

CHAPTER 2

GUIDELINES FOR DESIGNING A HEALTHY DIET

OVERVIEW

This chapter explores components of healthy diet plans – those that will minimize risks of developing nutrition-related diseases. Five aspects of a healthful diet (balance, variety, moderation, nutrient density, and energy density) are discussed. An overview of nutritional status and its assessment is provided. Tools for planning and evaluating dietary intake are discussed, including the Dietary Reference Intakes (DRI) the 2010 Dietary Guidelines for Americans, MyPlate.gov, nutrient standards, and food labels.

KEY TERMS

Adequate intake	Eating pattern	Overnutrition
Added sugar	Empty calories	Physical Activity Guidelines for Americans
Animal model	Environmental assessment	Placebo
Anthropometric assessment	Energy density	Recommended Dietary Allowance
Biochemical assessment	Epidemiology	Registered dietitian (R.D.)
Case-control study	Estimated energy requirement	Scurvy
Clinical assessment	Functional foods	Solid fats
Control group	Heart attack	Subclinical
Daily value	Hypothesis	Symptom
Dietary assessment	Malnutrition	Theory
Dietary reference intake	Megadose	Ulcer
Dietary Guidelines for Americans	Microorganism	Undernutrition
Double-blind study	MyPlate	Upper level
	Nutrient density	
	Nutritional state	

STUDENT LEARNING OUTCOMES

Chapter 2 is designed to allow you to:

- 2.1 Develop a healthy eating plan
- 2.2 Outline the measurements used (ABCDEs) in nutrition assessment: **A**nthropometric, **B**iochemical, **C**linical, **D**ietary, and **E**nvironmental status
- 2.3 Understand the basis of the scientific method as it is used in developing hypotheses and theories in the field of nutrition, including the determination of nutrient needs
- 2.4 Describe what the Recommended Dietary Allowances (RDAs) and other dietary standards represent
- 2.5 List the purpose and key recommendations of the Dietary Guidelines and the 2008 Physical Activity Guidelines for Americans
- 2.6 Exemplify a meal that conforms to MyPlate recommendations
- 2.7 Describe the components of the nutrition label and the various health claims and label descriptors that are allowed
- 2.8 Identify reliable sources of nutrition information

LECTURE OUTLINE

2.1 A Food Philosophy That Works

- A. Variety means eating many different foods
 1. Choose many different foods within a food group
 - a. No single food meets all nutrient needs
 - b. Every food in a food group is made up of different nutrients
 2. Supplements don't always have the same components as foods
 3. Various phytochemicals are present in fruits and vegetables
 - a. Some phytochemicals can help decrease cancer and other disease risk
 - b. Table 2-1 provides tips for boosting the phytochemical content of the diet
 4. Functional foods provide health benefits beyond those supplied by the traditional nutrients the food contains
- B. Balance means consuming food from each group
 1. Select foods from all of the food groups
 - a. Vegetables
 - b. Fruit
 - c. Grains
 - d. Protein
 - e. Dairy
 2. Use MyPlate.gov as a guide to select foods
- C. Moderation refers mostly to portion size
 1. Don't over-consume a specific nutrient
 2. Moderate intake of fat, salt, and calories
- D. Nutrient density focuses on nutrient content
 1. Compares the amount of nutrients to the calories in a food

2. Usually used to describe a specific nutrient but can be used to describe the food overall
 3. A high nutrient density means a food has many nutrients and few calories
 4. Nutrient density is particularly important for those who consume few calories (e.g., on a weight-loss diet, children, older adults)
- E. Energy (kcal) density affects calorie intake
1. Compare the calorie content with the weight of the food
 - a. High energy density foods include nuts, fried food, cookies
 - b. Low energy density foods promote satiety without high calorie content
 2. People tend to consume fewer calories when eating low energy dense foods
 3. Low energy dense foods contain high amounts of water and fiber (e.g., fruits and vegetables)
 4. Table 2-2 presents the energy density of some common foods

2.2 States of Nutritional Health

A. Desirable nutrition

1. Body tissues have enough of a nutrient to support normal metabolic function
2. Surplus of nutrient can be used in times of need

B. Undernutrition

1. Form of malnutrition in which nutrient intake does not meet nutrient needs
2. When nutrient levels fall sufficiently low, biochemical evidence appears
3. Subclinical means there are no outward signs
4. Over time, clinical symptoms of deficiency surface, often evident in skin, hair, tongue, or eyes

C. Overnutrition

1. Form of malnutrition characterized by prolonged consumption of more nutrients than the body needs
2. Example: too much vitamin A can have negative effects during pregnancy
3. Excess calorie intake is most common in industrialized nations
4. The difference between optimal and over consumption is the smallest for vitamin A, calcium, iron, and copper

2.3 How Can Your Nutritional State Be Measured?

A. Analyzing background factors

1. Family history
2. Medical history: disease states or treatments could affect nutrient status
3. Medications
4. Social history such as marital status or living conditions
5. Education: know how to present the information
6. Economic status: ability to purchase, transport, and cook food

B. Assessing nutritional status using the ABCDEs

1. Anthropometric assessment: height, weight, body composition, circumferences
2. Biochemical assessment: measuring nutrients or by-products in the blood and other body fluids
3. Clinical assessment: looking for physical evidence (e.g., high blood pressure)
4. Dietary assessment: examining dietary intake
5. Environmental assessment: ability to purchase and prepare foods

C. Recognizing the limitations of nutritional assessment

1. Clinical symptoms of nutrient status may take years to develop
 - a. One may eat a diet high in saturated fat for many years before a heart attack occurs
 - b. One may have a calcium deficiency but it takes years to appear as low bone density
 2. Many signs are not specific to a nutrient deficiency (e.g., diarrhea, facial sores)
- D. Concern about the state of your nutritional health is important
1. Those who recognize the importance of nutritional health are more apt to live a longer and vigorous life.

2.4 Using the Scientific Method to Determine Nutrient Needs

- A. The Scientific Method involves several steps
1. The first step of this method is to observe natural phenomenon and develop hypotheses
 2. Research experiments are then developed and conducted
 - a. There are several forms of studies that may be conducted
 - 1) May involve human experiments
 - 2) Animal models
 - 3) Epidemiological studies looking at diseases among populations
 - 4) Case-control studies where comparisons are made between individuals with and without certain conditions
 3. Data are gathered and evaluated
 - a. Hypotheses will be accepted or rejected based on these results
 4. Peer review and publication
 5. Additional follow-up studies will be conducted to confirm or refute the previous findings

2.5 Specific Nutrient Standards and Recommendations

- A. Dietary Reference Intakes (DRI) is the umbrella reference term that describes four standards for nutrient needs
- B. Recommended Dietary Allowances (RDA)
1. Meets the needs of 97% of all healthy individuals in a particular age and gender group
 2. Intakes slightly above or below the RDA are of no concern
 3. A significant deviation (70% below or 3X above) for an extended period can lead to deficiency or toxicity
- C. Adequate intake (AI)
1. Set if there is not sufficient information on human needs to set an RDA
 2. Further research is required before scientists can establish a more definitive number
 3. Derived from dietary intakes of people who appear to be maintaining nutritional health (no deficiency apparent)
- D. Estimated Energy Requirement (EER)
1. Not set higher than average need (as for vitamins and minerals) because this would lead to excess calories and weight gain
 2. Takes into account age, gender, height, weight, and physical activity
 3. Also accounts for additional needs during growth and lactation

4. Based on the average person; only serves as a starting point for estimating calorie needs
- E. Tolerable Upper Intake Level (UL)
1. The highest amount of a nutrient that is unlikely to cause adverse health effects in the long run for most people
 2. Usually seen with diets promoting excess intake of a limited variety of foods, many fortified foods, or megadoses of specific vitamins or minerals
 - a. Set to protect even very susceptible people
 - b. As intake increases above the UL, effects generally increase
- F. Daily Value
1. Generic standard used on food labels – usually reflects the highest RDA (or related nutrient standard) seen in various age and gender categories for the nutrient
 2. Allows consumers to compare intake from a specific food to desirable (or maximum) intake levels
- G. How should these nutrient standards be used?
1. The type of standard that is set depends on the quality of available evidence
 2. Diet plans should strive to meet the RDA or AI without exceeding the UL
 3. AI should not be used alone to evaluate individual needs
 4. Standards for each nutrient are printed on the inside cover of the book
 5. Daily Values, which appear on food labels, serve as rough guidelines for comparison of nutrient content of foods to approximate human needs; set at or close to highest RDA value
 6. Figure 2-6 illustrates how the various nutrient standards relate to each other and to risk for deficiency or toxicity

2.6 Recommendations for Healthy Living

A. Dietary Guidelines-the basis for meal planning

1. The newly released 2010 Dietary Guidelines for Americans provides nutrition and physical activity recommendations for all individuals 2 years of age and older
 - a. Published every five years by the USDA and U.S. Department of Health and Human Services (USDHHS)
 - b. Components of the new edition
 - c. Include 29 key recommendations
 - d. Three major goals
 - 1) Balance calories with physical activity to manage weight
 - 2) Consume vegetables, fruits, whole grains, fat-free or low-fat dairy products, and seafood to provide certain nutrients
 - 3) Consume less refined grains and those foods with added sugar, fats, cholesterol
2. Balancing calories to manage weight
 - a. Maintain and achieve a healthy weight
 - b. You can estimate your caloric needs by using the online calculator at www.ChooseMyPlate.gov
3. Foods and food components to reduce
 - a. Saturated fats

- b. Trans fats
 - c. Cholesterol
 - d. Added sugar
 - e. Refined grains
 - f. Moderate alcohol consumption
 - 4. Foods and nutrients to increase
 - a. Vegetables
 - b. Fruit
 - c. Whole grains
 - d. Fat-free and low-fat dairy products
 - e. Seafood
 - f. Figure 2-7 presents the key recommendations from the 2010 Dietary Guidelines
 - 5. Building healthy eating patterns
 - a. Individuals can find examples of healthy eating patterns by examining those outlined in the Dietary Approaches to Stop Hypertension (DASH) and MyPlate.gov
 - b. Common healthy patterns include an abundance of vegetables and fruits, emphasis on whole grains, moderate intake of protein-rich foods, and limited intake of added sugars and solid fats
 - 6. The Dietary Guidelines and you
 - a. There is no “optimal” diet, but Dietary Guidelines provide typical adults with simple advice
 - b. Take into account individual differences
 - c. Keep in mind current health status, family history
 - d. Table 2-5 presents examples of recommended dietary changes based on the Dietary Guidelines
- B. MyPlate-a menu-planning tool
1. Overview
 - a. MyPlate was released in 2011 and is a visual depiction that is based on the 2010 Dietary Guidelines for Americans
 - b. MyPlate replaces the early edition known as MyPyramid
 2. Dishing up MyPlate
 - a. The new MyPlate icon emphasizes five food groups
 - 1) Fruits and vegetables which cover half of the plate
 - 2) Grains which cover slightly more than one-fourth of the plate
 1. Half of your grain intake should be from whole grain products
 - 3) Protein which cover the remaining portion of the plate
 1. Proteins should be lean meats, poultry, and fish 2x weekly
 - 4) Dairy appears as a cup next to the plate
 1. 2-3 cups of fat-free or low-fat dairy products or other sources of calcium
 - 5) There are no separate group for fats or oils included in MyPlate
 3. Actionable health messages

- a. ChooseMyPlate.gov illustrates the three primary goals of the 2010 Dietary Guidelines for Americans
 - 1) Balance your caloric intake
 - 2) Increase certain foods
 - 3) Decrease certain foods
4. Daily food plan
 - a. An interactive tool for individuals to estimate their caloric need and provides them with a suggested food pattern based on their age, gender, height, and weight
 - b. Table 2-6 presents the recommended MyPlate food-intake patterns
 - c. Serving size descriptions can be seen on Figure 2-11
 - d. Examples of estimating servings sizes can be seen on Figure 2-12
5. Additional MyPlate resources
 - a. There are several interactive tools available for consumers at ChooseMyPlate.gov website that can assist individuals in making healthy choices
 - b. MyPyramid resources are also still available at this website
6. Menu planning with MyPlate
 - a. There are several considerations that one must remember when using MyPlate when planning menus
 - 1) It is not intended for infants or children under 2 years of age
 - 2) There are no single perfect meals so consuming a variety of foods is important
 - 3) There can be variation in the amount of certain nutrient within each food group
 - 4) Choosing fat-free or low-fat options allows for greater amounts of certain foods to be eaten
 - 5) Plant foods can also be good sources of proteins
 - 6) Focus on colorful fruits and vegetables to increase the nutritional quality of these choices
 - 7) Choose whole grain products over refined grains
 - 8) Include healthy oils from plants and fish as part of your weekly dietary intake
 - 9) Table 2-7 presents the nutrient contribution of the MyPlate food groups
7. Reviews of MyPlate
 - a. There are several limitations that should be considered when using MyPlate
 - 1) Does not provide information about the overall calories, serving sizes, or number of servings
 - 2) It does not differentiate between food quality and food quantity
 - 3) It focuses on plates at each mealtime but not the overall diet of individuals
8. How does your plate rate?
 - a. Compare your overall intake to those recommendations detailed at ChooseMyPlate.gov and using the Food Tracker tool

- b. Compare your intake to the DRI and make the necessary changes to improve your food selections
 - C. Physical Activity Guidelines for Americans
 - a. Overview
 - b. The first edition was released in 2008 by the USDHHS to complement the Dietary Guidelines
 - c. The belief is that regular physical activity for people of all ages will produce long-term health benefits
 - d. Table 2-9 presents selected physical activity recommendations from these guidelines
 - D. A coordinated effort
 - 1. There are a number of educational tools available to the public concerning improving their nutritional and physical health available through coordinated efforts of the USDA's Center for Nutrition Policy and Promotion (CNPP)
- 2.7 Food Labels and Diet Planning
- A. Overview
 - 1. Labels must include: product name, manufacturer name and address, amount of product in package, ingredients in descending order by weight
 - 2. Monitored by FDA
 - 3. Nutrition Facts panel must include
 - a. Kilocalories
 - b. Calories from fat, total fat, sat fat, *trans* fat, and cholesterol
 - c. Total carbohydrate, fiber, and sugar
 - d. Protein
 - e. Vitamin A, vitamin C, calcium, and iron
 - f. Monounsaturated or polyunsaturated fats, potassium and others, if health claims are made about them
 - g. Percent of the Daily Value for each nutrient
 - 4. Serving sizes must be consistent among similar foods but are not necessarily the same as what is recommended by MyPyramid
 - 5. Food claims must follow legal definitions
 - B. Exceptions to food labeling
 - 1. Fresh foods (e.g., fruit, vegetables, fish, meat, and poultry) are not required to have Nutrition Facts labels
 - 2. Because protein deficiency is so rare in the US, %DV for protein is not required for products designed for people 4 years or older
 - 3. If % DV is included, the product must be analyzed for protein quality
 - C. Health claims on food labels
 - 1. FDA permits some health claims with restrictions
 - 2. Must be significant scientific agreement that a relationship exists between the nutrient and the disease
 - 3. Current allowed claims
 - a. Calcium for osteoporosis prevention
 - b. Total fat for prevention of some cancers
 - c. Saturated fat and cholesterol for heart disease prevention
 - d. Fiber from fruits, vegetables, and grains for cancer prevention

- e. Low sodium and high potassium for hypertension and stroke prevention
- f. Fruits and vegetables for cancer prevention
- g. Folate for prevention of neural tube defects
- h. Sugarless gum for prevention of tooth decay
- i. Fruits, vegetables, and grain products that contain fiber for prevention of cardiovascular disease
- j. Whole grains for cardiovascular disease prevention
- k. Soy protein for prevention of cardiovascular disease
- l. Fatty acids from fish for prevention of cardiovascular disease
- m. Plant stanols and sterols for cardiovascular disease prevention
- 4. Table 2-10 describes allowable nutrient claims in detail, such as
 - a. Sugar free: less than 0.5 grams per serving
 - b. Reduced fat: 25% less fat than the reference product
- 5. Fortified or enriched: vitamins or minerals have been added back to at least 10% of what is normally present
- 6. Overall, claims fall into 4 categories
 - a. Health claims
 - b. Preliminary health claims
 - c. Nutrient claims
 - d. Structure/function claims

2.8 Epilogue

A. Menu planning can start with MyPlate

- 1. Dietary Guidelines can be used to evaluate total diet
- 2. Daily Values on Nutrition Facts panel can be used to evaluate individual foods

Nutrition and Your Health: Evaluating Nutrition Claims and Dietary Supplements

A. Overview

- 1. Apply basic nutrition principles you've learned to any nutrition claim
- 2. Examine the background and credentials of the individual, organization, or publication making any nutrition claim
- 3. Be wary of health-related nutrition claims that ignore possible disadvantages, sound too good to be true, seem biased against the medical community, or are touted as a secret breakthrough
- 4. Note the size and duration of studies cited in a nutrition claim
- 5. Beware of marketing hype
- 6. Expect a nutrition professional to question your medical background and habits, tailor a diet plan to your needs, follow up, involve family members, when appropriate, and work with other health professionals
- 7. Avoid supplement megadoses
- 8. Examine product labels carefully

B. Dietary supplements

- 1. Dietary Supplement Health and Education Act (DSHEA) classified vitamins, minerals, amino acids, and herbal remedies as foods, which restricts FDA's ability to tightly regulate their quality and safety
- 2. Supplements can be marketed without FDA approval if:
 - a. There is a history of use or reasonable evidence of safety when used labeled

- b. The product is labeled as a dietary supplement
3. Permissible claims
 - a. Relate supplement use to classic nutrient-deficiency disease
 - b. Structure/function claims: describe how a nutrient affects human body structure or function
 - c. General well being
4. Disclaimer: “This statement has not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent disease.”
5. Figure 2-17 illustrates the Supplement Facts label
6. Do not assume that supplements have been evaluated by FDA
7. Consult a physician or registered dietitian (RD)
8. Helpful websites for dietary supplement information are listed in the text