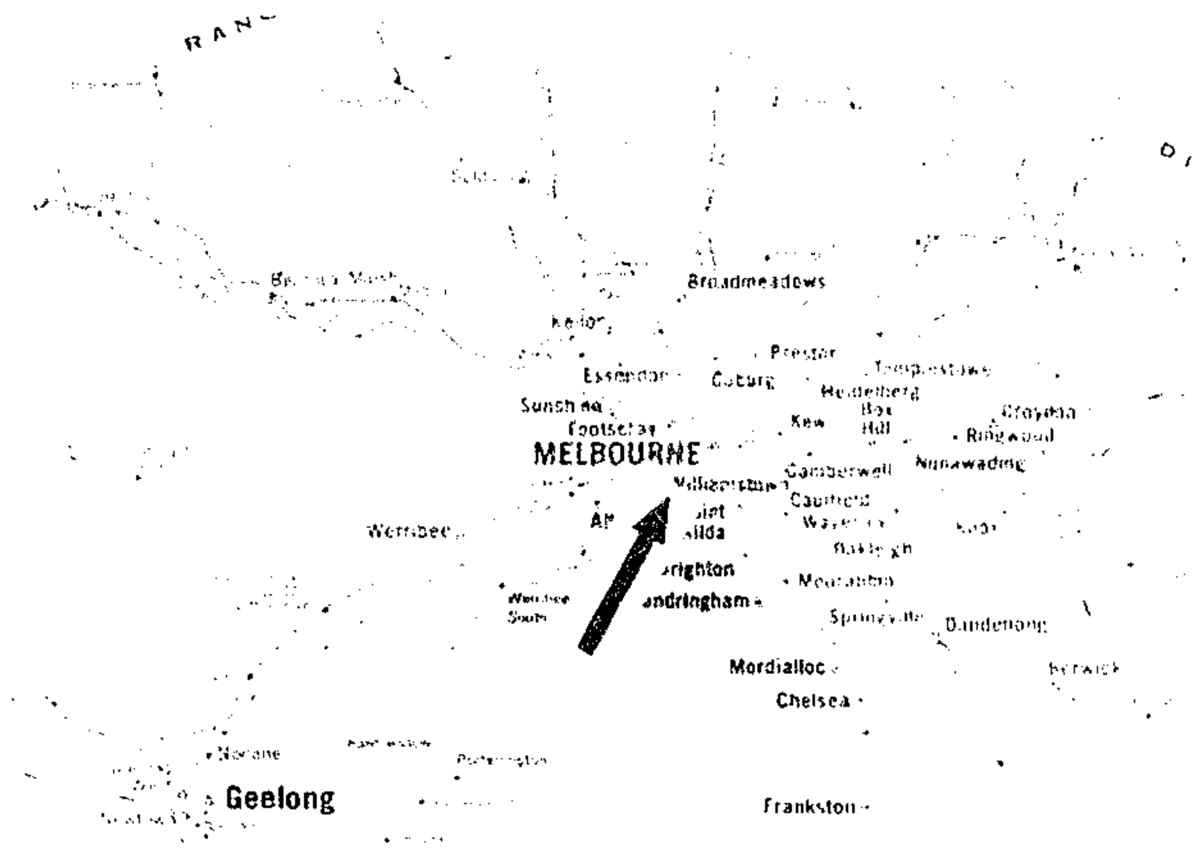


Figure 4.3b Map of Melbourne, Australia



c. Melbourne, Australia

Melbourne is situated on the south coast of the state of Victoria in Australia. The area covered by the state of Victoria is slightly under that of Great Britain, around 227,600 square kilometres (Wahlqvist et al., 1995). Temperatures vary greatly within seasons while humidity is moderate. Melbourne's hottest months are normally January and February, with an average temperature of 26°C. Melbourne is often referred to by locals as the city that has "four seasons in one day". Melbourne has an annual average of twenty-nine days where the temperature is over 30°C. Overnight temperatures in Melbourne remain above 20°C on about 4 nights per year. Melbourne nights tend to be colder at distances from the sea and the city, since buildings, roads and pavements retain heat and can maintain the air at a slightly higher temperature.

The coldest months are between June and July when the average temperatures are about 10-15°C. However, temperatures below -1°C have been experienced during the months of May to August, even as late as October. Snow is rare in Victoria below elevations of 600 metres although it is a common winter occurrence at similar latitudes on the eastern seaboard of the great landmasses of the Northern Hemisphere. Victoria is famous for its beautiful gardens, particularly in Melbourne because rainfall is plentiful. Rainfall averages vary greatly, rising from 250 mm in the driest parts of the Mallee to 2,600 mm at Falls Creek in the Australian Alps. The average annual number of wet days also varies greatly, from about 200 days to 100 days, over the Otway Ranges, and to a distance of approximately 160km inland from the

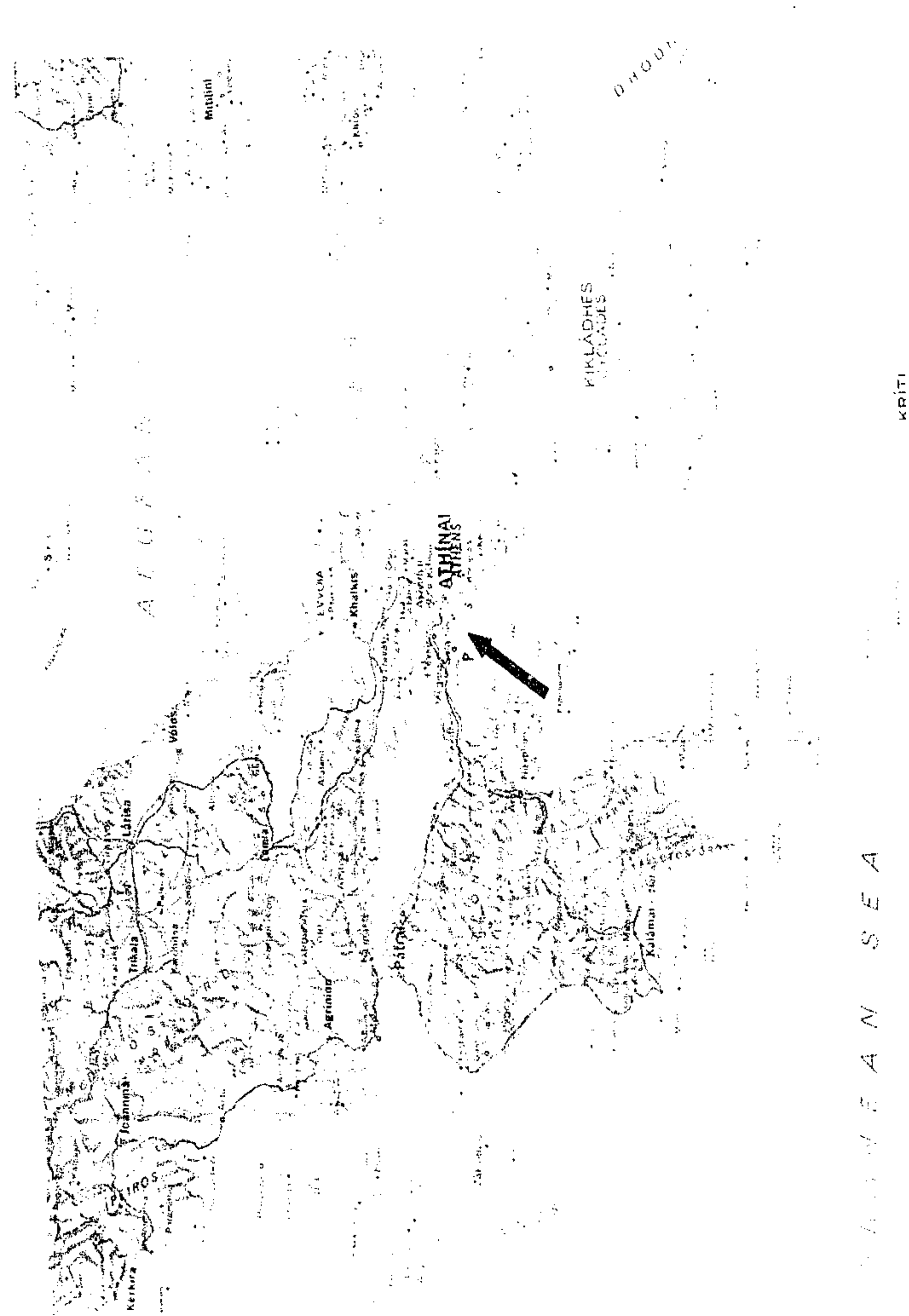


Figure 4.4 Map of Athens and surrounding areas

coast, respectively. The map of Victoria is shown in Figure 4.3a and the map of Melbourne is shown in Figure 4.3b.

d. Spata, Markopoulou, and Paiania, Greece

Spata, Markopoulou, and Paiania are three Greek villages located about 20 km from Athens in the Greek State of Att ki. There are four seasons in Greece, although temperatures do not fluctuate much within seasons. There is very little rain in summer (June-August) and the rocky terrain presents limited opportunities for modernised agriculture (Wahlqvist et al., 1995). In winter, during the month of December, the temperature is around 10°C, while around 30° in summer during July. Humidity ranges from 50% in summer to 70% in winter. The map of Greece is shown in Figure 4.4.

4.3 HISTORY, CULTURE, CUISINE AND RELIGION

a. Japanese in Japan

The history of Japan has been shaped through various occurrences. The first settlers survived by hunting and fishing (Ridgwell, 1993). Around 200 BC migrants from China, Mongolia and the Pacific Islands arrived in Japan (Ridgwell, 1993; Watanabe and Mackereth, 1993). Chinese immigrants introduced rice (Oryza sativa japonica) to Japan and since then rice has become part of a staple diet (Watanabe and Mackereth, 1993). In the sixth century, under the influence of Buddhism, Japanese people were banned from consuming meat and other animal products (Otsuka S, 1996; Watanabe and Mackereth, 1993). Thus, soya bean (daizu) was used as a substitute source of protein in Japan (Watanabe and Mackereth, 1993).

After more than 200 years of isolation, Japan began making contact with the rest of the world in 1868 (Otsuka S, 1996; Watanabe and Mackereth, 1993). Consequently, meat consumption, especially pork, was re-introduced into the Japanese diet and was eaten in a small amount along with rice as a staple diet, vegetables, soya bean and fish (Otsuka S, 1996; Watanabe and Mackereth, 1993).

Since the end of Second World War (1939-1945), Japan has grown rapidly into one of the richest countries in the world (Ridgwell, 1993). The impact of economic changes on the Japanese diet and longevity has been substantial. In 1960s, it was documented that the traditional Japanese food pattern was characterised by a high consumption of rice, fish, vegetables and soy products (Anonymous, 1995; Kromhout et al., 1989). However, for the last 30 years as a wider variety of food has become available there has been an increase in the consumption of fruits, eggs, milk and meat. Today, the "modern" Japanese food pattern consists of high intakes of cereals, fish, vegetables, fruits, and legumes, with moderate intakes of eggs, milk, and meat (Anonymous, 1995).

Japanese meals can be divided into a few categories such as family meals, packed meals and formal meals (Hosking, 1997). In the Kanto region where Okazaki is located, these meals generally are spicier and more soy sauce is used than the rest of the region (Anonymous, 1997). The family meal normally follows the basic "ichiju sansai" (a soup and three dishes) with rice, pickles and tea. The three dishes consist of namasu (sashimi/raw fish or vinegared raw fish), nimono (a gently simmered dish), and yakimono (a grilled dish). These three dishes can be subsituted by nabemono (a one-pot dish). Desert is not part of the traditional Japanese meal, however, fresh fruit is served nowadays, accompanied by tea. The packed/boxed meals (bento) are very popular in Japan. There are several types of bento from a simple school lunch, picnic, lunch on the train, lunch for office workers to lunch during an interval of a Kabuki performance. Each bento consists of at least 10-20 varieties of food items. The formal meals include elaborate reception such as a wedding party and kaiseki ryori. The menu of a wedding reception includes zensai (appetizers), suimono (clear soup), sashimi (raw fish), yakimono (grilled food), mushimono (steamed food), nimono (simmered food), agemono (deep-fried food), sunomono (vinegared food), aemono (cooked salad), sekihan or sushi with plenty of sake and tea. The kaiseki ryori is served at a full tea ceremony (sado).

The foods in a formal meal are arranged beautifully based on the Japanese rules of moritsuke. The first meal is garnished with a leaf or certain flowers to show the season of the year. The following meals have to be served according to strict rules of moritsuke: round pieces of food on a square dish and square or long pieces of food on a round dish.

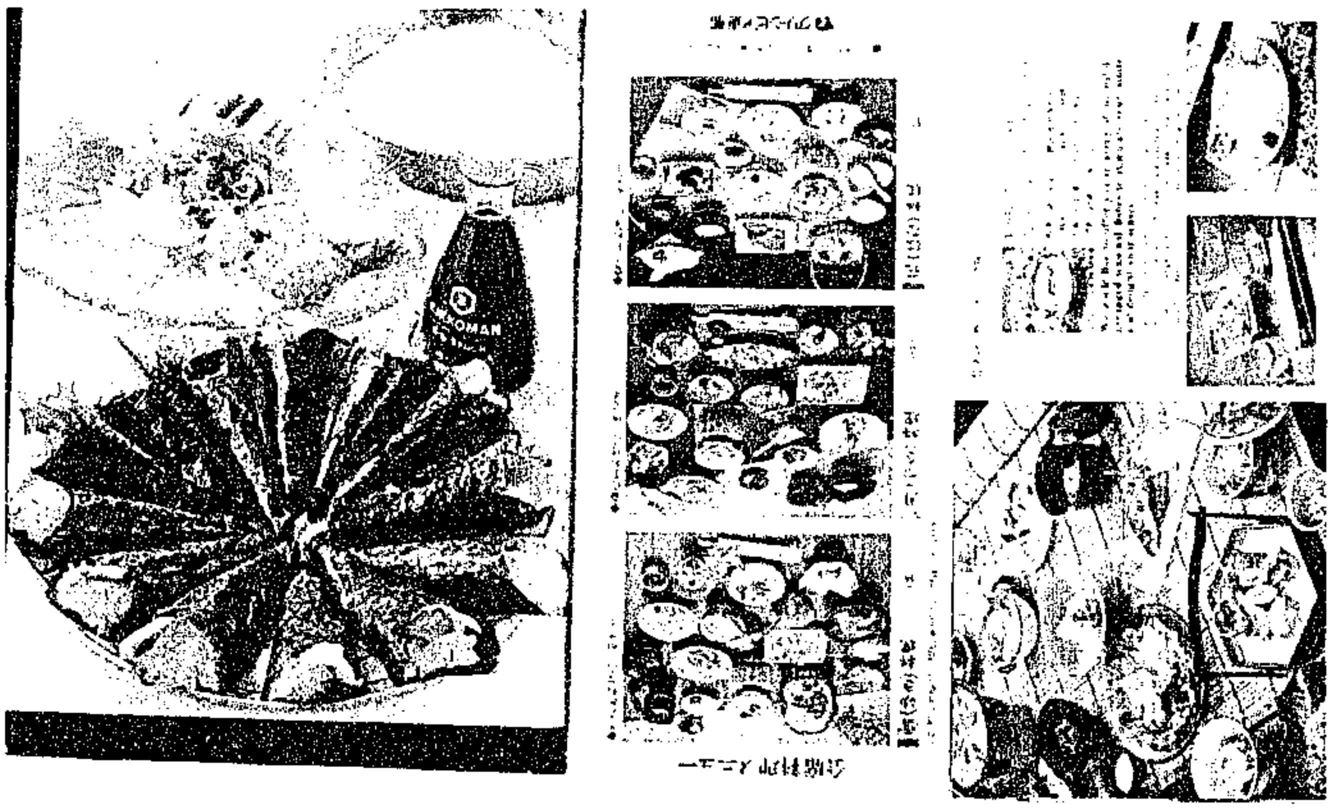
Japanese culture plays an important role in its cuisine. The classic Japanese cuisine was served on trays (oshiki) or trays with legs (zen) on the floor in individual portions (Hosking, 1997). Nowadays, the traditional Japanese cuisine is still served individually with people sitting around in a single low table on a straw mat (tatami) on the floor. This common practice was started in the Edo period (1603-1868) when communal one-pot dishes (nabemono) became popular (Otsuka S, 1996). Since the beginning of the ninth century, chopsticks (hashi) have been the main utensils, whilst soup is drunk directly from the bowl (Hosking, 1997; Otsuka S, 1996).

There are a great number of special dishes associated with the traditional rituals of certain festivals and with certain times of the year which mark the passing of the seasons in Japan. New Year is the most important celebration in Japan. Special foods osechi ryori (lacquer-boxed red and white rice and fish dishes) are eaten during this period along with special sake and rice cakes dipped in a sweet soybean powder. During spring, Setsubun festival (bean-throwing ceremony for expelling ill fortune and bringing good luck), Hinamatsuri (Girls' Day celebrated with special rice crackers, sweets and amazake/white rice alcohol) and Hanami (cherry blossoms viewing celebrated with sakura mochi pink rice cakes wrapped in cherry leaves) are celebrated. The most important festival in summer is a Buddhist festival called Obon (All Souls' Day) when the spirits are farewelled with special okuridango (rice flour dumplings). Keiro-no-hi (Respect-for-the-Aged Day) on September 15th every year is a national holiday to celebrate elderly people's longevity and good health. On

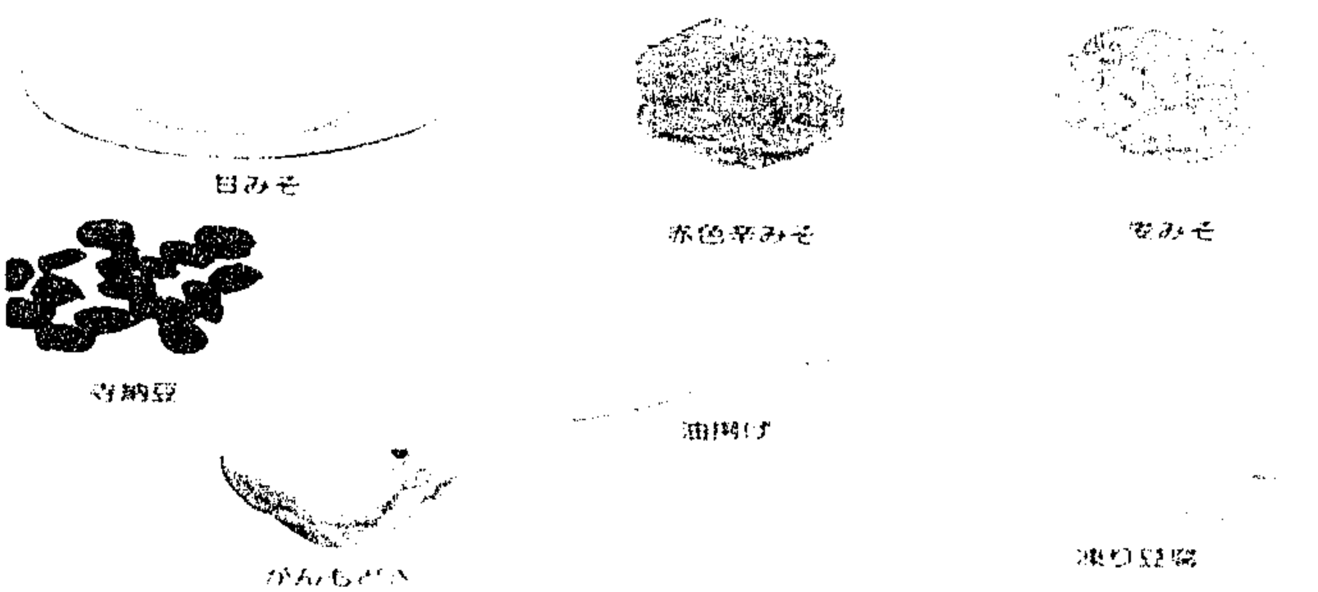
New Year's Eve, many families gather at shrines or at homes eating toshikoshi soba (buckwheat noodles that symbolise longevity).

Culture retention is associated with maintaining the language as well as the religion. Shintoism and Buddhism are the older religions in Japan with followers around 40% and 38%, respectively (Whiterick, 1998). Some Shintoism followers also practice Buddhism in their life, since Shintoism is 'polytheistic'. Thus, the Japanese people believe in the continuity of life and family ancestors, which is fundamental to Buddhism. Christianity has grown since the end of Second World War and about 4% of the total population practice this religion.

Traditional Japanese Diet



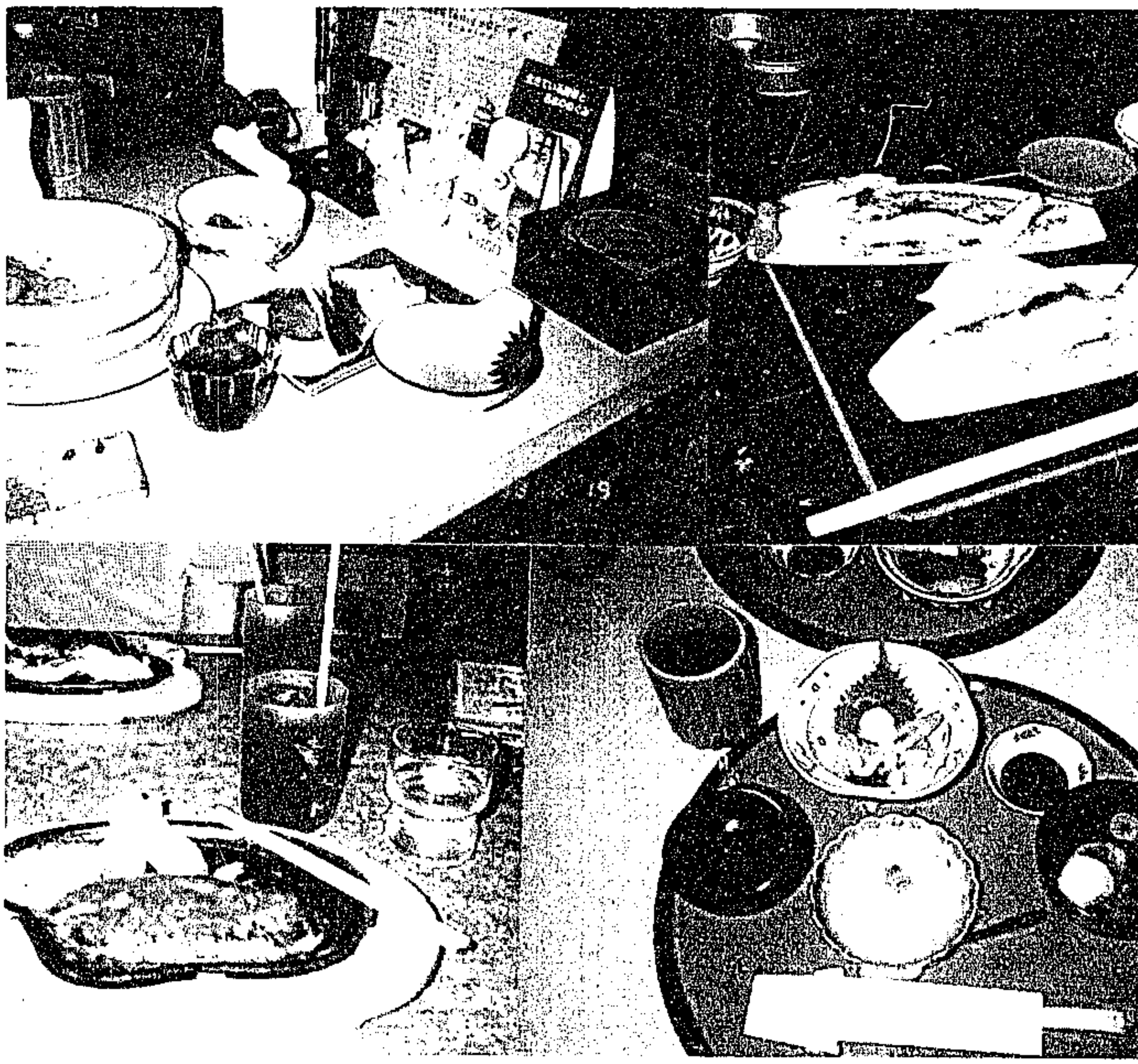
Different types of soy bean products: tofu, beancurd, and miso paste



Traditional Japanese cuisine in Okazaki, Japan

Cold noodles with soy sauce and tempura (top left)

Fried fish (top right)



Beef steak in a family restaurant in Okazaki, Japan is popular amongst younger population (bottom left)

Tofu and miso soup as part of traditional Japanese cuisine is still commonly consumed (bottom right)

b. Swedes in Sweden

The region's first "Goteborg" was at Lodose, 40km to the north of the present town on the Gota Alv, and was founded as early as the 11^{th} century (Wahlqvist et al., 1995). This was the first of four predecessors to the town's present location. On June 4, 1621 the Goteborg of today received its town privileges from King Gustaf II Adolf. Since then the city has been shaped throughout the centuries by the Europeans mainly from the Netherlands, Germany, Scotland and England. The town was planned according to Dutch concepts, with canals and fortifications. Goteborg was, from the beginning, an international town. The first council was made up of ten Dutchmen, seven Swedes, and one Scot. Goteborg became one of the most heavily fortified towns of the period, with three fortresses: "Skansen Kronan", "Skansen Lejonet", and the island fortress "Elfborg", as well as a wide water-filled moat and a city wall with canon bastions. Outside the moat grew the district of "Haga", home to the working people, the town plan of that remains unchanged to this day, including the so named "landshovdinge" houses. These have a ground floor built of stone and two upper stories built of wood.

Development has been strongly influenced by the town's seaside location. Goteborg quickly grew into an important seafaring and mercantile city. In the 18^{th} century the Swedish East India Company became the country's first international trading company. The turnover from its trade with China was more than Sweden's national budget of the time. The extravagant buildings along Norra and Sodra Hamngatan bear witness to its profitability.

Trade and shipping have played a major role over the centuries. During the industrialisation in the 19^{th} century, the city's rich men grew both richer and more numerous. Many of them have become immortal through their large donations to the city. Marked changes and new developments started towards the end of the nineteenth century when the population grew rapidly. The early 19^{th} century saw the beginnings of Goteborg's shipbuilding industry, when three major shipyards were constructed. New areas were incorporated into the city and industrial expansion started. Goteborg is today Sweden's most important city for trade and industry.

Large-scale emigration of Swedes, especially to the United States, started from Gothenburg. During the 1890's an average 20,000 Swedish people emigrated annually. Expansion continued until the 1970s when the population started to decrease moderately, as many people began to move to their own houses in small communities neighbouring the city.

Today, the majority of Swedes are Christian Lutheran followers. The "Schartauanism", a fundamentalist and conservative part of the Lutheran church, was very dominant on the West Coast, especially during the 19th century up to the beginning of this century.

Most people associate Swedish food with the Swedish smorgasbord, which is world-famous for its variety of tasty dishes (Anonymous, 1977). However, the Swedish table has a great deal more to offer for example favourite daily dishes:

meatballs, thin pancakes, fried stromming (small Baltic herring), fried salted herring, pea soup with pork, and kalops (a nourishing beef stew). Sweden also has a large number of provincial specialties which are cherished in certain regions, many of them are now available in food stores all over the country. To name a few, ostkaka (the curd cake), spettekaka (pyramid cake baked on a spit), and fotlandsflundror (smoked flatfish that is famous in Gotaland).

Dairy products have by tradition played an important part in the Swedish diet. Milk has always been the customary drink taken with meals, particularly everyday meals. Some people drink milk because they know it is beneficial for health, but most do so simply because they like it. This may therefore be the explanation for the number of big and strong Swedes people.

Bread is nearly always spread with butter, and normally the butter is salted. Extra salt butter is sold in a red package while regular butter in a golden package. The unsalted butter, which represents a very small part of the consumption, is sold in a green package. Sweden is also a cheese country par excellence. There are more than 200 different varieties of cheeses, and consumption has been growing rapidly and continuously during recent years.

In olden times the principal meal was at noon, with a light supper early in the evening. As years went by, dinner at five or six became more customary, when the whole family gathered around a rather heavy and elaborate meal. The Swedish lunch is a light meal with just one hot dish and usually a glass of milk. A cup of coffee completes the meal. Traditionally, the English drink tea whereas the Swedes drink coffee. Coffee is part of social life. Furthermore, the Swedes do not eat a piece of plain bread with their food, as is often the custom abroad. Instead there is a smorgas (open sandwich) for almost any occasion, with or without other food. The traditional Swedish loaf is often made with treacle (molasses). In addition, there is the Swedish knackebrod, the dry crisp bread.

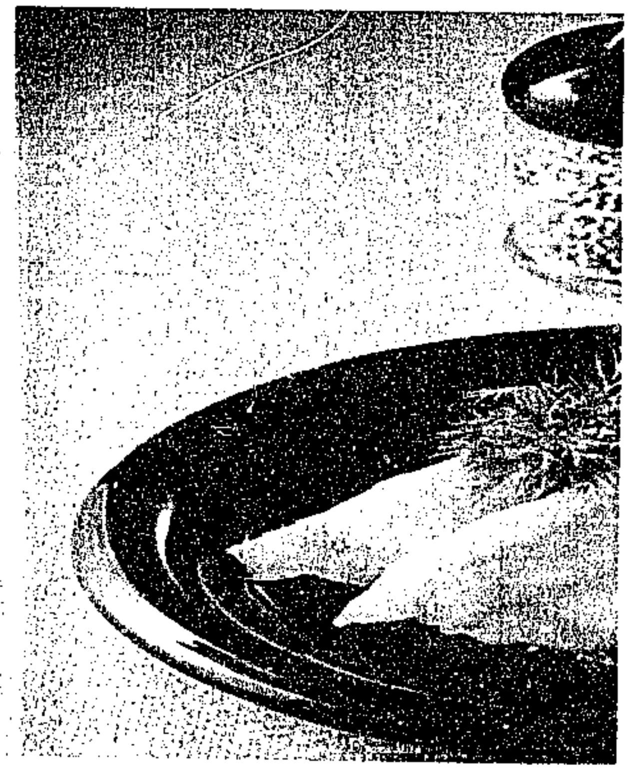
There is also festive food traditionally served on special occasions through the year. Foods usually consumed during spring include semla (big bun filled with almond paste and whipped cream eaten during Lent), waffles with jam and cream (on the Lady Day), eggs and pickled herring on Holy Saturday, leg of lamb for Easter Sunday, and gravadlax (fresh salmon with dill) for the end of April.

Summer is short but filled with delight. Green peas, tender beetroots and carrots are barely cooked in boiling water and served with butter. But tender vegetables are also necessary ingredients in the old-fashioned soup known as angamat (meadow soup). The traditional lunch on Midsummer's Day consists of boiled potato with dill and butter, together with sweet pickled herring, fermented cream and chopped chives with strawberries, raspberries, blueberries, and cloudberries. Fermented milk products are consumed in considerable quantities during summer. The hotter the summer the larger the consumption. The regular ferment milk is filmjolk, but low-fat fermented milk and yoghurt are gaining popularity.

In autumn, people eat crayfish with bread, butter, and cheese. They also consume shellfish, shrimps, and crabs. Lamb also becomes available along with fruits, mushrooms, and the typical Swedish red lingon-berries. Most of the lingon-berries are made into jam, of which the Swedes consume a considerable amount all through the year. The jam is served with pancakes and waffles, but also with meat dishes and puddings. It can also be served as a dessert with milk, while lingon-berry juice makes a refreshing drink.

Finally, during the cold Swedish winter hot food is particularly enjoyed. The most Swedish of soups, pea soup, is included on many menus every Thursday throughout the winter. Pea soup is made from dried yellow peas, which are boiled for a long time together with lightly salted pork. Thyme and marjoram give the soup a special flavour. Although pea soup is really a meal in itself, it is traditional to follow it with thick pancakes and jam. Other Swedish specialties which are popular during the winter are stewed brown beans with fried pork, and lightly salted meat which is boiled and served with mashed potatoes or mashed turnips. The most common fish dish is fried Baltic herring, which can be had all the year around. Plain boiled potatoes are, by tradition, served with Swedish meals as an everyday occurrence. In the olden days potatoes, cabbage and carrots were practically the only vegetables available in winter, and the main source of vitamin C. Christmas tables include a Christmas ham, boiled cabbage, spinach, herring salad with pickled beetroot, small meatballs, sausages, brawn, liver pate, rice porridge, gingerbread, and many more.

Traditional Swedish Diet
Thin pancake with lingon-berry
Pea soup with ham
Fish



Swedish Traditional Foods such as lingon-berry, fish, blood pudding, cream, meat, bread and bread crisp

Swedish Smorgasbord

c. Anglo-Celtic in Australia

Of the population of Victoria, only 17.5% claims Australian-only ancestry (Crocliett RA, 1990; Wahlqvist et al., 1995). In excess of 40% of the population of Victoria were of Anglo-Celtic descent, with English-only ancestry accounting for 31.6% based on the 1986 Census. Italians, Greeks, Germans, Chinese, Dutch and Maltese were other single ancestries which amounted to more than 1% of the population (Crocliett RA, 1990). There was a decline in the proportion of Christian followers from 75.9% in 1976 to 68.8% in 1986 (Wahlqvist et al., 1995). The decline resulted from an increase in the population of non-Christians (from 1.4% to 2.6%), the proportion of the population that stated no religion (from 9.4% to 13.9%) and those defined as "other" who include non-theistic groups, either inadequately described their response or did not respond (13.4% to 14.7%).

British eating patterns (Flint DM, 1983) influenced eating patterns of Anglo-Celtic Australians. The majority of British settlers in the early twentieth-century had wheat grain as staple food. At that time, Australians were considered to be high consumers of meat, with meat commonly being consumed three times a day. Three daily meals, including additional snacks in between meals, were served as part of a traditional meal pattern. A variety of foods were consumed in the morning such as porridge, oatmeal, wheatmeal, milk, sugar, egg, bacon, toast, white bread, marmalade, and tea or coffee. Lunch for workers normally consisted of a cut lunch or a meat pie; this trend is still seen today. Other members of the family ate sandwiches at home. Three courses of meals were served at dinner time: namely, soup, meat with gravy, potatoes, yellow and green vegetables, and steamed pudding or egg custard as dessert. Tea and beers were among the most popular beverages at that time. Since 1960s, the consumption of red meat, butter, tea, flour, and bread has decreased. However, increasing consumption of poultry, margarine, beer, carbonated drinks, wine, coffee, seafood, rice, breakfast, fruits, and vegetables has been observed. The presence of immigrants from other European countries, the Middle East and Asia has influenced heavily the eating patterns of Anglo-Celtic Australians today.

d. Greeks in Australia

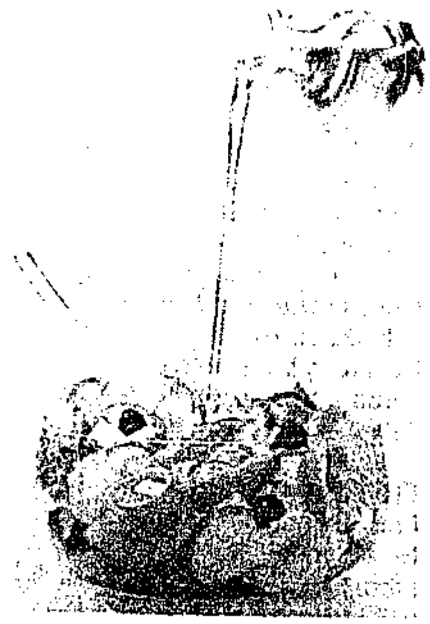
Australian immigration policy has influenced the make-up of the country's population, in particular the ethnicity of the ageing population (Wahlqvist et al., 1995). Its immigration policy, which commenced at the end of Second World War, resulted in Dutch, German and Italian, followed by Greek and Yugoslav migrants gradually replace migrants from the United Kingdom. This migration started from 1950 and continued until the early 1970s. The majority of migrants coming to Australia in the 1950s were in their twenties. Today, the proportion of the population aged 60 years and over formed by these diverse groups has doubled from 20 to 40%. A rapid increase in the elderly aged 75 years and over has subsequently emerged, which has corresponded with a fall in the group aged 60-74 years (Cozzi F, 1988; Crockett RA, 1991; Wahlqvist et al., 1995)

With very little formal education, but experience in farming, those Greeks migrating to Australia were predominantly from villages in rural mainland Greece, particularly from the north (e.g. Macedonia). Some of those that migrated came from major cities, such as Athens and Thessaloniki with better education. Greek-born Victorians' education as a whole is much lower than that of the total Victorian population. The majority of Greek-born Victorians that left school before the age of 16 have less than 5 years of primary school, and account for approximately 64.2%, compared with 39% for the Victorian population as a whole (Crockett RA, 1991; Wahlqvist et al., 1995).

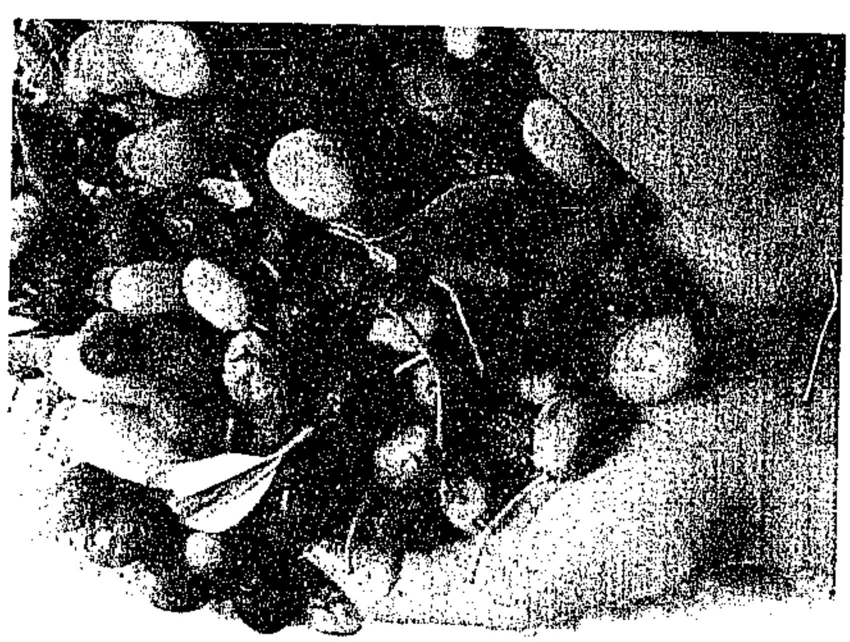
Traditional Greek foods are still being prepared by first generation Greeks, in particular the elderly, and many of these foods are typical of the region these Greeks originally migrated came from. The traditional Greek diet does not normally contain a lot of red meat, and is usually eaten only on special occasions, however white meat (especially fish) is eaten often. Traditional Greek cuisine does however have a large variety of 'vegetarian' style dishes. Other Greeks (Southern and island Greeks) consumed a lot of olive oil, a large variety of legumes and vegetables (especially wild greens and tomatoes), olives, limited meat (mainly lamb less than once a week) and plenty of fruit (especially grapes and figs but little citrus fruits) and fish (Anonymous, 1991a; Girkenezis M et al., 1970; Wahlqvist et al., 1995). Meat was comparatively cheap when Greeks migrated to Australia in the 1950s, resulting in meat being part of meals on a daily basis - a significant change to traditional food habits. Meat consumption has decreased since this time as a result of several factors, namely the unfavourable publicity it has received in terms of its negative effects on health, and the increasing prevalence of heart disease in Greek Australians (Wahlqvist et al., 1995).

Greeks in Australia have managed to keep much of their language intact. Given that culture retention refers to both language, religion and cuisine, Greeks have in many ways retained significant aspects of their culture, despite living abroad from their homeland. In the 1986 census, it was reported that 95% of people claiming Greek ancestry in Victoria spoke Greek at home, while 89.6% gave their religion as Greek Orthodox (Crockett RA, 1991; Wahlqvist et al., 1995). Despite being loyal followers of the Greek Orthodox religion, the elderly Greeks in Melbourne do not follow the fasting practices as strictly as elderly Greeks in Greece. Some examples of this divergence are where the Church recommends animal products be avoided during Easter (40 days), Christmas (40-60 days), Virgin Mary celebration (15 days in August) and Saint Apostollos (15 days). Instead, Melbourne Greeks tend to consume legumes, seafood, olives, olive oil, rice, pasta and bread in lieu of animal products (Wahlqvist et al., 1995).

Greek salad with fresh tomatoes, lettuce, fetta cheese, cucumber, olives and olive oil



Green and Black Olives



e. Greeks in Greece

The dietary habits in Greece differ depending on the region of habitation. For example, several regions (particularly rural areas) still follow a more traditional Greek diet and lifestyle, whereas city regions have adopted a more 'affluent' way of life (Trichopoulou A et al., 1993; Trichopoulou A and Efstathiadis PP, 1989). The rural region of Greece includes Spata, Markopoulou, and Paiania, where the inhabitants still follow a more traditional lifestyle. Accordingly, these 'traditional' Greek villages act as a standard by which to determine the degree of lifestyle and dietary changes made on migration by elderly Greeks to Australia. Many of Melbourne's Greeks migrated from rural villages in Greece in the 1950s and 1960s, such as Spata.

The traditional Greek diet consumed in these villages was, historically, typical of the foods and dishes eaten by southern Greeks and islanders, and consisted mainly of vegetarian style dishes. Although the traditional Greek diet is still evident today, meat is now eaten more frequently with legumes eaten less often. Also, the elderly in these communities are staunch followers of the Greek Orthodox religion performing most religious practices, namely fasting.

The Greek variant of the Traditional Mediterranean Diet

4.4 SOCIO-DEMOGRAPHIC

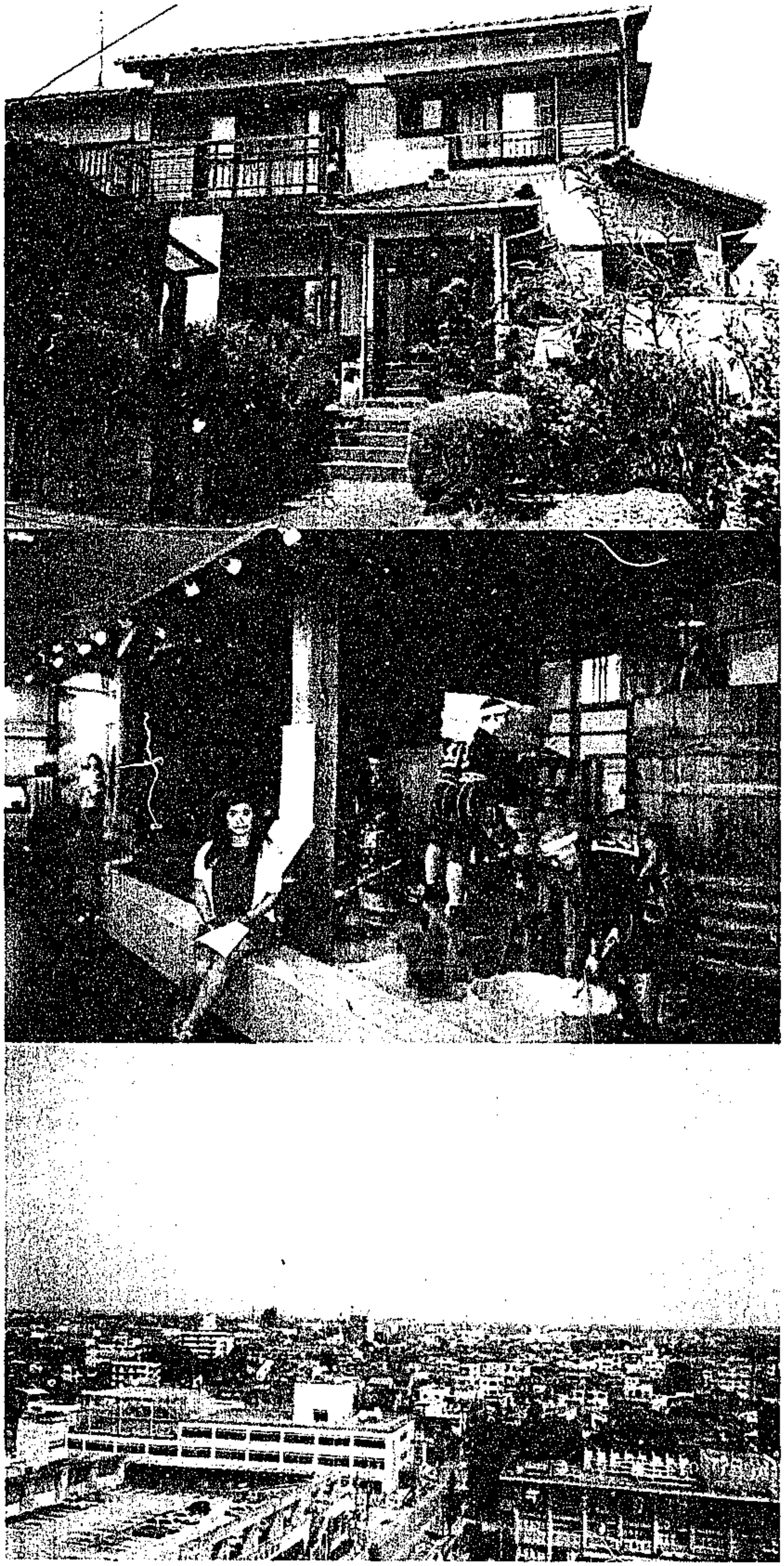
a. Japanese in Japan

In 1990, the total population of Japan was 123,610,000 persons (Statistics Bureau, 1995). Since 1950 to 1994, the birth rate has decreased from 28.1 to 10 per 1000 population. Similar trends were observed for the death rate from 10.9 to 6.7 per 1000 population. Based on 1991 figures, the total population of Okazaki was about 310,000 people (approximately equal numbers of men and women), with a population density of 1,352 persons/km^2 (Anonymous, 1992; Ueda, 1993). This figure was well above the nationwide population density of 333 persons/km^2 (Anonymous, 1992; Ueda, 1993).

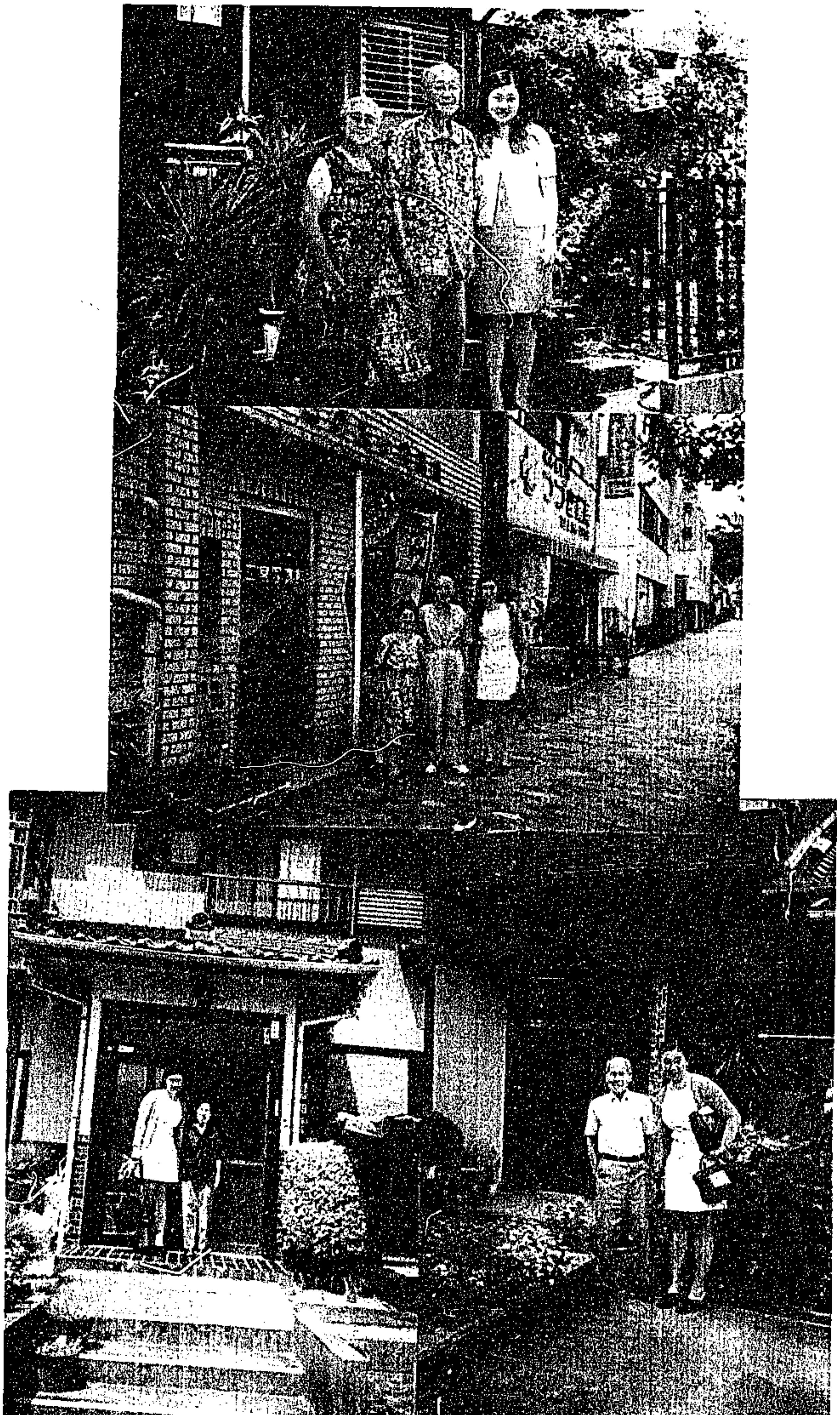
The ratio of the aged population (65 and over) to total population has increased from 4.9% in 1950 to 12.1% in 1990 with an estimated of 25.5% in 2020 (Statistics Bureau, 1995). The World Health Organization report in 1992 showed Japan as the leader in the world in average life expectancy at birth. The life expectancy for Japanese males increased from 58 years in 1950 to 76.57 years in 1994 whilst for females there was an increase from 61.5 years in 1950 to 82.98 years in 1994 (Statistics Bureau, 1995). In 1991, the elderly aged 65 years and over were 9.5% whilst the elderly aged 70 years and over were 6.22% of the total population in Okazaki. The latter figure was below the average Japanese elderly nationwide of 8.19%.

Japanese people earned an average of US$26,095 annually per person in 1993 (Statistics Bureau, 1995). This figure was well above other developed countries such as France, Germany, UK and USA. Thus Japanese people can be assumed to be 'affluent'. According to the 1990 statistics, the largest proportion of Japanese were employed as craftsmen, manufacturing, and construction workers (26.6%) (Statistics Bureau, 1995).

From top to bottom: Typical house in Okazaki; Visiting *miso* factory in Okazaki; Semi-urban Okazaki City



Visiting and interviewing elderly survivors in Okazaki, Japan



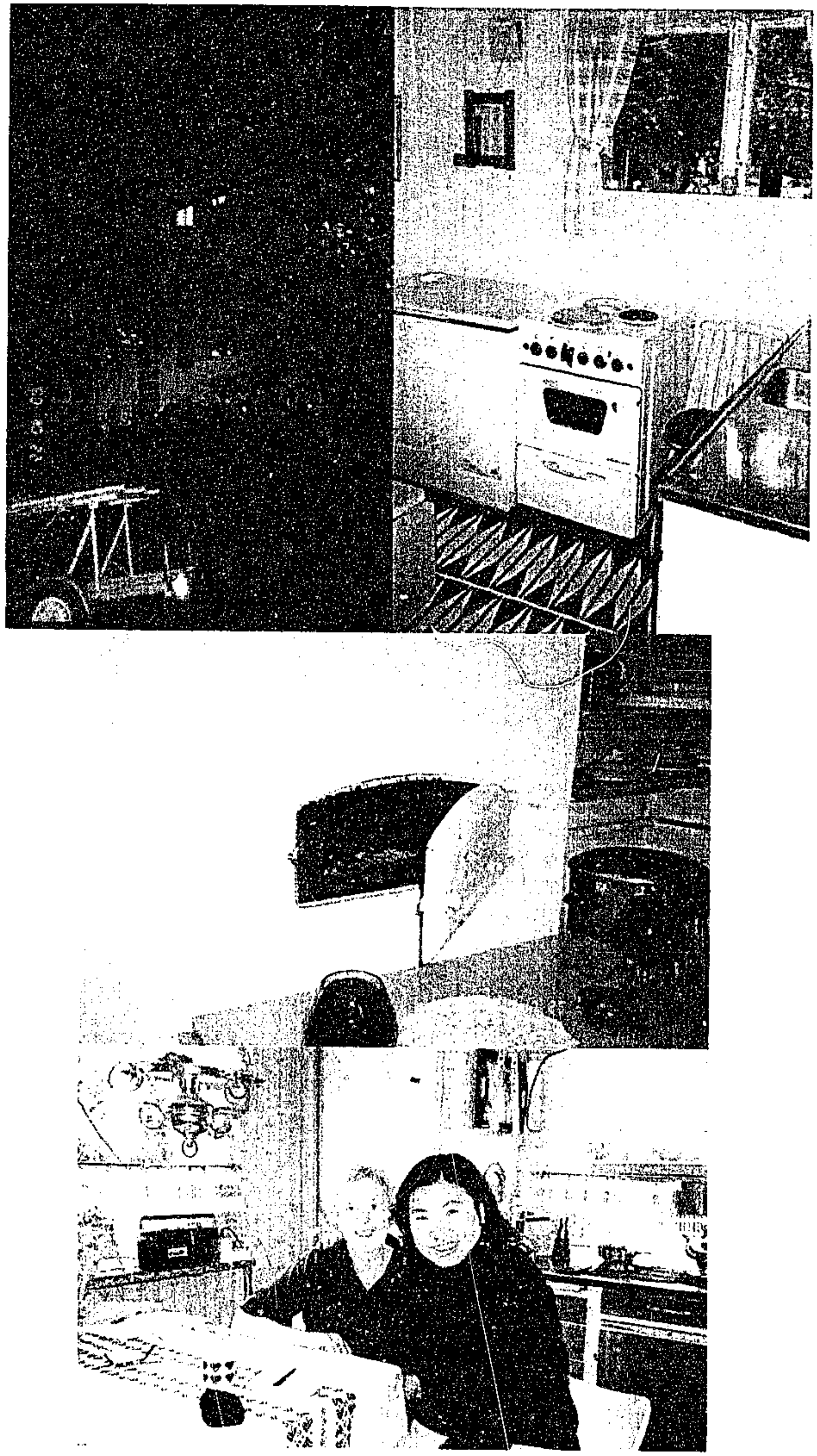
b. Swedes in Sweden

There has been a rapid increase in the number of elderly people, both in relative and absolute terms, during the last four decades. For example, in 1990, about 18% of the Swedish population were aged 65 years or older, where the proportion and number of the "very old" had rapidly increased. From 1980 to 1987 the proportion of individuals 90 years of age and older increased by 46%, while the proportion of younger people and children decreased. Life expectancy at birth was reported as rising to about 81 years for females and 75 years for males (Anonymous, 1992b).

Mortality does not exactly abide by socio-economic levels, as results from the Gerontological and Geriatric population studies in Gothenburg have shown (Steen B and Djurfeldt H, 1993; Wahlqvist et al., 1995). This indicates that lifestyle and other environmental factors might have greater importance. Interestingly, the differences between low-risk and high-risk occupations seem to be more pronounced after retirement. It appears that social network and associated factors have an increasing impact on morbidity and mortality patterns in Sweden. For instance, a risk indicator for elderly men may be whether or not they live alone.

Thirty-one per cent of the Johanneberg population are 65 years of age or older, compared to 19% in Gothenburg as a whole. Johanneberg is a very central area of Gothenburg, with a high proportion of elderly. Johanneberg is also a very stable area, where most people have lived between 30-60 years of their lives. The majority of these people can be characterised as middle or upper middle class. The proportion of immigrants in the Johanneberg area is very low compared to the city as a whole (4.4 and 10.3%, respectively). Few immigrants in the area have lived there for a long period of time, and most of them mainly came from Nordic countries.

Apartments in Johannberg area of Gothenburg, Sweden; Typical kitchen at proband's home; Visiting elderly folk in Gothenburg



Australia, Melbourne (Anglo-Celtic) (1992): type of housing in suburbs sampled; majority of homes are brick veneer built in the 1960s.

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c. *Anglo-Celtic in Australia*

In 1988, there was approximately 4.3 million people living in Victoria (Wahlqvist et al., 1995). This represented 26.0% of Australia's population, where in June of that year, the estimated resident population of Australia was 16.5 million. From 1983 to 1988, the average rate of growth of Australia's population was 1.44% per year whilst in Victoria alone it was 1.1%. It was reported that Victoria was considered to be the most densely populated State with average persons per square kilometre (18.7) as much as 3 times higher than New South Wales. Data from the Melbourne Statistical Division showed that on average 490 persons per square kilometre lived in Victoria whilst the Australian average was just over 2 persons per square kilometre. Out of this, over two thirds lived in the Melbourne Statistical Division, which comprised an estimated of 3,001,200 persons in 1988.

In 1988, 30,726 deaths were documented in Victoria (Crocliett RA, 1986; Wahlqvist et al., 1995). Diseases of the circulatory system accounted for 43.5% of all deaths. Of these diseases, ischaemic heart disease (IHD) and cerebrovascular disease (CVD) were most prevalent. IHD accounted for a slightly higher percentage of male deaths than female deaths (25.0% and 23.2%, respectively). In contrast, CVD represented a much higher percentage of female deaths than male deaths (12.8% and 7.3%, respectively). Malignant neoplasms caused 25.5% of all deaths in 1988, comprising 26.9% of male deaths and 24.0% of female deaths. Of the 4,419 male deaths from this cause, 1200 (27.2%) were from neoplasms of the trachea, bronchus, and lung, which were the most frequent sites of neoplasms in males. The most frequent site of neoplasms in females was the breast, which comprised 644 (18.8%) of the 3,429 female deaths from malignant neoplasms. Other common sites of neoplasms in females were the colon (12.2%) and the trachea, bronchus and lung (12.4%). Other major causes of death during 1988 were diseases of the respiratory system (7.9%), motor vehicle and other accidents (6.0% and 3.6% of males and female deaths respectively).

d. Greeks in Australia

Greeks have favoured Melbourne more than any other City for migration. Consequently, Melbourne has been the most common destination for Greek migrants to Australia, and is now the world's third largest Greek city, making it the third largest overseas-born community in the state. Almost half the Greek-born communities live in Victoria, with 96.6% residing in Melbourne. The Victorian Greek-born community comprises 49.3% of the total Australian Greek-born community (Crockett RA, 1991; Powles JW, 1990; Wahlqvist et al., 1995). In excess of 30% of Melbourne's population of 3 million are either foreign-born, or the children of foreign-born parents.

There were approximately 130,553 persons in Victoria who claimed Greek ancestry according to the 1986 census. Of these, 65,515 were born in Greece. The percentage of Greek-born elderly in Victoria in 1986 (78%: 15-54, 6.3%: 65+, 2%: 70+, 0.5%: 80+) was considerably lower than the total percentage of elderly in Victoria in 1991 (57.4%: 15-54, 11.6%: 65+, 7.7%: 70+, 2.3%: 80+) (Crockett RA, 1991; Wahlqvist et al., 1995).

The Greek-born population is slowly shifting from the inner areas of Melbourne (Richmond, Prahran, Brunswick, Footscray and Northcote) although some remain in the areas. The new destination areas include the outer eastern areas (Doncaster, Templestowe, Waverley) and Keilor in the West (Crockett RA, 1991; Powles JW, 1990; Wahlqvist et al., 1995). The largest proportion of Greek-born persons have been resident in Australia for between 15 and 39 years (83.5%), and therefore migrated to Australia between 1947 and 1971.

Greeks in Australia were regarded to be the 'second longest lived population in the world' in 1982 (Wahlqvist et al., 1995; Young C, 1986). This mortality advantage was extended to the major causes of death categories in which diet plays a major causal role - cardiovascular disease and cancer (Mc Michael AJ et al., 1980; Powles JW et al., 1988; Powles JW, 1990; Wahlqvist et al., 1995). These health benefits were seen to be stronger in the younger age groups than the older ones. On the other hand, the health profile of Greek Australians might have been transformed in an adverse direction since 1982 (Anonymous, 1991b; Wahlqvist et al., 1995). The prevalence of heart disease, hypertension and hypercholesterolemia were equally high or higher than Australian-born in all age groups particularly in women. Men in all age groups from this ethnic background received greater protection against cancer. It is interesting to note that in the majority of these

Australia, Melbourne (Greek) 1990-91: a typical weather board home in the northern suburbs of Melbourne, belonging to elderly Greeks

Australia, Melbourne (Greek) 1990-91: Greek navy sea captain

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cases, protection seems to have diminished earlier, than those who lived in Greece (Anonymous, 1992b; Armstrong et al., 1983; Wahlqvist et al., 1985).

Previous studies on elderly migrants in Australia found that Southern-European migrants had more health problems, suffered more nervous and mental disorders, had a higher prevalence of smoking, obesity and disability and lower exercise levels than their Australian-born counterparts (Australian Council on the Ageing and Department of Community Services, 1986; Australian Institute of Multicultural Affairs, 1985; National Heart Foundation, 1985). Similarly, Kouris-Blazos reported earlier that elderly Melbourne Greeks in the current study were not 'healthier' than Anglo-Celtic Australians (Kouris-Blazos, 1994; Wahlqvist et al., 1995).

In general, elderly Greek Australians appeared to be 'unhealthy' but at the same time they have protection against cancer. Powles argued that retention of some 'protective' elements of the traditional Greek diet (e.g. more fruit, vegetables, legumes, olive oil, less animal foods, moderate wine) would facilitate these health advantages (Powles JW, 1990). Furthermore, Trichopoulou et al has documented the benefits of preserving the traditional Greek diet in reducing the risk of death in the elderly (Trichopoulou et al., 1995).

e. *Greeks in Greece*

There were approximately 1.4 million elderly aged 65 or over living in Greece in 1991 (Anonymous, 1992b). More than 200,000 people had migrated back to Greece between 1976 and 1980 (Council of Europe, 1986). As a result, there have been considerable changes within the population.

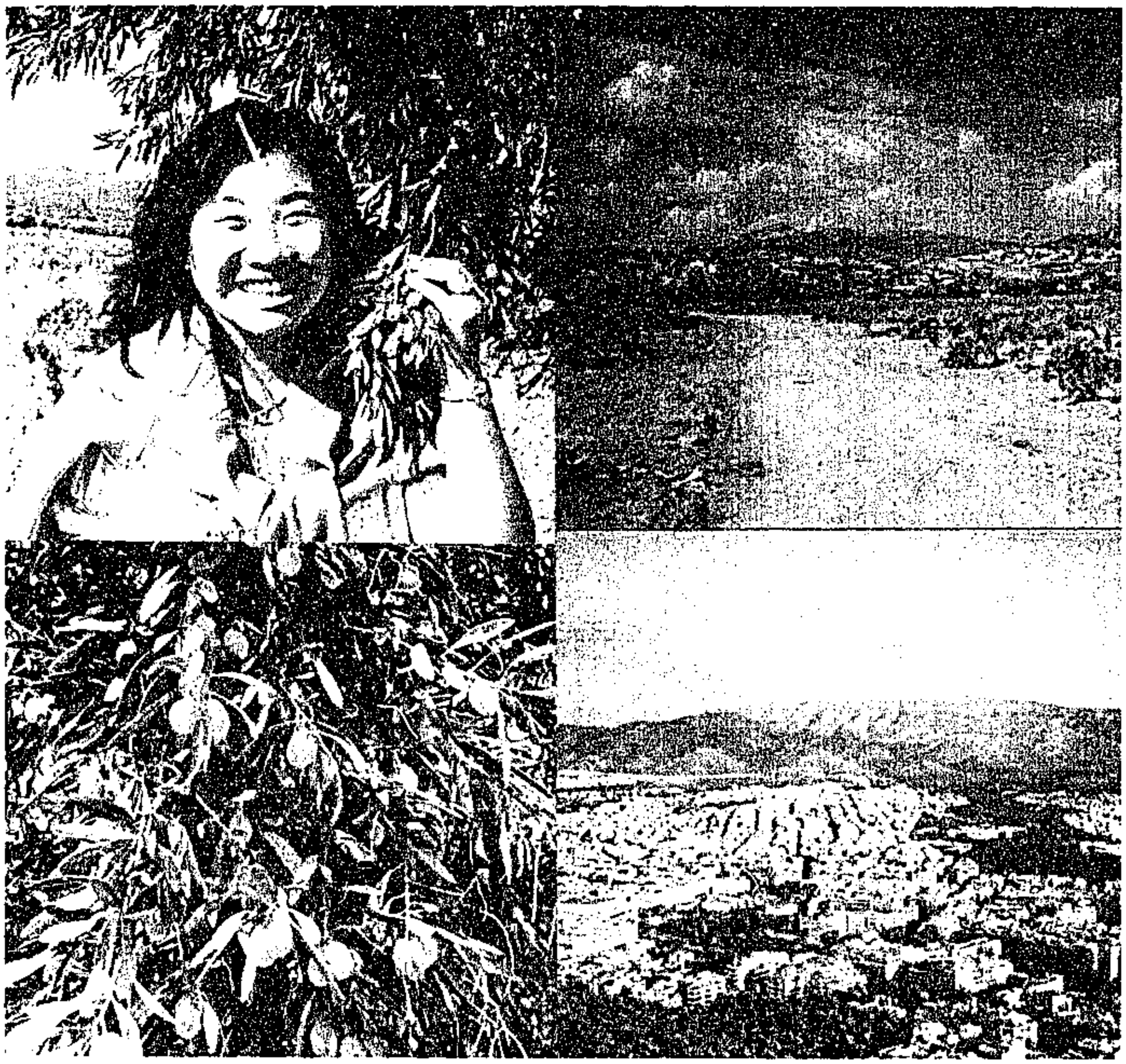
Greece is considered to be one of the healthiest countries in the world. It is interesting to note that although the age standardised death rates for IHD among Greeks in Greece were much lower in 1989, death rates for cerebrovascular disease were much higher than Australia. Age adjusted mortality from all causes in Greece was among the lowest in the world, especially in men. This might be due to very low cause-specific mortality rates from coronary heart disease and several cancers, such as those of the large bowel, prostate and breast (Trichopoulos D et al., 1989). In general, death rates for cancer were lower in Greece, however, stomach cancer rates were greater than in Australia. In contrast, death rates for breast and colon cancer were found to be lower in Australia (Anonymous, 1992b).

There is growing mortality and morbidity from heart disease with its common risk factors, such as hypercholesterolaemia and obesity (Anonymous, 1992b; de Groot LCPGM et al., 1991; Kafatos et al., 1991; Trichopoulou A, 1992). Mortality from other causes such as colon and breast cancers has also increased, but at a slower pace (Trichopoulos D et al., 1982). The protection against heart disease has slowly disappeared in Greece, like Australia (de Groot LCPGM et al., 1991), but retention against cancer is still observed.

Similarly, it has been proposed that retention of some 'protective' elements of the traditional Greek diet (e.g. more fruit, vegetables, legumes, olive oil, less animal foods, moderate wine) may help to preserve such health advantages (Anonymous, 1992b; Trichopoulou A, 1992). Furthermore, it has been demonstrated that elderly Greeks in Greece who preserved their traditional Greek diet have been shown to have lower risk from premature death (Trichopoulou et al., 1995).

Age structure, demographic characteristics and morbidity statistics for Spata, Markopoulou, and Paiania were not available. The only data available was from the electoral rolls in Spata. It was reported in 1981 that there were 52 deaths in Spata. Moreover, it was documented that the sex specific mortality rate for men and women were 3.6 and 4.2 per 1000 per year, respectively (Anonymous, 1992b; Wahlqvist et al., 1995). Mortality data from other Greek villages were not available.

Spata village in Greece with its winery and olive trees (top pictures)



Left-bottom: Green Olives

Right-bottom: Athens in Greece

Visiting elderly Greeks survivors living in a typical rural house in Spata, Greece

4.4.1 AGE AND GENDER

The average age of subjects who survived was 76 years old whilst the average age of subjects who died was 79 years old. Subjects who died were found to be significantly older than those who survived (P=0.0001). Using the Cox Proportional Hazard, subjects who were older at the commencement of the study were more likely to die (RR=1.073, CI 1.048-1.097; P=0.0001). The effect of gender was also being examined. After controlling for age at enrolment, male subjects were found to be at higher risk of death than their female counterpart (RR=1.388, CI 1.022-1.885; P=0.036).

The cross-cultural comparisons of average age at enrolment within the FHILL centres are summarized at the end of this chapter.

4.4.2 EDUCATION ATTAINMENT

The IUNS questionnaire included questions on education background in each FHILL centre (Wahlqvist et al., 1995). Subjects who had at least 12 years of formal education were considered as having attended secondary school. The majority of the Japanese cohort in Japan was found to attend secondary school. Moreover, around one third of Anglo-Celtic Australians particularly in the younger elderly have completed secondary school. In contrast, there was only a minority of Greeks in both Australia and Greece who undertook secondary education.

4.5 ANTHROPOMETRY AND BODY COMPOSITION

Anthropometry and body composition assessment were of interest in the current study for the following reasons:

- To describe weight and height across longevity cultures
- To identify body mass index in the elderly in both survivor and deceased groups

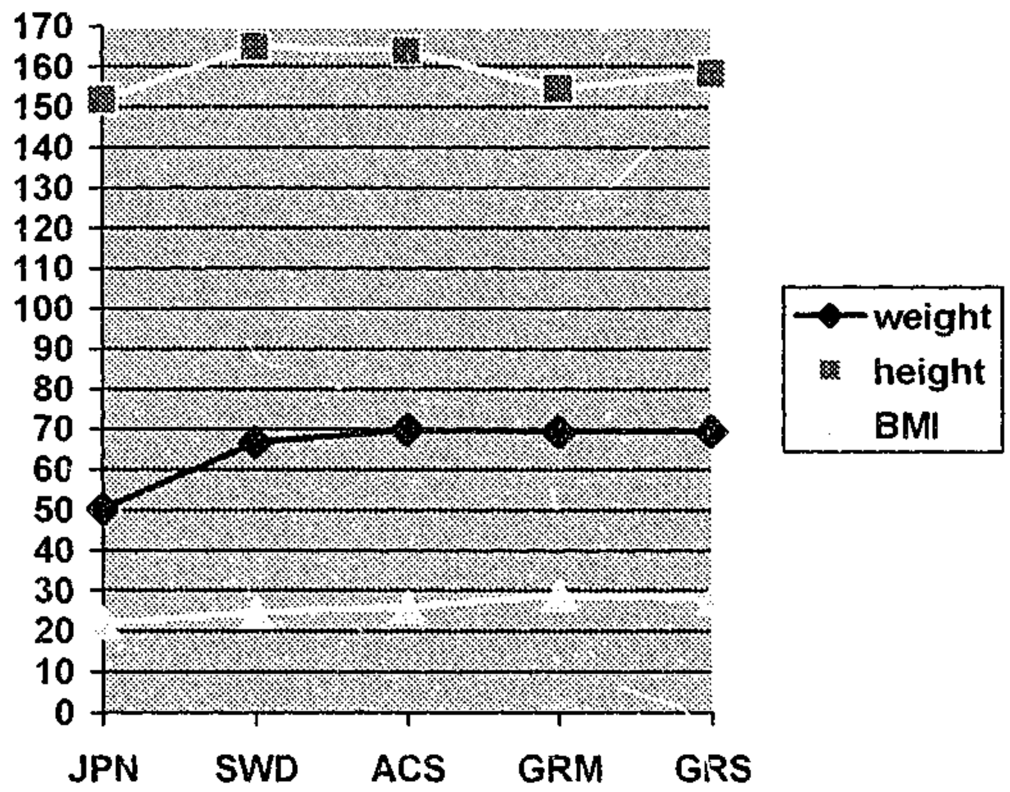
4.5.1 WEIGHT

Weight is the most commonly recorded anthropometric variable, and generally it is measured with sufficient accuracy. Weight measurement reflects the recent and present balance between energy intake and energy expenditure. Weight is a composite measure of total body size. It is important in screening for unusual growth, obesity, and undernutrition. A loss of weight (mainly lean mass) is common in the elderly but this has not been seen in some groups, particularly if they are physically active (Carmeli D et al., 1991; Durnin JVGA, 1985).

4.5.2 HEIGHT

Stature is an essential indicator of general body size and of bone length. It is used in screening for disease or malnutrition and in the interpretation of weight. Variations from the normal range can have social consequences, in addition to their associations with disease. As people get older, a decrease in stature is common (Chandler PJ and Bock RD, 1991; Chumlea WC et al., 1988; Cline MG et al., 1989). These decreases are mainly due to losses in trunk length (Frisancho AR, 1990; Parizkova J and Eiselt E, 1980; Wahlqvist ML and Flint DM, 1988).

Figure 4.1. Cross-cultural comparison of weight, height, and BMI amongst longevity cultures.



4.5.3 Body Mass Index (BMI)

Body Mass Index (BMI) is calculated as weight in kilograms divided by squared of height in metres. According to the WHO classification, BMI between 18.5-24.9 is considered to be in the normal/healthy range, BMI between 25-29.9 is in the overweight range, BMI>30 is in the obese range, and a BMI<18.5 is considered underweight/malnutrition (See chapter 3). Furthermore, there are three categories for chronic energy deficiency (CED) where subjects have BMI<18.5 kg/m^2 (James WPT et al., 1988). It has been reported that Asian populations experienced greater health problems at a lower BMI than Caucasian populations (Europids) (Inoue S and Zimmet P, 2000). Therefore, a lower cut-off point has been introduced namely BMI ≥23 kg/m^2 for overweight and BMI ≥25 kg/m^2 for obesity.

In the current study, height and weight were measured to calculate BMI. The average BMI for this population was 26.4 kg/m^2 for survivors and 25.1 kg/m^2 for deceased groups. Subjects in the survivors group had significantly higher BMI than those in the deceased group.

Table 4.1. Descriptive statistics for body mass index (kg/m^2) by survival status

	Survivors			Deceased		
Variable	Mean	±	SD	Mean	±	SD
	N	=	575	N	=	144
BMI**	26.4	±	4.6	25.1	±	4.9

** P<0.01; Significant differences by Wilcoxon rank-sum test.

4.6 CHAPTER SUMMARY

The summary of FHILL longevity cohort characteristics is described below.

Table 4.2. Summary of FHILL cohort characteristics

Code	Location	Rural or Urban	Ethnicity	Sample Size			Age		
				Men	Women	Total	Mean	±	SD
JPN	Okazaki, Japan	Semi-urban	Japanese	43	46	89	77.18	±	5.7
SWD	Gothenburg, Sweden	Urban	Swedes	73	144	217	77.88	±	5.5
ACS	Melbourne, Australia	Urban	Anglo-Celtic	70	71	141	74.26	±	4.7
GRM	Melbourne, Australia	Urban	Greeks	94	95	189	77.58	±	6.2
GRS	Spata, Markopoulou, Paiania, Greece	Rural	Greeks	91	91	182	76.27	±	4.5

CHAPTER 5

CHAPTER 5

SURVIVAL DETERMINANTS: HEALTH, SOCIAL, AND LIFESTYLE

5.1 INTRODUCTION

The mortality follow-up of the FHILL study allows an integrative analysis of the cross-cultural prediction of survival by various indices of age-fitness. Between 1993 and 1999 mortality data was collected from five elderly cohorts: namely Japanese in Japan, Swedes in Sweden, Anglo-Celts and Greeks in Australia, and Greeks in Greece. Cox's Proportional Hazards models were developed to examine the effect of health status, social and lifestyle variables on survival.

The objectives of this chapter include:

- To describe the collective health status, social and lifestyle variables of populations surveyed at baseline
- To examine health status, social and lifestyle variables in predicting mortality of elderly people from different locations and ethnic backgrounds
- To describe cross-cultural comparisons amongst longevity cultures based on health status, social and lifestyle variables at baseline
- To analyse cross-cultural comparisons of health status, social and lifestyle variables in predicting mortality of individual cohorts

Results for each determinant of survival are divided into two major sections. Firstly, the general predictors of mortality in combined cohorts are examined, whilst the second section deals with cross-cultural comparisons of each cohort.

5.2 HEALTH STATUS

This section examines predictors of mortality based on participants' health status at baseline. The health status measured at the commencement of the study included:

- Memory
- Wellbeing
- Self-rated health
- Health behaviour
- Self-reported health conditions
- Non-index items
- Self-reported medication use

The usual instrument used to assess cognitive function is the Folstein Mini-Mental-State Examination (MMSE) (Folstein MF et al., 1975). It measures orientation, recall, language, attention, and calculation. This test has limitations cross-culturally as equivalent phrases in another language are not always available and it assumes a certain level of education and literacy. The questions on memory and orientation are more cross-culturally robust. Accordingly, only 5 questions on ability to recall correct year, month/day of the week, address, and whether they feel they are forgetful at present, were included in this study.

The questions on memory were adapted from the WHO Western Pacific Study that was almost identical to the MMSE (Anonymous, 1986). These questions were asked at the beginning of the interview at baseline in order to assess the reliability of the participant's memory before proceeding to the rest of the questionnaire. Spouse or relatives were included in the interview if incorrect answers to two or more of these questions were obtained. A simple score was created ranging from 0-5, with 5 representing good memory and orientation.

The questions on well-being were also taken from WHO Western Pacific Study (Anonymous, 1986). These questions were not designed to be diagnostic, but rather to identify the range of affective functioning in the study populations. They described feelings of worry, depression, tiredness, loss of interest and sleeplessness (questions WB 11-17). A further 5 questions were created for the study to describe contentedness with life, tendency to laugh, enjoyment of music, feeling lonely and feelings of acknowledgment and respect by friends and relatives (WB 17a-19 and SAR 101-102). The well-being score ranged from 0-7, with 7 representing a good state of well-being (with little or no depression).

Based on a review by Fillenbaum, the Multi-level Assessment Instrument (MAI) was used to obtain information on self-rated health, health behaviour and health conditions (Fillenbaum GG, 1984; Lawton MP et al., 1982). MAI is one of the most valid and reliable measures to be used on a population study, as it is carefully constructed and has been tested for reliability and validity. Total health score (ranged from 33-74) was calculated based on individual health variable scores: namely self-rated health score (from 4-13), health behaviour score (from 3-9), health conditions score (from 25-50), and a non-indexed item (from 1-2). In all cases, a higher score is associated with a better score. The self-rated health score describes overall health at baseline, while the health behaviour score describes the use of medical services, and the health conditions score describes common health conditions such as diabetes, high blood pressure, eyesight and hearing, and whether limbs were missing or handicapped. Finally, non-indexed item describes the use of a wheelchair.

The self-reported medication used was assessed by the means of a 21-item check-list of the Older American Research Services (OARS) questionnaire (Fillenbaum GG and Smyer MA, 1981). The medication score ranged from 21-42, with a higher score indicating less medication used. Questions on vitamin supplements and the use of various health aids, such as canes and hearing aids, were also collected.

The memory, well-being, and health variable scores measured at baseline were introduced alternatively in the Cox Proportional Hazard model. This model was controlled for age at enrolment (in 5-y intervals), gender (0=female, 1=male), and smoking status (0=non-smoker, 1=smoker). In addition, adjustment for ethnicity/locality (0=JPN, 1=SWD, 2=ACS, 3=GRM, 4=GRS) was incorporated into Cox's model to predict mortality in combined cohorts only.

5.2.1 General predictors of mortality in elderly people from different locations and ethnic backgrounds

The average health scores of combined cohorts (JPN, SWD, ACS, GRM, and GRS) assessed at baseline are presented in Table 5.1. The average well-being score in the survivors (5.3) were significantly higher than in the deceased group (4.9). The average self-rated health score also appeared to be significantly higher in the survivors group (9.3 vs 8.2). Similarly, the survivors had a significantly higher health behaviour score (7.8 vs 7.3), health conditions score (46.7 vs 45.5), medication score (40.2 vs 39.8), and total health score (65.8 vs 63).

Table 5.1. The average health scores at baseline from combined FHILL cohorts based on 5-7 years mortality follow-up.

Variables	Score range	Survivors Mean ± SD N = 553	Deceased Mean ± SD N = 148	Total Mean ± SD N = 701
Memory Score	0-5	4 ± 1	4 ± 1	4 ± 1
Wellbeing Score*	0-7	5 ± 2	5 ± 2	5 ± 2
Self-rated health Score***	4-13	9 ± 2	8 ± 2	9 ± 2
Health behaviour Score*	3-9	8 ± 1	7 ± 2	8 ± 1
Health conditions Score***	25-50	47 ± 4	46 ± 3	46 ± 4
Medication Score*	21-42	40 ± 2	40 ± 2	40 ± 2
Total health Score***	33-74	66 ± 5	63 ± 5	65 ± 5

Significant differences between Survivors and Deceased by Wilcoxon Rank-sum test:

* *P<0.05;* *** *P<0.001*

The memory score was associated with less risk of death by 24% (*RR=0.76, P=0.001*). The wellbeing score was associated with a reduction in risk of death by 12% (*RR=0.88, P=0.029*). The self-rated health score was associated with a 14% reduction in hazard of death (*RR=0.86, P=0.0005*). The health behaviour score was associated with a sharp reduction in risk of death by 20% (*RR=0.80, P=0.0002*). Similar findings were observed for the health conditions score, although the risk-ratio did not reach significance (*RR=0.95, P=0.05*). The medication score was associated with less risk of death by 9% (*RR=0.91, P=0.03*). And finally, the total health score was associated with a 7% reduction in risk of death (*RR=0.93, P=0.0002*). The results above occurred for one unit increase in each score.

Table 5.2. Mortality risk-ratio estimates (and 95% CI) derived from alternative Cox's models with each health variable

	Risk Ratio† *(95%CI)*	*P value*
Memory Score	0.76 (0.64 to 0.89)	0.0014
Wellbeing Score	0.88 (0.79 to 0.98)	0.0288
Self-rated health Score	0.86 (0.79 to 0.94)	0.0005
Health behaviour Score	0.80 (0.72 to 0.90)	0.0002
Health conditions Score	0.95 (0.89 to 1.00)	0.0521
Medication Score	0.91 (0.84 to 0.99)	0.0296
Total health Score	0.93 (0.90 to 0.97)	0.0002

†From model including terms of age at enrolment (5-y interval), gender, smoking status, and ethnicity/locality

5.2.2 CROSS-CULTURAL COMPARISONS: PREDICTORS OF MORTALITY IN ELDERLY PEOPLE FROM DIFFERENT LOCATIONS AND ETHNIC BACKGROUNDS

In a comparison of the Japanese in Japan, Swedes in Sweden, Anglo-Celts in Australia, Greeks in Australia and Greeks in Greece, it was found that, in general, Japanese and Swedes had a higher memory score. Swedes had the highest wellbeing score than the rest of the populations. Greeks in Australia reported the highest self-rated health score amongst other FHILL cohort studies. Swedes in Sweden, Greeks in Australia and in Greece reported a better health behaviour score. Anglo-Celts in Australia reported better health conditions score and total health score. Lastly, Japanese in Japan reported using less medication (higher medication score means less medication used). Cross-cultural comparisons of health scores are presented in Table 5.3.

Results from the Cox's model for each of the health variables showed a reduction in risk of death between 3-16%, with a higher total health score cross-culturally, although it was least evident for the Japanese in Japan. Better health behaviour score and less medication used (higher medication score) might reduce the hazard of death for Japanese in Japan.

A higher memory score was associated with a 37% lower risk of death for Swedes in Sweden *(RR=0.63%, P=0.02)*. About a 34% and 15% reduction in risk of death were observed with a unit increase in self-rated health score for Anglo-Celts in Australia *(RR=0.66, P=0.029)* and Greeks in Greece *(RR=0.85, P=0.047)*, respectively. A higher health behaviour score, health conditions score, and total health score were a significant predictor of the hazard of death for Greeks in Australia, whereas memory score and wellbeing score might also reduce the hazard of death. These results are presented in Table 5.4.

Tables 5.3. Average scores of health variables from each FHILL cohort.

Variables	Scores range	Japanese in Japan Mean ± SD N = 81	Swedes in Sweden Mean ± SD N = 217	Anglo-Celts in Australia Mean ± SD N = 135	Greeks in Australia Mean ± SD N = 189	Greeks in Greece Mean ± SD N = 104
Memory Score	0-5	5 ± 1	5 ± 1	4 ± 1	4 ± 1	4 ± 1
Wellbeing Score	0-7	5 ± 1	6 ± 2	5 ± 1	5 ± 2	5 ± 2
Self-rated health Score	4-13	8 ± 2	9 ± 2	9 ± 2	10 ± 2	8 ± 3
Health behaviour Score	3-9	7 ± 2	8 ± 1	7 ± 1	8 ± 1	8 ± 1
Health conditions Score	25-50	48 ± 5	43 ± 2	50 ± 2	46 ± 2	47 ± 2
Medication Score	21-42	41 ± 1	40 ± 2	N/A	40 ± 2	40 ± 1
Total health Score	33-74	65 ± 6	62 ± 5	69 ± 4	66 ± 5	65 ± 5

N/A data were not available

Table 5.4. The Cox Proportional Hazards model adjusted for age, gender and smoking on health variables from each FHILL cohort

Variables	*Japanese in Japan N=81 RR*	*P value*	*Swedes in Sweden N=184 RR*	*P value*	*Anglo-Celts in Australia N=126 RR*	*P value*	*Greeks in Australia N=189 RR*	*P value*	*Greeks in Greece N=104 RR*	*P value*
Memory Score	1.10 (0.59 to 2.08)	0.763	0.63 (0.42 to 0.94)	0.023	0.70 (0.44 to 1.09)	0.116	0.75 (0.56 to 1.01)	0.056	0.81 (0.60 to 1.09)	0.161
Wellbeing Score	0.71 (0.48 to 1.06)	0.090	0.97 (0.79 to 1.18)	0.753	1.01 (0.59 to 1.71)	0.981	0.78 (0.61 to 1.01)	0.058	0.90 (0.74 to 1.08)	0.250
Self-Rated Health Score	0.78 (0.55 to 1.11)	0.167	0.90 (0.79 to 1.03)	0.125	0.66 (0.46 to 0.96)	0.029	0.88 (0.72 to 1.08)	0.228	0.85 (0.72 to 0.99)	0.047
Health behaviour Score	0.80 (0.64 to 1.00)	0.053	0.83 (0.66 to 1.05)	0.122	0.80 (0.55 to 1.17)	0.255	0.62 (0.47 to 0.84)	0.002	0.91 (0.71 to 1.17)	0.482
Health conditions Score	1.00 (0.89 to 1.13)	0.961	0.92 (0.78 to 1.08)	0.305	0.80 (0.57 to 1.10)	0.169	0.81 (0.67 to 0.98)	0.029	0.90 (0.76 to 1.06)	0.203
Medication Score	0.63 (0.38 to 1.02)	0.062	0.95 (0.86 to 1.06)	0.387	N/A		0.88 (0.71 to 1.10)	0.253	0.78 (0.60 to 1.01)	0.059
Total Health Score	0.97 (0.01 to 1.03)	0.305	0.94 (0.88 to 1.01)	0.082	0.84 (0.72 to 0.99)	0.031	0.89 (0.81 to 0.97)	0.010	0.93 (0.86 to 1.01)	0.071

N/A = data were not available

5.3 SOCIAL AND LIFESTYLE FACTORS

Social factors were assessed by questionnaire at the commencement of the FHILL study. The questionnaire was an adaptation of the social activity part of the Multi-level Assessment Instrument for the elderly (MAI), developed by the Philadelphia Geriatric Centre in the USA (Lawton MP et al., 1982). The score explores frequency and ways of spending time alone or with others.

The social network score describes relationships and support from friends and relatives, feelings of loneliness, and respect accorded by other members of the family. The questions were modified from the Multi-level Assessment Instrument and WHO Western Pacific Study (1986; Lawton MP et al., 1982).

Insomnia is a prevalent health complaint among elderly persons, but it is not a normal consequence of aging (Kouris-Blazos, 1994). Trichopoulos et al reported that napping reduced coronary mortality in Greek men (Trichopoulos D et al., 1987). Pattern of sleep, such as hours of sleeping and napping, as part of lifestyle variables were obtained through the questionnaire at the commencement of this study. These variables were then introduced alternatively into the Cox's model.

Cigarette smoking is the single most preventable cause of morbidity and mortality in the USA (Giordano JM, 1997). The association between cigarette smoking and premature death was first reported by Pearl in 1938 (Pearl R, 1938). Since then clinical, epidemiological, pathologic, and laboratory findings have consistently verified a relationship between smoking and cancer, cardiovascular, and chronic pulmonary diseases (Cosin-Aguilar J et al., 1995; Fielding JE, 1985; Kannel WB, 1981). Primary prevention trials on reducing smoking rates have resulted in a reduction in mortality from coronary heart disease (Dowse GK et al., 1995; Neaton JD and Wentworth D, 1992).

Results from five cohorts combined were analysed using Cox Proportional Hazard's models controlled for age at enrolment (in 5-year intervals), gender (0=female, 1=male), smoking status (0=non-smoker, 1=smoker), and ethnicity/locality (0=JPN, 1=SWD, 2=ACS, 3=GRM, 4=GRS). Results for cross-cultural comparisons of each FHILL cohort were not controlled for ethnicity/locality since each cohort was assessed individually. Each variable was introduced in the model separately. Smoking status was placed as a predictor variable in the Cox's model to obtain the hazard of death from smoking.

5.3.1 General predictors of mortality in elderly people from different locations and ethnic backgrounds

The average level of social activity and social network scores are illustrated in the table below. It was found that the average of both social activity score and social network score were significantly higher in survivors than in the deceased (*P=0.0001*).

Table 5.5. Average hours of sleep and level of social activity and social network scores.

Variables	Score range	Survivors			Deceased			Total		
		Mean	±	SD	Mean	±	SD	Mean	±	SD
		N	=	553	N	=	148	N	=	701
Social Activity Score***	22-176	56	±	14	49	±	13	55	±	14
Social Network Score***	12-46	35	±	5	33	±	5	34	±	6
Sleeping	0-12	7	±	2	7	±	2	7	±	2
Napping	Yes-No									
Smoking status	Yes-No									

Significant differences between Survivors and Deceased by Wilcoxon Rank-sum test:

*** $P<0.001$

The Social Activity and Social Network scores were separately introduced into the Cox's Proportional Hazards model with adjustment for age at enrolment (5-y intervals), gender, smoking status and ethnicity/locality. A higher Social Activity score was associated with less risk of death by 3% *(RR=0.97, P=0.0008)*. A higher Social Network score was associated with less risk of death by 7% *(RR=0.93, P=0.0002)*.

The length of sleep was not found to be associated with mortality. The absence of napping during the day was significantly associated with a reduction in risk of death by 43% (*RR= 0.57 (0.4 to 0.8); P = 0.001)*. However, this ratio was a significant predictor of mortality only when ethnic origin (ethnicity/locality) was not included as an independent risk factor.

Smoking was a significant predictor of the hazard of death *(RR=1.55, P=0.04)*. This result was based on the Cox's model, controlled for age at enrolment in 5-y intervals, gender (0=female, 1=male), and ethnicity/locality (0=JPN, 1=SWD, 2=ACS, 3=GRM, 4=GRS). Current smoker status at baseline included those who quit smoking in the last five years, whereas non-smoker status included ex-smokers who quit smoking for more than five years at the commencement of this study.

Table 5.6. Mortality risk-ratio estimates (and 95% CI) derived from alternative Cox's models with each of social and lifestyle variables

	Risk Ratio† (95%CI)	*P value*
Social Activity Score	0.97 (0.96 to 0.99)	0.0008
Social Network Score	0.93 (0.89 to 0.97)	0.0002
Sleeping (hours of sleep)	1.00 (0.89 to 1.12)	0.9607
Napping (0=taking a nap, 1=not taking a nap)	0.70 (0.46 to 1.05)	0.0853
Smoking status# (0=non-smoker, 1=smoker)	1.55 (1.02 to 2.35)	0.0416

†Except smoking status, from model including terms of age at enrolment (5-y interval), gender, smoking status, and ethnicity/locality.
#Smoking status at enrolment (0=non-smoker, 1=smoker) from model including terms of age at enrolment (5-y interval), gender (0=female, 1=male), and ethnicity/locality (0=JPN, 1=SWD, 2=ACS, 3=GRM, 4=GRS).

5.3.2 CROSS-CULTURAL COMPARISONS: PREDICTORS OF MORTALITY IN ELDERLY PEOPLE FROM DIFFERENT LOCATIONS AND ETHNIC BACKGROUNDS

The Greeks in Greece had the lowest social activity score amongst other FHILL cohorts, whilst the Anglo-Celts in Australia had the highest score. The Japanese in Japan had the lowest social network score whereas the Greeks in Australia had the highest score. The average number of hours of sleep was 8 hours for Japanese in Japan, 6 hours for Greeks in Greece, and 7 hours for other populations.

Up to a 4% reduction in hazard of death was associated with higher social activity scores cross-culturally, in particular for Greeks in Greece *(RR=0.96, P=0.01)*. A similar trend was observed with higher social network scores across populations yielding up to a 16% reduction in risk of death, especially for Greeks in Greece *(RR=0.84, P=0.0003)*. An inverse trend was seen in current smoking status. Smokers were associated with increased risk of death cross-culturally, although this trend did not reach significance.

Table 5.7. The average level of social and lifestyle variables in 5 FHILL cohorts.

Variables	Japanese in Japan	Swedes in Sweden	Anglo-Celts in Australia	Greeks in Australia	Greeks in Greece
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
	N = 81	N = 184	N = 126	N = 189	N = 104
Social Activity Score (22-176)	50 ± 11	54 ± 12	65 ± 15	54 ± 14	48 ± 14
Social Network Score (12-46)	28 ± 4	33 ± 6	35 ± 4	38 ± 5	36 ± 4
Sleeping (hours of sleep at night)	8 ± 1	7 ± 1	7 ± 3	7 ± 2	6 ± 2

Table 5.8. The Cox Proportional Hazards model adjusted for age at enrolment (in 5-y intervals), gender, and smoking on social and lifestyle variables from each FHILL cohort.

Variables	*Japanese in Japan N=81 RR*	*P value*	*Swedes in Sweden N=184 RR*	*P value*	*Anglo-Celts in Australia N=126 RR*	*P value*	*Greeks in Australia N=189 RR*	*P value*	*Greeks in Greece N=104 RR*	*P value*
Social Activity Score	0.97 (0.92 to 1.01)	0.137	0.99 (0.96 to 1.02)	0.579	0.98 (0.94 to 1.01)	0.216	0.97 (0.93 to 1.00)	0.077	0.96 (0.92 to 0.99)	0.014
Social Network Score	0.91 (0.79 to 1.04)	0.147	0.96 (0.90 to 1.01)	0.136	0.93 (0.80 to 1.09)	0.354	0.95 (0.87 to 1.03)	0.213	0.84 (0.76 to 0.92)	0.0003
Sleeping	0.97 (0.69 to 1.37)	0.871	0.99 (0.78 to 1.26)	0.934	0.83 (0.68 to 1.02)	0.079	1.19 (0.94 to 1.51)	0.145	1.06 (0.86 to 1.31)	0.618
Napping	0.45 (0.17 to 1.16)	0.099	0.62 (0.33 to 1.18)	0.147	0.72 (0.20 to 2.58)	0.613	1.46 (0.59 to 3.63)	0.415	0.45 (0.09 to 2.33)	0.341
Smoking	1.12 (0.43 to 2.91)	0.823	1.80 (0.90 to 3.61)	0.097	2.50 (0.66 to 9.43)	0.177	1.23 (0.39 to 3.90)	0.723	1.51 (0.62 to 3.67)	0.367

5.4 CHAPTER DISCUSSION

Several studies have examined the associations between state of health, social activity, social network, social support, lifestyle, and mortality in later life (Barberger-Gateau P et al., 1992; Berg S et al., 1981; Rinder L et al., 1975; Simons LA et al., 1990; Steen B and Djurfeldt H, 1993). Similarly in the current study, elderly people from different ethnic backgrounds were recruited under the auspices of IUNS Food Habits in Later Life study and were followed for more than five years. All-cause mortality was used as the main outcome of the Cox Proportional Hazard model. All-cause mortality was used in this study in order to prevent bias from the known inaccuracies in death certification in elderly people. This method has also been employed by Euronut study of elderly Europeans (Osler and Schroll, 1997; World Health Organization 1996).

Several studies have reported that cognitive impairment in elderly people is associated with increased mortality risk (Edelstein et al., 1998; Gale et al., 1996; Jagger and Clarke, 1988; Kelman et al., 1994). Likewise, the current study showed a significant reduction in death rates by having a higher memory score. This result was of particular importance for Swedes in Sweden. It has been established that healthy diet and social network might influence cognitive impairment, but social drinking and cigarette smoking were not related to cognitive function in the elderly (Edelstein et al., 1998; Fratiglioni L et al., 2000; Huijbregts et al., 1998).

Depression, as a sign of poor mental status, has been linked to an elevated risk of death (Barefoot JC and Schroll M, 1996; Blazer and Friedman, 1979). It has been suggested that elderly who lived in communities maintained better wellbeing in their later life (Yamashita et al., 1993). Other longitudinal studies showed the importance of social (social activity and social support) and psychosocial factors in determining the state of well being in the elderly such as happiness, depression, and life satisfaction (Graney, 1975; Kim et al., 1999; Kivela et al., 1996). However, there is little evidence to show the potential impact of good mental status on survival in community-based elderly people. Findings from the current study confirmed that better mental/well-being status as reflected in the absence of difficulty to sleep, sleeping too much, feelings of worry, lost interest, feeling sad or depressed, tiredness, and the presence of contentedness with life, reduced the risk of death in free-living elderly people.

In this study, the average health scores from all health variables (except memory score) were significantly higher in elderly people who survived. Furthermore, these health scores (memory score, wellbeing score, self-rated health score, health behaviour score, health conditions score, mediation score, total health score) individually showed a reduction in risk of death after controlling for age at enrolment, gender, smoking and ethnicity/locality in the Cox Proportional Hazard model. These results therefore suggest that maintaining good memory, wellbeing, and health status over the long run might be beneficial for survival. Interestingly, both Anglo-Celtic and Greek cohorts in Melbourne, Australia showed a significant reduction in the risk of death with a one-unit increase in the total health score. This may be partly due to better health services in Australia compared to other countries such as Greece, Sweden and Japan.

Several factors have been recognised to influence health in predicting mortality. Findings from the NHANES study revealed that health behaviour was associated with survival but this result varied by age and gender (Davis et al., 1994). Earlier findings from NHANES study also showed lower risk of death with better self-rated health only among men (Idler et al., 2000). In general, higher socioeconomic status (Osler, 1993), higher occupational classes (Rosengren et al., 1998), adherence to Mediterranean diet (Darmon and Khlat, 2001), being more physically active (Ljungquist and Sundstrom, 1996), and having regular health checks or daily preventive health (Nakanishi et al., 1997) are believed to bring about higher survival rates. Results from the Longitudinal Study of Aging in the USA observed changes over time in self-reported health (Grant et al., 1995). It was suggested that there was a rapid decline in health before death in men whilst there was a long period of declining health before death in women. Age and gender differences were also observed in predicting mortality in other studies (Lefrancois, 1999; Markides and Lee, 1991; McCallum et al., 1994).

A prospective study of two groups of Swedish men aged 50 and 60 respectively, followed for nine years, found that the most socially active men (in both groups) had the lowest mortality. Moreover, this association remained strong even after adjusting for age, smoking, blood pressure, cholesterol levels, and perceived health that were measured at the start of the study (Welin L et al., 1985). In another prospective study that followed 1169 men and 1643 women living in the USA and aged 65 years or older for 13 years found those who were the least socially active were also more likely to die prematurely compared with those who fell into the most socially active category. This outcome occurred irrespective of age, health, or the level of physical activity or productive activity such as gardening and shopping (Glass et al., 1999). Similarly, the current study also found a significant reduction in death with increase in social activity. This result was irrespective of age, gender, smoking status and ethnicity/locality.

Other longitudinal studies also confirmed that social activities (Jylha and Aro, 1989), including participation in religious activity (Helm et al., 2000; Kobayashi et al., 1996; Koenig et al., 1999) and living with family at home (Kobayashi et al., 1996), were associated with increased survival and have been associated with happiness in women. Interestingly, a study in Japan showed that social activity increased up to the age of 75 and decreased thereafter (Tamakoshi et al., 1995).

The living arrangements of elderly people necessarily determine in part the level of interaction they have with other adults and subsequently the social support immediately available to them. Results from NHANES study in the USA and a study in Japan showed that living with a spouse increased survival, particularly in men (Davis et al., 1992; Nakanishi et al., 1998; Steinbach, 1992). Social isolation in the elderly has been shown to elevate mortality (Orth-Gomer et al., 1988). From the Alameda County Study, it was found that social ties amongst elderly aged 70 years or older lowered the risk of death (Seeman et al., 1987). It is interesting to note that ties with friends and relatives were of greater magnitude for elderly aged 60 and over. Living arrangements were not examined in the current study. However, a higher social network score was associated with a significant reduction in the risk of death.

The Greeks in Greece also showed a significant reduction in the risk of death for every unit increase in social activity score or social network score after controlling for age, gender and smoking status. Results from other FHILL cohorts were not statistically significant. Thus, social activity and social network may be culturally sensitive for the Greeks in Greece in predicting survival.

Little evidence is available on the effect of sleep in predicting survival in elderly people. The Alameda County Study in the USA suggested that maintaining seven daily habits, such as sleeping for 7-8 hours daily, prolong longevity (Schoenborn, 1986). The current study examined the average sleep duration at baseline in predicting survival. Sleep duration was not different between survivors and deceased groups. Furthermore, it was not associated with mortality. This confirmed previous findings in another elderly Americans study (Pollak et al., 1990).

Taking a nap (siesta) has been known to be part of a traditional lifestyle amongst certain cultures such as the Mediterranean people (Trichopoulos D et al., 1987). Several authors have examined the risk of napping in elderly people in predicting survival (Bays JC et al., 1996; Bursztyn et al., 1999; Rockwood K et al., 2001; Trichopoulos D et al., 1987). Although Trichopoulos et al reported a beneficial effect of having a siesta during the day in reducing mortality in men, other authors observed an inverse relationship. Having a siesta or taking a nap during the day has been associated with impaired night-time sleep, overall tiredness, physical activity deficits, and depressive symptoms. Results from the current study also suggested that there was a significant increase in the hazard of death amongst subjects who took a nap during the day. However, this finding did not persist when ethnicity/locality was incorporated into the Cox's model. Thus, cultural differences have to be taken into account in interpreting the risk of napping.

There is growing evidence suggesting an inverse relationship exists between cigarette smoking and health (Branch and Jette, 1984; Cosin-Aguilar J et al., 1995; Fielding JE, 1985; Giordano JM, 1997; Kannel WB, 1981; Mathers et al., 2000; Pearl R, 1938; Sugisawa et al., 1998). This effect can be translated further into increasing risk of death, particularly from cardiovascular diseases. Results from the current study confirmed the adverse effect of smoking in an elderly population from different ethnic backgrounds. This result remained significant irrespective of age, gender, and ethnicity/locality. (Idler and Angel, 1990)

5.5 CHAPTER SUMMARY

Health scores including memory score, wellbeing score, self-rated health score, health behaviour score, health conditions score, medication score, and total health score, were associated with a reduction in the risks of death per one unit increase in the health score. These results were irrespective of age, gender, smoking status, and ethnicity/locality.

Social and lifestyle variables such as social activity score, social network score, napping, and smoking were also predictors of mortality. Higher social activity and social network scores lowered mortality risks. In contrast, taking a nap during the day and smoking increased death risks.

CHAPTER 6

CHAPTER 6

SURVIVAL DETERMINANTS: PHYSICAL ACTIVITY

6.1 INTRODUCTION

Physical activity is thought to have a protective effect against mortality from all-cause or coronary heart disease (CHD) (Blair et al., 1989; Blair et al., 1993; Blair et al., 1995; Blair and Brodney, 1999). In a 10-year follow-up study of Harvard alumni, the sedentary lifestyle attributed to 31% more CHD (Paffenbarger RSJ et al., 1978). A similar inverse relationship has also been reported in the MRFIT (Paffenbarger RSJ et al., 1978) and other studies (Blair et al., 1992; Leon AS and Connet J, 1991; Whaley and Blair, 1995). Population-based observational studies have consistently shown the negative dose-response relationship between physical activity or fitness and mortality (Morris JN et al., 1990; Whaley and Blair, 1995).

In this study, assessment of physical activity was of interest for the following reasons:

- To describe ADL score and exercise in survivors and deceased groups
- To describe cross-cultural differences in the average ADL and exercise scores
- To examine whether ADL score and exercise score individually predict survival in the combined FHILL cohorts

- To examine whether ADL score and exercise score individually predict survival cross-culturally for elderly from different ethnic backgrounds.

Results on physical activity include activities of daily living (ADL) and exercise. Each topic is examined within the context of general predictors of combined cohorts and cross-cultural comparisons between cohorts. The Cox Proportional Hazard models were adjusted for age at enrolment (in 5-year intervals), gender (0=female, 1=male), and smoking status (0=non-smoker, 1=smoker). Adjustment for ethnicity/locality (0=JPN, 1=SWD, 2=ACS, 3=GRM, 4=GRS) was added to assess general predictors of combined cohorts. The average level of Physical Activity amongst FHILL cohorts is illustrated in Table 6.3.

6.2 ACTIVITIES OF DAILY LIVING (ADL)

Activities of Daily Living (ADL) reflected degree of difficulty in performing basic tasks such as eating, walking, cooking, dressing and using the toilet. The questions were from the WHO 11 country study, adapted earlier from the validated instrument of Katz and Akpom (1983; Katz S and Akpom CA, 1976). There were 15 questions (ADL88, EX84) measuring the degree of difficulty in performing basic tasks (walking, climbing stairs, cooking, housework, transportation, medication) and coping with basic bodily functions and self care (dressing, bathing, continence, feeding, transferring, toileting). There were several levels for the degree of difficulty: without difficulty=4, with difficulty but without help=3, only with help=2, and not able to perform=1. The ADL score ranged from 15 - 62, with a higher score reflecting limited disability.

6.2.1 General predictors of mortality in elderly people from different locations and ethnic backgrounds

Table 6.1 below shows the average level of Activity of Daily Living (ADL) score in survivors and deceased in the combined cohorts. It was found that survivors had significantly higher average ADL score than the deceased group, with an average score of 57.7 and 54.2, respectively.

Table 6.1. Differences in ADL score between survivors and deceased

Variables	Score range	Survivors	Deceased	Total
		Mean ± SD	Mean ± SD	Mean ± SD
		N = 553	N = 148	N = 701
ADL Score***	15-62	58 ± 6	54 ± 9	57 ± 7

Significant differences between Survivors and Deceased by Wilcoxon Rank-sum test: *** *P<0.001*

ADL score was introduced separately into the Cox's model adjusted for age at enrolment (5-y intervals), gender, smoking status, and ethnicity/locality. A 5% reduction in risk of death was associated with a unit increase in ADL score (*P=0.0001*).

Table 6.2. Mortality risk ratio estimates (and 95% CI) derived from alternative Cox's models with ADL variable

Variables	P value	Risk Ratio † (95%CI)
ADL Score	0.0001	0.95 (0.93 to 0.97)

†From model including terms of age at enrolment (5-y interval), sex, smoking status, and ethnicity/locality

6.2.2 CROSS-CULTURAL COMPARISONS: PREDICTORS OF MORTALITY IN ELDERLY PEOPLE FROM DIFFERENT LOCATIONS AND ETHNIC BACKGROUNDS

The Swedes in Sweden had limited disability amongst other FHILL cohorts with the average ADL score of 58. The average level of ADL scores in FHILL cohorts are presented in Table 6.3.

The ADL score was examined in each cohort using the Cox's model adjusted for age at enrolment (in 5-y intervals), gender, and smoking status. There was a reduction in risk of death across longevity cultures for every unit increase in ADL score. This result was found to be significant for Swedes in Sweden (reduction of mortality risk by 4%), Greeks in Australia (reduction of mortality risk by 6%), and Greeks in Greece (reduction of mortality risk by 7%). The Cox Proportional Hazard results amongst FHILL cohorts are shown in Table 6.4.

Table 6.3. Cross-cultural comparisons of ADL and exercise scores in FHILL cohorts

Variables	Japanese in Japan Mean ± SD N = 81	Swedes in Sweden Mean ± SD N = 184	Anglo-Celts in Australia Mean ± SD N = 126	Greeks in Australia Mean ± SD N = 189	Greeks in Greece Mean ± SD N = 104
ADL Score (15-62)	56 ± 4	58 ± 8	57 ± 2	56 ± 8	56 ± 9
Exercise Score (1-7)	4 ± 1	5 ± 2	5 ± 1	3 ± 1	3 ± 2

Table 6.4. Mortality risk ratio estimates (and 95% CI) derived from alternative Cox's models with ADL and exercise variables

Variables	Japanese in Japan N=81 RR	P value	Swedes in Sweden N=184 RR	P value	Anglo-Celts in Australia N=126 RR	P value	Greeks in Australia N=189 RR	P value	Greeks in Greece N=104 RR	P value
ADL Score	0.94	0.321	0.96	0.039	0.81	0.126	0.94	0.021	0.93	0.002
	(0.83 to 1.06)		(0.93 to 0.99)		(0.62 to 1.06)		(0.90 to 0.99)		(0.90 to 0.97)	
Exercise Score	0.97	0.876	0.89	0.295	1.10	0.751	0.58	0.021	0.69	0.008
	(0.70 to 1.26)		(0.71 to 1.11)		(0.61 to 1.96)		(0.47 to 0.92)		(0.53 to 0.91)	

From model including terms of age at enrolment (5-y interval), gender, and smoking status.

6.3 EXERCISE

The exercise score measured the frequency of going out and the time spent in daily physical activities. The purpose of the questions and score in this study were to provide a global measure of physical activity rather than fitness levels or a measure of energy expenditure. The interviewer graded the exercise level of the participant based upon responses to questions EX86A-G. The exercise score ranged from 1 (very inactive) to 7 (very active) (See Chapter 3 for classification of exercise levels).

6.3.1 GENERAL PREDICTORS OF MORTALITY IN ELDERLY PEOPLE FROM DIFFERENT LOCATIONS AND ETHNIC BACKGROUNDS

The average levels of exercise score in survivors and deceased in the combined cohorts are presented below. The survivors were significantly more active (higher average exercise score) than those who died *(mean 4.3 vs 3.7; P=0.0001)*.

Table 6.5. Differences in exercise score between survivors and deceased

Variables	Score range	Survivors	Deceased	Total
		Mean ± SD	Mean ± SD	Mean ± SD
		N = 553	N = 148	N = 701
Exercise Score***	1-7	4 ± 2	4 ± 2	4 ± 2

Significant differences between Survivors and Deceased by Wilcoxon Rank-sum test: *** *P<0.001*

Exercise score was introduced separately into the Cox's model controlled for age at enrolment (5-y intervals), gender, smoking status, and ethnicity/locality. A higher exercise score was associated with an 18% lower risk of death (*P=0.0037*).

Table 6.6. Mortality risk ratio estimates (and 95% CI) derived from alternative Cox's models with exercise variables

	P value	*Risk Ratio† (95%CI)*
Exercise Score	0.0037	0.82 (0.72 to 0.94)

†From model including terms of age at enrolment (5-y interval), sex, smoking status, and ethnicity/locality

6.3.2 Cross-cultural comparisons: predictors of mortality in elderly people from different locations and ethnic backgrounds

Amongst FHILL cohorts, Swedes in Sweden and Anglo-Celts in Australia were more active, performed gardening or walking about one hour, or a few hours of housework daily, and were on feet most of the day. Their average exercise score were 5. Results on the levels of exercise score cross-culturally are presented in Table 6.3.

The exercise score was also investigated as the independent predictor of mortality using the Cox Proportional Hazard model. This model was controlled for age at enrolment in 5-year interval, gender, and current smoking status. The exercise score was found to be a significant predictor of mortality for Greeks in both Australia and Greece. There were 42% and 31% reductions in risk of death for both Greeks in Australia *($P=0.021$)* and Greeks in Greece *($P=0.008$)*, respectively.

6.4 CHAPTER DISCUSSION

The later years of life are perceived within most cultures as a time of slowing down and progressive dependence (Cantor MH, 1991). Ageing is at present associated with progressive biological deterioration and increasing health problems. Therefore, the elderly may be at increased risk of poor nutritional status because of chronic disease, social isolation, cognitive impairment, and functional disability.

Mobility is one of the indicators of functional status and independence of the aged. The high prevalence of functional limitations leads to immobility in the elderly, particularly in women (Henrard, 1980). Thus, in the current study, the Cox Proportional Hazard model was adjusted for gender along with age at enrolment, smoking status and ethnicity/locality. Results showed that for every unit increase in ADL score, there was a reduction in mortality risk by 5%. A similar trend was observed within individual FHILL cohorts, particularly for Swedes in Sweden, Greeks in Australia and Greece. Finally, it was also found that survivors had significantly higher ADL scores than the deceased group.

Despite growing evidence that disability is associated with morbidity, little research has been done to show that disability in the elderly increases the risk of death. The Nordic Research on Ageing (NORA) study in Denmark observed changes in mobility functions over a 5-year mortality follow-up, and confirmed results from previous studies that there was more deterioration than improvement observed in the elderly people (Schroll M et al., 1997). In addition, it was concluded that survival was independently related to physical activity in both men and women. Nevertheless, the NORA study overlooked other confounding factors such as cigarette smoking that may affect overall survival.

To quote Powell and Blair (1994): "Mortality is only one aspect of public health burdens that would be reduced by greater participation in regular physical activity" (Powell and Blair, 1994). In other several review articles, Blair has consistently shown that becoming more physically active increases longevity (Blair et al., 1989; Blair et al., 1992; Blair et al., 1995; Blair et al., 2001; Blair, 2000). The elderly people were encouraged to walk briskly for at least 30 minutes daily or participate in different types of activities, and therefore to enjoy the health benefits. It was also noted that being fit and active were particularly important in reducing morbidity and mortality, irrespective of obesity (body weight) (Blair and Brodney, 1999).

Several researchers have studied the relationships between physical activity, exercise or physical fitness and mortality (Blair et al., 1989; Blair et al., 1992; Blair et al., 1995; Blair et al., 2001; Blair, 2000; Hakim AA et al., 1998; Kaplan et al., 1987; Morgan K and Clarke D, 1997). A study in Nottingham, UK, underlined the association between high levels of habitual physical activity and increased survival (Morgan K and Clarke D, 1997). In a 12-year follow-up study of retired, non-smoking men from the Honolulu Heart Program, the distance walked on a daily basis appeared to be positively associated with survival. Men who walked more than two miles (3.2 km) daily were twice as likely to survive longer than the men who walked less than one mile (1.6 km) daily (Hakim AA et al., 1998). An inverse relationship between a change in physical fitness and mortality was also observed in a group of 40 to 60 year-old Norwegian men followed for 7 years (Erikssen G et al., 1998). Finally, in a large observational cohort of US Caucasian men aged 30-83 years of age, who were followed for 8 years, cardio-respiratory fitness was shown to be an important indicator of longevity. Fit men, whether lean or obese had increased longevity compared with unfit men (Lee et al., 1999).

Results from the current study were consistent with growing evidence on the favourable effect of physical activity and exercise on survival. Survivors had significantly higher exercise levels compared to the deceased group. The exercise score was found to be a significant predictor of mortality. For every unit increase in exercise score, an 18% reduction in premature death from all-cause mortality was observed. This result was significant after controlling for the few confounding factors such as age, gender, smoking, and ethnicity/locality. Across longevity cultures, the protective effect of exercise was mainly seen in elderly people from Greek ethnicity residing in Australia and Greece.

Coronary heart disease is a major cause of death in both men and women (Whaley and Blair, 1995). However, most studies examining the association between physical activity and the incidence of coronary heart disease have concentrated mainly on men. In the Nurses Health Study, women who did not have a diagnosis of cardiovascular disease at baseline were followed for eight years. Analysis of the data found that women who walked briskly for at least three or more hours per week had a substantially lower risk (around 30 to 40%) of coronary events (Manson JE et al., 1999).

The beneficial effects of physical activity were not limited to mortality. Several studies have addressed the importance of physical activity in later life that may lower mortality. Physical activity seems to reduce the risk of depression, a major mental health problem. In the Iowa 65+ Rural Health Study, walking was negatively associated with depressive symptoms (Mobily KE et al., 1996). In the Alameda County study, low levels of physical activity were predictive of subsequent depression (Camacho TC et al., 1991). Strength training has also been shown to have a positive impact on psychological wellbeing (Karvonen, 1996). It can reduce self-attentiveness (Perrig-Chiello P et al., 1998), improve mood and self-perceived confidence in physical ability (Tsutsumi T et al., 1997), and ameliorate symptoms of depression and improve subjective sleep quality (Naylor et al., 2000; Singh et al., 1997a; Singh et al., 1997b).

Another study suggested that physical activity had an influence on health behaviour such as overeating, smoking, substance abuse, stress management, and risk taking (Blair et al., 1985). Low intensity activities such as walking have been shown to deliver health benefits (Pereira et al., 1998; Stofan et al., 1998) and memory function (Naylor et al., 2000). Moreover, resistance training was associated with improvement in functional mobility and counteracting physical frailty (Fiatarone et al., 1990; Fiatarone et al., 1994) towards independence in later life (Bath and Morgan, 1998).

6.5 CHAPTER SUMMARY

In general, the survivors of combined FHILL cohorts in Japan, Sweden, Australia and Greece were significantly less disabled than those who passed away. The more disabled these elderly participants, the more likely they were to die prematurely, irrespective of age, gender, smoking status and their ethnic background. Overall, the Swedes in Sweden appeared to be less disabled compared to the Japanese in Japan, Anglo-Celts in Australia, Greeks in Australia and in Greece. A trend was observed between mortality and ADL score cross-culturally. Across longevity cultures, limited functional disability reduced the risk of death. This result was found to be a significant predictor of mortality for Swedes in Sweden (4%; 1% - 7%), Greeks in Australia (6%; 1% - 10%), and Greeks in Greece (7%; 3% - 10%).

A similar result was established for the exercise score. Based on data on combined cohorts, the survivors were found to be significantly more active than the deceased groups. Furthermore, exercise appeared to have a significant inverse relationship with mortality. This result remained significant after adjusting for age, gender, smoking status, and ethnicity/locality. On average, the exercise level of elderly people from 5 different ethnic backgrounds and localities appeared to be low to moderate. Within longevity cultures, Swedes in Sweden and Anglo-Celts in Australia seemed to be more physically active than other cohorts. However, exercise score was a strong predictor of mortality mainly for both Greeks in Australia and in Greece.

CHAPTER 7

CHAPTER 7

SURVIVAL DETERMINANTS: FOOD INTAKES AND FOOD INTAKE PATTERNS

7.1 INTRODUCTION

It is becoming apparent that people of all nations with different food cultures can have comparable life expectancy and morbidity rates (Powles JW, 1992). The FHILL studies have concentrated on food intake and food intake patterns as differentiators and common denominators in health susceptibility and for survival within and between cultures (people of different ethnicity living in different localities).

The objectives of this chapter include:

- Descriptive statistics for consumption of nine major food groups by survival status (grams/day adjusted to 2500 kcal for men and 2000 kcal for women)
- Cross-cultural comparisons on average food consumption amongst FHILL cohorts
- Examining the individual food group as a predictor of mortality within FHILL cohorts (adjusted and non-adjusted for ethnic backgrounds)
- Examining the death hazard of individual food group in each FHILL cohort
- Investigating the protective effect of Traditional Mediterranean Diet in the combined FHILL cohorts

- Investigating whether Plant-Based and Fish Diet may have protective effect amongst longevity cultures

7.2 FOOD INTAKES

It has been suggested that the dietary patterns in the early 1960s best characterise what is known today as the "Traditional Greek Food Pattern or Traditional Mediterranean Diet" (Trichopoulou A et al., 1993; Trichopoulou and Vasilopoulou, 2000). The Greek variant of the Traditional Mediterranean Diet has been documented in the "Seven Countries Study" by Keys et al (Kromhout et al., 1989; Willet WC, 1994). This diet was characterised by:

1. Plentiful fruits, vegetables, legumes, grains
2. Olive oil as the principal fat
3. Lean red meat consumed only a few times per month or in very small portions
4. Low to moderate daily consumption of dairy products
5. Poultry, fish and eggs consumed a couple of times per week
6. Moderate consumption of wine

In the current study, food consumption gathered from interviewer-administered semi-quantitative FFQ and 3 day weighed food record was translated into intake in grams per day. Furthermore, these food items were grouped into eight major food groups based on the Mediterranean diet (Kouris-Blazos and Wahlqvist, 1998; Kouris-Blazos et al., 1999; Osler and Schroll, 1997; Trichopoulou A et al., 1993; Trichopoulou A et al., 1995; Trichopoulou et al., 1995; Woo J et al., 1998). To acknowledge the emerging evidence of beneficial effects of fish consumption in health and survival, the fish and shellfish group was added. Thus the nine major food groups included vegetables, legumes, fruits and nuts, milk and dairy products, cereals and potatoes, meat and meat products, ethanol, monounsaturated to saturated fats ratio, and fish groups. Furthermore, these food groups were adjusted to 2500 kcal for men and 2000 kcal for women for comparison purposes.

7.2.1 GENERAL PREDICTORS OF MORTALITY IN ELDERLY PEOPLE FROM DIFFERENT LOCATIONS AND ETHNIC BACKGROUNDS

The survivors significantly consumed greater amount of vegetables, fruits and nuts, as well as meat and meat products compared to those who died. However, intake of cereals was found to be significantly lower in the survivors group. The average daily consumption of major food groups in combined FHILL cohorts are illustrated in the Table 7.1.

Results from the overall FHILL cohorts suggested that higher intakes of legumes, fish and shellfish, and olive oil (reflected in monounsaturated:saturated fat ratio) were significant predictors of survival in the elderly. There was a reduction in risk of death by up to 8% for every 20 grams increase in legumes intake. The result remained significant with or without controlling for ethnic backgrounds. With every 20 grams increase in fish and shellfish intake, there was a 6% decrease in the hazard of death (CI 1%-12%), after adjusting for age, gender, and smoking status. For every unit increase in the monounsaturated:saturated fat ratio there was 46% decrease in the hazard of death (CI 9%-68%). However, this ratio was a significant predictor of mortality only when ethnic background was included as a confounding factor in addition to age at enrolment (in 5-year intervals), gender, and smoking status. The results above were shown in Table 7.2.

Table 7.1. Mean daily consumption of nine major food groups and energy intakes from combined FHILL cohorts.

Consumption	Survivors			Deceased			Total		
	Mean	±	SD	Mean	±	SD	Mean	±	SD
	N	=	616	N	=	169	N	=	785
Vegetables*	292	±	163	264	±	166	286	±	164
Legumes	54	±	57	49	±	43	53	±	54
Fruits and nuts**	274	±	171	237	±	171	266	±	172
Dairy products	294	±	200	277	±	189	291	±	198
Cereals**	272	±	113	305	±	125	279	±	116
Meat and meat products**	131	±	80	113	±	79	127	±	80
Fish and shellfish	59	±	54	63	±	48	60	±	53
Ethanol	8	±	14	11	±	21	9	±	16
Monounsaturated : Saturated ratio	1.3	±	0.6	1.3	±	0.6	1.3	±	0.6
Energy (kcal)	2123	±	615	2162	±	740	2131	±	644

#Food groups were adjusted to 2500 kcal for men and 2000 kcal for women
Significant differences between Survivors and Deceased by Wilcoxon Rank-sum test: * *P<0.05;* ** *P<0.01*

Table 7.2. Mortality risk ratio estimates (and 95%CI) deprived from alternative Cox's models with each of nine major food groups*

Variables	P value	Risk Ratio† (95% CI)	P value	Risk Ratio‡ (95% CI)
Vegetable intake (20g)	0.70	1.00 (0.98 to 1.02)	0.97	1.00 (0.98 to 1.02)
Legume intake (20g)	0.02	0.92 (0.85 to 0.99)	0.02	0.93 (0.87 to 0.99)
Fruit and nut intake (20g)	0.38	0.99 (0.97 to 1.01)	0.29	0.99 (0.97 to 1.01)
Cereal intake (20g)	0.75	0.99 (0.97 to 1.02)	0.89	1.00 (0.98 to 1.03)
Dairy intake (20g)	0.29	1.01 (0.99 to 1.03)	0.58	0.99 (0.98 to 1.01)
Meat intake (20g)	0.42	1.02 (0.97 to 1.08)	0.34	0.98 (0.94 to 1.02)
Fish intake (20g)	0.23	0.96 (0.89 to 1.03)	0.04	0.94 (0.88 to 0.99)
Monounsaturated : Saturated ratio (1 unit)	0.02	0.54 (0.32 to 0.91)	0.85	0.97 (0.74 to 1.29)
Ethanol intake (10g)	0.83	1.01 (0.92 to 1.10)	0.40	1.04 (0.95 to 1.13)

*Adjusted to 2500 kcal (10,460 kJ) for men and 2000 kcal (8368 kJ) for women

†From model including terms of age at enrolment (5-y interval), sex, smoking status, and ethnicity/locality

‡From model including terms of age at enrolment (5-y interval), sex, and smoking status, but not ethnicity/locality

7.2.2 CROSS-CULTURAL COMPARISONS: PREDICTORS OF MORTALITY IN ELDERLY PEOPLE FROM DIFFERENT ETHNIC BACKGROUNDS

From Table 7.3, it appears that most cohorts consumed vegetables between 283 and 353 grams/day. However, the Swedes in Sweden ate far less vegetables. The Japanese in Japan, along with both Greek cohorts in Australia and Greece, consumed more legumes (63-86g/d) compared to other cohorts. Fruits and nuts intakes were very little for Japanese in Japan (140g/d) compared to the rest of the cohorts (252-330g/d). On the other hand the intake of cereals (which was mainly rice), as expected, was high for Japanese in Japan (366g/d). Other cohorts consumed between 102-280 grams of cereals daily.

Milk and dairy consumption varied between cohorts. It was noted that Swedes consumed more than 400g/d whilst Japanese consumed as little as 165g/d. The variation in meat consumption was enormous. In Japan, the Japanese ate very little meat (less than 50g/d). In contrast, the Greeks in Australia ate about 190g of meat and meat products daily. Little fish and shellfish were eaten by the Anglo-Celts in Australia (21g/d). However, the Japanese in Japan consumed five times more than the Anglo-Celts in Australia (more than 100g daily).

Ethanol consumption appeared to be varied between cohorts. While most cohorts consumed between 5 and 10 grams of ethanol daily, the Japanese (mainly men) drank about 15 grams of ethanol per day. The Swedes and

Anglo-Celtic seemed to consume more saturated fats than the rest of the cohorts. This result was reflected in low monounsaturated:saturated fat ratio (less than 1). Finally, there was considerable variation between the cohorts in energy intakes. The Japanese in Japan reported a very low energy intake (about 1600 kcal daily). On the other hand, the Swedes in Sweden consumed around 2500 kcal per day. Other cohorts reported energy intakes between 2060-2118 kcal daily.

Risk ratios for mortality in relation to different levels of nutritional status were examined using the Cox's Proportional Hazards model in each cohort as seen in Table 7.4. For every 20g increase in the daily intake of dairy products, there was a significant increase risk of death by 4% (risk ratio 1.04, P=0.01) was observed in Greeks in Greece (Trichopoulou A et al., 1995). The Greeks in Australia had a significant reduction in risk of death by 12% (risk ratio 0.88, P=0.004) for every 20g increase in daily consumption of fruits and nuts. A higher consumption of fruits, nuts, cereals and olive oil (reflected in the monounsaturated:saturated fat ratio) was found to be protective amongst the combined Anglo-Celts and Greek cohorts in Australia (Kouris-Blazos and Wahlqvist, 1998; Kouris-Blazos et al., 1999). The risk of death amongst the Japanese in Japan was reduced by 13% (risk ratio 0.87, P=0.04) per 20g increase in the consumption of fish and shellfish. Moreover, this result reflected the significant beneficial effect of the consumption of omega-3 fatty acids in predicting survival of Japanese in Japan (Darmadi et al., 1999; Darmadi et al., 2000).

Table 7.3. Average amount of foods consumed (grams) per person daily in FHILL cohorts

Variables	Japanese in Japan Mean ± SD	Swedes in Sweden Mean ± SD	Anglo-Celts in Australia Mean ± SD	Greeks in Australia Mean ± SD	Greeks in Greece Mean ± SD
	N = 89	N = 184	N = 141	N = 189	N = 182
Vegetables	283 ± 152	165 ± 117	346 ± 180	353 ± 143	295 ± 152
Legumes	85 ± 68	21 ± 18	14 ± 19	86 ± 58	63 ± 47
Fruits and nuts	140 ± 99	298 ± 179	330 ± 188	252 ± 135	261 ± 179
Cereals	366 ± 102	102 ± 54	204 ± 104	261 ± 97	280 ± 112
Dairy products	165 ± 150	404 ± 205	346 ± 173	245 ± 172	243 ± 184
Meat and meat products	43 ± 38	73 ± 49	151 ± 84	190 ± 79	110 ± 58
Fish and shellfish	102 ± 69	73 ± 49	21 ± 20	73 ± 51	42 ± 38
Ethanol	15 ± 30	5 ± 9	8 ± 14	7 ± 12	10 ± 15
Monounsaturated:saturated ratio	1.3 ± 0.3	0.7 ± 0.2	0.8 ± 0.2	1.7 ± 0.4	1.8 ± 0.5
Energy (kcal)	1599 ± 414	2501 ± 689	2096 ± 503	2118 ± 537	2060 ± 671

Food groups were adjusted to 2500 kcal for men and 2000 kcal for women

Table 7.4. Cox Proportional Hazards from 5 cohorts for individual food groups adjusted for age, gender, and smoking.

	Japan N=89 P value	RR	Sweden N=184 P value	RR	ACS N=141 P value	RR	GRM N=189 P value	RR	GRS# N=182 P value	RR
Vegetable intake (20g)	0.40	0.979	0.15	1.032	0.16	1.040	0.46	1.021	0.20	0.970
Legume intake (20g)	0.08	0.894	0.82	1.039	0.96	0.983	0.81	0.982	0.13	0.900
Fruit and nut intake (20g)	0.73	0.987	0.39	0.982	0.27	1.042	0.004	0.883	0.75	1.010
Cereal intake (20g)	0.93	0.997	0.54	1.015	0.72	0.978	0.30	0.953	0.49	1.020
Dairy intake (20g)	0.76	1.007	0.25	0.983	0.87	0.994	0.70	0.991	0.01	1.040
Meat intake (20g)	0.94	1.007	0.07	1.114	0.89	1.009	0.38	0.950	0.65	1.020
Fish intake (20g)	0.04	0.871	0.25	1.070	0.09	1.475	0.87	1.013	0.35	0.930
Monounsaturated:Saturated Fat ratio (1unit)	0.11	0.329	0.14	2.551	0.94	1.179	0.10	0.348	0.14	0.600
Ethanol intake (10g)	0.55	1.037	0.25	0.637	0.46	0.838	0.38	1.155	0.47	1.070

#(Trichopoulou A et al., 1995)

7.3 FOOD INTAKE PATTERNS

All foods play a role in nutritional health. It is not the presence or absence of any one food or nutrient, but the appropriate selection of foods in proper amounts and combinations, as seen in many 'food cultures', that may be important to longevity. There are many cultures around the world, all of which have their distinct cuisine and usage of particular foods.

The Traditional Mediterranean Diet has attracted considerable attention ever since Keys et al published the results of the Seven Countries Study (Keys A, 1995; Kromhout et al., 1989). This diet is shown to be protective against coronary heart disease and may confer longevity (Kafatos et al., 1997; Keys A et al., 1986; Kromhout, 1999; Trichopoulou A et al., 1995; Trichopoulou and Vasilopoulou, 2000).

In the current study, the Mediterranean Diet (TMD) was defined in terms of food groups with the addition of a moderate intake of ethanol and scored in terms of eight characteristics, using gender-specific median values as the cut-off points (See 7.2). Some mixed dishes were classified or grouped according to the proportion of major ingredient in the dishes according to each ethnic background. For example, milk porridge in Sweden consisted of 10% cereals and 90% dairy products. These food groups were further adjusted to energy intakes of 2500 kcal for men and 2000 kcal for women in order to derive rate ratio estimates independent of variations in caloric intake.

The Traditional Mediterranean Diet has eight key features:

1. High consumption of cereals (including potatoes, rice and pasta)
2. High consumption of legumes/pulses (including soy)
3. High consumption of vegetables (including mushrooms and seaweed)
4. High consumption of fruits, nuts and seeds
5. Low consumption of meat and meat products
6. Low consumption of milk and dairy products
7. Moderate consumption of ethanol
8. High Monounsaturated : Saturated fat ratio.

A diet with more of these characteristics was assumed to be healthier. Another similar diet score described as Plant-based and fish diet (PBD) was also created to recognise the importance of fish and shellfish consumption in predicting survival. Thus, TMD ranged between 0 and 8, whilst PBD ranged between 0 and 9. Each of both diet scores from combined cohorts was introduced separately into the Cox's model adjusted for age at enrolment (in 5-year intervals), gender, current smoking status, and ethnicity/locality. There were three different approaches used to generate TMD and PBD scores based on gender-specific median cut-off points.

7.3.1 COHORT SPECIFIC MEDIAN FOOD INTAKE PATTERNS

The first approach was based on gender and cohort-specific median food intake patterns. The gender-specific daily median consumption in each FHILL cohort is described in Table 7.5.

Table 7.5. Gender specific median daily consumption between FHILL cohorts.

Consumption (grams, adjusted for 2500 kcal for men and 2000 kcal for women)	Japanese in Japan		Swedes in Sweden		Anglo-Celts in Australia		Greeks in Australia		Greeks in Greece	
	Men N=43	Women N=46	Men N=66	Women N=120	Men N=70	Women N=71	Men N=94	Women N=95	Men N=91	Women N=91
Vegetables	270	261	130	140	334	291	350	313	303	248
Legumes	73	68	22	15	9	7	81	61	60	49
Fruits and nuts	139	138	194	199	283	326	255	204	249	216
Dairy products	152	167	407	385	329	313	237	219	201	194
Cereals	382	327	342	274	206	161	259	236	291	248
Meat and meat products	34	32	133	96	148	124	205	155	109	91
Ethanol	0	0	6	2	5	0	6	0	10	0
Moncunsaturated:Saturated ratio	1.4	1.4	0.6	0.6	0.8	0.8	1.7	1.7	1.6	1.6
Fish and shellfish	107	78	77	59	14	16	76	50	32	29
Energy (kcal)	1695	1475	2677	2220	2213	1916	2331	1864	2206	1760

The risk ratio for an increment of one unit in the TMD score was similar (0.89) to that estimated in Greece (Trichopoulou A et al., 1995) and the associated *P value* was 0.06. On the other hand, a higher PBD score was significantly associated with a sharply reduced risk of death by 11% per one unit increase (*P=0.04; CI, 1-20%*). These results are shown in Table 7.6.

Table 7.6. Mortality risk ratio estimates (and 95%CI) deprived from alternative Cox's models.

Variables	*P value*	*Risk Ratio† (95% CI)*
Traditional Mediterranean Diet score (1 unit)	0.06	0.89 (0.79 to 1.01)
Plant-based and Fish Diet score (1 unit)	0.04	0.89 (0.80 to 0.99)

†From model including terms of age at enrolment (5-y interval), sex, smoking status, and ethnicity/locality

7.3.2 COMBINED COHORT MEDIAN FOOD INTAKE PATTERNS

The second approach was based on gender and combined-cohort-specific median food intake patterns. The gender and combined-cohort-specific median daily consumption within combined FHILL cohorts is presented in Table 7.7.

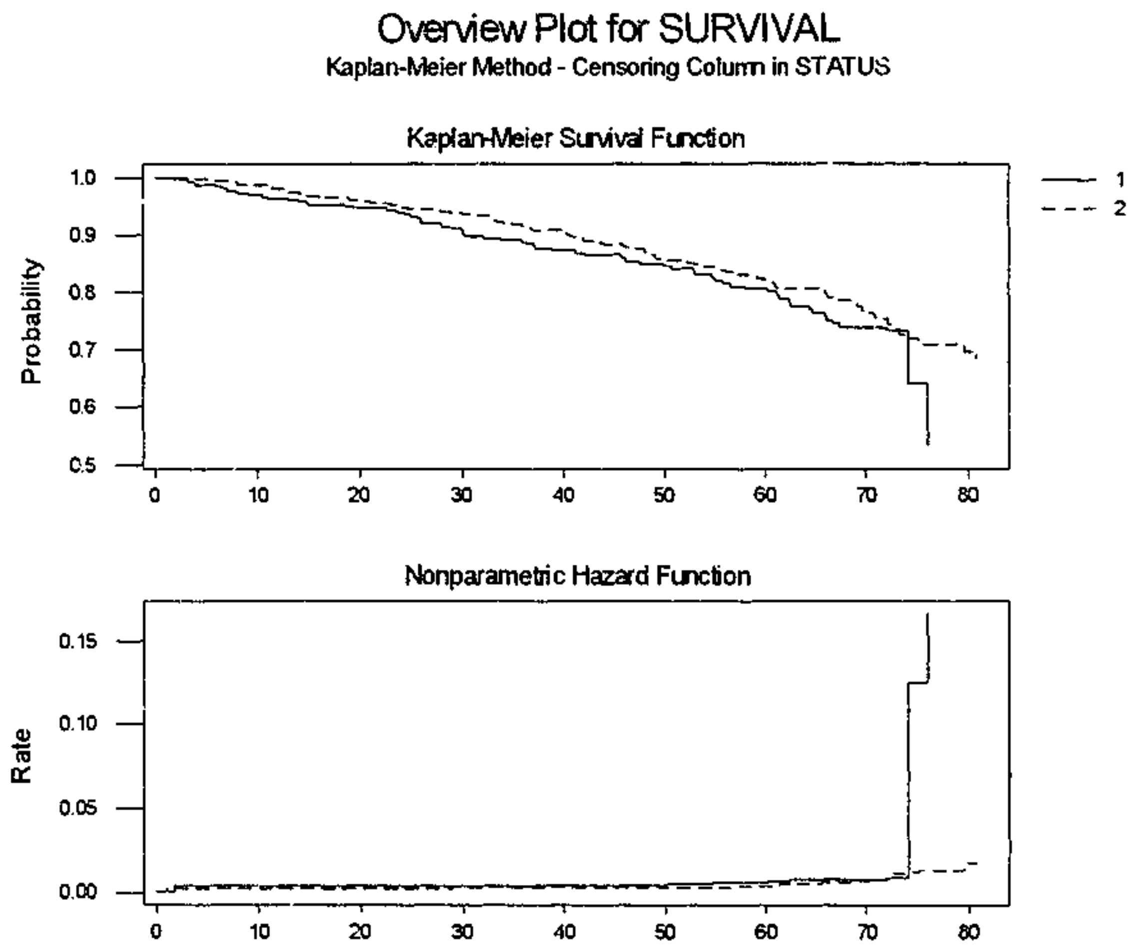
Table 7.7. Median daily consumption based on gender in combined FHILL cohorts.

Consumption	Men N=364	Women N=420
Vegetables	300	243
Legumes	46	31
Fruits and nuts	245	232
Dairy products	271	264
Cereals	294	245
Meat and meat products	135	98
Ethanol	8	0
Monounsaturated:Saturated ratio	1.3	1.2
Fish and shellfish	54	44
Energy (kcal)	2296	1907

Grams adjusted to 2500 kcal for men and 2000 kcal for women

Kaplan Meier method was employed to show the unadjusted survival probability of adhering to Traditional Mediterranean Diet (Figure 7.1) and Plant-Based and Fish Diet (Figure 7.2).

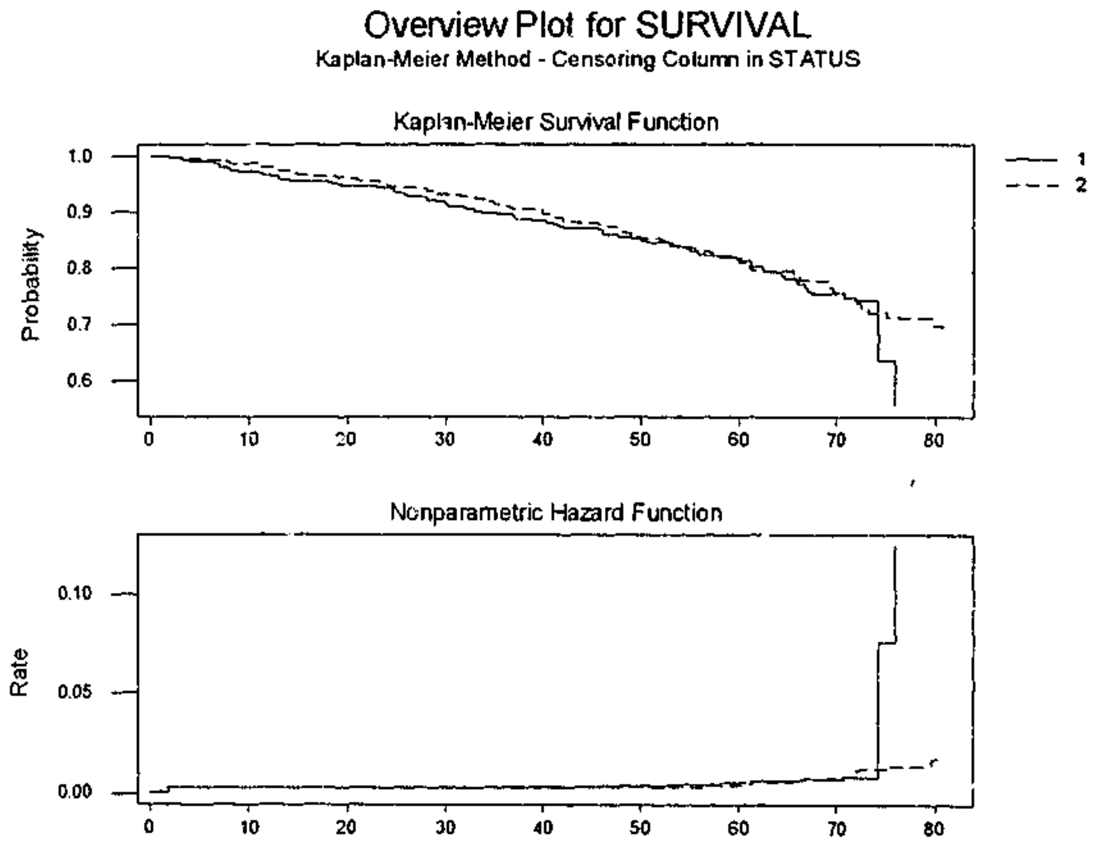
Figure 7.1 Kaplan Meier Plot of unadjusted TMD Scores



1=TMD Scores<4

2=TMD Scores≥4

Figure 7.2 Kaplan Meier Plot of unadjusted PBD Scores



1=TMD Scores<4

2=TMD Scores≥4

By the means of Cox Proportional Hazard regression, both TMD and PBD scores showed consistent decline in the hazard of death by 13% for every one unit increase in the diet score (CI, 2-24% and CI, 2-23%, respectively). The Cox's model was adjusted for age at enrolment (in 5-y interval), gender, smoking status and ethnicity/locality background. Results on TMD and PBD scores analysed using the Cox's model are illustrated in Table 7.8.

Table 7.8. Mortality risk ratio estimates (and 95%CI) deprived from alternative Cox's models.

Variables	P value	Risk Ratio † (95% CI)
Traditional Mediterranean Diet score (1 unit)	0.03	0.87 (0.76 to 0.98)
Plant-based and Fish Diet score (1 unit)	0.03	0.87 (0.77 to 0.98)

†From model including terms of age at enrolment (5-y interval), gender, smoking status, and ethnicity/locality

7.3.3 GREEKS MEDIAN FOOD INTAKE PATTERNS

The third approach was based on gender and Greek-specific median food intake patterns (Trichopoulou A et al., 1995). This median cut-off was examined from the Greeks' cohort from three rural villages in Greece. It was used as a 'surrogate' to assess the 'Greek-ness' of this food intake pattern. The gender and Greek-specific median food intake pattern is shown in Table 7.9.

Table 7.9. Gender specific median daily consumption according to the Greeks in Greece cohort

Consumption	Greeks in Greece Men N=91	Greeks in Greece Women N=91
Vegetables	303	248
Legumes	60	49
Fruits and nuts	249	216
Dairy products	201	194
Cereals	291	248
Meat and meat products	109	91
Ethanol	10	0
Monounsaturated:Saturated fat ratio	1.6	1.6
Fish and shellfish	32	29
Energy (kcal)	2206	1760

Grams adjusted to 2500 kcal for men and 2000 kcal for women

After controlling for age at enrolment, gender, current smoking status, and ethnic backgrounds, TMD and PBD scores were significantly associated with a 12% reduction of the mortality risk for every unit increase in diet score (*P=0.04; CI,1-23%, and P=0.03; CI, 1-21%, respectively*).

Table 7.10. Mortality risk ratio estimates (and 95%CI) deprived from alternative Cox's models.

Variables	P value	Risk Ratio† (95% CI)
Traditional Mediterranean Diet score (1 unit)	0.04	0.88 (0.77 to 0.99)
Plant-based and Fish Diet score (1 unit)	0.03	0.88 (0.79 to 0.99)

†From model including terms of age at enrolment (5-y interval), sex, smoking status, and ethnicity/locality

7.4 CHAPTER DISCUSSION

Food intake promises to be, not surprisingly, one of the best measures of nutritional status. Together with body composition and various performance measures such as strength and endurance, it represents the inputs, outputs and the sum total of energy and food component throughput and status or balance in human biology. Biomarkers of food intake offer ways in which its validity can be increased and its perturbations recognised.

In the current study, intakes of vegetables, fruits and nuts were significantly greater in the survivors group. Similar results were reported from two prospective cohort studies in Italy and Sweden (Fortes et al., 2000;

Strandhagen et al., 2000). Meat and meat products consumption were significantly higher in the survivors group. This result is supported by findings in the Japanese elderly by Shibata et al (Shibata, 1996), however, Fortes et al reported that moderate to high meat intake was associated with negative effect on survival (Fortes et al., 2000). Interestingly, cereals intake was significantly lower in the survivors group. Findings by Fortes et al revealed that intakes of certain types of cereals such as pasta was significantly associated with higher survival. On the other hand, other types of cereals like bread and rice were not associated with survival (Fortes et al., 2000). A Danish study also reported an inverse relationship of rye intake with mortality (Osler and Schroll, 1997). It appeared that over consumption of rye might reduce intakes of other foods. Moreover, another study has proposed that oats was associated with higher mortality from coronary arterial disease and stroke mortality appeared to be related to proteinaceous plants (Seely, 1989). Thus this finding needs further investigation, especially as oats (and its brans) have attracted attention for their ability to decrease the glycemix index (GI) response to a meal and to improve serum lipoprotein status (Holt et al., 1992).

Only for legumes intake was the result plausible, consistent and statistically significant from collective FHILL cohorts data (8% reduction in risk of death for every 20 grams increase in daily legumes intake). Legumes intake has been long associated with longevity food cultures for example, the Japanese (soy, tofu, natto, miso), the Swedes (brown beans, peas), and the Mediterranean (lentils, chickpeas) (1977; Hosking, 1997; Kouris-Blazos, 1994; Ridgwell, 1993; Shibata, 1996; Strandhagen et al., 2000; Trichopoulou and Vasilopoulou, 2000;

Willet WC, 1994). A significant decrease in the hazard of death (6%; CI, 1-12%) for every 20 g increase in intake of fish and shellfish was observed when the Cox's model did not include ethnicity/locality as a confounding factor. It appeared that fish and shellfish intakes were shown to prolong survival, but it may be related to certain food cultures that have high intakes of fish such as the Japanese (Shibata H et al., 1992). The Monounsaturated:Saturated fat ratio was associated with a 46% decrease in the hazard of death (CI 9%-68%) for every unit increase. This ratio was a significant predictor of mortality only when ethnic background was included as a confounding factor in the Cox's model. Thus across longevity cultures in the FHILL study, higher Monounsaturated:Saturated fat ratio (as reflected in intake of olive oil in the Mediterranean cultures) appeared to be protective against premature death irrespective of their ethnic backgrounds. The intake of monounsaturated fat has been shown to be protective against breast cancer in Sweden (Wolk et al., 1998).

There were variations between the five FHILL cohorts on average daily consumption of foods consumed. Taller elderly consumed most calories whilst the shortest elderly consumed less. These findings about food and survival apply across cultures with a wide range of energy intakes (Japanese 1599kcal - Swedes 2501kcal) and wide range of stature (Japanese 152cm - Swedes 165cm). Results from the current study were compared with the results documented by Keys and his colleagues from the classical international "Seven Countries Study". It was observed in the current study that the average cereal and ethanol consumption were lower whilst the average meat consumption was higher across longevity cultures, in comparison to the intake from the "Seven Countries study" in the 1960s (Kromhout et al., 1989). Overall, the Japanese in the current study consumed more vegetables, fruits, meat and dairy products than the Japanese cohort from the "Seven Countries Study". On the other hand, they consumed less legumes, cereals, fish, and alcohol. On average, both the Greek cohorts in Australia and Greece consumed more vegetables, legumes, fish, meat and dairy products compared to two Greek cohorts from the "Seven Countries Study". However, they consumed less fruits, cereals, and alcohol.

Between longevity cultures, higher intakes of fruits, nuts, fish and shellfish were associated with a significant reduction in the hazard of death for the Greeks in Australia (Darmadi I et al., 2001), and the Japanese in Japan, respectively. In contrast, dairy products were associated with increased risk of death for the Greeks in Greece (Trichopoulou A et al., 1995). From the combined Australian cohorts (Greeks and Anglo-Celts), it was found that higher intakes of cereals, fruits, and nuts, along with Monounsaturated:Saturated fat ratio was associated with increasing survival (Kouris-Blazos et al., 1999). Further analysis of the Japanese cohort data revealed that total omega-3 fatty acids intake, particularly alpha-linolenic acid, was higher in the survivors group (Darmadi et al., 1999; Darmadi et al., 2000).

Low energy expenditure generally results in low food intake during aging. To acknowledge physiological, psychological and socio-economic changes as people getting older, there is a need to have dietary guidelines specifically targeted for elderly people. However, several authors argued that a more food-based approach using traditional food patterns is more feasible (Keys A, 1995; Truswell, 1998). Amongst traditional food patterns, the Mediterranean Diet, in particular its Greek variant, has received enormous consideration for its favourable effect against premature death, especially from coronary heart disease (Kafatos et al., 1997; Keys A, 1995; Kouris-Blazos and Wahlqvist, 1998; Kouris-Blazos et al., 1999; Lasheras C et al., 2000; Noah A and Truswell AS, 2001; Osler and Schroll, 1997; Trichopoulou A et al., 1993; Trichopoulou A et al., 1995; Trichopoulou et al., 1995; Trichopoulou and Vasilopoulou, 2000; Truswell, 1998; Willet WC, 1994; Woo J et al., 2001).

The concept of "Mediterranean Diet" was first introduced by Keys in the 1960s (Keys A, 1995). Later, Trichopoulou et al developed a Greek variant of Traditional Mediterranean score (Trichopoulou A et al., 1995; Trichopoulou et al., 1995) which has also been successfully adapted in other Mediterranean and non-Mediterranean countries (Kouris-Blazos and Wahlqvist, 1998; Kouris-Blazos et al., 1999; Lasheras C et al., 2000; Noah A and Truswell AS, 2001; Osler and Schroll, 1997; Woo J et al., 2001). The Traditional Mediterranean Diet is characterised by high intakes of plant foods, low intakes of animal foods, moderation in alcohol consumption, and low saturated fat intakes. These characteristics are arguably similar to other traditional diet such as the Chinese traditional diet (Woo J et al., 2001). Similarly, this method has been adapted in the current study to assess whether adherence to those characteristics prolongs survival in later life.

Based on gender and cohort specific median cut-offs, the food pattern (PBD) that had the eight key features of the Greek variant of the "Traditional Mediterranean Diet" with the inclusion of fish intake, were shown to significantly reduce the risk of death by 11% within a particular cohort. Results based on the characteristics of "Traditional Mediterranean Diet" on collective cohort after adjusting for age at enrolment, gender, smoking status and ethnic backgrounds were plausible, suggestive and in the 'expected' directions (*RR=0.89; P=0.06*).

A greater predictive power was observed when gender and global median cut-offs were introduced to calculate the diet scores. Both TMD and PBD showed significantly better prospect of surviving (13% reduction of mortality risk) for every unit increase in the diet scores.

It is interesting to note that the "Greekness" of the diet by introducing the exact gender specific median cut-offs into the Cox's model revealed that both TMD and PBD scores were associated with a 12% reduction in hazard of death for every unit increase.

The use of food scores in predicting mortality has also been examined by another study (Kant et al., 2000). They developed "Recommended Food Score" and examined it in middle-aged and elderly women. This food score consisted of fruits, vegetables, lean meat, low fat dairy and poultry and showed an inverse relationship to mortality.

7.5 CHAPTER SUMMARY

Intakes of vegetables, fruits, nuts, meat and meat products were significantly higher in the survivors group. Interestingly, cereal consumption in the survivors group was found to be significantly lower than the deceased group.

With every 20g increase in legumes intake, a significant reduction in risk of death was seen. This result remained significant with or without controlling ethnic backgrounds as a confounding factor. Irrespective of their ethnic backgrounds, a prolonged survival was seen for every one unit increase in the Monounsaturated:Saturated fat ratio. On the other hand, higher fish intake was significantly associated with a reduction in risk of death within longevity cultures when ethnic background was not taken into account.

Certain food groups such as fruits and nuts as well as fish and shellfish lowered risk of death for the Greeks in Australia and Japanese in Japan, respectively. However, dairy products increased hazard of death in Greeks in Greece.

Within and between longevity cultures, the Traditional Mediterranean Diet as well as Plant-based and Fish Diet appeared to be protective against mortality. Adherence to the key characteristics of these diets may be beneficial in longevity.

CHAPTER 8

CHAPTER 8

AN INTEGRATED APPROACH TO CROSS-CULTURAL SURVIVAL DETERMINANTS

8.1 INTRODUCTION

Social sciences are increasingly arguing that health and survival are principally dependent on social and societal factors, provided there is enough food to eat. The FHILL study through its cross-cultural indices of predictors of survival is allowing this question to be addressed.

The purpose of this chapter is to:

1. Describe ethnicity and locality as predictors of survival and
2. Examine the relative importance of difference forms of survival determinants in later life.

8.2 ETHNIC ORIGIN AND LOCALITY DETERMINANTS

The effect of ethnicity and locality in predicting survival in the FHILL cohorts was considered using the Cox's Proportional Hazards model. Greeks in Greece were used as the reference point (parameter estimate=0.00 and risk ratio=1.00). For the four other FHILL cohorts, to be Greek in Australia conferred the lowest risk of death (risk ratio 0.23, *P=0.0001*). The risk of death was also lower among Swedes in Sweden and Japanese in Japan (risk ratio

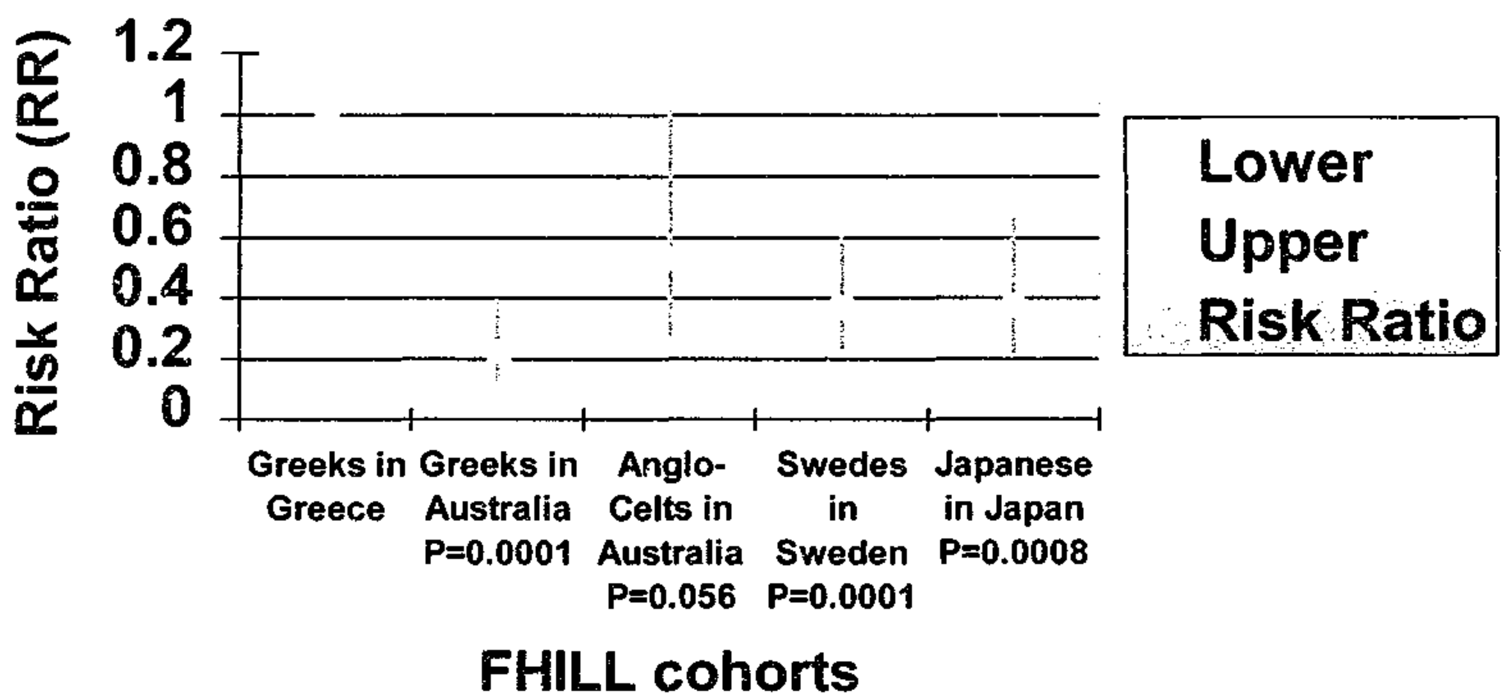
0.37, *P=0.0001*) and (risk ratio 0.37, *P=0.0008*), respectively. Similar findings were observed for Anglo-Celts in Australia, although the risk ratio did not reach significance (*P=0.056*).

Table 8.1. Mortality risk-ratio estimates (and 95% CI) derived from Cox's models with ethnicity and locality variables

Variables	Risk Ratio (95%CI)	P value
Greeks in Greece	1.00 (Reference category)	N/A
Greeks in Australia	0.23 (0.13 to 0.39)	0.0001
Anglo-Celts in Australia	0.53 (0.28 to 1.02)	0.0560
Swedes in Sweden	0.37 (0.23 to 0.60)	0.0001
Japanese in Japan	0.38 (0.21 to 0.67)	0.0008

The effect of ethnicity and locality in predicting survival is illustrated in the following Figure.

Mortality Risk Ratio (95% CI) derived from Cox's Proportional Hazards model amongst FHILL cohorts by ethnicity and locality



8.3 SOCIAL, PHYSICAL ACTIVITY AND NUTRITIONAL DETERMINANTS

To test the relative importance of various survival determinants in later life, a Cox Proportional Hazard model was developed. This model was controlled for confounding factors such as age at enrolment, gender, and ethnicity/locality. Thus all major variables that predicted mortality (See Chapters 5-7) were integrated as predictor variables into one Cox's model.

Results in Table 8.2 are presented based on the magnitude of risk ratios of death. There are several modifiable variables in predicting mortality that were being examined into one Cox's model. The nutritional variable was shown to significantly reduce risk of death by 14% for every unit increase in PBD diet score. The Activities of Daily Living (ADL) score also showed a significant reduction in risk of death by 5% for a one unit increase in ADL score. Similar results were observed amongst social variables, namely social network score, and social activity score. However, these results were not statistically significant. Smoking was associated with a 4% increase in the hazard of death although this result was suggestive (*P=0.06*).

Table 8.3 presents the risk ratios of death according to the magnitude of both modifiable and less-modifiable variables in predicting mortality. Cognitive function, diet, ADL, and total health showed the greatest magnitude in significantly reducing risks of death by 22%, 13%, 4%, and 4%, respectively. On the other hand, male gender and smoker were significantly associated with increased risks of death by 63% and 67%, respectively. Other variables did not show significant association in predicting mortality.

Table 8.2. Mortality risk-ratio estimates† (and 95% CI) derived from the Cox's model with modifiable variables

Variables	Risk Ratio† (95%CI)	P value
Plant-based and Fish Diet Score #	0.855 (0.743 - 0.983)	0.028
Activities of Daily Living Score	0.950 (0.922 - 0.978)	0.001
Social Network Score	0.974 (0.934 - 1.016)	0.222
Social Activity Score	0.995 (0.975 - 1.014)	0.591
Exercise Score	1.039 (0.881 - 1.226)	0.647
Smoking status (0=non-smoker, 1=smoker)	1.517 (0.978 - 2.353)	0.062

†From model including terms of age at enrolment (5-y interval), gender (0=female, 1=male), and ethnicity/locality (0=JPN, 1=SWD, 2=ACS, 3=GRM, 4=GRS).

#Plant-based and Fish Diet Score (PBD) based on gender and combined cohorts median cut-offs (See Chapter 7.3.2).

Table 8.3. Mortality risk-ratio estimates† (and 95% CI) derived from the Cox's model with both modifiable and less-modifiable variables

Variables	Risk Ratio † (95%CI)	P value
Memory Score	0.781 (0.670 - 0.912)	0.0017
Plant-based and Fish Diet Score #	0.870 (0.762 - 0.994)	0.041
Activities of Daily Living Score	0.955 (0.928 - 0.983)	0.002
Total Health Score	0.963 (0.928 - 1.000)	0.048
Well-being Score	0.968 (0.862 - 1.086)	0.577
Social Network Score	0.983 (0.944 - 1.024)	0.415
Social Activity Score	0.999 (0.980 - 1.018)	0.894
Exercise Score	1.089 (0.921 - 1.288)	0.317
Gender (0=female, 1=male)	1.627 (1.101 - 2.405)	0.015
Smoking status (0=non-smoker, 1=smoker)	1.668 (1.100 - 2.529)	0.016

†From model including terms of age at enrolment (5-y interval) and ethnicity/locality (0=JPN, 1=SWD, 2=ACS, 3=GRM, 4=GRS).

#Plant-based and Fish Diet Score (PBD) based on gender and combined cohorts median cut-offs (See Chapter 7.3.2).

8.4 CHAPTER DISCUSSION

Japan, Australia, Sweden and Greece are known to be amongst leading countries in long life expectancy (Mathers et al., 2001). In the current study, five cohorts from four longevity cultures from around the world were examined. Different ethnicity and locality was found to be significantly predicted survival outcome. Moreover, it was revealed that being Greeks in Australia conferred the lowest mortality risk, followed by Swedes in Sweden, Japanese in Japan and Anglo-Celtic in Australia, when Greeks in Greece were placed as a reference point. These results were significant after controlling for age at enrolment, gender, and smoking status, except for Anglo-Celtic in Australia (*P=0.06*).

Information on the effect of ethnicity and locality alone in predicting mortality are currently unavailable. There are several other cross-cultural longitudinal studies, such as the Seven Countries Study, SENECA, MONICA, and CRONOS that examined health and nutrition in later life (de Groot LCPGM et al., 1991; Huijbregts et al., 1997; Keys A et al., 1986; Kromhout, 1999; Osler et al., 2000; Osler et al., 2001; Pedro and Barba, 2001; Schlettwein-Gsell et al., 1991; Schroll et al., 1996a; Schroll et al., 1996b; Thorvaldsen et al., 1995). However, the effect of ethnicity itself on predicting survival failed to be explored further.

To date, very limited data are available on cross-cultural longitudinal studies that examine the interaction between social, physical activity and nutritional variables in predicting survival (all-cause mortality). Previous studies mainly focus on one or two predictors of mortality only as discussed earlier in Chapter 2 (Literature Review). The correlation between nutritional, physical activity, and social variables were investigated in the current study. It was found that nutritional variable was significantly correlated with ADL and social network scores. However, nutritional variable was inversely correlated with exercise score (*r= - 0.21, P=0.0001*) and social activity score (*r= - 0.11, P=0.0053*). Social and physical variables were also significantly correlated with each other. Despite results suggesting that these variables might interact with each other, each variable is important in its own right and therefore all major variables were included into the Cox's model.

Univariate results from previous chapters showed that social, physical activity, and nutritional variables (diet scores) were significant predictors of mortality. In all cases, higher scores were associated with better survival. Later, each of the social variables (social activity score and social network score), lifestyle (smoking status), and physical activity variables (activity of daily living score and exercise score) were tested using separate Cox's model with diet score (PBD global median cut-offs) as another predictor variable. After controlling for other confounding factors, namely age at enrolment, gender, and ethnicity/locality, it was found that each of social, lifestyle, and physical activity variables remained statistically significant in reducing risks of death, whilst diet score appeared not to be statistically significant. One of the explanations for this result was that social, lifestyle, and physical activity variables were more powerful in predicting mortality than nutritional variables. It was also noted that the error of measurement in dietary intakes was greater. Nevertheless, further investigation on the interaction between all variables in one model was carried out.

Interestingly, nutritional variables (diet score) was shown to have the greatest magnitude in reducing risk of death based on one integrated Cox's model (86% reduction, *P=0.03; CI 2-26%*). Similarly, Activity of Daily Living Score was also found to be significantly associated with a reduction in risk of death (*5%, CI 2-8%; P=0.001*). It was suggested that smoking might increase the risk of death (*P=0.06*) as previously reported by several authors (Branch and Jette, 1984; Cosin-Aguilar J et al., 1995; Pearl R, 1938). Results on other social and physical activity variables were not statistically significant in predicting mortality. When TMD was applied as nutritional variable instead of PBD, TMD was also shown to significantly reduce the risk of death by 84% (*P=0.02, CI 2-27%*). Inclusion of fish and shellfish into the diet score showed a further 2% reduction in risk of death. Thus it was proposed that food intake pattern (nutritional variables/diet score) along with the ability to perform daily activities played major roles amongst other variables in determining survival in later life.

In the current study, an attempt was also made to investigate whether inclusion of less-modifiable variables such as gender, cognitive function, well-being, and health status, might predict mortality in addition to modifiable factors such as diet, ADL, social activity and network, exercise and smoking. It was found that elderly with better cognitive function, better health status with limited disability and better diet score were associated with prolonged survival. Moreover, it was revealed that being male and a smoker showed an inverse relationship to mortality. These results remained significant after adjusting for age at enrolment in a 5-year interval and ethnic backgrounds. Therefore, irrespective of cognitive functions, well-being and health status, diet score still shows beneficial effect in reducing risk of death.

8.5 CHAPTER SUMMARY

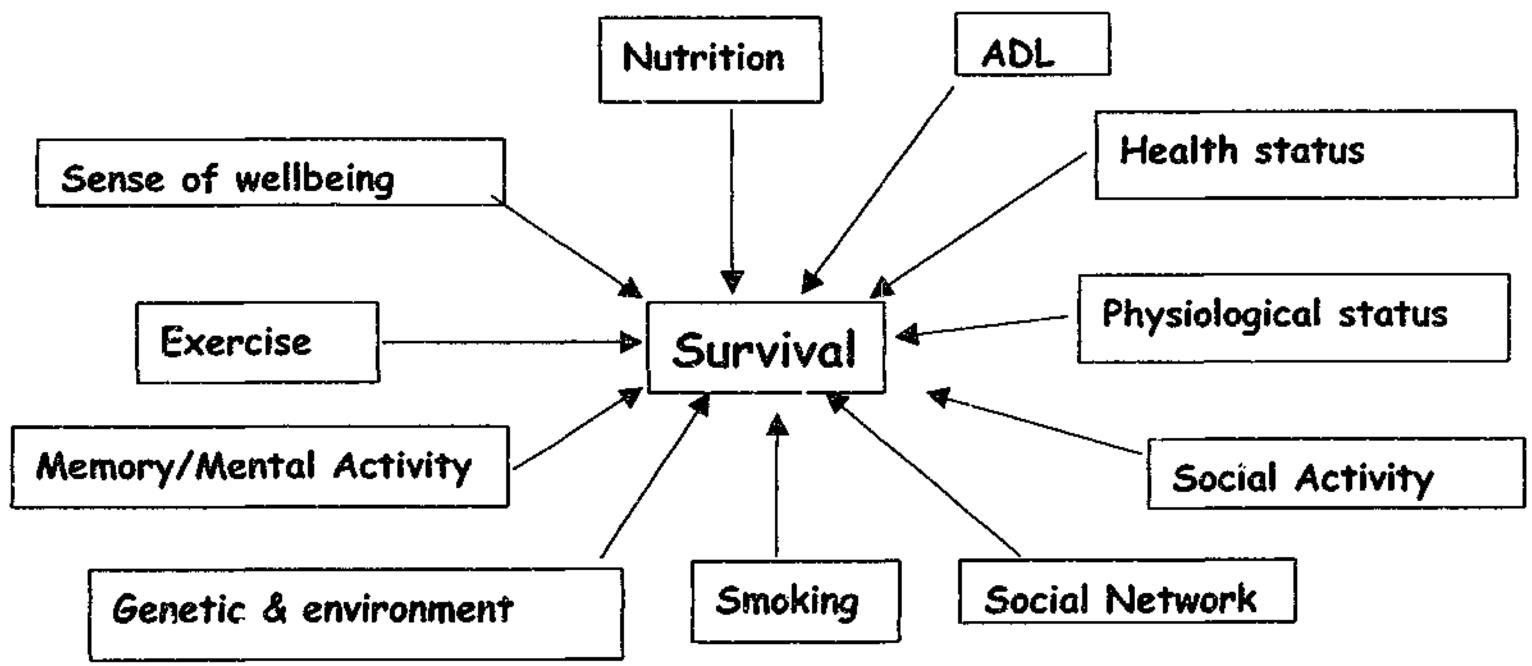
From the FHILL cross-cultural study, it was found that different ethnic background might predict a different survival outcome. To be Greek in Australia (risk ratio 0.23, *P=0.0001*), Swedes in Sweden (risk ratio 0.37, *P=0.0001*), and Japanese in Japan (risk ratio 0.37, *P=0.0008*), conferred lower risks of death when Greeks in Greece were set as a reference point. The risk of death was also lower for Anglo-Celts in Australia, although the risk ratio did not reach significance (*P=0.056*).

Later, major predictors of mortality were integrated into one Cox's model and controlled for age at enrolment (in 5-year intervals), gender, and ethnicity/locality. Diet appeared to be associated most with a significant reduction in risk of death amongst other predictors. It was shown to be significantly reduce risk of death by 14% for every unit increase in PBD diet score. The Activities of Daily Living (ADL) also showed a significant reduction in risk of death by 5% for a one unit increase in ADL score. There was a 4% increase of risk of death for being asmoker (*P=0.06*). Nevertheless, social network, social activity, and exercise were not significantly associated with this hazard.

In addition, other less-modifiable factors, together with modifiable factors, were shown to improve survival. Amongst the significant results were memory, diet, ADL, and general health status. Being male and a smoker significantly increased the risk of death.

It was concluded that modifiable predictors include social, physical activity, lifestyle and nutritional variables. The less-modifiable predictors include health status, memory, and well-being. There is interaction between each of these areas in predicting mortality. However, each of them is important in their own right and has been shown to reduce risks of death. Nutrition appeared to be the most important factor in reducing risk of death irrespective of memory, well-being, and health status across longevity cultures.

Figure 8.2. Interaction between modifiable and less-modifiable variables in predicting survival



CHAPTER 9

CHAPTER 9

GENERAL DISCUSSION AND CONCLUSION

Phase II (mortality follow-up) of the FHILL study provided an opportunity to investigate the effect of baseline data of five longevity cultures in different parts of the world on survival in later life. Baseline data consisted of food intakes, food intake patterns, health, social, and physical activity. Each of these factors as well as the interactions between these factors in predicting mortality were examined using the Cox Proportional Hazard. All-cause mortality was used as the main outcome of the Cox Proportional Hazard model. All-cause mortality was used as the end point in order to prevent bias from the known inaccuracies in death certification in elderly people. This method has also been employed by Euronut study of elderly Europeans (Osler and Schroll, 1997; World Health Organization, 1996).

In the current study, results on all health variables showed that elderly people from different ethnic backgrounds and locality had significantly reduced risks of death by having better cognitive functions, well-being, health status, and by using less medication. Age and gender have been reported to confound these results in another study (Davis et al., 1994). Thus, in the current study confounding factors such as age, gender, smoking, and ethnicity/locality were taken into account. To date, there are limited data available on cross-cultural non-institutionalised elderly cohorts. However, findings from other longitudinal studies supported the view that health in general played a major role in determining survival in later life (Davis et al., 1994; de et al., 1999; Nakanishi et al., 1997; Pulska T et al., 1998).

Being socially active as well as maintaining relations with family, friends, and relatives proved to prolong survival (Welin L et al., 1985)(Glass et al., 1999). Within longevity cultures in the FHILL study, it was revealed that social variables determined survival. Thus, elderly who were socially active and maintained relations had more chance to survive.

Several authors have reported the adverse effects of cigarette smoking on health and survival (Branch and Jette, 1984; Cosin-Aguilar J et al., 1995; Fielding JE, 1985; Giordano JM, 1997; Kannel WB, 1981; Mathers et al., 2000; Pearl R, 1938; Sugisawa et al., 1998). In this study, current smokers were 55% more likely to experience premature death. This result was significant irrespective of age at enrolment, gender, and ethnic background.

Other lifestyle factors were also of interest in the current study. Based on the response to the questionnaires at the commencement of the study, data on length of sleep and the habits of taking a nap during the day were collected. The length of sleep itself was not proven to affect survival, but taking a nap during the day was associated with an increase in the risk of death. This result was significant only when age and gender were controlled. As previously reported, taking a nap (siesta) is part of a traditional lifestyle especially in the Mediterranean. It was shown to reduce risk of death from coronary heart disease in Greek men (Trichopoulos D et al., 1987). In contrast, it has been argued that taking a nap during the day was related to impaired night-time sleep, overall tiredness, physical activity deficits, and depressive symptoms (Bays JC et al., 1996; Rockwood K et al., 2001). However, cultural differences may influence the risk of napping in predicting mortality, thus further study is needed.

It was reported earlier that more deterioration than improvement was observed in the elderly people (Schroll M et al., 1997). Limited functional disability and more exercise have independently shown to be predictors of mortality in this study. Thus being fit and active were particularly important in reducing morbidity and mortality (Blair and Brodney, 1999).

Legumes intake has consistently shown to be a predictor of mortality irrespective of the ethnic background of longevity cultures in this study. Legumes have been widely used as part of traditional food cultures in Japan, Sweden, Australia and Greece. The benefit of the Greek variant of Traditional Mediterranean Diet seems to be extended to other longevity cultures in this study. This result supported previous findings in other cultures (Kouris-Blazos and Wahlqvist, 1998; Kouris-Blazos et al., 1999; Lasheras C et al., 2000; Noah A and Truswell AS, 2001; Osler and Schroll, 1997; Woo J et al., 2001). The addition of fish and shellfish to TMD is also generating more pronounced outcomes in survival of elderly people.

The Mediterranean Diet represents a cultural model for healthy eating (Simopoulos AP, Visioli F, eds, 2000). In some instances, healthy traditional dietary patterns are in decline as increasing industrialization and urbanization have led to increasing wealth and a tendency to pursue diets higher in foods of animal origin. The current study attempted to investigate nine key features of the Mediterranean Diet and their interaction with other factors in predicting survival. It was found that within modifiable factors, diet remained the strongest predictor of mortality. However, when less-modifiable factors were taken into account, better memory became the strongest predictor. Nevertheless, diet remained a significant predictor of mortality. Therefore, it is a challenge today to address this less-modifiable factor and diet in determining longevity (Mattson, 2000).

Dietary changes in the elderly have been reported (de Lorenzo et al, 1999; Horwarth CC, 1989). The current study is limited by diet at point-in-time (baseline) as changes in dietary intake over time were not measured. Other limitations such as error in estimating dietary intake may obscure true dietary intake. In other instances, dietary trends have enhanced the health status of the region, as in the case where variety in the diet has increased over the last several decades, or consumption of fresh fruits and vegetables has risen as global food supply becomes available. Nevertheless, the task of establishing diet and health links becomes more challenging.

According to the study findings, the public health implications would be as follows:

- Encourage adherence to key features of Traditional Mediterranean Diet and Plant-based and fish diet, such as legumes, fish, and olive oil (higher monounsaturated:saturated fat ratio)
- Become more socially, mentally, and physically active
- Maintain better health, memory status, and sense of well-being

Although these findings are made from the more representative samples of homogenous population of elderly, they are likely to be applicable to other elderly communities as well. In conclusion, it is clear that in many respects, the way in which elderly Greeks eat is predictive of mortality. The overall food intake patterns which consist of key features of Traditional Mediterranean Diet may prolong survival, irrespective of the types of foods consumed and the mode of food preparation. It is interesting to note that Japanese and Swedes were amongst longevity cultures with their distinctive cultural settings. However, mortality advantage conferred by the food pattern with these key features was evident in the current study.

Other factors both modifiable and less-modifiable are also contributing towards survival in later life. Of particular interest, then, is that not only has the general hypothesis of this thesis been fulfilled, but also that new insights into the ways in which food affects health in later life have emerged. Further studies are needed to explore the ways in which interactions between diet, social, physical, mental, health and lifestyle factors may bring better survival in later life.

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APPENDICES

老年期の健康と食事 ---- Cross-Cultural Study ----

対象者番号

調査者番号　第1部
　第2部

調査年月日　第1部
　第2部

調査時間　第1部
　第2部

氏　名

住　所

TEL

居住形態
1. 庭付き二世代住宅
2. 庭付き一戸建て
3. 庭無し一戸建て
4. ユニットマンション
5. 貸家
6. 貸アパート
7. 木造アパート
8. 施設
9. その他

第１部　非栄養学的調査（健康とライフスタイル）

基本的特性

誕生日　　西暦　　年　　月　　日

年齢　　満　　才

性　　男　　女

結婚
未婚
既婚
死別
離婚／別居
パートナーと住んでいる

もし、あなたが、死別、離婚、別居しているとしたら、何年たちましたか？

出生地　　Country

移動経験　　Country

子供の頃に住んでいた所は？
１．主に都市
２．主に田舎
３．都市と田舎の両方

その町の名前は？

大人になって住んだ所は？
１．主に都市
２．主に田舎
３．都市と田舎の両方

その町の名前は？

DC26A　現在の家に住んで何年になりますか？

DC26B　その場所は？
１．都市
２．田舎

その町の名前は？

DC27A　あなたのお父さんの出生地は？

DC27B　あなたのお母さんの出生地は？

DC28　あなたは何年間、学校に行きましたか？

DC29　あなたは義務教育よりも、上の教育を受けていますか？
１．はい
２．いいえ

あなたの家族の健康状態についてお伺いします。
兄弟は年齢の順に、男性２人、女性２人まで記入出来ます。

			兄弟		姉妹	
	父	母	男性１	男性２	女性１	女性２
生・死(1or2)						
年齢						
心臓疾患(H)						
脳卒中　(S)						
糖尿病　(D)						
高血圧　(BP)						
癌　(C)						
老年病　(OA)						
その他						

(肥満OB、アルコール依存症AL、老衰SE、健康HT、パーキンソンPA)

１．専門・技術職、又は、 それに関連する職業
(建築家、エンジニア、化学者、医師、歯科医、法律家、僧職、看護婦)

２．管理的職業
(経営者、行政官、支配人、マネージャー)

３．事務職
(簿記係、現金出納係、タイピスト)

４．販売、セールス
(保険、ブローカー、土地管理人、競売人、地方巡回販売人、所有主（地主）や店主のアシスタント)

５．農業、漁業、狩猟従事者

６．鉱山労働者、石切工、又は、それに関連する職業

７．運送業
(バスの検閲者、トラック、バン、バス、タクシー、鉄道の運転手、パイロット、甲板員、車掌、電話電報のオペレーター、郵便局員、郵便局長など)

８．小売商人、生産、加工業従事者あるいは、労働者
(大工、配管工、機械技師、電気工、仕立て屋、機械工、工場労働者、職工長、建築労働者など)

９．サービス、スポーツ、レクリエーション業
(消防士、警官、番人（留守番人）、美容師、看護人（病院の雑役）、スポーツマン、写真家、葬儀屋)

１０．軍事サービス
(自衛隊員)

１１．旅館、ホテル、養老院、救貧院、houde duties

１２．技師

１３．ギリシャ産のブドウ酒の為の樹☆の☆持カス者

１４．馬、ロバ、動物の売買人

DC30GM　あなたのおばあさんは、何才で亡くなりましたか？

あなたのおじいさんは、何才で亡くなりましたか？

DC31A　あなたは一人で住んでいますか？
1．はい
2．いいえ

DC31BP　配偶者、又は、パートナーが一緒に住んでいますか?
1．はい
2．いいえ

DC31BC　同居している子供は、何人ですか？

DC31BG　同居している孫は、何人ですか？

DC31BO　同居している他の人は、何人ですか？

DC31BGA　同居している一番若い孫は、何才ですか？
1．６才以下
2．６～１２才
3．１２～１８才
4．１８才以上
5．いない

DC32A　あなたが、最も長く従事した仕事は？

DC32B　あなたは、現在働いていますか？

8. はい
1. いいえ

DC32B　“はい”と答えた人は、それはどのような仕事ですか？

DC33A　あなたの配偶者が、最も長く従事していた仕事は何ですか？

DC33B　あなたの配偶者は、現在も働いていますか？

“はい”と答えた人は、それはどのような仕事ですか？

記憶

MA7　現在は、何年ですか？
1. 正解
2. 誤り

MA8　今は、何月ですか？
1. 正解
2. 誤り

MA9　今日は、何年何月何日ですか？
1. 正解
2. 誤り

MA10　あなたの住所は？
1. 正解
2. 誤り

MB17　あなたは、物を置いた場所を忘れたり、友達や知人の名前を忘れることがありますか？
0. はい
1. いいえ

身体状況

MB11　よく眠れませんか？
0. はい
1. いいえ

MB12　非常によく眠れますか？
0. はい
1. いいえ

MB13　小さなことをいつも以上に心配しますか？
0. はい
1. いいえ

MB14　人の世話をしたり、楽しんだりする事に興味を持てませんか？
0. はい
1. いいえ

MB15　死にたいと思うほど悲しくなったり、うつ状態になったりすることが、ありますか？
0. はい
1. いいえ

MB16　いつも疲れを感じますか？
0. はい
1. いいえ

MB17A　毎日の人生が、幸せで満足していますか？
0. いいえ
1. はい

健康

H34　　あなたの現在の健康状況は？
1．よくない
2．まあまあ
3．よい
4．非常によい

H35　　現在の健康状態は、3年前と比べてどうですか？
1．よくない
2．同じ
3．よりよい

H36　　あなたが、したいと思うことができないような健康上の問題がありますか？
1．たくさんある
2．少しある
3．ほとんどない

H37　　あなたは、同じ年頃の人と比べて健康状態がよいと言えますか？
1．よくない
2．同じくらい
3．よりよい

H38　　この一年間で、何回くらい医者にかかりましたか？
1．１３回以上
2．3～１２回
3．0～　2回

H39　　この一年間で病院に行った（あるいは入院した）のは何日くらいですか？
1．２２日以上
2．１～２１日
3．０日

H40　　この一年間で、ほとんど１日中床に就いた日は何日間でしたか？
1．１４日以上
2．１～１３日
3．０日

H41　　視力は、いかがですか？(眼鏡の使用可)
1．見えない、又は、一部分が見えない
2．よい、又は、十分である

H42　　聞こえ方は、どうですか？(補聴器の使用可)
1．聞こえない、又は、部分的に聞こえない
2．よい、又は、十分である

H43　この一年間で、次のような疾患に羅患したことがありますか？

a．糖尿病
b．高血圧
c．心臓障害
d．循環器障害、動脈硬化
e．麻痺
f．脳溢血（発作）
g．関節炎、リュウマチ
h．胃潰瘍
i．気腫、又は、喘息
j．緑内障
k．そこひ
l．腫瘍、ガン
m．肝障害、又は、黄疸
n．肝のう障害
q．座骨骨折
r．他の骨折
s．貧血
t．パーキンソン病
u．睡眠障害、不眠症
v．神経症、緊張症
w1．前立線障害
w2．骨粗症
w3．尿路感染
w4．高尿酸四症
w5．便秘症
w6．胃腸障害
w7．他

次のH43X、H43Yは、女性の方のみ答えてください。

H43X　初潮年齢は？

H43Y　閉経年齢は？

H43Z　この一年間に、風邪や流感に何回くらいかかりましたか？

投薬とビタミン

H44　一般によく使われている薬のリストがありますが、日常的に使っているものがありますか？
1．はい
2．いいえ

a．関節炎（痛風）薬
b．処方された痛み止め
c．アスピリン
d．高血圧剤
e．利尿剤
f．ジキタリス（心臓）
g．ニトログリセリン（胸の痛み）
h．抗凝固財　（血液を薄める薬）
i．循環促進剤
j．糖尿病のためのインシュリン
k．糖尿病のための薬
l．処方された潰瘍薬
m．脳溢血剤
n．サイロイトホルモン
o．コーテソーン薬、又は、注射薬
p．抗生物質
q．鎮静剤、又は、神経薬
r．睡眠薬
s．女性／男性ホルモン
t．抗心配／抗うつ剤
u．緑内障のための薬
v．筋肉緩下剤
w．アレルギー
x．便秘薬
y．他

H45 この一年間に漢方薬やビタミン剤を飲んだことがありますか？

1．はい
2．いいえ

“はい”と答えた方は、下記から選んでください。

a）ビタミンコード〔　　　〕なぜ〔　　　〕いつ〔　　　〕
b）ビタミンコード〔　　　〕なぜ〔　　　〕いつ〔　　　〕
c）ビタミンコード〔　　　〕なぜ〔　　　〕いつ〔　　　〕

ビタミンコード
1．複合ビタミン剤
2．B_{12}
3．ＶＣ，Ｃａ，ＶＤ
4．鉄、又は、薬酸
5．りん酸、又は、ペクチン
6．ＶＤ
7．Ｂ複合
8．ＶＡ，ＶＥ
9．ＶＣ
10．その他

理由
1．健康のため
2．神経的な問題のため
3．強壮のため
4．治療のため
5．貧血
6．骨のひめ
7．その他

いつ（どのくらい）
1．毎日
2．1週間に2回
3．1カ月に2回
4．
5．毎年2カ月、規則的に
6．1カ月くらい毎日
7．短期間、1日だけ

健康のため

H46 観察してチェック

code
1．はい
2．いいえ

a．腕に障害は？〔　〕
b．足に障害は？〔　〕

H47 次のものを使っていますか？

a．つえ
b．歩行機
c．病人用車椅子
d．足の添え木
e．背中のコルセット
f．補聴器
g．ペースメーカー
h．人口経門
i．導尿管
j．老人用椅子
k．眼鏡
l．人口の手足
m．その他

EX84　お天気のよい時、あなたはどのくらい家の外へ出ますか？
（外出しますか？）

1．出ない
2．1カ月に1回より少ない
3．1カ月に2、3回
4．1週間に1回
5．1週間に2～4回
6．1週間に5回以上

EX85A　あなたは、乗り物を持っていますか？
（例　車、バイク、ロバ等）

1．はい
2．いいえ

“はい”と答えた方、それは何ですか？　〔　　　　　　〕

EX85B　“はい”の方で、外出のとき、いつも使いますか？

1．はい
2．いいえ

EX86A　毎日、次のようなことをどのくらいの時間
していますか？

a．　歩くこと
b．　軽い家事仕事（例　皿洗い、掃除）
c．　重い家事仕事（例　床のモップかけ）
d．　農作業　　（例　肥料の穴掘り、又は他の激しい作業）
e．　庭いじり
f．　ぶらぶらしている
g a．動物やペットの世話
g b．その他
g c．その他

EX86B　調査対象者の身体活動に1～7のscoreを与えてください。

|—1—|—2—|—3—|—4—|—5—|—6—|—7—|

EX87　昨年と比べて

1．現在の方が活動的である
2．現在の方が活動的でない
3．現在はほとんど活動的でない
4．同じくらい

理由は？

活動と毎日の生活

あなたが、年を取ったために、次のような仕事をするのが、問題であったら教えてください。

1．できない
2．助けてもらえばできる
3．難しいが、助けがなくてもできる
4．難しくない

ADL88

a．部屋から部屋へ歩く
b．階段を使う
c．少なくても４００mは、歩くこと
d．歩いて行ける以上のところへ行けますか？
（バス、タクシー、電車を使って行く）
e．トイレを使えますか？
f．手を洗ったり、入浴が、自分でできますか？
g．衣服を脱いだり、着たりできますか？
h．風采に気をつけることが、できますか？
i．ベッドに入ったり、出たりできますか？
j．必要があれば、自分の食事の支度ができますか？
k．必要があれば、自分で食事ができますか？
l．必要があれば、軽い家事（例　皿洗い等）が、できますか？
m．必要があれば、重い家事（例　窓掃除）が、できますか？
n．必要があれば、薬を飲むことができますか？

ADL88O　お漏らしをしたことが､ありますか？
（尿意を感じでもトイレに行けないときがある）

1．ない
2．時々
3．たびたび

ADL88L　（便意を感じても､トイレに行けないときがある）

1．ない
2．時々
3．たびたび

ADL88Q　あなたを主に助けてくれる人は？

1．配偶者、又は、パートナー
2．子供、又は、子供達
3．友人、親族
4．隣人
5．雇っている人

睡眠

SL89A　何時くらいに寝ますか？
（11:30くらいでしたら､11時としてください。）

SL89B　何時におきますか？

SL89C　平均、何時間くらい寝ますか？

SL89D　昼寝をしますか？
“はい”と答えた方、何時間くらいですか？

喫煙

SM90A　あなたは、タバコを吸っていたことが、ありますか？

1．はい。習慣的に吸っていた
2．はい。昔は、毎日吸っていたが、今はやめている
3．吸ったことは、ない
4．時々、吸ったことがある

SM90B　"はい"と答えた方、何年くらい吸っていましたか？
（1と2の方）

SM90C　"はい"と答えた方、一日何本くらい吸いましたか？
又は、吸っていますか？

SM90D　タバコをやめた方は、やめて何年になりますか？

社会生活

SAR92　この一年、次のことをどのくらい行いましたか？

1．しなかった
2．年に3回
3．年に4～10回
4．月に1回
5．月に2～3回
6．週に1回
7．週に2～4回
8．週に5回以上

（季節中行うときは、頻繁にしてください。例えば、夏だけ毎日泳ぐ時は、コード8になります。）

a．市民センターに行ったり、市民グループ活動に参加したりする

b．教会活動に参加する／宗教活動に参加する

c．教会グループや他のグループのクラブ会合に参加する

d．映画、教会、劇場、コンサート、講演会に行く

e．スポーツ活動に参加する

f．水泳、釣り、狩猟、自転車、ゴルフのようなスポーツに参加する

g．カート、ビンゴ、ビリヤードのようなゲームをする

h．園芸、庭いじりをする

i．縫い物、編み物、木工などの趣味や手工芸をする

j．絵を描いたり、楽器を演奏する

k．レストランで特別な理由で友人と食事をする

l．孫や子供の子守をする

m．友人の家や子供の家に泊まる

n．週末に小旅行をする（町を離れる）

o．喫茶店やパブ、飲み屋などで友人と会う

p．ボランティア活動をする

q．農業をする

r．テレビを見たり、ラジオを聞いたりする

s．ダンスに行く

t．動物（ペット等）のめんどうをみる

u．読書

Social Relation

SAR93 打ち明け話をしたり、あなたの抱えている問題を話せる人がいますか？
1．はい
2．いいえ

SAR94 同居している子供がいますか？
1．はい
2．いいえ

SAR95 同居している兄弟（姉妹）がいますか？
1．はい
2．いいえ

SAR96 だいへん親しいと感じられる人がいますか？
1．はい
2．いいえ

SAR97 親しい友人や家族の訪問をうけることがありますか？
1．ない
2．たまに
3．毎月
4．毎週
5．毎日

SAR97B 親しい友人や家族を訪問することがありますか？
1．ない
2．たまに
3．毎月
4．毎週
5．毎日

SAR97C 家族や友人と電話で話しますか？
1．ない
2．たまに
3．毎月
4．毎週
5．毎日

SAR97D 家族や友人に手紙を書きますか？
1．ない
2．たまに
3．毎月
4．毎週
5．毎日

SAR98 ちょっとした病気になったとき、家族や友人が同居してくれますか？
1．いいえ
3．はい

SAR100 ちょっとした病気になったとき、助けてくれる友達や隣人がいますか？
1．いいえ
3．はい

SAR101 一人だと感じることがありますか？

1．よく感じる
2．時々
3．たまに
4．ない

SAR102 子供や孫の尊敬や感謝を感じていますか？

1．ない
2．時々
3．ほとんど
4．いつも

Economic Resource

EC0103 主な収入源は、何ですか?

1．1つの年金（恩給）だけ
2．2つの年金（恩給）（配偶者も含む）
3．1つの年金（恩給）と他の収入源
4．2つの年金（恩給）と他の収入源
5．
6．
7．
a．その他
b．
c．

1年間の収入は？（配偶者の収入も含む）

EC0104 他のかたちの援助を受けていますか？（お金以外）

1．はい
2．いいえ

“はい”の方、どんな援助を受けていますか？

a．食事
b．衣類
c．保護
d．医療
e．交通費
f．その他

EC0104G 誰からの援助ですか？

1．子供
2．親類、友人
3．隣人
4．その他

EC0105 生きて行くのに十分なお金、食べ物、居住、衣類等を持っていると言えますか？

1．いいえ。十分ではない
2．はい。　十分である
3．はい。　十分過ぎる

“いいえ”と答えた方、特に必要なものは何ですか？

EC0106A 現在、働きたいですか？

1．はい
2．いいえ

“はい”と答えた方、それはなぜですか？

1．活動したい
2．収入がほしい
3．1と2と両方
4．その他

第２部　栄養学的側面（食習慣、食信仰、食物摂取）

食欲について

APP53　食生活を十分楽しんでいますか？

1．はい
2．いいえ

"いいえ"と答えた方、どうしてですか？

Code　1．はい
2．いいえ

a．食べ物に興味がない
b．食事を共にする人がいない
c．料理に興味がなくなった
d．食欲がない
e．食べ物がおいしくない
f．食べ物の匂いがよくない
g．消化障害がある
h．その他

APP54　食欲はありますか？

1．ない
2．普通
3．ある
4．たいへんある

APP55　次のようなことに問題がありますか？

Code　1．はい
2．いいえ

a．入れ歯が合わない
b．ある食べ物の酸味が、強すぎると感じる
c．咬みづらい
d．飲み込みづらい
e．消化しにくい
f．口が、ただれている
g．口が乾く
h．その他

歯について

APP55Tth　歯について該当するものを選んでください

1．入れ歯
2．ほとんど自分の歯
3．いくらか自分のものがある
4．歯が無く、ゴムで咬んでいる

Food Avoidance

APP56　食べたくないとか、食べることを避けている食べ物がありますか？

1．はい
2．いいえ

もし、次の食べ物を食べるのを避けているとしたら、その省略形を入れてください。該当しないものは、空白のままにしてください。その理由を下から選んで省略形で記入してください。

Food

1．肉＝ＭＴ
2．塩気のある食品＝ＳＴ
3．脂肪、油＝ＦＴ
4．卵＝ＥＧ
5．魚介類(例 ヤリイカ)＝ＳＦ
6．甘いもの＝ＳＷ
7．乳製品＝ＣＳ
8．玉ねぎ、にんにく＝ＯＧ
9．豆類＝ＬＧ
10．パン＝ＢＤ
11．果物＝ＦＲ
12．ほうれん草＝ＳＰ
13．＝Ｗ
14．オレンジ＝Ｏ

Food〔　　〕 理由〔　　〕
〔　　〕 〔　　〕
〔　　〕 〔　　〕

理由

1．体重減少＝ＷＴ
2．健康＝Ｈ
3．糖尿病＝Ｄ
4．高血圧＝Ｅ
5．コレステロール＝ＣＨ
6．胃腸障害＝ＳＴ
7．小腸の問題＝ＧＩ
8．下痢＝ＤＲ
9．関節炎＝ＡＲ
10．咀しゃく障害＝ＴＨ
11．嫌い＝ＤＫ
12．酸が強すぎる＝ＡＣ
13．心臓病＝ＨＤ
14．胆石＝ＧＳ
15．尿酸＝ＵＡ
16．宗教＝Ｒ

APP56LONG　どのくらいの間、その食べ物を食べるのをやめていますか？

食環境 (Eating Environment)

DH57　　いつもあなたの食事を作るのは、誰ですか？

1. 自分自身
2. 配偶者
3. 親類、友人、隣人
4. 社会福祉員、又は、ボランティアの人
5. プライベートに雇用している人
6. ある機関からの食事を受けている
7. その他

DH57MOW　　食事を供給されているとしたら、1週間にどのくらいですか？

DH58　　他の人と食事を共にするのは、どのくらいですか？

1. ほとんど一人
2. 週に2～3回
3. 毎日

ほとんど1人(1の方) と答えた方、どのくらい1人で食べていますか？

DH59　　他の人と食べるとき、いつも何人くらいで食べますか？

	朝食	昼食	夕食
小中高生の子供の数			
男　性			
女　性			

外食 (Eating Out)

DH60　　外食をどのくらいしますか？
(例　友人の家、レストラン、居酒屋)

1. 毎日
2. 週に3～4回
3. 週に1～2回
4. 月に1～2回
5. 1カ月に1日以下
6. 外食はしない

DH60Place　　最もよく行く場所は？

1. 居酒屋
2. レストラン
3. 友人、又は、親戚の家
4. パブ
5. その他

DH60Food　　外食では、主にどのようなものを食べますか？

1. スナック (サンドイッチのような物)
2. 主食 (肉、魚)
3. くだらないもの (パスタ)
4. その他

食物の購入 (Food Purchase)

DH61 あなたは食物をどのような割合で手に入れますか？

code
1．全て
2．ほとんど
3．少し
4．ない

a．庭や農場から
b．仕事をして食べ物を得ている
c．食べ物と食べ物を交換している
d．お店

DH61A 歩ける範囲に、食べ物を売っているお店が、ありますか？
1．はい
2．いいえ
3．いくつか

DH62 食べ物を買いますか？
1．はい
2．いいえ

“いいえ”の方、どうしてですか？
1．必要があれば行くが、私のために行ってくれる人がいる
2．体が弱くて行けない
3．店が遠すぎる
4．その他

“いいえ”の方、あなたの為に、誰が買い物に行ってくれますか？
1．配偶者
2．子供
3．孫
4．友人、親類
5．隣人
6．雇用している介助人
7．その他

DH64A 食事について気をつけている人が、家の中にいますか？
1．はい
2．いいえ

“はい”の方、
どうしてですか？（APP56の理由の中から選べ）

どのくらいですか？

DH64D　　それは、また、あなたが食べる物に影響していますか？

1．はい
2．いいえ

調理・貯蔵の容易、簡易さ
(Storage and Cooking Facilities)

DH65　　あなたは、次のうち何を持っていますか？

a．ストーブ
b．オーブン
c．冷凍庫
d．テレビ
e．ラジオ
f．電話
g．トイレ
h．湯
i．電子レンジ
j．冷蔵庫
k．その他

食物と宗教 (Food and Relagion)

DH66　　あなたが次の項目の為に、断食したのは、1年に何日くらいですか？

1．イースター
2．クリスマス
3．Virgin Mary
4．その他．(St. Apostollos)

何日間くらいですか？

DH66WF　　毎週水曜日とか、毎週金曜日とか断食しますか？

1．はい
2．いいえ

DH67A　　断食した日は別にして、ほとんど食べない日がありますか？

1．はい
2．いいえ

“はい”の方、週に何日くらいですか？

脂肪と塩分 (Fat and Salt)

DH68　　肉の脂味を食べますか？

1．食べる
2．時々
3．たまに
4．ほとんどない

DH69　　鶏肉の皮を食べますか？

1．食べる
2．時々
3．たまに
4．ほとんどない

DH70　　料理をするとき、塩をよく使いますか？

1．いいえ
2．時々
3．いつも

DH71 (DH~~72~~)　　食卓で塩をよくかけますか？

1．いいえ
2．時々
3．いつも

DH72　一世帯で、週に大人一人当たり、どのくらいの油を使いますか？　　下記の項目の油について

0
150 (< 1/4 litre)
250 (1/4 lLitre)
500 (1/2 litre)
1000 (1 litre)

1. オリーブ
2. サフラワー
3. コーン
4. サラダ
5. その他

DH72　使っている油の名前は、何ですか？

1. 作ったもの
2. 買って来たもの

DH72T　あなたが毎日使っている油は、どのくらいですか？

DH73　週に家でマーガリン、バター、ラードは、どのくらい使いますか？
(家・大人の人数で、消化量を割って見てください)

1. バター
2. マーガリン
3. リノール酸入りマーガリン
4. ラード
5. その他

DH73N　マーガリン、バターは、何を使いますか？

1. 手造り
2. 買って来たもの

DH73T　毎日、あなたはどのくらい使いますか？

料理方法 (Cooking Methods)

DH74　あなたは、野菜をどのように料理して食べますか？

code
1. はい
2. いいえ

a. ゆでる
b. 暖める
c. 電子レンジ
d. キャセロール
e. 揚げる
f. 炒める
g. 生・サラダ

DH75　あなたは、肉、魚、鶏肉をどのようにして、料理して食べますか？

code
1. はい
2. いいえ

a. ゆでる
b. 暖める
c. 電子レンジ
d. キャセロール
e. 揚げる
f. 炒める
g. 生・サラダ
h. グリルで焼く
i. BBQ

アルコール (Alcohol)

DH76A

少なくても、1カ月に1回くらい、ビール、ワイン、スピリッツを飲みますか？
（1カ月に1回以下の時は、“いいえ”にしてください）

1．はい
2．いいえ

“はい”の方、どのくらい飲みますか？（1日当たりのml数）

a．ローアルコールのジュース
b．ビール、又は、アルコール入りサイダー
c．ワイン
d．ポートワイン、又は、チェリー酒
e．スピリッツ、又は、リキュール

DH76B

何年くらい飲んでいますか？

a．ワイン
b．ビール
c．ポートワイン、チェリー酒
d．スピリッツ

DH76C

現在、飲んでいなくても、過去にどのくらい飲んでいましたか？

a．ワイン
b．ビール
c．ポートワイン、チェリー酒
d．スピリッツ

DH76D

どのくらい(年数)飲みましたか？

a．ワイン
b．ビール
c．ポートワイン、チェリー酒
d．スピリッツ

DH76E

アルコールは、健康によいと思いますか？

1．はい
2．いいえ

“はい”の方、どのくらい飲むのがよいと思いますか？

食物についての認識 (Food Beliefs)

1. 健康によいと思う食べ物は？

2. 健康によくないと思う食べ物は？

3. 病気に効くものを知っていますか？(治療に効果がある)

4. なぜ、長生きしたいと、思いますか？

5. 子供によい食べ物は、何ですか？

6. 子供と同じ食べ物を、食べますか？

7. 妊婦によい食べ物は、何ですか？

8. あなたが妊娠したとき、それらを食べましたか？

9. あなたの年齢の人々によい食べ物は？

10. あなたの年齢人々によくない食べ物は？

11. 食べ物が、不足して大変だった時（例　干ばつ、凶作、
戦争、貧乏のとき）何を食べましたか？
そして、それはどのくらいですか？

現在の食物摂取

一般的に、一日に食べるものと食べる時間を書いてください。
量は、必要ありません。

910626

Tom!

På följande sidor har jag kodat de SLV-koder som skall läggas in. Allt står för Anna Lamm. Ring mig gärna om det är något som vi behöver diskutera. I övrigt en glad sommar! Hälsn. Elisab

FETT OCH SALT

DH68 Äter Ni det synliga fettet på köttet?

1. oftast
2. ibland
3. sällan
4. inte applicerbart

[ ]

DH69 Äter Ni skinnet på kyckling?

1. oftast
2. ibland
3. sällan
4. inte applicerbart

[ ]

DH70 Tillsätter Ni salt eller buljongpulver eller tärning vid matlagningen?

1. nej
2. ibland
3. oftast

[ ]

040-451258

DH71 Tillsätter Ni salt vid bordet?

1. nej
2. ibland
3. oftast

[ ]

031-123294

DH72 Hur mycket olja används per vuxen person i Ert hushåll per vecka?
Dividera använd mängd med antal vuxna i hushållet.

Kod i gram: 0
150 (< 1/4 l)
250 (1/4 l)
500 (1/2 l)
1000 (1 l)

DH72OI Olivolja 7.330 [ ][ ][ ][ ]
DH72SF Solrosolja 7.370 [ ][ ][ ][ ]
DH72CN Majsolja 7.325 [ ][ ][ ][ ]
DH72VG Vegetabilisk olja 7.300 [ ][ ][ ][ ]
DH72OT Annan, specificera ....7.310, 7.360 ...... [ ][ ][ ][ ]
7.375 7.375; 7.365

DH72ON Vilket fabrikat på olja använder Ni?

1. eget/lokalt tillverkat
2. köpt, vilket .... [ ]

5 R

MAT	REF.PORTION (G) S	M	L	PROBANDENS PORTION (G)	FREKVENS MÅNAD/ÅR	TIDIGARE INTAG
KÖTT & CHARKPRODUKTER						
Kyckling						
ugnsstekt	60	120	180	AK		
kokt				AK		
lagad i gryta	90	170	250	AK		
Kalkon						
ugnsstekt	60	120	180	AK		
Viltfågel						
t ex vaktel	60	120	180	AK		
Får						
ugnsstekt	60	120	180	AK		
lagad i gryta	90	170	250	AK		
Lamm						
ugnsstekt	60	120	180	AK		
kotletter				AK		
lagad i gryta/ /kokt	90	170	250	AK		
Nötkött						
ugnsstekt	60	120	180	AK		
kokt				AK		
lagad i gryta (typ kalops)	90	170	250	AK		
Kalv	60	120	180	AK		
Köttfärs	60	120	180	S.5354, S.5 / S 5355 H 53	116 H.63 / 55 S 5557	5
Kanin						
gryta	90	170	250	AK		
Pastichio	150	300	450			
Moussaka	150	300	450	AK		
Skinka	1 skiva		30	5.410 5.412	5.411 5.4	13
Korv	60	120	180	5.514 5.519	5.527 5	.528 AK falukorv stekt
Salami	45	90	135	5.521, 5.522	5.039, 5.5	23 5.595
	1 skiva = 10					

AK
12

2/R

MAT	REF.PORTION (G) S	M	L	PROBANDENS PORTION (G)	FREKVENS MÅNAD/ÅR	TIDIGARE INTAG
? **Blekselleri** (rå - ej soppa) Meat (för Sop)	15	30	45			
? **Rödbeta** (kokta)	50	100	150			
V **Zucchini**	50	100	150			
V **Majs** (corn)	20	40	60			
Vindolme	1 dolme		30			
Paprika	15	30	45	1.079, 1.218	, 1.080	
V **Svamp** (Mushroom) (stekta)	30	60	90	1.328 1.225	1.047, 1.226	, 1.027 AK stekt svamp.
V ***Persilja** (Parsley)	N=aldrig S=ibland					
V ***Mynta** (Mint)	O=ofta VO=regelbundet					
***Dill**						
***Basilika**						
***Oregano**						
Herb **Vitlök** (Garlic) en klyfta		2		1.152		
Oliver 5g/st		20		1.077, 1.0	78	
FRUKT						
Apelsiner		130		2.012		
Grapefrukt		200		2.068		
Mandariner		100		2.053		
***Citron**				2.046		
Äpple		100		2.160,	2.166	

.19 R

1
AK

MAT	REF.PORTION (G) S	M	L	PROBANDENS PORTION (G)	FREKVENS MÅNAD/ÅR	TIDIGARE INTAG
Päron		120		2.140		
Bananer		100		2.033		
Bär	20 =	100		2.083, 2.183, 2.084, 2.039, 2.040, 2.041, 2.153		
Körsbär	20 =	100		2.110		
Jordgubbar	12 =	100		2.087	2.240, 2.088, 2.089	
Melon utan skal	60	120	180	1.076,	1.045	
Vattenmelon utan skal	130	260	390	1.144		
Persika	1 =	120		2.127		
Plommon	3 =	100		2.136		
Druvor	20 =	100		2.155		
Fikon	2 =	100		2.060		
Ananas	1 bit =		80	2.003		
Aprikos	3 =	100		2.024		
Avocado	halv =		150	1.001		
Granatäpple	1 msk =		15	2.067		
	helt =		60			
Fruktsallad	60	120	180	AK		
Fikon torkade	2 =	30		2.065		
Katrinplommon	8 =	80		2.094		
Sultaner ljusa russin	1 msk =		15	2.147		
Dadlar	6 =	30		2.059		

/

· 21R AV

DH72T Hur många matskedar [ ][ ] eller
teskedar [ ][ ]
använder Ni dagligen (grov gissning)?

DH73 Hur mycket margarin/smör/ister används i detta hushåll per vecka?
Dividera använd mängd smör/margarin med antal vuxna i hushållet.

Kod i gram:
- 0
- 30 (1-2 msk)
- 120 (4-8 msk)
- 250 (1/2 ask)
- 500 (1 ask)

DH73B	Smör 7.400	[ ][ ][ ]
DH73TM	Bordsmargarin 7.135, 7.120, 7.140	[ ][ ][ ]
DH73PM	Fleromättat margarin 7.130, 7.200, 7.250	[ ][ ][ ]
DH73LD	Ister/talg 7.001	[ ][ ][ ]
DH73O	Annat, specificera 7.160 7.150 + AK	[ ][ ][ ]

AK
/

DH73N Vilket fabrikat smör/margarin använder Ni mest?

1. eget tillverkat
2. köpt, sort .... [ ]

DH73T Hur många matskedar [ ][ ]
eller teskedar [ ][ ]
margarin/smör använder Ni dagligen (ungefär)?

MATLAGNINGSMETODER

DH74 Hur äter Ni Era grönsaker oftast?

Kod: 1. Ja
2. Nej

1. kokta [ ]
2. ångkokta [ ]
3. lagade i mikrovågsugn [ ]
4. tillagade i gryta -/stuvade [ ]
5. friterade/stekta [ ]
6. ugnsstekta/bakade [ ]
7. råa/sallad [ ]

5 R

MAT	REF.PORTION (G) S	M	L	PROBANDENS PORTION (G)	FREKVENS MÅNAD/ÅR	TIDIGARE INTAG
					med mjölk (?)	
Efterrätter						
krämer	100	200	300	S2913, S2153		
soppor	100	200	300	S2041 S2153	S2182	
paj	100	150	200	6.905	+ ev. AK	
Desserter av ägg och mjölk t ex choklad-pudding, ostkaka	100	150	200		AK	
äppelmos, lingonsylt, marmelad		20		8.102		
Vetebröd släta bullar, skorpor		45		6.553, 6.552,	6.551, 6.550	
finare vetebröd/ wienerbröd		40		6.804		
bakelse/tårta		110		6.902 a	6.901	
konditori-kakor	25	35	50	6.900		
Sötsaker lakrits	5			8.204		

312 SLU-koder

TOT 242 RADER

10 R

TOT
76 AK

2
AK

MAT	REF.PORTION (G) S	M	L	PROBANDENS PORTION (G)	FREKVENS MÅNAD/ÅR	TIDIGARE INTAG
Vatten		200		9290		
*Tomat-ketchup				1.048		
*Senap				8.703		
Kaffe antal koppar brygg/kok				8.801		
snabb				8.806	AK	
Té antal koppar				8.805		
Örtté				S8075		
Socker	1 tsk	5		8.001		
Läskedryck eller sötdryck 1 glas		240		9.100, 9.101,	9.110, 8.	901,
Fruktjuice 1 glas		240		9.159, 2.	015, S2936	

10 R

1
AK

MAT	REF.PORTION (G) S	M	L	PROBANDENS PORTION (G)	FREKVENS MÅNAD/ÅR	TIDIGARE INTAG
Extra svenska pålägg						
leverpastej	10	15	20	5.581, 5.590, 5.582		
kaviar	5	10	5	5.711, 5.712		
smältost	10	15	20	4.465, 4.466, 4.467		
Gröt						
mjölkkokt	125	225	325	AK		
vattenkokt	125	225	325	AK		
välling	100	200	300	6.383, 6.382, 6.381, 6.085		
müsli/cornfl	15	25	40	6.150, 6.355, 6.373, 6.367, 6.368, 6.369		
Mjölkprodukter						
vispgrädde	10	25	50	4.103, 4.120		
kaffegrädde	10	25	50	4.105, 4.100		
keso	20	45	90	4.400		
gammaldags mjölk 4%	100	200	300	AK		
standard-mjölk 3%	100	200	300			
mellan-mjölk 1%	100	200	300	4.225		
Fisk						
inlagd sill 5g/bit	50	75	100			
fiskbullar/pudding	60	120	180	5.703, 5.704	H6156	+ Ev AK
Kötträtter						
kalvsylta	25	50	100	5.535		
köttfärssås	60	120	180	S 5356, H 5356		
Vilt						
älgkött	60	120	180	AK		
Soppor						
ärtsoppa	100	200	300	H 1864 +	Ev AK	
redda soppor	100	200	300	S 1293	+ AK	
bruna bönor	150	250	350	AK		
Potatis						
pytt i panna	125	225	325	S 3571, H 3571		
rotmos	100	200	300	S 3611, H 3611		

23 R

4
AK

MAT	REF.PORTION (G) S	M	L	PROBANDENS PORTION (G)	FREKVENS MÅNAD/ÅR	TIDIGARE INTAG
Choklad	15	30	45	8.301, 8.302, 8.303		
Klubbor		5		8.202, 8.201	- AK	8.210, tabletter; 8.223 = OS tabletter
NÖTTER						
Mandel 10 styck		15		8.427		
Kikärtor		15				
Pumpfrön		15		8.420		
Kastanjer 4 styck		20		8.435		
Annat				8.408, 8.426, 8.428	8.507, 8.402	8.351
DIVERSE						
Dipp	1 msk =		20			
taramosalata						
scordalia (vitlökdipp)						
auberginedipp (melitsanosalata)						
yoghurtdipp (tsatsiki)						
Pickles		20		1.086		
Sylt/marmelad		40		8.100, 8.115	8.114, 8.138	AK OS; 8114 ? → 8144
Äpplemos		40		8.105, 8.106	+	AK OS
Honung		40		8.004		
Petimezi		40				
Smörgåspålägg typ chokladsmör		40				

18 R

AK.
3

MAT	REF.PORTION (G) S	M	L	PROBANDENS PORTION (G)	FREKVENS MÅNAD/ÅR	TIDIGARE INTAG
BRÖD & SPANNMÅLSPRODUKTER						
Bröd						
1 skiva		25				
vitt				6.707 6.725	6.701	Kolla AK
fullkorn		35		6.608		–"–
råg				6.603 6.604	6.601	–"–
starenio						
Knäckebröd		8		6.500, 6.531, 6.504, 6.503	6.502, 6.505	
Paximadia		15		—		
Kolouraki		30		—		
Småkakor/ söta kex		10		6.852, 6.856, 6.853		
Kex		10		6.851, 6.890 AK: digestive		
Kakor						
gjorda på mördeg		10		AK		
kourambie		50		—		
malamakarono				6.903		
Bakverk/ vetebröd						
baclava		100		6.806, 6.805		
diples						
galakto-boureko		150		—		
Pannkakor	40	80	120	AK		
Mjuka kakor						
sockerkaka 1 skiva		50		6.904 + AK		
med frukt/ nötter 1 =		80		AK		
Inlagd frukt	10	20	30	—		
Halva	40	80	120	—		

la m SLV

AK.
21 R
2

MAT	REF.PORTION (G) S	M	L	PROBANDENS PORTION (G)	FREKVENS MÅNAD/ÅR	TIDIGARE INTAG
Frukt konserverad	45	90	150	2.143, 2.144, 2.006, 2.008, 2.009	2.252, 2.165, 2.181	
MJÖLK & MJÖLKPRODUKTER						
Fetaost						
mjuk	25	50	75	? 4.483		
hård						
Ricotta	25	50	75	—		
Casseri	25	50	75	—		
Kefalotiri	25	50	75	—	4.463, 4.488, 4.491	
Annan ost	25	50	75	4.450, 4.484	4.486, 4.487, 4.496, 4.461	
Mjölk	100	200	300			
komjölk				4.214, 4.208	4.224	
fårmjölk				4.228		
getmjölk				4.200		
kond mjölk	25	50	75	4.204		
-"- sötad	25	50	75	4.205		
torrmjölk	25	50	75	4.206, 4.216		
lättmjölk	100	200	300	4.212, 4.211		
Yoghurt	100	200	300			
>4% fett				AK dessertyoghurt		
<4% fett				4.218, 4.235	4.219, 4.217	
får						
get						
Desserter t ex						
rispudding	65	130	200	S4511 + AK		
Glass	30	60	90	4.006, 4.004	4.005, 4.001, 4.002	
Ägg		55		AK kokt	o.s.k.t	

21 R
AK.
23

MAT	REF.PORTION (G) S	M	L	PROBANDENS PORTION (G)	FREKVENS MÅNAD/ÅR	TIDIGARE INTAG
Squash (kokta)	50	100	150	1.121 √	Au:	stekt
Pumpor (kokta)	50	100	150	1.087 √	Pk	inlagd
Morot råa enbart - ej soppor	25	50	75	3.101 √ 3.106 √	Au	kokt
Brysselkål (kokta)	35	70	105	1.100 √ 1.101 √	Au uer ?	Finns i blancherad
Broccoli (kokta)	50	100	150	1.008 √ 1.009 √	Au	? Sallad med kokt.
Blomkål (kokt)	50	100	150	1.004 √	Au	kokt
Kål (rå)	50	100	150	1.151 √ 1.094 √		Au: uer
Sallad (rå)	25	50	100	1.095 √, 1.096 √ 1.097 √		
Silverbeet (kokt)	100	200	300			
Cikoria (kokta)	100	200	300			
Vilda växter kokta	100	200	300			
Tomater (råa)	100	200	300	1.139 √		
Lök (rå)	en halv		50	1.061 √	Au	stekt
Gurka (rå)	50	100	150	1.048 √ S.1255 √	S. 1254 √	
Ärter (ragu)	40	80	120	1.154 √, 1.155 √	1.157 √	Au kokt

· AK
15 R
9

MAT	REF.PORTION (G) S	M	L	PROBANDENS PORTION (G)	FREKVENS MÅNAD/ÅR	TIDIGARE INTAG
RÄTTER/SOPPOR SOM INNEHÅLLER BALJVÄXTER						
Bondbönor sallad	100	200	300	1.006 √	AK	
Limabönor kokta "Plaki"	100	200	300		? AK	
Haricotverts soppa	100	200	300	1.017 √ 1.018 √	1.080 √	+ 9k
Linser soppa	100	200	300	1.060 √	+ 9k	
Kikärtor soppa	100	200	300		AK	
Svartögda bönor soppa eller sallad	100	200	300			
Soppa "fava"	100	200	300	H 1864 √	+ EvAK	
SOPPOR						
Trahana	100	200	300			
Grönsaks-soppa	100	200	300	H 1282 √	+ AK	
Fisksoppa	100	200	300		AK	
Kyckling-soppa	100	200	300		AK	
Köttsoppa	100	200	300	S 5357 √	+ 9k	
GRÖNSAKER och ROTFRUKTER						
Potatis kokta	100	200	300	3.004 √ 3.003 √		
bakade	100	200	300	3.006 √		
stekta	75	150	225	3.005 √		

15 R
10
AK

MAT	REF.PORTION (G) S	M	L	PROBANDENS PORTION (G)	FREKVENS MÅNAD/ÅR	TIDIGARE INTAG
GRÖNSAKER/VEGETARISKA RÄTTER						
Spenatpaj	50	100	150	AK		
Ostpaj	50	100	150	AK		
Pizza	1 port/skiva		150	5.7583	5.7581	
Ris med spenat lök kål	125	250	375			
Matris	125	250	375	6.209, 6.201,	6.205	6.207
Pasta alla sorter	125	250	375	6.401, H.71	32	
Gröna bönor i gryta	125	250	375	1.017 1.018	1.020	
Äggplanta i gryta	125	250	375	AK		
Fyllda tomater och paprika	125	250	375	AK		
Okra i gryta	125	250	375	—		
Jordärtskockor stuvade	125	250	375	3.100 +AK		
Ratatouille "Briam"	125	250	375	AK		
Kåldolmar	1 dolme 1 dolme		90 150	5.5396	5.5399	5.5353

15 R

MAT	REF.PORTION (G) S	M	L	PROBANDENS PORTION (G)	FREKVENS MÅNAD/ÅR	TIDIGARE INTAG
Mortadella	45	90	135	—		
Get ugnsstekt	60	120	180	—		
Griskött stekt	60	120	180	AK		
Lever	60	120	180	AK		
Hjärna **Tarm**	60	120	180	5.356		
"Patsa"	125	250	375	—		
Inälvsmat	60	120	180	AK		
FISK, SKALDJUR SAMT SNIGLAR/OSTRON						
Fisk stekt ugnsstekt/ kokt	75	150	225	H.6712 + AK	AK	
Torsk	60	120	180	AK		
Sill	50	100	150	AK		
Småsill	60	120	180	AK		
Skaldjur	60	120	180	5.859, 5.8	57, 5.807	5.863, 5.854, 5.855, 5.853
Squid	60	120	180	—		
Bläckfisk	30	60	90	5.802		
Cuttle fish	60	120	180	—		
Sniglar lagad i gryta	60	120	180	5.801		
Sjöborre	60	120	180	—		

18 R

8
AK

DH75 Hur äter eller tillagar Ni kött/fisk eller kyckling?

Kod: 1. Ja
2. Nej

1. kokta [ ]
2. ångkokta [ ]
3. tillagad i mikrovågsugn [ ]
4. tillagad i gryta [ ]
5. stekta [ ]
6. ugnsstekta/bakade [ ]
6. grillat [ ]
7. halstrad [ ]

ALKOHOL

DH76A Dricker Ni öl/vin eller sprit minst en gång i månaden (om mindre svara "nej")

1. Ja
2. Nej [ ]

DH76A Om svaret är ja, hur ofta dricker Ni:

Kod: Skriv ml per dag (dela med rätt faktor om det inte konsumeras varje dag)

9.270
DH76LB Lättöl 1 glas = 200 ml [ ][ ][ ][ ] 9.201 V
9.202 V
DH76B Öl eller alkoholhaltig cider 1 glas = 200 ml [ ][ ][ ][ ] 9.500 V
DH76W Vin eller Retsina 1 glas = 100 ml [ ][ ][ ][ ] 9.600 V
DH76P Portvin eller Sherry 1 glas = 60 ml [ ][ ][ ][ ] 9.700 V
DH76S Sprit eller likör 1 glas = 30 ml [ ][ ][ ][ ] 9.701 V
9.702 V
9.703 V

DH76B I hur många år har Ni druckit så här mycket? Ta alla alkohol drycker
9.902 — 9.820. ✓

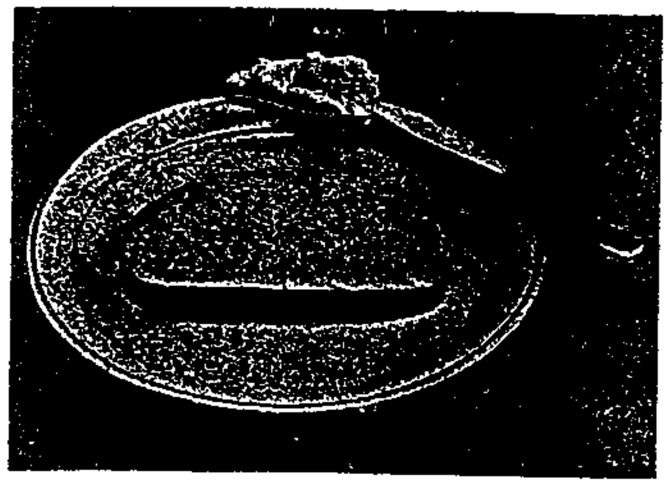
År A vin [ ][ ]
År B öl [ ][ ]
År C portvin/sherry [ ][ ]
År D sprit [ ][ ]

DH76C Hur mycket drack Ni förut eller om Ni har slutat dricka, hur mycket drack Ni förr?

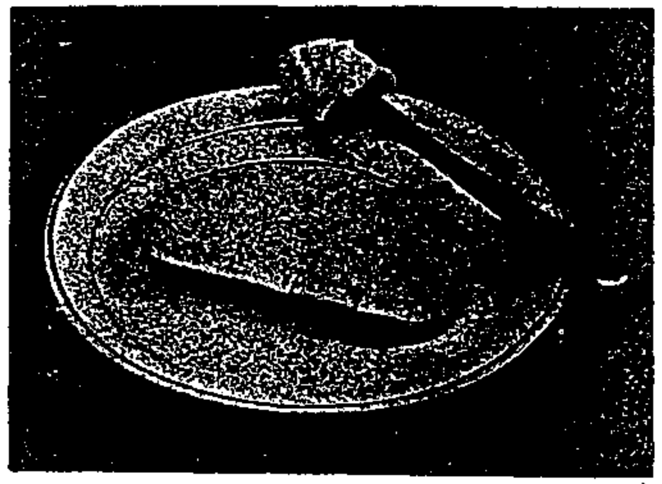
Prior A vin [ ][ ][ ][ ]
Prior B öl [ ][ ][ ][ ]
Prior C portvin/sherry [ ][ ][ ][ ]
Prior D sprit [ ][ ][ ][ ]

5 R

MATMALLEN



A



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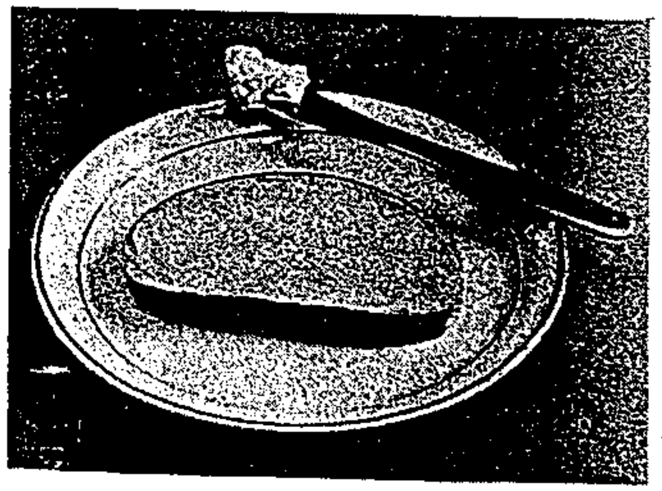

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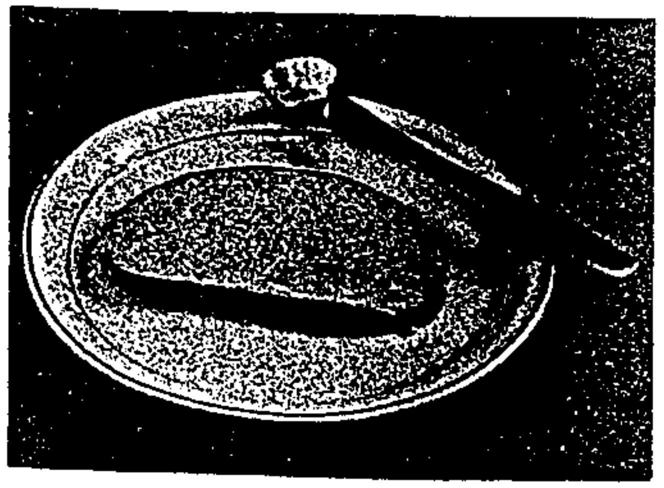


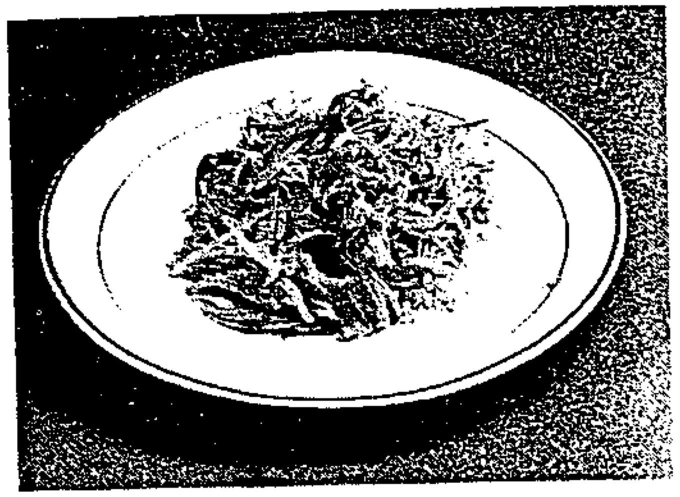
D

MATFETT o a

- Bordsmargarin
  t ex Flora
  Eve
  Lätt&Lagom
  Bregott
  Lätta
- Smör
- Bredbar leverpastej
- Smältost

LV mars 88

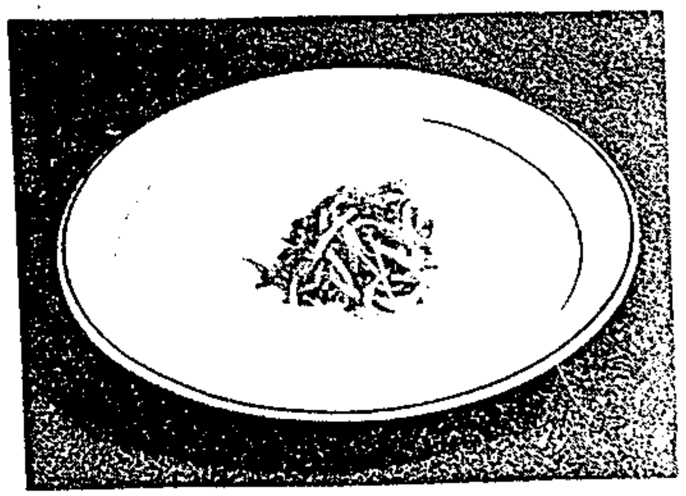
PORTIONSSTORLEKAR



E

F

G



H

Portioner av

grönsallad
vitkål
morot
potatismos
ris
spaghetti
makaroner
spenat
gröt
stekt potatis
kalops
pyttipanna

m. m.
m. m.

öttbulle
ök
orvskiva
lltårta
akor
rsika
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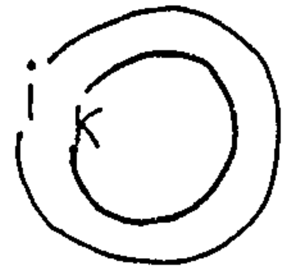
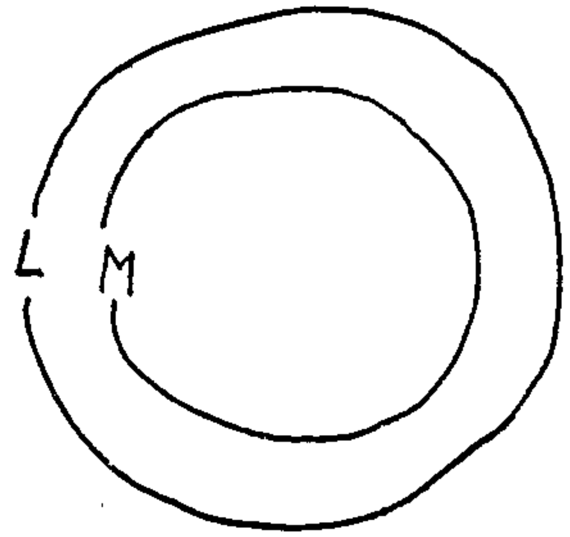
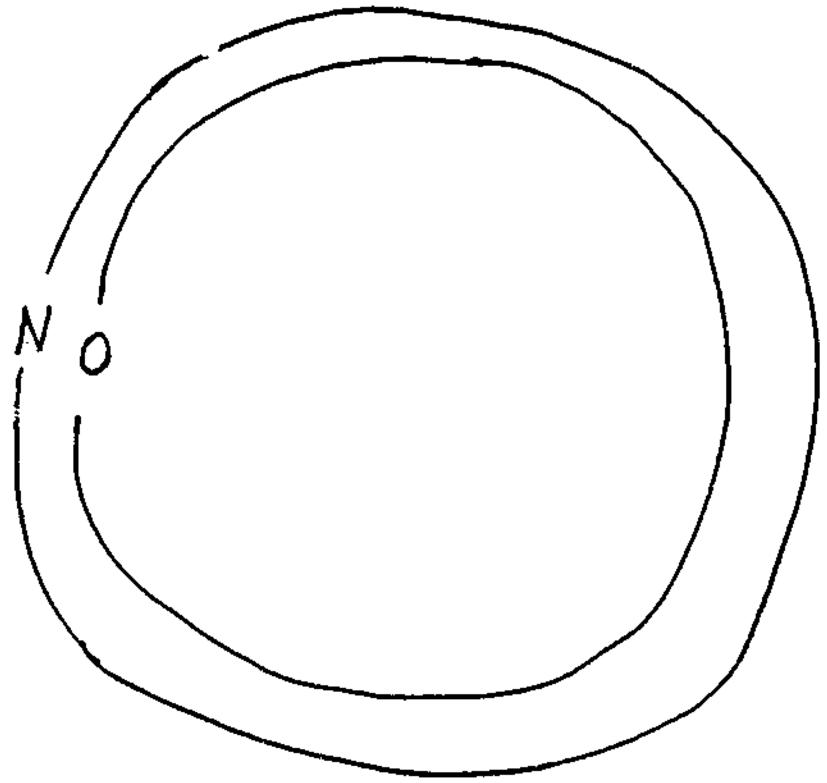
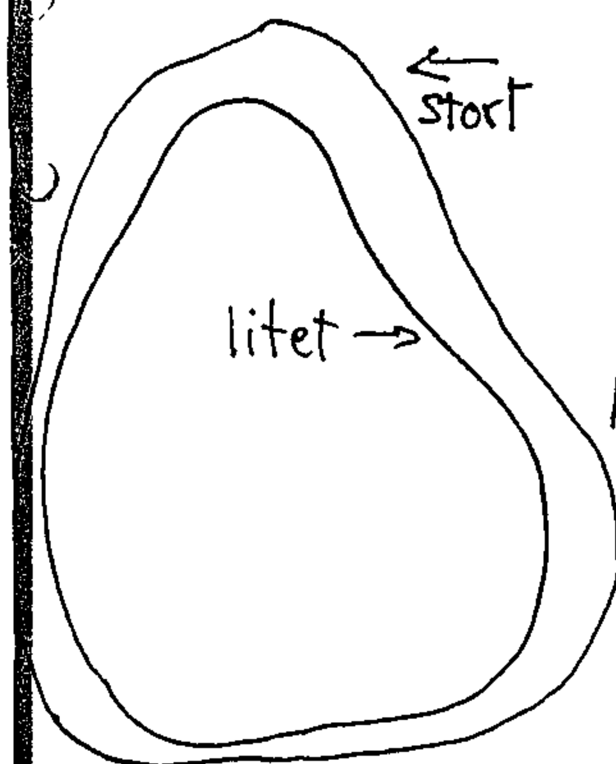
elsin
rape
amburgare
äron

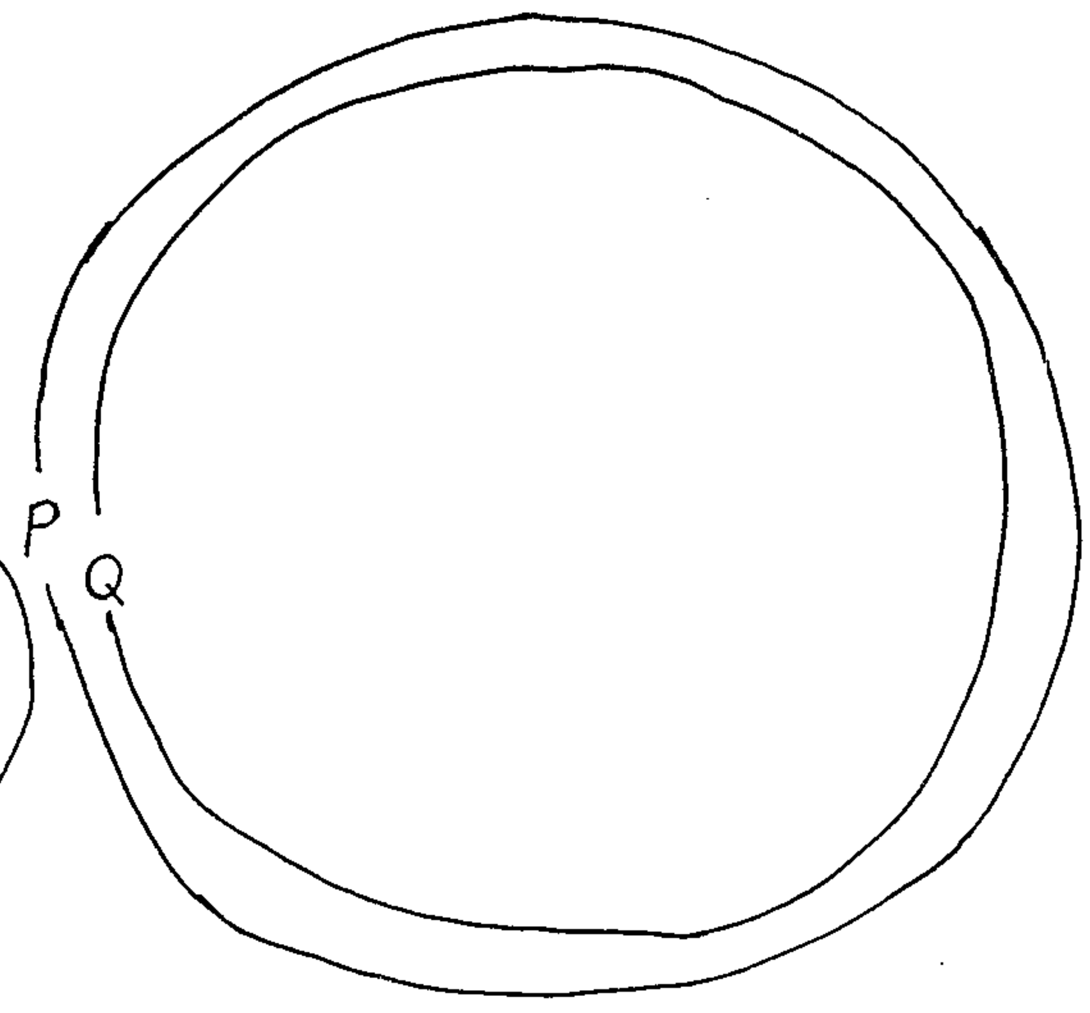
n.m.

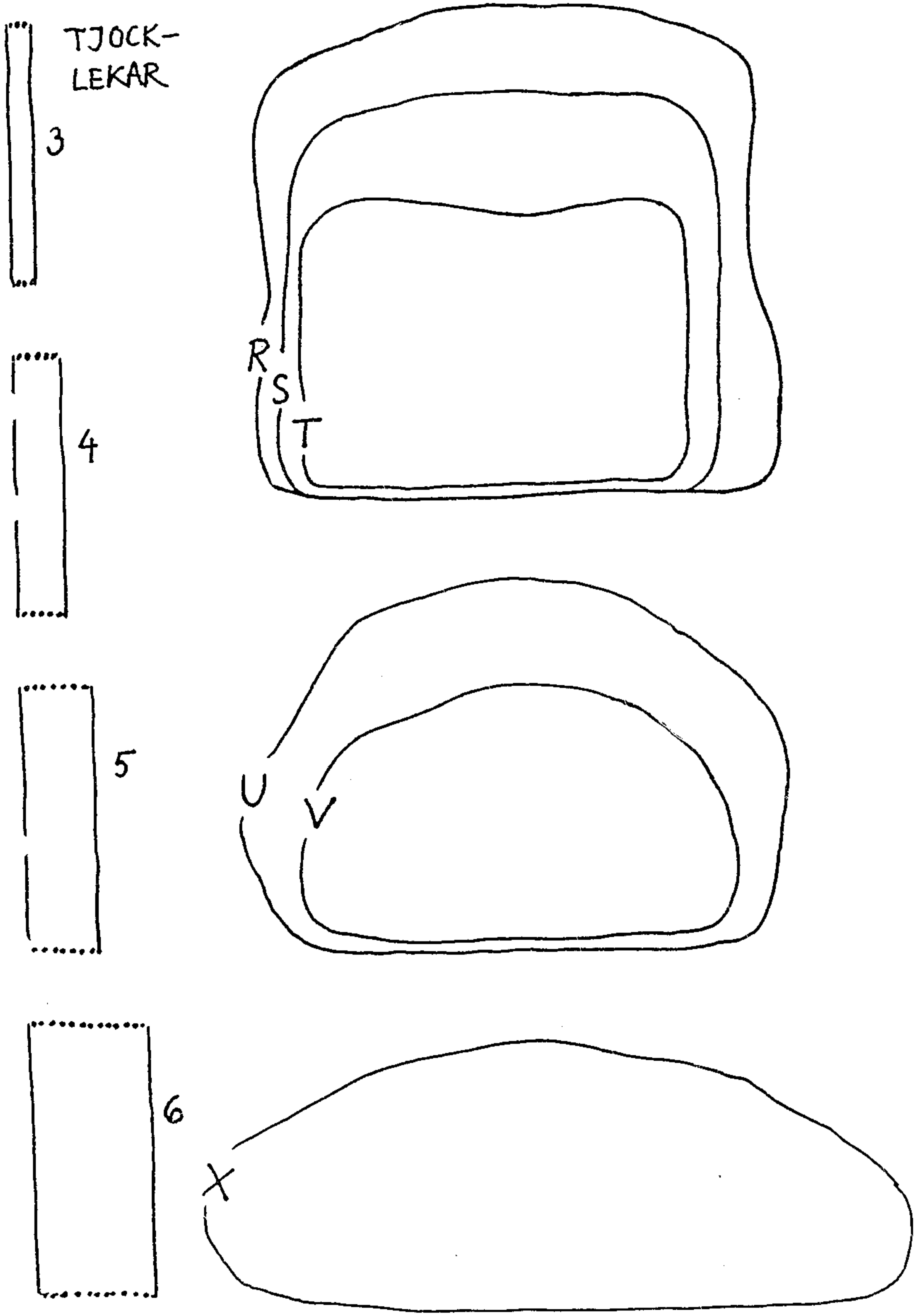




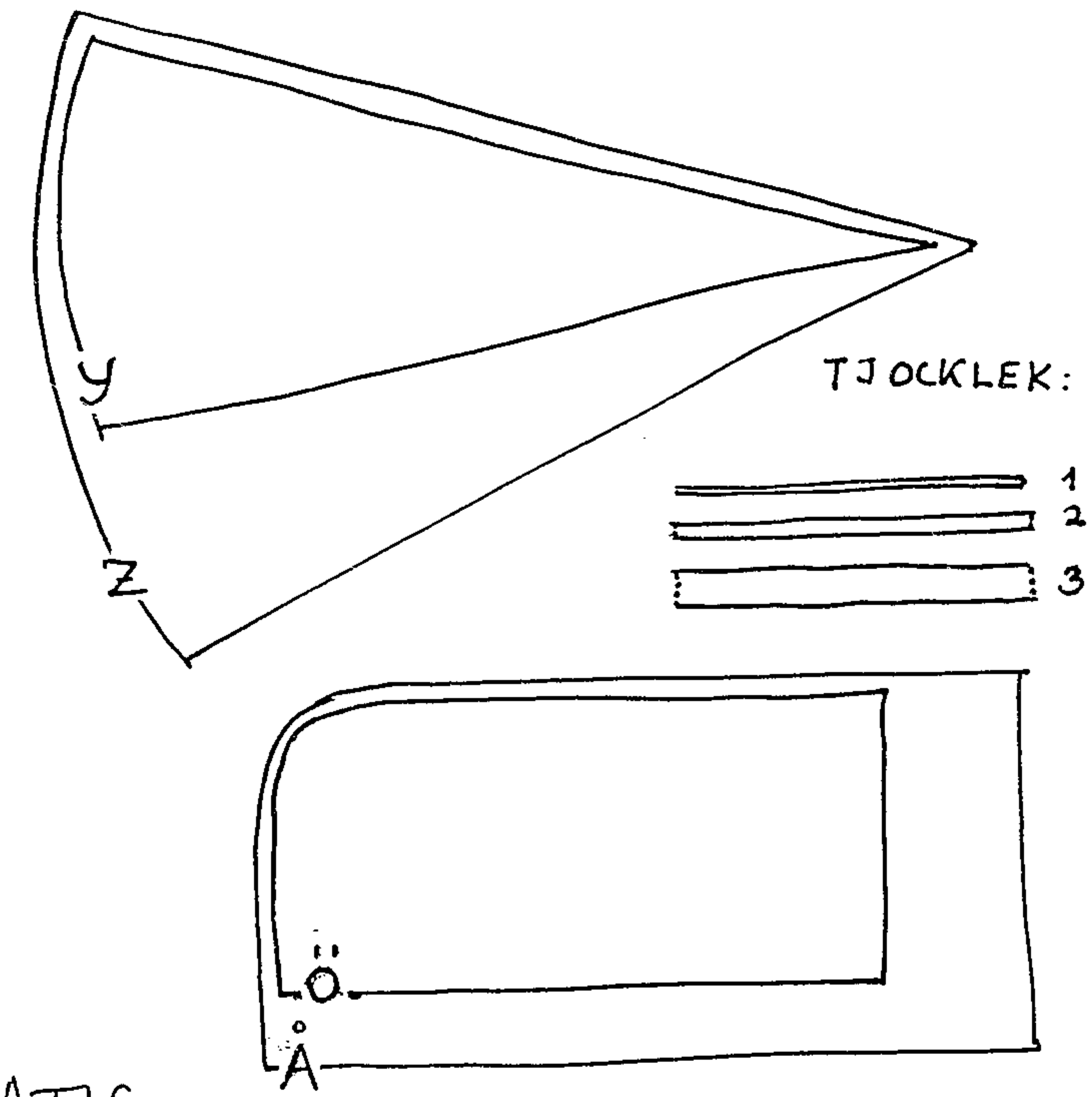




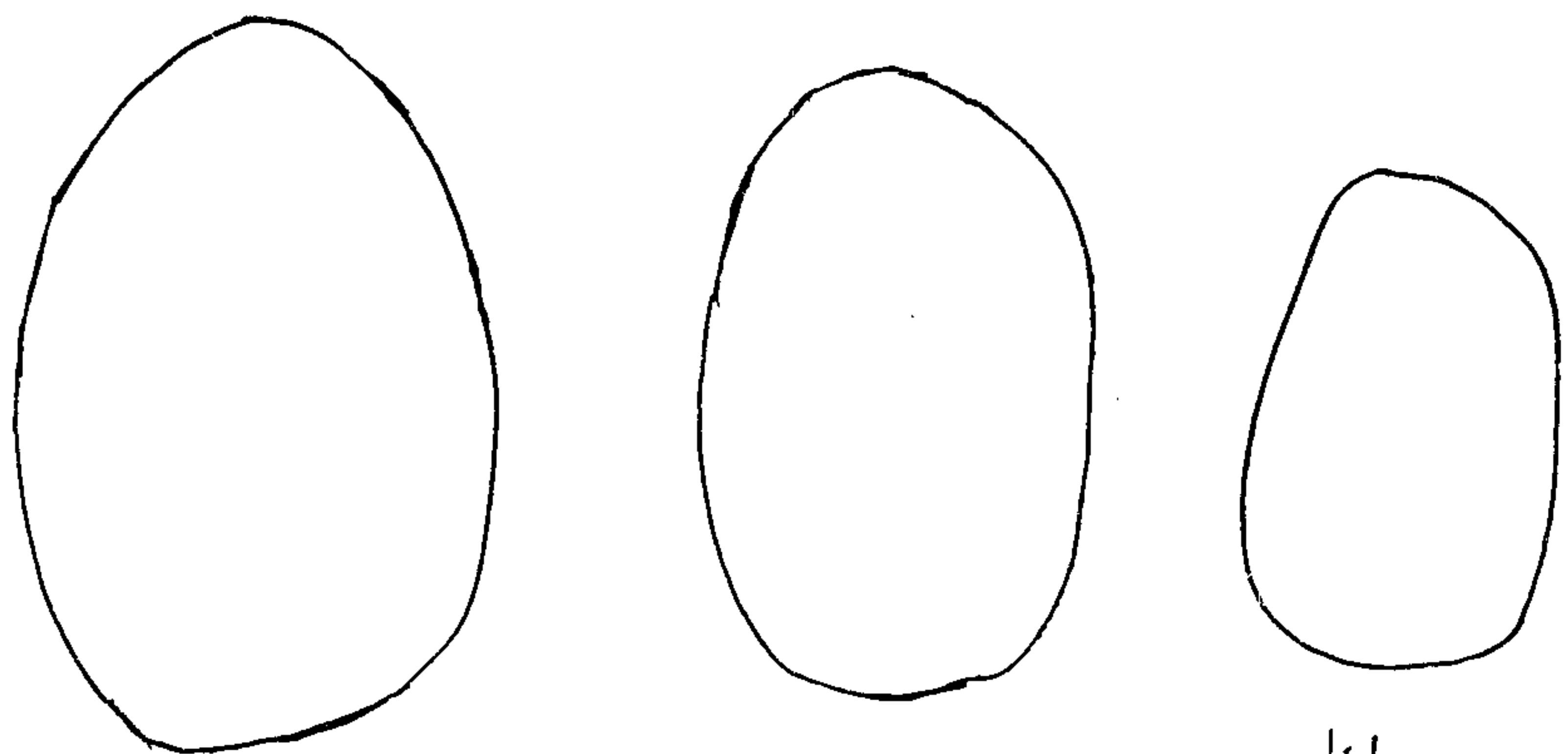




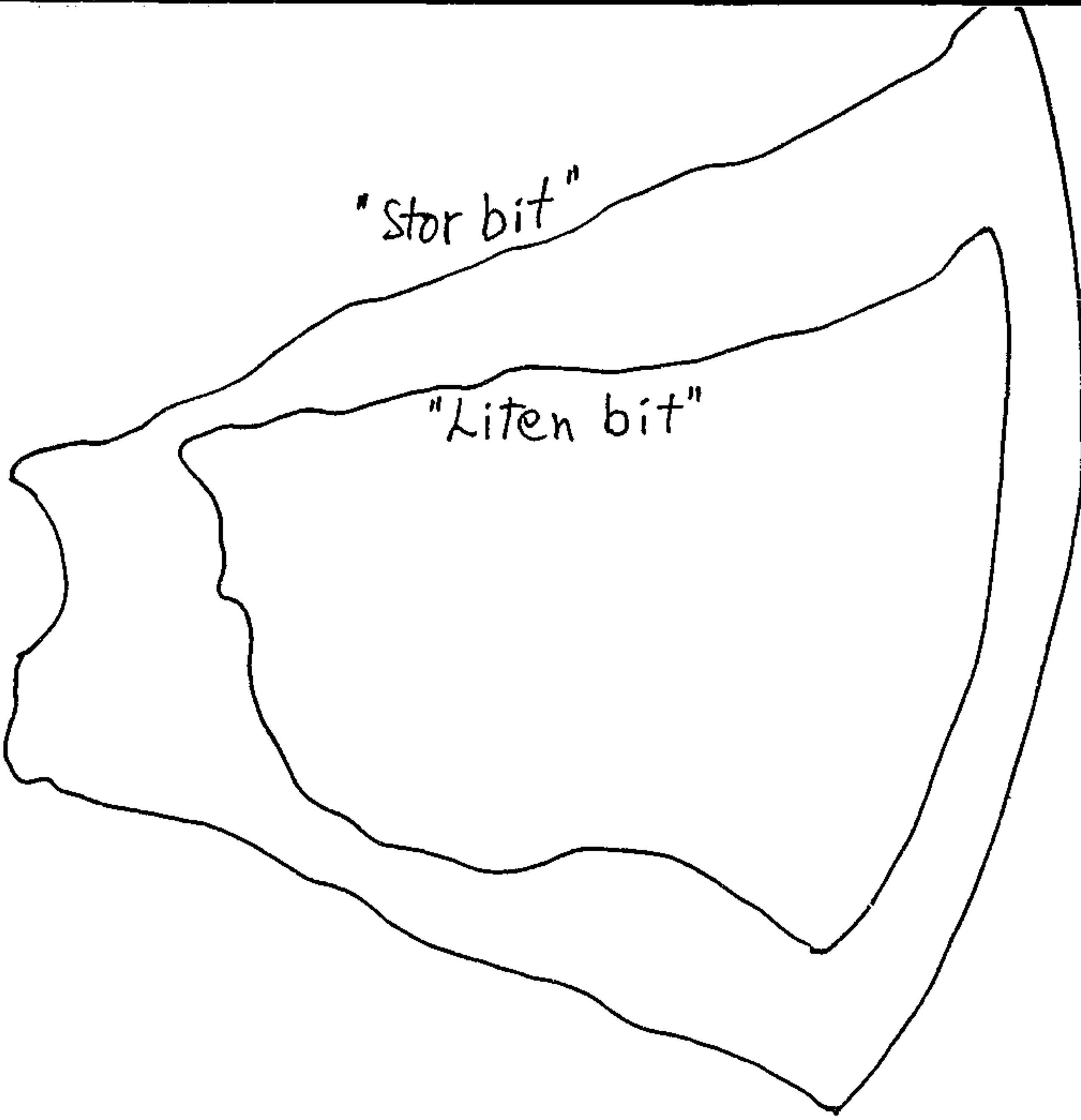
jLV mars 88



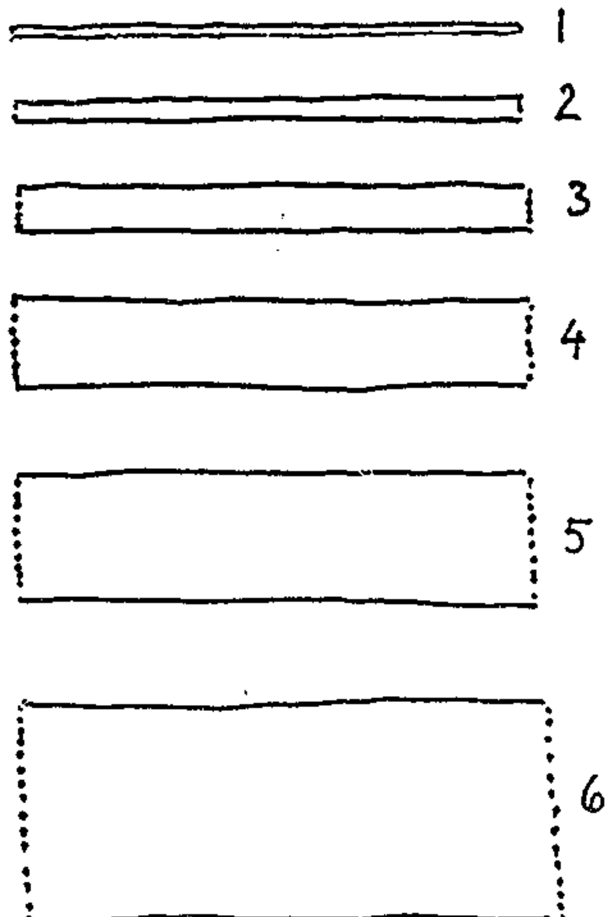
POTATIS



mars 88



TJOCKLEKAR



Skinka
Medvurst
Falukorv
Tomat
Rulltårta
Pizza
Ugnspannkaka
Lök
Hamburgare
m. m.

SLV mars 88

IN CONFIDENCE

BOOK I

HEALTH STATUS AND LIFESTYLE QUESTIONNAIRE

This book takes about 30 minutes to complete.
We recommend that you complete Book I (pink book) before Book II (blue book).
It is recommended that you complete Book I in one session.
Book II is about your food intake.

FOOD HABITS AND HEALTH STATUS OF ANGLO-CELTIC AUSTRALIANS

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This project is partially funded by the Victorian Health Promotion Foundation

Monash University Medical School, Department of Medicine, St Kilda Road, Prince Henry's Hospital, Melbourne 3004

Serial #

BACKGROUND

1. **Date of birth:** _______/ _______/ _______
day month year

2. Sex: (circle one number)

1 Male
2 Female

3. **What is your family's ancestry e.g Irish, Scottish, Welsh, English, or Welsh/Irish (if mixed)?**

Fathers side: ______________________

Mothers side: ______________________

4. **What is your partner's (spouse or defacto) ancestry (if relevant), e.g Chinese, English, Greek, Italian etc?**

Partner's ancestry: ______________

5. **In which country were your grandparents born?**

Father's father: ______________ Father's mother: ______________

Mother's father: ______________ Mother's mother: ______________

6. **Marital status:** (circle one number)

1 Single (never married)
2 Married/living together
3 Divorced/separated
4 Widowed

7. **Have you ever had any children, including adopted children or children you have raised or are raising?** (circle one number)

1 Yes
2 No

If Yes, how many children have you had? (please write total number)

Number of children: _______

8. **How many adults and children normally live in this household, including yourself?** (please write total number)

Number of people: _______

9. **With whom do you live?** (please tick one or more)

	YES
Partner (Spouse or Defacto)	
Children/grandchildren	
Parent(s)/parent(s)-in-law	
Sister(s)/brother(s)	
Other relative(s)	
Friend(s)	
Boarder(s)	

10. **What is the highest level of education you have completed?** (circle one number)

1 Never attended school
2 Primary school (1-6 years)
3 Some high school (7-9 years)
4 Completed high school (10-12 years)
5 Diploma from CAE,TAFE college or institute of technology
6 Degree from university

11. **Which of the following best describes your <u>usual</u> occupational category, or if retired, your past occupational category?** (circle one number)

1 Professional, technical or related worker (architect, engineer, chemist, doctor, dentist, lawyer, clergy, nurse, etc).

2 Administrative, executive or managerial worker.

3 Clerical worker (book-keeper, cashier, typist, etc)

4 Sales worker (insurance, real estate, auctioneer, commercial traveller, proprietor and shop assistant, etc).

5 Farmer, fisherman, hunter, timber or related worker.

6 Miner, quarryman or related worker.

7 Worker in transport or communication (driver of truck, delivery van, bus, taxi, railway engine, pilot, deckhand, conductor, bus inspector, telephone/telegraph operator, postman, postmaster, etc).

8 Tradesman, production-process worker or labourer (carpenter, plumber, mechanic, electrician, tailor, machinist, factory worker, foreman, builder's labourer, etc).

9 Service, sport or recreational worker (fireman, policeman, caretaker, orderly, barber, sportsman, photographer, undertaker, etc).

10 Member of the armed forces.

11 Domestic duties, housewife

12. **Which of the following describes you and your partner's (if relevant) current employment status?** (Please tick appropriate box(es) for you and your partner).

	Yourself	Partner
Self-employed		
In full-time paid employment		
In part-time paid employment		
Temporarily out of work		
Not employed (but not retired)		
Full-time student		
Part-time student		
Retired (early or age)		
Permanantly unable to work/ill		
Domestic duties		

13. **Which of the following range best describes your household total gross income?** (please give total sum , circle one number)

1 Less than $6,000
2 $6,001 - $12,000
3 $12,001 - $22,000
4 $22,001 - $40,000
5 $40,001 plus

HEALTH STATUS

14. **Was your birth** (circle one number)

1 premature (4 weeks or more, earlier than expected)?
2 on time (36-42 weeks pregnancy)?
3 post mature (more than 42 weeks)?
4 Don't know.

15. **What was your approximate birth weight?** (please write in one of the following)

Pounds ______ **OR** Kilograms ______

16. **What was your approximate weight:**

		Stones	**OR**	**Kilograms**
a	At age 21?	_____		_____
b	When you first married or were in a defacto relationship?	_____		_____

17.

		Stones	**OR**	**Kilograms**
a	**What has been your maximum weight in adult life?**	_____		_____
	How old were you then? Age in years: _______			
b	**What has been your minimum weight in adult life?**	_____		_____
	How old were you then? Age in years: _______			
c	**What is your current weight?**	_____		_____
d	**How much would you like to weigh?**	_____		_____

18. **Have you recently been told by a doctor, dietitian or nurse that you need to lose weight?** (circle one number)

1 Yes
2 No

If Yes , how many pounds or kilograms were you advised to lose? (please write number)

Pounds _____ **OR** Kilograms _____

19. **Are you aware of a major event in your life that caused a drastic increase in your weight?** (circle one or more numbers)

1 My weight has never increased drastically
2 When I first married or was in a defacto relationship
3 After first pregnancy
4 When I first stopped playing sport
5 When I stopped smoking
6 When I was on the contraceptive pill
7 After major stressful event, ie divorce,death,change of job
8 After retirement
9 End of high school or university

20. **Do you find that you have to watch your weight most of the time, i.e do you gain weight easily?** (circle one number)

1 Yes
2 No

If Yes, what measures have you found to be more helpful in maintaining a satisfactory weight? (circle one or more numbers)

1 Special diet
2 Avoiding any particular food
3 Herbs
4 Fasting
5 Skipping meals
6 Exercise
7 Stress management
8 Medication
9 Smoking

21. **Please ask your spouse/partner (if you do not have a partner ask your family or friend) to assess your current weight status:** (circle one number)

1 Underweight
2 Normal
3 A little overweight
4 Very overweight

22. **How do you think others perceive your weight?** (circle one number)

1 Underweight
2 Normal
3 A little overweight
4 Very overweight

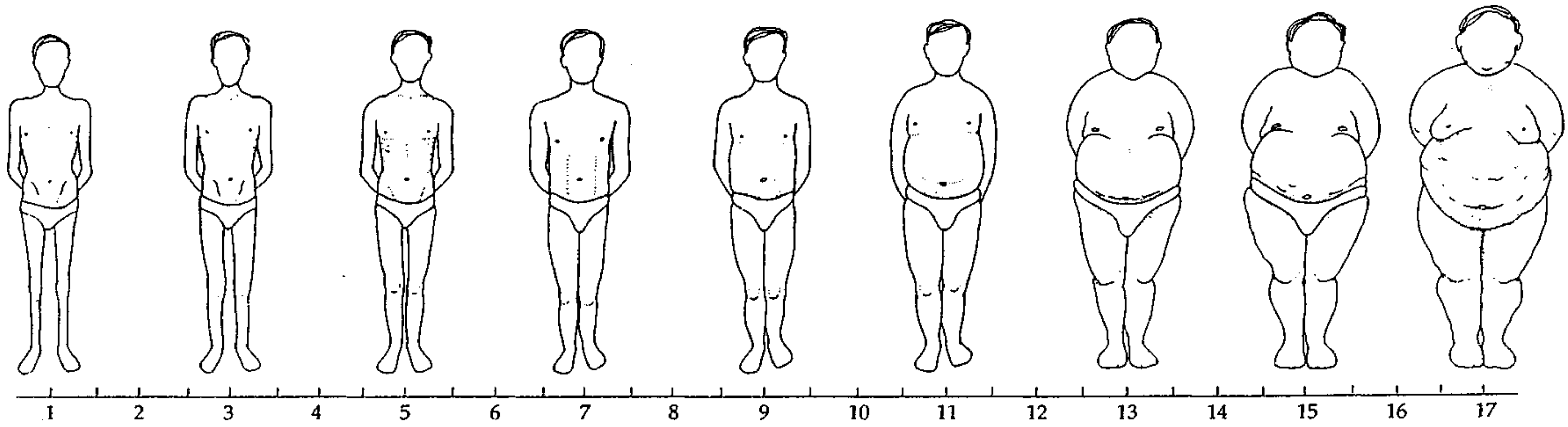
23. **Are you aware of any family members ever being grossly overweight or obese (e.g about 30kg over their desirable weight)?** (circle one number)

1 Yes
2 No

24 & 25: *The next two questions* (**24 and 25**) *are about your body size and how you would like your body size to be.*

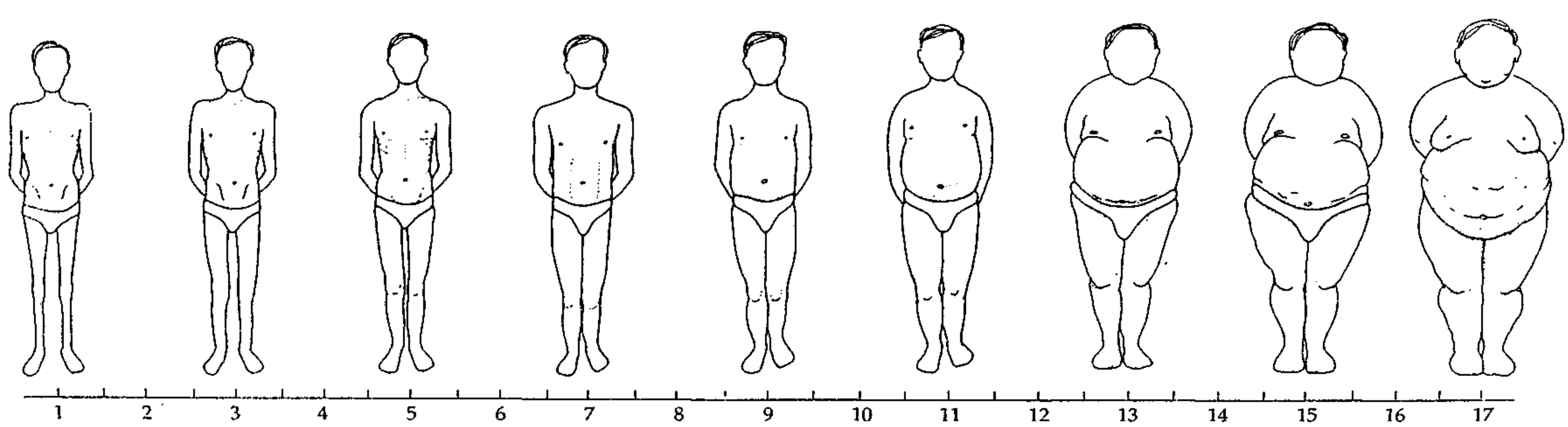
Please circle the number on the line closest to your present size, and the size you would like to be, by referring to page 5a if you are female and page 5b if you are male.

Circle the number on the line closest to your present size.



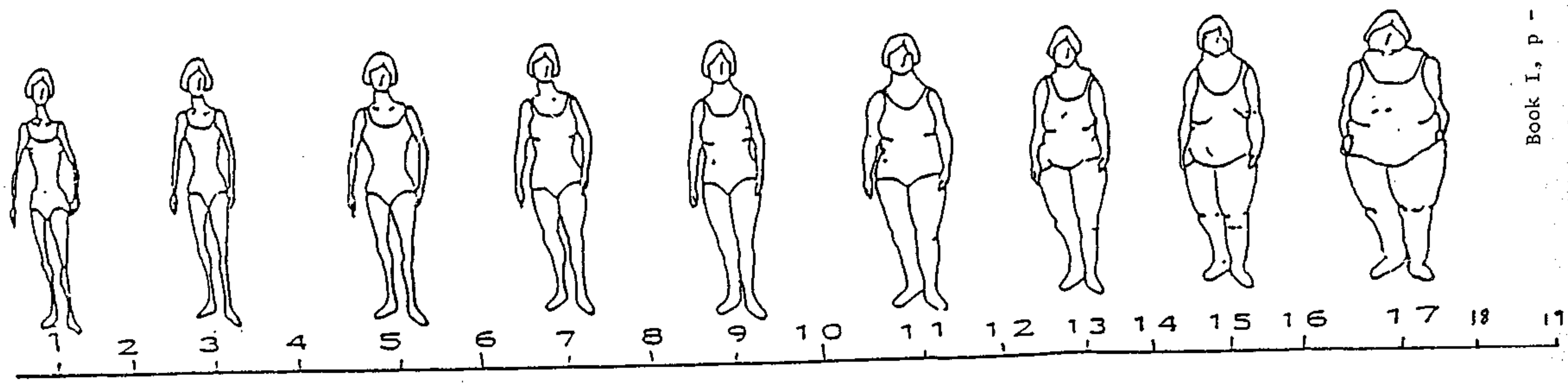
Book I, p - 5b

Circle the number on the line closest to the size you would like to be like.



Circle the number on the line closest to your present size.

Book I, p - 5a



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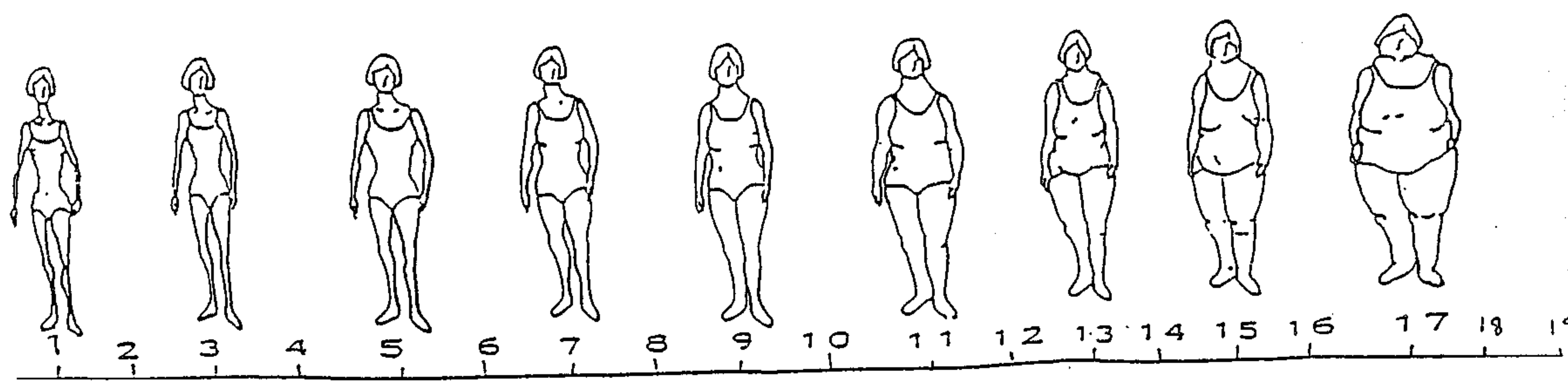


26. **We are interested in knowing about the health of your family and whether any of the following conditions or diseases have been encountered by your father, mother, brothers, sisters, or close relatives. If any of these family members are already deceased, please indicate the presence of conditions/diseases when alive.** (please tick one or more)

Condition	Present in family
High blood pressure	
High blood cholesterol	
Heart disease (e.g. angina,heart attack)	
Stroke	
Obesity	
Diabetes	
Osteoporosis/bone weakening condition	
Cancer of the bowel	
Cancer of the breast	
Cancer of the uterus/womb or cervix	
Cancer of the skin	
Other cancer	

26a **How old are your parents and grandparents if alive or dead?** (please write age)

	IF ALIVE	OR	AT DEATH
Mother	________		________
Mother's mother	________		________
Mother's father	________		________
Father	________		________
Father's mother	________		________
Father's father	________		________

26b **How many <u>other</u> family members (great aunts and uncles etc.) have lived beyond the age of 80 years?**

Number of other family members: ________

27. **How many times did you visit a medical doctor during the past 12 months?** (circle one number)

1 Not at all
2 Once or twice
3 3 - 12 times
4 More than 13 times

28. **If you have been hospitalized for reasons other than pregnancy/childbirth, how many days have you spent in hospital during the past 12 months?** (circle one number)

1 None
2 1 - 14 days
3 More than 14 days

29. **About how many days during the past 12 months have you been sick in bed all or most of the day?** (circle one number)

1 None
2 1-14 days
3 More than 14 days

30. **How would you rate your overall health at the present time?** (circle one number)

1 Excellent
2 Good
3 Gair
4 Poor

31. **Have you ever suffered from any of the following complaints for <u>more than 4 weeks</u> (consecutive or random) and for how many years have you had this complaint?** (tick one or more and write number of years)

COMPLAINT	YES	YEARS
Hay fever		
Persistent cough		
Indigestion or dyspepsia		
Diarrhoea		
Constipation		
Insomnia, trouble sleeping		
Back problem, e.g. slipped disc, back pain		

32. **Have you ever been told by a doctor/nurse that you have any of the following conditions and in which year were you told?**(tick one or more and write year)

CONDITION	YES	YEAR
High blood pressure		19
High cholesterol		19
High triglyceride		19
Angina (Heart pain)		19

continued on next page

32. **Have you ever been told by a doctor/nurse that you have any of the following conditions and in which year were you told?**(tick one or more and write year)

CONDITION	YES	YEAR
Heart attack: coronary occlusion, thrombosis, myocardial infarction		19
Stroke		19
Obesity		19
Diabetes		19
Peptic or Duodenal Ulcer		19
Gall Bladder trouble		19
Ulcerative colitis or Crohn's disease		19
Haemorroids		19
Anaemia		19
Arthritis, Rheumatism		19
Gout		19
Asthma or emphysema		19
Kidney trouble		19
Thyroid problems		19
Bladder trouble, urinary tract infection		19
Liver trouble or jaundice		19
Parkinson's disease		19
Prostate problems		19
Nervous disorder		19
Osteoporosis/bone weakening condition		19
Cancer of the bowel		19
Cancer of the breast		19
Cancer of the uterus		19
Cancer of the skin		19
Other cancer		19
Other condition, specify		19

33. **How many times have you suffered from a cold or flu in the past 12 months?** (please write number in space provided)

Number of times: ________

34. **Do your health problems stand in the way of you doing things you want to do?** (circle one number)

1 I do not have any health problems
2 Not at all
3 A little
4 A great deal

35. **Are you currently taking any medication for treatment?** (circle one number)

1. Yes
2. No

If **Yes**, please write the name of the medication (excluding dietary supplements, see question 36) from all packets or bottles in space provided below and indicate what this medication is prescribed for:

Name of Medication (write name from packet/bottle)	**What treatment is this medication for?**

36. **Are you currently taking any dietary supplements (usually tablets bought from the chemist or health food stores, for example vitamins, minerals, fish oil tablets, dietary fibre , garlic)** ? (circle one number)

1 Yes
2 No

If Yes, please write the name of the supplement from all packets or bottles in space provided below and indicate what this supplement is used for:

Name of Supplement (write name from packet/bottle)	**Why do you take this?**
______________	______________
______________	______________
______________	______________
______________	______________
______________	______________

36a **Do you use herbal medicines ?** (circle one number)

1 Yes
2 No

36b **Were you given cod liver oil or fish oil on a regular basis as a child?** (circle one number)

1 Yes
2 No

Men please go to page 12, question 45.....

WOMEN ONLY (questions 38 to 44)

37. **How old were you when you had your first menstrual period?** (please write number)

Years of age: ______

38. **Do you still have your menstrual period?** (circle one number)

1 Yes
2 No

If No, at what age did menstruation stop? (please write number)

Years of age: ______

39. **Have you ever taken an oral contraceptive pill?** (circle one number)

1 Yes
2 No (please go to question 42)

40. **For how long altogether have you taken the oral contraceptive pill?** (please estimate the total duration of use and circle one number)

1 Less than 6 months
2 Between 6 months and 2 years
3 Between 2 and 5 years
4 Between 5 and 10 years
5 Longer than 10 years

41. **Are you <u>now</u> taking the contraceptive pill?** (circle one number)

1 Yes
2 No

42. **In the past 12 months, have you had a lump, swelling or pain in the breast, or bleeding or discharge from the nipple?** (circle one number)

1 Yes
2 No

43. **Have you had a hysterectomy?** (circle one number)

1 Yes
2 No

44. **Have you ever had a Pap smear?** (circle one number)

1 Yes
2 No (please go to question 45)

44a If Yes, when did you last have a Pap smear? (specify year)
19____

44b If Yes , what was the result of your last Pap smear? (circle one number)

1 Normal
2 Abnormal

LIFESTYLE

Physical activities

45. **If you engage in any of the following regularly (i.e weekly), please estimate how many hours per week (and months per year if activity is seasonal) you spend in these types of activities and place numbers in space provided.**

		Hours per week	Months per year (for seasonal activity)
a	Power walking	______	______
b	Jogging	______	______
c	Aerobics	______	______
d	Work out at the gym	______	______
e	Weight lifting	______	______
f	Swimming	______	______
g	Cycling	______	______
h	Team sports e.g football	______	______
i	Playing Tennis or Squash	______	______
j	Dancing	______	______
k	Golf	______	______
l	Lawn Bowls	______	______
m	Horse riding	______	______
n	Sailing	______	______
o	Bush Walking	______	______
p	Walking	______	______
q	Warm-up/toning exercises e.g stretching,push-ups	______	______
r	House cleaning	______	______
s	House repairs	______	______
t	Gardening	______	______

46. **How many hours a day would you spend walking around or standing (e.g up and about at work, pottering around at home)?** (please write number)

Number of hours per day: _____

Stress

47. **Do you think that stress is adversely affecting either your health or the quality of your life?** (circle one number)

1 Yes
2 No

48. **This question asks about stress levels during every day life. Would you say that you are:** (circle one number)

1 Rarely or never under much stress
2 Sometimes under a little stress
3 Often under a little stress
4 Sometimes under a lot of stress
5 Often under a lot of stress
6 Almost always under a lot of stress

Cigarette smoking

49. **Have you ever smoked regularly, at least one cigarette a day?** (circle one number)

1 Yes
2 No (please go to question 50)

A. **At what age did you start smoking?** ____________

B. **If you have given up smoking completely:**

a) At what age did you give up smoking? ____________

b) How many cigarettes did you smoke a day? ____________

C. **If you are currently smoking:**

a) How many cigarettes do you smoke a day? ____________

b) For how many years have you been smoking this much? ____________

c) If you smoked more or less in the past, how many cigarettes did you smoke? ____________

d) If you smoked more or less in the past, how many years did you smoke amount stated in (c)? ____________

50. **Have you ever drunk alcohol regularly, (i.e at least once a month)?** (circle one number)

1 Yes
2 No (please go to question 51,page 16)

If **Yes**, but have given up drinking go to **50A**, page **14**. If **Yes**, and currently still drinking go to **50B**, page **15**.

50A. **If you have given up drinking alcohol completely, how often did you usually drink it?** (circle one number)

1 About once a month
2 About once a fortnight
3 On 1 or 2 days a week
4 On 3 or 4 days a week
5 On 5 or 6 days a week
6 Every day

On a day when you drank alcohol, how many drinks did you usually have and for how many years did you drink this much? (write number in space provided)

	Number of Glasses	Number of Years
Low alcohol beer (1 glass = 200ml)		
Beer or alcoholic cider (1 glass = 200ml)		
Wine (1 glass = 100ml)		
Port or sherry (1 glass = 60ml)		
Spirit or liqueur (1 glass = 30ml)		

If you have given up drinking alcohol please go to question **51, page 16.**

If you are currently drinking alcohol go to **50B, page 15.**

50B. **How often do you usually drink alcohol?** (circle one number)

1 About once a month
2 About once a fortnight
3 On 1 or 2 days a week
4 On 3 or 4 days a week
5 On 5 or 6 days a week
6 Every day

50B.1 **On a day when you drink alcohol, how many drinks do you usually have and how many years have you drunk this much?** (write number in space provided)

	Number of Glasses	Number of Years
Low alcohol beer (1 glass = 200ml)		
Beer or alcoholic cider (1 glass = 200ml)		
Wine (1 glass = 100ml)		
Port or sherry (1 glass = 60ml)		
Spirit or liqueur (1 glass = 30ml)		

50B.2 **Did you drink more alcohol in the past compared to what is stated in 50B.1?** (circle one number)

1 Yes
2 No

Leisure Activities

51. How many hours on <u>average</u> do you sleep per day? (please write number)

Number of hours per day: ________

52. Do you have the habit of napping a few times a week? (circle one number)

1 Yes
2 No

53. How many hours on average do you work per week? (please write number)

Number of hours per week: ________

54. In the past year, how often have you undertaken the following leisure activities. Please write number code in space provided to indicate how often the activity is performed:

1 = never
2 = 3 times a year or less
3 = 4-10 times a year
4 = once a month
5 = 2-3 times a month
6 = once a week
7 = 2-4 times a week
8 = 5 times a week or more

a Gone to movies,theatre,concerts or seminars? ________

b Gone to a sporting event as a spectator? ________

c Participated in a leisure sport e.g fishing, horseriding,kite flying,sailing,hunting? ________

d Participated in a sport for fitness e.g tennis, jogging,team sports, gym, aerobics? ________

e Played cards,bingo,billiards,chess,darts etc? ________

f Taken care of house plants or done gardening? ________

g Worked on a hobby e.g sewing,woodwork? ________

h Painted pictures or played a musical instrument? ________

i Watched TV or listened to the radio? ________

j Looked after animals/pets? ________

k Read books,newspapers,magazines etc.? ________

Social Activities

55. In the past year, how often have you undertaken the following social activities. Please write number code in space provided to indicate how often the activity is performed:

1 = never
2 = 3 times a year or less
3 = 4-10 times a year
4 = once a month
5 = 2-3 times a month
6 = once a week
7 = 2-4 times a week
8 = 5 times a week or more

a Gone to a senior center or attended a senior citizen's group? ________

b Attended a church congregation? ________

c Gone to meetings of a group or club? ________

d Eaten out at a restaurant for a special occasion with friends or family? ________

e Met up with friends at a coffee shop,pub? ________

f Gone dancing at a night club,disco,ballroom etc. ________

g Visited friends at home? ________

h Baby-sat for children? ________

i Left home to go for a short stay at friend's house? ________

j Gone out of town for a holiday? ________

k Done volunteer work? ________

Social Networks

56. Is there anyone in particular in whom you confide or talk to about your problems? (circle one number)

1 Yes
2 No

57. Do you have any living brothers or sisters? (circle one number)

1. I am the only child
2 Yes
3 No

58. **Are there any other relatives to whom you feel very close?** (circle one number)

1 Yes
2 No

59. **About how often do you <u>receive</u> visits from close family or friends, including neighbours and work mates?** (circle one number)

1 Never/rarely
2 Monthly
3 Fortnightly
4 Weekly
5 Daily

60. **How often <u>do you visit</u> close family or friends, including neighbours and work mates?** (circle one number)

1 Never/rarely
2 Monthly
3 Fortnightly
4 Weekly
5 Daily

61. **How often do you speak to family or friends, including neighbours and work mates, on the telephone?** (circle one number)

1 Never/rarely
2 Monthly
3 Fortnightly
4 Weekly
5 Daily

62. **How often do you write letters to family or friends?** (circle one number)

1 Never/rarely
2 Monthly
3 Fortnightly
4 Weekly
5 Daily

63. **If you live alone and need help during a sickness would you stay with family or friends for a short while?** (circle one number)

1 I don't live alone
2 Yes
3 No

64. **Do you have family or friends, including neighbours or work mates, that would help you if you needed it, e.g.for a sickness?** (circle one number)

1 Yes
2 No

65. **Do you feel lonely?** (circle one number)

1 Never/rarely
2 Sometimes
3 Often
3 Always

66. **Do you believe your family and friends, including neighbours and work mates, respect and acknowledge you?** (circle one number)

1 Never/rarely
2 Sometimes
3 Often
4 Always

Appetite and Food Preference

67. **Which of the following best describes your appetite?** (circle one number)

1 Very good
2 Good
3 Fair
4 Poor

68. **Which of the following best describes your <u>usual way of eating</u>?** (circle one number)

1 No special diet, I eat almost everything
2 No special diet, but I try and avoid fatty foods, sugar etc.
3 No special diet, but I avoid red meat
3 Fat modified diet to lower blood fat or cholesterol
4 Pritikin diet
5 Vegetarian
6 Diabetic diet
7 A weight loss diet

How many **years** have you been eating this way? (please write number)?

Years: ________

69. **Have you ever been on a diet to lose weight?** (circle one number)

1 Never dieted
2 Have dieted occasionally, in the past
3 Have dieted frequently, in the past
4 Continually dieting to lose weight

If you have been on a diet or are currently dieting, briefly describe type of diet i.e weight watchers, Gloria Marshall, Herbalife etc.

____

70. Are there days when you do not eat any cooked meals? (circle one number)

1 Yes
2 No

If Yes, how many days of the month and what is the reason?

Number of days per month: ________

Reason: ____

____

71. Are there any foods or herbs that you include in your diet because you believe they are "GOOD" for your health or for treating certain ailments? (circle one number)

1 Yes
2 No

If Yes, please specify food and reason for eating it.

Food	*In what way do you believe that you may benefit from this food?*

72. Are there any foods or herbs that you try to avoid because of your belief that they are "BAD" for your health? (circle one number)

1 Yes
2 No

If Yes, please specify food and reason for not eating it.

Food	*In what way do you believe that you may be affected by this food?*

Eating Surroundings

73. How often do you eat with your family or friends? (circle one number)

1 Daily
2 2-3 times a week
3 I normally eat alone

73a When you eat alone do you? (circle one or more)

1 Eat while watching television
2 Listen to music
3 Eat at the fridge
4 Eat standing up
5 Eat in a rush
6 Eat on the run

If you normally eat alone go to question 76.

74. Do you usually have the following meals with your family? (please tick)

Meal	YES
Breakfast	
Lunch	
Dinner	
Supper	

75. How many people (including yourself) usually eat together during a meal? (please write number)

Meal	Number of persons	Often skip this meal
Breakfast		
Lunch		
Dinner		
Supper		

76. **How often do you eat away from home, excluding lunch meal at work?** (circle one number)

1 Rarely or never
2 Several times a year
3 1-2 times a month
4 1-2 times a week
5 3-4 times a week
6 Daily

77. **In what type of place do you mostly eat?** (circle one number or more)

1 Restaurant/Bistro/Cafe
2 "Fast Food" restaurants e.g McDonalds,Kentucky,Denny's
3 Pub
4 Club e.g senior citizens
5 Friend's/relative's home

Food Habits and Cooking Methods

78. **What are the usual time that your meals and snacks are eaten?**

Meal	**Time (eg 6.30pm)**
Breakfast	
Morning Tea	
Lunch	
Afternoon Tea	
Dinner	
Supper	

79. **Do you mainly eat lean cuts of red meat (e.g rump,round steak, topside etc.)?** (circle one number)

1 I do not eat red meat (go to question 80)
2 Yes (go to question 80)
3 No

If No, when you eat meat with fat on it, do you eat? (circle one number)

1 Little or none of the fat
2 About half of the fat
3 Most of the fat
4 All of the fat

80. **Do you eat the skin on chicken?** (circle one number)

1 I do not eat chicken
2 Yes
3 No

81. **How do you usually cook meat, fish or chicken?** (please tick one or more cooking method for each item)

		Beef/Lamb	Chicken	Fish
1	Boiled	______	______	______
2	Steamed	______	______	______
3	Casseroled	______	______	______
4	Microwaved	______	______	______
5	Fried	______	______	______
6	Roasted	______	______	______
7	Grilled	______	______	______
8	Barbecued	______	______	______

82. **What kind of fats do you usually use in your household?** (circle one number or more)

1 Butter
2 Butter blended with vegetable oil (e.g Dairy soft)
3 Polyunsaturated margarine
4 Cooking or table margarine
5 Canola margarine
6 Low fat margarine e.g ERA ,weight watchers
7 Blended vegetable oil
8 Polyunsaturated vegetable oil
9 Sunflower oil
10 Grape seed oil
11 Peanut oil
12 Corn oil
13 Canola oil
14 Olive oil
15 Other,please specify ________________

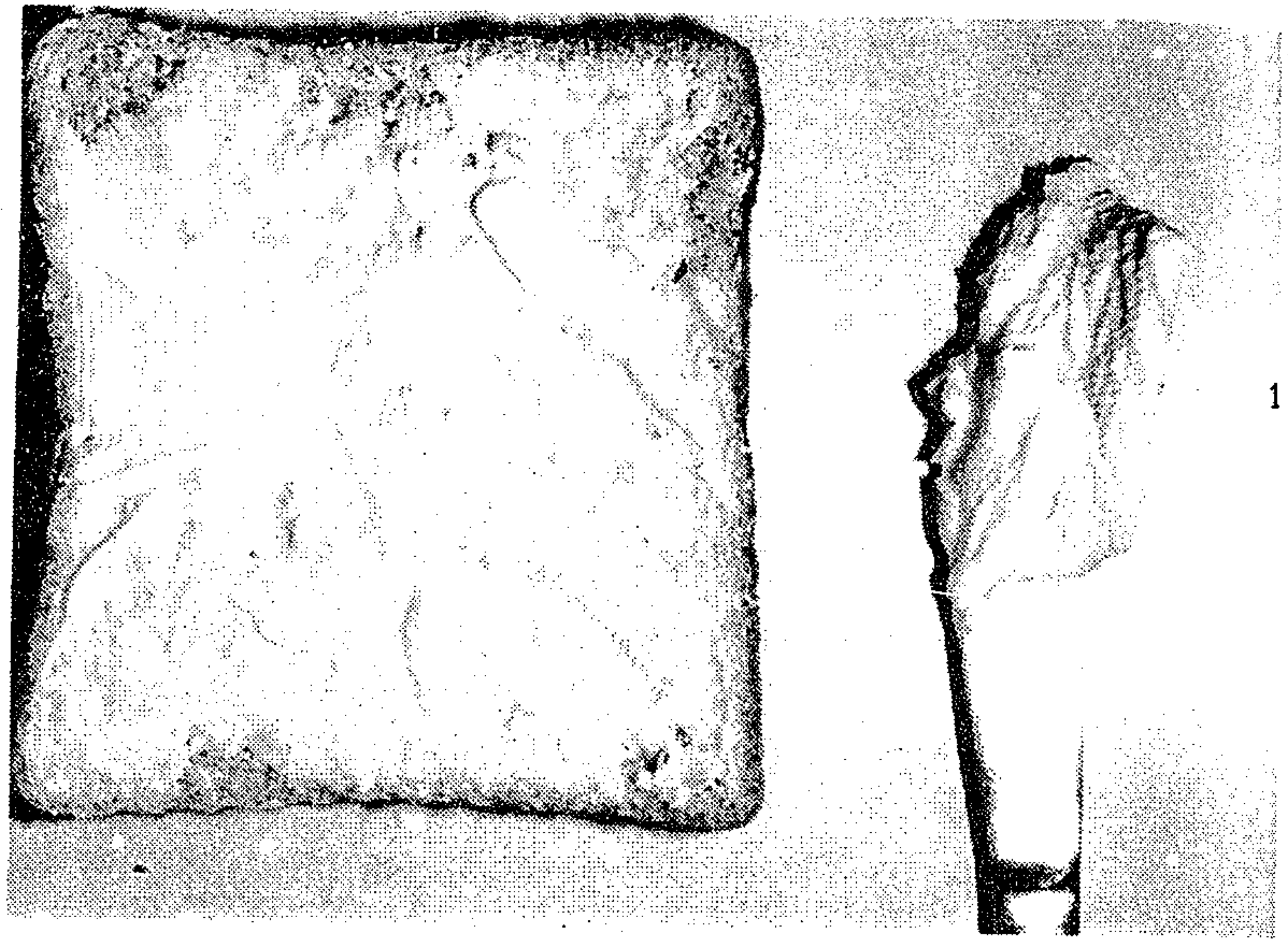
83. **On average, how many teaspoons of butter or margarine would you eat per day (include amount on bread,vegetables etc)?**

To help you quantify amount, please refer to pictures on next page (page 23a) to estimate amount usually spread on bread (there are about 4 teaspoons in a tablespoon) and sum total amount spread on bread and vegetables eaten throughout day.

Photograph 1 = 2 teaspoons on knife ; Photograph 2 = 1 teaspoon on knife.

Number of teaspoons butter/margarine per day: ______

BUTTER / MARGARINE



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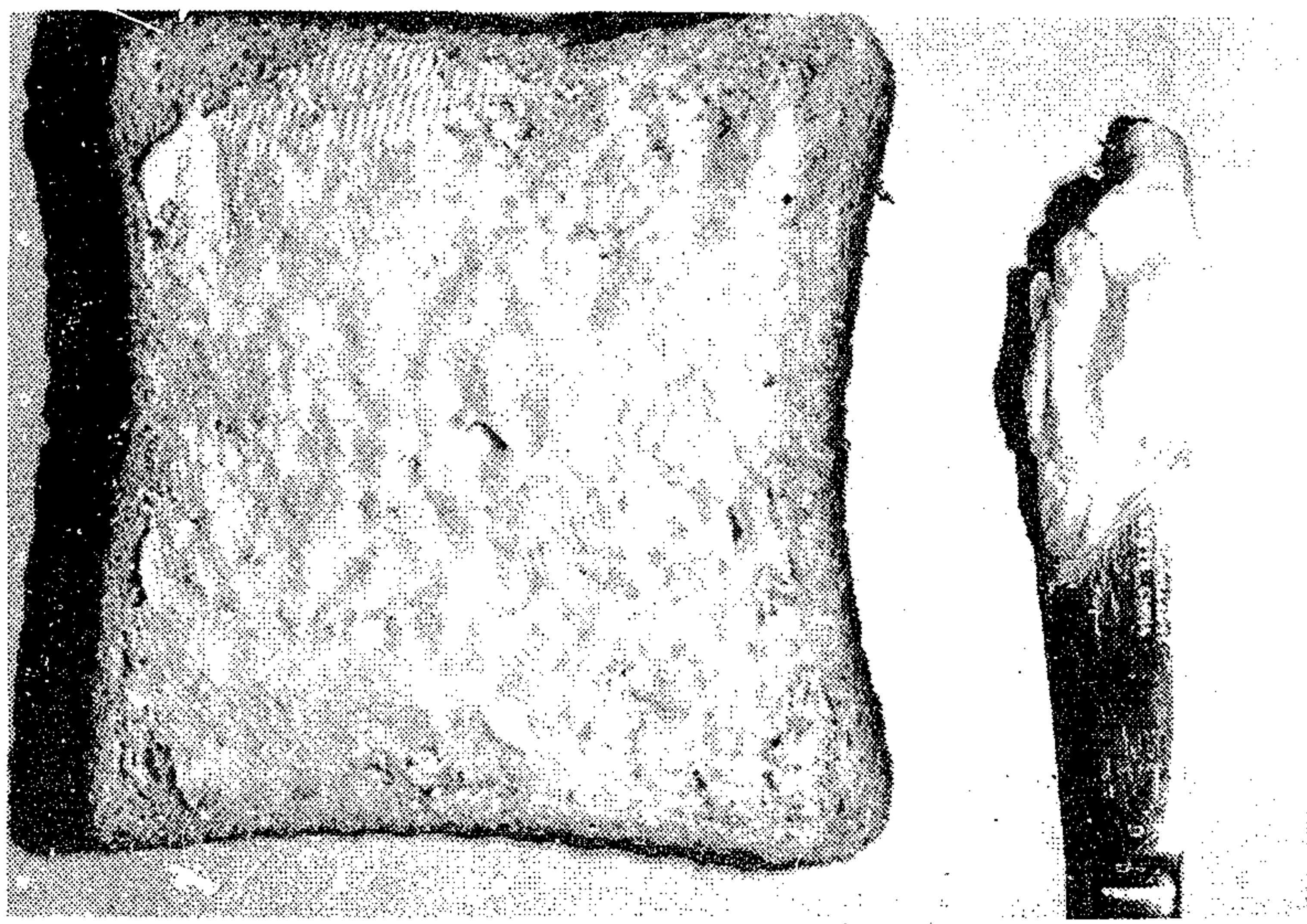

2

84. **On average, how many teaspoons of oil would you eat per day (include oil in cooking and salads)?** (There are about 4 teaspoons in a tablespoon, please write number.)

    Number of teaspoons of oil per day: _____

85. **Do you ever cook with lard, dripping or ghee?** (circle one number)

    1 Rarely/never
    2 Sometimes
    3 Often
    4 Always

86. **How do you usually cook or eat your vegetables?** (circle one number or more)

    1 Boiled
    2 Steamed
    3 Casseroled
    4 Microwaved
    5 Fried
    6 Roasted/baked
    7 Raw, salad

87. **If salt is added to the cooking, are the foods?** (circle one number)

    1 I never add salt to cooking
    2 lightly salted
    3 medium salted
    4 heavily salted
    5 salting is highly varied

88. **How often do you use stock cubes or salty sauces, e.g.soy sauce, in cooking?** (circle one number)

    1 Rarely/never
    2 Sometimes
    3 Often
    4 Always

89. **How often do you add salt or salty sauces, e.g. soy sauce, and tomato sauce, to your meals after they are cooked or at table?** (circle one number)

    1 Rarely/never
    2 Sometimes
    3 Often
    4 Aalways

90. **On average, how many teaspoons of sugar do you have <u>per day</u> which is <u>added</u> to food and drinks?** (please write number)

Number of teaspoons per day: _____

91. **Do you eat vegetables/fruit grown in your backyard?** (circle one number)

1 Yes, please specify ______________________________
2 No

92. **Do you normally eat organically grown foods?** (circle one number)

1 Yes, please specify ______________________________
2 No

93. **Which of the following types of vegetables do you eat <u>most often</u>?** (circle one number or more)

1 Fresh
2 Frozen
3 Canned
4 Fresh and frozen
5 Fresh and canned
6 Frozen and canned
7 Fresh,frozen and canned
8 I don't eat vegetables

94. **How often do you put lemon juice on your food, in tea, in salads etc.?** (circle one number)

1 Rarely/never
2 Sometimes
3 Often
4 Always

95. **How often do you use the following herbs and spices?** (please tick one or more)

	Always	Often	Sometimes	Rarely
Parsley	____	____	____	____
Spring onions	____	____	____	____
Chilli/hot peppers	____	____	____	____
Chives	____	____	____	____
Mint	____	____	____	____
Basil	____	____	____	____
Dill	____	____	____	____
Oregano	____	____	____	____
Thyme	____	____	____	____
Mixed herbs	____	____	____	____
Mixed spices	____	____	____	____
Cinnamon	____	____	____	____
Cloves	____	____	____	____

96. **Do you eat convenience prepackaged meals from the supermarket, that normally only require heating before eating (e.g lasagna, lean cuisine, TV dinners, pizzas, tinned stew)?** (circle one number)

1 Yes
2 No

If **Yes**, how many times a month? (please write number): ________

Please describe convenience meals bought from supermarket:

a ______________________________
b ______________________________
c ______________________________
d ______________________________

THANK YOU

We suggest that you have a break for a cup of tea or coffee.

Book II (blue cover) is about your Food Intake.

Please make sure Book II is also completed.

IN CONFIDENCE

BOOK II

FOOD INTAKE QUESTIONNAIRE

This book takes about 60 minutes to complete.
We recommend that you complete Book I (pink book) before Book II (blue book).
It is recommended that you complete Book II in one session.
Please refer to food photographs (yellow book) when estimating your serving size.
Book I is about your health status and lifestyle.

FOOD HABITS AND HEALTH STATUS OF ANGLO-CELTIC AUSTRALIANS

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Monash University Medical School, Department of Medicine, St Kilda Road, Prince Henry's Hospital, Melbourne 3004

YOUR FOOD INTAKE

Serial #

This questionnaire covers food items that you eat/drink at different times of the day and how often you eat/drink them throughout the year. It is important that your answers are based upon the usual foods/drinks consumed by you (**not your whole family**) during the last 12 month period. Careful answers will enable us to give you an accurate analysis for more than 20 nutrients in your diet and how it may relate to your long-term health status.

ABOUT THE QUESTIONNAIRE

We would like to know:

Part A. At which meal various food types are eaten e.g fruit in general (pages 3 & 4)

Part B. How much and how often you ate specific foods over the last 12 months e.g specific fruit (pages 7 to 23)

Important Note : *If you find the foods listed do not represent what you normally eat, for example if you consume mostly Chinese foods, please contact us (tel:6488400) to supply you with a more appropriate food intake questionnaire.*

To ANSWER PARTS A & B YOU NEED TO KNOW THE FOLLOWING:

Foods Eaten At Least Once a Month.

We would like to know about all foods and drinks consumed **once or more** times a month when available. Place a **tick** (✓) in the space provided next to those foods eaten once or more per month. If the food is seasonal then think about how often you eat the food when it is in season. If you eat the food **less than once a month**, please go to the next food item.

How Many Times Eaten?

If you eat the food once or more per month when it is available we would like you to indicate how often you eat the food by placing a number in one of the three columns provided. We want you to recall your food intake in terms of these three categories shown here:

Daily- food items that you eat at least once every day. Write how many times per day.

Weekly- that is not everyday but at least once per week. Write how many times per week

Monthly- that is not every week, but at least once a month Write how many times per month.

PART A AT WHICH MEAL VARIOUS FOOD TYPES ARE EATEN

At Which Meal Eaten?

This column is only provided in Part A of this questionnaire.
We would like to know the meal in which various food types are consumed.

Please use the following abbreviations to indicate at which meal food item is eaten and write in last column:

B = breakfast
M = morning tea (between breakfast and lunch)
L = lunch
A = afternoon tea (between lunch and dinner)
D = dinner
S = supper (after dinner).

An Example for Part A

FOOD TYPE	TICK IF EATEN AT LEAST ONCE PER MONTH	HOW MANY TIMES EATEN (on average over last 12 months) [place a number in one of the columns below if you have ticked the first column] PER DAY	PER WEEK	PER MONTH	AT WHICH MEAL EATEN B=breakfast M=morning L=lunch A=afternoon D=dinner S=supper
EGGS/EGG DISHES	✓		4		B, L, D
FISH	✓		2		D
RICE	✓			3	L, D
AVOCADOS					
COFFEE / TEA	✓	2			M, A

Eggs / Egg dishes This person eats eggs on average four (4) times per week for breakfast, lunch or dinner (B,L,D).

Fish Fish is eaten about two (2) times per week for dinner (D).

Rice Rice is eaten about four (3) times per month for lunch or dinner (L,D).

Avocados Avocados are not eaten. All spaces for this food have therefore been left blank.

Coffee / Tea Coffee is drunk twice (2) per day at morning and afternoon tea (M,A).

PART A AT WHICH MEAL VARIOUS FOOD TYPES ARE EATEN

We would like you to write how often you eat each of the food types and at which meal they are eaten .

FOOD TYPE	TICK IF EATEN AT LEAST ONCE PER MONTH	HOW MANY TIMES EATEN (on average over last 12 months) [place a number in one of the columns below if you have ticked the first column] PER DAY	PER WEEK	PER MONTH	AT WHICH MEAL EATEN B=breakfast M=morning L=lunch A=afternoon D=dinner S=supper
EGGS/EGG DISHES					
LOW FAT CHEESE					
OTHER CHEESE					
LOW FAT YOGHURT					
FULL FAT YOGHURT					
BEEF/VEAL					
LAMB					
PORK					
CHICKEN/POULTRY					
PIES,SAUSAGES,HAM					
OFFAL (Liver, etc)					
FISH					
SEAFOOD - NOT FISH					
VEGETABLES - SALADS					
VEGETABLES - COOKED					
AVOCADOS					
FRESH FRUITS					
CANNED FRUITS					
DRIED FRUITS					
SOUPS					

FOOD TYPE	TICK IF EATEN AT LEAST ONCE PER MONTH	HOW MANY TIMES EATEN (on average over last 12 months) [place a number in one of the columns below if you have ticked the first column] PER DAY	PER WEEK	PER MONTH	AT WHICH MEAL EATEN B=breakfast M=morning L=lunch A=afternoon D=dinner S=supper
BREAKFAST CEREALS					
RICE					
PASTA					
BREAD (including toast)					
DESERTS/PUDDINGS					
CAKES/BISCUITS					
CHOCOLATE					
SWEETS (confectionery)					
PACKET SNACKS (eg. chips)					
WATER					
FULL FAT MILK					
LOW FAT MILK					
FRUIT JUICES / DRINKS					
SOFT DRINKS / CORDIALS					
COFFEE/TEA					
ALCOHOL(beer,wine,spirits)					
NUTS					
TAKE-AWAYS (Hamburgers,Dim sims etc)					
OILS / DRESSINGS					
MARGARINE					
BUTTER					
SAUCES,GRAVIES					

PART B HOW MUCH AND HOW OFTEN SPECIFIC FOODS ARE EATEN OVER THE PAST 12 MONTHS

In this part we would like you to estimate **the amount** of food you ate as well as the **frequency** it was eaten over the past 12 months i.e times per day, week, or month.

There are 2 methods for estimating your serving size :

In the column "Reference Serving or Photograph" there is either a reference serving or photo page number of the food you are to refer to when estimating your serving size.

If a **Reference Serving** is given:

This is usually given in household measures or as a unit e.g 2 chops or 1 cup of milk or 1 slice of bread.

a) *If your serving size is* **the same** *as the reference serve*

Place a tick (✓) in the column named "Your Serve".

b) *If your serving size* **is not the same** *as the reference serve*

For example the reference serve may be "2 chops", but your serving size may be 3 chops. You would therefore write "3" in the "Your Serve" column i.e the actual number of chops you normally eat.

Important Note : *The reference serve given is not necessarily an average or normal serving size. It is there to be used as a guide for determining your serving size.*

If a **Food Photograph Page Number** is given:

Foods that are difficult to quantify in household measures (e.g cheese) have been photographed and provided in the *yellow book* to assist you in estimating your serving size. The photograph you are to refer to is given in the "Reference Serving or Photograph" column .
For example "P 1" refers to page 1 of *yellow book*.

On each page there are two photographs (a larger and a smaller serving) of the food in **actual** size as it would appear on a **standard main course plate** . We would like you to estimate your serving size from these photographs and indicate your serving by placing a letter (A, B, C, D, or E) in the "Your Serve" column.

A = If your serving size is larger than photograph 1.

B = If your serving size is equal to photograph 1.

C = If your serving size is between photograph 1 and photograph 2.

D = If your serving size is equal to photograph 2.

E = If your serving size is smaller than photograph 2.

Please write the letter which best matches your serving size in the "Your Serve" column.

An Example for Part B

FOOD ITEM	TICK IF EATEN AT LEAST ONCE PER MONTH	HOW MANY TIMES EATEN (on average over last 12 months) PER DAY	PER WEEK	PER MONTH	Reference Serving OR Photograph	Your Serve
FRUITS apples	✓	1			1 medium	✓
avocados					1/4 avocado	
cantelope/honey dew melon	✓			2	P 38.	C
oranges	✓		3		1 medium	✓
apricots - fresh	✓		3		3 medium	2
other, specify PAW PAW	✓		1			1/4

Apples This person eats one medium apple every day. A tick has therefore been placed in the first column, a "1" in the "per day" column, and a tick in the "your serve" column to indicate that the reference serve of one medium apple is also their serving size.

Avocados Avocados are not eaten.

Cantelope Cantelope is eaten 2 times per month when in season." P 38." is given in the "Reference Serving or Photograph " column. After looking at photograph on page 38 of *yellow book* (P 38.) it was decided that their serving size was between the large and small serving size photographs. "C" was therefore placed into the "Your Serve" column.

Oranges 1 medium orange is eaten 3 times per week.

Apricots 2 medium apricots are eaten 3 times per week when in season. Because their serving size is 2 medium apricots and not 3,"2" was therefore written in the "Your Serve" column.

Other 1/4 of a paw paw is eaten 1 time per week when available. Paw paws are not listed as a food item so they have written it in the "other" section, together with how often it is eaten and the serving size.

Abbreviations

g = grammes　　cm = centimeter
tbs = tablespoon　　tsp = teaspoon

N/A = not applicable (a serving size is not required)

PART B　INDIVIDUAL FOOD AND DRINK ITEMS

1. In the first column we would like you to indicate if you eat each food item once per month or more.
2. If you don't then go on to the next food item.
3. If you do then place a tick (✓) in the first column and indicate how often you eat that food by placing a number in one of the next three columns under the heading "HOW MANY TIMES EATEN" (Eg. a 3 in the "PER WEEK" means the food is eaten 3 times per week.
4. If the food is seasonal then indicate how often you eat the food when it is in season.
5. In the "Reference Serve or Photograph" column there is either a reference serving or a page number of the photograph (yellow book) you are to refer to when estimating your serving size.
6. In the "Your Serve" column we would like you to give an estimate of your serving size either in terms of the reference serving (if the same as reference place a tick (✓), if not the same then write number indicating your serve) OR in terms of the photographs (yellow book) by writing A,B,C,D or E (A = larger than photo 1, B = equal to photo 1, C = between photo 1 & 2, D = equal to photo 2, E = smaller than photo 2).

FOOD ITEM	TICK IF EATEN AT LEAST ONCE PER MONTH	HOW MANY TIMES EATEN (on average over last 12 months) PER DAY	PER WEEK	PER MONTH	Reference Serving OR Photograph	Your Serve
BEEF roast					P 1.	
corned beef					P 1.	
boiled					P 1.	
stir-fried					P 2.	
casserole / stew / curried					P 2.	
steak/kidney pie					P 3.	
steak					P 4.	
rissoles					P 5.	
meat loaf					P 5.	
stewed mince					P 5.	
lasagne					P 6.	
mousaka					P 7.	
other,specify:					P 7.	
VEAL roast					P 1.	
schnitzel					P 8.	
other,specify:						

FOOD ITEM	TICK IF EATEN AT LEAST ONCE PER MONTH	HOW MANY TIMES EATEN (on average over last 12 months) PER DAY	PER WEEK	PER MONTH	Reference Serving OR Photograph	Your Serve
LAMB						
roast					P 1.	
casserole / stew (eg.irish)					P 2.	
chops/cutlets					2 chops	
lean short cuts (e.g cubes)					P 4.	
PORK						
lean fillets (e.g new fashioned)					P 1.	
chops					1 chop	
leg / roast					P 1.	
bacon					2 rashers	
ham					3 thin or 2 thick slices	
ham steak					1 steak	
casserole / stew					P 2.	
stir-fried pork					P 2.	
sweet and sour pork					P 2.	
other, specify:						
CHICKEN / POULTRY						
grilled / boiled/ steamed					P 9.	
roast - meat and skin					P 9.	
- meat only , breast					P 9.	
- meat only, other					P 9.	
chicken - fried/crumbed					P 10.	
stir-fried chicken					P 10.	
casserole / stew					P 11.	
duck (roast)					P 9.	

FOOD ITEM	TICK IF EATEN AT LEAST ONCE PER MONTH	HOW MANY TIMES EATEN (on average over last 12 months) PER DAY	PER WEEK	PER MONTH	Reference Serving OR Photograph	Your Serve
turkey					P 9.	
rabbit					P 2.	
SAUSAGES/PIES						
sausages					3 thin or 2 thick	
frankfurt					6 cocktail or 3 hotdog type	
sandwich meat (eg.salami)					3 slices	
home made pies/pasties					P 3.	
other, specify:						
OFFAL						
liver					1/2 of liver	
brains					1 whole brain	
tripe					1 cup	
other, specify:						
SEAFOOD						
fresh fish - fried					P 12.	
- grilled/baked/boiled					P 12.	
- fried in batter					P 12.	
tinned salmon/tuna					1/2 cup	
tinned sardines					4 to 5 fish	
dried salted fish eg.Cod					P 12.	
fish fingers/cakes					2 cakes or 4 fingers	
squid (calamari)					P 13.	
scallops					5 pieces	
prawn					5 pieces	

FOOD ITEM	TICK IF EATEN AT LEAST ONCE PER MONTH	HOW MANY TIMES EATEN (on average over last 12 months)			Reference Serving OR Photograph	Your Serve
		PER DAY	PER WEEK	PER MONTH		
oysters					5 pieces	
canned/dried shrimps					1/2 cup	
other, specify:						
EGGS boiled/poached/fried					1 egg	
omelette					P 14.	
scrambled					1 egg	
quiche					P 15.	
other, specify:						
CHEESE cheddar/tasty					P 16.	
reduced fat cheddar/tasty					P 16.	
processed e.g Kraft slices					2 slices	
reduced fat processed e.g slices					2 slices	
polyunsaturated cheese (minichol)					P 16.	
low fat yellow cheese e.g cotto					P 16.	
edam					P 16.	
swiss					P 16.	
danish blue					P 16.	
camembert					P 16.	
fetta					P 16.	
cream cheese					1 tsp	
philadelphia cheese					1 tsp	
low fat philadelphia					1 tsp	
cottage					P 17.	

FOOD ITEM	TICK IF EATEN AT LEAST ONCE PER MONTH	HOW MANY TIMES EATEN (on average over last 12 months)			Reference Serving OR Photograph	Your Serve
		PER DAY	PER WEEK	PER MONTH		
ricotta					P 17.	
parmesan					P 18.	
other cheese,specify:						
YOGHURT low fat yoghurt - plain					1 carton (200 g)	
low fat yoghurt - fruit					1 carton	
full fat yoghurt - plain					1 carton	
full fat yoghurt - fruit					1 carton	
frozen yoghurt					1 carton	
other,specify:						
MILK (include milk in coffee, tea, cereals etc) full cream milk					1 cup	
soya milk (eg. "So Good")					1 cup	
Rev / Physical					1 cup	
Skinny milk					1 cup	
dried full cream milk					1 cup	
dried skim milk					1 cup	
other milk, specify:						
SOUPS pea and ham					1 cup	
cream soup (eg. cream of ...)					1 cup	
vegetable					1 cup	
tomato					1 cup	
minestrone					1 cup	

FOOD ITEM	TICK IF EATEN AT LEAST ONCE PER MONTH	HOW MANY TIMES EATEN (on average over last 12 months) PER DAY	PER WEEK	PER MONTH	Reference Serving OR Photograph	Your Serve
packet soup (eg.noodle)					1 cup	
lentil or dried bean soup					1 cup	
other, specify:						
VEGETABLES						
asparagus					5 spears	
green beans					P 19.	
broad beans					1/2 cup	
kidney beans					1/3 cup	
4 bean salad					1/3 cup	
alfalfa					P 21.	
bean sprouts (all kinds)					P 21.	
bean curd					5 cubes	
green peas					P 22.	
snow peas					1/3 cup	
black eye bean					1/3 cup	
baked beans					P 23.	
lentil burgers					1 burger	
vegetable burgers					1 burger	
beetroot					2 slices	
broccoli					P 24.	
brussel sprouts					5 sprouts	
cabbage (all types)					P 25.	
capsicum (peppers)					2 strips 0.5cm wide	
mixed vegetables (frozen)					1/3 cup	
carrots					P 26.	

FOOD ITEM	TICK IF EATEN AT LEAST ONCE PER MONTH	HOW MANY TIMES EATEN (on average over last 12 months) PER DAY	PER WEEK	PER MONTH	Reference Serving OR Photograph	Your Serve
cauliflower					P 27.	
sweet corn/baby corn					P 28.	
celery					one 15cm (6") stick	
cucumber					5 medium slices	
egg plant					1 cup	
endives/chickory					1/2 cup	
coleslaw					P 29.	
tomatoes					1 medium	
lettuce					P 30.	
mushrooms					P 31.	
onions (fried,salad,etc)					P 32.	
garlic					1/2 clove	
parsnips					2 medium pieces	
swede					1/3 cup	
turnips					1/3 cup	
potatoes - boiled					P 33.	
- mashed					P 34.	
- roast					P 33.	
- chips					P 35.	
- microwave					P 33.	
potato salad					3 tbs	
pumpkin					P 36.	
radishes					2 radishes	

FOOD ITEM	TICK IF EATEN AT LEAST ONCE PER MONTH	HOW MANY TIMES EATEN (on average over last 12 months) PER DAY	PER WEEK	PER MONTH	Reference Serving OR Photograph	Your Serve
spinach					1/3 cup (cooked)	
silver beet					1/3 cup (cooked)	
squash					1/3 cup	
zucchini / gourgettes					P 37.	
artichoke					1/3 cup	
ratatouille e.gvegetable stew					P 20.	
olives					5 olives	
gherkins/tomato relish pickles/pickled onions					1 piece or 1 tbs	
other,specify:						
FRUITS						
apples					1 medium	
oranges					1 medium	
apricots - fresh					3 medium	
avocados					1/4 avocado	
bananas					1 medium	
berries					3/4 cup	
cherries					3/4 cup	
figs					1 medium	
grapefruit					1/2 medium	
grapes					about 20	
kiwi fruit					1 medium	
mandarines					1 medium	
mangoes					1/2 medium	

FOOD ITEM	TICK IF EATEN AT LEAST ONCE PER MONTH	HOW MANY TIMES EATEN (on average over last 12 months) PER DAY	PER WEEK	PER MONTH	Reference Serving OR Photograph	Your Serve
cantelope/honey dew melon					P 38.	
watermelon					3 medium pieces	
passion fruit					1 medium or 1 tbs	
peaches - fresh					1 medium	
pears - fresh					1 medium	
pineapple - fresh					one 2cm slice	
plums					3 medium	
rhubarb - stewed					1/2 cup	
strawberries					10 to 12	
fruit salad - fresh					3/4 cup	
canned fruit, specify:					1 cup	
other, specify :						
DRIED FRUITS						
dried apricots/apples					4-5 pieces	
currants					2 tbs	
dates					4-5 pieces	
figs					2-3 pieces	
prunes					4-5 pieces	
raisins					2 tbs	
sultanas					P 39.	
dried fruit mix					2 tbs	
other, specify:						

FOOD ITEM	TICK IF EATEN AT LEAST ONCE PER MONTH	HOW MANY TIMES EATEN (on average over last 12 months) PER DAY	PER WEEK	PER MONTH	Reference Serving OR Photograph	Your Serve
CEREALS						
cornflakes					1 cup	
Weetbix/Vita Brits					2 biscuits	
Muesli - toasted					1/2 cup	
natural or flakes					1 cup	
Rice Bubbles					1 cup	
Bran cereals (eg.All Bran)					1 cup	
Wheatgerm					1 tbs	
Raw Bran					1 tbs	
Oat Bran					1 tbs	
Oat Bran cereal					1 cup	
Porridge/Oats					P 40.	
Just Right					1 cup	
Other, specify:						
RICE/PASTA/PIZZA						
boiled/steamed white rice					P 41.	
boiled/steamed brown rice					P 41.	
fried rice (Chinese style)					P 41.	
noodles					P 42.	
macaroni cheese					P 42.	
pasta (e.g spaghetti,fetuccini)					P.42.	
pasta sauce (tomato)					1 cup	
pasta sauce (with mince)					1 cup	
other, specify:						

FOOD ITEM	TICK IF EATEN AT LEAST ONCE PER MONTH	HOW MANY TIMES EATEN (on average over last 12 months) PER DAY	PER WEEK	PER MONTH	Reference Serving OR Photograph	Your Serve
BREADS/SCONES/ MUFFINS						
white bread					1 slice	
white bread - hi fibre					1 slice	
oat bran bread					1 slice	
wholemeal bread					1 slice	
brown bread					1 slice	
multigrain					1 slice	
rye bread					1 slice	
fruit loaf					1 slice	
rolls - white					1 roll	
- brown					1 roll	
pita bread					1 piece	
scones					1 scone	
pikelets					2 picklets	
crumpets					1 crumpet	
muffins					1 muffins	
SPREADS						
jam					1 tbs	
honey					1 tbs	
peanut butter					1 tbs	
vegemite					1 tsp	
other, specify:						
DRINKS						
apple juice					1 glass	
orange juice					1 glass	

FOOD ITEM	TICK IF EATEN AT LEAST ONCE PER MONTH	HOW MANY TIMES EATEN (on average over last 12 months)			Reference Serving OR Photograph	Your Serve
		PER DAY	PER WEEK	PER MONTH		
orange and mango juice					1 glass	
other fruit juice, specify:					1 glass	
fruit drink (25% fruit juice)					1 glass	
ribena					1 glass	
cordial					1 glass	
tang, quench etc.					1 glass	
vegetable juice					1 glass	
tea					1 cup	
herb tea,specify					1 cup	
coffee (instant/filter/etc)					1 cup	
decaf coffee/coffee substitute					1 cup	
flavoured milks e.g Big M					1 glass	
milk shake / thick shake					1 medium	
ovaltine/milo (drink,on cereal)					2 tsp	
cocoa					1 glass	
cola e.g Coke,Pepsi					1 glass	
lemonade,fanta					1 glass	
low calorie soft drink					1 glass	
flavoured mineral water					1 glass	
soda water/mineral water 100%					1 glass	
other soft drinks,specify:					1 glass	
wine cooler					1 glass	
water					1 glass	
DESSERTS						
ice-cream (in summer)					2 scoops	

FOOD ITEM	TICK IF EATEN AT LEAST ONCE PER MONTH	HOW MANY TIMES EATEN (on average over last 12 months)			Reference Serving OR Photograph	Your Serve
		PER DAY	PER WEEK	PER MONTH		
ice-cream (in winter)					2 scoops	
cream					2 Tbs	
custard					1/2 cup	
trifle					1 cup	
jelly					1/2 cup	
mousse					1/2 cup	
pudding,specify:					1/2 cup	
other deserts, specify:					1/2 cup	
CAKES AND PASTRIES						
plain cake(eg.butter,carrot)					P 44.	
rich cake (eg.cream,cheese)					1 medium piece	
lamington					1 lamington	
fruit cake					P 45.	
shortbread					1 piece	
pavlova					P 46.	
fruit pie/crumble (eg.apple)					P 46.	
pancakes					1 pancake	
donuts					1 donuts	
other pastries(eg.danish etc)					1 pastry	
BISCUITS						
dry biscuits , specify					4 biscuits	
plain sweet e.g marie					2 biscuits	
oat/wholemeal e.g anzac,granita					2 biscuits	
cream					2 biscuits	

FOOD ITEM	TICK IF EATEN AT LEAST ONCE PER MONTH	HOW MANY TIMES EATEN (on average over last 12 months) PER DAY	PER WEEK	PER MONTH	Reference Serving OR Photograph	Your Serve
choc coated					2 biscuits	
other, specify:						
SWEETS						
lollies/toffees					4-5 pieces	
chocolate pieces					9-10 pieces	
chocolate bars					1 bar 30g	
health or muesli bar					1 bar 40g	
other, specify:					1 bar	
NUTS						
unroasted - almond					about 10	
unroasted - walnuts					about 10	
other unroasted,specify:					about 10	
roasted - peanuts					about 10	
roasted - cashews					about 10	
mixed nuts					about 10	
other unroasted,specify:						
OTHER SNACKS						
potato chips/crisps					1 pack 50g	
corn chips					1 pack 50g	
cheezels/twisties					1 pack 50g	
other, specify:						
TAKE-AWAYS						
spring rolls					1 spring roll	
chicko rolls					1 chicko roll	
Dim Sims					2 dim sims	

FOOD ITEM	TICK IF EATEN AT LEAST ONCE PER MONTH	HOW MANY TIMES EATEN (on average over last 12 months) PER DAY	PER WEEK	PER MONTH	Reference Serving OR Photograph	Your Serve
hot dogs					1 hot dog	
chicken rolls					1 chicken roll	
souvlaki in pita					1 souvlaki	
sausage rolls					1 large	
meat pies					1 pie	
pasties					1 pastie	
hamburgers					1 burger	
fish & chips - fish					P 12.	
- chips					P 35.	
DIPS						
french onion					P 47.	
salmon					P 47.	
chickpea e.g hoummos					P 47.	
eggplant					P 47.	
garlic					P 47.	
caviar salad					P 47.	
fish paste					P 47.	
pate					P 47.	
other, specify:					P 47.	
SAUCES/DRESSINGS						
tomato sauce					2 tbs	
BBQ sauce					2 tbs	
soy sauce					2 tbs	
worcestershire sauce					2 tbs	
mustard					2 tbs	

FOOD ITEM	TICK IF EATEN AT LEAST ONCE PER MONTH	HOW MANY TIMES EATEN (on average over last 12 months) PER DAY	PER WEEK	PER MONTH	Reference Serving OR Photograph	Your Serve
gravy					1/4 cup	
white sauce e.g bechamel					1/4 cup	
mayonnaise - regular					1 tbs	
mayonnaise - light,low cal					1 tbs	
salad dressing - regular					1 tbs	
salad dressing - light,low cal					1 tbs	
sour cream					1 tbs	
other, specify:						
EATING OUT						
Chinese					N/A	
Indian					N/A	
other Asian					N/A	
French					N/A	
Greek					N/A	
Italian					N/A	
Lebanese					N/A	
Mexican					N/A	
Russian					N/A	
M^cdonalds/Hungry Jacks					N/A	
Kentucky fried/Red Rooster					N/A	
Dennys/counter tea (hotel)					N/A	
Pancake parlor					N/A	
Pizza (eg.pizza hut),takeaway					N/A	
other, specify:						

THANK YOU FOR COMPLETING BOOK II

Please make sure Book I (pink book) is also completed

THANK YOU FOR PARTICIPATING IN THIS STUDY.

YOUR COOPERATION HAS BEEN GREATLY APPRECIATED.

IN CONFIDENCE

SUPPLEMENT

(for 65 years and over)

This book takes about 15 minutes to complete.

FOOD HABITS AND HEALTH STATUS OF ANGLO-CELTIC AUSTRALIANS

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BACKGROUND

1. **As a child did you live in:** (circle one number)

1 Mainly urban areas
2 Mainly rural areas
3 Both rural and urban areas

2. **As an adult did you live in:** (circle one number)

1 Mainly urban areas
2 Mainly rural areas
3 Both urban and rural areas

3. **If you are widowed , divorced or separated how many years ago did this occur?** (please write number)

Number of years ago: 5 years

4. **Are you currently doing any casual/part-time work?** (circle one number)

1 Yes, paid work
2 Yes,unpaid work
3 No

If Yes, please describe work you are doing.

Helping at St Vincents de Paul store

5. **Do you live with a grandchild?** (circle one number)

1 Yes
2 No

If Yes, how old is the youngest grandchild that lives with you? (circle one number)

1 Less than 6 years old
2 6-12 years old
3 12-18 years
4 >18 years old

WELL-BEING → 0-7 score
10 Qs.

6. Do you have difficulty with sleep ? (circle one number)

   1 Yes
   2 No → 0!

7. Do you find you are sleeping too much ? (circle one number)

   1 Yes
   2. No

8. Do you worry more than usual about little things ? (circle one number)

   1 Yes
   2 No

9. Have you lost interest in doing things you usually cared about or enjoyed ? (circle one number)

   1 Yes
   2 No

10. Have you ever felt so sad or depressed you thought you wanted to die ? (circle one number)

    1 Yes
    2 No

11. Do you feel tired most of the time ? (circle one number)

    1 Yes
    2 No

12. Are you happy and content with your every day life ? (circle one number)

    1 Yes
    2 No

13. Do you laugh easily ? (circle one number) WB 18

    1 Yes
    2 No

14. Do you listen to music or sing your favourite tunes ? (circle one number)

1 Yes
2 No

15. Do you forget where you left things more than you used to, or forget the names of close friends or relatives? (circle one number)

1 Yes
2 No

NB 17

HEALTH STATUS

16. Is your health now better, about the same, or not as good as it was three years ago ? (circle one number)

1 Not as good
2 Same
3 Better

17. Would you say your health is better, about the same, or not as good as most people of your age ? (circle one number)

1 Not as good
2 Same
3 Better

18. How good is your eyesight (with glasses if used)? (circle one number)

1 Blind or partially blind
2 Good or adequate

19. How good is your hearing (with hearing aid if used)? (circle one number)

1 Deaf or partially deaf
2 Good or adequate

20. **How many falls have you had in the past 3 years ?**
(circle one number)

1 None
2 One fall
3 Two falls
4 Three falls
5 More than 3 falls

21. **Do you have problems moving your arms or legs, e.g are you handicapped or paralysed due to a stroke, arthritis, osteoporosis?** (circle one number)

1 Yes
2 No

21a Do you have a missing arm or leg due to an accident, diabetes etc.? (circle one number or more)

Q 21AA 1 Yes, an arm missing
21AB 2 Yes, a leg missing
21AC 3 No

22. **Do you use any of the following aids ?** (please tick)

	HEALTH AID	YES
A	Cane	
B	Walker	
Q22C	Wheelchair	
	Leg brace	
	Back brace	
	Hearing aid	
	Pacemaker	
	Colostomy	
	Catheter	
	Glassses	✓
	Artificial limb	
	Geriatric limb	

ACTIVITIES OF DAILY LIVING

23. Do you have problems performing the following tasks which are often difficult to perform as you get older?
Please write number cod in space provided.

1 = No
2 = Only with help
3 = With difficulty but without help
4 = Without difficulty

✓ a	To walk between rooms?	4
✓ b	To use stairs?	4
c	To walk at least 400m?	4
✓ d	To get to places out of walking distance, i.e by bus, taxi?	4
✓ e	To use the toilet?	4
✓ f	To wash and bathe yourself?	4
✓ g	To dress and undress?	4
✓ h	To take care of your appearance?	4
✓ i	To get in and out of bed?	4
✓ j	To do your own cooking if you had to?	4
✓ k	To feed yourself ?	4
✓ l	To do light housework (wash dishes) if you had to?	4
✓ m	To do heavy housework (wash windows) if you had to?	4
✓ n	To take your own medicine if you had to?	4
o	To use the telephone (if available)?	4
✓ p	To handle your own money/bills if you had to?	4

23a Do you read newspapers every day? (circle one number)

1 Yes
2 No

√24. **Are there occasions when you do not get to the toilet on time to pass water ? (circle one number)**

1 Never
2 Occasionally
3 Frequently

√25. **Are there occasions when you do not get to the toilet on time to empty your bowel ? (circle one number)**

1 Never
2 Occasionally
3 Frequently

√26. **Who is your main helper ? (circle one number)**

1 Spouse/partner
2 Your child/ren
3 Friend/relative
4 Neighbour
5 Welfare or voluntary help
6 Paid help

27. **What time do you :**

27a Normally go to bed at night?

Please write time : 9.30 Pm

27b Normally get up from bed in the morning?

Please write time : 7.30 Am

EXERCISE

28. **About how often do you go out of your house/building in good weather ? (circle one number)**

1 Never
2 Less than once a month
3 2 or 3 days a month
4 Once a week
5 2-4 days a week
6 5 days a week or more

29. **Do you have a vehicle to use or any other form of transport, e.g car, bike ? (circle one number)**

1 Yes
2 No

29a If Yes, please describe: car

29b If Yes, do you usually take it where ever you go ? (circle one number)

1 Yes
2 No

ECONOMIC RESOURCES

30. Do you receive any forms of assistance (other than money)? (circle one number)

1 Yes
2 No

30a If Yes , what sort of support do you receive? (circle one number or more)

1 Food
2 Clothing
3 Shelter
4 Medication
5 Transport

30b If Yes , from whom do you receive support? (circle one number or more)

1 Child
2 Relative/friend
3 Neighbour
4 Welfare or voluntary help
5 District nursing

31. **Thinking about how you live,would you say you had enough money or other help for food, housing, clothing , etc.?** (circle one number)

1 No, I do not have enough
2 Yes, I have just enough
3 Yes, I have more than enough

Supplement ,

32. **Do you prefer to work at present ?** (circle one number)

1 Yes
2 No

32a If Yes, why ? (circle one number)

1 Need activity
2 Need income
3 All of the above

APPETITE & DENTITION

33. **Do you enjoy your food as much as you used to?** (circle one number)

1 Yes
2 No

33a If No, why is this? (circle one number or more)

1 Food doesn't interest me
2 I have no company at meal times
3 I've lost interest in cooking
4 My appetite is smaller
5 Food doesn't taste as good
6 Food doesn't smell as good
7 I have problems with digestion

34. **Do you have problems with any of the following?** Please write number code in space provided.

		1 = Yes 2 = No
a	Poorly fitting dentures	
b	Some foods are too acid	1
c	Difficulty in chewing	
d	Difficulty in swallowing	
e	Indigestion or heartburn	1
f	Sore mouth	
g	Dry mouth	

I can't eat citrus foods anymore c̄ age.
or anything fatty/fried → repeat on me

35. Do you have : (circle one number)

1 False teeth
2 I still have most of my teeth
3 I only have a few remaining teeth
4 No teeth , I use my gums to chew

FOOD PREPARATION & PURCHASE

36. Who usually prepares most of your meals ? (circle one number)

1 Yourself
2 Spouse
3 Relative/friend/neighbour
4 Welfare or voluntary help
5 Privately employed help
6 I receive meals on wheels

36a If you receive meals on meals, how many days a week do you get them? (Please write number)

Number of days: ______

37. Are the shops where you purchase food , within walking distance? (circle one number)

1 Yes
2 No
3 Some

38. Do you do any shopping for food? (circle one number)

1 Yes
2 No

38a If No, why? (circle one number)

1 Someone else goes for me, but I can go if I have to
2 I am too weak to go
3 The shops are too far away

38b If No, who goes shopping for you? (circle one number)

1 Spouse
2 Child
3 Grandchild
4 Friend/relative
5 Neighbour
6 Paid help

39. **Do you have any of the following:**
(Please write number code in space provided.)

1 = Yes
2 = No

a	Stove	1
b	Oven	1
c	Fridge	1
d	TV	1
e	Radio	1
f	Telephone	1
g	Toilet	1
h	Hot water	1
i	Microwave	1
j	Freezer	1

HEALTH BELIEF

40. **Why do you believe you have survived to later life and others have not?**

I think I've survived to later life because I had healthy parents who lived to a big age, also we were reared in a market garden area & had plenty of good plain food.

PAST FOOD INTAKE

41. **Compared to what you eat now, would you say you ate MORE, LESS or about the SAME amount of the foods listed below when you were in your twenties (i.e. just before the 2nd world war).**

Please write letter code in space provided.

M = more in the past
L = less in the past
S = same in the past

Beef	m
Lamb	L
Chicken	L
Rabbit	m
Fish	
Offal	
Eggs	S
Dried beans, lentils split peas, baked beans	
Nuts	
Milk	m
Cheese	m
Yoghurt	
Breakfast cereals	S
Oats, porridge	M
Bread	S
Rice	
Spaghetti, pasta	
Citrus fruit	m
Apples/pears	S

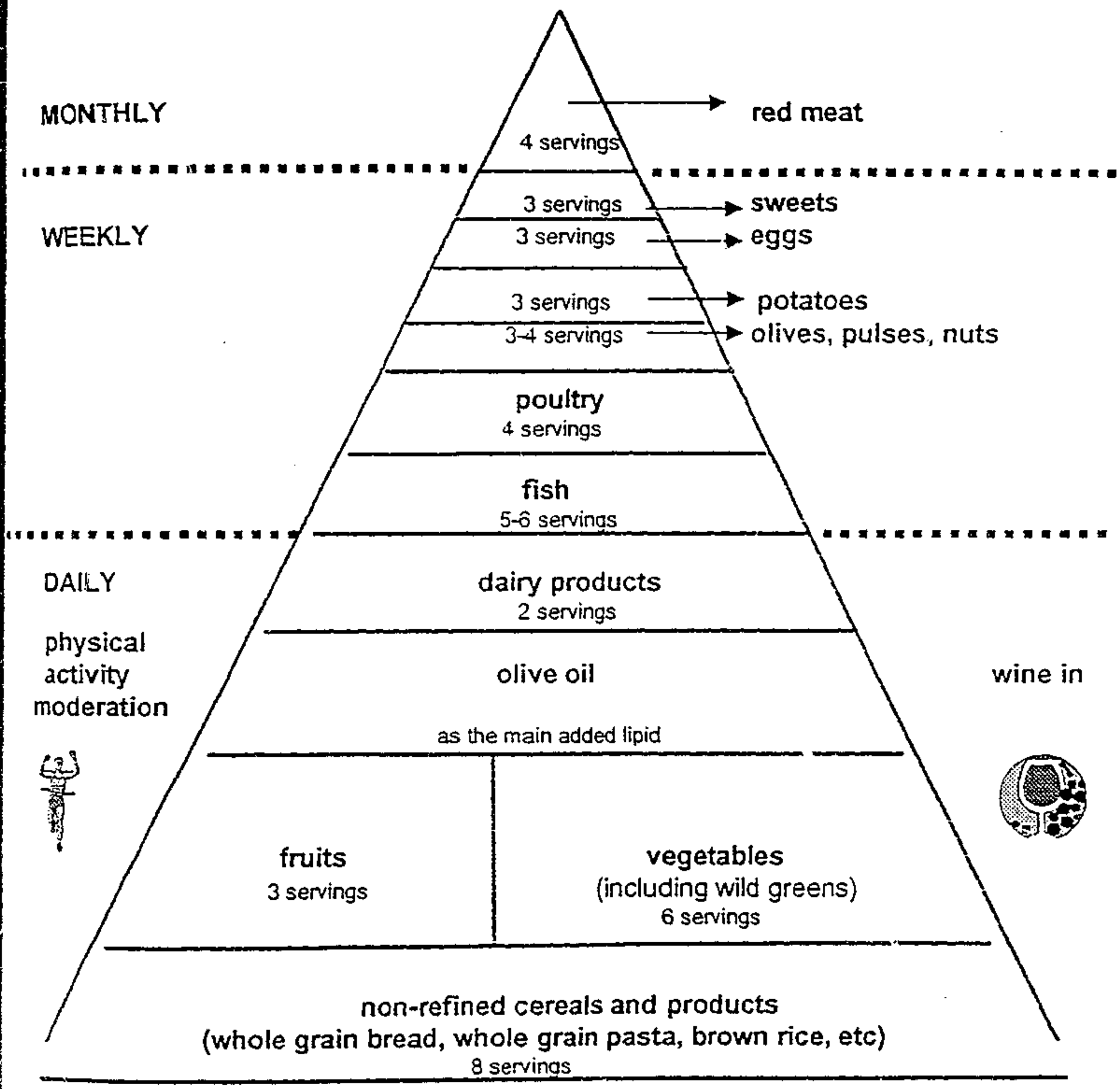
41. Compared to what you eat now, would you say you ate MORE, LESS or about the SAME amount of the foods listed below when you were in your twenties (i.e. just before the 2nd world war).

Please write letter code in space provided.

M = more in the past
L = less in the past
S = same in the past

Stone fruit	
Tropical fruit	
Potato	S
Parsnip, turnip	
other cooked vegetables	S
Salad vegetables	S
Lard, dripping	
Butter	S
Margarine	L
Oils	L
Cakes, biscuits, scones	M
Sweets, lollies, chocolate	M
Take away food	
Packet snacks e.g. chips	
Tea	S
Coffee	L
Fruit juice	
Soft drinks	
Water	

MEDITERRANEAN DIET



One serving equals approximately one half of the portions as defined in the Greek market regulations

Also remember to:
- drink plenty of water

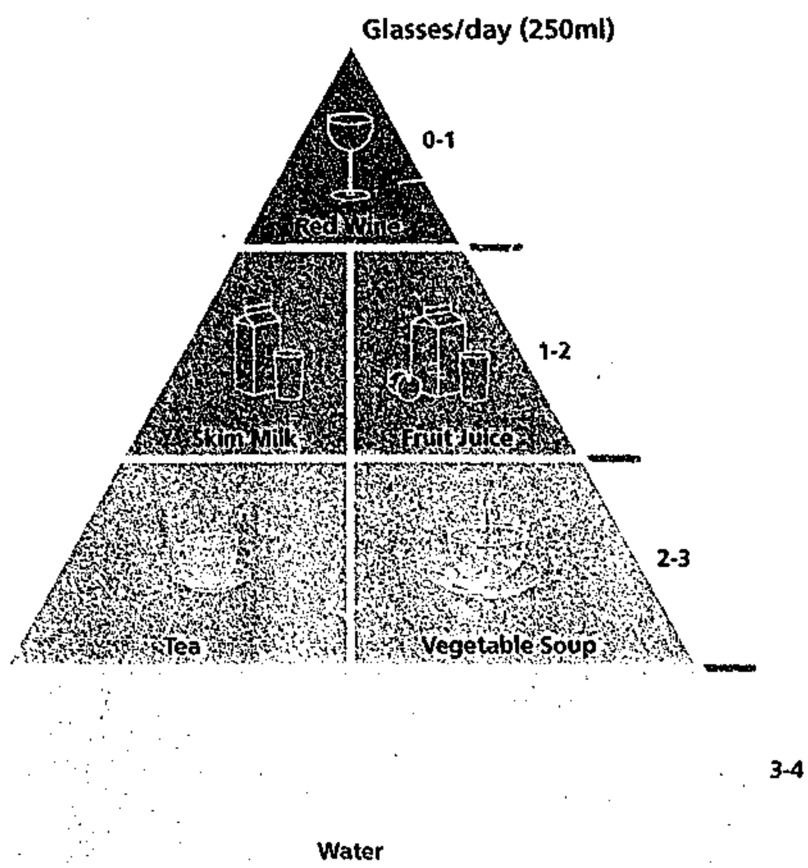
- avoid salt and replace it with herbs (e.g origan, basil, thyme, etc)

Fluid Intake Pyramid

Dr John Weisburger

For solid foods, the concept of a healthy diet pyramid has been introduced to describe preferred eating patterns. I have taken this idea further and designed a healthy fluids pyramid for adults. It is based on a recommendation to consume about two litres of fluid each day. At its base is, of course, water. The next most significant contribution should come from tea and, especially in winter, vegetable soup. Smaller amounts of fruit juice and skim milk or soy milk and the occasional glass of red wine complete fluid intake for the day. The outcome is an ample amount of fluid, high antioxidant intake, negligible saturated fat, no empty calories to challenge the waistline and just a little alcohol for the heart's sake

Fluid Intake Pyramid, showing optimal intakes of fluids from various sources



Created by Dr John Weisburger and Dr Zenon Apostolides

1. Adults, as above; total fluid 1.5 - 2.5 litres, function of body size, environmental temperature, exercise, and diet.
2. Children to age 18, use decaffeinated tea or transpose 1% milk for tea, and vise versa: no alcohol.
3. Water is as beverage, and water content of foods.
4. Red wine, with polyphenol tannins, is prefferred for those individuals using alcoholic beverages.

ELDERLY GREEKS IN SPATA, GREECE AND MELBOURNE, AUSTRALIA: HEALTH, FOOD HABITS AND LIFESTYLE

QUESTIONNAIRE

Interviewer adminstered

C/O Mrs Antigone Kouris–Blazos,
Department of Medicine, Monash Medical Centre, Block E, 5th Floor,
Clayton Road, Clayton, Vic 3168, Australia

SUBJECT CODE [ ][ ][ ][ ]

DATE OF INTERVIEW

Part 1 [ ][ ]/ [ ][ ]/ [ ][ ]
day month year

Part 2 [ ][ ]/ [ ][ ]/ [ ][ ]
day month year

LENGTH OF INTERVIEW

Part 1 [ ][ ]
Part 2 [ ][ ]
hours

NAME ....

ADDRESS ....

....

TELEPHONE ....

TYPE OF HOUSING

1. granny flat/house attached to family house with garden
2. house with garden
3. house without a garden
4. unit
5. apartment in house
6. apartment in building
7. boarding house
8. institution
9. other [ ]

PART 1 NON-NUTRITIONAL SECTION (Health and Lifestyle)

DEMOGRAPHIC CHARACTERISTICS

For the following questions enter abbreviated answer or letter in front of answer into boxes provided.

DATE OF BIRTH	[ ][ ]/ [ ][ ]/ [ ][ ] day month year	
AGE	[ ][ ][ ] age in years	
SEX	M male F female	[ ]
MARTSTAT	N never married M married W widowed D divorced/separated L living with partner	[ ]
WDS	If you are widowed,divorced or separated how long ago did this occur (in years)?	[ ][ ]
COUNTRY	Country of birth specify......................................	[ ]
MIGRATE DC24	How many years have you been in this country?	[ ][ ]
DC24A	As a child did you live in: 1. mainly urban areas 2. mainly rural areas 3. both rural and urban areas	[ ]
	Town,specify..................................	[ ]
DC25 DC25A	As an adult did you live in: 1. mainly urban areas 2. mainly rural areas 3. both urban and rural areas	[ ]
	Town, specify.................................	[ ]
DC26A	How long have you lived at this house (years)?	[ ][ ]

DC26B Subject lives in a:
1. rural area
2. urban area [ ]

Town,specify................................ [ ]

or postcode/zip .... [ ][ ][ ][ ]

DC27A Your father's country of birth
specify....................................... [ ]

DC27B Your mother's country of birth
specify....................................... [ ]

DC27FF, DC27FM, DC27MF,

DC28 DC27MM, DC28LDUC

For how many years did you have full-time education (i.e school,college) [ ][ ]

DC29 Did you undertake studies beyond secondary school?
1. Yes
2. No [ ]

We are interested in knowing about the health of your family (father, mother, siblings). Use the codes to specify the health problems of family members. If there is no answer leave blank. A maximum of 2 brothers and 2 sisters can be entered – start with the eldest.

	DC30F	DC30M	DC30B1	DC30B2	DC30S1	DC30S2
	Father	Mother	Brother1	Brother2	Sister1	Sister2
Alive=1 Dead=2	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Age	[ ][ ]	[ ][ ]	[ ][ ]	[ ][ ]	[ ][ ]	[ ][ ]
Heart disease=H	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Stroke=S	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Diabetes=D	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
High blood pressure = BP	[ ][ ]	[ ][ ]	[ ][ ]	[ ][ ]	[ ][ ]	[ ][ ]
Cancer=C	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Old age=OA	[ ][ ]	[ ][ ]	[ ][ ]	[ ][ ]	[ ][ ]	[ ][ ]
OT=other specify	[ ][ ]	[ ][ ]	[ ][ ]	[ ][ ]	[ ][ ]	[ ][ ]

OB=obese AL=alcohol abuse SE=senile HT=healthy PA=parkinsons,FL=flu/cold,AC=accident

DC30GM How old was your grandmother when she died? [ ][ ][ ]

DC30GF How old was your grandfather when he died? [ ][ ][ ]

DC31A Do you live alone?
1. Yes
2. No [ ]

DC31BP Does your spouse/partner live here?
1. Yes
2. No [ ]

DC31BC How many of your children live here? [ ][ ]

DC31BG How many of your grandchildren live here ? [ ][ ]

DC31BO TH How many other people live here? [ ][ ]
specify..

DC31BGA G BOTH How old is the youngest grandchild that lives here?
1. <6 years
2. 6–12 years
3. 12–18 years
4. >18 years
5. none [ ]

DC32A WDR What kind of work did you do most of your working life?
1. professional,technical or related worker(architect,engineer,chemist doctor,dentist,lawyer,clergy,nurse)
2. administrative,executive or managerial worker
3. clerical worker(book-keeper,cashier, typist)
4. sales worker(insurance,real estate, auctioneer,commercial traveller, proprietor and shop assistant)
5. farmer,fisherman,hunter,timber getter
6. miner,quarryman or related worker
7. worker in transport or communication (driver of truck,delivery van,bus,taxi, railway engine,pilot,deckhand,conductor, bus inspector,telephone/telegraph operator,postman,postmaster etc.)
8. tradesman,production-process worker or labourer(carpenter,plumber,mechanic, electrician,tailor,machinist,factory worker,foreman,builder's labourer etc.)
9. service,sport or recreational worker (fireman,policeman,caretaker,orderly, barber,sportsman,photographer,undertaker)
10. member of armed services
11. house duties
12. shepherd
13. collector of retsini (pine sap for retsina)
14. sold horses/donkeys/animals [ ]

DC32B wap
Do you work now?
8. Yes
1. No [ ]

DC32BY
If yes,specify (use codes DC32A).................. [ ]

DC33A
What kind of work did your spouse do most of his/her working life? (code as for DC32A) [ ]

DC33B
Is your spouse still working?
1. Yes
2. No [ ]

DC33BYes
If yes,specify (use codes DC32A) [ ]

MEMORY and COGNITIVE FUNCTION

MA7
What year is it (now)?
1. correct
0. incorrect [ ]

MA8
What month is it (now)?
1. correct
0. incorrect [ ]

MA9
What day or date of the month is it (now)?
1. correct
0. incorrect [ ]

MA10
What is your address?
1. correct
0. incorrect [ ]

WB17
Do you forget where you left things more than you used to,or forget the names of close friends or relatives?
0. Yes
1. No [ ]

WELL-BEING

WB11
Do you have difficulty with sleep?
0. Yes
1. No [ ]

WB12
Do you find you are sleeping too much?
0. Yes
1. No [ ]

WB13
Do you worry more than usual about little things?
0. Yes
1. No [ ]

WB14	Have you lost interest in doing things you usually cared about or enjoyed? 0. Yes 1. No	[ ]
WB15	Have you ever felt so sad or depressed you thought you wanted to die? 0. Yes 1. No	[ ]
WB16	Do you feel tired most of the time? 0. Yes 1. No	[ ]
WB17A	Are you happy and content with your every day life? 0. No 1. Yes	[ ]
WB18	Do you laugh easily? 0. No 1. Yes	[ ]
WB19	Do you enjoy music regularly e.g listen to the radio,sing your favourite tunes? 0. No 1. Yes	[ ]

HEALTH

H34	How would you rate your overall health at the present time? 1. poor 2. fair 3. good 4. excellent	[ ]
H35	Is your health now better,about the same, or not as good as it was three years ago? 1. not as good 2. same 3. better	[ ]
H36	Do your health problems stand in the way of your doing the things you want to do? 1. a great deal 2. a little 3. not at all	[ ]
H37	Would you say your health is better, about the same,or not as good as most people your age? 1. not as good 2. same 3. better	[ ]

H38	About how many times did you see any type of doctor during the past 12 months?Do not include doctors seen while subject was a patient in hospital. 1. >13 times 2. 3–12 times 3. 0–2 times	[ ]
H39	About how many days have you spent in hospital during the past 12 months? 1. >22 days 2. 1–21 days 3. 0 days	[ ]
H40	About how many days during the past 12 months have you been sick in bed all or most of the day? 1. >14 days 2. 1–14 days 3. 0 days	[ ]
H41	How good is your eyesight (with glasses if used)? 1. blind or partially blind 2. good or adequate	[ ]
H42	How good is your hearing(with hearing aid if used)? 1. deaf or partially deaf 2. good or adequate	[ ]
H43	In the past year, have you (had): Code: 1. Yes 2. No	
	a. diabetes	[ ]
	b. high blood pressure	[ ]
	c. heart trouble	[ ]
	d. circulation problems,hardening of the arteries e.g cholesterol	[ ]
	e. been paralyzed in any way e.g stroke	[ ]
	f. any other effects of stroke	[ ]
	g. arthritis,rheumatism	[ ]
	h. a stomach ulcer	[ ]
	i. emphysema or asthma	[ ]
	j. glaucoma	[ ]
	k. cataracts	[ ]
	l. a tumor or growth,cancer	[ ]
	m. liver trouble or jaundice	[ ]
	n. gall bladder trouble	[ ]
	o. kidney trouble	[ ]
	p. bladder trouble	[ ]
	q. a broken hip	[ ]
	r. other broken bones	[ ]
	s. anaemia	[ ]
	t. Parkinson's disease	[ ]
	u. trouble sleeping,insomnia	[ ]
	v. nervousness,tenseness	[ ]

H43 *continued*	In the past year, have you (had):		
	Code: 1. Yes 2. No		
		w1. prostate problems	[ ]
	or	w2. osteoporosis	[ ]
	or	w3. urinary tract infection	[ ]
	or	w4. uric acid	[ ]
	or	w5. constipated	[ ]
	or	w6. stomach/intestine problems	[ ]
	or	w7. bronchitis	[ ]
	or	w8. diarrhoea	[ ]
	or	w9. other,specify......................	[ ]

H43FALL	How many falls have you had in the past 3 years?	[ ]

ASK QUESTIONS H43X & H43Y OF THE WOMEN ONLY

H43X	How old were you when you had your first menstrual period?	[ ][ ]
H43Y	How old were you when your menstrual periods stopped (menopause)	[ ][ ]
H43Z	How many times have you suffered from a cold or flu in the past year?	[ ]

MEDICATION AND VITAMINS

H44 I have a list of common medicines that people take.Would you please tell me if you take any of the following regularly?

Code: 1.Yes
2.No

a. arthritis medication	[ ]
b. prescription pain killer	[ ]
c. aspirin	[ ]
d. high blood pressure medicine	[ ]
e. pills to make you lose water or salt	[ ]
f. pills for the heart e.g digitalis	[ ]
g. tablets for chest pain e.g nitroglycerine	[ ]
h. blood thinner medicine(anticoagulants)	[ ]
i. drugs to improve circulation e.g cholesterol	[ ]
j. insulin injections for diabetes	[ ]
k. pills for diabetes	[ ]
l. prescription ulcer medicine	[ ]
m. seizure medications	[ ]
n. thyroid pills	[ ]

H44 Medications – continued

Code: 1.Yes
2.No

	o. cortisone pills or injections	[ ]
	p. antibiotics	[ ]
	q. tranquilizers or nerve medicine	[ ]
	r. prescription sleeping pills	[ ]
	s. hormones,male or female	[ ]
	t. pills for anxiety or depression	[ ]
	u. drops/medication for glaucoma	[ ]
or	v. muscle relaxant	[ ]
or	w. allergy	[ ]
or	x. constipated	[ ]
or	y. gout	[ ]
or	z. indigestion	[ ]
or	z1. bronchitis	[ ]
or	z2. kidneys	[ ]
or	z3. other,specify..	[ ]

Who prescribed these medications?..

H45 Have you taken any herbal medicines or vitamins in the past year?
1.Yes
2.No [ ]

If yes,who prescribed it?..

If yes, specify (use codes below for no more than 3 supplements)

A1) vitamin code [ ]	B1) why [ ]	C1) when [ ]
A2) vitamin code [ ]	B2) why [ ]	C2) when [ ]
A3) vitamin code [ ]	B3) why [ ]	C3) when [ ]

A. Vitamin supplement?

code:
1. multivitamins specify..
2. vitamin B12 injection
3. vitamin C,calcium,vitamin D
4. iron & folate

5. phosphoric acid and pectin
6. vitamin D

7. multi B vitamins
8. vitamin A and E
9. vitamin C

10.folate alone
11.iron alone
12.calcium alone
13.pyridoxine (B6)
14.other,specify..

B. Why?

code:
1. health
2. nerves
3. strength
4. therapy
5. anaemia
6. bones
7. other specify...

C. When?

code:
1. daily
2. couple of times a week
3. couple of times a month
4. every couple of months
5. regularly for a couple of months of every year
6. daily for one month or less
7. for a short period, once only

HEALTH AIDS

H46 Check by observation

Code:
1. Yes
2. No

a. any arms missing/handicapped [ ]
b. any legs missing/handicapped [ ]

H47 Do you use any of the following aids:

Code:
1.Yes
2.No

a. cane [ ]
b. walker [ ]
c. wheelchair [ ]
d. leg brace [ ]
e. back brace [ ]
f. hearing aid [ ]
g. pacemaker [ ]
h. colostomy [ ]
i. catheter [ ]
j. geriatric chair [ ]
k. glasses [ ]
l. artificial limb [ ]
m. dialysis machine [ ]
n. other,specify... [ ]

EXERCISE

EX84	About how often do you go out of this house/building in good weather? 1. never 2. less than once a month 3. 2 or 3 days a month 4. once a week 5. 2–4 days a week 6. 5 days a week or more		[ ]
EX85A	Do you have a vehicle to use or any other form of transport e.g car,bike, donkey etc. 1.Yes 2.No		[ ]
EX85AYes	If yes, specify...		[ ]
EX85B	If yes,do you usually take it where ever you go? 1.Yes 2.No		[ ]
EX86	How many minutes do you spend daily or weekly doing the following:		
		DAY (min)	WEEK (hours)
	a. walking	[ ][ ][ ]	[ ]
	b. light housework (wash dishes,dust	[ ][ ][ ]	[ ]
	c. heavy housework e.g mop the floor	[ ][ ][ ]	[ ]
	d. farm work e.g pick fruit,dig soil or other strenuous activity	[ ][ ][ ]	[ ]
	e. gardening	[ ][ ][ ]	[ ]
	f. pottering	[ ][ ][ ]	[ ]
	ga.tending to animals/pets	[ ][ ][ ]	[ ]
	gb.other specify......................	[ ][ ][ ]	[ ]
	gc.other specify......................	[ ][ ][ ]	[ ]

EX86SC

What exercise score would you give the subject from 1 to 7 based on answer to EX86?

1 = inactive, in bed or seated all day
2 = inactive, seated most of the day
3 = inactive, seated most of day with few hours of pottering about
4 = active, walks or gardens (about 1 hour) or does a few hours of house work at least 3–4 times a week and on feet most of day
5 = active,walks or gardens (about 1 hour) or few hours of housework daily and on feet most of day
6 = active, heavy gardening or farming or plays an aerobic sport or few hours walking 3–4 times a week
7 = very active, heavy gardening or farming or plays an aerobic sport or few hours walking daily

1	2	3	4	5	6	7
inactive			active			very active

EX87 How does this compare with what you were doing last year?
1. more active now
2. less active now
3. much less active now
4. about the same [ ]
Reason:...

ACTIVITIES OF DAILY LIVING

The following tasks are often difficult to perform as you get older. I would like to know if you have problems in doing them?

Code: 1. No, I can't do it at all
2. Only with help
3. With difficulty but without help
4. Without difficulty

ADL88 Are you able :
a. to walk between rooms? [ ]
b. to use stairs? [ ]
c. to walk at least 400m? [ ]
d. to get to places out of walking distance i.e by bus,taxi,train? [ ]
e. to use the toilet? [ ]
f. to wash and bathe yourself? [ ]
g. to dress and undress? [ ]
h. to take care of your appearance? [ ]
i. to get in and out of bed? [ ]
j. to do your own cooking if you had to? [ ]
k. to feed yourself if you had to? [ ]
l. to do light housework(wash dishes) if you had to? [ ]
m. to do heavy housework (wash windows) if you had to? [ ]
n. to take your own medicine if you had to? [ ]
n1.to use the telephone(if available)? [ ]
n2.to handle your own money/bills? [ ]

ADL88O How often do you wet yourself?
(Paraphrase:Are there occasions when you do not get to the toilet on time to pass water?)
1. never
2. occasionally
3. frequently [ ]

ADL88P How often do you soil yourself?
(Paraphrase:Are there occasions when you do not get to the toilet on time to empty your bowel?)
1. never
2. occasionally
3. frequently [ ]

ADL88Q	Who is your main helper? 1.spouse/partner 2.your child/ren 3.friend/relative 4.neighbour 5.paid help	[ ]
SLEEP		
SL89A	What time do you normally go to bed (round off to nearest hour e.g 11.30 will be coded as 11)?	[ ][ ]
SL89B	What time do you normally get up from bed?	[ ][ ]
SL89C	On average,how many hours sleep do you get each night?	[ ][ ]
SL89D	Do you have a nap during the day? 1. Yes 2. No	[ ]
SL89DY	If yes,for how long (hours)?	[ ][ ]
SMOKING		
SM90A	Have you ever smoked regularly,at least one cigarrette/cigar/pipe a day? 1. Yes,I smoke regularly 2. I used to smoke regularly, but have now stopped 3. No, I have never smoked 4. Occasional smoker	[ ]
SM90B	If yes,for how many years did or do you smoke	[ ][ ]
SM90C	If yes,how many cigarettes did or do you smoke a day?	[ ][ ]
SM90D	If you smoked regularly but have now stopped, how many years ago did you stop smoking?	[ ][ ]

SOCIAL ACTIVITY (TIME USE)

SAR92

In the past year,how often have you:

Code:
1. never
2. 3x year or less
3. 4-10x year
4. 1x month
5. 2-3x month
6. 1x week
7. 2-4x week
8. 5x week or more

(Code according to frequency of activity in relevant season e.g if swims daily in summer only, code will still be 8).

a. gone to a senior center or attended a senior citizen's group? [ ]
b. attended a church or synagogue service? [ ]
c. gone to meetings of a church group or other groups or clubs? [ ]
d. gone to movies,theatre,concerts,or lectures? [ ]
e. gone to a sporting event? [ ]
f. participated in a sport like swimming fishing,hunting,bicycling,golf? [ ]
g. played cards,bingo,pool or some other game? [ ]
h. taken care of house plants or done outdoor gardening? [ ]
i. worked on a hobby or handwork like sewing,knitting,or woodworking? [ ]
j. painted pictures or played a musical instrument? [ ]
k. eaten out at a restaurant for a special occasion with friends? [ ]
l. baby-sat for grandchildren or other children? [ ]
m. left home to go a short distance for overnight or longer e.g stay at a friends house,stay with your child? [ ]
n. gone out of town (long distance)for a holiday? [ ]
o. met up with friends at a coffee shop, "cafeneion" or pub etc. [ ]
p. done volunteer work [ ]
q. done farm work [ ]
r. watched TV or listened to the radio? [ ]
s. gone to a dance e.g Greek dance? [ ]
t. looked after animals/pets? [ ]
u. reading [ ]

SOCIAL RELATIONS (NETWORKS)

SAR93 Is there anyone in particular in whom you confide or talk to about your problems?
1. No
3. Yes [ ]

SAR94 Do you have any living children?
1. No
3. Yes [ ]

SAR95 Do you have any living brothers or sisters?
1. No
3. Yes [ ]

SAR96 Are there any other relatives to whom you feel very close?
1. No
3. Yes [ ]

SAR97A About how often do you receive visits from close family or friends?
1. never
2. rarely
3. monthly
4. weekly
5. daily [ ]

SAR97B How often do you visit close family or friends?
1. never
2. rarely
3. monthly
4. weekly
5. daily [ ]

SAR97C How often do you speak to family or friends on the telephone?
1. never
2. rarely
3. monthly
4. weekly
5. daily [ ]

SAR97D How often do you write letters to family or friends?
1.never
2.rarely
3.monthly
4.weekly
5.daily [ ]

SAR98 Would you stay with family or friends if you were sick,for a short while?
1. No
3. Yes [ ]

SAR100

Do you have friends or neighbours that would help you if you were sick, for a short while?
1. No
3. Yes [ ]

SAR101

Do you feel lonely:
1. very often
2. sometimes
3. rarely
4. never [ ]

SAR102

Do you believe your children and grandchildren respect and acknowledge you?
1. never
2. sometimes
3. most of the times
4. always [ ]

AC

ECONOMIC RESOURCES

ECO103A

What is your main source of income?
1. one pension
2. two pensions (i.e including spouse)
3. one pension and other source(s)
4. two pensions and other source(s)
5. pension and supplementary benefit
6. no pension [ ]

specify source(s)
a. .... [ ]
b. .... [ ]
c. .... [ ]

ECO103B

What is your approximate income/year (include spouse's income) optional US$ [ ][ ][ ][ ][ ][ ]

ECO104

Do you receive any other forms of assistance (other than money)?

1. Yes
2. No [ ]

ECO104Yes

If yes,what sort of support do you receive?
Code: 1.Yes
2.No

a. food [ ]
b. clothing [ ]
c. shelter [ ]
d. medication [ ]
e. transport [ ]
f. other specify.......................... [ ]

ECO104G

From whom do you receive support?
1. child
2. relative\friend
3. neighbour
4. other specify.......................... [ ]

ECO105

Thinking about how you live,would you say you had enough money or other help for food, housing, clothing etc.
1. No,I do not have enough
2. Yes,I have just enough
3. Yes,I have more than enough [ ]

ECO105No

If no, which needs would you say were not being met(specify)?

.... [ ]

ECO106A

Do you prefer to work at present?
1. Yes
2. No [ ]

ECO106B

If yes,why?
1. need activity
2. need income
3. both 1&2
4. other specify............................ [ ]

PART 2 NUTRITIONAL SECTION (Food habits,beliefs,intake)

APPETITE

APP53 Do you enjoy your food as much as you used to?

1. Yes
2. No [ ]

APP53NO If no,why is this?

Code: 1. Yes
2. No

a. Food doesn't interest me [ ]
b. I have no company at mealtimes [ ]
c. I've lost interest in cooking [ ]
d. My appetite is smaller [ ]
e. Food doesn't taste as good as it used to [ ]
f. Food doesn't smell as good [ ]
g. Problems with digestion [ ]
h. other specify................................ [ ]

APP54 How would you describe your appetite?

1. poor
2. fair
3. good
4. very good [ ]

APP55 Do you have problems with any of the following?

Code: 1.Yes
2.No

a. poorly fitting dentures [ ]
b. some foods are too acid [ ]
c. difficulty in chewing [ ]
d. difficulty in swallowing [ ]
e. indigestion or heartburn [ ]
f. sore mouth [ ]
g. dry mouth [ ]
h. other specify........................... [ ]

DENTITION

APP55TEETH Subject has:

1. false teeth
2. most of his/her own teeth
3. only a few remaining teeth
4. no teeth,chews with gums [ ]

FOOD AVOIDANCE

APP56 Are there any foods that you try to avoid or that you can't eat?
1. Yes
2. No [ ]

If any of the following foods are avoided, enter abbreviation into corresponding boxes labelled "FOOD",otherwise leave blank.

	FOOD	REASON
Food 1 Meat = MT	[ ][ ]	[ ][ ]
Food 2 Salty food = ST	[ ][ ]	[ ][ ]
Food 3 Fats/oils = FT	[ ][ ]	[ ][ ]
Food 4 Eggs = EG	[ ][ ]	[ ][ ]
Food 5 Seafood =SF	[ ][ ]	[ ][ ]
Food 6 Sweets=SW	[ ][ ]	[ ][ ]
Food 7 Cheese/Milk = CS	[ ][ ]	[ ][ ]
Food 8 Onions=OG	[ ][ ]	[[[ ]
Food 9 Legumes=LG	[ ][ ]	[ ][ ]
Food 10 Bread=BD	[ ][ ]	[ ][ ]
Food 11 Fruit=FR	[ ][ ]	[ ][ ]
Food 12 Spinach=SP	[ ][ ]	[ ][ ]
Food 13 Wild Greens=W	[ ][ ]	[ ][ ]
Food 14 Oranges=O	[ ][ ]	[ ][ ]
Food 15 uncooked vegetables=VG	[ ][ ]	[ ][ ]

For each food avoided,enter abbreviated reason why food is avoided into boxes labelled "REASON" for each corresponding food.

REASON

Weight loss= WT	Arthritis=AR
Health=H	Chewing problem=TH
Diabetes=D	Dislike=DK
Blood Pressure=E	Too acid=AC
Cholesterol=CH	Heart disease=HD
Stomach problems=ST	Gall stones=GS
Intestinal problems=GI	Uric acid=UA
DR=diarrhoea	Religious=R
Kidneys=K	

APP56Long How long have you been avoiding these foods (in years)? [ ][ ]

EATING ENVIRONMENT

DH57 Who usually prepares most of your meals?
1. myself
2. spouse
3. relative\friend\neighbour
4. welfare or voluntary help
5. privately employed help
6. I receive meals on wheels
7. other specify.......................... [ ]

DH57MOW	If you receive meals on meals, how many days a week do you get them?	[ ]
DH58	How often do you eat with others? 1. I normally eat alone 2. 2–3 times a week 3. daily	[ ]
DH58alone	If you eat alone,how many years have you been eating alone?	[ ][ ]
DH59	When you eat with others,how many people are usually present at:	

		Breakfast	Lunch	Dinner
DH59CH	Number of children	[ ][ ]	[ ][ ]	[ ][ ]
DH59M	Number of men	[ ][ ]	[ ][ ]	[ ][ ]
DH59W	Number of women	[ ][ ]	[ ][ ]	[ ][ ]

EATING OUT

DH60	How often do you eat away from home (e.g friends home,restaurant,tavern)? 1. daily 2. 3–4 times a week 3. 1–2 times a week 4. 1–2 a month 5. less than once a month 6. never	[ ]
DH60Place	In what type of place do you mostly eat? 1. tavern 2. restaurant 3. friend's/relative's home 4. pub 5. other specify.................................	[ ]
DH60Food	When you go out, what kind of food do you usually eat? 1. snack\small meal e.g sandwich 2. main meal e.g meat,fish 3. tripe (patsa)....................... 4. other specify.......................	[ ]

Interviewer: Please describe the following:
a) Eating utensils used?...
....

b) What are the "table" practices e.g sharing and serving of food?..
....
....
....
c) What kind of cooking/serving/eating vessels are used e.g copper, clay, aluminium?...................
....

FOOD PURCHASE

DH61 What proportion of the food you eat comes from:

Code:
1. all
2. most
3. some
4. none

a. your garden or land [ ]
b. receiving food for a job done [ ]
c. exchanging food for food [ ]
d. a shop [ ]

DH61Shop Are the shops where you can purchase food, within walking distance?
1. Yes
2. No
3. Some [ ]

DH62 Do you do any shopping for food?
1. Yes
2. No [ ]

DH62WHY If no,why?
1. someone else goes for me,but I can go if I had to
2. I am too weak to go
3. the shops are too far away
4. other specify.............................. [ ]

DH62WHO If no,who goes shopping for you?
1.spouse
2.child
3.grandchild
4.friend/relative
5.neighbour
6.paid help
7.other specify...................... [ ]

DH64A Is there someone in the household watching the food they eat ?
1.Yes
2.No [ ]

DH64B If yes, why?
(use "reason" codes as for APP56,p20) [ ][ ]

STORAGE AND COOKING FACILITIES

DH65 Do you have any of the following:

Code: 1.Yes
2.No

a. stove [ ]
b. oven [ ]
c. fridge [ ]
d. TV [ ]
e. radio [ ]
f. telephone [ ]
g. toilet [ ]
h. hot water [ ]
i. microwave [ ]
j. freezer [ ]

k. other specify................................ [ ]

Interviewer: What fuels are used for cooking and is there a limited supply e.g coal, wood, gas?

....

FOOD AND RELIGION

DH66 How many days of the year do you fast for:

DH66East	Easter	[ ][ ]
DH66Xmas	Christmas	[ ][ ]
DH66Mary	Virgin Mary	[ ][ ]
DH66When	Other specify..	[ ][ ]
DH66Day	For how many days?	[ ][ ]

DH66WedFri Do you fast every Wednesday and/or Friday?
1. Yes
2. No [ ]

DH67A Apart from the days when you are fasting,are there days when you eat very little?
1. Yes
2. No [ ]

DH67B If yes,how many days a week? [ ]

FAT AND SALT

DH68	Do you eat the fat on meat? 1. usually 2. occasionally 3. rarely 4. not applicable	[ ]
DH69	Do you eat the skin on chicken? 1. usually 2. occasionally 3. rarely 4. not applicable	[ ]
DH70	Do you add salt or stock cubes to food whilst cooking? 1. No 2. Sometimes 3. Most of the times	[ ]
DH71	Do you add salt to your food at the table? 1. No 2. Sometimes 3. Most of the times	[ ]
DH72	How much oil is used **per week** per adult in this household? Divide weekly household disappearance of oil by number of adults in household. Code in grams: 150 (<1/4 litre) 250 (1/4 litre) 500 (1/2 litre) 1000 (1 litre)	
DH72Olive	Olive oil	[ ][ ][ ][ ]
DH72Sunflw	Sunflower oil	[ ][ ][ ][ ]
DH72Corn	Corn oil	[ ][ ][ ][ ]
DH72Veg	Vegetable oil	[ ][ ][ ][ ]
DH72OT	Other specify	[ ][ ][ ][ ]
DH72Tbs **DH27Tsp**	How many tablespoons OR teaspoons of oil would you have daily (rough guess)?	[ ][·] [ ][·]
DH73	How much margarine/butter/lard is **used per week** in this household? Divide household disappearance with number of adults in household. Code in grams: 30 (1-2 Tablespoons) 120 (4-8 Tablespoons) 250 (1/2 tub) 500 (1 tub)	

DH73Butter	Butter	[ ][ ][ ]
DH73Tmrg	Table Margarine	[ ][ ][ ]
DH73Pmrg	Polyunsaturated Margarine	[ ][ ][ ]
DH73Lard	Lard/dripping	[ ][ ][ ]
DH73OT	Other specify.....................	[ ][ ][ ]
	How many teaspoons of	
DH73Martsp	margarine	[ ][ ]
DH73Buttsp	butter	[ ][ ]
	would you have daily (rough guess)?	

COOKING METHODS

DH74 How do you usually cook or eat your vegetables?

Code: 1. Yes
2. No

DH74cook	1.boiled	[ ]
DH74stem	2.steamed	[ ]
DH74mico	3.microwaved	[ ]
DH74stew	4.casseroled	[ ]
DH74frid	5.fried	[ ]
DH74owen	6.roasted,baked	[ ]
DH74raw	7.raw,salad	[ ]

DH75 How do you usually cook or eat meat, fish or chicken?

Code: 1. Yes
2. No

DH74cook	1. boiled	[ ]
DH74stem	2. steamed	[ ]
DH74mico	3. microwaved	[ ]
DH74stew	4. casseroled	[ ]
DH74frid	5. fried	[ ]
DH74owen	6. roasted,baked	[ ]
DH74stek	7. grilled	[ ]
DH74BBQ	8. BBQ	[ ]

ALCOHOL

DH76A	Do you drink beer,wine or spirits at least monthly (if less than once a month answer "NO")? 1. Yes 2. No	[ ]
DH76A	If yes,how often do you drink: Code: enter ml per day (divide by appropriate factor if not consumed daily)	
DH76Lobeer	Low alcohol beer 1 glass=200ml	[ ][ ][ ][ ]
DH76Beer	Beer or alcoholic cider 1 glass=200ml	[ ][ ][ ][ ]
DH76Wine	Wine or Retsina 1 glass=100ml	[ ][ ][ ][ ]
DH76Sherry	Port or Sherry 1 glass=60ml	[ ][ ][ ][ ]
DH76Spirit	Spirit or Liquer 1 glass=30ml	[ ][ ][ ][ ]
DH76B	How many years have you been drinking this much?	
	YearsA wine	[ ][ ]
	YearsB beer	[ ][ ]
	YearsC port/sherry	[ ][ ]
	YearsD spirit	[ ][ ]
DH76C	How much were you drinking prior to this or if you do not drink now, how much were you drinking in the past?	
	PriorA wine	[ ][ ][ ][ ]
	PriorB beer	[ ][ ][ ][ ]
	PriorC port/sherry	[ ][ ][ ][ ]
	PriorD spirit	[ ][ ][ ][ ]
DH76D	For how many years did you drink this much?	
	YearsA wine	[ ][ ]
	YearsB beer	[ ][ ]
	YearsC port/sherry	[ ][ ]
	YearsD spirit	[ ][ ]
DH76E	Do you think alcohol is good for one's health? 1. Yes 2. No	[ ]
DH76Yes	If yes,how much do you think is good?	[ ][ ][ ]

FOOD BELIEFS

Are there any foods you think are good for health?

Are there any foods you think are bad for health?

Do you know of any foods that can treat (i.e be used as medicine) any health problems?

Why do you think you have survived to later life and others have not?

What foods are good/bad for children?

Were you fed these foods as a child?

What foods are good/bad for pregnant mothers?

Did you eat these foods when you were pregnant?

What foods are particularly good for people your age?

What foods are particularly bad for people your age?

What hard times can you remember where there was a shortage of food e.g drought,famine,war,poverty? What foods did you eat and for how long?