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Nutrition Across Life Stages is dedicated to my grandmother, Cherie Fine, who passed away at the age of 95 as we were nearing the completion of this edition. She had a special gift of connecting with people of all ages. Everyone who was fortunate to be a part of her life experienced her warmth, generosity, and wisdom. May her memory be a blessing.

—Melissa Bernstein

Nutrition Across Life Stages is dedicated to my three children. May they always see the value in making good choices for their health and well-being, and that they set good examples for others.

—Kimberley McMahon
In *Nutrition Across Life Stages*, Melissa Bernstein and Kimberly McMahon take us across the life cycle with scientific clarity, covering the intersection between nutrition and health from preconception to adolescence to older adulthood. Over the course of this whirlwind trip, the authors raise insightful questions vital to the study of life cycle nutrition. What are the benefits and disadvantages of iron supplements? Can being underweight affect a pregnancy? Why is it important for a woman to take folic acid before she becomes pregnant? The authors discuss which substances found in the home or workplace can make it more difficult for a woman to become pregnant or to provide a healthy environment for her baby. Has she been exposed to toxic substances such as lead, mercury, pesticides, solvents, or radiation? These conditions are reviewed in detail.

Bernstein and McMahon are particularly good at citing the latest studies to show the consequences of dietary decisions. Vitamin D deficiency, for example, is a major, unrecognized epidemic in adult women of childbearing age and can result in significant health problems in children born to these women. What about women who are strict vegetarians? Can they meet all their nutritional needs?

A very strong and compelling part of the book is the material related to the older adult and geriatric population. The authors expertly discuss the role of nutrition in the management of acute or chronic conditions specific to mature adults, such as drug–nutrient interactions, depression, anorexia of aging, arthritis, osteoporosis, overweight and obesity, and Alzheimer’s disease. Given the increased role registered dietitian nutritionists now play in healthcare for older adults, the latter part of the book becomes a veritable page turner.

Paul Insel, PhD
Stanford University
Welcome to Nutrition Across Life Stages! This text covers topics applicable and relevant for entry-level Nutrition and Dietetics students who are focusing their study on nutritional requirements and challenges during each life stage. As such, Nutrition Across Life Stages includes chapters highlighting clinical-, health-, and disease-related topics specific to each age group that provide students with a knowledge and understanding of prevalent nutritional concerns from preconception to advanced age. Throughout, we as authors have strived to incorporate topics of special interest and to break down complex topics into key components to improve student understanding and build their practical knowledge base.

In writing this text, we kept in mind the needs of undergraduate students enrolled in an introductory life cycle nutrition course. As such, our aim has been to map to the way these courses are taught in a Nutrition and Dietetics program; however, we hope Nursing programs and programs that offer nutrition certification will also find this book a good fit.

The Goal of this Text

Good nutrition is a critical component at every stage of life, from preconception to end-of-life care. The maintenance of good health for all ages requires approaches that recognize multiple levels of influence on the individual and the impact of social, cultural, environmental, organizational, and medical factors. At any given age, there are significant challenges to healthy eating, especially for those affected by chronic conditions, physical limitations, and financial constraints; those who are racial and ethnic minorities; and those who reside in potentially challenging environments. More attention, resources, and nutrition expertise are needed to meet the food and nutrition requirements of vulnerable populations so that they can live healthfully with a good quality of life at every stage of life. Healthcare providers have opportunities to develop care plans that can help individuals of all ages promote personal well-being. Providing targeted and personalized nutrition guidance, services, and programs is vital to making a positive impact in the lives of all people.

As authors on two well-established introductory nutrition texts—Nutrition and Discovering Nutrition—we aim to keep our texts current and engaging for instructors and students alike. Having taught Life Cycle Nutrition ourselves, we saw a need for a fresh approach to this material. Learning about the varying needs and challenges of different age groups begins with a solid foundation in nutrition basics, before then applying that knowledge to different ages, environments, challenges, and medical conditions. By using an approach that begins with normal nutrition and then considers alterations in nutritional needs and challenges resulting from common diseases and conditions that affect individuals at various ages, Nutrition Across Life Stages strives to keep students engaged and thinking critically in order to creatively apply their knowledge to problem-solving challenging real-life scenarios. Our aim is to make learning the material approachable, interesting, relevant, and fun without feeling overwhelming. We believe Nutrition Across Life Stages accomplishes this by presenting fresh pedagogy and engaging, student-centered learning activities that appeal to various learning styles.

Nutrition Across Life Stages facilitates active and participatory learning by providing many opportunities for classroom discussion and active engagement, presenting students with a multidimensional approach to the material. Discussion prompts and learning activities embedded throughout the text are designed to facilitate personalized teacher interaction with students. In lieu of rote lecturing, these endeavor to create a dynamic learning experience, whether they’re used in a traditional classroom, as part of an online curriculum, or some hybrid of the two.

In crafting this text, we wanted to avoid categorizing older adults by chronological age. As a result, this is the first life cycle nutrition text to break out coverage of older adults across three unique chapters. Chapter 14, “Older Adult Nutrition,” discusses normal nutrition for otherwise healthy older adults, while Chapter 15, “Geriatric Nutrition,” highlights topics relevant to those who are frail, ill, and whose health is failing. Finally, Chapter 16, “Nutrition for Health and Disease in Older Adults and Geriatrics,” addresses common health-related situations that require additional nutrition consideration.

Organization of the Text

We wrote Nutrition Across Life Stages with the typical Life Cycle Nutrition course in mind—that is, one focused on normal nutrition. Nutrition Across Life Stages begins in Chapter 1 with an overview of normal nutrition, national nutrition guidelines, and
Within the chapters, several boxed features appear. These include the following:

- **The Big Picture** is an enhanced visual feature that incorporates key photos, diagrams, graphs, and illustrations to help visual learners by highlighting key concepts and breaking down tough concepts to their constituent components.
- **News You Can Use** presents topics of special interest to students, usually tied to current research in nutritional science.
- **Let’s Discuss** provides topics that are meant to trigger engaging and insightful conversations in the classroom.

Each chapter concludes with a Learning Portfolio that contains the following:

- Visual Chapter Summary
- Key Terms
- Discussion Questions
- Activities
- Study Questions
- Weblinks

### Features and Benefits

*Nutrition Across Life Stages* incorporates a strong array of pedagogical features, including several that contain a strong visual component. These are deployed consistently across chapters, ensuring a uniform learning experience for the student.

Each chapter begins with a brief Chapter Outline, along with a series of Learning Objectives that establish what the chapter seeks to convey to the reader. Toward the beginning of each chapter, a Case Study is also introduced that is directly relevant to the content being discussed. These case studies are progressive and revisited throughout the chapter; questions tied to each Case Study have been included that can be used for self-study or as part of a classroom assignment. Additionally, each section within each chapter begins with a **Preview** statement and ends with a summarizing **Recap** that includes questions that allow the reader the opportunity to identify key concepts.

**The Complete Learning Package**

*Nutrition Across the Life Stages* provides instructors with a full suite of resources, including:

- Test Bank, containing more than 500 questions
- Slides in PowerPoint format, featuring more than 350 slides
- Image Bank, collecting photographs and illustrations that appear in the text
- Instructor’s Manual, including an array of useful instructor tools:
  - Learning Objectives
  - Chapter Outlines
  - Answers to in-text Case Study questions
  - Answers to in-text Study Questions
  - Answers to in-text Discussion Questions
  - Nursing Notes, highlighting content especially relevant to Nursing students

Melissa Bernstein  
Kimberley McMahon
Nutrition Across Life Stages incorporates an array of pedagogical features in order to facilitate active student engagement and class discussion.

The Chapter Outline at the beginning of each chapter gives students a preview of topics that will be covered.

Learning Objectives focus students on the key concepts of each chapter and the material they will learn.

A Case Study is introduced at the beginning of each chapter, illustrating how topics discussed in the text might appear in real-life. These case studies are revisited throughout the chapter, building in concert with the foundational material. As the case study progresses, questions are incorporated to encourage active student engagement with the scenarios.

Key Terms are in boldface type the first time they are mentioned, with definitions appearing in the end-of-chapter Learning Portfolio.

Adolescence is a period of great physical, psychological, and emotional development that spans ages 10 to 19 years. Perhaps the simplest way to define its endpoints is the entrance of a child and emergence of a young adult. Changes over this near decade of life are constant, with internal influences such as hormonal shifts and external factors such as family, school, media, and daily social interactions. Adequate nutrition is necessary for adolescents to achieve their growth potential, and with this period of development comes increased nutritional needs. The American Academy of Pediatrics (AAP) recommends discussion of nutrition and physical activity during annual preventive care appointments. The role for registered dietitian nutritionists and other health-care providers in supporting healthy adolescent development is increasingly vital.

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Human milk is a unique, bioactive substance derived by the body to further the biological development of the human infant. Use of human milk enhances the immune, gastrointestinal, and metabolic health of infants.

The structure of the breast allows for its function of providing nutrients to an infant. Hormones enhance development of the mammary gland and prepare the mammary system for milk production. For the initial stage of milk production, the mother’s body produces colostrum, the first secretion from the mammary glands of the mother after giving birth. Colostrum is uniquely nutritive and significantly important, because this is the first feedings for an infant who has been well nourished by the maternal blood supply during pregnancy. The composition of breastmilk changes through the course of lactation, providing the vast majority of nutrients required for infant growth.

1. Explain how prolactin and oxytocin influence human milk production.

Changes along the gastrointestinal tract that can cause nutritional deficiencies and disease.

The News You Can Use feature presents topics of special interest to students, usually anchored in current nutritional science research.

References

The Let's Discuss feature provides prompts for class discussion.

Each chapter concludes with a Learning Portfolio, assembling an array of student-centered resources and activities.

The Visual Chapter Summary summarizes the chapter content in bullet form, complemented by important illustrations and photos found in the chapter.

Each chapter ends with an inventory of Key Terms and their definitions; all terms and definitions are also found in the end-of-text Glossary.

Discussion Questions encourage students to probe deeper into the chapter content, making connections and gaining new insights.

Suggested Activities encourage students to put theory into practice.
Study Questions provide multiple-choice and true/false questions at the end of each chapter, testing students’ knowledge of the information covered in the text. These can be utilized for student self-assessment or as homework material.

Weblinks direct students to online resources relevant to the chapter content.

Study Questions

1. Physiological functions begin to deteriorate increasingly after which age?
   a. 10 years
   b. 30 years
   c. 40 years
   d. 50 years

2. Seizures is a term that refers to a decline in organ function and physiological functions caused by injury, illness, or poor lifestyle choices.
   a. True
   b. False

3. Which physiological changes occur with aging?
   a. Increase in BMI and increase in fat mass
   b. Decrease in caloric need and decrease in bone mass
   c. Increase in bone mass and increase in estrogen
   d. Increase in fat mass and decrease in testosterone

4. What is immune system affected by?
   a. Dietary micronutrient intake
   b. The body’s micronutrient status
   c. Levels of physical activity
   d. All of the above

5. Factors that contribute to the obesogenic environment include all of the following except which one?
   a. Lack of available food
   b. EXPENSIVE GYM MEMBERSHIPS
   c. Reduced portion sizes at restaurants
   d. Long commutes to and from work

6. Healthy people have established benchmarks and monitored progress over time to help encourage community collaboration and empower individuals to make good health decisions.
   a. True
   b. False

7. “Superfood” can help you lose weight?
   a. True
   b. False

8. What is a characteristic of people who struggle with orthorexia nervosa?
   a. They are satisfied on eating only vegan food.
   b. They want to lose weight and be thin.
   c. They want to eat unhealthy foods.
   d. They are satisfied with their weight and body image.

9. What is the Estimated Energy Requirement?
   a. The additional calories needed by the body to carry on the normal processes of life.
   b. The needed dietary energy intake to maintain energy balance
   c. The number of calories needed to promote weight loss in obese adults
   d. The energy required to promote health

10. What is the basic metabolic rate?
    a. The energy needed to support major body functions
    b. The energy required to support activities of daily living
    c. The energy required daily to support an exercise session
    d. The energy required to metabolize the food consumed

11. What is the thermic effect of food?
    a. The energy required to facilitate exercise
    b. The reaction that occurs when food is consumed
    c. The energy required by the ingestion, digestion, and absorption of food
    d. The energy required for the synthesis and secretion of hormones

12. What are macronutrients?
    a. Vitamins that provide energy to the body
    b. Nutrients such as calcium, potassium, and fiber
    c. Nutrients such as carbohydrates, proteins, and fat
    d. Nutrients that help the body store and use energy

13. What is a function of carbohydrates?
    a. Help repair cells in the body
    b. Supply energy to the cells in the body
    c. Maintain proper GI tract functioning
    d. Promote heart function

14. What are amino acids?
    a. The basic structures of proteins
    b. The basic structures of carbohydrates
    c. The basic structures of fats
    d. The basic structures of vitamins and minerals

15. What are micronutrients?
    a. Substances such as carbohydrates, proteins, and fat
    b. Vitamins and minerals
    c. Nutrients essential for the absorption of fat-soluble vitamins and minerals
    d. Nutritional components of all the cells in the human body

16. Mix Jones is a 24-year-old woman who is breast-feeding her 2-month-old child. What are her caloric needs?
    a. The same as the calorie needs of other 24-year-
    b. Lower than her daily calorie needs
    c. Higher than her daily calorie needs
    d. The same as the calorie needs of other 24-year-olds

Weblinks

- Minnesota Public Radio, “The Salt”: Fad Diets Will Seem Even Crazier After You See This
  http://www.npr.org/sections/health-shots/2013/08/23/214121007/fad-diet-will-seem-even-crazier-after-you-see-this
  Visit this providing website to see a unique photo series visually representing fad diets!

- Baylor College of Medicine Calorie Needs Calculator
  https://www.bcm.edu/cnrc-apps/caloriesneed.cfm
  Use this tool to estimate how many calories you need.

- Choose MyPlate Interactive Tools: SuperTracker
  http://www.choosemyplate.gov/supertracker/other-tools
  Do you want to plan a healthy diet and track your physical activity? Use the Choose MyPlate SuperTracker to help you achieve your health and fitness goals.

- USDA Choose MyPlate: Pregnancy and Lactation
  http://www.choosemyplate.gov/moms-pregnancy-breastfeeding
  Learn more about nutrition needs during pregnancy and lactation.

- Interactive DRI Tool for Healthcare Professionals
  http://fnic.nal.usda.gov/fnic/interactiveDRI/
  Use this tool to calculate daily nutrient recommendations to assist you with planning your diet based on the Dietary Reference Intakes (DRIs).
About the Authors

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