

# Nutrition and Dietary Interventions Update

2013 Geriatric Update  
Meharry Consortium Geriatric Education Center

## Inter-Professional Panel

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## Disclosures

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None

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None

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Grants, Contracts: NIH

## Objectives

- Differentiate between the effects of starvation and obesity on life expectancy.
- Name two examples of negative effects of vitamin supplementation.

# Nutrition & Dietary Interventions Update

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## Objectives

- Describe the effect of starvation on life expectancy
- Identify the effects of obesity and being overweight on survival

## Life Span

**Maximum life span** corresponds to the age at which the oldest known member of a species or experimental group has died

*mean life span (average life span or life expectancy at birth).*

**Mean life span** varies with susceptibility to disease, accident, suicide and homicide, whereas maximum life span is determined by "rate of aging".

## Life Expectancy

**Life expectancy** is the expected (in the statistical sense) number of years of life remaining at a given age

## Longest Living Person

The longest-living person whose dates of birth and death were verified to the modern norms of *Guinness World Records* and the Gerontology Research Group: **Jeanne Calment, a French woman who lived to 122.**

## Caloric Restriction (CR) Rats

McCay et al. in 1935 described, for the first time, that the restriction of calories without malnutrition prolongs mean and maximal lifespan in rats compared with ad libitum feeding.

J Nutr. 1935;10:63-79

## CR Rodents

Yu BP, et al. J Gerontol. 1982;37:130–41

CR ( 60% of adlib):

- Increased the mean length of life and maximal life span (by 60%)
- Delayed or prevent tumors
- Delayed the decline in Gastrocnemius muscle mass with advanced age
- Lean body mass did not progressively decline with increasing age but rather decline occurred only after the onset of the terminal disease process.

## CR different Species

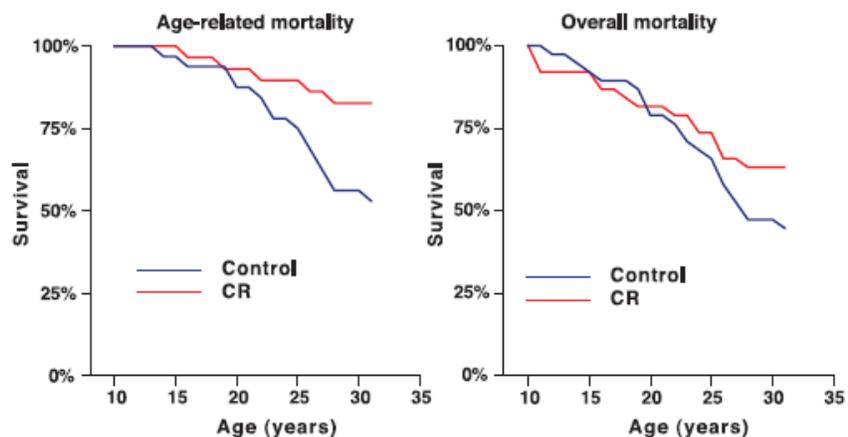
Anderson RM, et al. Toxicologic Pathology, 2009;37: 47-51.

- CR (dietary restriction) is so far the only nongenetic method that extends lifespan in yeast, worms, flies, and rodents.

## CR Primates

Colman RJ, et al. Science. 2009;325:201–4  
 20-year longitudinal adult-onset (7-14 yrs old) CR (30% restriction); Rhesus macaques (Wisconsin National Primate Research Center)

- Increased survival
- Attenuated age-associated sarcopenia
- There was significant maintenance of lean muscle.
- The incidence of neoplasia was reduced by 50%
- The incidence of cardiovascular disease was reduced by 50%
- CR macaques Appeared to be biologically younger
- Reduced age-associated brain atrophy in key region.



Colman RJ, et al. Science. 2009;325:201–4

## CR Primates

Mattison JA, et al. *Nature*. 2012;489: 318–321  
CR (10–40% in intake of a nutritious diet) regimen implemented in young (aged 1 to 14) and older age (16 to 23) rhesus monkeys at the National Institute on Aging (NIA)

- No improvement of survival outcomes
- Conferred health benefits (decreased cancer incidence)
- Study design, husbandry and diet composition may strongly affect the life-prolonging effect of CR in a long-lived nonhuman primate

## CR Humans

Willcox BJ, et al. *Journal of Gerontology: Biological Sciences*. 2004; 59A:789–795  
8006 Japanese-American men; 45–68 years; for 36 years; lived in Oahu, Hawaii, in 1965.

- A trend toward decreased all-cause mortality in men taking 15% less.
- Increased mortality was seen with intakes below 50%

## CR Humans: Okinawa Experience

Willcox BJ, et al. Ann. N.Y. Acad. Sci. 2007;1114: 434-455

Okinawan population in CR until the 1960s

10.9% fewer calories than recommended for maintenance of body weight

20% less than average Japanese caloric intake.

- Extended average *and* maximum life span that is potentially due to CR
- population has among the longest life expectancy in the world.
- The world's highest prevalence of exceptionally aged individuals, such as centenarians.

# BMI

## BMI

World Health Organization (2006)

- BMI between 18.50 - 24.99 NL Wt
- BMI of 25 - 29.9 overweight
- BMI 30-34.99 Class 1 obesity
- BMI 35-39.99 Class 2 obesity
- BMI 40 and above Class 3 obesity

## BMI and Mortality

Finkelstein EA, et al. Obesity (Silver Spring). 2010  
Feb;18(2):333-9

- Overweight was not associated with increased mortality
- Excess mortality was associated with Class 1 obesity and rises sharply as BMI increases
- Excess BMI was calculated to be responsible for approximately 95 million Years-of-life-lost (YLLs) in US

Crimmins EM. Explaining Divergent levels of longevity in High-Income Countries. 2011

- Overweight (BMI 25 - 30) was not associated with all-cause mortality; it increased the risk of dying from coronary heart disease.

## BMI all Individuals

BMI has its largest effect on the risk of mortality for adults under 50, and the correlation between BMI and mortality decreases beyond that age.

at older ages, the curve relating mortality risk to BMI changes in shape from a J to a U.

Crimmins EM. Explaining Divergent levels of longevity in High-Income Countries. 2011.

## BMI Elderly

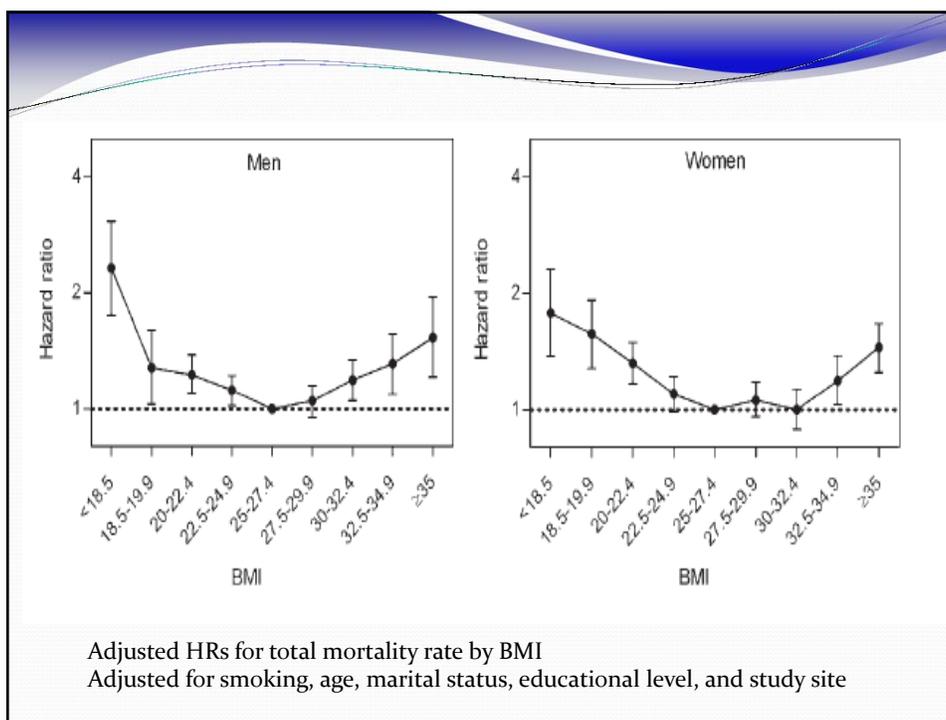
It is difficult to obtain accurate measures of weight and height in many elderly persons, especially those who are bedbound. As a result, BMI calculations sometimes are incorrect, particularly if height and/or weight are self reported rather than measured.

*International Dietetics and Nutrition Terminology*

## BMI Mortality Elderly

Kvamme JM. J Epidemiol Community Health. 2012 Jul;66(7):611-7

- 16711 participants; 65 years of age and older; 9.3 years of follow-up.
- Increased total mortality in elderly individuals with a BMI below 25.
- Overweight persons (BMI 25-29.9) have the lowest mortality (men BMI 25-29.9; women 25-32.4)
- A moderate increase in mortality was observed with increasing BMI in obese individuals (BMI  $\geq 30$  in men and  $> 32.4$  in women)
- It persisted with exclusion of deaths during 1<sup>st</sup> year; diagnosis of cancer, asthma, or bronchitis at baseline. No change between smokers and nonsmokers.



## BMI Mortality Elderly

Singh PN. J Am Geriatr Soc. 2011;59(6):1003-11

- Excess body fat (BMI>22.3 for men and BMI > 27.4 for women) in persons (75-99 years of age) decreases life expectancy but appears to be less lethal in women.

## BMI Elderly

American Dietetic association;

- Most experts suggest use of a higher BMI threshold for underweight elderly individuals, compared to what is used for the general population
- *International Dietetics and Nutrition Terminology* defines underweight in persons >65 years of age as a BMI of <23.

## BMI and Osteoporosis

Barrera G, et al. Nutrition. 2004;20:769-71).

- Risk of having osteoporosis in femoral neck (measured as bone mineral density) in persons 70 years or older was lower with higher BMI (25-30 and >30) (

Nielson CM, et al. J Bone Miner Res. 2011; 26: 496-502.

- Obesity (class2 and above) in men ( $\geq 65$ ; 5995) was associated with an increased risk of fracture. This association is at least partially explained by worse physical function in obese men (

## BMI and QOL

Yan LL, et al. Obesity research. 2004;12:69-76

- Underweight and obese older adults reported impaired quality of life, particularly worse physical functioning and physical well-being.

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## CR Humans

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## BMI

Eileen M. Crimmins, Samuel H. Preston, and Barney Cohen, Editors. *The Role of Obesity in Explaining Divergent levels of longevity in High-Income Counties.* 2011. National Academic Press. Washington, DC

Finkelstein EA, Brown DS, Wrage LA, Allaire BT, Hoerger TJ. Individual and aggregate years-of-life-lost associated with overweight and obesity. *Obesity (Silver Spring).* 2010 Feb;18(2):333-9.

## BMI Mortality Elderly

Kvamme JM, Holmen J, Wilsgaard T, Florholmen J, Midthjell K, Jacobsen BK. Body mass index and mortality in elderly men and women: the Tromso and HUNT studies. *J Epidemiol Community Health*. 2012 Jul;66(7):611-7

Singh PN, Haddad E, Tonstad S, Fraser GE. Does excess body fat maintained after the seventh decade decrease life expectancy? *J Am Geriatr Soc*. 2011 Jun;59(6):1003-11

## BMI Osteoporosis

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## BMI and QOL

Yan LL, Daviglius ML, Liu K, Pirzada A, Garside DB, et al. BMI and Health-Related Quality of Life in Adults 65 Years and Older. *OBESITY RESEARCH*. 2004;12:69-76

## IMPROVING NUTRITIONAL WELL-BEING IN THE ELDERLY

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2013 Geriatric Update  
Meharry Consortium Geriatric Education Center

## OBJECTIVES

- Identify risk factors for poor nutritional status in the elderly
- Identify red flags and nutrition interventions to improve status



## ELDERS: BENEFITS OF PROPER NUTRITION

- Reduce risk of chronic illness
- Manage existing illness
- Promote energy
- Weight management
- Improved quality of life
- Reduced health costs



## RISK FACTORS OF POOR NUTRITIONAL STATUS

- Inappropriate food intake
  - Poverty
  - Social isolation
  - Cognitive dysfunction
  - Depression
  - Impaired functional status
  - Acute or chronic disease
  - Oral health problems
- 

## INAPPROPRIATE FOOD INTAKE

- Poor diet quality is associated with chronic illness such as diabetes, CVD, and osteoporosis
  - Elders have inadequate intakes of whole grains, dark green and orange vegetables, and low fat dairy according to Older Americans 2012 report
  - Cultural, behavioral, and physical factors affect food choices and intakes
  - Overeating may lead to obesity. In 2009-2010 about 38% of elders were obese
- 

## POVERTY

- According to U.S Census Bureau, in 2010 about 9% of elderly were living in poverty
- About 26% of elderly belong to low income groups
- Limited resources make it difficult to afford food, medications, and pay bills
- Elderly may delay food purchases or go without food



## SOCIAL ISOLATION

- Older men who are single or widowers seldom know how to cook or shop for themselves
- Older women often cook less when living alone
- Women especially widows sometimes have difficulty affording food
- Social isolation together with functional impairment may affect access to food
- Rural elder may experience transportation issues



## COGNITIVE CHANGES/DEMENTIA

- Loss of focus at mealtimes
  - Loss of the ability to use eating utensils
  - Unable to remember to eat or if they have already eaten
  - May experience swallowing difficulty
  - Loss of interest in food
  - Refusal to eat
  - Limited responsiveness in advanced cases of dementia
- 

## DEPRESSION

- Elders with depression may experience changes in appetite, or lack of interest in food
  - Insufficient food intake may lead to unintentional weight loss
  - Medications prescribed for depression may cause decreased appetite, constipation, and dry mouth
  - Medication side effects may compound other problems related to nutritional status
  - Older women are more likely to report depressive symptoms over men
- 

## IMPAIRED FUNCTIONAL STATUS

- Limited ability to perform ADL's such as cooking, shopping for food, and eating
- Inability to achieve recommended amount of exercise may increase risk of certain diseases
- 46% of women over 65 reported functional impairments compared to 35% of men



## ACUTE OR CHRONIC ILLNESS

- Chronic or long term illness affect quality of life, and may cause decline in functioning
- Nutritional management is needed in conditions such as diabetes, hypertension, CHF, and others
- Dietary changes or restrictions related to chronic disease may impact food intakes
- Prescribed medications may alter appetite and taste
- Acute illness may cause short term changes in eating pattern

## ORAL HEALTH PROBLEMS

- Oral health problems in the elder include; tooth loss, poorly fitting dentures, and mouth pain
  - Impairs an elder's ability to eat
  - Impacts food choices and adequacy of diet
  - Poor oral health is a major cause of weight loss in older persons
  - Taste alterations have been reported by elders who have complete dentures
- 

## ETHNICITY AND NUTRITION STATUS

- Culture and tradition may influence food choices
  - In 2009-2010 Blacks over 65 reported higher levels of diabetes and hypertension than Whites
  - Hispanics also reported higher levels of diabetes than non Hispanic Whites
  - In 2010 Blacks over 65 reported lower levels of physical activity than Whites
  - Nutrition interventions for minority elderly must be culturally sensitive
- 

## THE NUTRITION ASSESSMENT

- Medical history and physical examination
- Anthropometrics and weight history
- Laboratory data
- Medications
- Usual intakes, food allergies, supplement use
- Socio-economic factors
- Physical Activity/Functional Status
- Dentition/Swallowing/Digestion
- Skin integrity



## NUTRITION RED FLAGS IN THE ELDERLY

- Weight loss of > 5% in a month
- Loss of appetite, or refusal to eat
- Edentulism, tooth loss, ill fitting dentures
- Dysphagia, painful swallowing, choking
- Appetite stimulants
- History of malnutrition, failure to thrive, or anorexia
- Motility issues, constipation, diarrhea, nausea
- Pressure ulcers
- Unable to access or prepare food, or feed self



## CASE STUDY

- CT is a 68 year old female
  - Medical problems: DM, HTN, High cholesterol, and Arthritis
  - Medications: Metformin, Atorvastatin, Furosemide, and Insulin
  - Labs: A1c 10.3%, cholesterol 239
  - 4'11", 198 lbs , BMI 39.9 (Class II obesity)
  - Limited income
  - Lives alone, and seldom cook or shop for food
  - Eats microwaveable foods at breakfast
  - Eats at least 2 senior center meals most days
  - No previous nutrition education
- 

## CT'S RISK FACTORS

- Financial – limited income
  - Social isolation – lives alone
  - Functional impairments – limits on activity
  - Lack of education – no previous diet education
  - Health status – multiple chronic diseases
  - Others factors such as ethnicity and gender
- 

## NUTRITION INTERVENTIONS FOR CT

- Provide education on dietary guidelines for diabetes, hypertension, and elevated cholesterol
- Discuss portion control using Plate Method
- Provide tips for choosing nutritious convenience foods, and snacks
- Discuss tips for stretching food budget
- Encourage physical activity as able
- Follow up with weigh in, labs, and diet recall every 2-3 months



## OTHER NUTRITIONAL INTERVENTIONS

- Liberalize diet
- Modify diet/food textures
- Provide oral supplements, or snacks
- Recommend probiotics, or fiber
- Recommend vitamin, mineral supplements
- Recommend appetite stimulant
- Refer to community programs
- May need to recommend nutrition support



# Update on Vitamins, Minerals, and Supplements

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2013 Geriatric Update  
Meharry Consortium Geriatric Education Center

## VITAMINS

### MAJOR FUNCTIONS:

- **Bioenergetics:** production and release of energy
- **Hematopoiesis:** the production of red blood cells and the hemoglobin contained in them
- **Antioxidation:** the prevention of “unwanted” oxidation of compounds in the body
- **Growth and development:** cellular level

## RDA for Persons Ages 51 and Over

	Males		Females	
	51-70	>70	51-70	>70
<b>Weight (lbs)</b>	<b>170</b>	<b>170</b>	<b>143</b>	<b>143</b>
<b>Height (in)</b>	<b>68</b>	<b>68</b>	<b>63</b>	<b>63</b>
<b>Protein (g)</b>	<b>63</b>	<b>63</b>	<b>50</b>	<b>50</b>
<b>Vitamin A (µg RE)</b>	<b>1000</b>	<b>1000</b>	<b>800</b>	<b>800</b>
<b>Vitamin D (µg)</b>	<b>15</b>	<b>20</b>	<b>15</b>	<b>20</b>
<b>Vitamin E (mg α-T)</b>	<b>10</b>	<b>10</b>	<b>8</b>	<b>8</b>
<b>Vitamin K (µg)</b>	<b>80</b>	<b>80</b>	<b>65</b>	<b>65</b>
<b>Vitamin C (mg)</b>	<b>60</b>	<b>60</b>	<b>60</b>	<b>60</b>

Vit D: 1µg (microgram) = 40 IU (International Unit)

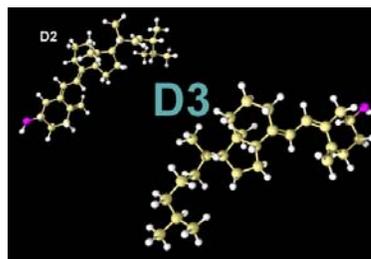
## RDA for Persons Ages 51 and Over

	Males		Females	
	51-70	>70	51-70	>70
<b>Thiamin (mg)</b>	<b>1.2</b>	<b>1.2</b>	<b>1.1</b>	<b>1.1</b>
<b>Riboflavin (mg)</b>	<b>1.3</b>	<b>1.3</b>	<b>1.1</b>	<b>1.1</b>
<b>Niacin (mg)</b>	<b>16</b>	<b>16</b>	<b>14</b>	<b>14</b>
<b>Vitamin B<sub>6</sub> (mg)</b>	<b>2.0</b>	<b>2.0</b>	<b>1.6</b>	<b>1.6</b>
<b>Folate (µg)</b>	<b>400</b>	<b>400</b>	<b>400</b>	<b>400</b>
<b>Vitamin B<sub>12</sub> (µcg)</b>	<b>2.4</b>	<b>2.4</b>	<b>2.4</b>	<b>2.4</b>

## $\beta$ -CAROTENE

- **Functions:** broken down in body to vitamin A; is also an antioxidant by itself
- **Excess intake:** leads to yellowing of skin but no other known problems from excess intake; is some recent concern with supplements taken by heavy smokers; excess intake of  $\beta$ -carotene does NOT cause dangerously high concentrations of vitamin A as this conversion is controlled by the amount of vitamin A already in the body
- **Food sources:** found only in plants, especially the yellow and orange ones

## Vitamin D



- Fat-soluble
- 2 types
  - $D_2$  = ergocalciferol, found in plants
  - $D_3$  = cholecalciferol, found in animal and made from UV
- Excess stored in liver and fat tissue
- Made by UV light from the sun
- Hormone: made in one location and acts in another

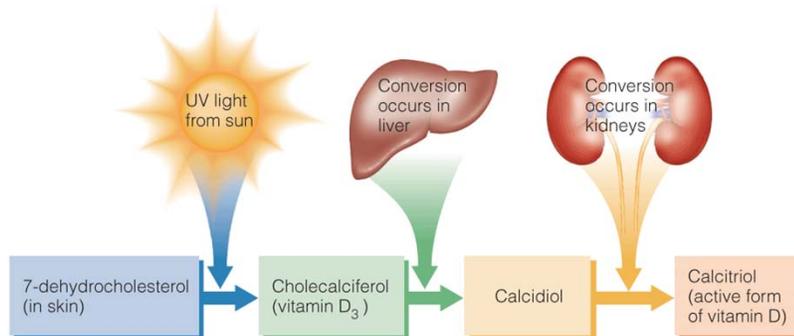
## Vitamin D: Functions

- **Calcitriol** works with PTH and calcitonin to **regulate blood Ca levels and maintain bone health**
  - Regulate Ca and P absorption
  - Regulate kidney excretion/absorption
  - Stimulates osteoclasts
- Necessary for **bone calcification**
- Other functions: **immunity** and **cell differentiation**

## Vitamin D: Deficiency

- Cause: ↓ intestinal absorption of fat
- Causes less Ca absorption (10-15%)
- Can trigger increased PTH
- Rickets – bending of soft bones in children
- Osteomalacia – soft bones in adults
- Osteoporosis

## Vitamin D: Formation/Activation



**Figure 9.5** The process of converting sunlight into vitamin D in our skin. When the ultraviolet rays of the sun hit our skin, they react with 7-dehydrocholesterol. This compound is converted to cholecalciferol, an inactive form of vitamin D also called provitamin D<sub>3</sub>. Cholecalciferol is then converted to calcidiol in the liver. Calcidiol travels to the kidney, where it is converted into calcitriol, which is considered the primary active form of vitamin D in our bodies.

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## Vitamin D: Toxicity

- Skin synthesis (sun exposure) cannot cause excess
- Can occur from excess supplements or fish oils
- Hypercalcemia – high blood calcium
  - Leads to disability and death due to calcification of soft tissues
- Upper Limit (UL) set at 50 µg/day

## Vitamin B<sub>12</sub>: Deficiency

### Deficiency Symptoms:

#### Pernicious Anemia

- Mouth: smooth, red tongue
- Nervous system:
  - fatigue/ataxia
  - degeneration of peripheral nerves progressing to paralysis
- Skin: hypersensitivity/parasthesia
- Dementia and cognitive function?
- Alzheimer's Disease?



## Vitamin B<sub>12</sub>: Deficiency

### Intrinsic Factor:

- glycoprotein secreted by parietal cells
- secreted by normal gastric mucosa
- extrinsic factor is vitamin B<sub>12</sub>

### Inadequate or no secretion

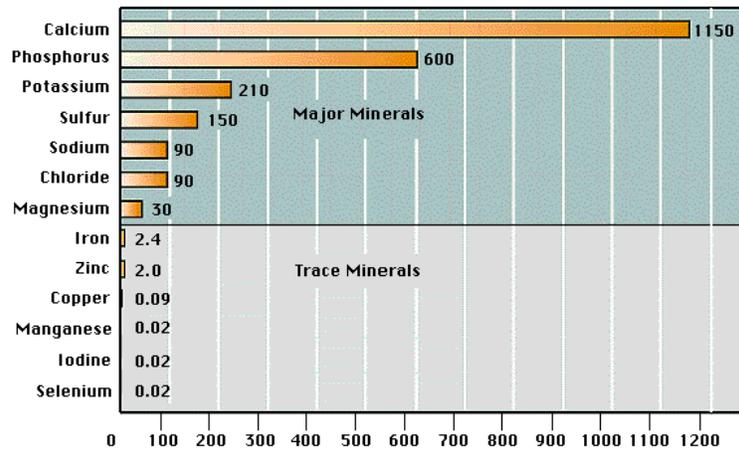
- pernicious anemia

#### secondary causes:

- gastrectomy
- mucosal damage
- congenital causes (extremely rare)



## Minerals in a 60 Kilogram Person



## RDA for Persons Ages 51 and Over

	Males		Females	
	51-70	>70	51-70	>70
<b>Calcium (mg)</b>	<b>1,200</b>	<b>1,200</b>	<b>1,200</b>	<b>1,200</b>
<b>Sodium (mg)</b>	<b>1,300</b>	<b>1,300</b>	<b>1,300</b>	<b>1,300</b>
<b>Magnesium (mg)</b>	<b>420</b>	<b>420</b>	<b>320</b>	<b>320</b>
<b>Iron (mg)</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>
<b>Zinc (mg)</b>	<b>15</b>	<b>15</b>	<b>12</b>	<b>12</b>

## Calcium: Supplements

- **Forms:**
  - Carbonate
  - Citrate
  - Lactate
  - Phosphate
  - Coral, chelated
- **Gastrointestinal absorption ~ 30%**
- **Used when unable to eat enough foods with Ca**
- **Excessive intakes possible**
- **Better absorbed with meals**

## Dietary Supplement

Any product taken by mouth that contains a so-called "dietary ingredient" and its label clearly states that it is a dietary supplement.

## **DIETARY INGREDIENTS**

**include:**

- **vitamins**
- **minerals**
- **herbs**
- **amino acids**
- **enzymes**
- **organ tissues**
- **metabolites**
- **extracts or concentrates**

**Are dietary supplements drugs?**

**NO**

A product sold as a dietary supplement and touted in its labeling as a new treatment or cure for a specific disease or condition would be considered an unauthorized - and thus illegal - drug.

## **Supplements: Regulations**

**Regular foods and medications require regulatory FDA review and approval, but dietary supplements do not.**

- no research requirements
- harmful effects are not recognized for a long time
- adverse events not reported
- little government monitoring exists
- burden to prove is on the FDA
- banned only after adverse effects have occurred

## **Supplements: Labeling**

**Structure-function claim and the disclaimer statement:**

**“THIS STATEMENT HAS NOT BEEN EVALUATED BY THE FOOD AND DRUG ADMINISTRATION (FDA). THIS PRODUCT IS NOT INTENDED TO DIAGNOSE, TREAT, CURE OR PREVENT DISEASE”**

## Supplements: Effectiveness

### Depends on:

- **bioavailability** (% of a compound that reaches its target)
- “**natural**” vs. “**synthetic**”
- **composition** (amount of active ingredient)

### Claims of benefits:

- no claim about prevent, treating, or cure the disease
- claims on structural or functional properties promising such benefits allowed

## How botanicals are prepared?

- A **tea**, also known as an **infusion**, is made by adding boiling water to fresh or dried botanicals and steeping them.
- Some roots, bark, and berries simmered in boiling water to extract their desired ingredients making a **decoction**.
- A **tincture** is made by soaking a botanical in a solution of alcohol and water.
- An **extract** is made by soaking the botanical in a liquid that removes specific types of chemicals. The liquid can be used as is or evaporated to make a dry extract for use in capsules or tablets.

## Garlic (*Allium sativum*)



- **Prevention of atherosclerosis**
    - Some clinical trials-reduced serum cholesterol
    - warfarin interaction, bleeding episodes
  - **Diuretic**
  - **Asthma, bronchitis**
  - **Duodenal ulcers, hepatitis**
  - **Lupus**
  - **Hair growth**
- Use: 600-900 mg garlic tablets daily (powder)**

## Ginkgo biloba

- **Age Associated Memory**
- **Alzheimer's disease**
- **Vertigo**
- **Tinnitus (ringing in ears)**
- **Quality Issues-critical**



**Only 2 extracts tested in clinical trials-shown to be safe and efficacious**



**Dose range: 40-60 mg 3-4 times daily (120-240 mg) standardized special extract**

- »24-27% flavonoid glycosides
- »5-7 % diterpene lactones
- »<5 ppm ginkgolic acids

## St. John's Wort (*Hypericum perforatum*)

- Symptomatic treatment of **mild to moderate depression**.
- **Dose:** 350-900 mg of a dried 60 % ethanol or 80 % methanol extract, standardized to contain 0.3% hypericin.
- Two trials using an extract standardized to contain 5% hyperforin.



## Kava (*Piper methysticum*)

- **Anxiolytic activity**
- **Sedative**
  - In vivo studies only
  - CNS depression in animal models
- **Tranquilizer**
- **In vivo studies only**
  - 60-210 mg kava pyrones per day
  - 30-70% kava pyrones
  - Dermatological side effects
  - Extrapryamidal side effects-4 cases of oral, lingual and trunk dyskinesia
  - Parkinson's disease
  - Should not be combined with alcohol, sedatives, tranquilizers



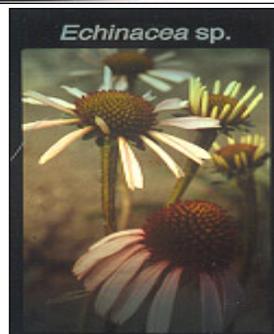
## Saw palmetto (*Serenoa repens*)

- Native American plant, used by native American Indians
- Symptomatic treatment of benign prostatic hyperplasia (LUTS)
  - 85-95% fatty acids, esters and sterols
  - 320 mg daily after prostate screening
  - few side effects
- Three extracts: n-hexane, 90 % ethanol, and a supercritical carbon dioxide extract
- Standardized to contain 70-95 % free fatty acids, esters and sterols



## Echinacea

- Three species used medicinally:
  - *Echinacea purpurea* (roots & herb)
  - *Echinacea pallida* (roots)
  - *Echinacea angustifolia* (roots)
- Roots and aerial parts
- Claims are it is efficacious immune system stimulant
- Effects appear to be product specific
- 1-3 grams per day



## **Cranberry (*Vaccinium macrocarpon*)**

- **Traditional use in NE**
- **Treatment of UTI's**  
(urinary tract infections)
- **Both juice and dried berries**
- **28 RCT's-all positive**
- **Procyanidins are antiadhesive**



## **Supplements: Safety and Risk**

- Many supplements contain **active ingredients that can have strong effects in the body.**
- Always **be alert to the possibility of unexpected side effects**, especially when taking a new product.
- Supplements are **most likely to cause side effects or harm when people take them instead of prescribed medicines or when people take many supplements in combination.**
- **Some supplements can increase the risk of bleeding or, if a person takes them before or after surgery, they can affect the person's response to anesthesia.**

## Supplements: Safety and Risk

Dietary supplements can interact with certain prescription drugs in ways that might cause problems. Here are just a few examples:

- **Vitamin K** can reduce the ability of the blood thinner Coumadin® to prevent blood from clotting.
- **St. John's wort** can speed the breakdown of many drugs (including antidepressants and birth control pills) and thereby reduce these drugs' effectiveness.
- **Antioxidant supplements, like vitamins C and E,** might reduce the effectiveness of some types of cancer chemotherapy.

## Supplements: Practice Implications

- Patients not telling health care providers about alternative therapies.
- Perception of botanicals as “supplements” not medicines.
- **Pharmacist is better than a health food store.**
- Awareness of drug-herb or drug-food interactions, which may not be immediate; if involve gene expression - may take 10-14 days.
- **Dietary supplements are intended to supplement the diet, not to cure, prevent, or treat diseases or replace the variety of foods important to a healthful diet.**