



CONCLUSIONS, OPPORTUNITIES AND RECOMMENDATIONS

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32.1 HISTORY

Interests in the cultural diversity of different communities of elderly people and the implications of this diversity for health, have now taken considerable momentum. Consequently it has been possible to bring together, in largely descriptive terms, the experience and findings of several research groups around the world, in the one book. Towards the end of the 20th century, we can now gain an appreciation of the way in which elderly people, born early this century, are presently eating. We cannot, regrettably, easily retrieve information about what their counterparts, who have died before them, ate.

This publication comes at a time when the age structure of the world is rapidly changing towards one which is more elderly. More and more health resources are inevitably being directed towards the health care of elderly people. Opportunities for health prevention will be increasingly sought after, and it is reasonable to consider the extent to which life long practices may be adjusted with health benefit.

This report represents the work and interests of a consortium of investigators who wish to ensure that any effort to make adjustments to the food intake of elderly people does not outweigh the benefits of adhering to traditional food habits and lifestyle. The historical point which these investigators have reached is that some hypotheses are being tested and many more are being identified for future testing. Scientifically-based health care does the best it can, but is also has the task to gather as much evidence as it can.

32.2 OBJECTIVES

The broad objectives of characterising elderly communities as far as their food intakes and health profiles are concerned, and of providing instruments whereby other communities may engage in evaluating their health relationships, are fulfilled by the present reports. However, there is much methodological critique within the pages of this book and this will serve to enrich and make more rewarding any future studies. Again, the scene is now set for the communities already studied to participate in longitudinal evaluation of food health relationships.

32.3 MAIN FINDINGS

"Food Habits in Later Life" has drawn together the findings of 13 communities studied to varied extents by a protocol devised by the IUNS committee on "Nutrition and Ageing". Additionally, similar studies have been undertaken by SENECA (19), Horwath and colleagues in Australia and New Zealand (2), and the Institute of Nutrition and Food Hygiene in Beijing (6), comprising 27 study centres in all.

The value of the present book is that it brought together variables from all of these centres for comparison. The variables covered socio-demography, life-style, well-being, health status, food intake, and nutrient intake. The compilation provides the opportunity to consider the interplay between these categories of variables, in particular those pertaining to food and health.

The purposes of the present work and report are:

- 1) to document the food and health situation and historical points for as many disparate communities as possible for the record,
- 2) to provide reference point and methodology for other communities interested in establishing food-health relationships,
- 3) to provide the basis for the examination of food and nutrient intake as determinants of health status, allowing the relative importance of other variables, and
- 4) to provide the basis for the ongoing review of a number of rather different communities of elderly people.

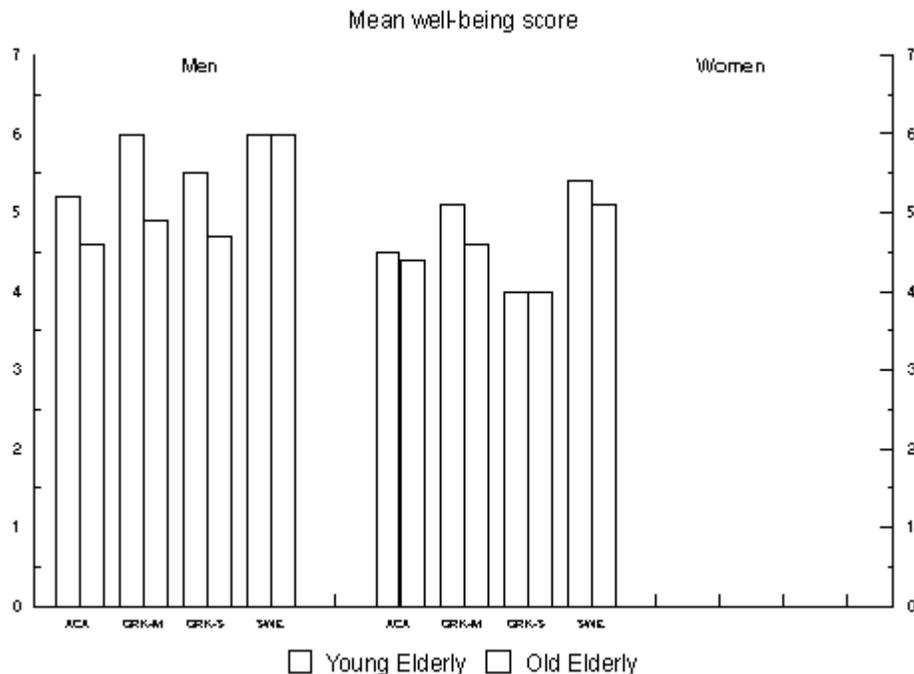
The hypotheses in the mind of the investigators have, we assess, in part been fulfilled. The principal one is that it is possible for comparable health status to be achieved by people in later life, having eaten, and continuing to eat in quite different ways from each other. We cannot, however comment on the nature of survivorship from a nutritional point of view for those who die prematurely, before the age of 70, or before the upper age stratum in a community where life expectancy is relatively short. Nevertheless, our premise is that achievement of optimum health status by nutritional means, is worthy of consideration among the aged in its own right. The limitations of the reported project principally relate to their cross-sectionality and, wherever possible, opportunity is being taken to continue observations in study communities in a longitudinal fashion. We summarise the findings of these studies and draw conclusions on the basis of methodologies which are, at access to the communities wherever possible, socio-anthropologic (RAP) and, then, questionnaire in type with cross-checking by informants and investigators.

32.3.1 Health status

32.3.1.1 Well-being

In a comparison of the Anglo-Celtic Australians, Greek Australians, Greeks in Spata and Swedes in Gothenburg, it was found that, in general, the men had a higher well-being score than the women, and young elderly (age group 70 to 79 years) had a higher score than the old elderly. Melbourne Greek and Swedish men had the highest well-being score of all the communities where the score was obtained (Figure 32.1).

Figure 32.1. Mean well-being score, by study community, age group and gender.

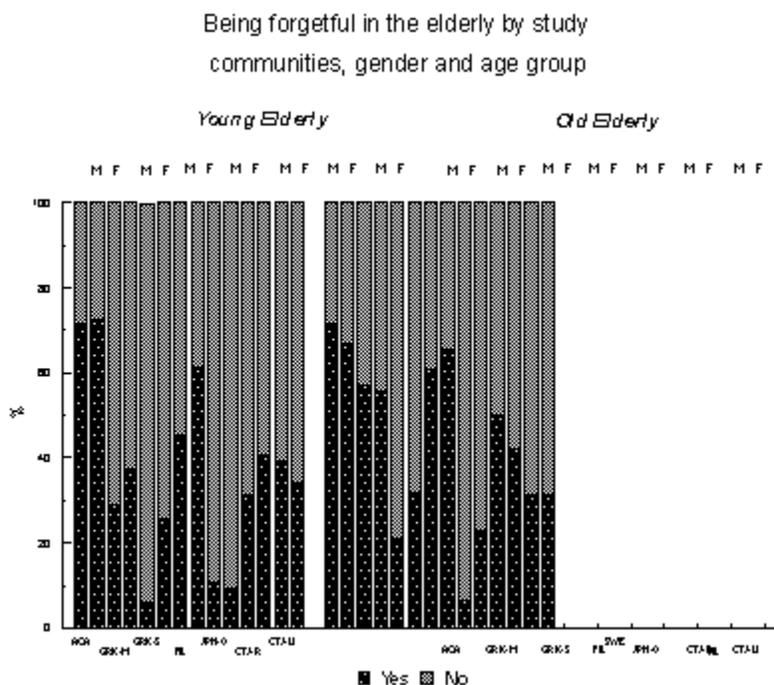


32.3.1.2 Mental status

About 80% of the young and old elderly in all study communities reported being happy, the only exception being Greek elderly in Spata, where 50 to 60% reported happiness. On the other hand, 20 to 30% of the elderly reported feeling sad or depressed, except Spata and Japanese women (50%). Overall, a greater proportion of women reported feeling depressed or sad compared with the men.

It can be concluded that, in the main, whatever their circumstances, disability, or disease profile, elderly people regarded themselves as being happy. A greater proportion of Anglo-Celtic elderly (70%) reported being more forgetful, followed by Filipinos (60%), Greeks in Melbourne (50%), Greeks in Spata and Chinese elderly (30%). Only 10% of the Japanese elderly reported being forgetful.

Figure 32.2.



32.3.1.3 Physical disability

We used the activities of daily living (ADL) score to indicate how spared elderly people were of disability. This score could only be computed in the Caucasian elderly. The maximum score possible was 62. Men generally had scores above 55. Women tended to have lower scores, but even here the lowest was 49 amongst older Greek women in Melbourne. In support of the ADL score, enquiry about difficulty walking between rooms revealed that it was unusual for more than 15% of the elderly to have difficulty. Although it was found that the proportion of Greek women had a greater experience of difficulty, this may reflect a lesser degree of institutionalised elderly amongst these people in comparison with some other communities.

32.3.1.4 Self-reported health

We graded self-reported health status into poor, fair, good, and excellent. Combining good and excellent together, Greeks in Melbourne and Chinese in Tianjin, whether rural or urban, rated their health best. Those who rated least well were Filipinos in Manila and Japanese in Okazaki. Men also tended to rate their health better than the women especially in the older age group. This gender difference was particularly evident in the Greek and Swedish elderly. It would seem that elderly people do not have to have a sense of good health to feel happy.

Rheumatism and/or arthritis, hypertension, 'heart trouble', diabetes and stroke were disorders most commonly reported in the elderly communities studied. Rheumatic disorders are a significant source of morbidity for 40 to 60% of the Anglo-Celtic, Greek and Filipino elderly, compared with only 10% of the Swedes, Chinese and Japanese elderly. Rheumatism appeared to be more frequently reported by women than by men. Self-reported hypertension ranged from 30 to 55% in the Caucasian communities and below 30% for most Asian communities. Japanese men reported the lowest rates of hypertension (5 to 10%). Women were more likely to report hypertension compared to the men, especially Anglo-Celtic, Greeks and Filipinos.

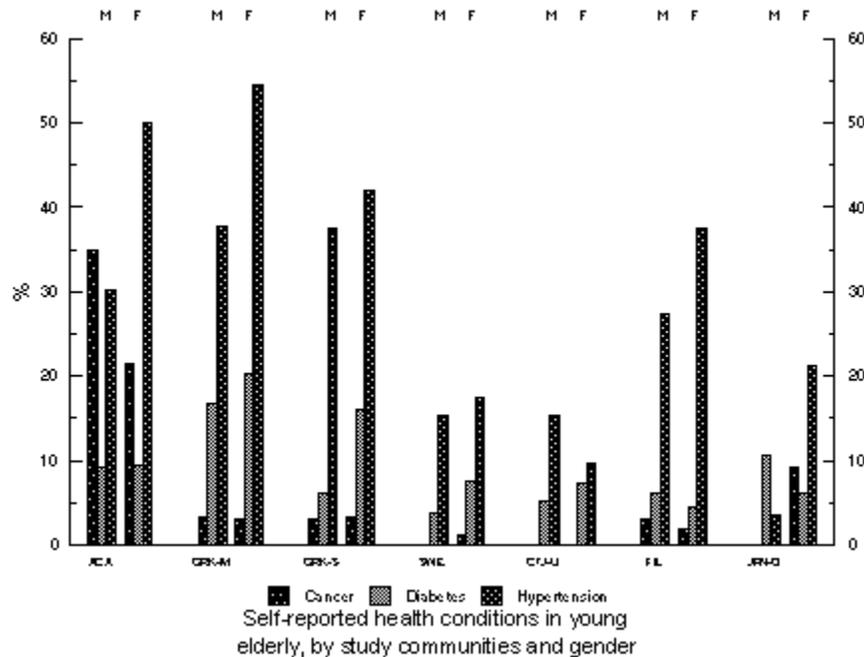
Self-reported stroke ranged between 5 to 10%. Rural Chinese in Tianjin reported the highest rates (30%), followed by Japanese men (15%) and Spata women (15%). Anglo-Celtic men had higher reported stroke rates than their female counterparts. In contrast, Greek and Filipino women reported higher stroke rates than the men. Self-reported stroke appeared to be higher in the age group 80 years and over, especially by men.

Although self-reported hypertension was greater amongst Anglo-Celtic and Greeks subjects, stroke rates were comparably lower than the Asian communities which did not tend to report hypertension. The reasons for this may be complicated insofar as there may be greater recognition and treatment of hypertension amongst the Caucasian communities.

Anglo-Celtic men aged 70 to 79 years had the highest self-reported rate of heart disease (60%), followed by Greek women in Melbourne aged 80 years and over (50%) and Swedish women aged 80 years and over (45%). About 20 to 30% of the remaining subjects reported having heart problems. Rural Chinese and Japanese subjects reported the lowest rates of heart problems (less than 10%).

The self-reported prevalence of diabetes was as high as 20% amongst older Anglo-Celtic and Greek women, in each case higher than for men. Of the men, Greek Australians had the highest prevalence of diabetes (17%), followed by Japanese men aged 70 to 79 years (15%). The diabetes prevalence amongst the Chinese, Filipinos and Japanese was about 5 to 10%. Amongst Caucasian, Swedish elderly had the lowest prevalence of diabetes, comparable to Asians. Overall, the prevalence of diabetes appeared greater in the women compared to the men and in those aged 80 years and over.

Figure 32.3. Prevalence of the self-reported diabetes, cancer, hypertension, by study community, age group and gender, for young elderly.



The cancer prevalence amongst the elderly Anglo-Celtic individuals were the highest amongst all communities studied (30%). This is probably attributable to the fact that skin cancer prevalence of Anglo-Celtic Australians is high by international comparisons. We asked about broken bones as an indirect index of osteoporosis and tendency to fall amongst the elderly. It was of interest that amongst the younger elderly, Anglo-Celtics had the highest prevalence of fractures (30 to 40%), followed by Greek, Swedes and Japanese men and women. Chinese and Filipino elderly reported low fracture rates, less than 5%. Older Japanese elderly had an appreciably higher fracture rate compared with their younger counterparts.

Apart from lower rates amongst the Chinese (less than 5%) and higher rates amongst Anglo-Celtic women (35%), the prevalence of self-reported cataracts was between 10 to 20% for the younger elderly. Self-reported cataracts increased significantly to about 40% in the older age group.

32.3.2 Lifestyle

32.3.2.1 Social factors

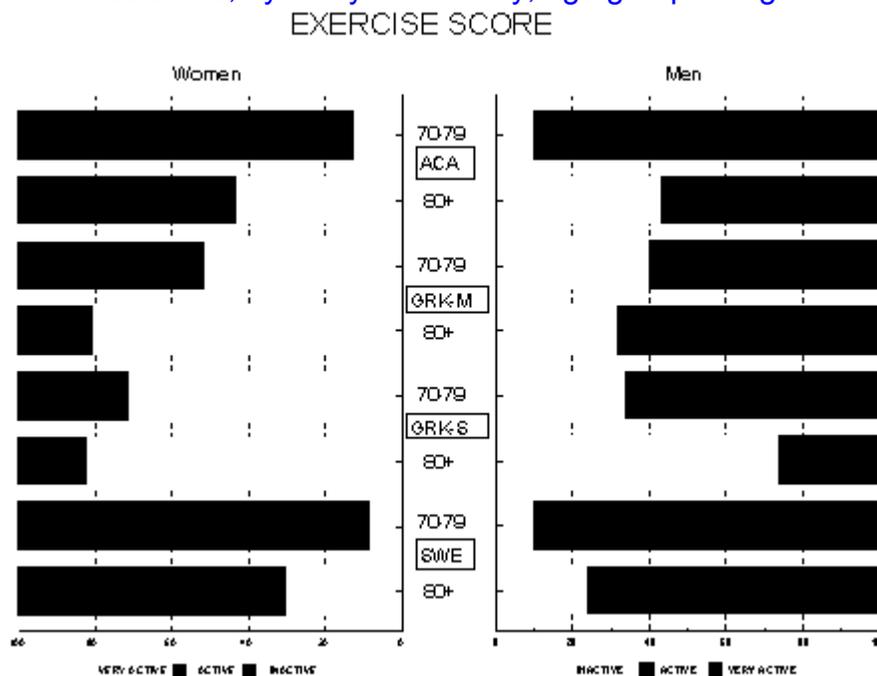
The largest proportion of elderly reporting to have someone to confide in were the Greek subjects (90%), followed by Anglo-Celtic, Swedish and Japanese elderly (80%), and lastly Filipino elderly (30%). However, when questioned about feeling lonely, Greek elderly in Melbourne (especially women) reported the greatest frequency of loneliness (20%) whereas

Anglo-Celtic and Filipino elderly were less likely to report feeling lonely very often. Similarly, less than 10% of the Swedes, Chinese and Japanese reported feeling lonely very often.

32.3.2.2 Physical activity

The exercise score could only be computed for the Caucasian elderly and the Japanese. Overall, the least active appeared to be Melbourne and Spata Greeks, especially the women, with only 10% defined as very active; except 40% of Spata men were defined as very active due to their farming activities. Anglo-Celtic and Swedish elderly appeared to be the most active with 40% being defined as very active. The Japanese elderly appeared to be moderately active (Figure 32.4).

Figure 32.4. Exercise score, by study community, age group and gender.



32.3.2.3 Sleep

Overall sleeping disorders were reported more often by women (20 to 30%) than by men (5 to 15%). However, the duration of sleep for about 80% of the subjects exceeded six hours a night. We have separate data on siestas where this is culturally applicable.

32.3.3 Nutritional status

32.3.3.1 Food beliefs

Of the communities studied, food beliefs were most commonly held by Greeks in Melbourne and Spata. These applied to each of the major food categories, namely cereals, dairy products, fish, fruit, legumes, meat and vegetables. We categorized food beliefs into those foods considered 'good' for health and 'bad' for health. Swedes were next most commonly engaged in food beliefs, which, interestingly applied to traditional food commodities. It must be acknowledged that there appeared to be considerable variation with respect to the degree of in-depth enquiry performed by study investigators. For example, amongst the Chinese in rural and urban Tianjin, food beliefs were reported by less than 25%, yet the Chinese culture is well known for its strongly held and structured food-health beliefs.

32.3.3.2 Food intake

Total food intake (excluding fluid) was about 1500 grams per day for the Caucasian men and 1300 grams per day for the women. Asian men consumed about 1000 gram per day of solid food and women about 700 grams per day. Rural Greeks in Spata and rural Chinese in Tianjin consumed about 300 grams less food daily than their urban counterparts.

Marked differences were observed in the types and quantities of foods consumed. Mean daily intake of cereals was highest amongst Chinese elderly (350 grams per day), followed by Greeks (250 grams per day), Swedes and Anglo-Celtics (200 grams per day). Total vegetable intake was highest amongst Greeks in Melbourne (355 grams per day for men and 300 grams per day for women), followed by Anglo-Celtic Australians (350 grams per day for men and 320 grams per day for women) and Swedes (330 grams per day for men and 320 grams per day for women). Greeks in Greece (280 grams per day for men and 220 grams per day for women), Chinese in Beijing (292 grams per day for men and 244 grams per day for women) and Chinese in urban Tianjin (296 grams per day for men and 257 grams per day for women) had similar intakes of vegetables. Chinese in rural Tianjin had the lowest intakes of vegetables (210 grams per day for men and 190 grams per day for women).

Anglo-Celtic elderly had the highest mean fresh fruit intake (200 to 300 grams per day), followed by Greeks and Swedes (200 grams per day), Japanese and Beijing Chinese (100 grams per day) and Tianjin Chinese (less than 50 grams per day). Caucasian elderly (especially in Australia) generally consumed almost three times as much meat (100 to 150 grams per day) as Asian elderly (30 to 40 grams per day). Anglo-Celtic elderly consumed little fish or shellfish (less than 20 grams per day) compared with Greek Australians (60 grams per day) and Swedes (90 grams per day). Japanese and Chinese elderly in Beijing also had high fish intakes (60 to 80 grams per day) compared to Tianjin elderly (less than 20 grams per day).

Mean daily intake of milk and milk products was greatest amongst the Swedes (400 grams per day), followed by Anglo-Celtics (300 grams per day), Greeks in Melbourne (200 grams per day), Greeks in Spata, Chinese in Beijing and Japanese (150 grams per day) lastly Chinese in `Tianjin

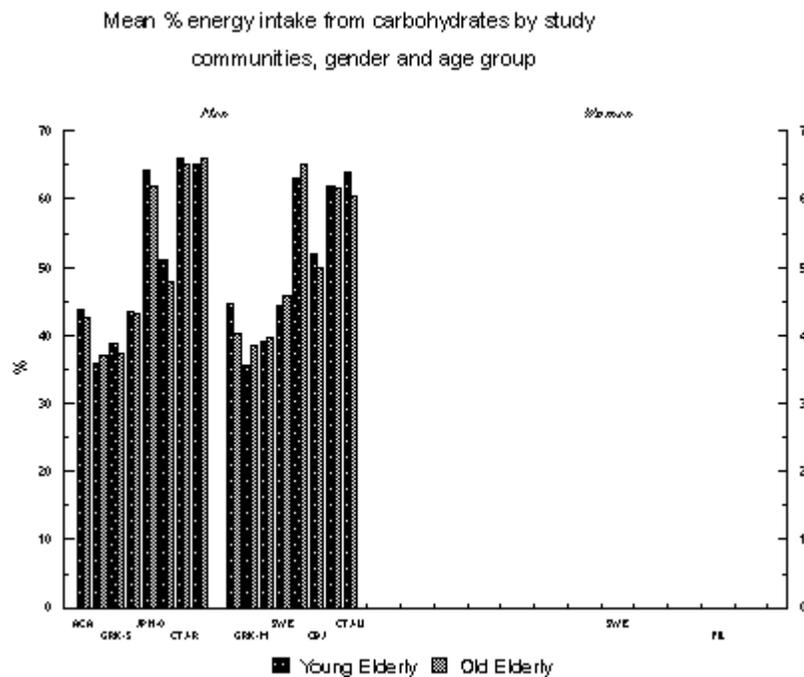
(less than 100 grams per day).

32.3.3.3 Energy & Macronutrient intake

Mean energy intake for the Caucasian men ranged between 2200 kcal per day (Greek and Anglo-Celtic) and 2700 kcal per day (Swedes). Japanese and Chinese men had energy intakes between 1700 kcal per day and 2000 kcal per day. Of the Caucasian women, Swedes had the highest energy intake (2500 kcal per day), followed by Anglo-Celtic (2100 kcal per day), Greek Australians (1900 kcal) and Spata women (1700 kcal per day). The Chinese and Japanese women had average energy intakes of about 1700 kcal per day.

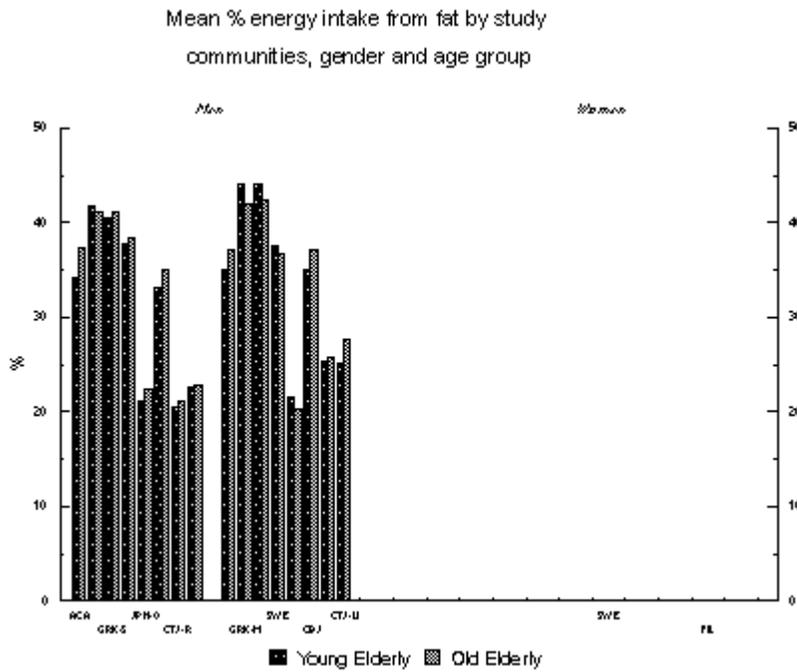
Mean percentage energy intake from carbohydrates was high amongst Japanese and Chinese elderly (55 to 65%) compared with Caucasian elderly (38 to 45%). Greek elderly had the lowest mean percentage from carbohydrates (38%).

Figure 32.5.



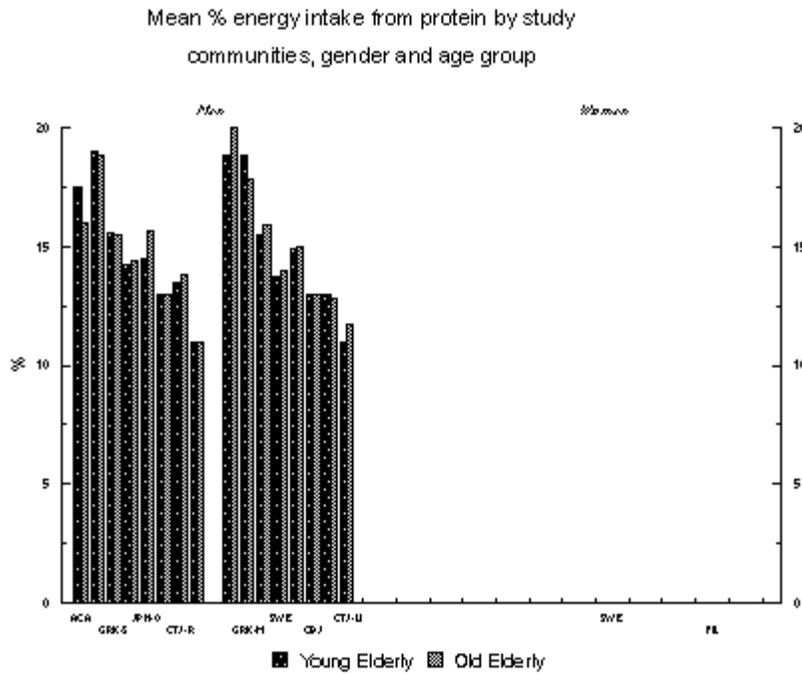
Mean percentage energy intake from fat was high amongst Caucasian elderly (35 to 43%) compared with Chinese and Japanese elderly (20 to 25%). Of the Caucasian elderly, Greek subjects had the highest mean percentage energy from fat (42%) and the Anglo-Celtics the lowest (35%). Of the Asian elderly, Beijing Chinese had the highest percentages of energy from fat (35%). Overall, the women appeared to have a greater proportion of their energy intake from fat compared with the men.

Figure 32.6.



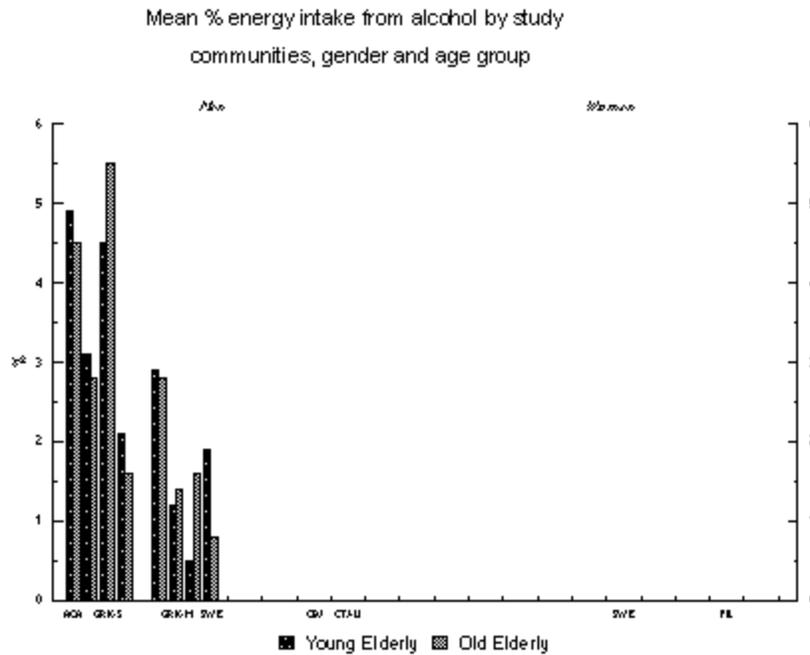
The Anglo-Celtic and Greeks in Melbourne had the highest percentage of energy from protein (18%), followed by Greeks in Spata (16%), Japanese (15%), Swedes (14%) and Chinese (12%).

Figure 32.7.



Spata and Anglo-Celtic men had the highest percentage of energy intake from alcohol (5%), followed by Greek men in Melbourne (3%), Anglo-Celtic women (3%), Swedish men (2%), and Greek and Swedish women (1.5%).

Figure 32.8.

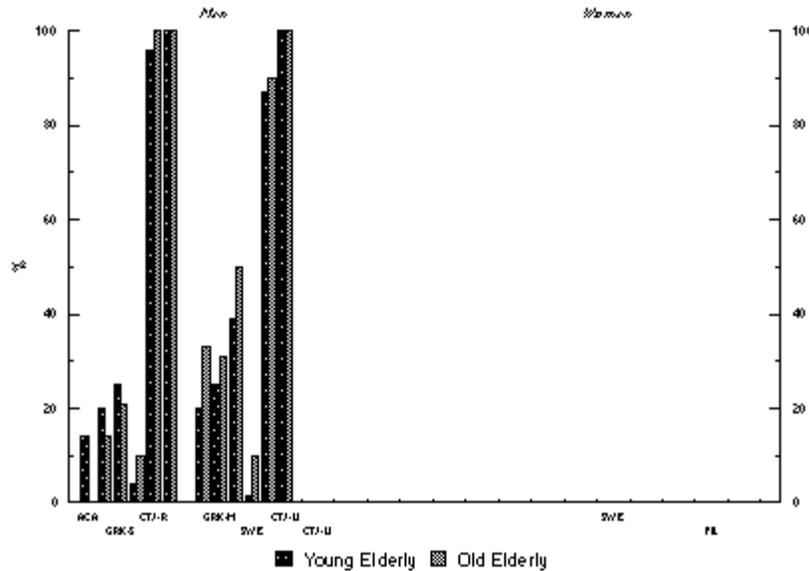


32.3.3.4 Micronutrient intake

Almost 100 per cent of the Chinese elderly did not achieve two thirds of the US RDA for calcium, followed by Greek (30 to 50%) and Anglo-Celtic women (20%). Less than 5% of Swedish elderly did not achieve two thirds of the US RDA. Overall, a greater proportion of women appeared to have mean calcium intakes lower than the men.

Figure 32.9.

Percentage below two thirds of the US RDA - CALCIUM
by study communities, gender and age group



Iron intake appeared adequate in most study communities, with less than 5% of the subjects having intakes below two thirds of the US RDA. In contrast, a greater proportion of elderly (especially women) appeared to have inadequate zinc intakes. About 20 to 30% of Anglo-Celtic men and women, Spata and Swedish women had intakes below two thirds of the US RDA. Melbourne Greek women, Greek and Swedish men had higher zinc intakes (less than 15% had intakes below two thirds of the US RDA).

Figure 32.10.

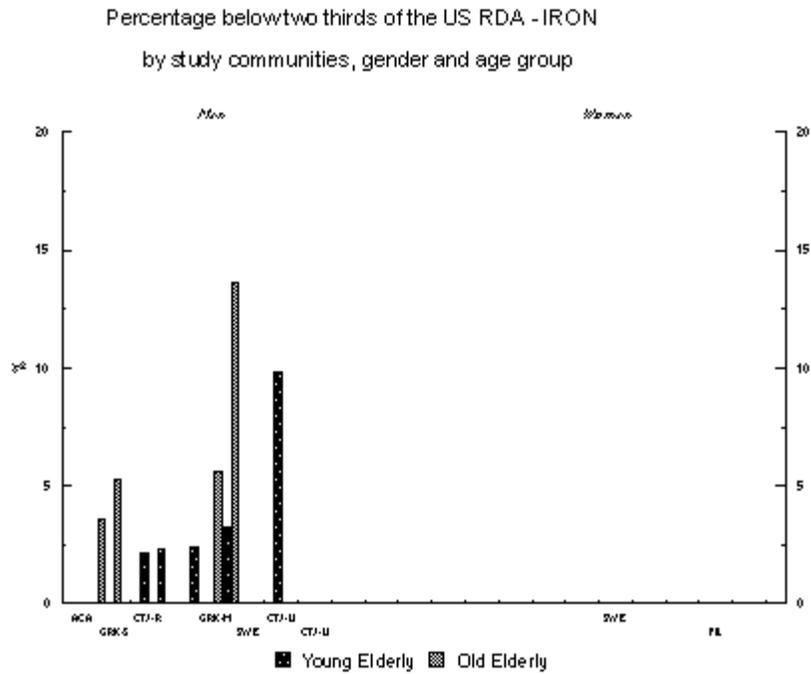
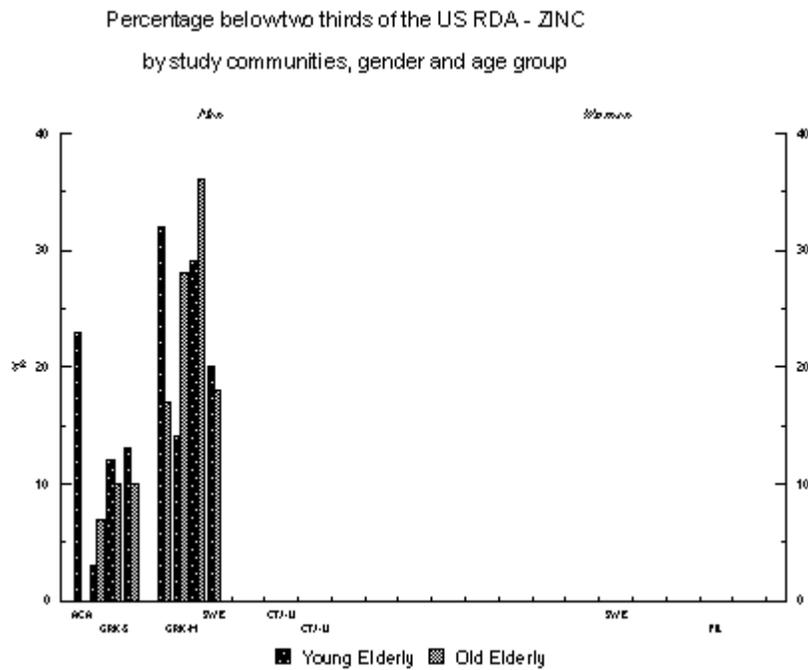


Figure 32.11.



About 10 to 20% of the Anglo-Celtic, Greek Australians and Swedes were not achieving two

thirds of the US RDA for magnesium compared with 40 to 60% of the Spata elderly. Almost 100% the Chinese subjects were not achieving two thirds of the US RDA for vitamin A (retinol equivalent), followed by Greeks in Spata (60%), and Greeks in Melbourne (20%). Less than 10% of Swedes and Anglo-Celtic Australians were not achieving two thirds of the US RDA.

Figure 32.12.

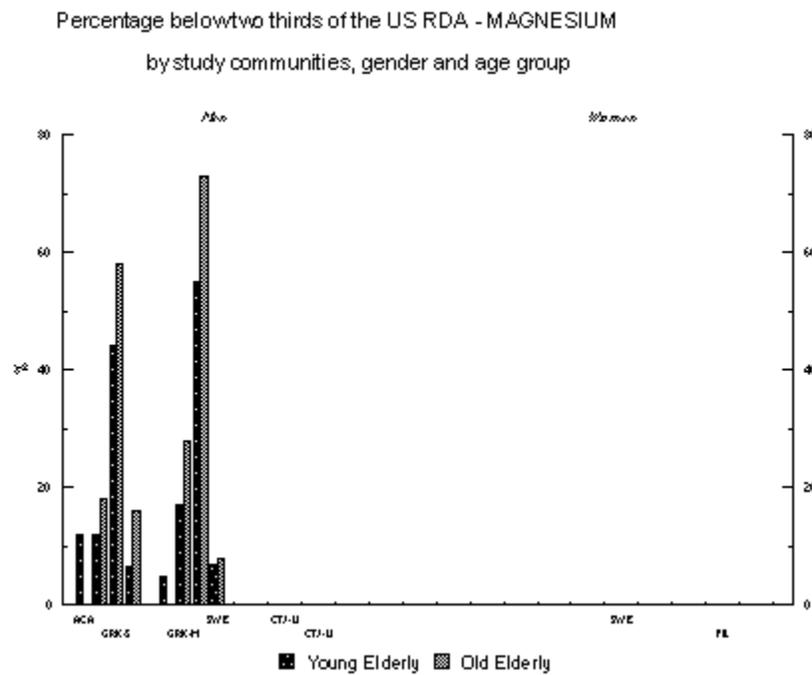
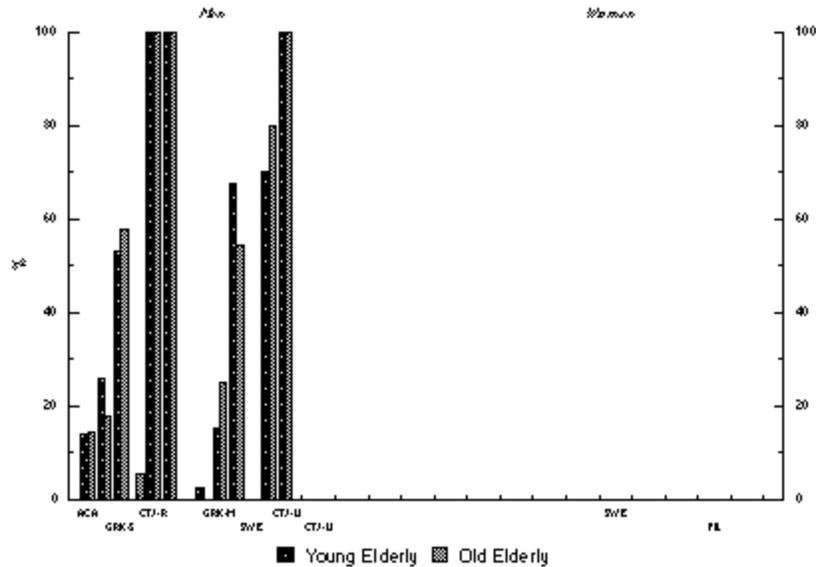


Figure 32.13.

Percentage below two thirds of the US RDA - VITAMIN A
by study communities, gender and age group



Intake of thiamin was particularly high amongst Anglo-Celtics and Swedes, with less than 5% not achieving two thirds of the US RDA. Average daily thiamin intakes were similar amongst the Greeks in Melbourne, the Chinese and the Japanese with 10 to 20% not achieving two thirds of the US RDA. The Greeks in Spata had the lowest thiamin intakes, with 30 to 50% below two thirds of the US RDA. Anglo-Celtic Australians and Swedes had a somewhat higher riboflavin intake compared to other communities. Less than 2% of the subjects did not achieve two thirds of the US RDA. Greek Australians had a higher riboflavin intakes than their counterparts in Greece; only 5% of Melbourne Greeks and 10 to 20% of Spata Greeks did not achieve two thirds of the US RDAs. More than 75% of the Chinese in Tianjin had a intake below two thirds of the US RDA. Most elderly achieved the US RDA for niacin.

Figure 32.14.

Percentage below two thirds of the US RDA - THIAMIN
by study communities, gender and age group

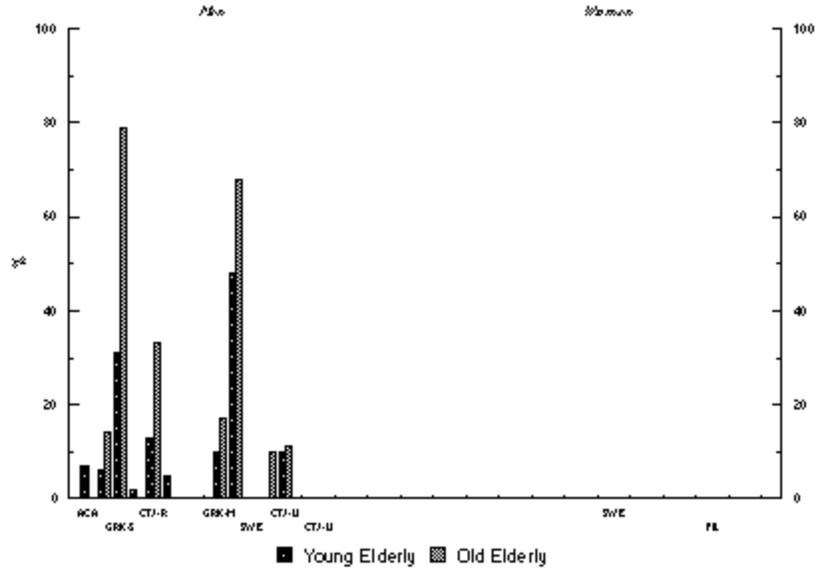
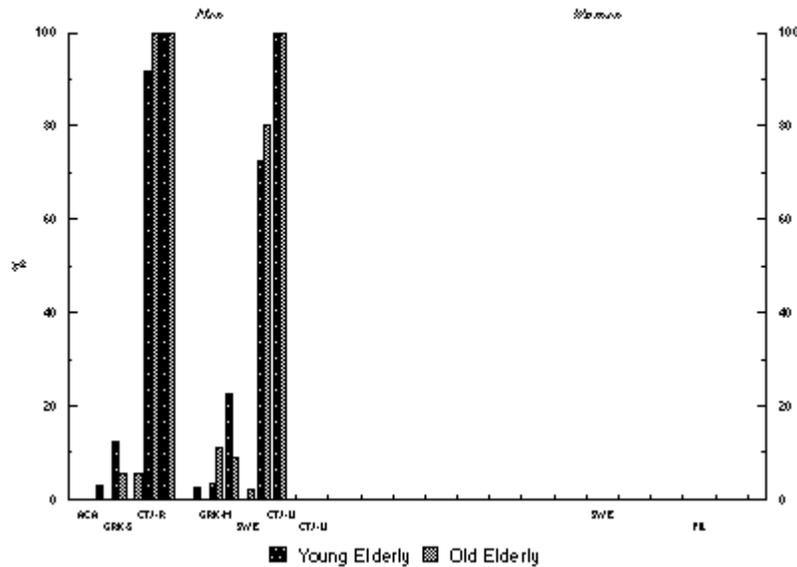


Figure 32.15.

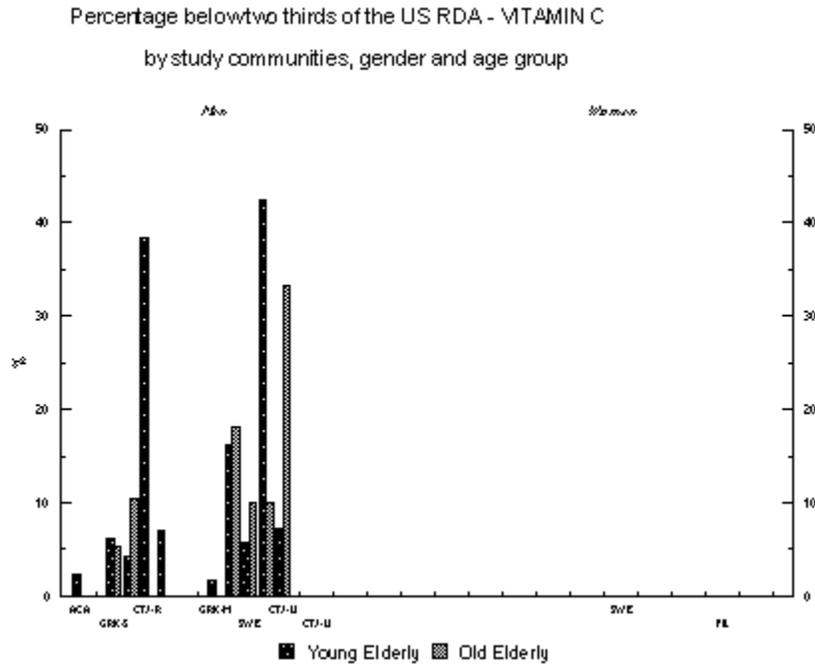
Percentage below two thirds of the US RDA - RIBOFLAVIN
by study communities, gender and age group



The highest mean intakes of vitamin C were observed in the Anglo-Celtic and Greek Australians; none of the subjects had intakes below two thirds of the US RDA. About 5 to 10%

of the Swedish elderly did not achieve two thirds of the US RDA. The Spata Greeks, followed by the Chinese and Japanese elderly, had the lowest mean vitamin C intakes. Spata elderly had lower mean intakes than their counterparts in Melbourne, with 5 to 15% not achieving two thirds of the US RDA. In China, up to 40% of the elderly were not achieving two thirds of the US RDA.

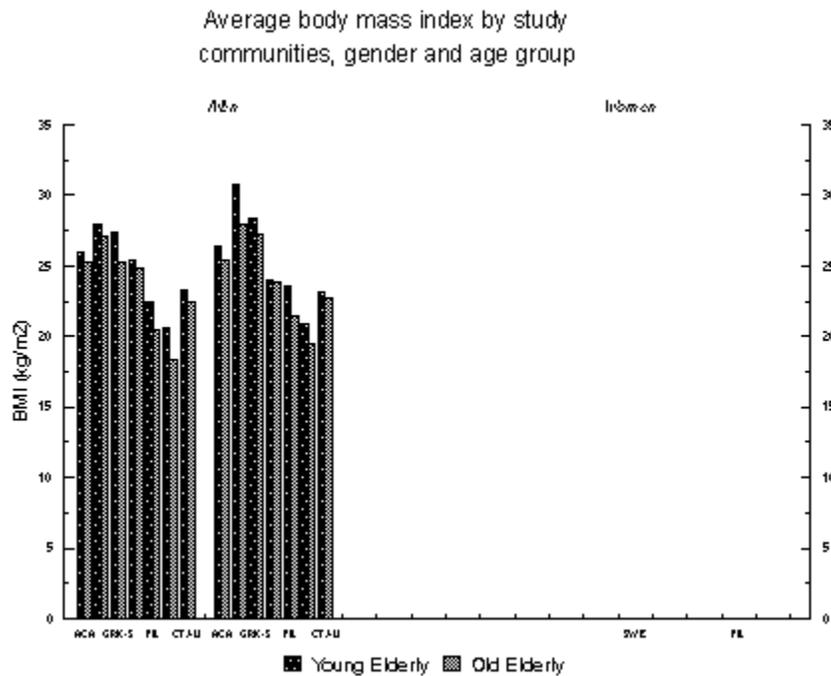
Figure 32.16.



32.3.4 Body Composition

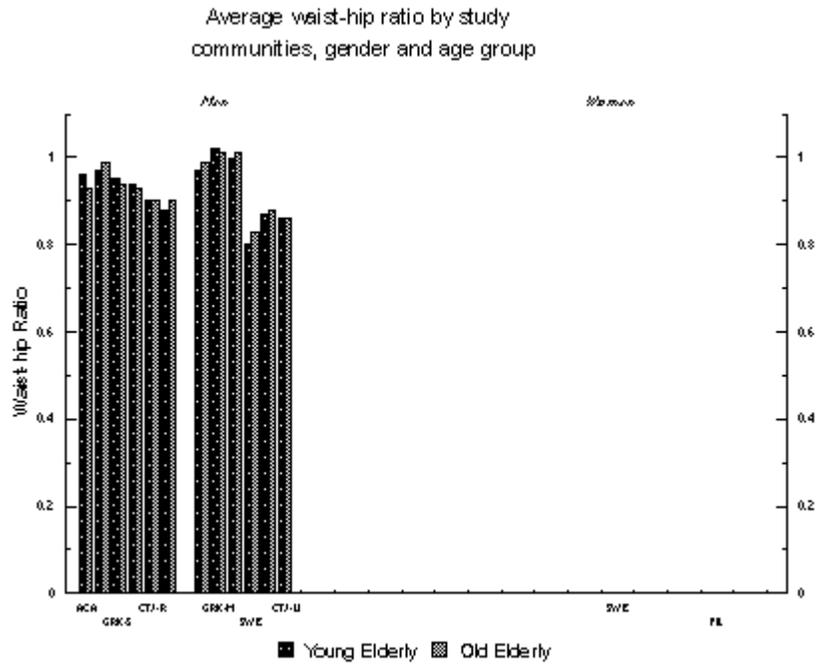
The Greek women in Melbourne had the highest mean body mass index (BMI 30), followed by Greek women in Spata (BMI 29) and Anglo-Celtic women in Melbourne (BMI 27). The remaining Caucasian elderly of both genders had average BMI of about 25. Filipino and Chinese elderly had average BMI between 20 to 22, the rural Chinese having the lowest BMI of all study communities (BMI 19). Overall, the women tended to have higher BMI than the men, and the young elderly had higher BMI than their older counterparts.

Figure 32.17.



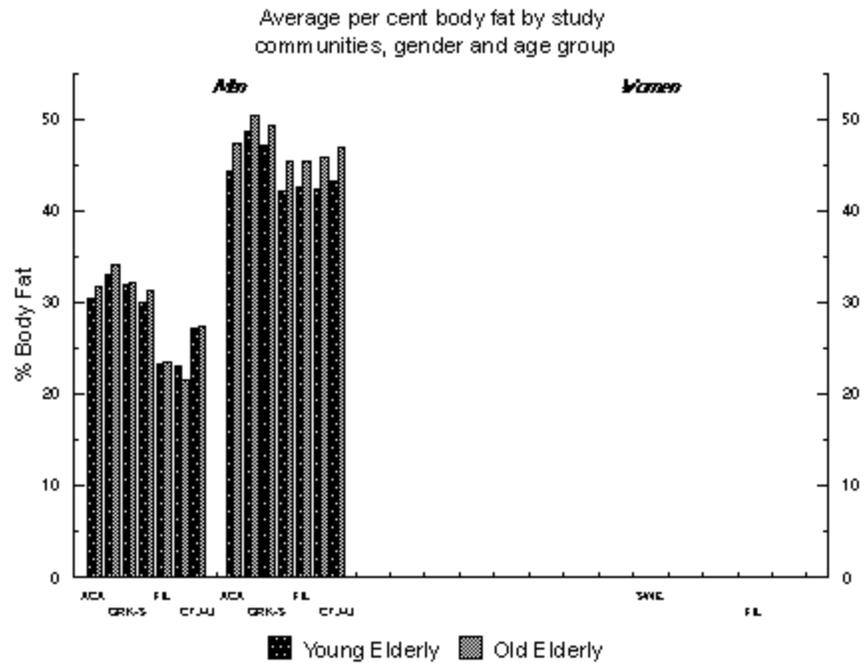
The Greek and Anglo-Celtic women had the highest average WHRs (about 1.1) compared with the Swedish (about 0.8) and Chinese women (about 0.9) and the men. The men in all study communities had average WHR between 0.9 and 0.95.

Figure 32.18.



Average per cent body fat ranged between 43 to 50% in the women and between 25 to 35% in the men. The Greek women in Melbourne had the highest mean percentage of body fat (48%), followed by Greek women in Spata (47%) and Anglo-Celtic women (45%). The Swedish, Chinese and Filipino women had about 43% average body fat. The Caucasian men all had average body fat of about 33%. The Asian men appeared to have markedly lower average percentages of body fat (23%).

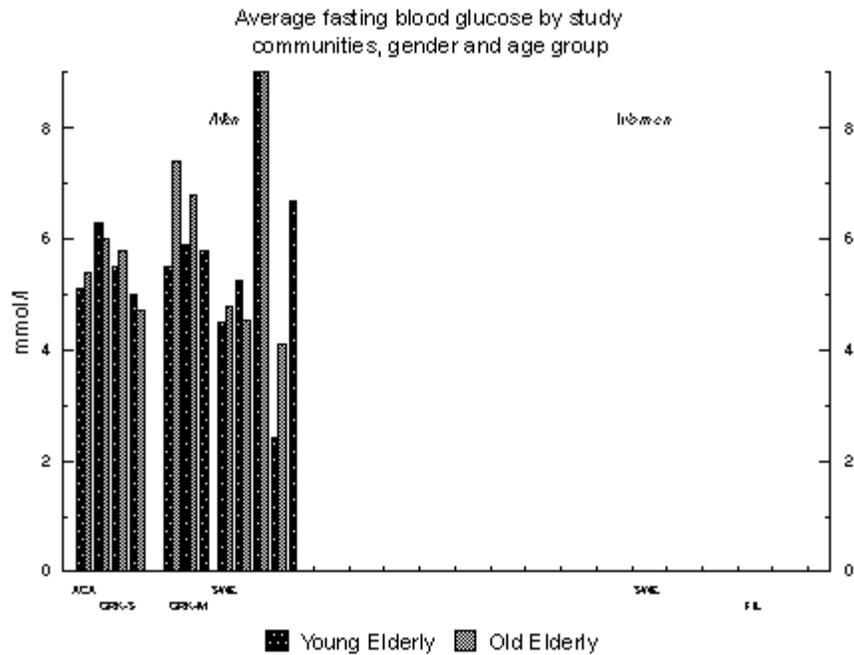
Figure 32.19.



32.3.5 Blood Lipids

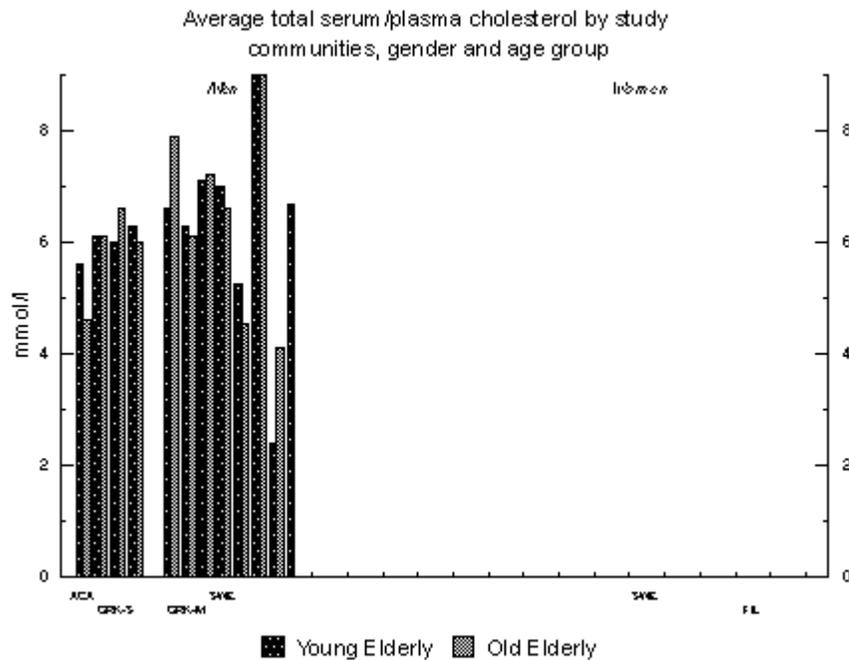
Blood tests were only performed on Caucasian elderly. Average fasting plasma blood glucose was greatest amongst Greeks in Melbourne (6 mmol/L), followed by Greeks in Spata (5.5 mmol/L) and Anglo-Celtic and Swedish elderly (5.0 mmol/L). The women tended to have higher values than the men and the old elderly tended to have higher values than their younger counterparts.

Figure 32.20.



The Anglo-Celtic young elderly men had the lowest average total serum cholesterol (5.8 mmol/L) compared to the other Caucasian communities (6 to 6.5 mmol/L). Cholesterol values tended to be higher amongst the old elderly.

Figure 32.21.



32.3.6 Discussion

The first part of the IUNS study has provided us with a unique data set on health, dietary patterns, social activity and lifestyle in 13 disparate communities. The most striking differences in health profiles and food intake patterns are seen between Caucasian and Asian communities, rather than between individual communities. Notwithstanding the differences in cultural or ethnic background, well-being is comparable and high across all elderly communities. In the main, whatever their circumstances, disability or disease profile, elderly people regarded themselves as happy. Social network and activity levels appeared to account best for sense of well-being in those communities where we were able to examine the relationships. It would seem that elderly people do not need to have a sense of good health to feel happy.

The different dietary methods used on Caucasian elderly and Asian elderly should be taken into account when interpreting the food intake data. The use of 24-hour recall in Chinese and Japanese communities may result in underestimation of food intake, when comparing to data obtained with food frequency questionnaires in the Caucasian communities. The findings described so far will be used in further cross-sectional analyses on the role of differences in dietary habits and nutrition on health, taking into account living habits and lifestyle. The results allow identification of nutritional risk profiles in the elderly, of which the importance and impact on health should be confirmed in a follow-up study. Prospective studies linking dietary intake of nutrients with nutritional status, health, and especially functional capacity, will provide a better understanding of the nutritional requirements of the elderly and the establishment of RDAs and dietary guide-lines for the various subsets of the older population of different ethnicity.

32.4 COMPOSITE LATER LIFE HEALTH STATUS

Health can be viewed in different ways, each of which has its potential importance for elderly people. It can also be evaluated relative to previous life experience, to others within a community or with reference to other communities. The IUNS study has provided opportunities to consider each of these comparisons, although most attention in the present report has been paid to the between-community comparisons in the main text, and the appendices provide for intra-community comparisons.

Overall, elderly people maintain good well-being scores, where they have been measured. Their self-reported health status, may vary widely between and within communities. Whether cause or effect, or association, correlates of health appeared to include social activity, physical activity and medication used.

Body composition disorders (over-fatness, underweight) may in themselves define health status to some extent, contribute to it, or, at least, reflect determinants of it. Communities who have the higher BMIs have more diabetes, as might be expected, with its prospect for increased morbidity, but well-being may not be impaired - an interesting consideration. Those communities with low BMIs may or may not have an increased burden of self-reported health. For example, Filipinos tend to report poor health, rheumatism and hypertension more often than Japanese elderly for similar BMIs.

There is a clear need to understand the significance of the present recommendations by the WHO Expert Committee (1994) for BMI as indicative of underweight (17-18.5 underweight; 16-16.9 moderately underweight; <16 severely underweight) in more detailed body compositional and culturally specific terms for the elderly. A multidimensional index of health status (later life status score), embracing well-being, memory, activities of daily living, exercise, social activity, social networks, medications and health, has been devised and tested on the Greek samples, presented in Chapter 31.

The most important factors identified as determining later life status in Greek elderly included mobility and independence (exercise and activities of daily living), well-being and memory. Social activity and networks were the next most important factors - mainly in Melbourne. Health conditions and medication were of least importance in determining later life status. The later life status score was also used to determine food predictors of 'health' in Greek elderly. A high absolute intake and variety of legumes, vegetables and fruit and a low intake of meat, were associated with better later life status in elderly Greeks. A high intake and variety of fish were also associated with better later life status in Spata men only. Future studies should be interested in such composite approaches to evaluating the health of elderly people from nutritional or other points of view.

32.5 BRINGING FOOD AND HEALTH TOGETHER

The present work represents only the beginnings of the fulfilment of this challenge through the IUNS, SENECA, North Chinese, Antipodean (Australian and New Zealand), Meso-American, Indonesian and Japanese studies. There are considerable differences in the food habits and foods eaten between elderly communities reported in this book. An effort has been made to develop various food as well as nutrient indicators which might be used to evaluate the healthful properties, or otherwise, of the diets of elderly people cross-culturally.

Food categories like animal or plant-derived, fish, legumes, root vegetables or food indices like "traditionality", "variety/diversity" maybe helpful in relation to well-being or disease profiles. Can the prevalence of obesity and diabetes be accounted for, in part, by the differences in amount and type of foods like meat, fish, vegetables and legumes? The present data provide opportunities for hypothesis development and methodological refinement for future studies.

Nutrient analyses are more immediately helpful because more is known about nutrient-deficiency diseases, at least in younger people. The relatively low thiamin intakes amongst Greeks in Spata, and Vitamin A amongst elderly Chinese in the North of China provide a stimulus to look out for related morbidities and increased mortality. And, of course, opportunities to improve the health of such elderly communities that arise, with the caveat that it is necessary to do so within the traditional cultural context, may still represent advantage for, for example, well-being.

32.6 THE FUTURE NUTRITIONAL STUDY OF THE AGED

The documentation we now have of nutritional and health profiles in quite disparate elderly communities will stimulate more and different work.

32.6.1 Mortality data

Since elderly people are at relatively high risk of dying, smaller cohorts can be followed over a few years in relation to nutritional predictors of mortality. If common nutritional indicators can be agreed (e.g., food, nutrient, body compositional) then the combined efforts of several investigators and communities can be made more productive.

32.6.2 Dynamic cohort studies

Because of the importance of longitudinal and prospective studies, maintaining an adequate cohort of study subjects is a challenge. One approach is to develop a "dynamic cohort" or "continuing cross-sectional with replacement subjects" which recruits new subjects as the earlier members of the cohort die. Prospective study of an individual requires that individual to continue throughout the study. But each time of restoration of the total cohort, it is possible to acquire the

same power as at the beginning of the study.

32.6.3 Functional outcomes

Those functions of elderly people most relevant to their well being and health should be focussed on in future studies. These might include :

- (i) Cognitive functions
- (ii) Activities of daily living (ADL)
- (iii) Immune functions
- (iv) Cardiorespiratory functions.

In each case, some notion of "reserve capacity" would be helpful. It is this on which elderly people must call in time of health stress. A measure of "nutritional reserve" in the form of food or nutrient intakes and body composition, is worth registering.

32.6.4 Consideration of non-nutrient component of foods as predictors of health outcomes

There is an increase in appreciation of the biological importance of non-nutrients (examples would be salicylate, phytoestrogens, caffeine, non-provitamin A carotenoids & flavonoids) in foods. For the elderly, these may have particular relevance. For example, in neurological, cardiovascular, bone and immunological health, where much morbidity arises.

32.6.5 The development of designer foods

As a better appreciation of how food and its properties and components affects the health of elderly people, interest in the development of novel foods will increase. This may reflect physico-chemical and component features and could for example, be designed to delay the development of osteopenia - the decline in immune function seen with age. There will be risks or unintended consequences of such developments. But they can be minimised by the present evaluation of food-health relationships in the elderly being socio-culturally sensitive and complete.

CHAPTER 32

CONCLUSIONS, OPPORTUNITIES AND RECOMMENDATIONS

32.1 HISTORY

32.2 OBJECTIVES

32.3 MAIN FINDINGS

32.3.1 Health status

- 32.3.1.1 Well-being*
- 32.3.1.2 Mental status*
- 32.3.1.3 Physical disability*
- 32.3.1.4 Self-reported health*

32.3.2 Lifestyle

- 32.3.2.1 Social factors*
- 32.3.2.2 Physical activity*
- 32.3.2.3 Sleep*

32.3.3 Nutritional status

- 32.3.3.1 Food beliefs*
- 32.3.3.2 Food Intake*
- 32.3.3.3 Energy &Macronutrient intake*
- 32.3.3.4 Micronutrient intake*

32.3.4 Body composition

32.3.5 Blood lipids

32.3.6 Discussion

32.4 COMPOSITE LATER LIFE HEALTH STATUS

32.5 BRINGING FOOD AND HEALTH TOGETHER

32.6 THE FUTURE NUTRITIONAL STUDY OF THE AGED

32.6.1 Mortality data

32.6.2 Dynamic cohort studies

32.6.3 Functional outcomes

32.6.4 Consideration of non-nutrient component of foods as predictors of health outcomes

32.6.5 The development of designer foods

32.7 LEGENDS

32.7 LEGEND FOR FIGURES

- Figure 32.1 Mean well-being score, by study community, age group and gender.
- Figure 32.2 Percentage reported being forgetful, by study community, age group and gender.
- Figure 32.3 Prevalence of the self-reported diabetes, cancer, hypertension, by study community, age group and gender, for young elderly.
- Figure 32.4 Exercise score, by study community, age group and gender.
- Figure 32.5 Percentage energy derived from carbohydrate intake, by study community, age group and gender.
- Figure 32.6 Percentage energy derived from fat intake, by study community, age group and gender.
- Figure 32.7 Percentage energy derived from protein intake, by study community, age group and gender.
- Figure 32.8 Percentage energy derived from alcohol intake, by study community, age group and gender.
- Figure 32.9 Percentage below two thirds of the US RDA for calcium, by study community, age group and gender.
- Figure 32.10 Percentage below two thirds of the US RDA for iron, by study community, age group and gender.
- Figure 32.11 Percentage below two thirds of the US RDA for zinc, by study community, age group and gender.
- Figure 32.12 Percentage below two thirds of the US RDA for magnesium, by study community, age group and gender.
- Figure 32.13 Percentage below two thirds of the US RDA for vitamin A, by study community, age group and gender.
- Figure 32.14 Percentage below two thirds of the US RDA for thiamin, by study community, age group and gender.
- Figure 32.15 Percentage below two thirds of the US RDA for riboflavin, by study community,

age group and gender.

Figure 32.16 Percentage below two thirds of the US RDA for vitamin C, by study community, age group and gender.

Figure 32.17 Average body mass index, by study community, age group and gender.

Figure 32.18 Average waist-to-hip circumference ratio, by study community, age group and gender.

Figure 32.19 Average percentage body fat, by study community, age group and gender.

Figure 32.20 Average fasting plasma glucose, by study community, age group and gender.

Figure 32.21 Average serum total cholesterol, by study community, age group and gender.

