

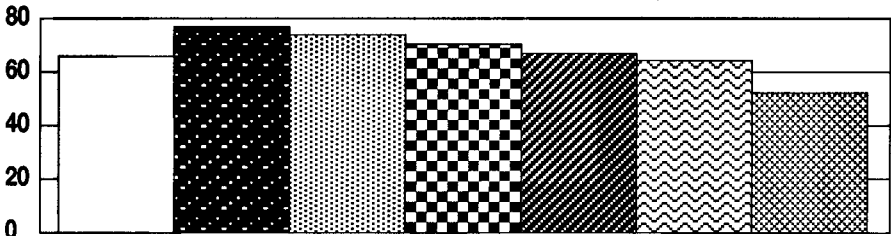
Food security and the aged

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Introduction

Changing demography

In both the developed and developing worlds, the human population is inexorably aging (Figure 1). The developing and transitional economies are the more populous, thus the majority of the world's over-65 year population will shortly, if not already, be outside the developed world (*Andrews et al, 1986*). In Africa, the proportion over 65 years in 1995 ranged from 2.4% in Botswana, Uganda and Zambia, to 4.4% in South Africa and 5.9% in Mauritius (Table 1). In Sub-Saharan Africa, the proportion of the population aged 65 years and over was 2.7% in 1990 and it is projected to reach 2.9% in the year 2010 and 3.4% in the year 2025. These projections are much lower than those proposed for North America, where the population (aged 65 years and over) was 12.6% in 1990 and is estimated to climb to 14% and 20% for the years 2010 and 2015 respectively (Table 2). In part, this changing demography is due to improved nutritional status in earlier life; it also reflects a trend towards smaller family size and a real increase in life expectancy within the later years of life (*Steen et al, 1994*).



(Source: Population Reference Bureau, World Population Data Sheet 1996.)

Figure 1 Life expectancies at birth around the world in 1996.

Table 1 Life expectancy at birth (years) and percentage aged 65 years and over for the African region in 1995 (WHO, 1995)

Country	Life expectancy at birth (years)	% aged 65 and over (years)
Algeria	68.9	3.6
Angola	49.0	2.9
Botswana	67.3	2.4
Burundi	51.2	3.0
Camroun	58.5	3.6
Central African Republic	50.2	4.0
Chad	49.5	3.6
Congo	49.9	3.3
Equatorial Guinea	50.0	4.3
Ethiopia	50.0	2.9
Gambia	47.0	2.9
Ghana	58.0	2.9
Kenya	54.2	2.9
Liberia	57.5	3.7
Madagascar	59.0	2.8
Mauritius	71.6	5.9
Mozambique	46.8	3.2
Nigeria	52.4	2.8
Rwanda	46.6	2.5
South Africa	65.2	4.4
Swaziland	60.0	2.6
Uganda	43.3	2.4
Tanzania	51.5	2.6
Zaire	51.9	2.9
Zambia	46.1	2.4
Zimbabwe	50.8	2.8

Table 2 Projected proportion of the population aged 65 years and over, 1990-2025

Region	Percentage of the population		
	Year	≥ 65 years	≥ 80 years
Europe*	1990	13.7	3.2
	2010	17.5	4.9
	2025	22.4	6.4
North America	1990	12.6	2.8
	2010	14.0	4.0
	2025	20.1	4.6
Asia*	1990	4.8	0.6
	2010	6.8	1.2
	2025	10.0	1.8
Eastern Mediterranean/North Africa	1990	3.8	0.5
	2010	4.6	0.8
	2025	6.4	1.1
Sub-Saharan Africa	1990	2.7	0.3
	2010	2.9	0.3
	2025	3.4	0.4

(*Data excludes countries of the former USSR. Adapted from the *WHO World Technical Report Series* (853), 'Epidemiology and prevention of cardiovascular diseases in elderly people', 1995: 3.)

If this growing cohort of older people do not have resources of their own (e.g. through a social contract that supports them, or by remaining economically active members of society), they will be vulnerable in so far as the basic necessities of life, including food, are concerned. When economies are in transition, the risk to vulnerable groups such as the aged increases since social structures change and resources are redistributed. Food security for the aged may be jeopardized because of: 1. political instability (e.g. poor administration, corrupt officials or where international trade and economic arrangements are not favourable to the society in which the aged live); 2. famine attributable to conflict, climatic changes or pestilence.

The definition of who are the aged in a society may be chronological, biological or societal. There is good evidence that biological age has lengthened during the 20th century (*Wahlqvist et al, in Biswas & Gabr, 1994*). The shift in biological age in turn requires a redefinition of the significance of chronological and societal age. The societal expectations of people in later life are undergoing significant change as the competing

phenomena of increased age-related morbidity and healthy ageing become apparent. Indeed, any definition of the aged needs to acknowledge marked heterogeneity in this population (*German & Shapiro, 1997*). Fortunately, there are clear indications that biological ageing is being deferred to a later chronological age, judging from functional performance and disability data (*Khaw, 1997; Butler, 1997; Fries, 1996*). This deferral depends more on lifestyle than on affluence or proportion of GDP spent on health (*Butler, 1997*). The prospects for healthy aging through environmental approaches, including food security, in developing and transitional societies are available through the maintenance of biodiversity, the creation of safe precincts and the development of highly efficient food production systems.

Society and the aged

Bismarck, the German Chancellor (1883-1887) set a remarkably enduring benchmark for the societally aged with occupational retirement at age 65. It is only recently that the rights and responsibilities of people, to be respected irrespective of chronological age, have been on the ascendancy. However, for various reasons, governments may shift this definition to suit the assignment of resources. For example, the right to retire earlier and receive fiscal benefits has been a phenomenon with those governments which want the labour force to be younger. The need to retire earlier has also been a phenomenon in times of high unemployment. However, governments are increasingly encouraging later retirements so that elderly people continue to generate income into their later years, so as not to be a burden on the government purse or on their families who should provide the required support. The extent to which the aged are incorporated into or excluded from society for economic or other reasons is a major consideration for their food security and health (*Hickey et al, 1997*). Rationing health care or implementing a user-pay approach may unfairly discriminate against older adults. This process of incorporation or exclusion has ethical and equity issues underpinning it (*Solomons, in Wahlqvist & Vobecky, 1994*). The ability of the aged to call up 'social credits' in later life is also a reflection of their own anticipation of their needs, their lifelong interpersonal skills and their family and community values. Thus, the meaning of societal aged (the view about an individual's age which society confers, like being a grandparent) is also generated by the lifelong interplay between one generation and the next. Some of this has to do with how elderly people were nurtured and how they nurture others. So the matter of food security in the aged is inter-generational as well as intra-generational.

The aged as a food and health resource

As the food supply changes, the older members of society represent, in many cases, the principal repository of the food knowledge and skills. They are an invaluable food and health resource for their community. Thus, in 1986, the International Union of Nutritional Sciences (IUNS) Committee on 'Nutrition and Aging' established the international 'Food Habits In Later Life' (FHILL) programme which gathers information about the eating habits of a wide range of communities of elderly people around the world, including Australia (Anglo-Celts and Greek-born), Japan, China, the Philippines, Greece, Sweden and South Africa (Wahlqvist et al, 1995; Charlton, Labadarios et al, 1996; Charlton, Bunn et al, 1996; Charlton, Fourie et al, 1997; Charlton, Levitt & Lombard, 1997). The major finding from the IUNS study highlighted that it is possible to achieve comparable health in old age in different cultural settings with widely differing food habits. More specifically, some of the other findings included:

- Total food intake (excluding fluid) was about 1 500g/per day for the Caucasian men and 1 300g/ day for the women; Asian men consumed about 1 000g/day of solid food and women about 700g/day; rural elderly consumed about 300 grams less food daily than their urban counterparts.
- Mean daily intake of cereals was higher in Asian elderly (350g/day) than Caucasians (250g/day).
- Total vegetable and fruit intakes were higher in Caucasians (350g/day, 250g/day respectively) than Asian cohorts (250g/day, <100g/day respectively).
- Caucasian elderly (especially in Australia) consumed almost three times as much meat (100-150g/day) as Asian elderly (30 – 40g/day).
- Anglo-Celtic elderly consumed little fish or shellfish (<20g/day) compared with Greek-born Australians (60g/day), Swedes (90g/day) and Asian elderly (60 – 80g/day).
- Mean daily intake of milk and milk products was greatest amongst the Swedes and Anglo-Celts (300 – 400g/day), followed by Greek-born Australians (200g/day); rural Greeks in Greece and Asian elderly consumed the least (<150g/day).
- Mean energy intake for the Caucasian men ranged between 2 200 – 2 700kcal/day compared with 1 700 – 2 000kcal/day for Asian men. Of the Caucasian women, Swedes had the highest energy intake (2 500kcal/day); others had intakes between 1 700 – 2 100kcal/day). The Asian women had average energy intakes of about 1 700kcal/day.

- Mean percentage energy intake from carbohydrates was higher amongst Asian elderly (55 – 65%) compared with Caucasian elderly (38 – 45%). Mean percentage energy intake from fat and protein was higher amongst Caucasian elderly (35 – 43%, 18% respectively) compared with Asian elderly (20 – 25%, 12% respectively).
- Almost 100% of the Asian elderly did not achieve two thirds of the US recommended dietary intake (RDI) for calcium, compared with <50% of the Caucasians.
- Iron intake appeared adequate in most study communities, with less than 5% of the subjects having intakes below two-thirds of the US RDI. In contrast, a greater proportion of elderly (especially women) appeared to have inadequate zinc and magnesium intakes (about 20% did not achieve two-thirds of the US RDI).
- Almost 100% of Asian subjects were not achieving two-thirds of the US RDI for vitamin A (retinol equivalent), compared with less than 20% of Caucasians.
- About 20% of the elderly were not achieving two-thirds of the US RDA for thiamin, and about 50% of the Asian cohorts were not achieving two-thirds of the US RDA for riboflavin and vitamin C.

The second phase of this FHILL study is to prospectively examine the effect of food patterns on survival in 5 – 6 year mortality follow-up studies of the elderly cohorts. From the analyses of mortality data from the elderly Greek and Anglo-Celtic cohorts has come an understanding that food patterns, even as late as 70 years and onwards, remain predictive of survival (*Trichopoulou et al, 1995; Kouris-Blazos et al, 1995*) and are also associated with function and morbidity (*Wahlqvist, Kouris-Blazos et al, 1998*).

Problem identification: RAP (Rapid Assessment Procedures)

The integration of elderly food habits requires a combination of anthropological and nutritional methods. Rapid Assessment Procedures (RAP) have been used to set the framework for the various community studies of the FHILL project (*Scrimshaw & Hurtado, 1987*). RAP was used to obtain information on food and health beliefs (*Kouris et al, 1991*) and to further examine other factors possibly affecting food intake. RAP encouraged the expression of food culture of the study communities and, within the framework of food habits inquiries, allowed for modification. For example, it was difficult to use a questionnaire approach with an elderly Aboriginal Australian community because there were difficulties with questions relating to concepts about 'health', 'time', 'frequency' and 'quantity'. More 'valid' information was obtained by

interviewing 'key' informants (e.g. health workers, supermarket managers) and groups of selected elderly Aboriginals (a total of 25 people being interviewed), which allowed cross-checking or 'triangulation' to reconstruct the typical elderly diet. The quantitative food frequency questionnaire was therefore modified, using RAP, to be usable with 'key' informants and at the group level, so as to build a consensus statement about group food intake patterns. The average quantities of foods consumed were approximations based upon observation, the weighing of food and information from 'key' informants (*Wahlqvist, Kouris et al, 1991*). One of the intentions of the IUNS work has been to provide tools for communities to establish their own assessment procedures (*Scrimshaw et al, in Wahlqvist et al, 1995*).

Nutritional status of the aged: Its relationship to health and well-being

There is an extensive literature which relates nutritional status to health in the aged, insofar as energy, under- and over-nutrition, protein dysnutrition, micronutrient and, increasingly, phytochemical deficiencies, are concerned (*Wahlqvist et al, in Biswas & Gabr, 1994; Fiatarone et al, 1994; Wahlqvist, Savige & Lukito, 1995; Wahlqvist, 1997*). For example, protein intake may be excessive in relation to renal function but deficient in relation to bone health and muscle mass (*Schürch et al, 1998*). Plants contain factors not regarded as essential nutrients which, when ingested in adequate amounts, can maintain immuno-competence and decrease free radical damage as we age (*Wahlqvist, Wattanapenpaiboon et al, 1998*). However, studies which model food intake in the aged and predict health outcomes are few. Mortality follow-up studies using the traditional Greek food pattern (or its analogues) to predict survival in Greek and non-Greek elderly cohorts, are amongst them (*Trichopoulou et al, 1995; Kouris-Blazos et al, 1995; Osler & Schroll, 1997*).

In prospective cohort studies of elderly people in rural Greece (n=182), Greek-born (n=189) and Anglo-Celtic Australians (n=141) and Danes in Denmark (n=202), it was found that adherence to the traditional Greek food pattern (TGFP) was associated with lower overall mortality and longer survival, irrespective of the types of foods consumed within food groups and the mode of food preparation. TGFP was scored in terms of eight food groups, giving a final score ranging between 0 – 8: 1. high consumption of vegetables; 2. high consumption of legumes; 3. high consumption of fruits; 4. high consumption of cereals; 5. low consumption of dairy products; 6. low consumption of

meat and meat products; 7. moderate ethanol consumption; 8. high monounsaturated: saturated fat ratio. A higher TGFP score was significantly associated with a sharply reduced risk of death, by 17 – 23% per one unit increase and by more than 50% per four unit increase in the different cultural settings. Elderly subjects who were following a more TGFP could expect to live a further five years.

The key message from these studies is that the overall food pattern is more important for longevity than individual food groups. Whether or not further mortality benefit may have been obtained in the non-Greek cohorts if foods were prepared according to Greek cuisine requires further study. The emergence of more data about genetic polymorphisms and how they relate to diet and health outcomes will give more confidence to causality.

The earlier life nutritional precursors of health and the aged are receiving more attention with the pioneering work of Barker and colleagues about maternal and fetal nutrition and infant nutrition as precursors of non-communicable diseases (NCD) (*Barker, 1997*) and risk of fracture (*Cooper & Barker, 1995*). Furthermore, the Swedish Twin-Adoptive studies indicate that environmental effects early in life may play a more influential role on later life metabolic phenomena than do genetic factors (*Heller et al, 1993*). Does nutritional security for the aged begin in early life? Does the early life experience predicate, to some extent, what food security is required contemporaneously amongst the aged? These issues merit a greater level of inquiry than currently pertains.

The extent to which there is nutritional reserve capacity in the aged is a question requiring more investigation. Clearly, if hepatic stores of certain micronutrients like folate and vitamin B12 are in good reserve, the risk of becoming deficient is reduced if older adults are subjected to a food crisis. This is particularly true of fat-free mass – both muscle and bone (*Fiatarone et al, 1994*). Sense of balance and muscle strength conferred by regular physical activity are yet other examples of resilience amongst the aged, in this case, amongst others, a decreased proneness to falls (*Province et al, 1995*) and fractures (*Luukinen et al, 1997*).

For people entering later life the first requirement is to enter it with good nutritional reserves, and the second is to maintain nutritional status as far as possible beyond the age of seventy without decline. The latter will be achieved by an ongoing intake of nutritious food (judged by its nutrient density) and a relatively higher plane of energy nutrition, which will be predicated on continuing physical activity and food intake to match it (*Wahlqvist, in Prinsley & Sandstead, 1990*). Other environmental factors may also influence food intake, such as the

physical surrounding in which food is consumed (*Elmståhl et al, 1987*). The nutritional and health dimensions of the aged are principally ones of cognitive function (*Ortega et al, 1997*), mobility (measured by activities of daily living or ADL) (*Gill et al, 1997; Era et al, 1997*), immune function and the ability to fend off infection (*Chandra, 1992*) and neoplastic disease (*Willett, 1994*), musculo-skeletal integrity and muscle strength (*Wahlqvist et al, 1995*) and cardio-respiratory fitness.

Food supply of the aged

For those who may be more distanced from the origins of their food through social isolation, who may have less than adequate economic means, who may be disadvantaged by lack of independent means of transport, by limited food storage facilities (such as pantry and freezer space), by disabilities which limit food preparation, by inadequate cooking facilities and by the social stimulus and framework in which they eat, food intake may be jeopardized. This is the untoward scenario for some of the aged. Thus, the entire food chain and the specific food supply arrangements for the aged need analysis. Arrangements like 'meals-on-wheels' in some societies can overcome a number of these impediments to an adequate food supply for the aged (*Lo et al, 1987*). But more comprehensive and culturally specific approaches are still required for the emergent needs of economically developing and transitional communities.

Food security for the aged

Food security for the aged will depend on: 1. nutritional reserve capacity with which people enter later life; 2. the social credits that older people possess; 3. personal management skills; 4. the level of maintained independence or the level of dependence; 5. support for women who tend to outlive men and be left alone, and who, in many communities, assume a disproportionate share of the load in caring for others with food or other modalities. It may be valuable to have a developed and simple index of food security which ascribes a numerical value to each of these considerations. It could be validated in a variety of community settings through cross-sectional and observational studies and serve as a stimulus to the provision of food security for the aged.

Food-based dietary guidelines (FBDGs) and the aged

Formerly, most national dietary guidelines (DGs) were essentially nutrient-based (fat, alcohol, salt, sugar, calcium, iron) and did not

address traditional foods and dishes, eating patterns, food availability or sustainable food production. Therefore, it is not surprising that their use has met only moderate success. There is gathering momentum for a shift towards a more integrated way of describing the human diet which incorporates not only the nutrient composition of foods, but also the non-nutrient components of food, food patterns (e.g. traditional diets), locally available foods and their influence on morbidity and mortality levels in populations. This paradigm shift is likely to make a significant contribution to human health, to the maintenance of cultural diversity, and to optimal nutritional status in a sustainable environment. This approach has come to be known as Food-Based Dietary Guidelines (FBDGs).

FBDGs aim to reduce: 1. chronic malnutrition; 2. micronutrient malnutrition; 3. diet-related communicable and non-communicable diseases (*WHO & FAO, 1996*). Country- and cuisine- specific FBDGs will be based directly on diet and disease relationships of particular relevance to the individual country and the age group they are targeting. The priorities in addressing FBDGs for older adults will depend on whether the relevant public health concerns are related to dietary insufficiency or excess, or indeed to combinations of both.

In contrast to younger adults, older people are more likely to adhere to traditional cuisines and values, with retention of cooking skills and a preference for home-cooked meals over take-away food (*Wahlqvist et al, in Biswas & Gabr, 1994; Fukuba, 1992; Kouris-Blazos et al, 1996*). FBDGs allow the principles of nutrition education to be expressed mostly as foods and culture-specific dishes (qualitative and quantitative). This will not only be particularly relevant to older adults but should make the guidelines more practical and user-friendly. FBDGs encourage maintenance of healthy traditional dishes and cooking practices, and are sensitive to the local agriculture and whether it can support the guidelines. In the future, however, the preferences of older adults are predicted to change, since the elderly of the future will have had greater exposure to non-traditional foods than the current elderly (*Fukuba, 1992*). Whereas staying within one's traditional food culture simplifies one's nutritional decision-making, this will be less and less possible. Food labels are diversifying rapidly and the marketplace is replete with new products and the information that goes with them (*Wahlqvist, in Merican & Quee Lan, 1995*). FBDGs will need to reflect these shifts in food preference.

It is likely that the Eurasian cuisine which is developing in Australia (and on the west coast of Canada and the United States of America) will profoundly influence the 21st century global cuisine. This has important implications for FBDGs because it provides an opportunity

to develop a 'super diet' which includes the healthiest traditional foods and dishes from Asia and the Mediterranean and novel Eurasian dishes which will hopefully translate into a longer and healthier life. In order to embrace the food cultural wisdom of Africa, more active documentation of African cuisines and health is required. FBDGs for older adults will need to acknowledge and promote the following (Wahlqvist *et al*, 1999):

- food variety within and across food groups, e.g. fruits and vegetables, soy, legumes and nuts, low-fat dairy products, herbs and spices;
- fish;
- lean meat as a condiment;
- tea (or its equivalents) as a beverage;
- unrefined fat from whole foods, such as nuts, seeds and fatty fish or from cold pressed oil, which are high in omega 3 and omega 9 fats, i.e. canola, olive, soy bean; fatty spreads, however, can be avoided;
- healthy traditional dishes (e.g. vegetable/legume-based dishes, such as vegetarian-style and the use of meat and nuts as condiments), as opposed to dishes/foods heavily preserved, pickled in salt or smoked;
- traditional foods/dishes from other cuisines to increase food variety, e.g. tomato-based Mediterranean vegetable dishes, Chinese cuisine, tofu from Asia, couscous from Middle East, polenta and beans from Latin America;
- healthy novel foods (e.g. breads with additional ingredients, such as soy and linseed, to mainstream healthy foods), and functional foods (such as fermented drinks) which have a basis in food culture;
- in more urban settings, the food industry can produce 'home meal replacements' or 'fast foods' which are low in animal fats (e.g. frozen vegetarian meals based on soy). A specific line of home meal replacements can be developed by the food industry, targeting the older population, which can be fortified with nutrients that older adults are most at risk of being deficient in. Rural communities have considerable capacity, as long as there is equitable distribution of responsibility between gender and age groups to provide local food and dishes for elders. It must also be acknowledged that sharing in a sophisticated service organization or a food industry engaged in meal provision to the aged, or safe street foods, are of great value in securing the food supply of the aged in traditional communities;
- the time, frequency and size of meals may be an important consideration in ageing adults. Mealtimes, especially in institutions, can adversely affect food intake if they fall too closely together. Smaller meals, eaten more frequently, can help overcome problems associated with small appetites and may also have important implications in

terms of health outcomes, such as obesity, hypercholesterolaemia and glucose intolerance (*Fábry et al, 1964; Jenkins et al, 1988*).

- Since FBDGs acknowledge the importance of cultural roots, sustainability and the science of healthy eating, they are likely to contribute to food security in later life.

Governance

The governance of food security can be addressed in various ways and at various levels.

Local: The rural and urban village

A globe of villages rather than a global village will have food security advantages for the aged. Engagement of village elders in both rural and urban settings will be crucial in arrangements for the community food supply and how it affects the vulnerable group of older persons. It will be desirable to include younger generations, inculcated with a sense of the importance of early life nutritional determinants for later life health, and with the idea of the complementary roles of younger and older people in ensuring the belief and knowledge skills basis for lifelong food security at the local level.

National

National food and nutrition policies can link the various sectors (agricultural, food industry, educational, health and local government) into age-specific programmes with appropriate management.

Regional

Regional nutrition policies, like those presently evolving around FBDGs, can be particularly helpful (*Wahlqvist, Worsley et al, 1998*). In the case of regions such as Africa and Asia, the traditional respect for the aged can be recruited and sustained with traditional and newer multi-media learning methods.

Global

Since the shift in demography towards a more aged population is a global phenomenon, international efforts are of growing consequence. These include the IUNS Food Habits in Later Life Programme and the WHO Global Programme for the Elderly now focused as

'<http://www.who.ch/hpr/ahe/index.html>'. WHO is also now developing FBDGs for older adults (Wahlqvist et al, 1999).

There are several requirements for effective governance in relation to food security amongst the aged. These include:

- capacity building and leadership in the government and non-governmental organization sectors;
- relevant data assembly;
- monitoring and surveillance;
- a commitment to sustainability and durability of programmes;
- development of the aged as a resource for themselves and others.

As one of the major matters confronting world health, the governance of food security for the aged requires international support.

REFERENCES

- Andrews, G.R., Esterman, A.J., Braunack-Mayer, A.J. and Rungie, C.M. (Eds.) 1986. 'Ageing in the Western Pacific - A four country study'. Manila: World Health Organization, Western Pacific Reports and Studies No.1.
- Barker, D.J.P. 1997. 'Maternal nutrition, fetal nutrition, and disease in later life'. *Nutrition*. 13: 807-813.
- Butler, R.N. 1997. 'Population aging and health'. *BMJ*. 315: 1082-1084.
- Chandra, R.K. 1992. 'Effect of vitamin and trace-element supplementation on immune responses and infection in elderly subjects'. *Lancet*. 340: 1124-1127.
- Charlton, K.E., Bunn, A.E., Lombard, C.J. and Marais A.D. 1996. 'Body composition assessment of older coloured South Africans: no association between obesity and conventional cardiovascular risk factors'. *S Afr J Food Sci Nutr*. 8: 123-130.
- Charlton, K.E., Fourie, J.M., Steyn, K. and Lombard, C.J. 1997. 'Prevalence of hypertension among the elderly coloured population of the Cape Peninsula'. *S Afr Med J*. Vol. 87, Cardiovascular suppl 2, C75-C80.
- Charlton, K.E., Labadarios, D., Lombard, C.J. and Louw, M.E. 1996. 'Vitamin D status of older South Africans'. *S Afr Med J*. 86: 1406-1410.
- Charlton, K.E., Levitt, N.S. and Lombard, C.J. 1997. 'The prevalence of diabetes mellitus and associated risk factors in elderly coloured South Africans'. *S Afr Med J*. 87: 364-7.
- Cooper, C., Barker, D.J.P. 1995. 'Risk factors for hip fracture'. (Editorial.) *New Engl J Med*. 332: 814-815.
- Elmståhl, S., Blabolil, V., Fex, G., Küller, R. and Steen, B. 1987. 'Hospital nutrition in geriatric long-term care medicine. I. Effects of a changed meal environment'. *Compr Gerontol*. 1: 29-33.
- Era, P., Avlund, K., Jokela, J., Gausenilsson, J.G., Heikkinen, E., Steen, B. and Schroll, M. 1997. 'Postural balance and self-reported functional ability in 75-year-old men and women - a cross-national comparative study'. *J Am Geriatr Soc*. 45: 21-29.
- Fábry, P., Fodor, Z., Hejl, H., Braun, T. and Zvol-nkov., K. 1964. 'The frequency of meals: its relationship to overweight, hypercholesterolemia, and decreased glucose-tolerance'. *Lancet*. 2: 614.
- Fiatarone, M.A., O' Neill, E.F., Ryan, N.D., Clements, K.M., Solares, G.R., Nelson, M.E.,

- Roberts, S.B., Kehayias, J.J., Lipsitz, L.A. and Evans, W.J. 1994. 'Exercise training and nutritional supplementation for physical frailty in very elderly people'. *N Engl J Med.* 330(25): 1769-1775.
- Fries, J.F. 1996. 'Physical activity, the compression of morbidity, and the health of the elderly'. *J R Soc Med.* 89: 64-68.
- Fukuba, H. 1992. 'Meeting the challenges of an aging population: an overview'. *Nutr Rev.* 50 (12): 467-471.
- German, P.S., Shapiro, S. 'Heterogeneity and multiple risk factors in aging populations: Implications for research'. In Hickey, T., Speers, M.A. and Prohaska, T.R. (Eds.) 1997. 'Public health and Aging'. Baltimore and London: The Johns Hopkins University Press. 190-206.
- Gill, T.M., Robison, J.T., Tinetti, M.E. 1997. 'Predictors of recovery in activities of daily living among disabled older persons living in the community'. *J Gen Inter Med.* 12: 757-762.
- Heller, D.A., de Faire, U., Pedersen, N.L., Dahlen, G. and McClearn, G.E. 1993. 'Genetic and environmental influences on serum lipid levels in twins'. *New Engl J Med.* 328: 1150-1156.
- Hickey, T., Speers, M.A. and Prohaska, T.R. 1997. *Public Health and Aging*. Baltimore and London: The Johns Hopkins University Press.
- Jenkins, D.J.A., Wolever, T.H.S., Vuksan, V., Brighenti, F., Cunnane, S.C., Rao, V., Jenkins, A.L., Buckley, G., Patten, R., Singer, W., Corey, P. and Josse, R.G. 1988. 'Nibbling versus gorging: metabolic advantages of increased meal frequency'. *New Engl J Med.* 321: 929-934.
- Khaw, K.T. 1997. 'Healthy aging'. *BMJ.* 315: 1090-1096.
- Kouris, A., Wahlqvist, M.L., Trichopoulos, A. and Polychronopoulos, E. 1991. 'Use of combined methodologies in assessing food beliefs and habits of elderly Greeks in Greece'. *Food & Nutr Bull.* 13(2): 139-144.
- Kouris-Blazos, A., Gnardellis, C., Wahlqvist, M.L., Trichopoulos, D., Lukito, W. and Trichopoulos, A. 1999. 'Are the advantages of the Mediterranean diet transferable to other populations? A cohort study in Melbourne, Australia'. *Br J Nutr* (in press).
- Kouris-Blazos, A., Wahlqvist, M. 1998. 'Traditional Greek food pattern and overall survival of elderly people'. *Aust J Nutr Diet.* 4 supp: 20-23.
- Kouris-Blazos, A., Wahlqvist, M.L., Trichopoulos, A., Polychronopoulos, E. and Trichopoulos, D. 1996. 'Health and nutritional status of elderly Greek migrants to Melbourne, Australia'. *Age Ageing.* 25: 177-189.
- Lo, C.S., Briggs, D.R., Wahlqvist, M.L. 1987. 'Nutritional evaluation of meals-on-wheels (MOW) in Melbourne: Dietary fibre'. *Proc Nut Soc Aust.* 12: 157.
- Luukinen, H., Koski, K., Laippala, P. and Kivela, S.L. 1997. 'Factors predicting fractures during falling impacts among home-dwelling older adults'. *J Am Geriatr Soc.* 45: 1302-1409.
- Ortega, R.M., Requejo, A.M., Andres, P., Lopezsober, A.M., Quintas, M.E., Redondo, M.R., Navia, B. and Rivas, T. 1997. 'Dietary intake and cognitive function in a group of elderly people'. *Am J Clin Nutr.* 66: 803-809.
- Osler, M. and Schroll, M. 1997. 'Diet and mortality in a cohort of elderly people in a Northern European Community'. *Int J Epidemiol.* 26(1): 155-9.
- Province, M.A., Hadley, E.C., Hornbrook, M.C., Lipsitz, L.A., Miller, J.P., Mulrow, C.D., Marcia, G., Sattin, R.W., Tinetti, M.E. and Wolf, S.L. 1995. 'The effects of exercise on falls in elderly patients: a preplanned meta-analysis of the FICSIT trials'. *JAMA.* 273: 1341-1347.
- Schürch, M.A., Rizzoli, R., Slosman, D., Vadas, L., Vergnaud, P. and Bonjour, J.P. 1998. 'Protein supplements increase serum insulin-like growth factor-1 levels and attenuate

- proximal femur bone loss in patients with recent hip fracture: A randomized double-blind, placebo-controlled trial'. *Ann Intern Med.* 128: 801-809.
- Scrimshaw, S. and Hurtado, E. 1987. *Rapid Assessment Procedures*. UCLA: United Nations University, Latin American Centre Publications.
- Scrimshaw, N., Kouris-Blazos, A., Taub, B., Wahlqvist, M.L. and Davies, L. 'Rapid assessment procedures for use in the elderly'. In Wahlqvist et al. (Eds.) 1995. *Cross-cultural Study of Food Habits and Health Status in Later Life: Description of Elderly Communities and Lessons Learnt*. Melbourne: United Nations University Press & *Asia Pacific Journal of Clinical Nutrition*.
- Solomons, N.W. 'The ethics of prevention'. In Wahlqvist, M.L. and Vobecky, J.S. (Eds.) 1994. *Medical Practice of Preventive Nutrition*. London: Smith-Gordon. 291-306.
- Steen, B., Landin, I. and Mellström, D. 'Nutrition and health in the eighth decade of life'. In Wahlqvist, M.L., Truswell, A.S., Smith, R. and Nestel, P.J. (Eds.) 1994. *Nutrition in a Sustainable Environment*. Proceedings of the XV International Congress of Nutrition: IUNS Adelaide. UK: Smith-Gordon. 331-333.
- Trichopoulou, A., Kouris-Blazos, A., Wahlqvist, M.L., Gnardellis, C.H., Lagiou, P., Polychronopoulos, E., Vassilakou, T., Lipworth, L. and Trichopoulos, D. 1995. 'Diet and overall survival in elderly people'. *British Medical Journal.* 311(7018): 1457-1460.
- Wahlqvist, M.L. 'Vitamins, nutrition and aging'. In Prinsley, D.M. and Sandstead, H.H. (Eds.) 1990. *Nutrition and Aging. Progress in Clinical and Biological Research*. New York: Alan R. Liss. 175-202.
- Wahlqvist, M.L. 'Nutrition in the 21st century: updates and challenges'. In Merican, Z. and Quee Lan, Y. (Eds.) 1995. *Food Agenda 21st Century*. Malaysia: Malaysian Institute of Food Technology. 97-108.
- Wahlqvist, M.L. 1997. 'Nutritional deficiencies underpin some clinical disorders'. *Current Therapeutics.* 34-35.
- Wahlqvist, M.L., Hsu-Hage, BH-H., Kouris-Blazos, A. and Lukito, W. (Eds.) 1995. *Food Habits in Later Life: A Cross-cultural Study*. Melbourne: *Asia Pac J Clin Nut & United Nations University Press*, (CD Rom).
- Wahlqvist, M.L., Hsu-Hage, BH-H., Kouris-Blazos, A. and Lukito, W. 1995. 'Food habits in later life --An overview of key findings'. *Asia Pac J Clin Nutr.* 4(2): 1-11.
- Wahlqvist, M.L., Kouris, A., Gracey, M. and Sullivan, H. 1991. 'An anthropological approach to the study of food and health in an indigenous population'. *Food & Nutr Bull.* 13(2): 145-149.
- Wahlqvist, M.L., Kouris-Blazos, A., Hsu-Hage, BH-H. 1998. 'Ageing, food culture & health'. *SE Asian J Trop Med Pub Health.*
- Wahlqvist, M.L., Kouris-Blazos, A. and Savige, G. 'Older people - physiological changes'. In Sadler, M.J., Caballero, B. and Strain, J.J. (Eds.) *Encyclopedia of Human Nutrition*. London: 43.
- Wahlqvist, M.L., Kouris-Blazos, A. and Savige, G. 1999. *Food-based Dietary Guidelines for Older Adults: Healthy Ageing and Prevention of Chronic Non-communicable Diseases*. WHO, (in press).
- Wahlqvist, M.L., Lukito, W. and Hsu-Hage, BH-H. 'Nutrition and ageing in development. In Biswas, M.R. and Gabr, M. (Eds.) 1994. *Nutrition in the 90s - Policy Issues*. Oxford: Oxford University Press. 84-108.
- Wahlqvist, M.L., Savige, G.S. and Lukito, W. 'Nutritional disorders in the elderly'. *Med J Aust.* 163: 376-381.
- Wahlqvist, M.L., Wattanapenpaiboon, N., Kannar, D., Dalais, F. and Kouris-Blazos, A. 1998. 'Phytochemical deficiency disorders'. *Current Therapeutics.* 53-60.
- Wahlqvist, M.L., Worsley, A., Harvey, P., Crotty, P and Kouris-Blazos, A. *Food-Based*

- Dietary Guidelines for the Western Pacific: Nutrition in Transition*. Manila: World Health Organization, (in press).
- Willet, W. 1994. 'Diet and health: What should we eat?' *Science*. 264: 532-537.
- World Health Organization. 1996. *World Health Statistics Annual 1995*. Geneva: WHO.
- World Health Organization & Food and Agriculture Organization. 1996. 'Preparation and use of food-based dietary guidelines. Report of a joint FAO/WHO consultation, Nicosia, Cyprus'. Geneva: WHO.

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with
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