

## 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. Three principles of a healthful diet (variety, proportionality, moderation) as well as nutrient and energy density are discussed. The purpose and key recommendations of the Dietary Guidelines and the 2008 Physical Activity Guidelines for Americans are explained. Tools for planning and evaluating dietary intake are discussed, including the Dietary Reference Intakes (DRI), the Dietary Guidelines, MyPlate.gov, the Mediterranean Diet, nutrient standards, and food labels. An overview of nutritional status and its assessment is provided. Suggestions are outlined to highlight the best approach to evaluate nutrition information.

#### KEY TERMS

Adequate intake (AI)	Energy density	Recommended Dietary Allowance (RDA)
Added sugars	Estimated Energy Requirement (EER)	Registered dietitian (R.D.) or registered dietitian nutritionist (R.D.N.)
Anthropometric assessment	Functional foods	Solid fats
Biochemical assessment	Heart attack	Subclinical
Clinical assessment	Malnutrition	Symptom
Dietary assessment	Megadose	Undernutrition
Dietary Reference Intakes (DRIs)	Nutrient density	Tolerable Upper Intake Level (UL)
Dietary Guidelines for Americans	Nutritional state	
Eating pattern	Overnutrition	
Empty calories		
Environmental assessment		

#### STUDENT LEARNING OUTCOMES

Chapter 2 is designed to allow you to:

- 2.1 Use variety, proportionality, and moderation, as well as nutrient and energy density, to develop a healthy eating plan.
- 2.2 List the purpose and key recommendations of the Dietary Guidelines and the 2008 Physical Activity Guidelines for Americans.
- 2.3 Design a meal that conforms to the MyPlate recommendations as well as the Mediterranean diet and/or other diet planning guides.
- 2.4 Describe the three states of nutritional health.

- 2.5 Outline the measurements used (ABCDEs) in nutritional assessment: **A**nthropometric, **B**iochemical, **C**linical, **D**ietary, and **E**nvironmental status.
- 2.6 Describe the specific nutrient recommendations categories within the Dietary Reference Intakes.
- 2.7 Identify reliable sources of nutrition information.
- 2.8 Describe the components of the Nutrition Facts panel and the various health claims and label descriptors that are allowed.

## LECTURE OUTLINE

### 2.1 A Food Philosophy That Works

#### A. Overview

1. *Consume a variety of foods, balanced by a moderate intake of each food.*
2. Emphasize a total diet pattern
3. Principles of variety, moderation, and proportionality

#### B. Variety Means Eating Many Different Foods

1. Choose foods from all food groups and subgroups as no single food meets all nutrient needs.
2. Select foods from all of the food groups using MyPlate as a guide.
  - a. Vegetables
  - b. Fruit
  - c. Grains
  - d. Protein
  - e. Dairy
3. Choosing a variety of foods, particularly from fruits and vegetables, provides benefits beyond meeting nutrient needs.
  - a. Various phytochemicals are present in fruits and vegetables.
    - 1) Some phytochemicals can help decrease cancer and other disease risk.
    - 2) Table 2-1 provides tips for boosting the phytochemical content of the diet.
    - 3) Foods, rather than supplements, can provide phytochemicals.
  - b. Phytochemicals are considered functional foods.
    - 1) Provide health benefits beyond those supplied by the traditional nutrients the food contains
    - 2) Ex: Tomatoes contain the phytochemical lycopene which provides health benefits beyond those benefits provided by the vitamins/minerals found in a tomato.

#### C. Proportionality Means Eating More of Nutrient-Dense Foods

1. Choose more nutrient-dense foods and beverages such as fruits, vegetables, whole grains, and fat-free or low-fat milk products.
2. Choose less often foods high in solid fats, sugars, cholesterol, salt, and alcohol.
3. Match energy intake with energy expenditure.

4. Nutrient density is characteristically used to determine a food's nutritional quality. (see Fig. 2-1)
  - a. A food is more nutrient dense when its contribution to nutrient needs exceeds its contribution to calorie needs.
  - b. Nutrient density is often used to describe a food relative to an individual nutrient. (ex: An orange is nutrient dense for Vitamin C).
  - c. Nutrient density is particularly important for those who consume few calories (e.g., on a weight-loss diet, children, older adults).
- D. Moderation Refers Mostly to Portion Size
  1. Do not overconsume any nutrients
    - a. Moderate intake of animal fat, added sugars, cholesterol, salt, and alcohol.
    - b. Avoid overconsumption of nutrients from supplements.
  2. Energy density describes the calorie content of a food.
    - a. Compare the calorie content with the weight of the food.
      - 1) High energy density foods include nuts, fried food, cookies.
      - 2) Low energy density foods promote satiety without high calorie content.
    - b. Eating lower energy dense foods promotes satiety without contributing many calories.
      - 1) People consume a constant weight of food at one time.
      - 2) Low energy dense foods contain high amounts of water and fiber (e.g., fruits and vegetables).
    - c. Carefully plan to include foods that are both nutrient and energy dense (i.e., peanut butter).
    - d. Table 2-2 presents the energy density of some common foods.

## 2.2 Dietary and Physical Activity Guidelines

### A. Dietary Guidelines—the Basis for Menu Planning

1. The 2010 Dietary Guidelines for Americans provide nutrition and physical activity recommendations for all Americans 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. Message of calorie balance is a key component.
  - c. New to 2010 Guidelines: recommendations for those at risk of developing chronic diseases
  - d. Include 20 key recommendations (see Fig. 2-2)
  - e. Three major goals
    - 1) Balance calories with physical activity to manage weight.
    - 2) Consume more of certain foods and nutrients, such as vegetables, fruits, whole grains, fat-free and low-fat dairy products, and seafood.
    - 3) Consume fewer foods with sodium (salt), saturated fats, trans fats, cholesterol, added sugars, and refined grains.
2. Balancing calories to manage weight
  - a. Maintain and achieve a healthy weight.

- b. Figure 2-3 provides general estimations of calorie needs or you can estimate your caloric needs by using the online calculator at [www.ChooseMyPlate.gov](http://www.ChooseMyPlate.gov).
3. Foods and food components to reduce (see Fig. 2-2)
  - a. Sodium (salt)
  - b. Solid fats
  - c. Added sugars
  - d. Refined grains
  - e. Reduce to or maintain moderate consumption of alcohol
4. Foods and nutrients to increase (see Fig. 2-2)
  - a. Vegetables
  - b. Fruits
  - c. Whole grains
  - d. Fat-free or low-fat milk and milk products
  - e. Seafood
  - f. Lean meats and poultry
  - g. Eggs
  - h. Beans and peas
  - i. Nuts and seeds
  - j. Plant oils
5. Figure 2-4 illustrates the inadequacies of the Typical American Diet in meeting the recommendations of Dietary Guidelines for specific nutrients.
  - a. Calories from solid fats and added sugars (SoFAS) are a source of empty calories and consumed at 280% recommended limit.
  - b. Fiber, potassium, Vitamin D, and calcium are nutrients consumed in inadequate amounts and are of greatest concern.
6. Building healthy eating patterns
  - a. Individuals can find examples of healthy eating patterns by examining the Dietary Approaches to Stop Hypertension (DASH), USDA Food Patterns that accompany MyPlate, the Harvard Healthy Eating Plate, vegetarian eating patterns, and Mediterranean-style eating patterns.
  - b. Include an abundance of vegetables and fruits, with emphasis on whole grains, moderate and varied intake of protein-rich foods, limited solid fats and added sugars (SoFAS), higher proportion of unsaturated fats compared to saturated fats, increased potassium intake, and lower sodium intake.
7. The Dietary Guidelines and you
  - a. Dietary Guidelines provide typical adults with simple advice.
  - b. Consider current state of health, differences in genetic background, and family history when planning your diet.
  - c. Table 2-3 presents examples of recommended diet changes based on the Dietary Guidelines.

## B. Physical Activity Guidelines for Americans

1. U.S. Department of Health and Human Services (DHHS) issued the first Physical Activity Guidelines for Americans in 2008 to complement the Dietary Guidelines.
2. The main idea: regular physical activity for people of all ages will produce long-term health benefits
3. General Recommendations
  - a. Adult recommendation: 150 minutes/wk of moderate-intensity physical activity.
  - b. Children and adolescent recommendation: 60 minutes/day of physical activity
  - c. Include both aerobic and strength training activities for optimal benefits
  - d. Activities should be safe and enjoyable
4. Table 2-4 presents key physical activity recommendations from these guidelines.

### 2.3 MyPlate—a menu-planning tool

#### A. Overview

1. MyPlate was released in 2011 and is a visual depiction that is based on the 2010 Dietary Guidelines for Americans. (see Fig. 2-5)
2. MyPlate replaced the previous visual representation of guidelines known as MyPyramid.
3. Dishing up MyPlate
  - a. The MyPlate icon includes 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
    - 3) Protein which cover the remaining portion of the plate
    - 4) Dairy appears as a cup next to the plate
  - b. There is not a separate group for fats or oils included in MyPlate.
4. Consumer health messages
  - a. Simple, actionable health messages capture attention and achieve behavior change.
  - b. ChooseMyPlate.gov provides three clear recommendations:
    - 1) Balance Calories
    - 2) Foods to increase
    - 3) Foods to reduce
5. Daily food plans
  - a. ChooseMyPlate.gov provides an interactive tool to estimate caloric need and provide a suggested food pattern based on age, gender, height, and weight.
  - b. Table 2-5 presents the recommended MyPlate food-intake patterns.
  - c. See Figure 2-6 for a description of what counts as a MyPlate serving.
  - d. Figure 2-7 shows a convenient guide to estimate common serving size measurements.

- e. MyPlate recommends limits for empty calories from solid fats and added sugars (SoFAS) and sets allowances at a range of 120-600 kcal per day based on total energy needs.
  6. Additional MyPlate resources
    - a. There are several interactive tools available for consumers at ChooseMyPlate.gov that can assist individuals in making healthy choices.
    - b. Nutrition education, sample menus and recipes, Food-A-Pedia, and SuperTracker tool
  7. Menu planning with MyPlate
    - a. Important considerations when using MyPlate to plan a menu
      - 1) It is not intended for infants or children under 2 years of age.
      - 2) Consume a variety of foods to obtain all nutrients needed.
      - 3) There can be variation in the amount of nutrients and calories within each food group.
      - 4) Choosing fat-free or low-fat dairy items allows for greater amounts of foods to be eaten from all groups.
      - 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 plant oils daily and fish at least twice a week.
    - b. Table 2-6 presents the nutrient contribution of the MyPlate food groups.
    - c. Table 2-7 illustrates an example of putting MyPlate into practice.
  8. Limitations of MyPlate
    - a. Does not provide information about the overall calories, serving sizes, or number of servings
    - b. The MyPlate icon doesn't address the types of foods to choose within each food group.
    - c. It focuses on plates at each mealtime but not the overall diet of individuals.
    - d. Populations with poor diets may not easily obtain the messages from MyPlate using the internet.
  9. How does your plate rate?
    - a. Compare your overall intake to the recommendations detailed at ChooseMyPlate.gov and by using the SuperTracker tool.
    - b. Compare your intake to the DRI and make the necessary changes to improve your food selections.
- B. The Mediterranean Diet Pyramid (see Fig. 2-9)**
1. Diet patterns of the southern Mediterranean region are outlined in this eating pattern.
  2. Mediterranean diet is associated with low rates of chronic disease and high life expectancy.

#### 2.4 States of Nutritional Health (see Fig. 2-10)

### A. Desirable nutrition

1. Body tissues have enough of a nutrient to support normal metabolic function.
2. Achieved by consuming essential nutrients from variety of foods

### 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 but without outward symptoms (subclinical deficiency).
3. Over time, clinical symptoms of deficiency surface, often evident in skin, hair, nails, 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.

## 2.5 Measuring Your Nutritional State

### A. Analyzing Background Factors (see Table 2-8)

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 level
6. Economic status: ability to purchase, transport, and cook food

### B. Assessing Nutritional Status Using the ABCDEs (see Table 2-8 and Fig. 2-11)

1. Anthropometric assessment: height, weight, skinfold thicknesses, and body 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: from background analysis

### 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 for low bone density to appear.
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. Healthy habits include:
  - a. Consuming a healthy diet

- b. Maintaining a healthy weight
- c. Occasionally consuming alcohol in small amounts
- d. Exercising for at least 30 min/day
- e. Avoiding tobacco

## 2.6 Specific Nutrient Standards and Recommendations

### A. Overview

1. Dietary Reference Intakes (DRI) is the umbrella reference term that describes four standards for nutrient needs: Recommended Dietary Allowance (RDA), Adequate Intake (AI), Estimated Energy Requirement (EER), Tolerable Upper Intake Level (UL).
2. Development of DRI's is an ongoing effort between Food and Nutrition Board (FNB) and Institutes of Medicine.
3. Table 2-9 summarizes nutrient standards used in the United States and Canada.

### B. Recommended Dietary Allowance (RDA)

1. Daily amount of nutrient that 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. Established if there is not sufficient information on human needs to set an RDA
2. 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. Serves as a starting point for estimating calorie needs, as individual needs vary

### 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

### 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. Values based on consumption of 2000 kcal per day
3. Allows consumers to compare intake from a specific food to desirable (or maximum) intake levels



### G. How Should These Nutrient Standards Be Used?

1. Figure 2-12 illustrates how the various nutrient standards relate to each other and to risk for deficiency or toxicity.
2. The type of standard that is set depends on the quality of available evidence.
3. Diet plans should strive to meet the RDA or AI without exceeding the UL.
4. AI should not be used alone to evaluate individual needs.
5. Daily Values, which appear on food labels, serve as guidelines for comparison of nutrient content of foods to approximate human needs; set at or close to RDA value.

## 2.7 Evaluating Nutrition Information

### A. Suggestions to Make Healthful and Logical Nutrition Decisions

1. Apply basic nutrition principles you've learned to any nutrition claim.
2. Examine the background and scientific 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, and work with other health professionals.
7. Avoid supplement megadoses.
8. Examine product labels carefully.

### B. Consult Registered Dietitian (R.D.)

### C. Consult Reputable Websites

1. [www.eatright.org](http://www.eatright.org) (American Academy of Nutrition and Dietetics)
2. [acsh.org](http://acsh.org) (American Council on Science and Health)
3. [www.quackwatch.org](http://www.quackwatch.org)
4. [www.ncahf.org](http://www.ncahf.org) (National Council Against Health Fraud)
5. <http://ods.od.nih.gov/> (National Institutes of Health, Office of Dietary Supplements)
6. [www.fda.gov](http://www.fda.gov) (US Food and Drug Administration)

## *Nutrition and Your Health: 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 (see Fig. 2-13) must include:
  - a. Total calories (kcal)
  - b. Calories from fat
  - c. Total fat
  - d. Saturated fat
  - e. *Trans* fat

- f. Cholesterol
  - g. Sodium
  - h. Total carbohydrate
  - i. Fiber
  - j. Sugars
  - k. Protein
  - l. Vitamin A
  - m. Vitamin C
  - n. Calcium
  - o. Iron
  - p. Monounsaturated or polyunsaturated fats, potassium and others, if health claims are made about them
4. Serving sizes must be consistent among similar foods but are not necessarily the same as what is recommended by MyPlate.
  5. Food Claims listed on package must follow legal definitions (see Table 2-10 for list of definitions for nutrient claims allowed on food labels).
  6. Daily Values are often listed for fat, cholesterol, and carbohydrate.
- B. Proposed Changes to Nutrition Labels
1. FDA proposed changes to Nutrition Facts Panel in February 2014.
    - a. Update the Daily Values for various nutrients
    - b. More realistic serving size information will reflect what is typically consumed in one sitting.
    - c. Calorie amount printed in larger size than other information
    - d. Two columns listed on larger packages to show information for serving size as well as package as a whole
    - e. Additions include "added sugars," potassium, and Vitamin D amounts.
    - f. Calories from fat will no longer be included.
  2. Changes will take up to 2 years to implement once proposals are approved. See <http://www.fda.gov/ForConsumers/ConsumerUpdates/ucm387114.htm>.
- C. Diet Planning with Labels
1. Use Daily Values to compare foods on nutrients.
  2. Labels are helpful in identifying which foods are nutrient dense and energy dense.
  3. Individuals who read Nutrition Facts when shopping for food report healthier nutrient consumption than those who do not.
- D. Exceptions to Food Labeling
1. Fresh fruits, vegetables, and fish are not required to have Nutrition Facts labels.
  2. Because protein deficiency is rare in the United States, % Daily Value for protein is not required for products designed for people 4 years or older.
  3. If % Daily Value is included, the product must be analyzed for protein quality.
- E. Health Claims on Food Labels
1. FDA permits some health claims with restrictions.
  2. Four categories for claims on foods
    - a. Health claims—closely regulated by FDA

- b. Preliminary health claims—regulated by FDA but evidence may be scant for the claim
    - c. Nutrient claims—closely regulated by FDA (review Table 2-10)
    - d. Structure/function claims—these are not FDA-approved or necessarily valid
  3. FDA limits health messages to instances in which there is significant scientific agreement that a relationship exists between the nutrient and the disease.
  4. Current allowed claims
    - a. A diet with enough calcium and vitamin D and a reduced risk of osteoporosis
    - b. A diet low in total fat and reduced risk of some cancers
    - c. A diet low in saturated fat and cholesterol and a reduced risk of cardiovascular disease
    - d. A diet rich in fiber and a reduced risk of some cancers
    - e. A diet adequate in the synthetic form of the vitamin folate and reduced risk of neural tube defects
    - f. Use of sugarless gum and reduced risk of tooth decay
    - g. A diet rich in fruits, vegetables, and grain products that contain fiber and reduced risk of cardiovascular disease. Oats and Psyllium can be singled out in reducing risk of cardiovascular disease when statement also includes that the diet should be low in saturated fat and cholesterol.
    - h. A diet rich in whole grain foods and other plant foods, as well as low in fat, saturated fat, and cholesterol, and a reduced risk of cardiovascular disease and certain cancers
    - i. A diet low in saturated fat and cholesterol that also includes 25 grams of soy protein and a reduced risk of cardiovascular disease
    - j. Fatty acids from oils present in fish and a reduced risk of cardiovascular disease
    - k. Margarines containing plant stanols and sterols and a reduced risk of cardiovascular disease prevention
  5. A health claim must meet two general requirements before it can be made for a food product.
    - a. Must be a "good source" (before fortification) of fiber, protein, vitamin A, vitamin C, calcium, or iron
    - b. Single serving cannot contain more than 13 grams of fat, 4 grams of saturated fat, 60 milligrams of cholesterol, or 480 milligrams of sodium
  6. Qualified health claims are permitted when there is emerging evidence for a relationship between a food, food component, or dietary supplement and a reduced risk of a disease or health-related condition.

**BEST PRACTICES: TEACHING STRATEGIES, DEMONSTRATIONS, ACTIVITIES, ASSIGNMENTS, AND MORE**

1. Have students complete the **Rate Your Plate** activities, "Does Your Diet Compare to MyPlate?", "Are You Putting Health Advice into Practice?" and "Applying the Nutrition Facts Label to Your Daily Food Choices". In this activity, students will use the dietary record they kept as suggested in Chapter 1 activities. Having students complete and analyze a three-day food record would provide a more accurate nutrition assessment. Students should hold on to this assessment for future use.
2. Ask students to select nutrition labels from four food products they consume regularly and to calculate the actual amount or percent of RDA of selected nutrients for their age and gender group provided by these products.
3. Provide students with a sample of a day's food intake. Make sure it is high in fat, sodium, simple sugars, and low in fruits and vegetables. Ask students to make changes in this menu to comply with the Dietary Guidelines.
4. People often have difficulty accurately estimating portion/serving sizes of foods they eat. To help students with this, have them estimate food portions in class. You can do this by bringing to class samples of commonly consumed foods, various-sized glasses, bowls, measuring cups, measuring spoons, and a food scale if one is available. Examples of food to bring: puffed rice, Grape Nuts, cooked pasta, bagel or English muffin, chips, peanut butter, shelled sunflower seeds, raisins, orange juice, grape juice, mayonnaise, and some type of salad dressing. Pick and choose students to estimate a portion size using only the bowls and glasses provided. Keep the measuring cups and spoons, as well as the food scale hidden during this phase of the activity. Once portion sizes have been estimated by the students, show them, using measuring cups, measuring spoons, and the food scale, how accurate portion sizes look. They will be amazed. At the same time, discuss how to record food portions, what could happen to one's health when portion sizes are either overestimated or underestimated, how the Food Guide Pyramid and Exchange System differ in serving sizes, and how relatively easy nutrient needs can be met by consuming foods.
5. Assign students the task of visiting the web site, <http://www.dietitian.com/calcbody.php>, to complete the Healthy Body Calculator. Discuss the various factors this site uses to assess a "healthy body." How should individuals interpret their results?