Nestlé
Good Food, Good Life

Food and Nutrition Communication

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Good Food for Healthy Ageing

Studies show that many institutionalised older people are not getting a properly balanced diet for their age, and many are not even absorbing the recommended amount of energy per day.

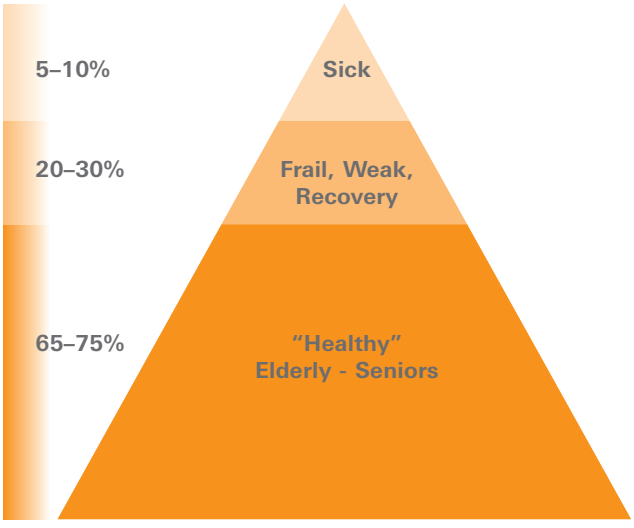
In this edition we look at the differing nutritional needs of the older adult population from the still dynamic 60+ to the more frail 80+ age groups.

Outlined are some of the reasons for poor nutrition, how nutritional requirements for older people differ from those of younger adults, and what are some of the health risks for the elderly. Finally we report on how Nestlé is engaged in research and development for this widening sector of the world population.

The over-sixties make up the fastest growing segment of the population in most industrialized countries. Although life expectancy has also increased dramatically over the last 100 years, this segment of the population is susceptible to many health risks from a poor diet. Evidence from various sources indicates that many older people fail to get the amounts and types of food necessary to meet essential energy and nutrient needs. There are numerous reasons why older people might not be getting the most nutritious diet and health care professionals are encouraged to be aware of this possibility.

Who are the "Elderly"

65+ population



Source: Nestlé Research Center

Why poor nutrition occurs

Psychological, physiological and economic changes can all contribute to poor nutrition among the elderly. Ensuring people eat healthily therefore needs an approach that tackles a whole range of factors contributing to sub-optimal macro and micronutrient intakes.

After the age of fifty, many metabolic and physiological changes occur in the body. The metabolic rate slows down, and can decline by as much as 30% over a lifetime. Body composition changes as lean tissue mass declines and the proportion of fat increases. This means that most older people actually need a slightly larger amount of protein in their daily diets to try to maintain lean tissue mass, the more so because as people age, their bodies use and absorb protein less efficiently than when they were young.

Oral and dental problems, and loss of appetite through illness or medication can all add to an unsatisfactory nutritional status.

While there are many physical and clinical factors that can contribute to undernutrition, equally important are social and economic factors. Loneliness, depression, worrying about money, lack of cooking skills, and a suspicious attitude to 'new' foods, or foods people are not familiar with, can all contribute to a state of inadequate nutrition. Affordability of food is perhaps the most crucial issue for retired people on small pensions or low income levels.

Older people can be over-sensitive to health warnings

There is evidence that older people are very sensitive to health warnings. Sometimes nutrition messages aimed at ***other*** groups, such as overweight young or middle-aged people are taken very seriously by older individuals, who then worry too much about eating energy-dense food,

or over-restrict their consumption unnecessarily. One of the unfortunate consequences of the low-fat message with regard to cholesterol, for example, is that many people deprive themselves of healthy oils such as olive, rapeseed or high-oleic sunflower seed oil which could make their meals more enjoyable while actually improving their cholesterol status.

Caregivers for the elderly: inadequate knowledge of nutrition

A study *[1]* in the United States of 78 care-givers to determine their knowledge of nutrition and specific nutritional care behaviours, indicated that knowledge of nutrition was minimal, despite the fact that many of the survey participants were educated beyond high-school levels. Most of the care givers surveyed, however, believed the people they were looking after were receiving a nutritionally correct diet.

Health behaviours are partially linked to health beliefs. Getting older people to eat better is actually easier than persuading many young adults to do the same. Health promotion campaigns for the older sectors of the population should concentrate on clearing up confusion in older people's beliefs about the nutritional value of certain foods, enabling them to make more positive lifestyle changes they can believe in, and hopefully, adhere to better.

The economic factor

Animal-protein foods are usually expensive. Many old age pensioners can not easily afford to eat meat or fish every day, but eggs, and pulses such as lentils, are less expensive sources of good quality protein. It is extremely important that new products designed for older people should be affordable.

Nutritional status evaluation

Unrecognised undernutrition can cause the condition known as "failure to thrive" and can trigger a domino effect to further decrease the physical health and psychological function in the elderly.

The nutritional status is determined by nutrient requirements that are themselves influenced by other factors, such as physical activity, lifestyle, family and social networks, mental and intellectual activity, disease states, and socio-economic constraints. Any meaningful evaluation of nutritional status must take account of all these parameters.

Nutritional intervention should begin with regular weight monitoring, but not be based on this. The Mini Nutritional Assessment questionnaire, developed by the Nestlé Research Centre in collaboration with the Universities of Toulouse and Alburquerque in the early nineties was designed to enable health professionals to perform a rapid screening of the risk for undernutrition in the 65+ age group. *(www.mna-elderly.com)*

How much do nutritional needs for seniors differ from those of younger adults?

Most nutritional requirements remain about the same, ***but energy needs decrease***. People in the older age groups should choose foods with ***high nutrient density***.

Energy needs decrease with age because the lean body mass decreases and the overall level of activity usually decreases as well. Calorie needs depend on activity level as well as on body weight and composition, so obviously a person who is confined to bed needs less than a person who is mobile. The higher the lean body mass, the more a person can eat without gaining weight and the more likely he or she will be to get adequate supplies of nutrients from daily meals. The body needs about 1.5 times the basal energy expenditure per day. There is a 10% reduction in this caloric need between the ages of 50 and 75 with an additional 10-15% reduction after 75, depending on individual activity.

The European Union's 2004 Nutri-Senex report gives the following macro-nutrient recommendations:

Energy measured in k/cal : Men – 2,300, Women 1,800

Protein 0.8–1.0g pro/kg body weight and about 12–14% of total k/cal

Fats no more than 10% from saturated fat.

(Dietary cholesterol: no more than 300mg per day)

Carbohydrates: minimum 50–100g per day At least 50% of total calories should come from complex carbohydrate sources.

Fibre: 20–35 g per day

Vitamin A needs decrease, so vitamin A in the form of supplements should be avoided. Requirements should be covered by varied food choices.

Vitamin D needs increase, so exposure to sunlight is recommended and vitamin D-rich foods such as fish and fortified skim milk should be part of the diet.

Vitamin B12 needs increase. This vitamin, extremely important for brain function, is found in lean red meat, chicken and skim milk. In fact all vitamins of the B group are important with advancing years. *(see more on B12 below)*

Folate is not required in higher doses than for younger adults. It is commonly found in green vegetables, liver and yeast.

Chromium needs increase. Whole grain cereals and brewers' yeast are good sources.

Zinc needs increase. Foods rich in zinc are red meat, oysters, wheat germ and whole grains.

Water *(see section on Dehydration)* at least 6-8 glasses daily.

Calcium
In old age, calcium is less well absorbed, due to alterations in vitamin D metabolism. Many post-menopausal women do not get their 1000mg daily intake, or three servings of calcium-rich foods per day. Many studies even recommend 1500 mg per day. It is recommended that older people who are lactose intolerant or allergic to milk, look for special foods such as black molasses (treacle) or other non-milk sources or supplements to complete daily requirements. Mineral waters such as Contrex are a good source of assimilable calcium. *(See also section on osteoporosis)*

Some common health concerns among the ageing population

Dehydration

Dehydration is frequent among elderly people. It is often the reason for urgent hospitalisation, and if undiagnosed, can be fatal. The loss of fat-free mass, (which contains over 70% water) that occurs with ageing, can induce total body fluid imbalance. The sensation of thirst diminishes with age and therefore the risk of dehydration increases as people "forget" to drink, (old age often being accompanied by diminished cognitive and visual function). This double risk – lack of sensation of thirst, plus "forgetting" to drink – puts major responsibility on caregivers to make sure elderly people drink small quantities regularly. Many older people are afraid of incontinence or prostate problems and voluntarily limit their water intake. Dehydration is often linked to infection and can be very serious - mortality reaching up to 50% of cases involving both conditions. Water loss of as little as 2% body weight leads to decreased endurance and the risk of heat exhaustion. Maintaining sufficient water in the body is important because cells need adequate hydration to function correctly.

For a long time it was thought that water movement occurred by simple diffusion across cell membrane layers. It is now known that water crosses the membranes through water channels or acquaporins, which are made of proteins and are present in the lipid membrane in large numbers. Water is renewed rapidly and constantly in the tissues, maintaining a balance between intake and losses. Water deprivation can result in dehydration in just a few days. In the elderly it may result not only from drinking less but also from eating less, as food contains significant amounts of water. This fluid deficit from eating less food must be made up for with increased intake of liquids.

The water requirement of an individual can be defined as the quantity of water necessary to maintain homeostasis of both intra- and extra-

cellular liquid compartments. Unfortunately, precise recommendations for water consumption are still under discussion. This is in fact quite a complex area of research. It is not just a question of "the more the better". Several cases of water intoxication in hospitalized patients reported recently in France were due to ***over***-consumption of water, some old people being forced to drink over three litres of water per day as a consequence of the excessive zeal of their healthcare providers, themselves haunted by the spectre of the high mortality figures for old people in France, and indeed throughout the whole of Europe, during the very hot summer of 2003.

Knowing when a person is dehydrated

Sudden weight loss, muscle cramps and mental confusion and a feeling of intense tiredness and muscular weakness are typical signs of dehydration. Concentrated urine, also considered a sign, actually depends on the kidneys' ability to concentrate or dilute urine. Kidney function is reduced in elderly, which makes it more difficult for an old person to recover either from dehydration or from over-hydration.

Loss of Mobility and Autonomy

The elderly are at significant risk of vitamin D deficiency for various reasons, but primarily because of reduced exposure to sunlight and impaired vitamin D metabolism. The risk is particularly high for those living in less sunny countries or those who are confined to their homes, but even in Australia, as many as 75% of nursing home residents have marginal vitamin D deficiency. What is interesting is that beyond the osteoporosis factor, (and the danger of fractures after falls), there is reason to believe that vitamin D can actually play a role in ***preventing*** falls in the first place, by improving ***muscle strength and reaction***. Vitamin D has important functions unrelated to calcium and bone metabolism. These extra functions include effects on immunity, muscular strength and coordination. Deficiency produces muscle weakness. There is a direct correlation between serum vitamin D level and leg muscle strength in the elderly *[13]*. This is particularly relevant because muscle strength and muscle mass both decline sharply with advancing age, thus increasing the risk of falls. More severe atrophy of hip muscle fibre is observed during hip fracture operations on patients with low levels of vitamin D.

Arthritis

Osteoarthritis is the most common form of arthritis. This joint disease affects most commonly the knee, the hip, the spine and the joints of the hands. The major symptoms of osteoarthritis include joint pain and stiffness. Age is the most important risk factor for osteoarthritis making this disease one of the leading causes of disability in the elderly. Osteoarthritis affects 37% of the adult population and 85% of those over 80 years old. In Europe in 1998, osteoarthritis was the second most prevalent disease after ischaemic heart disease in 45–59 year olds. In the US, by 2020, the estimated number of persons with osteoarthritis is projected to increase by 57% and activity limitations by 66%, mainly because of the increasing average age of the population.

Currently there is no cure for osteoarthritis. For knee and hip osteoarthritis, once the articular cartilage is completely destroyed and the pain unbearable, joint replacement surgery (prosthesis) is performed. Before this extremity however, the symptoms can be eased with aids such as analgesics, the use of a walking stick or frame to encourage exercise, and certain ***nutritional*** measures.

The ability of specifically designed nutritional interventions to improve the condition of osteoarthritic patients is demontrated by the well-described pain relief efficacy of glucosamine sulfate and chondroitin sulfate *[14]* and by their broad use by osteoarthritic patients. *(A recent systematic review of the literature [15] also found good evidence of efficacy for avocado, soybean, and other plant extracts.*

Osteoporosis
New research on the acid/alkali ratios — effects of Potassium

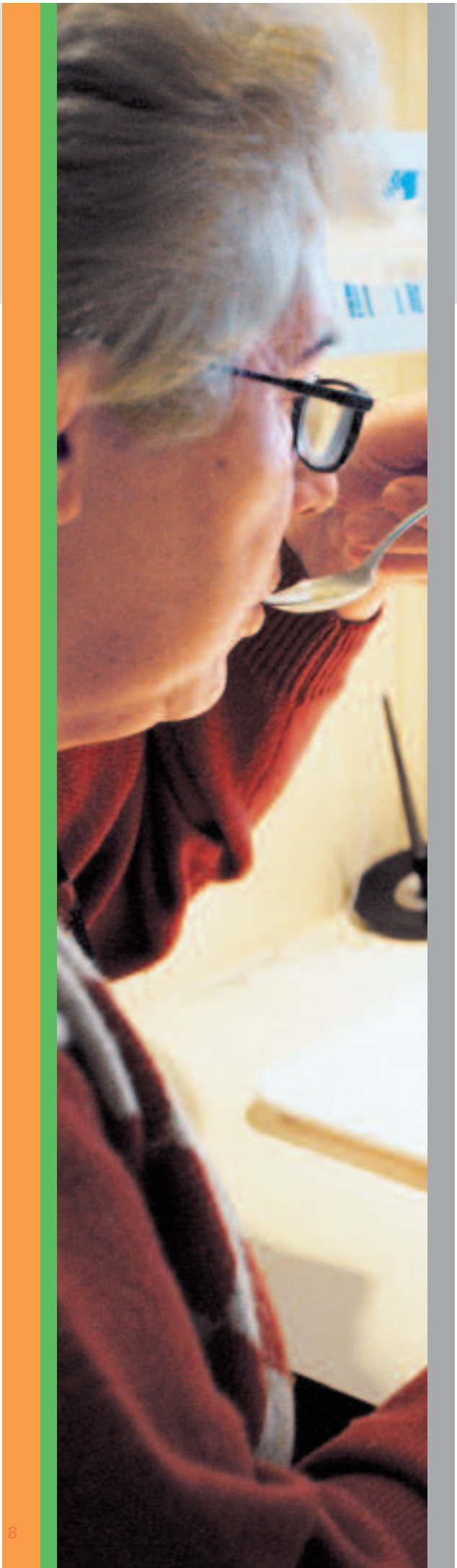
Osteoporosis, the gradual weakening and fragilisation of the bones, is estimated to affect about 75 million people in Europe, the USA and Japan. According to the International Osteoporosis Foundation, the direct cost of fractures is €31.7 billion in Europe and $17.5 billion in the US. Calcium intake is often found to be too low in populations at risk, and assimilation depends largely on efficient Vitamin D metabolism.

It is well known that the mineral potassium is important for regulating pH (acid) levels in body fluids, blood pressure, muscle and nerve cells, osmotic pressure and water balance. It is often included in diet products and meal replacement bars because it is critical for individuals who are dieting or taking diuretics.

New research, published in the November 2006 issue of the *Journal of the American Society of Nephrology*, claims to be the first to report the benefits of pH regulation with potassium citrate and the subsequent effects on bone mineral density.

The researchers, led by Prof. Krapf, recruited 161 post-menopausal women (average age 59) with known low bone mass, and therefore considered to be at high risk of fracture. The women were randomly assigned to one of two intervention groups, one taking potassium citrate supplement as tablets, which provides a very small amount of alkali, and another an equal dose of potassium chloride supplement (acidic). After one year, women taking the potassium ***citrate*** supplement were reported to have a significant, 1% increase in bone mass density in the vertebrae of the lower back (lumbar spine), compared to baseline.

However, the bone density of the lumbar spine of women taking the potassium ***chloride*** supplement (acidic) was found to have significantly decreased after one year of supplementation, also by about 1%.



Increases in bone mass at the hip are also reported in the study. Women taking the alkaline supplement were also found to have lower amounts of calcium excreted in the urine. Lower calcium excretion was interpreted as greater calcium retention in the skeleton.

The mechanism behind the apparent benefits is thought to be by the alkaline supplement's neutralization of the high body acidity caused by the modern western diet.

"In the modern diet, acid is generated from foods like dairy products, grains, and meats," explained Prof. Krapf in a statement. *"Previous studies have found that the kidney does not quite keep up in removing this excess acid load, resulting in mildly elevated blood acidity.*

"Taking an alkaline supplement in this study resulted in sustained reduction of acidity of body fluids, assessed by urinary acid and citrate tests, such that in essence, the supplement modified the effects of the normal diet, making it mimic the low acid content of the ancestral diet of nearly all fruits and vegetables."

Although many other substances are known to play a role, the results of this particular study, by Prof. Reto Krapf of the University of Basel, Switzerland, demonstrate for the first time that just by partially reversing the acidity of the diet, bone mass increased rapidly in amounts that are comparable to those achieved by medication.

Decline in Immune function, and Infections

Infections are common in old age, and in many cases fatal. Specialised nutrition can help to boost individual immune function to some extent.

As people age, immune function diminishes in different ways. For example, there can be a decreased antibody response to vaccines such as the 'flu vaccine. There are also decreased cell-mediated immune responses (decreased T-cell

responses). With ageing there is also an almost permanent activation of macrophages – the cells that destroy foreign material - and an important increase in the production of radicals derived from oxygen, leading to chronic oxidative stress.

Many nutritional deficiencies in elderly have been associated with decreased immunity. Dietary antioxidants such as vitamins A, C, and E are believed to be of particular importance due to their stabilizing effect on cell membranes and the prevention of damage by free radicals. Vitamin E in particular enhances the immune response in elderly *[4]*. Minerals such as iron, zinc, selenium and copper are needed for enzymes to neutralize free radicals. The combination of zinc and selenium lowers the incidence of respiratory and urinary infections and enhances the antibody response to the 'flu vaccine *[5]*.

Probiotics – beneficial intestinal bacteria – have been clinically shown to boost immune properties in elderly. A study by a team of Nestlé researchers and the Department of Medicine of the University of Chile, to test the effects of a nutritional supplement on the immune response and cytokine production of free living Chilean elderly people, demonstrated increased innate immunity and protection against infections *[16]* Dr. D. Bunout and colleagues concluded that the nutritional supplement, containing a combination of micronutrients (vit. E, B12), probiotics and prebiotic fibres did indeed have this effect of reducing the incidence of infections in elderly people. *See also Food and Nutrition Communication June 2003, for more on Probiotics.*

As people age, protein metabolism also slows, and the rate of replacement of specific amino acids therefore also declines, leading to less efficient immune function and/or response to infection or trauma *[6]*.

Declining cognitive function

Just getting older increases the risk of developing dementia, but there are many factors that make some people age better than others.

Using Folstein's Mini-Mental State Examination and Pfeiffer's Mental Status Questionnaire, researchers in Madrid found that test groups with a better balanced diet had better results in the mental tests, adding to the growing body of evidence showing the influence of good nutrition on the brain. How exactly this happens is being actively researched.

High alcohol consumption and vitamin and zinc deficiency negatively affect the brain. Vitamins of the B group and fish oils are promising components against cognitive decline, Recently, scientists from the Karolinska University Hospital Huddinge in Sweden reported that omega-3 fatty acid supplementation, mainly DHA (docosahexaenoic acid) may slow mental decline in people with very mild Alzheimer's disease *[7]* Folic acid, has also been shown to slow cognitive decline in people over 50. Caffeine is a substance that has been been shown to improve mood and reduce anxiety.

Nestlé and the EPFL will work together on nutrition and the brain.

The Nestlé Research Center and the EPFL (Ecole Polytechnique Fédérale de Lausanne – one of the two Swiss Federal Institutes of Technology), recently signed a five-year agreement to conduct research on the relationship between nutrition and the brain. Under this agreement, Nestlé will contribute CHF 5 million per year to research at EPFL's Brain Mind Institute, where two Nestlé Chairs will be established. The research will extend from studying the role nutrition plays in children's brain development to identifying ways of slowing down brain decline in older age and preventing conditions such as Alzheimer's disease.

Gastric problems and Vitamin B12

Vitamin B12 deficiency is high among the elderly often because atrophic gastritis (or a previous history of gastric surgery) decreases the production of the acid and digestive enzymes needed to disconnect protein-bound vitamin B12 from the natural chemical form of vitamin B12 found in

meat, poultry, fish and dairy foods. Between 5 and 20% of older adults have some degree of B12 deficiency. Clinical trials indicate that an oral dose of 500microg/d of crystalline vitamin B12 is needed to reverse biochemical signs of vitamin B12 deficiency in older adults *[8]*.

Weight management

Although we have spoken mainly about the frail elderly in this publication, some older people are overweight or obese for a number of reasons including sedentary lifestyle. The primary nutritional problems affecting this sector of the population are excess energy intake, and mild vitamin and trace mineral deficiencies. Obesity makes breathing more difficult and aggravates many chronic diseases. Heavier women, on the other hand, are less susceptible to hip fractures. This is not only because of the added 'padding' and stronger muscles, but also to potentially higher oestrogen levels from the conversion of precursor steroids to oestrogen in fat tissue *[6]*.

Healthy Eating Messages

- Eat More Calcium-Rich Foods
- Eat Protein-Rich Foods
- Eat More Green Leafy Vegetables
- Eat More Fibre, Seeds and Nuts
- Eat More Fruits with Antioxidants and Vitamin C
- Eat More Fruits and other coloured Vegetables with Phytonutrients

Good Food – some healthy eating recommendations

Although older adults need fewer total calories, they have an increased need for certain vitamins and minerals. This increased need must therefore be satisfied with a lower overall intake. It is especially important for seniors to eat foods rich in nutrients such as vegetables and fruits, whole grains, lean meat, fish, poultry, low-fat milk and dairy products, nuts and seeds. Sweets and alcohol should be limited, but not excluded, as a good healthy diet should also give as much pleasure as possible within reasonable limits.

Vegetables and Fruit

A British study *[3]* to assess the levels of vegetable and fruit consumption in elderly people, and to examine the socio-economic, physical and psychological factors which influence this consumption, revealed that of the 445 people aged 65+ observed, less than half of the respondents achieved the target of five portions of fruit and vegetables per day, (37% of those in urban areas and 51% of those in rural areas). The profile of the low fruit and vegetable consumer was male, a smoker, and someone with low levels of social engagement. The study concluded that most fruit and vegetable campaigns were not reaching the targeted elderly, and those particularly at risk of low consumption. Findings may be extrapolated to similar areas of the world.

Present in fruit and vegetables, phytochemicals, also known as phytonutrients, are plant-based compounds with a number of physiological functions. They include phenolic phytochemicals, (flavonoids, tannins, stilbenes and lignans), carotenoids, phytosterols, and sulphur-containing compounds (sulphides and glucosinolates). Phytochemicals can have beneficial effects in a range of diseases including cardiovascular disease and cancer, as well as immune function. Knowledge is still incomplete about their metabolism, bioavailability, mode of action, dose response and in some cases, the actual compounds responsible

for the health benefit *[6]*. The antioxidants present in many foods, but particularly in fruit and vegetables help to counteract chronic inflammation, a risk for the onset of various degenerative diseases. Vegetables are far richer in useful nutrients than fruits, but fruits are pleasant to eat, so better accepted in health campaigns.

A micronutrient strongly associated with eye health is lutein. This carotenoid extracted from Marigold flowers is claimed to have stronger antioxidant activity than beta-carotene and lycopene. It is safe at all recommended doses, and could protect against damage to the eyes through the ageing process.

Protein

The importance of protein, especially in the elderly *[11]*.

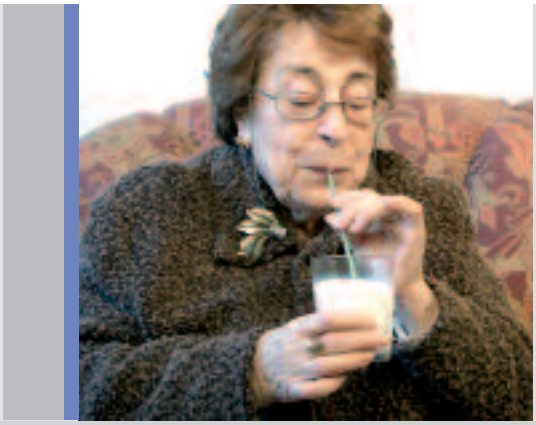
Protein is an essential macronutrient that must be consumed in the diet throughout life. The reason for this is that 8 of its total of 20 constituent amino acids (the basic units that are linked together to form proteins) cannot be made by the body from other metabolites and, therefore, have to be obtained from food. For this reason they are referred to as essential amino acids. The amino acids are: leucine, valine, isoleucine, tryptophan, phenylalanine, threonine, methionine and lysine. In addition to these, 6 other amino acids are considered as semi-essential – because although the body is capable of synthesising them from other metabolites, the amount that can be produced may not always be sufficient to satisfy needs in specific situations (such as during an infection). These semi-essential amino acids are cysteine, tyrosine, arginine, histidine and glutamine. The remaining 6 (glycine, alanine, proline, asparagine, aspartate and glutamate) can always be synthesised in adequate amounts.

Protein is required for many specific functions in the body, the overall purpose being to build and maintain the tissues of the body - both structurally (as in the case of muscle, connective tissue, blood vessels, skin and internal organs) and functionally (such as digestive enzymes, metabolic enzymes, haemoglobin, antibodies and peptide hormones).

Protein needs, expressed per kg body weight change little during adult life (recommended dietary intake for adults above the age of 18 years are 0.8 g dietary protein per kg body weight). However, with increasing age there is a commensurate decrease in the efficiency of digestion, a gradual but continuous decrease in muscle mass (muscle wasting) and an increase in the risk of infection – all of which require higher protein levels to overcome or compensate for them

Although there are currently insufficient data to establish an adequate protein allowance specifically for older persons, it is suggested that the recommendation for protein intake for older people should be increased by around 10%–20% (i.e. be between 0.9–1.0 g protein per kg body weight instead of the current 0.8g per kg body weight for all adults above the age of 18 years).

In fact a 10-year longitudinal study *[12]* in initially healthy elderly women showed that women who habitually consumed greater than 1.2g protein per kg body weight developed fewer health problems than those who consumed the recommended value of 0.8g.



Dietary recommendations - Tables

Macronutrients: Recommended Intakes for Different Age Groups

Life stage	Total water (L/d)		Carbohydrates (g/d)		Total fibre (g/d)		Protein (g/d)	
19–30 yrs	3.7	2.7	**130**	**130**	38	25	**56**	**46**
31–50 yrs	3.7	2.7	**130**	**130**	38	25	**56**	**46**
51–70 yrs	3.7	2.7	**130**	**130**	30	21	**56**	**46**
> 70 yrs	3.7	2.7	**130**	**130**	30	21	**56**	**46**

For 70 kg adult males and 58 kg adult females

Bold type: *Recommended Dietary Allowances (RDAs) to meet needs of 97-98% of individuals in a group*

Ordinary type: *Adequate Intakes (AIs) believed to cover needs of all individuals in a group*

Trans- and saturated fatty acids as low as possible while consuming a nutritionally adequate diet

Added sugars limited to no more than 25% of total energy

Total water is all water contained in all foods and drinks

Source: Food and Nutrition Board, Institute of Medicine, National Academy, Dietary Reference Intakes for Macronutrients (2002)

Micronutrients: Recommended Intakes for Different Age Groups

Life stage	Vit A (uμ/d)		Vit D (uμ/d)		Vit B12 (uμ/d)		Folate (uμ/d)		Chromium (uμ/d)		Copper (uμ/d)		Zinc (uμ/d)	
19–30 yrs	**900**	**700**	5	5	**2.4**	**2.4**	**400**	**400**	35	25	**900**	**900**	**11**	**8**
31–50 yrs	**900**	**700**	5	5	**2.4**	**2.4**	**400**	**400**	35	25	**900**	**900**	**11**	**8**
51–70 yrs	**900**	**700**	10	10	**2.4**	**2.4**	**400**	**400**	30	20	**900**	**900**	**11**	**8**
> 70 yrs	**900**	**700**	15	15	**2.4**	**2.4**	**400**	**400**	30	20	**900**	**900**	**11**	**8**

For 70 kg adult males and 58 kg adult females

In Bold type: *Recommended Dietary Allowances (RDAs) to meet needs of 97–98% of individuals in a group.*

In ordinary type: *Adequate Intakes (AIs) believed to cover needs of all individuals in a group.*

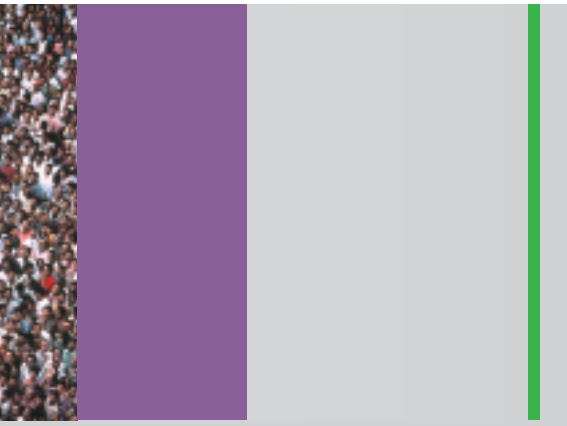
It is suggested to meet Vitamin A requirements, not as retinal supplements, but in the form of carotenes, lycopene, which are safer.

10 to 30% of the elderly may malabsorb food vitamin B12 due to loss of ability to cleave enzyme from its protein carrier: over 50 years old, should eat Vit B12 enriched foods or B12 supplements.

Requirements for over 50s: Vitamin C, men –90 mg/d, women –75 mg/d; Calcium, men –1500 mg/d; women –1200 mg/d; Magnesium, men –350 mg/d, women –280 mg/day; Iron, men and women –10 mg/d

High levels of fibres or simple sugars can increase excretion of chromium

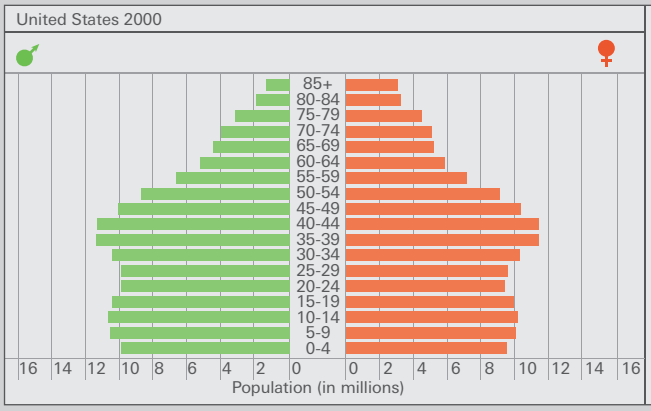
Source: Food and Nutrition Board, Institute of Medicine, National Academy, Dietary Reference Intakes for Micronutrients (2004)

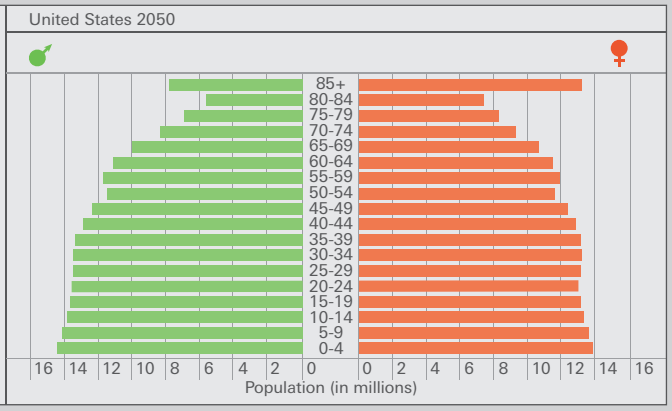


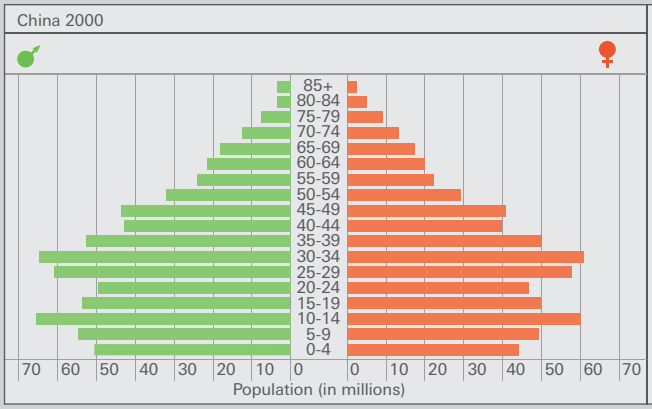
The Demographics of Ageing

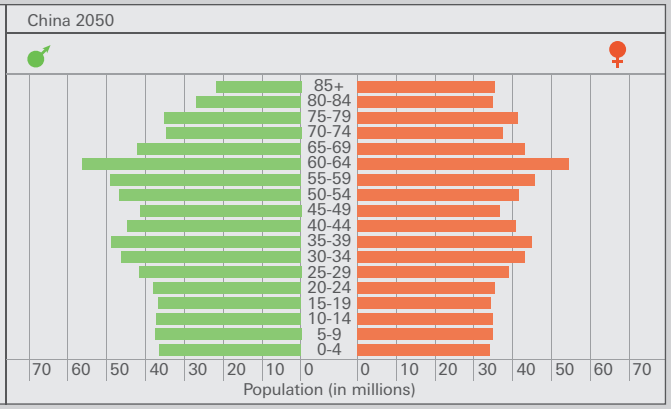
The following charts show the populations of the United States, China and India from the year 2000 compared to provisions for all three countries in 2050.

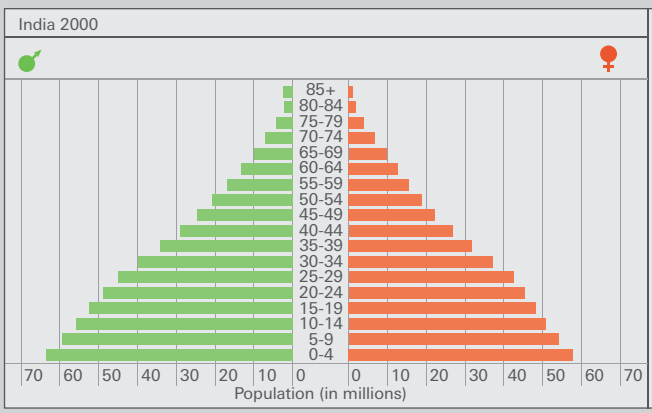
The charts show the increasing cohorts of older people to be cared for in the coming years

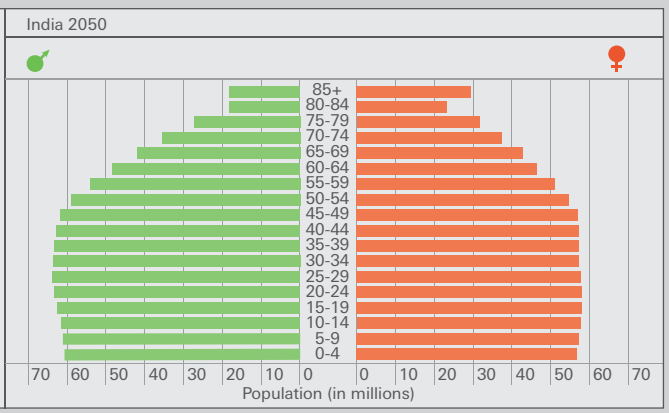












Source: U.S. Census Bureau, International Data base

Nestlé can provide excellent products for healthy ageing.

Whey protein is an important ingredient for products designed for older people. Whey, which makes up 20% of milk protein, is absorbed quicker than other protein sources, including casein.

Nestlé Nutrition's NUTREN Optimum is a delicious meal replacement, in vanilla or chocolate flavour, which has been very successful since its launch in the Philippines. The taste of NUTREN Optimum Chocolate is preferred by consumers over alternative products in a consumer test, which underlines the advantage of offering taste variety to motivate the elderly to consume these products. NUTREN contains whey, plus all of the essential nutrients, vitamins and minerals necessary for this age group. Whey protein has been clinically demonstrated to:

- Help maintain muscle mass throughout ageing, and repair body tissues
- Provide anti-oxidant benefits by raising levels of glutathione (the body's primary anti-oxidant).
- Help boost the immune system, thereby helping reduce the risk of infection.

More Appetizing Snacks for the Elderly!

Results of a cross-sectional study of dietary patterns among elderly people held at the Ben-Gurion University of the Negev, Israel, showed that total food intakes were lower among people older than 75 than in the 65–74 year old group. Risk factors for low intake included poor appetite and health status, gastrointestinal problems and the social isolation of eating alone. Intakes of fat, carbohydrates, vitamins E, C and B1 were significantly lower for people aged 75 and older compared with people aged 65–74. Factors contributing to lower energy intake were low appetite and more use of medication for both sexes and with eating alone. The authors of the study recommended more frequent snacking for this age group to make up the deficit *[9]*.

In Japan, a new product KindNes, features Whey Protein and Zinc. Zinc is a nutritional element which helps to metabolize protein and nucleic acid. It is essential for bone mineralization and the development of collagen matrix. This product has the most effective ratios of calcium:phosphorus and omega oils 3:6.

These and other products are based on the amino acid profile of whey protein, the benefits being excellent tolerance, rapid digestion and its stimulation of the muscle-building protein synthesis. The work on whey protein was a significant scientific development by the Product Technology Centre of Konolfingen, Switzerland, with "Whey-way" technology. This work will pave the way for developing new products to boost body protein synthesis and help maintain lean body mass.

One of the signs of Alzheimer's disease is weight loss and muscle wasting (sarcopenia) as patients often forget to eat. One of the best and easiest ways of ensuring Alzheimer's disease patients can cover their protein and micronutrient requirements is with a nutritional supplement in the form of a drink. Nestlé Nutrition has products that are particulary suitable for this situation (Build-Up), including a powdered product to be mixed with milk in the UK, and for Spain a soup product, simply mixed with hot water.

In the Corporate Wellness Unit's 3rd edition of Food and Nutrition Communication, dealing with the skin, we outlined Nestlé Nutrition's contribution to the healing of pressure sores through targeted supplementary food drinks.

Nestlé Branded Active Benefits (BABs)

Milk based products containing probiotics such as *LC1* and *Prebio 1* for intestinal health, or others with *Calci-Lock* for bone matrix formation and to help reduce bone loss in post-menopausal women, are particularly useful for older people who continue to buy their own regular products.

Three other relevant BABs for the older adult age groups are: *Omega 3:6*, which offers optimized levels of saturated, monounsaturated and polyunsaturated fatty acids and a balanced ratio of omega-6 to omega-3 fatty acids, *ActiFibras* which helps prevent constipation, and *ActiCol* to lower plasma cholesterol with selected plant sterols, widely recognized for their cardio-vascular benefits.

Packaging

Food packaging can be a problem for older people living at home with failing eyesight and weaker hands due to arthritis. Labels printed large enough to read, and packets made easy to open and close, are therefore important. So also is correct sizing of portions. Sophisticated, heavy or bulk packaging is not for individual elderly consumers living at home alone.

Last but not least the importance of exercise – Don't give up!

There is no reason to assume that it is too late to reap the benefits of adopting a healthier lifestyle after 65 or 70 years of age. Improvements in nutrition and regular exercise can benefit health into advanced old age. Older muscles are just as responsive to strength-training exercise as young muscles. Even 90-year olds have shown impressive increases in muscle mass, muscle strength and walking speed with weight training programmes. Endurance activities improve heart and lung fitness and psychological functioning, while strength training enhances muscle size and strength thus helping to reduce muscular atrophy.

30 minutes per day of an endurance exercise such as brisk walking, plus some strength training helps the tendons, ligaments and bones to remain healthy and improves blood sugar levels. The key is to stick at it. Don't give up *[6]*.

Conclusion

Although our lifespan is to a major extent genetically defined, the probability of reaching that lifespan in good health seems to be heavily influenced by environmental and lifestyle factors, especially diet.

The frail elderly population can suffer from osteoarthritis, osteoporosis, digestive malapsorption, muscle weakness, loss of cognitive function and sensory impairment as part of the 'normal' ageing process.
When to these factors are added physical, psychological and emotional stress, the risks increase sharply for compromised immune system, worsened inflammatory status, weight loss, generalised weakness, and all too often, thoughts of imminent decline, which can also negatively influence recovery.

Without overestimating our impact on certain factors of ageing, Nestlé can make a difference to the quality of life of older people by offering customized products based on research into optimal nutritional care of this growing sector of the population. Nestlé's commitment involves maintaining highest level collaboration with the scientific community. One such example is the agreement mentioned earlier between Nestlé and the Swiss technology institute EPFL which comes in the wake of the 3rd International Nutrition Symposium held at the NRC, in October 2006 on the subject of Food and the Brain. The symposium contributed to improving scientific understanding of the importance of food in fuelling the brain, and of the activity of brain in choosing food. The brain uses about a quarter of the body's energy and a key notion was that a good diet has more potential than previously recognised to improve brain function. These findings are likely to help set specific nutritional targets to slow down or even stabilise age-related brain decline – a giant step towards improving the quality of life for older people.

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Nestlé

Good Food, Good Life

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