Nutrition Challenges and the Older Adult
Session Objectives

The participant will be able to:

• Explain issues that interfere with older adults consuming an adequate diet.
• Identify 4 key nutrient deficiencies for older adults and gain ideas for addressing them.
• Describe the signs, issues and treatments of frailty, sarcopenia and failure to thrive.
Multiple Medical Conditions*

Prevalence of Malnutrition in Disease States and Conditions likely to affect the Elderly

<table>
<thead>
<tr>
<th>Disease State/Condition</th>
<th>Prevalence of Malnutrition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rheumatoid Arthritis</td>
<td>26%-71% not seen in younger people</td>
</tr>
<tr>
<td>Chronic Obstructive Pulmonary Disease</td>
<td>20%-70% highest in emphysema</td>
</tr>
<tr>
<td>Chronic renal failure</td>
<td>30%-76% higher in elderly and when second to diabetes</td>
</tr>
<tr>
<td>Chronic heart failure</td>
<td>10%-25%</td>
</tr>
<tr>
<td>Stroke</td>
<td>8%-16% at hospitalization; 22% at discharge</td>
</tr>
<tr>
<td>Dementia</td>
<td>12-50% institutionalized; esp. Alzheimer’s</td>
</tr>
<tr>
<td>Hip fracture</td>
<td>Up to 50%</td>
</tr>
</tbody>
</table>

The Role of Nutrition

Nutrition Intervention Opportunities:

• Prevention – encouraging healthy eating & fitness to maximize health

• Risk Reduction – slowing progression of chronic nutrition related diseases to maintain functionality and QOL

• Therapy – nutrition becomes part of treatment for many chronic disease

Krause's Food & Nutrition Therapy 12th Edition

It is never too late to eat healthy and be active.
Healthy Eating Interferences

**Physical**
- Mobility to shop/cook
- Home bound
- Chair/bed bound
- Chronic diseases
- Aches / pain
- Alzheimer’s / Dementias
- Alcoholism
- Substance abuse
- Medications

**Psychological**
- Stubborn, denial
- Anger, anxiety
- Depression / loneliness
- End-of-life; no will and/or fear

**Social**
- No cooking knowledge
- Restrictive diet
- Loss of spouse/partner
- Loss of friends
- Isolation
- Moving from home to alternate care
- Neglect and abuse

**Economic**
- Poverty
- Access to food
- Access to care
- Lack of support and help

>70% of older Americans would benefit from improved eating habits.

Energy (kcal/day) Intake of Adults
Usual Intake from Food

Carbohydrate (g/day) Intake of Adults
Usual Intake from Food

Source: What We Eat in America National Health and Nutrition Examination Survey (NHANES) 2009-2010
Fat (g/day) Intake of Adults
Usual Intake from Food

![Fat Intake Graph]

Source: What We Eat in America National Health and Nutrition Examination Survey (NHANES) 2009-2010

Protein (g/day) Intake of Adults
Usual Intake from Food

![Protein Intake Graph]

Source: What We Eat in America National Health and Nutrition Examination Survey (NHANES) 2009-2010
Vitamins & Minerals

- Over 40% of adults don’t meet the daily recommended intakes for vitamins & minerals through diet alone
  - Calcium, Potassium, Magnesium, Vitamins A, C, & E
  - For older adults also: Vitamin B₁₂ & D

- Older adults have increased need for:
  - Vitamin D & B₁₂
  - Calcium & α-Zinc

- Women have ↓ need for iron after menopause


Prevalence of Protein - Energy Malnutrition in the Geriatric Population

- 6-15% in LTC  Fazia M et.al. JAMDA 2013; 14:77-79

- 5-10% Community Dwellers
- 60% Hospitalized
- 35-85% in LTC  Furman EF. J Gerontol Nurs 2006;32:22-27

- 6% Community Dwellers
- 39% Hospitalized
- 51% Rehab

Nutrients of Concern

• Protein

• Vitamin B12

• Calcium & Vitamin D

Protein Needs with Aging

• Preserve and/or replace lean body mass
• Maintain healthy immune system
• Assist with normal cell repair
• Promote wound healing
• Promote functional independence

Protein is fundamental to every system and function in the body.
Protein Needs Don’t Change with Age

• Protein metabolism is less efficient in older adults

Protein Needs of Older Adults

• Current requirements based on N-balance and not optimizing muscle mass or functionality
• 0.8 g/kg PRO is not enough for >65 y
• [Healthy] elderly require 1.0-1.2 g/kg BW high quality protein daily to maintain / gain muscle
  • Requirement may be 1.2-2.0 g/kg BW for repletion
• Adequate [quality] protein intake per meal is important
  • 25 – 30 gram / meal target / threshold

Benefits of Higher Protein Intake

• Correlates to:
  • ↑ Bone mass density
  • Slower rate bone loss
  • Slower loss of muscle mass and strength

Health ABC Study: subjects in highest quintile of protein intake lost ~40% less LBM than those in lowest quintile


All Proteins are Not “Equal”

• Two considerations:
  • Quality [essential amino acid content; esp. leucine]
  • Digestibility and bioavailability
• Good, Better, Best…but any protein better than none
  • Plant proteins (soy)
  • Egg
  • Dairy (whey, casein) & (lean) Meat
    • Higher in key amino acid leucine

Optimal Feeding of Protein

- 25 – 30 gm / meal (w/ 2.5-2.8 gm leucine)
- OR, at minimum
- Main high-protein meal at midday


<table>
<thead>
<tr>
<th>Leucine Content of Foods</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1 scoop (36 g) of whey protein isolate</strong></td>
</tr>
<tr>
<td><strong>1 scoop (36 g) soy protein isolate</strong></td>
</tr>
<tr>
<td><strong>4 oz. sirloin steak</strong></td>
</tr>
<tr>
<td><strong>4 oz. chicken breast</strong></td>
</tr>
<tr>
<td><strong>1 cup low-fat yogurt</strong></td>
</tr>
<tr>
<td><strong>1 cup fat-free milk</strong></td>
</tr>
<tr>
<td><strong>1 egg</strong></td>
</tr>
<tr>
<td><strong>2 tbsp. peanut butter</strong></td>
</tr>
<tr>
<td><strong>1 slice wheat bread</strong></td>
</tr>
</tbody>
</table>

High Protein, What About…?

<table>
<thead>
<tr>
<th>Condition</th>
<th>Protein</th>
<th>Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitalized</td>
<td>1.2-1.7 g/kg</td>
<td>25-30 kcal/kg</td>
</tr>
<tr>
<td>Frailty</td>
<td>No specifics</td>
<td></td>
</tr>
<tr>
<td>Hip fracture</td>
<td>Met 80% target</td>
<td>Met 50% target</td>
</tr>
<tr>
<td>Osteoporosis</td>
<td>&gt;0.8 gm / kg or 24% of kcal</td>
<td>Higher BMD</td>
</tr>
<tr>
<td>Stroke</td>
<td>1 g/kg</td>
<td>Intake at 80-90% of target</td>
</tr>
<tr>
<td>Pressure ulcers</td>
<td>Up to 1.3 g/kg</td>
<td>Meals covered only 76% of energy need. ONS needed</td>
</tr>
<tr>
<td>COPD</td>
<td>20% of kcal from protein</td>
<td>Use ONS</td>
</tr>
<tr>
<td>Cardiac-critical</td>
<td>1.2-1.5 g/kg</td>
<td>20-25 kcal/kg</td>
</tr>
<tr>
<td>DM w/o kidney dz</td>
<td>20-30% of kcal</td>
<td></td>
</tr>
<tr>
<td>DM w/ kidney dz</td>
<td>‘low’ 0.8 gm/kg</td>
<td>Renal trumps DM</td>
</tr>
</tbody>
</table>

- For obese or underweight; use ideal body weight
- ONS = oral nutrition supplements

Bauer J, et al. JAMDA 2013;14:542-559
High Protein, What About Renal Disease?

Consider nutrition status 1) prior to the disease, 2) the disease, and 3) the impact the disease will have on nutrition status.

Bauer J, et al. JAMDA 2013;14:542-559

<table>
<thead>
<tr>
<th>Condition</th>
<th>Protein</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe CKD, GFR &lt;30</td>
<td>0.8 g/kg BW /d</td>
</tr>
<tr>
<td>Moderate CKD, GFR &gt;30 &lt;60</td>
<td>&gt;0.8 g/kg BW /d</td>
</tr>
<tr>
<td>Mild CKD, GFR &gt;60</td>
<td>Protein per needs</td>
</tr>
<tr>
<td>Hemodialysis</td>
<td>&gt;1.2 g/kg BW /d</td>
</tr>
<tr>
<td></td>
<td>Ideally 1.5 g/kg</td>
</tr>
<tr>
<td>Peritoneal dialysis</td>
<td>&gt;1.2 g/kg BW /d</td>
</tr>
<tr>
<td></td>
<td>Ideally 1.5 g/kg</td>
</tr>
</tbody>
</table>

As able...30-60 min. / day of endurance exercise
Resistance training 2-3 x/wk for 10-15 min.

Frail individuals can gain muscle strength and function!

Journal of the American Medical Directors Association 2013 14, 542-559DOI: (10.1016/j.jamda.2013.05.021
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Vitamin B₁₂

- DRI 2-3 mcg /day
- New data suggests 4-7 mcg/day (for 4 yrs. and up)
- Role:
  - Nervous system health
  - Red blood cell formation
  - DNA Synthesis
  - Cell metabolism
  - Fatty acid / amino acid metabolism
- 1.5%-15% of pop. deficient
  - Supplement at 25-100 mcg/day
  - 2000 mcg/day titrated down
### Sources of Vitamin B<sub>12</sub>

<table>
<thead>
<tr>
<th>Micrograms (mcg) per serving</th>
<th>Percent DV*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clams, cooked, 3 ounces</td>
<td>84.1</td>
</tr>
<tr>
<td>Liver, beef, cooked, 3 ounces</td>
<td>70.7</td>
</tr>
<tr>
<td>Breakfast cereals, fortified with 100% of the DV for vitamin B12, 1 serving</td>
<td>6.0</td>
</tr>
<tr>
<td>Trout, rainbow, wild, cooked, 3 ounces</td>
<td>5.4</td>
</tr>
<tr>
<td>Salmon, sockeye, cooked, 3 ounces</td>
<td>4.8</td>
</tr>
<tr>
<td>Trout, rainbow, farmed, cooked, 3 ounces</td>
<td>3.5</td>
</tr>
<tr>
<td>Tuna fish, light, canned in water, 3 ounces</td>
<td>2.5</td>
</tr>
<tr>
<td>Cheeseburger, double patty and bun, 1 sandwich</td>
<td>2.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Micrograms (mcg) per serving</th>
<th>Percent DV*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haddock, cooked, 3 ounces</td>
<td>1.8</td>
</tr>
<tr>
<td>Breakfast cereals, fortified with 25% of the DV for vitamin B12, 1 serving</td>
<td>1.5</td>
</tr>
<tr>
<td>Beef, top sirloin, broiled, 3 ounces</td>
<td>1.4</td>
</tr>
<tr>
<td>Milk, low-fat, 1 cup</td>
<td>1.2</td>
</tr>
<tr>
<td>Yogurt, fruit, low-fat, 8 ounces</td>
<td>1.1</td>
</tr>
<tr>
<td>Cheese, Swiss, 3 ounce</td>
<td>0.9</td>
</tr>
<tr>
<td>Beef taco, 1 soft taco</td>
<td>0.9</td>
</tr>
<tr>
<td>Ham, cured, roasted, 3 ounces</td>
<td>0.6</td>
</tr>
<tr>
<td>Egg, whole, hard boiled, 1 large</td>
<td>0.6</td>
</tr>
<tr>
<td>Chicken, breast meat, roasted, 3 ounces</td>
<td>0.3</td>
</tr>
</tbody>
</table>

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

- Deficiency <170-250 pg/mL (<120-180 picomol/L)
- B12 serum concentration might be suspect?
- >13 micromol/L homocysteine – maybe an indication
- >4 micromol/L methylmalonic acid – highly probable

- Symptoms: extreme fatigue, confusion, tingling and weakness in arms/legs, unsteady gait, tinnitus, pernicious anemia, GI disturbances, inflammation of tongue, urinary incontinence, loss of appetite
Why Older Adults Need B₁₂ Supplementation

• Potential Problems
  • ↓ food intake; vegetarian
  • Early satiety
  • ↓ absorption efficiency
    • 10-30% have ↓ stomach acid
    • Fortified w/ B12 sources help
• Medications
• Decreased resistance to ulcers, cancers, and infection
• Existing chronic conditions

Older Adults need Calcium & D

Drink milk!
(or have something ‘dairy’)
~54 million Americans have Osteoporosis

- Osteoporosis = Bone disease → loss or too little
  - Peak bone mass at 18-25 years
  - Mid-life = increasing bone loss
  - Post-menopause women can lose up to 20% of bone density

- A break is often first hint of problem
  - 1 in 2 women and 1 in 4 men will break a bone

- Bone make-up:
  - Collagen
  - Calcium-phosphate mineral
  - Bone cells

- Bone loss not ‘normal’ part of aging

Bone Health & the Calcium Connection

Protecting bone health:

- Proper diet; including Calcium and Vitamin D
  - And protein
- Exercise (strength)
- Avoid smoking
- Limit alcohol

- Calcium deficiency → bone loss
  - Absorption efficiency ↓ with age
  - Btw 70-90 yr. absorb ~1/3 less calcium than younger

- Diets (usually) inadequate → supplement as needed
### Daily Calcium Intake Target

#### Recommended Dietary Allowances (RDAs) for Calcium

<table>
<thead>
<tr>
<th>Age</th>
<th>Male</th>
<th>Female</th>
<th>Pregnant</th>
<th>Lactating</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–6 months*</td>
<td>200 mg</td>
<td>200 mg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7–12 months*</td>
<td>260 mg</td>
<td>260 mg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1–3 years</td>
<td>700 mg</td>
<td>700 mg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4–8 years</td>
<td>1,000 mg</td>
<td>1,000 mg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9–13 years</td>
<td>1,300 mg</td>
<td>1,300 mg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14–18 years</td>
<td>1,300 mg</td>
<td>1,300 mg</td>
<td>1,300 mg</td>
<td>1,300 mg</td>
</tr>
<tr>
<td>19–50 years</td>
<td>1,000 mg</td>
<td>1,000 mg</td>
<td>1,000 mg</td>
<td>1,000 mg</td>
</tr>
<tr>
<td>51–70 years</td>
<td>1,000 mg</td>
<td>1,200 mg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>71+ years</td>
<td>1,200 mg</td>
<td>1,200 mg</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Adequate Intake (AI)  

National Institutes of Health

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### Calculating Calcium Intake

#### Estimated Food Intake

- **+ Supplements (if taken)**
- **- Daily target**

**+/− Calcium Goal**

<table>
<thead>
<tr>
<th>Product</th>
<th>Servings Per Day</th>
<th>Calcium (mg)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk (8 oz.)</td>
<td>× 300</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yogurt (6 oz.)</td>
<td>× 300</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cheese (1 oz. or 1 cubic inch)</td>
<td>× 200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fortified Foods &amp; Juices</td>
<td>× 80 - 1,000</td>
<td></td>
<td>250</td>
</tr>
</tbody>
</table>

**Total Daily Calcium Intake, in mg**

National Osteoporosis Foundation
Don’t Forget the (Vitamin) D

• Adequate D is needed to absorb Calcium

<table>
<thead>
<tr>
<th>Vitamin D Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under age 50</td>
</tr>
<tr>
<td>Age 50 and older</td>
</tr>
</tbody>
</table>

**Some people need more vitamin D. According to the Institute of Medicine (IOM), the safe upper limit of vitamin D is 4,000 IU per day for most adults.

• Calcium absorption compromised when 25-hydroxy vitamin D blood levels are <30 nmol/L
  • AGS recommends level of ≥75 nmol/L

• Best Sources of D:
  • Fortified foods (e.g. milk) ☺ AND sunlight!
  • Supplement


Top Foods for Calcium & Vitamin D

Calcium
• Milk (fortified milks like soy or rice)
• Other Dairy (cheeses, yogurt, pudding)
• Dark Greens (spinach, kale, collards, turnip)
• Some fish, (sardines, salmon, perch, trout)
• Soybeans
• White beans
• Almonds
• Foods that are calcium-fortified, such as some orange juice, breakfast cereals

Vitamin D
• Cod Liver Oil
• Fortified Milk (& other dairy)
• Fatty fish, (swordfish, tuna, salmon, sardines)
• Foods fortified with vitamin D, (orange juice, soy milk, and cereals)
• Beef liver
• Egg yolks
Avoiding the “Worst” Scenarios...

...Sarcopenia, Frailty and Failure to Thrive

Sarcopenia

• Age-related loss of muscle mass AND strength

• Not specific to frail individuals
  • Observed in “healthy”; well-nourished elderly
  • Lean mass >2 SD below the young normal mean
  • Sarcopenic obesity...loss of lean muscle with excess adipose tissue

• Presents as: physical disability, functional impairment, decreased physical performance, loss of independence, falls

• Diet helps; strength training is key
  • Hormone therapy?....mixed results

Thomas, DR. Asia Pacific Geriatric Congress Hong Kong October 2012
Frailty Syndrome

- **Prevalence:** 3-6% of 65–70 yrs. and >16% aged 80+
- **Fried’s Frailty Syndrome Phenotype:**
  - Weight loss >4.5 kg in past year
  - Exhaustion – often or most of the time
  - Very low to no physical activity
  - Low walking speed (<15’ in >6-7 sec)
  - Low hand grip strength
- **Etiology → many**
  - Treatable? Or, GFTT?
  - Multiple issues increase the complexity
- **Prevention:**
  - Strength training
  - Adequate protein and iron
  - Staying generally active


Same or Different?

- **Sarcopenia vs. Frailty**
  - Common and overlapping in older adults
- Frail person may not be sarcopenic
- Sarcopenic person is often, but not always, frail

Geriatric Failure to Thrive (GFTT)

- GFTT is **not** “normal”
- Recognize & Intervene
- Late-life syndrome defined by:
  - Wt. loss >5% of baseline
  - ↓ appetite....dehydration ....poor nutrition
  - Inactivity
  - Depression
  - Impaired immune function
  - Low cholesterol levels (<160 mg/dl and declining)
- 4 common syndromes; predictive of adverse outcomes:
  - impaired physical function
  - malnutrition
  - depression
  - cognitive impairment

Prevalence:
- ~5%-35% community dwelling elders
- ~25%-40% nursing home residents


Assessing Geriatric Failure to Thrive

**Indications:**
- Depression  • Cognitive Impairment
- Malnutrition  • Functional Impairment

**Failure to Thrive**

**Investigation**

- Lab / diagnostics
- MMSE, ADL, IADL, “Up & Go Test”
- Geriatric depression scale
- MNA ®
- Rx review
- Chronic disease evaluation
- Assess environment

Assessing Geriatric Failure to Thrive

**Depression**
- Psychotherapy
- Antidepressants
- Modify environment

**Malnutrition**
- SLP Eval
- Treat oral pathology
- Review diet restrictions
- Inc. feedings
- Nutr. Supplements
- Tube feed?

**Cognitive Impairment**
- Optimize living conditions
- Treat depression
- Treat malnutrition
- Treat infection
- Dementia-delaying Rx

**Functional Impairment**
- PT
- OT
- Modify environment

With results, continue to treat.
If no/ minimal result conduct care planning. Repeat evals/end-of-life / hospice

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**Top Chronic Health Concerns Over 65**

- **Stroke**
- **Diabetes**
- **Cancer**
- **Heart Disease**
- **Arthritis**
- **Hypertension**

- **6.** Leading cause of functional impairment and dysphagia.
- **5.** No standard diet - BG control important; HHS is a concern
- **4.** Diet – per assessment, tx goal & pt wishes
- **3.** Restricting dietary cholesterol has little impact on coronary events
- **2.** Impacts nutrition via ↓ physical function – access to food may be the bigger concern
- **1.** #1 issue but low sodium diets may not be helpful

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CDC State of Aging in America 2013.
• Healthy aging involves interaction between genes, environment & lifestyle choices.
• Older adults are at greater risk of nutritional deficiencies due to:
  • Aging processes
  • Chronic [& acute] medical conditions
    • Medications / therapies
  • Psycho-social changes
  • Socio-economic status
• Aging milestones can be managed or minimized and nutrition plays a key role.

Thank you for participating in today’s session!

This presentation is intended to provide general information about geriatric nutrition issues but is not intended to provide medical advice.

Presentation Author: Debra Zwiefelhofer, RDN, LD
Select References

Books

Journals

Select References

*Recommended

Journals (continued)
Select References
*Recommended

Journals (continued)

POST-TEST

1. Identify a plan to assess intake adequacy for protein, B12, calcium and vitamin D in older adults.

2. Identify 2-3 ways to better meet protein, B12, calcium and vitamin D needs in older adults.