



Moore Family Center Food, Nutr

Thank you very much...



What Makes the Older Age Group Different?

- Heterogeneous group
- More chronic disease
- Physiological different
- More life experiences





Nutrition Screening

- ◆ Purpose: To quickly identify individuals who are malnourished or at nutritional risk and to determine if a more detailed assessment is warranted
- ◆ Usually completed by DTR, nurse, physician, or other qualified health care professional
- ◆ At-risk patients referred to RD



Characteristics of Nutrition Screening

- ◆ Simple and easy to complete
- ◆ Routine data
- ◆ Cost effective
- ◆ Effective in identifying nutritional problems
- ◆ Reliable and valid

Screening Tools for Older Adults

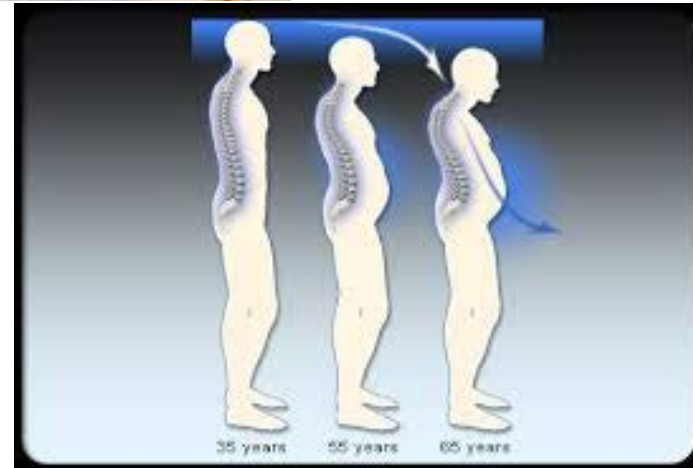
- **Subjective Global Assessment (SGA)**
- **DETERMINE checklist; Nutrition Screening Initiative**
- **Malnutrition Screening Tool (MST)**
- **Malnutrition Universal Screening Tool (MUST)**
- **Nutritional Risk Screening Tool (NRS)**
- **Mini Nutrition Assessment (MNA).**

Summary of Screening Tools

- Provide documentation
- Increase awareness of conditions that may be overlooked
- Can be used for community-dwelling, assisted living, nursing home or in-patient
- Is a basis for continued monitoring

- More on specifics...

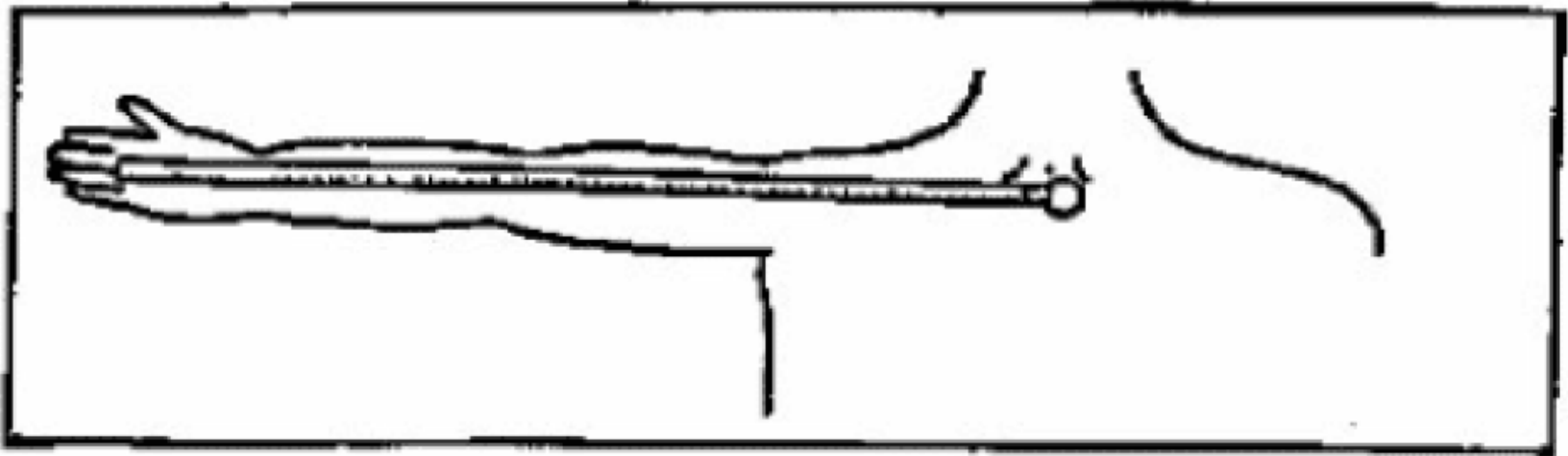
Height



nutrition assessment strategies

Height

Figure 4 The Demispan Measurement



To calculate height:

Females: Height (cm) = 1.35 x demispan [cm]) + 60.1

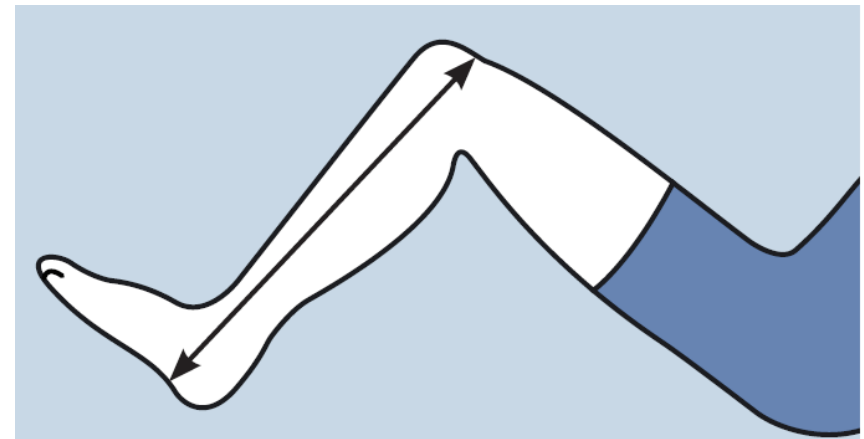
Males: Height (cm) = 1.40 x demispan [cm]) + 57.8

Height

Have the subject bend the knee and ankle of one leg at a 90 degree angle while lying supine or sitting on a table with legs hanging off the side.

Place the fixed blade of the knee caliper under the heel of the foot in line with the ankle bone. Place the fixed blade of the caliper on the anterior surface of the thigh about 3.0 cm above the patella.

Be sure the shaft of the caliper is in line with and parallel to the long bone in the lower leg (tibia) and is over the ankle bone (lateral malleolus). Apply pressure to compress the tissue. Record the measurement to the nearest 0.1 cm.





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Measuring Height without a Stadiometer:

Empirical Investigation of Four Height Estimates Among Wheelchair Users

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Abstract

Recumbent> knee height>self-report>armspan

nutrition assessment strategies

Journal of Gerontology: MEDICAL SCIENCES
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doi:10.1093/gerona/gdq100

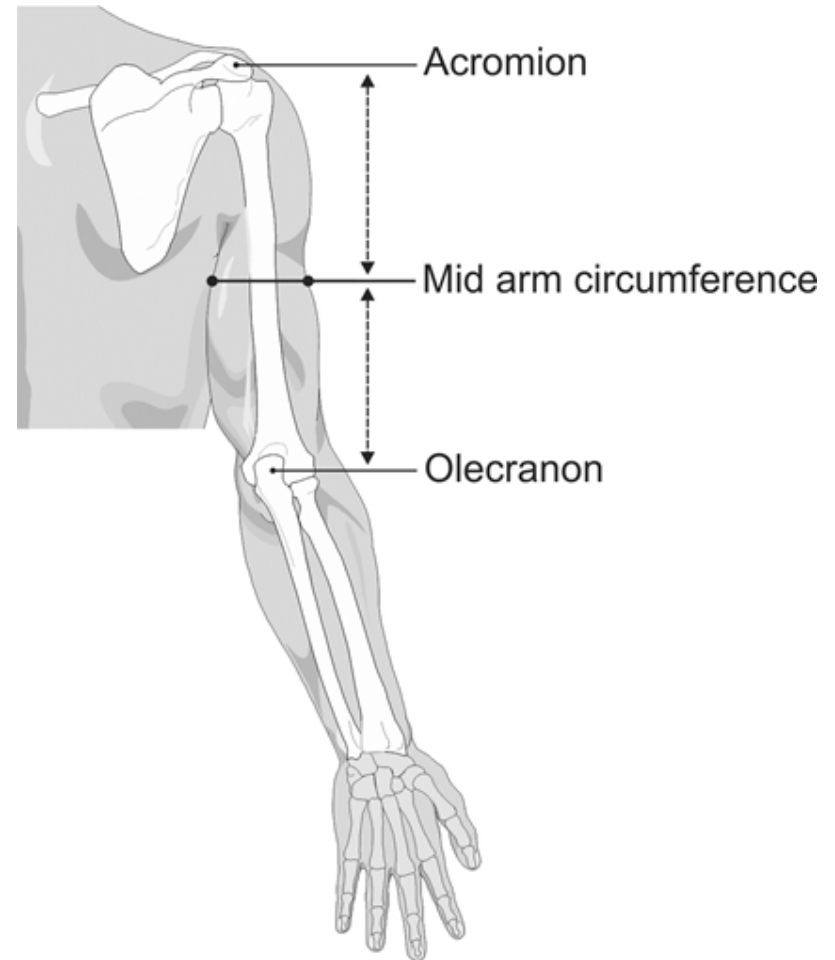
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Low Mid-Upper Arm Circumference, Calf Circumference, and Body Mass Index and Mortality in Older Persons

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Arm Circumference

- Mid-arm circumference and mid arm muscle circumference may be used to evaluate somatic muscle reserves.



Calf Circumference

- Calf circumference is sometimes used as an indicator of muscle mass in the elderly, and is part of the MNA. They suggest the client can be sitting or standing, and that the measurement should be taken at the widest part of the calf.



Dietary Assessment Methods

- 24-hour recall
 - All foods & beverages
 - Time of day eaten
 - Amounts consumed
 - Food preparation
 - Typical day?
- Food frequency questionnaire
- Food record
 - Recorded over several days
 - Recorded as consumed
 - Does not rely on memory
- Direct observation
 - Calorie counting

Concerns with Diet Assessment in Elderly

- Memory
- Special diets
- Fear
- Poverty
- Lack of interest



Preparing a snack.

nutrition assessment strategies

Which Nutrients Appear to Have Different Requirements During Older Age?

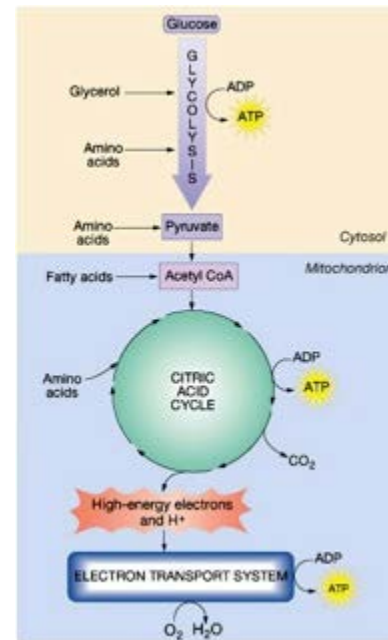
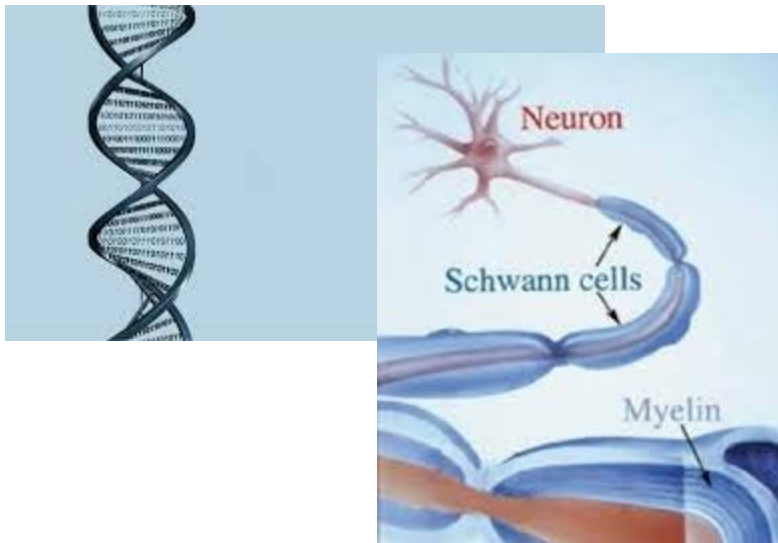
- Vitamin B₁₂
 - Protein
 - Calcium
 - Vitamin D
-
- Calories
 - Water



Nutrient requirements

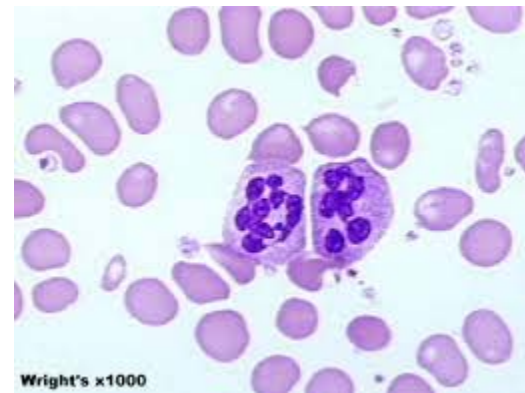
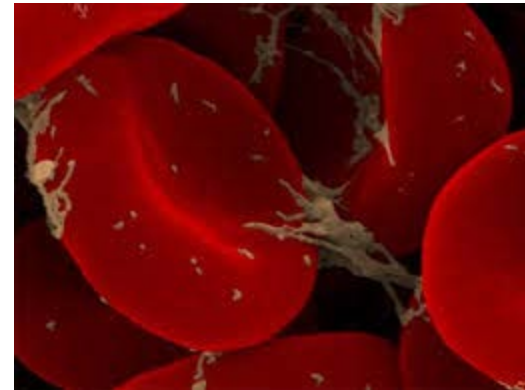
Vitamin B₁₂ Requirement of the Older Adult

- Sources
- Physiological function



How You Assess Vitamin B₁₂ Status

- Hemoglobin
- MCV
- Serum B₁₂
- Neutrophil hypersegmentation



Current Vitamin B₁₂ Recommendations

- A. 2.4 micrograms
- B. 2.4 milligrams
- C. 2.4 grams

Current Vitamin B₁₂ Recommendations

- Men 51 and older: 2.4 µg/d
- Women 51 and older: 2.4 µg/d
 - 1998 RDA
- ⊙ IMFIT 3.8 ± 3.1 µg/d
 - Wardwell, Herrel, Woods, Chapman-Novakofski, 2006
- ⊙ Botswana 2.1 ± 3.1 µg/d
 - Maruapula, Chapman-Novakofski, 2006

Vitamin B₁₂ in Food

- 4 oz. hamburger = 2.0 μg
- 3 oz. steak = 1.8 μg
- 3 oz. canned tuna = 1.9 μg
- 3/4 cup dry cereal = 1.5 μg



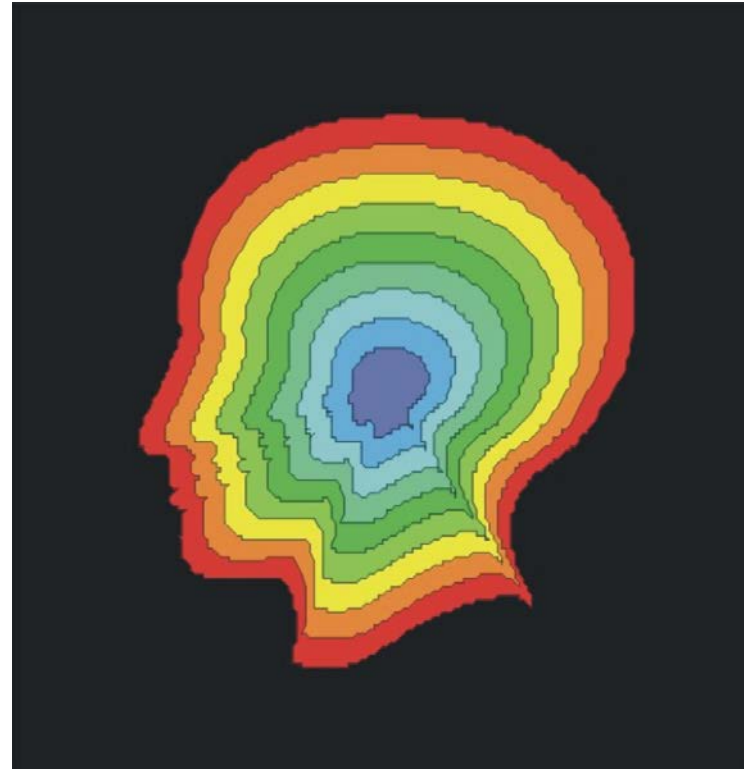
Factors Affecting Vitamin B₁₂ Requirements

- Absorption
 - Lack of intrinsic factor
 - Achlorhydria



Too little vitamin B₁₂?

- 3-41%
- Anemia
- Neurological changes
 - Neuropathy
 - Cognitive changes



Too Much Vitamin B₁₂

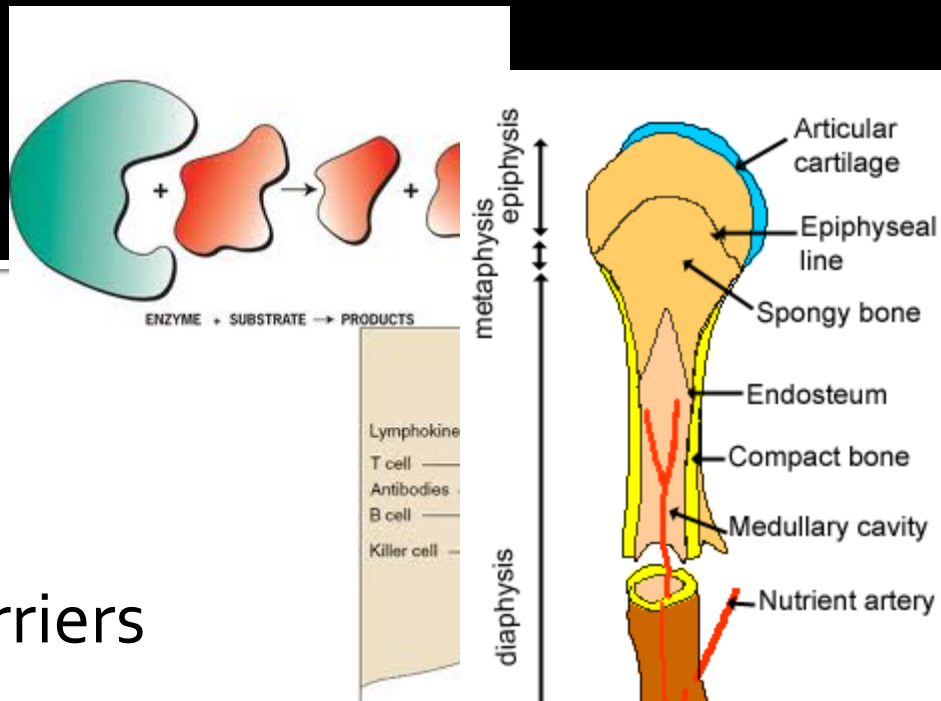
Meeting Vitamin B₁₂ Needs

- Animal products
- **Fortified foods**
- Supplements
- Injections

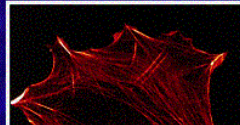
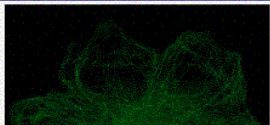
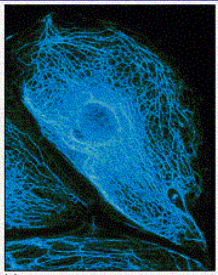


Protein

- Sources
- Functions
 - Enzymes, transport carriers
 - Immune function
 - Muscles and collagen
 - Structure
 - Hormones



Cell structure depends on protein filaments

Hormonal Balance

Ovaries/Testes Estrogen/ Testosterone/ Progesterone Sexual Function	Adrenal Gland Cortisol Stress Response
Thyroid Gland Thyroid Hormone Metabolic Rate	Pancreas Insulin Blood Sugar

(c)

Intermediate Filaments

s of protein subunits

Protein Requirements of the Older Adult

- Assessing adequacy of protein intake
 - Dietary assessment
 - Biochemical assessment
 - Serum proteins
 - Nitrogen balance

Determining Protein Adequacy

- Requirements affected by
 - Type of protein
 - Stress
 - Individual variation
 - **Calories consumed**



Current Recommended Intake for Protein

- 0.8 gm/kg/day
- Body weight in pounds divided by 2.2 = kg body weight
- Multiply kg body weight by 0.8
- 175 pounds/2.2 kg/lb= 79.5 kg
- 79.5 kg x 0.8 = 63.6 grams protein



Protein in Food

- 7 grams per 1 ounce of meat:
3 oz. chicken = 21 grams protein
- 8 grams per serving of milk
- 2 grams per serving of vegetable
- 3 grams per serving of starchy foods
- No protein for most fruit



Menu...65 gms protein

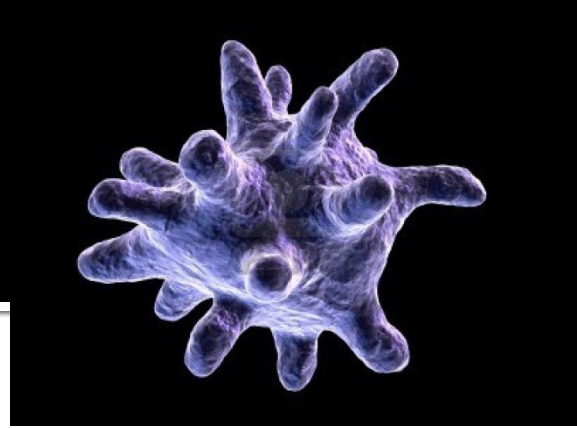
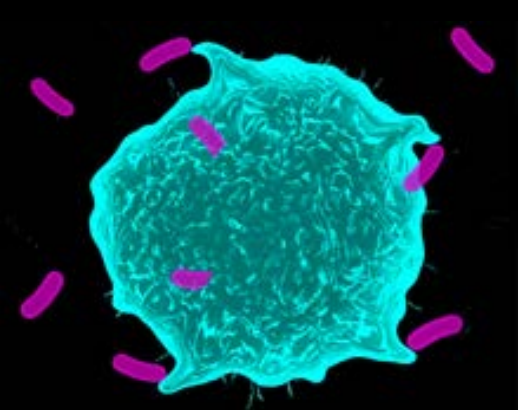
Breakfast	Lunch	Dinner
cereal	sandwich	chicken
milk	soup	rice
banana	peaches	green beans
juice		roll
$6+8=14$	$6+14+2=22$	$21+3+2+3=29$



What happens if you don't eat enough protein?

- Kids don't grow
- Immune function doesn't work as well
 - More infections
 - Harder to fight infections





"Amino acids are required for the synthesis of a variety of specific proteins (including cytokines and antibodies) and regulate key metabolic pathways of the immune response to infectious pathogens: activation of T and B lymphocytes, natural killer cells and macrophages; lymphocyte proliferation..."

Li et al, Br J Nutr 2007

What happens if you eat too much protein?

- As long as kidney function is okay, no Parkinson's, extra protein
 - Doesn't hurt, except will be stored with all other extra calories as fat
 - Doesn't help, won't make extra muscle without exercise



Are protein supplements a good thing?

- No effect on muscle strength or endurance

Carter et al J Ger Phys Therapy, 2005; Constantin et al, 2013

- Effect on bone

Tang et al, 2014

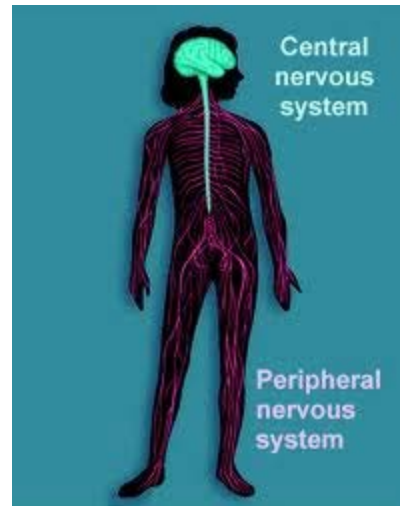
- Effect on nutritional status/mortality if malnourished, ill, frail

Milne et al Ann Intern Med, 2006; Tieland et al, 2012



Calcium Requirements of the Older Adult

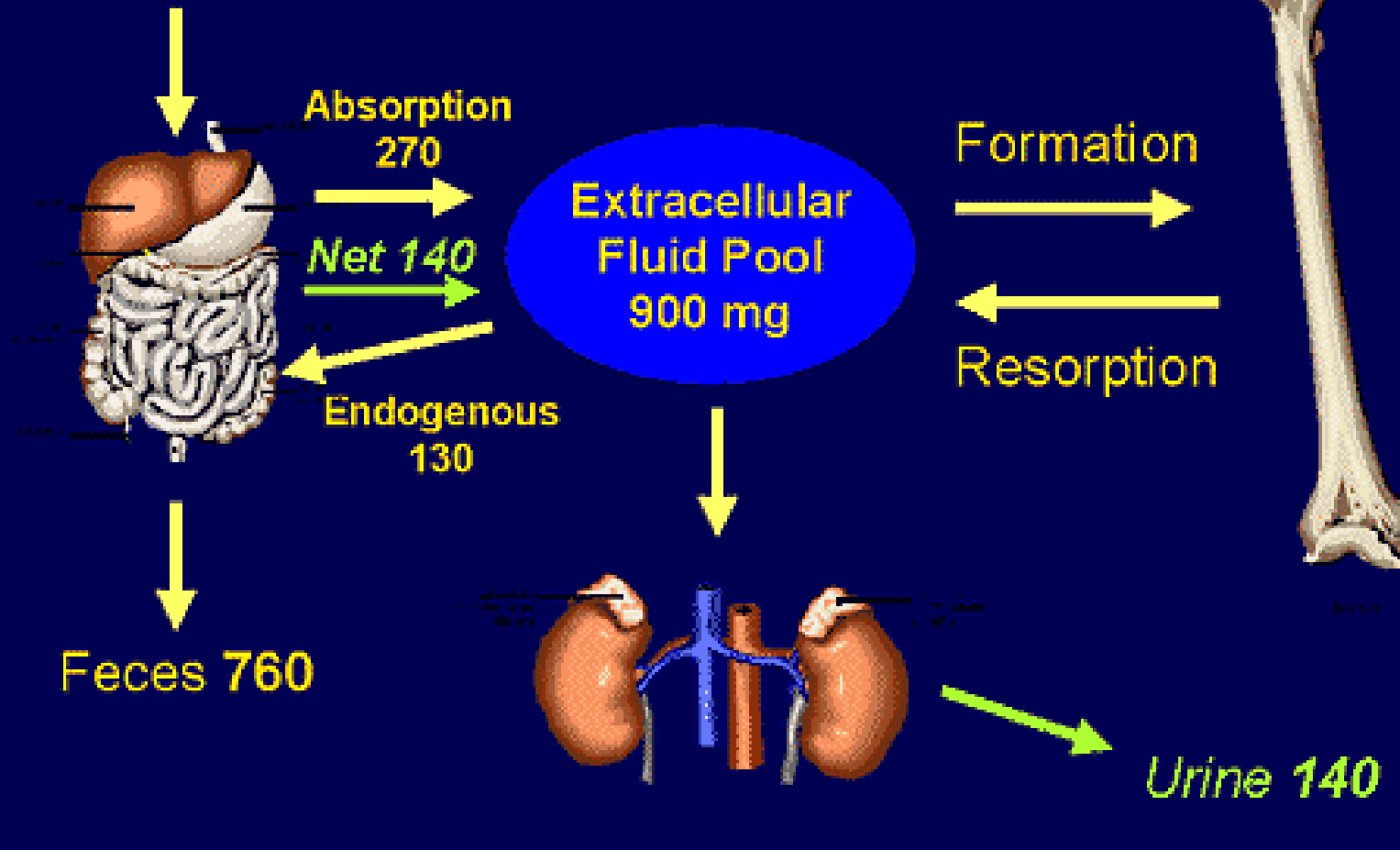
- Physiological function



Plawcki K, Chapman-Novakofski K. Nutrition issues in bone health and aging. *Nutrients*. 2(11):1086-1105, 2010.

Calcium Homeostasis (mg/day)

Intake 900



Calcium Excretion

- ↑excretion
 - Caffeine
 - Protein
 - Sodium



Caffeine



- Modest decrease absorption and no increase excretion
- Bone loss, but only in individuals with low milk or low total calcium intake
 - Barrett-Connor et al., 1994; Harris and Dawson-Hughes, 1994

Heaney, 2002

Protein



- Excess protein increases calcium excretion
- Also increases intestinal calcium absorption and IGF-1
- Average protein consumption balanced with adequate calcium intake, no decrease in bone health

Jesudason, Clifton, 2011; Tang et al, 2014

Sodium

- Sodium & calcium excretion linked in proximal renal tubule
- 40 mg of calcium excreted in the urine for every 2300 mg of dietary sodium
- Urinary sodium may be associated with BMD at lower but not higher calcium intake
- Not all show relationship between sodium intake and BMD



Current Calcium Recommendations

- 19-50 yrs. & 51-70 males
 - **1,000 mg**
- 51-70 yrs. Females & over 71 yrs
 - **1,200 mg**
- Tolerable Upper Intake Levels
 - 19-50 yrs: **2,500 mg**
 - 51+: **2,000 mg**

REPORT BRIEF NOVEMBER 2010

INSTITUTE OF MEDICINE
OF THE NATIONAL ACADEMIES

Advising the nation/Improving health

For more information visit www.iom.edu/vitamind

Dietary Reference
Intakes for Calcium
and Vitamin D



Calcium in Foods

- 1 glass of milk = 300 mg.
- 1 oz. of aged cheese = 200 mg.
- 8 oz. orange juice with calcium = 300 mg.
- 1 medium orange = 50 mg.
- ½ cup broccoli = 40 mg.
- cereals = 0 to 1300 mg per serving



2/26/2014



Calcium-Fortified Foods

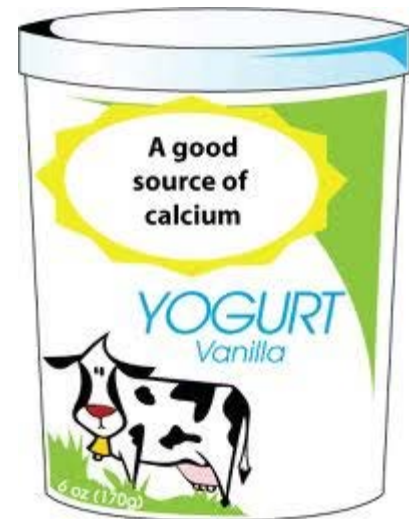
- Calcium intake from grains differed by race (black women 205 ± 201 mg/day vs white women 130 ± 234 mg/day; $P=0.010$) and fortified cereals were a major source of calcium for black women.



Mojtahedi MM, Plawecki K, Chapman-Novakofski K, et al. Older black women differ in calcium intake compared to age and socioeconomic matched white women. *J Amer Dietetic Assoc* 106(7):1102-1107, 2006.

Changing Calcium Intake

- **Good** source of calcium
 - 10-19% of Daily Value
 - 100 – 190 mg calcium per serving
- **Excellent** source of calcium
 - 20% or more of Daily Value
 - More than 200 mg calcium per serving



To convert the % DV (Daily Value) for calcium into milligrams, just multiply by 10.

30% DV = 300 mg calcium = 1 cup of milk

100% DV = 1,000 mg calcium

130% DV = 1,300 mg calcium

Dietary Fiber 0g		0%
Sugars 11g		
Protein 8g		
Vitamin A 6%	•	Vitamin C 4%
Calcium 30%	•	Iron 0%
Vitamin D 25%	•	

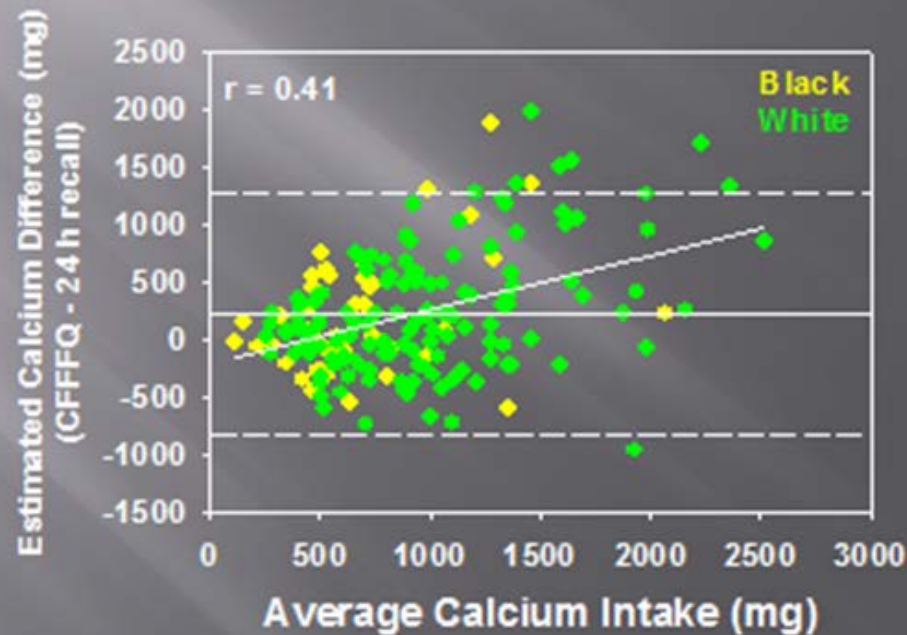
Menu...1900 mg calcium

Breakfast	Lunch	Dinner
Cereal-CF	Sandwich CF bread	Lasagna
Milk	Fruit	Italian bread
OJ-CF	Yogurt	Salad
Banana		Milk
		CF=calcium fortified
500+300+300	200+200	100+300



2/26/2014

Agreement between the CFFFAQ and the 24-hour recall



Plawecki K, Evans E, Mojtahedi M, McAuley E, Chapman-Novakofski, K. Assessing calcium intake in post-menopausal women. *Prev Chronic Dis J* 6(4):A124, 2009, Available at www.cdc.gov/pcd/issues/2009/oct/08_0197.htm.

What happens if you get too little calcium?

- Increased risk for osteoporosis



Cox J, Chapman-Novakofski K, Thompson CE. Nutrition and Women's Health. Practice Paper of the Academy of Nutrition and Dietetics, November, 2013

What happens if you get too much calcium?

- Upper limit of calcium intake
- Supplements vs food
- Associations with other medical conditions

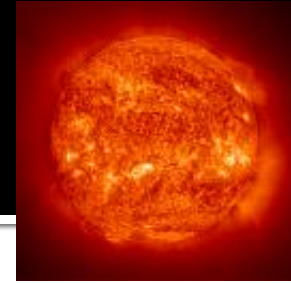
Milk alkali syndrome

Cardiovascular disease



Kidney stones

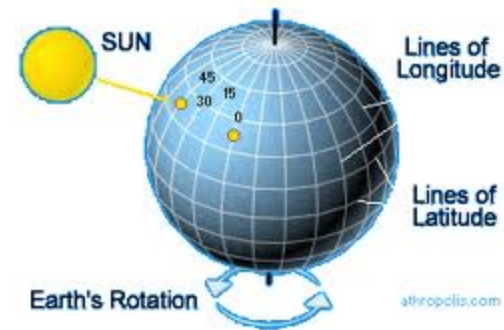
Vitamin D



- Fat soluble vitamin found in some foods and naturally in the body.
- Aids in the absorption of calcium from the intestine.
- Influences PTH
- Effects on muscle
- Association with many diseases

Assessing Vitamin D Status

- Sunlight is variable
- Dietary intake
- Blood levels

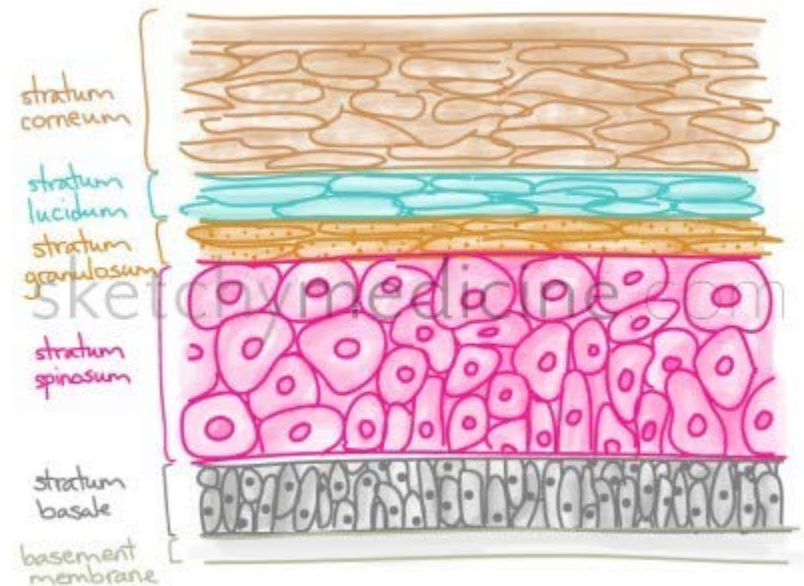
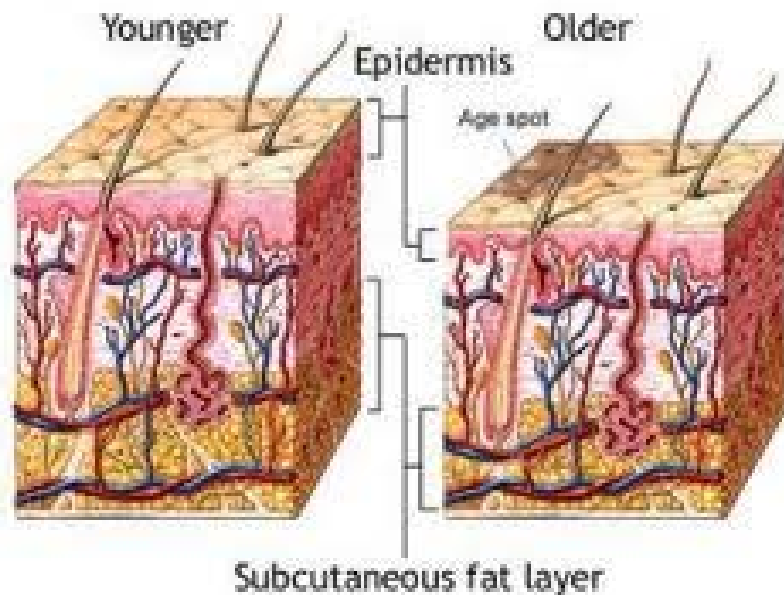


Serum 25-Hydroxyvitamin D

nmol/L	ng/mL	Health status
<30	<12	Associated with vitamin D deficiency, leading to rickets in infants and children and osteomalacia in adults
30–50	12–20	Generally considered inadequate for bone and overall health in healthy individuals
≥50	≥20	Generally considered adequate for bone and overall health in healthy individuals
>125	>50	Emerging evidence links potential adverse effects to such high levels, particularly >150 nmol/L (>60 ng/mL)

Vitamin D Requirements of the Older Adult

- Dermatological changes affect conversion of 7-dehydro-cholesterol to cholecalciferol

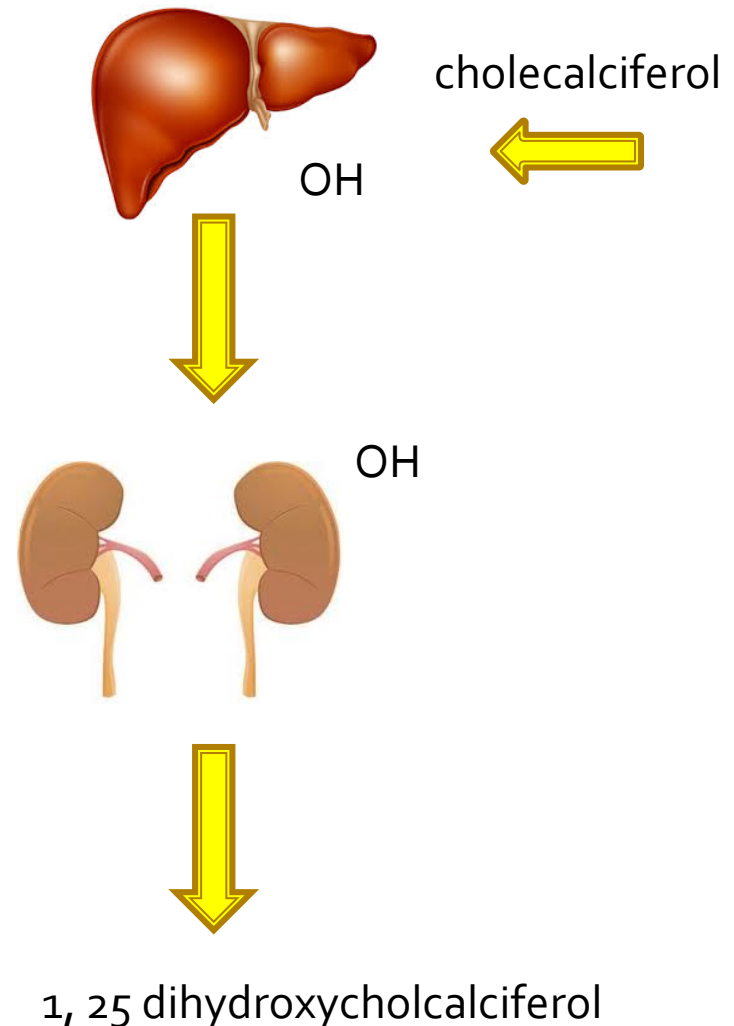


ADAM, Inc, 2010

stratum basale and stratum spinosum.

Vitamin D Requirements of the Older Adult

- Renal changes decrease the production of 1,25-dihydroxy-cholecalciferol
- Absorption in small intestine may be diminished



Recommended Dietary Intake for Vitamin D

- Basis of recommendation
- RDA 51 through 70 years
 - 15 μg (600 IU)/day
- RDA for > 70 years:
 - 20 μg (800 IU)/day
- Tolerable Upper Intake Limits
 - 100 μg (4,000 IU)

Vitamin D

- 1 glass of milk = 2.5 μg vitamin D
- Most supplements = 10 μg vitamin D

So if you are 71 years old, you need how many glasses of milk?



What happens if you get too little vitamin D?

- Rickets is deficiency disease
- Risk for osteoporosis
- Perhaps risk for other chronic diseases



What happens if you get too much vitamin D?

- Vitamin D 1000 μg (40,000 IU)/day produces toxicity within 1 to 4 mo in infants,
- Toxic effects have occurred in adults receiving 2500 μg (100,000 IU)/day for several months.

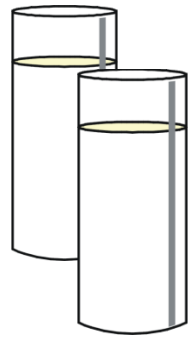
Symptoms of Vitamin D Toxicity

- High serum calcium
- Anorexia, nausea, and vomiting
- Polyuria, polydipsia, weakness, nervousness, and pruritus
- Renal function is impaired
- Metastatic calcifications may occur, particularly in the kidneys

Translating into Research into Practice

Results:

- Mean dietary calcium intake: 591 ± 355 mg/d
- 43% below 60% of the 800 mg RDA
- 27% believed they **WERE** meeting the RDA
- Concern about calcium intake increased as total dietary calcium intake increased, ($p < 0.001$)



Chapman (-Novakofski), K., Chan, M.W., and C.D. Clark.

Factors influencing dairy calcium intake in women. *J Amer Coll Nutr* 14(4):336-340, 1995.

Translating into Research into Practice

Results:

- Nutrition was not one of more important considerations; calcium was not either.
- Younger women believed that older women should be concerned about osteoporosis.
- Older women believed that younger women should be concerned about osteoporosis.



Chapman (-Novakofski), K.M., and M.W. Chan. Focus groups: their role in developing calcium-related education materials. *J Hum Nutr Diet* 8:363-367, 1995.

Translating into Research into Practice

Outcome variables:

- Calcium intake
- Weight-bearing activity- step counting
- Positive changes in Health Belief Model and Theory of Reasoned Action variables

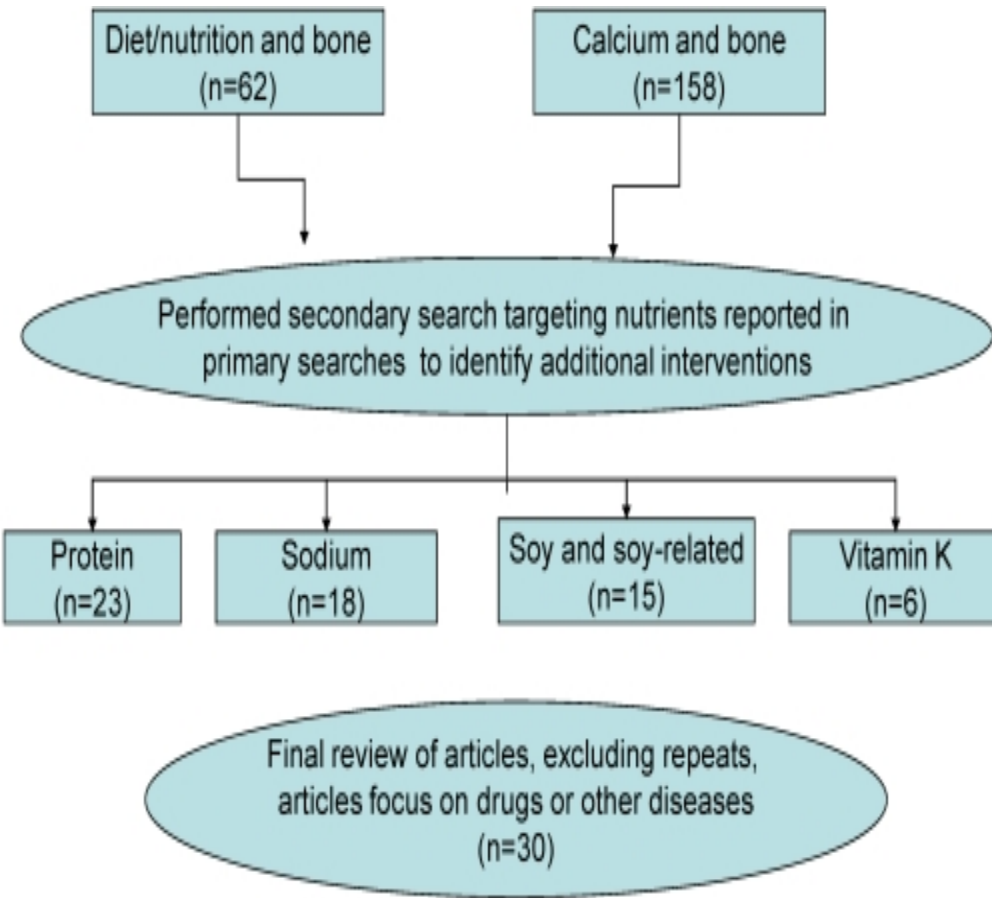
Tussing L, Chapman-Novakofski K. Osteoporosis prevention education: Behavior theories and calcium intake. *J Amer Dietetic Assoc* 105(1):92-97, 2005.

Diet Change During Intervention

- Significant increases from week 1 in calcium from fruit ($p < 0.005$) and total calcium ($p < 0.005$)
- Significant increases ($p < 0.015$) in vitamin D but AI not reached
- At eight weeks post-intervention, intake levels maintained, except for significant increase ($p < .042$) in calcium from grains

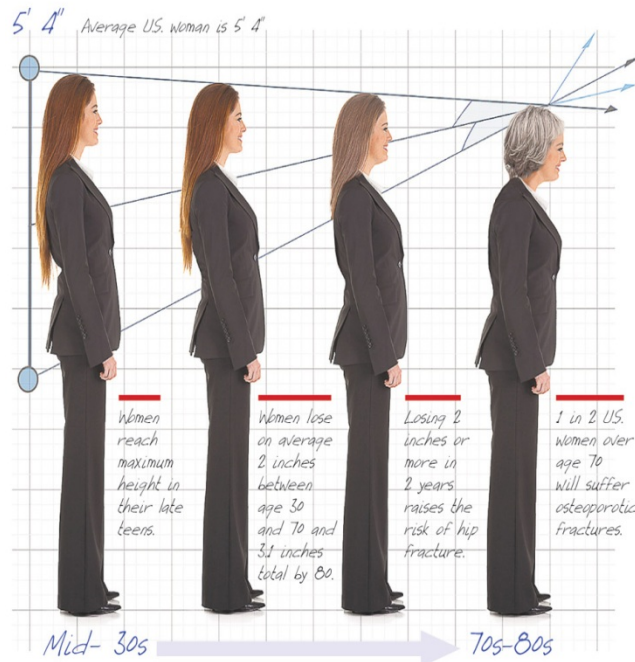
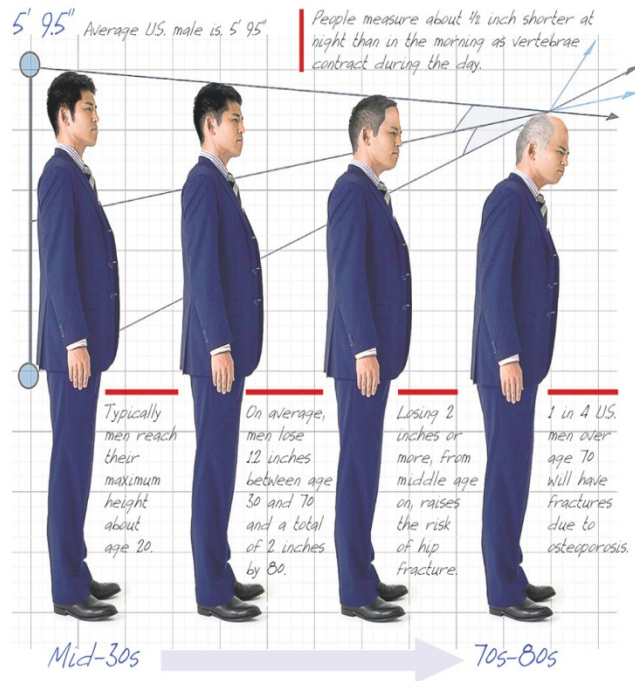
Plawecki K, Chapman-Novakofski K. Effectiveness of community intervention in improving bone health behaviors in older adults. *J Nutr Gerontol Geriatrics*, 32(2): 145-160, 2013.

Translating into Research into Practice



Calories and Energy Balance





The Obesity Paradox

Table 2. Summary Hazard Ratios (HRs) of All-Cause Mortality for Overweight and Obesity Relative to Normal Weight From Studies Considered Adequately Adjusted

	Self-reported or Measured Height and Weight		Height and Weight			
	No. of HRs	Summary HR (95% CI) ^a	Self-reported			
			I ² , %	No. of HRs	Summary HR (95% CI) ^a	I ² , %
BMI of 25-<30						
All ages	86	0.94 (0.90-0.97) ^a	74.8	41	0.95 (0.90-1.01) ^a	91.0
Mixed ages	68	0.95 (0.91-0.99) ^a	79.2	34	0.96 (0.91-1.02) ^a	91.8
Age ≥65 y only	18	0.90 (0.86-0.95)	23.4	7	0.91 (0.84-0.98)	42.9
BMI of ≥30						
All ages	42	1.21 (1.12-1.31) ^a	67.1	20	1.33 (1.21-1.47) ^a	88.0
Mixed ages	33	1.26 (1.16-1.37) ^a	66.7	17	1.39 (1.27-1.53) ^a	84.3
Age ≥65 y only	9	1.05 (0.92-1.21) ^a	73.1	3	1.08 (0.93-1.25)	39.7
BMI of 30-<35						
All ages	42	0.97 (0.90-1.04) ^a	64.2	21	0.94 (0.84-1.05) ^a	89.6
Mixed ages	33	0.98 (0.91-1.06) ^a	64.8	17	0.95 (0.85-1.07) ^a	90.3
Age ≥65 y only	9	0.88 (0.69-1.12) ^a	64.1	4	0.82 (0.46-1.47) ^a	88.1
BMI of ≥35						
All ages	42	1.34 (1.21-1.47) ^a	46.6	21	1.35 (1.16-1.57) ^a	88.7
Mixed ages	33	1.35 (1.22-1.50) ^a	40.4	17	1.34 (1.14-1.57) ^a	89.6
Age ≥65 y only	9	1.28 (0.93-1.76) ^a	37.8	4	1.40 (0.64-3.07) ^a	86.8

Abbreviation: BMI, body mass index (calculated as weight in kilograms divided by height in meters squared).
^aIndicates significant heterogeneity ($P < .05$).

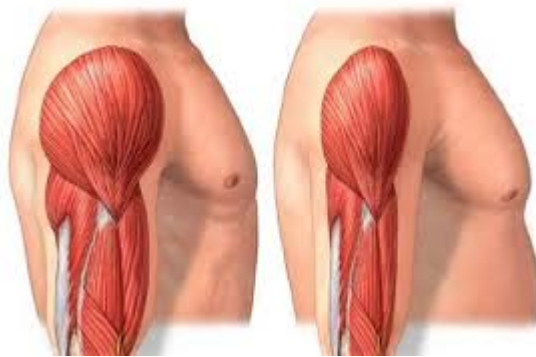


Are overweight elderly different from normal weight?

- A consensus panel of the American Society for Nutrition and the Obesity Society, after reviewing papers published between 1996 and 2005, stated that both **overweight and obesity in the elderly are linked to physical disability**.
- Overweight and obesity are also associated with higher risk of several chronic conditions such as diabetes, hypertension, stroke, heart disease and metabolic syndrome in the elderly.

Considerations

- Change in weight over time
- Overweight and pain
- Overweight disability
- Sarcopenia



- Some suggest that treatment strategies for obese older subjects should focus
 - more on maintaining body weight and
 - improving physical function,
 - but avoiding weight loss.



- Incorporate measures to avoid
 - loss of bone and
 - muscle mass



Lower Weight or Not?



- Higher adiposity: protection against catabolic stress?
 - American Society for Nutrition & the Obesity Society **support the positive effect of moderate weight loss** in the elderly.
 - Exercise and dietary weight loss: reducing weight; **managing chronic conditions** associated with obesity in the geriatric population, such as OA and CVD.
 - DeCaria 2012

3 take home pearls...



Meet vitamin B 12 needs with fortified foods



Protein a concern when caloric intake low



Meet calcium and vitamin D needs with fortified foods