Bayer HealthCare

European Nutritionals Press Workshop

Vitamins and minerals for health

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Outline

- Ensuring micronutrient sufficiency throughout the life cycle
- Populations at risk, particularly women of childbearing age and the elderly
- Inadequate micronutrient status is common in industrialised population
- Role of food supplements in nutrition and health policies

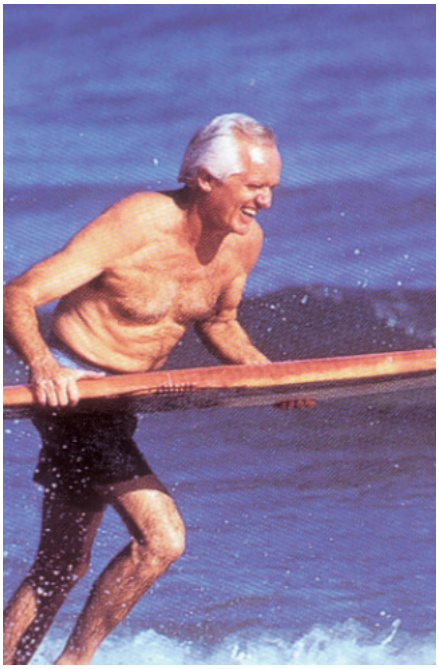
Role of nutrition

- **Maintain normal health**
- **Optimise performance and well-being**
- **Reduce risk of disease**

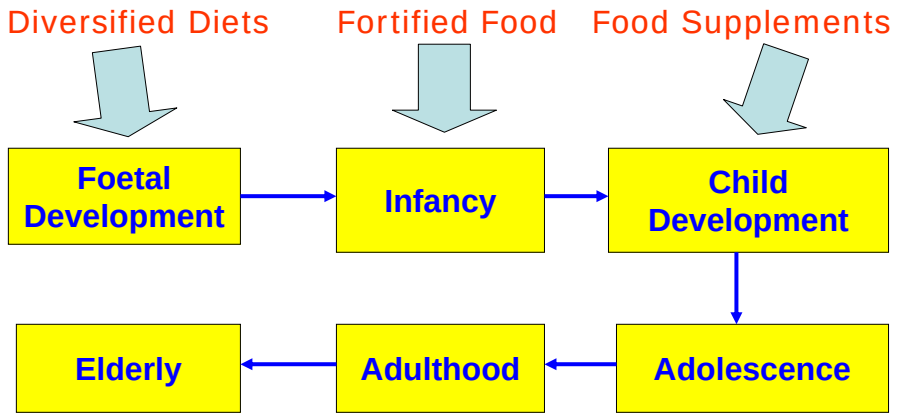
The essentials

- Water
- Carbohydrates
- Proteins
- Fats
- Vitamins
- Minerals
- Phytonutrients

- BALANCE
- VARIETY
- MODERATION



Ensuring micronutrient sufficiency throughout the life cycle



Diet is an important determinant of human health

OVERT DEFICIENCIES	MARGINAL DEFICIENCIES
Poor growth	Fatigue & loss of appetite Increased incidence of infections
Bone disorders	Impaired immune response

Increased susceptibility
to chronic degenerative diseases such as

heart disease, diabetes, cancers and osteoporosis

GRADUAL STATE OF NUTRIENT DEPLETION

Populations at risk

- Children and adolescents
- Women at various life stages
- The elderly
- People trying to lose weight
- People on restricted diets
- Socio-economically underprivileged groups
- Alcoholics and smokers

- Ideally, a sufficient & balanced diet should cover micronutrient requirements.
- There is a gap between the ideal balanced diet and the reality of what people actually eat.
- The body needs a regular supply of most essential nutrients.

Optimal development of the infant depends on mother's diet

- Pregnancy & lactation are periods when good nutrition is exceptionally important.
- The baby is not protected from the inadequate diet of the mother.
- Investing in nourishing pregnant & lactating women results in a many-fold return in better infant outcomes.

Zeisel SH (2009) *Am.J.Clin.Nutr.*89, 685S–687S

Recommended intakes for many essential nutrients increase during pregnancy & lactation

- Vitamin A is required for growth & maintenance of the foetus, particularly during the third trimester.
- Folate requirements increase to maintain plasma & red cell folate levels and to reduce incidence of neural tube defects in infants.
- Extra vitamin C is needed as the foetus concentrates the nutrient at the expense of maternal stores & circulating vitamin levels.
- Vitamin D to maintain vitamin D status & to reduce risk of hypocalcaemia, defects of dental enamel

Recommendations for food supplement use during pregnancy

- Convincing evidence that periconceptional folic acid supplementation can decrease neural tube defects in some women. Hence, many health organisations recommend routine folic acid supplementation of 400 µg/day from fortified foods, supplements or both, in addition to food folate from a varied diet.
- Essential nutrients for which there is a recommendation for supplementation during pregnancy include iron and iodine.
- US IOM recommends that all pregnant women who smoke or abuse alcohol or drugs take multivitamin & multimineral supplements, as should those on poor-quality diets or who are vegans.

Picciano & McGuire (2009) *Am.J.Clin.Nutr.* 89, 663S-667S

Iodine deficiency in pregnancy & the effects of maternal iodine supplementation on the offspring: a review

- Iodine requirements in pregnancy (WHO (2007) recommends 250 µg/day)
- Indicators of iodine status during pregnancy & infancy
- Iodine deficiency and effects on neurological development & function
- Effects of maternal iodine deficiency on the offspring
- Strategies to prevent or correct iodine deficiency in pregnancy with iodine supplementation in pregnancy

The importance of beta-carotene as a source of vitamin A with special regard to pregnant & breastfeeding women

- Vitamin A is important for lung development and maturation in the foetus and newborn.
- Pregnant women are generally advised to avoid liver and liver products based on unsupported scientific findings.
- Beta-carotene from foods & food supplements remain essential sources of vitamin A.
- Focus on diet & health communications and strategies to reduce micronutrient deficiencies, especially in young women.

Strobel, Tinz & Biesalski (2007) *Eur.J.Nutr.*46, 1–20

Dietary supplements contribute substantially to the total nutrient intake in pregnant Norwegian women

- Study done by the Norwegian Institute of Public Health based on 40,108 women.
- 81% reported use of 1 or more dietary supplements. The most commonly used categories were cod liver oil/fish oil (59%), folic acid (36%), multivitamin/multimineral supplements (31%) and iron tablets (22%).
- Nutrient contribution of dietary supplements was substantial (65% for folate & vitamin D as well as major contributions to DHA, EPA, vitamin B_6, copper & iron intakes).
- Need for public awareness of importance of iodine & vitamin D for pregnant women.

The sphere of influence of the vitamin D endocrine system goes well beyond calcium and bone

Selected biological responses relate to the health effects of vitamin D in the functions of the brain, muscle, heart & cardiovascular system, pancreas & insulin secretion, immune system, reduction of risk of cancer, calcium homeostasis & inflammatory disease of the central nervous system (multiple sclerosis).

Norman (2008) *Am.J.Clin.Nutr.* 88, 1455–1466.
Ramagopalan *et al.* (Feb. 2009) www.plosgenetics.org

Vitamin D nutritional status in the US population

- Looker *et al.* (2008) report a real decline in vitamin D status resultant from changes resultant from higher BMI, lower milk intake and more frequent sun protection.
- Mean serum 25(OH)D was lower in 2000–2004 compared with 1988–1994.
- Current trends in overweight, sun protection & milk intake support need to continue monitoring the serum 25(OH)D status of the population.

Looker *et al. Am. J.Clin.Nutr.* (2008) 88, 1519–1527.

The Nutritional Wellbeing of the British Population

Specific population groups identified as most at risk of poor dietary variety and low nutrient intake and biochemical status were:

- Children aged 18 and under
- Young adults aged 19–24 years (particularly women)
- Smokers
- People in lower socio-economic groups
- Adults aged 65 years and over living in institutions

UK Scientific Advisory Committee on Nutrition (September 2008) London: The Stationery Office

% of women with certain vitamin & mineral intakes from food sources below the RNI and LRNI (British Diet & Nutrition Survey 2000–1)

	19-24 yr		25–34 yr		35–49 yr		50–64 yr	
	< RNI	< LRNI	< RNI	< LRNI	< RNI	< LRNI	< RNI	< LRNI
Vit A Retinol equiv.	81	19	68	11	54	8	46	5
Riboflavin	45	15	38	10	22	5	8	6
Folic acid	40	3	36	2	28	2	25	2
Iron	96	42	93	41	90	27	38	4
Calcium	56	8	47	6	38	6	36	3
Magnesium	85	22	84	20	71	10	66	7
Iodine	63	12	56	5	38	4	31	1
Zinc	58	5	60	5	39	4	33	3

% of older free-living women with certain vitamin & mineral intakes from all sources below the RNI and LRNI

	65–74 yr		75–84 yr		85 and over	
	< RNI	< LRNI	< RNI	< LRNI	< RNI	< LRNI
Vit A retinol equivalents	44	3	45	5	43	4
Folic acid	43	3	53	6	62	11
Vitamin D	97	*	95	*	98	*
Iron	49	4	58	6	67	10
Calcium	52	8	63	10	62	15
Magnesium	82	19	91	27	95	34
Iodine	52	6	53	4	54	7
Copper	85	*	94	*	94	*
Zinc	61	3	66	7	70	10
*No LRNI established						

Nutrition, healthy ageing and public policy

International Alliance of Dietary Supplements Association
IADSA, 2007

“Every man desires to live long:
but no man would be old’.

—Jonathan Swift, 1706

HEALTHY LIFE EXPECTANCY IN SELECTED COUNTRIES

Mathers *et al. World Health Report 2000 Lancet* (2001) 357, 1685–1697

Country	Disability-Adjusted Life Expectancy (DALE)Yrs	RANK
Japan	74.5	1
France	73.1	3
Spain	72.8	5
Italy	72.7	6
Switzerland	72.5	8
UK	71.7	14
Germany	70.4	22
USA	70.0	24
Slovenia	68.4	34
Czech Republic	68.0	35
Poland	66.2	45
Hungary	64.1	62
Ukraine	63.0	70
Russian Federation	61.3	91
South Africa	39.8	160
Sierra Leone	25.9	191

- The dramatic increases in the number of elderly people around the world
- The challenges of an ageing population for healthcare and pension costs and the threat that poor health will derail efforts to extend our healthy working lives
- The nutritional vulnerability of older people (physical, social and psychological factors)

- The physical and cognitive changes that can lead to years of lost good health
- That safe nutritional interventions including conventional food, foods with added nutrients and food supplements can help slow the susceptibility to chronic disease, modulate the age-related decline in most organ functions and counter suboptimal nutritional status found in the elderly population
- The power of good nutrition to mitigate the burden of chronic disease and disability, and to improve the quality of life

Potential contributors to nutritional problems in elderly people

Physical factors	
Reduced total energy needs	Drug-nutrient interactions
Declining absorptive and metabolic capacities	Side effects of drugs (anorexia, nausea, altered taste, suppressed appetite)
Chronic disease	Restrictive diets
Anorexia	Alcoholism
Changes in taste / odour perception	
Poor dentition	
Reduced salivary flow	
Dysphagia	
Lack of exercise	
Physical disability (restricting the capacity to purchase, cook or eat a varied diet)	

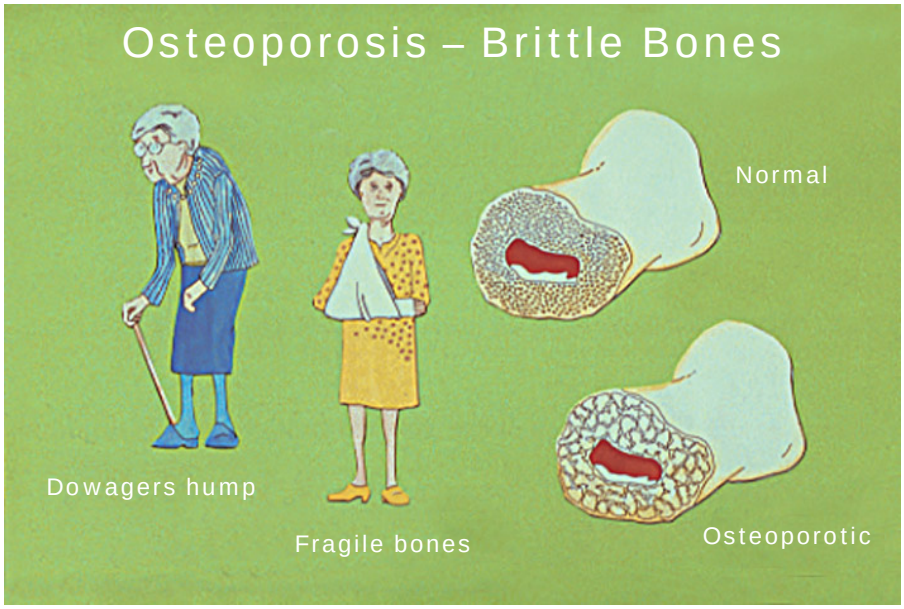
Potential contributors to nutritional problems in elderly people

Social & psychological factors	
Depression	Inadequate cooking or storage facilities
Loneliness	Poor nutrition knowledge
Social isolation	Lack of transportation
Bereavement	Shopping difficulties
Loss of interest in food or cooking	Cooking practices resulting in nutrient losses
Mental disorders	Inadequate cooking skills (men)
Food faddism	
Socioeconomic factors	
Low income	

The power of good nutrition to mitigate the burden of chronic disease and disability and to improve quality of life

- Chronic diseases—an epidemiological transition
  - **–obesity, diabetes, metabolic syndrome**
  - **–diet-related cardiovascular disease**
  - **–diet and cancer**
- Bone health
- Joint health and mobility
- Immune function and protection from infection
- Gut function and immunity
- Brain function and cognitive performance
- Cataract and macular degeneration
- Skin ageing
- Maintenance of lean body mass and muscle strength

With lower energy (calorie) intakes, ensuring nutrient density of the diet is even more vital.



Bone loss / osteoporosis / bone fractures

- Affects 1 in 3 women and 1 in 12 men over 50
- Annual cost of osteoporosis in the EU is nearly €14 billion.
- 414000 hip and 237000 spine fractures occur in Europe each year.
- Hip fractures account for over 90% of health service budget spent on osteoporosis.
- Hip fractures lead to an overall reduction in survival of around 15%.
- Most deaths occur within first 6 months following a fracture.

Neurological and cognitive functions

Mental impairment, confusional states and dementia can impact severely on a person's autonomy and independence. Hence, the prospect of postponing or reducing risk of cognitive impairment in the elderly is of great importance.

WHO, 2002.

The role of good nutrition in healthy ageing

Body composition	
Loss of lean body mass	
- sarcopenia	**Protein, branched chain amino acids, vitamins & minerals.**
Bone health	**Ca, vitamin D, Zn, P, Mg.**
Joint mobility	**Glucosamine, chondroitin, omega-3 fish oil.**
Immune function	**Vitamin B_6, folic acid, vitamins A, C & E; Zn, Fe, Se.**
Gut function & immunity	**Probiotics and prebiotics.**
Brain & cognitive function	**Micronutrients, amino acids.**
Heart health	**Omega-3 fish oils, dietary antioxidants.**

Health professionals and policy makers need to recognise the potential benefits of micronutrient supplementation across a broader cross-section of the population, particularly in those groups in which dietary intakes are not meeting recommended intakes.

Ensuring micronutrient sufficiency throughout the life cycle

Communication support →
Diversified diets →
Fortified foods →
Supplements (single and multiple nutrients) →

Public health action →
Monitoring and research →

MULTIPLE AND INTEGRATED STRATEGIES

Our health is our most precious asset

Vital messages to health professionals and policy makers:

- Recognise special needs of specific population groups
- Spot incidence and recognise malnutrition especially in vulnerable groups
- Align nutritional support to meet needs in acute and chronic conditions
- Ensure optimal energy, nutrient and fluid balances
- Maximise the span of good health & quality of life for the specific population groups

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