

Tishk International University
Faculty of Applied Science
Nutrition and Dietetics Department
Nutrition for Adolescents and the Elderly– 2nd Grade



Nutrition in Adulthood





Contents:

Foundations of Adult Nutrition

The Role of Macro & Micronutrients

Nutritional Transitions Across the Lifespan

Clinical Health and Disease Prevention

Practical Assessment and Interventions



Learning Outcomes:



Analyze nutrient requirement changes across the adult lifespan.

Evaluate dietary interventions for chronic disease prevention and management.

Develop evidence-based assessment plans for diverse and specialized populations.

Defining Adulthood: Nutritional Perspectives

- From a nutritional perspective, adulthood is defined not just by chronological age, but as a physiological transition from **growth-focused** to **maintenance-focused** biology.
- It is categorized into three primary stages, each with distinct metabolic priorities:



Young Adulthood (18–39):

Characterized by peak bone mass development and high energy requirements. This is the critical window for establishing long-term dietary habits.



Middle Age (40–64): Marked by the onset of metabolic slowdown and sarcopenia (muscle loss), which increases the risk of chronic disease.



Older Adulthood (65+): Focuses on muscle preservation and managing changes in nutrient absorption.



Physiological Changes



Metabolic Rate Decline: BMR decreases 2-3% per decade after age 20, primarily due to muscle mass loss.



Body Composition Shifts: Gradual increase in body fat percentage, redistribution to visceral areas, 3-5% muscle loss per decade.



Hormonal Changes: Decreased growth hormone, testosterone, estrogen affecting metabolism and body composition.



Key Nutritional Transitions



Shift from growth-focused to maintenance-focused nutrition.



Decreased caloric needs but stable micronutrient requirements.



Increased importance of nutrient density over energy density.

- **Chronological age \neq Biological age.** Nutritional needs must be individualized based on health status, activity level, genetics, and lifestyle factors, not just age.



Current Dietary Guidelines for Adults

Dietary Guidelines for Americans 2025–2030

- Evidence-based recommendations developed through systematic reviews of scientific literature, **updated every 5 years** to reflect current research.

Highlights:

- ✓ Vegetables, fruits, whole grains
- ✓ Lean proteins (variety)
- ✓ Healthy oils (olive, canola)
- ✓ Nutrient-dense foods

Limits:

- ✓ Added sugars (<10% calories)
- ✓ Saturated fat (<10% calories)
- ✓ Sodium (<2,300 mg/day)
- ✓ Alcoholic beverages



Dietary Guidelines for Americans 2025–2030

Key Updates for 2025–2030

Protein Increase: New recommendation of 1.2–1.6 g/kg/day, 50–100% higher than previous minimums.

Alcohol Guidance: "Consume less alcohol for better health" – more explicit messaging.

Life Stage Focus: Enhanced recommendations for older adults (65+).

Food Pattern Flexibility: Recognition of cultural dietary patterns.

Recommended Dietary Patterns

Healthy U.S.-Style: Emphasizes vegetables, fruits, dairy, grains.

Mediterranean-Style: More seafood, olive oil, nuts, less dairy.

Vegetarian: Plant-based with eggs, dairy, soy.

Macronutrients in Adulthood

Protein, carbohydrates, and fats - requirements, sources, and metabolic considerations

Protein Requirements and Quality

Recommended Intake

Traditional RDA:
0.8 g/kg (Minimum to prevent deficiency for adults 18+)

New Guidelines (2025–2030):
1.2–1.6 g/kg (50–100% increase for optimal health, muscle preservation)

Calorie Range:
10–35% of total daily calories from protein

Guideline Development

Based on **systematic reviews** of scientific evidence by the USDA and HHS, informed by the Dietary Guidelines Advisory Committee.

Note: These guidelines form the basis for federal nutrition policies and programs.

Complete vs Incomplete Proteins



Complete Proteins:

- Contain all 9 essential amino acids
- *Examples:* Meat, Fish, Eggs, Dairy, Soy, Quinoa



Incomplete Proteins:

- Lack one or more essential amino acids
- *Examples:* Legumes, Grains, Nuts, Seeds



Complementary proteins:

- (rice + beans) provide all amino acids



Evidence-Based Recommendations

1

Choose **plant-based proteins** and fish over red meat.

2

Include fish/seafood **2-3 times/week**, especially oily fish.

3

Select **lean cuts**, skinless poultry, avoid processed meats.

4

Distribute protein intake **evenly across meals** (20–35g per meal).

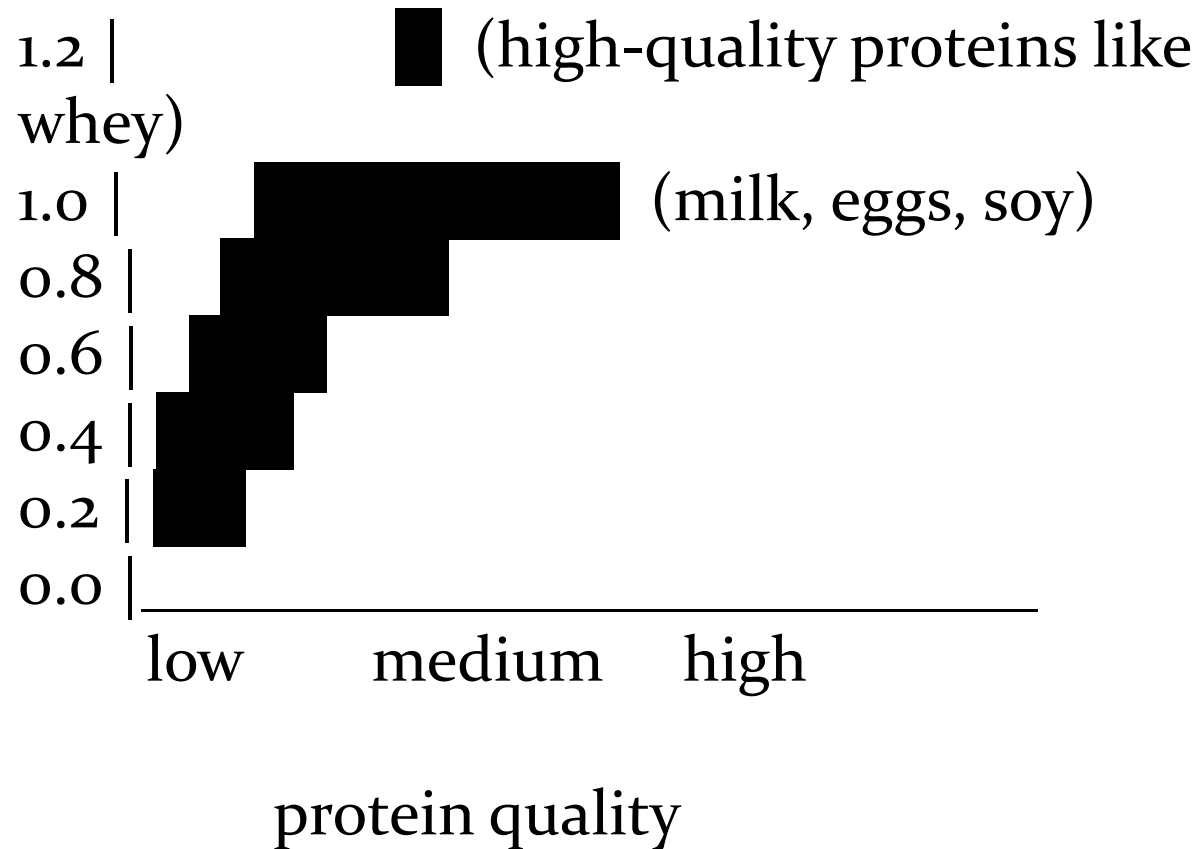


Protein Quality Assessment in Adulthood

“Protein quality matters” — scientific definition:

- It refers to the evaluation of a protein source based on both:
- Its ability to supply essential amino acids in the right proportions and be digested efficiently (measured by tools like PDCAAS and DIAAS), and
- The overall health effects of the food it comes from, including its surrounding nutrients within the food matrix.
- Protein quality is not just the protein itself, but how well it nourishes the body and how its whole food context affects health.
- PDCAAS (Protein Digestibility Corrected Amino Acid Score) and DIAAS (Digestible Indispensable Amino Acid Score) are scientific methods used to evaluate protein quality by measuring how well a protein provides essential (indispensable) amino acids and how efficiently it is digested and absorbed by the body.
- in adulthood, protein quality is important for maintaining muscle mass, supporting metabolism, and reducing age-related muscle loss (sarcopenia).

Protein Quality Score



Low-quality proteins (e.g., some cereals alone) → low digestibility or missing amino acids

Medium (mixed plant proteins) → improved balance

High-quality (egg, milk, whey) → near “complete” amino acid absorption



Carbohydrates: Quality Over Quantity

Adult Carbohydrate Needs

- **Recommended Range:**
45–65% of total daily calories
- **Complex Carbohydrates ✓**
Whole grains, legumes, vegetables, fruits – provide sustained energy, fiber, vitamins
- **Simple Carbohydrates ✗**
Sugary foods, refined grains – rapid blood sugar spikes, limited nutritional value

Carbs and Brain Function

- Carbohydrates influence **serotonin production** – a neurotransmitter regulating mood, sleep, and appetite.
- **Mood Benefits**
Complex carbs increase serotonin, promoting calmness and well-being
- **Energy for Brain**
Brain uses **20% of body's glucose** – steady supply critical for cognitive function



Glycemic Index & Load

- **Low GI (≤ 55):**
Oats, legumes, most fruits – gradual glucose release
- **High GI (≥ 70):**
White bread, potatoes, sugary drinks – rapid spikes
- **Glycemic Load** considers portion size – more practical for meal planning



Dietary Fats: Essential Fatty Acids and Health : Fat Requirements and Types:
Recommended Range: 20–35% of total daily calories

✓ Healthy Fats

- Monounsaturated (olive oil, avocados)
- Polyunsaturated (nuts, seeds, fish)
- Omega-3s (salmon, flaxseed, walnuts)

✗ Limit/Avoid

- Saturated fats (<10% calories)
- Trans fats (avoid completely)
- Processed meats, full-fat dairy



Considerations: Dietary Fats

- Not all fats are equal – focus on quality over quantity
- Replace saturated fats with unsaturated alternatives
- Avoid trans fats completely – check food labels
- Fat is essential for hormone production and nutrient absorption



Energy Balance and Metabolic Changes

Adult Energy Requirements

Factors Affecting BMR

- **Age** (declines 2-3% per decade)
- **Gender** (men higher than women)
- **Body composition** (muscle vs fat)
- **Genetics and hormones**
- **Estimated Daily Needs**
- *Varies by age, activity, weight goals*

Metabolic Slowdown Timeline

- **Age 30:** Weight loss becomes harder, 3-5% muscle loss per decade if inactive.
- **Age 40:** Sarcopenia begins, fat replaces muscle tissue.
- **Age 50+:** Significant BMR reduction, hormonal changes accelerate.



Combating Metabolic Decline

- **Strength Training:** Builds muscle mass, increases resting metabolic rate - **most effective strategy.**
- **Aerobic Exercise:** Burns calories, improves cardiovascular health - **150 min/week minimum.**
- **Protein Intake:** Higher protein (1.2-1.6 g/kg) preserves muscle mass during aging.
- **Sleep Quality:** 7-9 hours/night supports metabolic health and hormone regulation.



Practical Strategies

	Monitor portion sizes as caloric needs decrease.
	Prioritize nutrient-dense, lower-calorie foods.
	Stay physically active throughout adulthood.
	Adjust intake based on activity level changes.



Micronutrients essential for maintaining health in adulthood

- **Vitamins & minerals:** Support energy metabolism, immune function, bone health, and nerve signaling; prevent deficiencies (e.g., anemia, osteoporosis)
- **Dietary fiber:** Improves digestion, supports gut health, helps control blood sugar and cholesterol, increases satiety
- **Overall importance:** Essential for disease prevention, metabolic health, and healthy aging in adults



Dietary Fiber: The Forgotten Nutrient

Recommendations: Women require **25 g/day**, while men require **38 g/day**.

The Reality: **94% of Americans** fail to meet these goals, with an average intake of only **17 g/day**.

Type	Characteristics	Primary Health Benefits
Soluble	Forms a gel in water; found in oats, beans, citrus.	Lowers cholesterol and stabilizes blood sugar.
Insoluble	Adds bulk; found in whole wheat, nuts, and vegetables.	Promotes regularity and prevents constipation.



Hydration: Water, Electrolytes, and Health

1. Fluid Requirements & Indicators

- **Daily Target: 2.5–3+ Liters** (varies by activity, climate, and body size).
- **Demand Escalation:** Needs increase with physical activity (**0.3–2.0 L/hour sweat loss**), hot climates, high fiber intake, and illness.
- **Warning Signs:** Watch for thirst, dark urine, fatigue, dizziness, and dry skin.



2. Electrolyte Balance

- Essential minerals required for fluid balance, nerve function, and muscle contractions:
- **Sodium:** < 2,300 mg/day
- **Potassium:** 2,600–3,400 mg/day
- **Magnesium:** 310–420 mg/day
- **Chloride:** 1,800–2,300 mg/day



3. Vulnerable Populations: Older Adults

- Aging introduces specific physiological risks that necessitate consistent monitoring:
- **Reduced Thirst Sensation:** Diminished response increases dehydration risk even when the body needs fluid.
- **Kidney Function:** Decreased ability to concentrate urine requires more deliberate intake.
- **Medication:** Diuretics and laxatives increase fluid loss, requiring compensatory hydration.



4. Beverage Quality

Recommendation	Beverage Type	Impact
Optimal	Water & Herbal Tea	Best for hydration; caffeine-free.
Moderate	Coffee & Caffeinated Tea	Mild diuretic effect, but still contributes to total intake.
Avoid	Alcohol & Sugary Drinks	Dehydrating or provides "empty" calories.

Young Adults (18-39): Establishing Healthy Patterns





Young Adults (18-39): Establishing Healthy Patterns

1. Unique Nutritional Priorities

- **Peak Bone Mass:** Bones reach maximum density by **age 30**. Adequate **calcium (1,000 mg)** and **Vitamin D** are critical for lifelong skeletal health.
- **Metabolic Peak:** This stage features the highest metabolic rate in adulthood, allowing for caloric flexibility, though **nutrient density** remains vital.
- **Brain Maturation:** Prefrontal cortex development continues into the **mid-20s**; nutrition directly impacts cognitive function and decision-making.



2. Common Lifestyle Challenges

- **Time & Budget:** Busy schedules often lead to fast food reliance and skipped meals. There is a common (and often false) perception that healthy eating is inherently expensive.
- **Social Factors:** Social environments frequently involve high-calorie foods and excessive alcohol.
- **Digital Misinformation:** This demographic is highly vulnerable to "fad diets," "detoxes," and nutrition myths propagated on social media.



3. Building Lifelong Habits

- The goal is to develop eating patterns that persist for decades:
- **Technical Skills:** Mastering cooking and weekend meal preparation.
- **Awareness:** Practicing portion control, reading nutrition labels, and mindful eating.
- **Mindset:** Shifting toward an enjoyment of diverse whole foods rather than restrictive dieting.



4. Practical Strategies for Success

- Keep **healthy snacks** readily available to avoid impulsive choices.
- Focus on learning **quick, budget-friendly recipes**.
- Limit alcohol to **moderate amounts**.
- Verify health claims by seeking **credible nutrition information**.

Middle Age Adult (40-64):





Middle Age (40-64): Managing Metabolic Changes

1. Physiological Realities

- **Metabolic Slowdown:** Basal Metabolic Rate (BMR) decreases by 2–3% **per decade**, making weight gain common even without dietary changes.
- **Sarcopenia Onset:** Muscle loss begins around age 40. Protein intake and resistance exercise become critical to counteract this decline.
- **Disease Risk:** Significant rise in the risk of hypertension, type 2 diabetes, and cardiovascular disease.



2. Weight Management Barriers

- Middle-aged adults gain an average of **1–2 pounds per year** due to:
- Hormonal changes (menopause/andropause).
- Decreased physical activity and high stress.
- "Legacy" eating habits that no longer match a slower metabolism.



3. Strategic Nutritional Priorities

- **Muscle Preservation:** Increase protein to 1.0–1.2 g/kg and include resistance training 2–3x/week.
- **Heart & Bone Health:** Limit sodium and saturated fats; increase omega-3s and fiber. Maintain calcium and Vitamin D levels to prevent osteoporosis.
- **Density Over Volume:** Since caloric needs are lower, every meal must be more nutrient-dense to meet micronutrient requirements.



4. Essential Health Screenings

Regular monitoring is the primary defense against chronic conditions:

Metric	Frequency
Blood Pressure	Annually
Blood Sugar	Every 3 years
Cholesterol	Every 4–6 years
Bone Density	Women 65+, Men 70+

Older Adults (65+)





Older Adults (65+): Nutrition for Healthy Aging

1. Unique Nutritional Needs

- **Increased Protein (1.0–1.5 g/kg):** Vital to combat anabolic resistance and sarcopenia. For best results, distribute **25–30g per meal**.
- **Vitamin D (20 mcg / 800 IU):** Compensates for reduced skin synthesis; critical for bone health and muscle function.
- **Vitamin B12 (2.4 mcg):** Reduced stomach acid affects natural absorption; fortified foods or supplements are often necessary.
- **Calcium (1200 mg):** Essential for osteoporosis prevention, particularly in postmenopausal women.



2. Malnutrition Risk

- **Up to 50% of older adults** are at risk for malnutrition, which can lead to:
- Increased falls, fractures, and loss of independence.
- Impaired immune function and delayed wound healing.
- Higher mortality risk.



3. Common Lifestyle & Physical Challenges

- **Sensory & Dental:** Reduced appetite due to decreased taste/smell; dental problems that limit the ability to chew.
- **Medical:** Medication interactions that suppress appetite or interfere with nutrient absorption.
- **Social & Economic:** Social isolation leading to less meal preparation; financial constraints and physical limitations affecting food access.



4. Practical Strategies

- **Optimization:** Focus on **nutrient-dense foods** like eggs, dairy, lean meats, and fortified cereals.
- **Frequency:** Shift to **5–6 smaller meals** per day if appetite is low.
- **Texture:** Use soft, moist foods for those with chewing or swallowing difficulties.
- **Connection:** Seek **social eating opportunities** (community meals or senior centers) to improve both intake and quality of life



Class Activity:





Case Study Analysis

- **Scenario:** A 45-year-old male office worker notice he is gaining weight despite eating the same amount of food he did in his 20s. He does no strength training and sleeps 5 hours a night.
- **Task:** Identify **three physiological reasons** for his weight gain based on the "Metabolic Slowdown Timeline" and "Hormonal Changes."
- **Recommendation:** Suggest **two specific lifestyle changes** from the "Combating Metabolic Decline" section to help him reverse this trend.



Assignment:

- **The "Protein Package" Challenge**
- Choose two common protein sources (e.g., Grilled Chicken vs. Black Beans, or Salmon vs. Processed Deli Meat).
- **Task:** Research and compare them based on the "**Protein Package**" concept.
- **Analysis:** Beyond just the grams of protein, list the "extras" (Fiber, Saturated Fat, Sodium, etc.) for each.
- **Conclusion:** Which is the higher-quality choice for a middle-aged adult, and why?

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Thank
You