Chapter 2 Tools of a Healthy Diet

Overview

Chapter 2 provides students with the science behind current nutrition recommendations for North Americans. The components of the Dietary Reference Intakes are defined, including Estimated Average Requirements, Recommended Dietary Allowances, Adequate Intakes, Tolerable Upper Intake Levels, and Estimated Energy Requirements. The required and optional elements of food labels are also discussed. The text defines Daily Values as they relate to DRIs and also examines the various nutrition claims allowed on food labels. The development and utility of nutrient databases are presented. Finally, the Dietary Guidelines for Americans and MyPlate are presented as sound nutrition advice based on the latest scientific research.

Learning Objectives

1. Explain the purpose of the Dietary Reference Intake (DRI) and its components (Estimated Average Requirements, Recommended Dietary Allowances, Adequate Intakes, Upper Levels, Estimated Energy Requirements, and Acceptable Macronutrient Distribution Ranges).
2. Compare the Daily Values to the Dietary Reference Intakes and explain how they are used on Nutrition Facts panels.
3. Describe Nutrition Facts panels and the claims permitted on food packages.
4. Describe the uses and limitations of the data in nutrient databases.
5. Discuss the Dietary Guidelines for Americans and the diseases they are intended to prevent or minimize.
6. Discuss the MyPlate food groupings and plan a diet using this tool.
7. Develop a healthy eating plan based on the concepts of variety, balance, moderation, nutrient density, and energy density.

Teaching Strategies, Activities, Demonstrations, and Assignments

1. Complete **Take Action** activities, “Are You Putting the Dietary Guidelines into Practice?” and "Does Your Diet Meet MyPlate Recommendations?”. In this activity, students may 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. Find a particular nutritional supplement that exceeds the U.S. RDA for a variety of nutrients. Duplicate the label for each student. Project or provide the table of ULs and have students identify which nutrients are at or above the UL. Given the class's understanding of the U.S. RDA, ask them to discuss the implications of those nutrients exceeding it. (This project can also be done in small groups, by providing each group with a different nutritional supplement and then having them share what they have learned.)

6. 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?

7. Have students bring 1-2 food labels of their favorite foods to class (and provide some of your own). Students will then partner up with someone who has a food in the same category or pick a second label from one that you provide. (Categories can include breakfast foods, savory snacks, sweet snacks/dessert items, entrees, side dishes, bars, beverages.) Have students then compare labels for energy density (use the calculation in the textbook) and single nutrient (fiber, protein, calcium, potassium, etc) and overall nutrient density.

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Lecture Outline

2.1 Dietary Reference Intakes (DRIs)

A. General

1. Food and Nutrition Board formed in 1941 to establish the first dietary standards
   a. Evaluate nutrient intake of population
   b. Plan agricultural production
2. Dietary standards are periodically updated to reflect latest research
3. DRIs were established by scientists from the United States and Canada
4. DRIs vary by life stage and gender after age 9
5. Recommendations should be applied to average dietary intake
6. Figure 2-1 illustrates the relationship of the DRIs to each other

B. Estimated Average Requirements (EARs)

1. Daily nutrient intake amounts that are estimated to meet the needs of half of the people in a certain life stage
2. currently set for 17 nutrients
3. The Food and Nutrition Board must agree there is an accurate method for measuring whether intake is adequate.
   a. These measures, called functional markers, evaluate the activity of an enzyme in the body or the ability of a cell or an organ to maintain normal physiological function.
   b. If no measurable functional marker is available, an E A R cannot be set
4. E A R s meet the needs of 50% of those in a life stage
5. Used to evaluate the adequacy of diets of groups, not individuals

C. Recommended Dietary Allowances (RDAs)

1. Daily nutrient intake amounts sufficient to meet the needs of nearly all individuals (97 - 98%) in a life stage
2. Based on a multiple of the EAR
3. Set at an amount based on the nutrient's ability to prevent chronic disease rather than just prevent deficiency
4. RDA is higher than the average human needs
5. If average intake is less than the RDA and the person is healthy, one's need for this vitamin is probably less than the RDA
6. If intake regularly drops below the R D A, especially below the E A R, the risk of developing a deficiency is greater

D. Adequate Intakes (AIs)

1. Daily intake amounts set for nutrients for which there is insufficient research to establish an EAR
2. Based on observed or experimentally determined estimates of the average nutrient intake that maintains a defined nutritional state
3. Should cover the needs of 97-98% of individuals
4. Can be used for individuals

E. Tolerable Upper Intake Levels (Upper Levels, or ULs)

1. Maximum daily intake amounts of nutrients that are not likely to cause adverse health effects in 97-98% of individuals
2. Applies to chronic daily use
3. Set to protect those who are susceptible in the healthy population
4. Not a nutrient goal
   a. Ceiling below which nutrient intake should remain

F. Estimated Energy Requirements (EERs)

1. Average daily energy (calorie) intake needs for each life-stage group
2. Energy from carbohydrates, protein, fat, and alcohol consumed in amounts above need is stored as body fat
   a. Used to promote healthy body weight

G. Acceptable Macronutrient Distribution Ranges (AMDRs)
1. Set for intake of carbohydrate, protein, fat, and essential fatty acids
2. Provide a range of intake associated with good health and a reduced risk of chronic diseases

H. Appropriate Uses of the DRIs
1. Intended mainly for diet planning
2. Should aim to meet any R D A s or A I s set
3. Do not exceed the upper level for a nutrient
4. Can be applied to healthy people
5. May not be appropriate for the undernourished or those with diseases or other health conditions

I. Putting the DRIs into Action to Determine the Nutrient Density of Foods
1. Determining nutrient density
   a. Nutrient density is a tool for assessing the nutritional quality of an individual food.
   b. To determine:
      i. Divide the amount of a nutrient in a serving of food by your daily recommended intake
      ii. Next, divide the calories in a serving of the food by your daily calorie need (E E R)
      iii. Compare these values: food is nutrient dense if it provides a greater contribution to your nutrient need than your calorie need
   c. Empty-calorie foods tend to be high in sugar and/or fat with few other nutrients present (soft drinks, chips, cookies, candy, etc.)

2.2 Daily Values (DVs)

A. General
1. Generic standards developed by the U.S. Food and Drug Administration (F D A)
2. Found on the Nutrition Facts panel on a food label
3. Compares the amount of nutrients in the food with a set of standards
4. Set for 4 groups:
   a. Infants
   b. Toddlers
   c. Pregnant or lactating women
   d. People over 4 years of age
5. Based on combination of Reference Daily Intakes and Daily Reference Values

B. Reference Daily Intakes (RDIs)
1. Set for vitamins and most minerals
2. All have established nutrient standards:
3. For people over age 4, standards tend to be set at the highest R D A value (or AI for nutrients that do not have RDAs) for any life-stage group
4. RDIs are used to calculate percent D V on Nutrition Facts panels

C. Daily Reference Values (DRVs)
1. Standards for energy-producing nutrients, cholesterol, and sodium
2. For energy-producing nutrients, D R V s are based on daily caloric intake.
   a. F D A selected 2000 calories as the reference for calculating percent D V s

3. How D R V s for energy-producing nutrients are calculated:
   a. Fat is set at 35% of calories
   b. Saturated fat is set at 10% of calories
   c. Carbohydrate is set at 60% of calories
   d. Protein is set at 10% of calories

D. Putting the Daily Values into Action on Nutrition Facts Panels
1. Information related to the Daily Values is found on almost every food and beverage sold.
2. Labels include:
   a. Product name
   b. Name and address of manufacturer
   c. Amount of product in package
   d. Ingredients listed in descending order by weight
   e. Ingredients that are common allergens
   f. Nutrition Facts panel
3. Nutrition Facts panel lists amounts of certain food components and reports them as % Daily Value
4. Represent information for a single serving of food:
   a. Serving sizes are specified by the F D A
   b. Based on typical serving size eaten by Americans
5. Starting in 2018, the following must be listed on the Nutrition Facts panel:
   a. Total calories (kcal)
   b. Total fat, saturated fat, and trans fat
   c. Cholesterol
   d. Sodium
   e. Total carbohydrates
   f. Total sugars
   g. Added sugar
   h. Fiber
   i. Protein
   j. Vitamin D
   k. Potassium
   l. Calcium
   m. Iron
6. Manufacturers:
   a. Can choose to list other ingredients
   b. Are required to include a nutrient on the Nutrition Facts panel if they make a claim about its health benefits or if the food is fortified
7. Protein deficiency is not a public health concern in the U.S, so listing % Daily Value for protein is not mandatory on foods for people over 4 years of age.
8. Nutrients listed on Nutrition Facts panels tend to be the ones of greatest health concern.
9. Many people eat too much fat, saturated fat, trans fat, cholesterol, sodium, and sugar.
10. Many people are concerned that they don’t get enough fiber, calcium, iron, vitamin D, and potassium.

E. Claims on Food Labels
1. Marketing tool directed toward health-conscious consumers
2. Claims must comply with F D A regulations
3. Claims can be:

a. Nutrient content claims
b. Health claims
c. Structure/function claims

4. Nutrient content claims describe the nutrients in a food
5. Health claims describe a relationship between a disease and a nutrient, food, or food constituent
   a. Must have significant scientific agreement that they are true
   b. Must use a *may* or *might* qualifier
6. Structure/function claims describe how a nutrient affects body structure or function
   a. FDA does not approve or authorize
   b. Manufacturers are responsible for ensuring these claims are accurate and not misleading

2.3 Nutrient Composition of Foods

A. General

1. Nutrient databases make it possible to:
   a. Estimate the amount of calories and nutrients in foods
   b. See how closely intake matches dietary standards
2. Cannot account for:
   a. Factors that affect nutrient levels in the food we eat
   b. How nutrients are handled in the body

B. Putting Nutrient Databases into Action to Determine Energy Density and Dietary Intake

1. Nutrient databases can be used to calculate a food's **energy density**
   a. Determined by comparing a food's calorie count per gram weight of the food
2. Energy-dense foods are high in calories but weigh very little.
   a. Nuts, cookies, fried foods, and snack foods
   b. Can help people with poor appetite maintain or gain weight
3. Low-energy-dense foods contain large amounts of water and few calories.
   a. Fruits, vegetables, stews, casseroles, and oatmeal
   b. Can help keep calorie intake under control

C. Expert Perspective from the Field: Menu Labeling: How Many Calories Are in That?

1. Consumers have the right to know the nutrition content of foods
2. Restaurant food is now a significant portion of the food we eat
3. Evidence indicates that stating calorie content on menus can lead to dietary improvements
   a. Fast food customers who reported seeing calorie information at the point of purchase ordered meals with fewer calories
   b. When calorie information was included in menus, customers ordered lower-calorie dinners for themselves and their children
4. www.menulabeling.org

2.4 Dietary Guidelines for Americans

A. General

1. The U.S. government's foundation for nutrition policy and education
2. Reflect the most accurate and up-to-date scientific knowledge about nutritious diets, physical activity and related healthy lifestyle choices
3. Designed to meet nutrient needs while reducing the risk of:
   a. Obesity

b. Hypertension
c. Cardiovascular disease
d. Type 2 diabetes
e. Osteoporosis
f. Alcoholism
g. Foodborne illness

4. Premise is that nutrient needs should be met primarily by consuming foods
   a. Fortified foods and dietary supplements may be useful sources of nutrients in certain cases
   b. Dietary supplements are not a substitute for a healthful diet
5. 2020–2025 Dietary Guidelines for Americans have key recommendations intended to help people of all ages achieve healthy eating patterns. The key recommendations have interconnected relationships; thus, all need to be implemented to achieve the best health.

B. Calorie Balance in a Healthy Eating Pattern

1. Calorie needs vary depending on a person's age, sex, height, weight, and level of physical activity.
2. Monitor body weight and adjust calorie intake and expenditure in physical activity over time to achieve and maintain a healthy weight.
3. Children and adolescents are encouraged to maintain calorie balance to support normal growth and development without promoting excess weight gain.
4. Overweight or obese children and adolescents should change eating and physical activity behaviors to maintain or reduce rate of weight gain while linear growth (increases in height) continues so that they can reduce body mass index (B M I) percentile and move toward a healthy range.
5. Before becoming pregnant, women are encouraged to achieve and maintain a healthy weight.
6. Women who are pregnant are encouraged to gain weight within gestational weight gain guidelines.
7. Obese adults should change eating and physical activity behaviors to prevent additional weight gain and/or promote weight loss.
8. Overweight adults should not gain additional weight and those with C V D risk factors (e.g., hypertension and hyperlipidemia) should change eating and physical activity behaviors to lose weight.
9. To lose weight, most people need to reduce the number of calories from foods and beverages and increase physical activity.
10. Eating patterns that contain 1200 to 1500 calories each day can help most women lose weight safely.
11. Eating patterns that contain 1500 to 1800 calories each day help most men safely lose weight.

C. Dietary Guidelines 2020–2025

1. Follow a healthy eating pattern at every life stage.
   a. For the first 6 months of life, exclusively feed infants human milk. Fee infants iron-fortified infant formula during the first year of life when human milk is unavailable.
   b. Around 6 months, introduce infants to nutrient-dense complementary foods
   c. From 12 months through adulthood, follow a healthy pattern across the lifespan to meet nutrient needs, achieve a healthy body weight, and reduce the risk of chronic disease
2. Customize and enjoy nutrient-dense foods and beverages to reflect personal preferences, cultural traditions, and budgetary considerations.
   a. A healthy dietary pattern benefits all individuals regardless of age, race, ethnicity, or current health status.
3. Focus on meeting food group needs with nutrient-dense foods and beverages, staying within calorie limits.
   a. Nutrient-dense foods provide vitamins, minerals, and other health-promoting components and have no added sugars, saturated fat, or sodium.
   b. The core elements that make up a healthy dietary pattern include:

i. Vegetables of all types
ii. Fruits
iii. Grains (at least half should be whole grain)
iv. Dairy (including fat-free/low-fat milk/yogurt or lactose-free versions)
v. Protein foods (lean meats, poultry, eggs, seafood, beans, lentils, nut, seeds, soy products)
vi. Oils including vegetable oils and oils in food, like seafood and nuts

4. Limit foods and beverages higher in added sugars, saturated fat, and sodium, and limit alcoholic beverages.
   a. A healthy dietary pattern doesn't have room for extra added sugars, saturated fat, sodium, or alcoholic beverages. Limit to:
      i. Added sugars: Less than 10% of daily calories starting at age 2.
      ii. Saturated fat: Less than 10% of daily calories starting at age 2.
      iii. Sodium: Les than 2300 milligrams per day (less for children under age 14)
      iv. Alcoholic beverages: Adults can choose not to drink or to drink in moderation, limiting intake to 2 drinks or less in a day for men, 2 drink or less for women.
   b. Consider cultural and personal preferences to make these shifts easier to accomplish and maintain.

D. Putting the Dietary Guidelines into Action

1. Diet recommended by the Dietary Guidelines is not especially expensive
2. Fruits, vegetables, and low-fat and fat-free milk are similar in price to chips, cookies, and sugared soft drinks
3. Take into account your current health status and family history.
4. Identify specific changes you need to make.
5. Develop a plan to incorporate these changes.
6. See whether these changes are effective.

2.5 MyPlate

A. General

1. MyPlate depicts the key elements of a healthy diet and emphasizes the fruit, vegetable, grain, protein, and dairy food groups.
2. Key elements
   a. Balancing calories
      i. Enjoy your food, but eat less
      ii. Avoid oversized portions
   b. Foods to increase
      i. Make half your plate fruits and vegetables
      ii. Make at least half your grains whole grains
      iii. Switch to fat-free or low-fat (1%) milk
   c. Foods to reduce
      i. Compare sodium in foods like soup, bread, and frozen meals and choose the foods with lower numbers
      ii. Drink water instead of sugary drinks
3. The www.myplate.gov website has many resources to help consumers
   a. Daily Food Checklist - provides a quick estimate of what and how much food a person should eat.
   b. The SuperTracker - program provides detailed information on diet quality and physical activity status.
4. Table 2-7 presents MyPlate food serving sizes
   a. Grains: 1 ounce equivalent
      i. 1 slice of bread
      ii. 1 c ready-to-eat breakfast cereal
      iii. ½ c cooked cereal, rice, pasta, or bulgur

iv. 1 mini bagel or small tortilla
v. 1⁄2 muffin
vi. 3 c popcorn

b. Vegetable group: 1 cup
i. 1 c raw or cooked vegetables
ii. 1 c vegetable juice
iii. 2 c raw leafy greens

c. Fruits group: 1 cup
i. 1 c fruit
ii. 1 c 100% fruit juice
iii. ½ c dried fruit

d. Dairy group: 1 cup
i. 1 c of milk, yogurt, or calcium-fortified soymilk
ii. 1 c frozen yogurt or pudding made with milk
iii. 1 ½ c ice cream
iv. 1 ½ oz. of natural cheese
v. 2 oz. of processed cheese

e. Protein: 1 ounce equivalent
i. 1 oz. meat, poultry, fish, or cooked tempeh
ii. 1 egg
iii. 1 T peanut butter or hummus
iv. ¼ c cooked beans
v. ½ oz. nuts or seeds

f. Oils: 1 teaspoon
i. 1 t vegetable, fish oil, or oil-rich foods (e.g., mayonnaise, soft margarine)

B. Putting MyPlate into Action

1. Begin by estimating your energy needs.
2. Use Table 2-6 to discover how your energy needs correspond to the recommended number of servings from each food group.
3. The servings are based on the sizes listed in Table 2-7.
4. No specific food is required for good nutrition.
5. No individual food group provides all essential nutrients in adequate amounts.
6. The foods within a group may vary widely with respect to nutrients and energy content.
7. To keep calories under control, pay close attention to the serving size of each choice.
8. Variety is key to getting all nutrients offered by each food group.
9. Helpful hints for a nutritious diet
   a. Grains group: Make at least half of your grain choices those that are whole grains.
   b. Vegetables group: Variety within the vegetables group is especially important because different types of vegetables are rich in different nutrients and phytochemicals.
   c. Fruits group: Fruits also vary in the nutrients and phytochemicals they contain.
   d. Dairy group: Choose primarily low-fat and fat-free items.
   e. Protein group: Keep meat serving sizes under control.
   f. Oils: Though not a food group, small amounts of oils are needed to supply you with health-promoting fats, called essential fatty acids.
   g. Empty calorie foods: Foods from any of the food groups that are high in solid fats and/or added sugars should be kept at a level that matches your calorie needs.