Chapter 17
Adulthood
Fig. 17-1, p. 576

* Projections for 2010 split age groups slightly differently. Blue represents 18–24 years and purple represents <18 years.

SOURCE: U.S. Census Bureau, Decennial census of population, 1900 to 2000.
Nutrition and Longevity

Good nutrition and regular physical activity can increase life expectancy, support good health, prevent or prolong the onset of disease, and improve the quality of life.

Life expectancy:  
- WW - 81 years  
- WM - 76 years  
- BW - 77 years  
- BM - 70 years

Physiologic age: reflects your health status
Chronological age: actual age

Goals: Promote health and slow aging
Nutrition and Longevity

Healthy Habits:

Greatest influence on physiologic age

- Sleeping Regularly
- Well balance meals, rich in fruits and vegetables
- Regular physical activity
- Not smoking
- Alcohol: None or moderation
- Maintain healthy body weight
Nutrition and Longevity

Physical Activity - Older adults who are physically active:

• Weigh less
• Greater flexibility
• Endurance
• Better Balance
• Better Health
• Overall live longer
• Regular activity tones, firms, strengthens muscles improves confidence
• Decreases the risk of falling
• Regular physical activity is the most powerful predictor of mobility in later years.
<table>
<thead>
<tr>
<th>Examples</th>
<th>Aerobic</th>
<th>Strength</th>
<th>Balance</th>
<th>Flexibility</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Start easy and</strong></td>
<td>Be active 5 minutes on most per or all days</td>
<td>Using 0- to 2-pound weights, do 1 set of 8–12 repetitions twice a week</td>
<td>Hold onto table or chair with one hand, then with one finger</td>
<td>Hold stretch for 10 seconds; do each stretch 3 times</td>
</tr>
<tr>
<td><strong>progress gradually</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Frequency</strong></td>
<td>At least 5 days per week of moderate activity or at least 3 days per week of vigorous activity</td>
<td>At least 2 (nonconsecutive) days per week</td>
<td>3 days each week</td>
<td>At least 2 days per week; preferably on all days that aerobic or strength activities are performed</td>
</tr>
<tr>
<td><strong>Intensity</strong></td>
<td>Moderate, vigorous, or combination</td>
<td>Moderate to high; 10 to 15 repetitions per exercise</td>
<td></td>
<td>At least 10 minutes per day</td>
</tr>
<tr>
<td><strong>Duration</strong></td>
<td>At least 30 minutes of moderate activity in bouts of at least 10 minutes each or at least 20 minutes of continuous vigorous activity</td>
<td>8 to 10 exercises involving the major muscle groups</td>
<td></td>
<td>Stretch major muscle groups for 10–30 seconds, repeating each stretch 3 to 4 times</td>
</tr>
<tr>
<td><strong>Cautions and comments</strong></td>
<td>Stop if you are breathing so hard you can’t talk or if you feel dizziness or chest pain</td>
<td>Breathe out as you contract and in as you relax (do not hold breath); use smooth, steady movements</td>
<td>Incorporate balance techniques with strength exercises as you progress</td>
<td>Stretch after strength and endurance exercises for 20 minutes, 3 times a week; use slow, steady movements; bend joints slightly</td>
</tr>
</tbody>
</table>

*On a 10-point scale, where sitting = 0 and maximum effort = 10, moderate intensity = 5 to 6 and vigorous intensity = 7 to 8.

NOTE: Activity recommendations are in addition to routine activities of daily living (such as getting dressed, cooking, grocery shopping) and moderate activitieslasting less than 10 minutes.

Nutrition and Longevity

• Manipulation of Diet
  – Energy Restriction in Animals
    • Live longer
    • Fewer diseases
  – Energy Restriction in Human Beings
    • Applying results in animal studies to human beings is problematic.
    • Moderation of energy intake may be valuable.
The Aging Process

- Physiological, psychological, social, and economic changes that accompany aging affect nutritional status.
- Everyday stress can influence physical and psychological aging.
- Stressors elicit the body’s stress response.
- Physical stressors include alcohol and drug abuse, smoking, pain and illness.
- Psychological stressors include exams, divorce, moving, and the death of loved ones.
- Malnutrition is common.
The Aging Process

• Physiological Changes
  – Body Weight
    • Two thirds of the adults in the U.S. are overweight or obese.
    • For adults over the age of 65, health risks are not apparent until BMI reaches 27.
    • Older adults with low body weight may be unprepared to fight illness and disease and may be detrimental
  – Body Composition
    • Decrease bone and muscle mass
    • Increase in body fat
    • Sarcopenia is the loss of muscle mass which leads to decrease in strength and balance
    • Nutrition and exercise play a role in maintaining muscle mass.
These cross sections of two women’s thighs may appear to be about the same size from the outside, but the 20-year-old woman’s thigh (left) is dense with muscle tissue. The 64-year-old woman’s thigh (right) has lost muscle and gained fat, changes that may be largely preventable with strength-building physical activities.
Aging Process

• **Immune System**
  – Decline in function with age
  – Compromised by nutrient deficiencies
  – Infections are a major cause of death in older adults

• **G.I. Tract**
  – Decrease motility
  – Atrophic gastritis affects 1/3 of those over age 60
    • inflamed stomach
    • increased bacterial growth
    • reduced HLC acid, reduced intrinsic factor
    • increased risk of nutrient deficiencies, especially B\textsubscript{12}
  – Dysphagia, difficulty swallowing
Aging Process
Physiological Changes

• Dentition
  – Chewing problems
  – Tooth loss
  – Limited intake and poor nutrition

• Physical Problems/Sensory Losses
  – Poor eyesight
  – Limited mobility
  – Decreased taste and smell
  – Decreased hearing
Psychosocial Changes

• Psychological Changes
  – Depression and grief
  – Loss of appetite
  – Need support and companionship

• Economic Changes
  – Poverty affects 10% of those over age 65

• Social changes
  – Malnutrition is most common in hospitals and nursing homes
  – Malnutrition is most likely to occur in those living alone (especially men living alone)
  – Loneliness is directed related to nutrition inadequacies
Nutrient Needs of Elderly

Water:
- Risk of dehydration
  - Dehydration increases risks for urinary tract infections, pneumonia, pressure ulcers, confusion and disorientation.
- Recommendation: At least 6 glasses per day

Energy:
- Decline 5% per decade
- High nutrient dense foods

Protein:
- Lean meats, poultry, fish, eggs, legumes, lowfat milk products
Nutrient Needs of Elderly

CHO & Fiber:
- High fiber, water to help alleviate constipation

Fat:
- Limit as necessary
- Avoid becoming underweight
Vitamins and Minerals in the Elderly

**Vitamin D:**
- Limited exposure to sunlight
- Have a decreased milk intake
- Aging skin makes less Vitamin D
- 10 mcg/day - 51-70 years old
- 15 mcg/day - 71 and older

**B12:**
- 10-30% of adults over 50 have atrophic gastritis
- Decreased HCL acid and intrinsic factor
- Leads to $B_{12}$ deficiency
Vitamins and Minerals in the Elderly

Iron:
- Poor absorption - decreased hydrochloric acid
- Medication use
- Blood loss

Calcium:
- 1200 mg/day, RDA
- Stomach discomfort (lactose intolerance)
- *If intake is less than 1500 kcal - should take a vitamin/mineral supplement
Energy and Nutrient Needs of Older Adults

• Nutrient Supplements
  – Vitamin D and calcium for osteoporosis
  – Vitamin B\textsubscript{12} for pernicious anemia
  – Iron

• Daily multivitamin containing 100% of the listed nutrients may be beneficial.
Nutrition Related Concerns of Older Adults

Visual loss:

• Cataracts
  – thickening of the lens that impairs vision
  – 50% of adults over 65 have them
  – Antioxidant nutrients may help
    • Vitamin C, Vitamin E, and carotenoids

• Macular degeneration
  – Deterioration of the macula of the retina
  – May lead to blindness
Nutrition Related Concerns of Older Adults

Arthritis:

- **Osteoarthritis**-
  - Painful joint swelling
  - Weight loss may help

- **Rheumatoid**-
  - Immune response to joints
  - Results in joint destruction and arthritis
  - Omega-3 fatty acids and antioxidant nutrients may help
Nutrition Related Concerns of Older Adults

Aging Brain:

• Decreased blood supply
• Decreased number of neurons
• Affects: Hearing and speech
  Memory, cognitive function
  Balance and posture
<table>
<thead>
<tr>
<th>Brain Function</th>
<th>Adequate Intake of</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-term memory</td>
<td>Vitamin $B_{12}$, vitamin C, vitamin E</td>
</tr>
<tr>
<td>Performance in problem-solving tests</td>
<td>Riboflavin, folate, vitamin $B_{12}$, vitamin C</td>
</tr>
<tr>
<td>Mental health</td>
<td>Thiamin, niacin, zinc, folate</td>
</tr>
<tr>
<td>Cognition</td>
<td>Folate, vitamin $B_{6}$, vitamin $B_{12}$, iron, vitamin E</td>
</tr>
<tr>
<td>Vision</td>
<td>Essential fatty acids, vitamin A</td>
</tr>
<tr>
<td>Neurotransmitter synthesis</td>
<td>Tyrosine, tryptophan, choline</td>
</tr>
</tbody>
</table>
Nutrition-Related Concerns of Older Adults

• The Aging Brain
  – Alzheimer’s Disease
    • Affects 10% of U.S. adults by 70 years
    • Affects 30% of U.S. adults over age 85
    • Abnormal deterioration of the brain
    • Free radicals and build up of beta-amyloid protein clumps (senile plaques)
    • Neurofibrillary tangles develop in the brain (threadlike strands that extend from the nerve cell)
    • Drugs are useful.
    • Maintaining body weight is important; Alzheimer’s patients may forget to consume foods.
**TABLE 17-3** Common Signs of Dementia

- Agitated behavior
- Becoming lost in familiar surroundings or circumstances
- Confusion
- Delusions
- Loss of interest in daily activities
- Loss of memory
- Loss of problem-solving skills
- Unclear thinking
Predictors of Malnutrition in the Elderly

- Recent weight loss or gain of more than 6 pounds
- Physical disabilities
- Lack of sunlight exposure
- Bereavement, depression, loneliness
- Confusion
- Alcohol abuse
- Multiple medicines
Predictors of Malnutrition in the Elderly

- Long-term medicine use
- Low food or fluid intake
- Rejection of food
- No or little food kept at home
- Rejection of fruits and vegetables
- Too little money for food
- Too little nutrition knowledge
<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disease</td>
<td>Do you have an illness or condition that changes the types or amounts of foods you eat?</td>
</tr>
<tr>
<td>Eating poorly</td>
<td>Do you eat fewer than two meals a day? Do you eat fruits, vegetables, and milk products daily?</td>
</tr>
<tr>
<td>Tooth loss or mouth pain</td>
<td>Is it difficult or painful to eat?</td>
</tr>
<tr>
<td>Economic hardship</td>
<td>Do you have enough money to buy the food you need?</td>
</tr>
<tr>
<td>Reduced social contact</td>
<td>Do you eat alone most of the time?</td>
</tr>
<tr>
<td>Multiple medications</td>
<td>Do you take three or more different prescribed or over-the-counter medications daily?</td>
</tr>
<tr>
<td>Involuntary weight loss or gain</td>
<td>Have you lost or gained 10 pounds or more in the last 6 months?</td>
</tr>
<tr>
<td>Needs assistance</td>
<td>Are you physically able to shop, cook, and feed yourself?</td>
</tr>
<tr>
<td>Elderly person</td>
<td>Are you older than 80?</td>
</tr>
</tbody>
</table>

NOTE: A complete description of DETERMINE and its scoring system are available online from the American Academy of Family Physicians: www.aafp.org/afp/980301ap/edits.html

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Food Choices and Eating Habits of Older Adults

• Food Assistance Programs
  – Congregate meals are group settings at community centers.
  – Meals on Wheels is a home-delivered meal program.
  – The Senior Farmers Market Nutrition Program allows low-income older adults to exchange coupons for fruits, vegetables, and herbs.
Strategies for Growing Old Healthfully

• Choose nutrient-dense foods
• Be physically active: walk, run, dance, swim...
• Maintain appropriate body weight
• Reduce stress
• Quit smoking
Table 17-4 Strategies for Growing Old Healthfully

- Choose nutrient-dense foods.
- Be physically active. Walk, run, dance, swim, bike, or row for aerobic activity. Lift weights, do calisthenics, or pursue some other activity to tone, firm, and strengthen muscles. Practice balancing on one foot or doing simple movements with your eyes closed. Modify activities to suit changing abilities and preferences.
- Maintain appropriate body weight.
- Reduce stress—cultivate self-esteem, maintain a positive attitude, manage time wisely, know your limits, practice assertiveness, release tension, and take action.
- For women, discuss with a physician the risks and benefits of estrogen replacement therapy.
- For people who smoke, discuss with a physician strategies and programs to help you quit.
- Expect to enjoy sex, and learn new ways of enhancing it.
- Use alcohol only moderately, if at all; use drugs only as prescribed.
- Take care to prevent accidents.
- Expect good vision and hearing throughout life; obtain glasses and hearing aids if necessary.
- Take care of your teeth; obtain dentures if necessary.
- Be alert to confusion as a disease symptom, and seek diagnosis.
- Take medications as prescribed; see a physician before self-prescribing medicines or herbal remedies and a registered dietitian before self-prescribing supplements.
- Control depression through activities and friendships; seek professional help if necessary.
- Drink six to eight glasses of water every day.
- Practice mental skills. Keep on solving math problems and crossword puzzles, playing cards or other games, reading, writing, imagining, and creating.
- Make financial plans early to ensure security.
- Accept change. Work at recovering from losses; make new friends.
- Cultivate spiritual health. Cherish personal values. Make life meaningful.
- Go outside for sunshine and fresh air as often as possible.
- Be socially active—play bridge, join an exercise or dance group, take a class, teach a class, eat with friends, volunteer time to help others.
- Stay interested in life—pursue a hobby, spend time with grandchildren, take a trip, read, grow a garden, or go to the movies.
- Enjoy life.
Food Choices and Eating Habits of Older Adults

• Meals for Singles
  – Foodborne Illness
    • Greater risk in older adults
    • If severe, can cause paralysis, meningitis, or death
  – Spend Wisely
    • Buying proper quantities
    • Buy foods with longer shelf life – ultrahigh temperature (UHT) for milk products
  – Be Creative
    • Use fresh foods for different recipes.
    • Dine with others.
    • Freezing meals
# Table H17-1: Examples of Diet-Drug Interactions

## Drugs May Alter Food Intake by

- Altering the appetite (Amphetamines suppress appetite; corticosteroids increase appetite.)
- Interfering with taste or smell (Amphetamines change taste perceptions.)
- Inducing nausea or vomiting (Digitalis may do both.)
- Interfering with oral function (Some antidepressants may cause dry mouth.)
- Causing sores or inflammation in the mouth (Methotrexate may cause painful mouth ulcers.)

## Drugs May Alter Nutrient Absorption by

- Changing the acidity of the digestive tract (Antacids may interfere with iron and folate absorption.)
- Damaging mucosal cells (Cancer chemotherapy may damage mucosal cells.)
- Binding to nutrients (Bile acid binders bind to fat-soluble vitamins.)

## Foods and Nutrients May Alter Drug Absorption by

- Stimulating secretion of gastric acid (The antifungal agent ketoconazole is absorbed better with meals due to increased acid secretion.)
- Altering rate of gastric emptying (Intestinal absorption of drugs may be delayed when they are taken with food.)
- Binding to drugs (Calcium binds to tetracycline, reducing drug and calcium absorption.)
- Competing for absorption sites in the intestines (Dietary amino acids interfere with levodopa absorption.)
**Drugs and Nutrients May Interact and Alter Metabolism by**

- Acting as structural analogs (Warfarin and vitamin K are structural analogs.)
- Using similar enzyme systems (Phenobarbital induces liver enzymes that increase metabolism of folate, vitamin D, and vitamin K.)
- Competing for transport on plasma proteins (Fatty acids and drugs may compete for the same sites on the plasma protein albumin.)

**Drugs May Alter Nutrient Excretion by**

- Altering reabsorption in the kidneys (Some diuretics increase the excretion of sodium and potassium.)
- Causing diarrhea or vomiting (Diarrhea and vomiting may cause electrolyte losses.)

**Foods May Alter Medication Excretion by**

- Inducing activities of liver enzymes that metabolize drugs to allow their excretion (Components of charcoal-broiled meats increase metabolism of warfarin, theophylline, and acetaminophen.)

**Toxicity May Occur from Diet and Drug Interactions by**

- Increasing side effects of the drug (Caffeine in beverages can increase adverse effects of stimulants.)
- Increasing drug action to excessive levels (Grapefruit components may block metabolism of drugs and enhance drugs’ actions and side effects.)
# Table H17-2: Grapefruit Juice–Drug Interactions—Selected Examples

<table>
<thead>
<tr>
<th>Drug Category</th>
<th>Drugs Affected by Grapefruit Juice</th>
<th>Drugs Unaffected by Grapefruit Juice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiovascular drugs</td>
<td>Felodipine</td>
<td>Amlodipine</td>
</tr>
<tr>
<td></td>
<td>Nicardipine</td>
<td>Diltiazem</td>
</tr>
<tr>
<td></td>
<td>Nifedipine</td>
<td>Propafenone</td>
</tr>
<tr>
<td></td>
<td>Verapamil</td>
<td>Quinidine</td>
</tr>
<tr>
<td>Cholesterollowering drugs</td>
<td>Atorvastatin</td>
<td>Pravastatin</td>
</tr>
<tr>
<td></td>
<td>Lovastatin</td>
<td></td>
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<tr>
<td></td>
<td>Simvastatin</td>
<td></td>
</tr>
<tr>
<td>Central nervous system drugs</td>
<td>Buspirone</td>
<td>Clomipramine</td>
</tr>
<tr>
<td></td>
<td>Carbamazepine</td>
<td>Haloperidol</td>
</tr>
<tr>
<td></td>
<td>Diazepam</td>
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<tr>
<td></td>
<td>Triazolam</td>
<td></td>
</tr>
<tr>
<td>Anti-infective drugs</td>
<td>Saquinavir</td>
<td>Clarithromycin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Itraconazole</td>
</tr>
<tr>
<td>Estrogens</td>
<td>Ethinylestradiol</td>
<td>17-β-estradiol</td>
</tr>
<tr>
<td>Anticoagulants</td>
<td>—</td>
<td>Acenocoumarol</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Warfarin</td>
</tr>
<tr>
<td>Immunosuppressants</td>
<td>Cyclosporine</td>
<td>Prednisone</td>
</tr>
<tr>
<td></td>
<td>Tacrolimus</td>
<td></td>
</tr>
<tr>
<td>Antiasthmatic drugs</td>
<td>—</td>
<td>Theophylline</td>
</tr>
</tbody>
</table>

End of Chapter 17

Adulthood