The Elderly: Nutritional Needs, Challenges, Screening, and Solutions

Karen Lundgren, MS, RD
Medical Scientific Liaison
Medical Affairs
Nestlé HealthCare Nutrition, Inc.

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Note: Today’s presentation is being recorded and will be available in the future.
Program Objectives

• Describe how the nutritional needs of the elderly are different from other adult populations

• Identify several nutritional challenges facing the elderly and the related healthcare risks

• Describe the importance of nutritional screening and intervention with individuals at risk

• List at least two nutrition intervention solutions for the elderly
Nutrition: A Key Component of Successful Aging and Quality of Life

Quality of Life

Family, Caregivers, Community
Social Interactions, Spirituality, Religion
Independence, Living Arrangements
Physical, Mental, Emotional Functioning
Health Status, Disease Management
Nutritional Well-Being


Nutritional Needs of Healthy Adults: Estimated Energy Requirements Decline With Age

*For each year above 30, subtract 7 calories/day for women and 10 calories/day for men. Estimated calorie requirements based on height and weight (BMI), and physical activity level (sedentary, low active, active, very active).

Nutritional Needs of Healthy Adults:
Macronutrient Distribution to Meet Energy Needs

A balance of protein, carbohydrate and fat is needed, even as calorie (energy) requirements decline with age.

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>% of Total Calories</th>
<th>Average % Total Calories (70+ female)*</th>
<th>70 yrs 1482 Calories/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein</td>
<td>10-35%</td>
<td>15%</td>
<td>224 Cals (56g)</td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>45-65%</td>
<td>52%</td>
<td>772 Cals (193g)</td>
</tr>
<tr>
<td>Fat</td>
<td>20-35%</td>
<td>33%</td>
<td>486 Cals (54g)</td>
</tr>
</tbody>
</table>


Current Protein Recommendation May Not Be Adequate for Elderly

- **Current RDA for Protein**: 1
  - Established for healthy men and women ≥ 19 yrs
  - 0.8g protein/kg/day
  - 46g/day (female)
  - 56g/day (male)
- **Increased Protein Suggested for Elderly**: 2
  - To help maintain metabolic, physical and functional status
  - 1.0 – 1.5g protein/kg/day
  - 58g – 86g/day (female)
  - 70g – 105g/day (male)
- **Mean Protein Consumption Age 70+**: 3
  - 57g/day (female)
  - 73g/day (male)

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Nutritional Needs of Healthy Adults: A Look at Total Water and Fiber Requirements

<table>
<thead>
<tr>
<th>Adequate Intake DRI (Dietary Reference Intakes)</th>
<th>19-50 years</th>
<th>51-70 years</th>
<th>71+ years</th>
<th>70+ years mean consumption*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Water* (liters/day)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>male</td>
<td>3.7L</td>
<td>3.7L</td>
<td>3.7L</td>
<td>NA</td>
</tr>
<tr>
<td>female</td>
<td>2.7L</td>
<td>2.7L</td>
<td>2.7L</td>
<td>NA</td>
</tr>
<tr>
<td>Total Fiber (grams/day)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>male</td>
<td>38g</td>
<td>↓ 30g</td>
<td>↓ 30g</td>
<td>17.0g</td>
</tr>
<tr>
<td>female</td>
<td>25g</td>
<td>↓ 21g</td>
<td>↓ 21g</td>
<td>14.3g</td>
</tr>
</tbody>
</table>

*Total water includes all water contained in food, beverages, and drinking water


Question #1

- Name two vitamins and/or minerals whose recommended daily dietary intake is higher for men and women at age 75 than at age 25?
  
  A. Calcium and Iron  
  B. Iron and Sodium  
  C. Vitamin D and Calcium  
  D. Sodium and Vitamin D
Nutritional Needs of Healthy Adults: Some Micronutrient Requirements Change with Age

<table>
<thead>
<tr>
<th>DRI (Dietary Reference Intakes)</th>
<th>19-50 years</th>
<th>51-70 years</th>
<th>71+ years</th>
<th>70+ years mean consumption*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minerals (mg/day)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iron</td>
<td>female</td>
<td>18 mg</td>
<td>8 mg</td>
<td>12.6 mg</td>
</tr>
<tr>
<td></td>
<td>male</td>
<td>8 mg</td>
<td></td>
<td>15.6 mg</td>
</tr>
<tr>
<td>Sodium</td>
<td>female</td>
<td>1500 mg</td>
<td>1300 mg</td>
<td>2364 mg</td>
</tr>
<tr>
<td></td>
<td>male</td>
<td></td>
<td>1200 mg</td>
<td>3012 mg</td>
</tr>
<tr>
<td>Calcium</td>
<td>female</td>
<td>1000 mg</td>
<td>1200 mg</td>
<td>743 mg</td>
</tr>
<tr>
<td></td>
<td>male</td>
<td>1000 mg</td>
<td>1200 mg</td>
<td>837 mg</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamins (IU/day)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin D</td>
<td>female</td>
<td>600 IU</td>
<td>600 IU</td>
<td>152 IU</td>
</tr>
<tr>
<td></td>
<td>male</td>
<td></td>
<td></td>
<td>196 IU</td>
</tr>
</tbody>
</table>


Vitamin D Requirement for Healthy Adults Increased: 2011 Report by the Institute of Medicine

<table>
<thead>
<tr>
<th>VITAMIN D (IU / day)</th>
<th>Dietary Reference Intake (DRI) Established by Institute of Medicine (Meets the needs of 97-98% of the healthy population)</th>
<th>Upper Level Intake</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>19-30 years</td>
<td>31-50 years</td>
</tr>
<tr>
<td>Former* (1997)</td>
<td>400 IU</td>
<td>200 IU</td>
</tr>
<tr>
<td>NEW** (2011)</td>
<td>600 IU</td>
<td>600 IU</td>
</tr>
</tbody>
</table>


**IOM. Dietary Reference Intakes for Calcium and Vitamin D. 2011.
Vitamin D: The Sunshine Vitamin

Why is Vitamin D such an issue in the elderly?

- Insufficient sun exposure
  - Live in northern latitudes
  - Long winters
  - Protecting skin from sun
  - Darker skin tone
  - Institutionalized or limited time outdoors
- Age related ↓ in capacity of the skin to produce Vitamin D
- Insufficient intake

Associations

- Key role in bone health – strong evidence
- Other health outcomes – mixed evidence

IOM. Dietary Reference Intakes for Calcium and Vitamin D. 2011.

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Reduction of Falls and Fractures Seen in Older Adults 65+ yrs with Supplemental Vitamin D

FALLS -19%
NON-VERTEBRAL FRACTURES* -20%
HIP FRACTURES -18%

Vitamin D
700-1000 IU/day
n=1,921 (7 trials)
(RR 0.81; 95% CI, 0.71-0.92)

Vitamin D
482-770 IU/day
n=33,265 (9 trials)
(RR 0.80; 95% CI, 0.72-0.89)

Vitamin D
482-770 IU/day
n=31,872 (5 trials)
(RR 0.82; 95% CI, 0.69-0.97)

*Reduction significant in both community dwelling individuals (29%) and institutionalized individuals (15%).


Limited Vitamin D Sources to Achieve 800 IU/day

- Sun Exposure
- Food
  - Fatty Fish: salmon, tuna, sardines
  - Fortified Foods:
    - oral nutritional supplements
    - milk, orange juice, yogurt
    - cereals
- Supplements
  - Calcium & Vitamin D supplements
  - Standard Vitamin & Mineral supplements
  - Stand alone Vitamin D supplements (liquid and pill forms)
Vitamin D Food Sources to Achieve 800 IU/day

<table>
<thead>
<tr>
<th>Food</th>
<th>Serving</th>
<th>Vitamin D (IU)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salmon, canned</td>
<td>3 oz</td>
<td>465</td>
</tr>
<tr>
<td>Light Tuna, canned in oil</td>
<td>3 oz</td>
<td>229</td>
</tr>
<tr>
<td>Sardines, canned in oil</td>
<td>3 oz</td>
<td>164</td>
</tr>
<tr>
<td>Light Tuna, canned in water</td>
<td>3 oz</td>
<td>154</td>
</tr>
<tr>
<td>Fortified Milk, whole</td>
<td>1 cup</td>
<td>124</td>
</tr>
<tr>
<td>Fortified Milk, non-fat</td>
<td>1 cup</td>
<td>115</td>
</tr>
<tr>
<td>Fortified Cereal</td>
<td>1 cup</td>
<td>40</td>
</tr>
<tr>
<td>Oral Nutrition Supplements</td>
<td>8 fl oz</td>
<td>80 - 240</td>
</tr>
</tbody>
</table>


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Nutrient Intakes and Gaps Age 70+ yrs

Mean Consumption vs. Dietary Reference Intake (DRI) Ages 70+ yrs

Energy: 80% males, 89% females
Vitamin A: 78% males, 70% females
Vitamin D: 47% males, 41% females
Vitamin E: 25% males, 19% females
Vitamin K: 47% males, 41% females
Choline: 59% males, 61% females
Magnesium: 67% males, 73% females
Potassium: 58% males, 47% females

100% of DRI (70+ yrs)
106%
103%
80%
89%
78%
106%
103%
81%
96%
106%
103%
80%
89%
78%


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Effects of Aging on Nutrition

<table>
<thead>
<tr>
<th>Changes</th>
<th>Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensory impairment</td>
<td></td>
</tr>
<tr>
<td>– Decreased sense of taste</td>
<td>➔ Reduced Appetite</td>
</tr>
<tr>
<td>– Decreased sense of smell</td>
<td>➔ Reduced Appetite</td>
</tr>
<tr>
<td>– Loss of vision and hearing</td>
<td>➔ Decreased ability to purchase and prepare food</td>
</tr>
<tr>
<td>– Oral health / dental problems</td>
<td>➔ Difficulty chewing, inflammation, poor quality diet</td>
</tr>
<tr>
<td>Altered energy need</td>
<td>➔ Diet lacking in essential nutrients</td>
</tr>
<tr>
<td>Decreased physical activity</td>
<td>➔ Progressive depletion of LBW and loss of appetite</td>
</tr>
<tr>
<td>Muscle loss (sarcopenia)</td>
<td>➔ Decreased functional ability, assistance needed with ADLs</td>
</tr>
<tr>
<td>Psychosocial (isolation)</td>
<td>➔ Decreased Appetite</td>
</tr>
<tr>
<td>Environmental (financial)</td>
<td>➔ Limited access to food, poor diet</td>
</tr>
</tbody>
</table>

Cumulative Effect ➔ Progressive Undernutrition


Prevalence of Malnutrition in the Elderly

<table>
<thead>
<tr>
<th></th>
<th>Malnourished</th>
<th>At Risk</th>
<th>Normally Nourished</th>
<th>n=4274</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing Home</td>
<td>14%</td>
<td>53%</td>
<td>33%</td>
<td>n=1586</td>
</tr>
<tr>
<td>Hospitalized</td>
<td>39%</td>
<td>47%</td>
<td>14%</td>
<td>n=1384</td>
</tr>
<tr>
<td>Rehabilitation</td>
<td>50%</td>
<td>41%</td>
<td>9%</td>
<td>n=340</td>
</tr>
<tr>
<td>Community</td>
<td>6%</td>
<td>32%</td>
<td>62%</td>
<td>n=964</td>
</tr>
</tbody>
</table>

Inadequate Nutrition is Common in the Elderly

• 1 of 4 older adults are malnourished\(^1\)
• 2 of 4 older adults are at-risk for malnutrition\(^1\)
• Unintentional weight loss in the elderly could interfere with physical abilities and is associated with increased health risks\(^2-5\)


Possible Causes of Unintentional Weight Loss: The Meals on Wheels Mnemonic Guide

<table>
<thead>
<tr>
<th>M</th>
<th>Medications</th>
<th>W</th>
<th>Wandering and Other Dementia Related Behaviors</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>Emotional Problems</td>
<td>H</td>
<td>Hyperthyroidism, Hypothyroidism</td>
</tr>
<tr>
<td>A</td>
<td>Anorexia Nervosa</td>
<td>E</td>
<td>Enteric Problems (malabsorption)</td>
</tr>
<tr>
<td>L</td>
<td>Late-life Paranoia</td>
<td>E</td>
<td>Eating Problems (inability to feed self)</td>
</tr>
<tr>
<td>S</td>
<td>Swallowing Problems</td>
<td>L</td>
<td>Low Salt, Low Cholesterol Diets</td>
</tr>
<tr>
<td>O</td>
<td>Oral Factors (cavities, poorly fitting dentures)</td>
<td>S</td>
<td>Shopping, Social Problems</td>
</tr>
<tr>
<td>N</td>
<td>No Money</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Potential Consequences of Malnutrition

- Impaired immune response
- Reduced muscle strength and fatigue
- Inactivity
- Impaired temperature regulation
- Impaired wound healing
- Impaired ability to regulate fluid and electrolytes
- Impaired psycho-social function


Timely Routine Nutritional Screening Can Help Identify and Track Nutritional Risk

Identification of patients at risk of malnutrition ➔

Appropriate nutritional intervention ➔

↑ Intake of energy, protein & other nutrients ➔

↑ Improved anthropometric indicators ➔

↑ Improved disease outcomes - reduced complications ➔

↓ Decreased health care utilization and costs ➔
Ideal Nutritional Screening Tool

- Valid
- Reliable
- Accurate
- Clearly Defined Thresholds
- Relevant to Outcomes
- Inexpensive
- Acceptable to Clients
- Easy and Quick to Administer


Question #2

- Which of the following tools is most commonly used for nutritional screening of the elderly in your practice?
  
  A. SGA
  
  B. MUST

  C. MNA®
  
  D. Do Not Screen

  E. Other Tool
Examples of Nutrition Screening Tools

- Subjective Global Assessment (SGA)
- DETERMINE Checklist
- Malnutrition Screening Tool (MST)
- Malnutrition Universal Screening Tool (MUST)
- Geriatric Nutrition Risk Index
- Nutritional Risk Screening Tool (NRS 2002)
- Mini Nutritional Assessment (MNA®) Tool

MNA® Tool Specifically Developed for Elderly Population 65+ yrs

- The MNA® Tool was specifically developed to identify the elderly who are malnourished or at risk of malnutrition, so intervention can be started early
- MNA® Screening Form is a validated nutrition screening tool designed for adults 65+ yrs

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MNA® History

History
- Developed in 1990
- Validated for ages 65+ yrs
- Simple, reliable, non-invasive
- Validated across care settings
- Supported by >450 publications

Drawbacks to Old MNA®-SF
- Time consuming
- Height/weight not always available
- Did not identify malnourished without full MNA

The MNA® Short Form Today
- Based on the original MNA® Tool
- Uses only 6 items
- Quicker tool for clinical use ~5 min
- Relevant information
- Information may already be collected
- Validated in ambulatory elderly patients
- 3 cut-off points identify malnourished and allows direct movement from screening to intervention
- Calf-circumference valid alternative when height/weight or BMI unavailable
Calf Circumference: Acceptable and Validated Alternative to BMI in the Elderly

- In some settings, obtaining weight and height measures may be cumbersome or impossible (bed-bound persons or amputees)
- Calf circumference (CC) is an easy and quick alternative
- CC correlates with muscle loss in elderly

CC in centimeters
0 = CC < 31 centimeters
3 = CC ≥ 31 centimeters


New Self MNA®: Adapted For Self Completion by Older Adults (ages 65+) or Their Caregivers

- Self Mini Nutritional Assessment that determines a nutrition screening score
- Results to be shared and discussed with a Healthcare Professional
MNA® Resources and Tools for Clinicians:
www.mna-elderly.com

- MNA® Forms (found in >20 languages)
- MNA® User Guides
- MNA® Video
- MNA® Screening Process
- MNA® FAQs
- MNA® Literature Database
- Interpreting the MNA® Score

Recommendations for Nutrition Monitoring and Intervention Based on MNA® Score

Nutrition Intervention: Often Implemented Too Late

Malnutrition and Disease – A Downward Spiral towards dependence

- Pneumonia, flu and other infections
- Hip fracture, rehabilitation due to injury
- Recovery from surgery
- Muscle weakness due to illness or immobilization

Increased nutrient needs, decreased appetite and intake

Declining nutritional status and weight loss

Immobility, muscle weakness, risk of falls and fractures

Institutionalisation

Prolonged recovery, increased complications

Loss of ADLs/ADLs, increased dependency

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Nutrition Solutions to Support Nutritional Needs of the Elderly and Quality of Life

Quality of Life

Strong Nutritional Foundation

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Nutrition Solutions to Support Nutritional Needs of the Elderly and Quality of Life

Quality of Life

Easy to Chew – Easy to Swallow
Adequate Hydration – Adequate Fiber
Adequate Energy – Adequate Nutrients
Strong Nutritional Foundation

Nutrition Solutions to Support Nutritional Needs of the Elderly and Quality of Life

Quality of Life

Disease – Chronic Illness Related Needs
Easy to Chew – Easy to Swallow
Adequate Hydration – Adequate Fiber
Adequate Energy – Adequate Nutrients
Strong Nutritional Foundation
Nutrition Solutions to Support Nutritional Needs of the Elderly and Quality of Life

Quality of Life

Higher Protein, Higher Calories
Disease – Chronic Illness Related Needs
Easy to Chew – Easy to Swallow
Adequate Hydration – Adequate Fiber
Adequate Energy – Adequate Nutrients
Strong Nutritional Foundation

Oral Nutritional Supplements (ONS) Can Help Meet Energy and Nutrient Requirements in Older Adults

Mean Consumption vs. Dietary Reference Intake (DRI) Ages 70+ yrs

Energy
Vitamin A
Vitamin D
Vitamin E
Vitamin K
Vitamin C
Choline
Calcium
Magnesium
Potassium

ONS Can Help Meet Higher Protein Requirements for Older Adults

**Protein g/day**


Higher Protein Intake Seen with ONS Consumption in At-Risk Malnourished Patients Age 75+ yrs

Significantly Greater Total Protein Intake seen with ONS in At-Risk Malnourished Patients (75+ yrs) Discharged from Hospital (60 day follow up)

- RCT, 80 patients, 75+ yrs
- Hospitalized w/acute condition
- MNA® screen within 72 hrs
- At-risk for malnutrition
- Control vs. ONS 2x/day
- 250 Cals/10.5g protein/serving
- Similar LOS ~20 days
- 84% discharged home
- 60 day follow up

Higher Energy Intake Seen with ONS Consumption in At-Risk Malnourished Patients Age 75+ yrs

Significantly Greater Total Calorie Intake seen with ONS in At-Risk Malnourished Patients (75+ yrs) Discharged from Hospital (60 day follow up)

Prevention of Weight Loss Also Achieved with ONS


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Significant Reduction in Fall Incidents Seen in Malnourished Adults 65+ yrs who Consumed ONS + Vitamin D/Calcium Supplement

Lower incidence of falls seen at 3 months in malnourished patients (65-84 yrs) supplemented with high protein ONS and vitamin D/calcium supplement for 3 months

• RCT, 210 patients, 65+ yrs
• Newly admitted to acute care hospital
• Malnourished
• Control vs. ONS 2x/day + supplement (vitamin D [400 IU] calcium [500 mg])
• ONS provided 600 total Cals, 24g protein, 176 IU vitamin D₃, 364 mg calcium
• 3 month ONS intervention with RD telephone counseling every other week
• 3 month follow up

Percentage of older people with fall incidents at 3 months was significantly lower in patients randomly assigned to receive high protein ONS and vitamin D/calcium supplement (20%) compared with those in the placebo group (23%) (p=0.02) representing a 25% reduction. Risk of fall incidents in the 3 month follow up period was significantly lower in the ONS group than placebo after adjustment for other clinical risk factors (HR=0.41; 95% CI, 0.19-0.86 p=0.02).

Reduced Risk of Complications Seen in At-Risk Malnourished (65+ yrs) who Consumed ONS

Meta-analysis by Milne (2009) showed a reduction in complications in older people treated with ONS compared to routine care (24 trials, n=6225, RR=0.86; 95% CI, 0.75-0.99 p=0.029) and in a sub-group analysis of patients with hip fracture (6 trials, n=298, RR=0.60; 95% CI, 0.40-0.91 p=0.016).


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Significant Reduction in Hospital Readmissions of Acutely ill Age 65+ yrs Seen with ONS Consumption

Lower hospital non-elective readmissions seen at 6 months in patients (65-92 yrs) supplemented with ONS for 6 weeks

- RCT, 445 patients, 65+ yrs
- Hospitalized with acute illness
- Comparable nutritional status
- Control vs. ONS 2x/day
- ONS provided 995 total Cals +100% DRI vitamins & minerals
- 6 week ONS intervention
- LOS similar (10.1 vs. 9.4 days)
- 6 month follow up

Proportion of acutely ill older people readmitted to hospital at 6 months was significantly lower in patients randomly assigned to receive ONS (29%) compared with those in the placebo group (40%) (p=0.02) representing a 28% reduction. Risk of non-elective readmission in the 6 month follow up period was significantly lower in the ONS group than placebo after adjustment for other clinical risk factors (HR=0.60; 95% CI, 0.49-0.94).

The Elderly: Nutritional Needs, Challenges, Screening, and Solutions

Summary

• The nutritional needs of the elderly are different from other adult populations
• Physical and psycho-social changes associated with aging can effect nutritional health
• Malnutrition in older adults is a common problem
• The cornerstone of managing malnutrition is screening and early detection to help facilitate prompt intervention
• Appropriate nutrition solutions can help support the nutritional needs of the elderly, and ultimately the quality of life