

# Preface

## TO THE INSTRUCTOR

If you teach nutrition, you undoubtedly already find it a fascinating topic. However, nutrition can also be quite frustrating to teach. Claims and counterclaims abound regarding the need for certain constituents in our diets. Sodium is a good example. One group of researchers promotes a reduction in salt intake for the general population as an effective preventive measure for hypertension. Other groups believe that normal blood pressure values can often be maintained despite the excess intakes of salt common among Americans.

Your authors are aware of conflicting opinions in our field and thus draw on as many sources as possible in the continual updating of this textbook, now in its fifth edition. We have incorporated much new material, especially from recently published articles in major nutrition and medical journals; supplements to the *American Journal of Clinical Nutrition*; and the latest edition of *Modern Nutrition in Health and Disease*, edited by Shils, Olson, and Shike. In addition, available information as of February, 2001 on the ongoing DRI revision by the Food and Nutrition Board is incorporated where appropriate.

In all, the book strives to present many perspectives in current nutrition research so that you and your students can better understand and participate in debates about current nutrition issues.

### ■ PERSONALIZING NUTRITION

One prominent theme in nutrition research today is *individuality*. Not all of us, for example, find that saturated fat in our diets raises our blood cholesterol values above recommended standards. Each person responds individually, often idiosyncratically, to nutrients, and that is something we continually point out in this textbook.

Moreover, even at this basic level the book discussions do not assume that all nutrition students are alike. Chapter content repeatedly asks students to learn more about themselves and their health status and to use this new knowledge to improve their health. After reading this textbook, students will understand much more clearly how the nutrition information given on the evening news, on cereal box labels, in popular magazines, and by government agencies applies to them. They will become sophisticated consumers of both nutrients and nutrition information. They will understand that their knowledge of nutrition allows them to personalize information, rather than follow every guideline issued for an entire population. After all, a population by definition consists of individuals with varying genetic and

cultural backgrounds, and these individuals have varying responses to diet.

In addition, the book covers important questions that students often raise concerning ethnic diets, eating disorders, nutrient supplements, phytochemicals, vegetarianism, diets for athletes, food safety, fad diets, and alternative medical practices, with an overall emphasis on the importance of understanding one's food choices and changing one's diet as needed.

### ■ AUDIENCE

This book has been designed for a nutrition majors audience. The chemistry has been kept to an appropriate amount. Health majors, home economics majors, nursing students, physical education students, and students in other health-related areas will also find this text appropriate. Because of the flexible chapter organization and content, this book can be adopted for students of diverse educational backgrounds. Although it is not absolutely necessary, most students will find that having taken a course in biology or having an understanding of basic biological concepts provides a helpful background when using this book.

### ■ ORGANIZATION

The book is most suitable for a semester-length course; it can also be used in a quarter-length course by omitting chapters or by skipping various sections. A useful feature of this text is that it is presented in six segments:

Part One: Nutrition Basics

Part Two: The Energy-Yielding Nutrients

Part Three: The Vitamins and Minerals

Part Four: Energy Production and Energy Balance

Part Five: Nutrition Applications in the Life Cycle

Part Six: Putting Nutrition Knowledge into Practice

This organization makes it easy to tailor the text to specific course needs.

### ■ NEW TO THIS EDITION

The fifth edition of *Perspectives in Nutrition* incorporates several new features designed to enhance student learning and understanding. Many of these features are a direct result of feedback received from instructors using previous editions.

## Refresh Your Memory

Each chapter begins with a box reminding students of previous chapter content that will be helpful to know for understanding the current chapter, such as reminding students to review the concept of glycemic index in Chapter 5 before beginning the sports nutrition chapter, which is Chapter 14.

## Case Scenario

Each chapter contains a case scenario that allows students to apply knowledge gained from the chapter in a real-life setting. Answers to the case scenario are provided in the chapter at the point in which the specific content needed to answer the case scenario is covered.

## New or Updated Expert Opinions

All of the expert opinions are either updated or are new. Among those that are new to this edition are the following: trans fatty acids (Dr. Bruce Holub), a prescription for exercise (Dr. Sheri Melton), and the safety of genetically modified foods (Dr. John Allred).

## New Take Action Activities

Each chapter now contains two Take Action activities. Previous editions contained one. These activities are great assignments for students to complete in order to enhance nutrition knowledge.

## New Chapter on Alcohol

Chapter 8 expands content on both the benefits and risks associated with alcohol use and the treatment of alcoholism, compared with previous editions. The Nutrition Perspective covers the risk of binge drinking, a prevalent problem on college campuses.

## Expanded Coverage on Human Physiology

Chapter 3 covers not only the gastrointestinal tract, as was done in previous editions, but also now reviews the other body systems that support gastrointestinal function and overall health.

## Nutrition Perspective on Alternative Medical Practices

Chapter 18 contains a Nutrition Perspective on alternative medical practices. The implications of the 1984 Dietary Supplement and Health Education Act (DSHEA) are reviewed, as well as possible benefits and risks of the use of popular herbal remedies.

## Latest Dietary Reference Intakes (DRIs)

All of the current DRIs for vitamins and minerals are included in this revision, including those for vitamin A, vitamin K, and many trace minerals published in January 2001.

## Updated Illustration Program

Numerous new photos and illustrations, including colorful variations on the USDA Food Guide Pyramid, keep the text current and fresh, as well as help convey important concepts.

## ■ ADDITIONAL FEATURES

### Overall Content, Especially Controversial Topics Current and Well-referenced

Much of the material is from sources published after the previous edition of this text was published late in 1998. Providing up-to-date research not only gives students the most accurate picture of nutrition today but also directs them to current materials for further study.

### Separate Chapter on Eating Disorders

This chapter provides current and in-depth coverage of this popular topic.

### Emphasis on Nutrient Density

Discussions of nutrients concentrate on the most nutrient-dense sources of foods. Leading food sources in the U.S. diet are identified for each nutrient when that data are available.

### Application of the Exchange System

The latest version of the Exchange System is presented in Chapter 2 and summarized in Appendix D.

### Summary Tables

Some chapters contain large summary tables detailing the major points. These tables are convenient capsules for reference.

### URLs for Nutrition-Related Web Sites

URLs for a variety of credible nutrition-related web sites are included in the chapters. When available, toll-free telephone numbers and other resources are also listed.

## Glossary

A comprehensive glossary of key terms, located at the end of the text, is included for students' reference. The glossary contains pronunciation keys for many unfamiliar words.

## ■ SUPPLEMENTARY MATERIALS

The latest supplementary materials are provided to both you and students to make better use of the text and the concepts presented in the course.

### Course Integrator and Instructor's Manual

This manual includes all the features of a useful instructor's manual, including learning objectives, suggested lecture outlines, suggested activities, media resources, and web links. It also integrates the text with all the health resources McGraw-Hill offers, such as the Online Learning Center, the test bank, the Visual Resource Library, and the Nutrition Website. The guide also includes references to relevant print and broadcast media. Available to adopters of the book, it also includes suggestions for teaching difficult material; activities; suggested readings; activities to use with FoodWorks College Edition software; source lists of supplementary materials; and a "survival" section, addressed to the novice instructor, which discusses class organization, scheduling, and problem areas, such as cheating.

### Test Bank

This printed manual includes the test bank and features approximately 2,000 test items (multiple choice, short answer, and matching questions), coded for level of difficulty and type of knowledge being tested.

### Computerized Test Bank

Instructors who adopt the text may receive MicroTest, a computerized test bank package compatible with IBM and Macintosh microcomputers. This test-generation software combines a number of user-friendly aids, enabling you to select, edit, delete, or add questions and construct and print tests and answer keys.

### FoodWorks College Edition

Based on the widely tested professional version of FoodWorks, this dietary analysis software has been developed for use in college courses. It offers a variety of functions based on the latest release of the USDA database. FoodWorks College Edition features a novice-friendly interface and contains approximately 7,500 foods. It generates a wide range of standard, easy-to-grade reports and allows you to add your own foods to the database.

## PowerWeb Nutrition

Add the Internet to your course with PowerWeb. *PowerWeb: Nutrition* provides students with current articles from *Annual Editions*, curriculum-based materials, weekly updates with assessment, informative and timely world news, refereed web links, research tools, student study tools, and interactive exercises. Preview the site at [www.dushkin.com/powerweb](http://www.dushkin.com/powerweb). Students can purchase access online using e-commerce.

### e-Text to accompany *Perspectives in Nutrition*

Starting in winter 2002, a CD version *Perspectives in Nutrition*, fifth edition, will be available for purchase. This hybrid CD helps students integrate the media available with the text. It includes the entire book, animations, and live web links.

### Visual Resource Library for Nutrition 2002

Available to qualified adopters, this CD-ROM, compatible with either Windows or Macintosh, contains key illustrations from the text. The VRL also includes a book-specific PowerPoint presentation. Illustrations and the PowerPoint can also be printed full-size for use as acetates and may be exported for use with other programs and applications, such as the computerized test bank.

### Transparency Acetates for Nutrition 2002

Text adopters may receive 200 full-color transparency acetates. They feature key illustrations from *Perspectives in Nutrition*, as well as other McGraw-Hill nutrition texts, with large, easy-to-read labels.

### Online Learning Center

This site contains a variety of text and web resources correlated specifically to *Perspectives in Nutrition*. As students are assigned text chapters, they also can access additional study support, such as online quizzes, learning objectives, and web links, directly related to the material you are covering in that week's class. Instructor resources will correlate *all* instructor supplements to the appropriate chapter and are password-protected. In addition, there will be an online version of the Visual Resource Library. McGraw-Hill content can be delivered through most of the popular course management systems, such as WebCT and Blackboard. [www.mhhe.com/wardlaw](http://www.mhhe.com/wardlaw)

### PageOut Course Website Development Center

PageOut enables you to develop a web site for your course. The site includes

- A course home page

- An instructor home page
- A syllabus (interactive and customizable; it includes quizzing, instructor notes, and links on the Online Learning Center)
- Web links
- Discussions (multiple discussion areas per class)
- An online grade book
- Student web pages
- Design templates

This program is now available to registered adopters of McGraw-Hill textbooks.

## Nutrition Web Page

This web site has been designed to be a resource to students and instructors. The three key sections are

1. Nutrition analysis
  - FoodWorks information with nutrient data sites; suggested student activities; Frequently Asked Questions; a PowerPoint Walkthrough, and links to The Nutrition Company, the developer of the software
  - Links to 411 for Nutrition, Recipes, Dietary Myths, Nutrition for the Physically Active, A Body of Evidence, BMI Calculator, Phytochemicals, Vitamins for the Future, Food Sources of Nutrients, Glossary, Food Labels, Healthy People 2010, and Dietary Guidelines for Americans 2000
2. NutriNews
  - Links to *Innovations*, a nutrition newsletter published by McGraw-Hill with Novartis Nutrition addressing nutrition issues
  - Links to Business Week Online articles on nutrition
  - Other nutrition articles
3. NutriLinks: This list was developed as a convenient resource for students and instructors. We hope it will
  - Help you stay current
  - Help you develop your web search skills
  - Provide you with quick access to information that can be used in research papers
  - Provide you with easy access to topics of general interest

In addition, you can link to Online Learning Centers and find information on McGraw-Hill books and other educational materials, such as PowerWeb and PageOut.

[www.mmhe.com/nutrition](http://www.mmhe.com/nutrition)

## Innovations: Nutrition Applications and Updates

*Innovations* is a newsletter devoted to nutrition education; is jointly sponsored by Novartis Nutrition and McGraw-Hill and will be published twice yearly. It provides current information on topics that will appeal to anyone interested in nutrition and health. It is available free of charge to adopters of McGraw-Hill textbooks.

## Issues in Nutrition: Obesity and Weight Control Videotape

This video explores obesity and weight control, including the concept of energy balance and the importance of physical activity in the energy balance equation, body mass index, and safe vs. unsafe diets. Commenting on these issues are experts in their field. Kelly Brownell, professor of psychology and director, Yale Center for Eating and Weight Disorders; Jack H. Wilmore, professor of science, University of Texas at Austin; Steven Blair, director of epidemiology, Institute for Aerobics Research in Dallas; and Susan Yanovski, director, Obesity and Eating Disorders Program. Running time: 10 min. 34 sec.

## Issues in Nutrition: Eating Disorders Videotape

This video looks at three types of eating disorders: anorexia nervosa, bulimia, and compulsive overeating. Professionals define and discuss each of these eating disorders, and three people who have been in treatment for an eating disorder discuss their experiences. The professionals in this video are Dr. Arnold Anderson, professor of psychiatry and director of the Eating Disorders Inpatient Unit, University of Iowa; Dr. Janet David, professor, Institute for Contemporary Psychotherapy Center for the Study of Anorexia and Bulimia; and Becky Zimmerman, registered dietitian. Running time: 11 min. 29 sec.

## Annual Edition Nutrition

This publication contains an assortment of previously published, contemporary articles on many topics, such as nutrition through the life span, food safety, fat and weight control, health claims, and hunger and global issues.

## Diet and Fitness Log

This logbook helps students track their diet and exercise programs. Students don't always have access to a computer, and this booklet provides the diary that helps them log their behaviors.

## SPECIAL ACKNOWLEDGMENTS

We would like to thank Julie Giarrana, Monica Stubler, Jana Meyer, and Marcella Sandli for their help with this revision. Our editor, Lynne Meyers, supported and assisted us through every step of the revision, and facilitated the difficult decisions that frequently arose. Marilyn Rothenberger and Debra DeBord did excellent and careful production work and copyediting. All these individuals contributed key expertise to the project.

## Contributors

A special thanks to all those who contributed to this book—especially the authors of the Expert Opinion commentaries. Their names are listed in the Table of Contents.

## Reviewers

As with the earlier editions, the goal is to provide the most accurate, up-to-date, and useful introductory nutrition text available. We, along with our publishers, would like to recognize and thank those people whose direction and insight guided the latest edition.

## For the Fifth Edition

List to come???

## A REQUEST TO PROFESSORS WHO USE THIS BOOK

As you might imagine, it is difficult to range across the vast areas of nutrition science, following all of the various controversies and new developments. We try our best but realize that sometimes we miss a side of an argument that deserves attention. If as you read this book you find content that you question or believe warrants a more detailed or broader look, feel free to contact us by mail, fax, or e-mail.

Gordon M. Wardlaw, Ph.D., R.D., L.D., C.N.S.D.  
The Ohio State University  
516H School of Allied Medical Professions  
1583 Perry Street  
Columbus, OH 43210  
Fax: 614-292-0210  
E-mail: wardlaw.1@osu.edu

Margaret W. Kessel, Ph.D., R.D., L.D.  
The Ohio State University  
Department of Human Nutrition and Food Management  
1783 Neil Ave.  
Columbus, OH 43210  
Fax: 614-292-8880  
E-mail: kessel.2@osu.edu



# Preface

## TO THE STUDENT

**C**holesterol, sports drinks, food labeling, bulimia nervosa, alternative sweeteners, vegetarianism, and *Salmonella* food-borne illness—we suspect you have heard about these topics. Which of them are important enough to be a consideration in your life or in the life of someone you know?

Americans pride themselves on their individuality. Nutritional advice should be given accordingly. For example, not all of us have high blood cholesterol and other significant risk factors for premature development of cardiovascular disease. The need to tailor dietary advice to each person's individual nature is the basic approach of this book. First, you are given a brief introduction to the study of nutrition; then, how to be a knowledgeable consumer is discussed. With so much information floating around—both accurate and inaccurate—you should know how to make informed decisions about your nutritional well-being. Then you are encouraged to learn the basic principles of nutrition and to discover how to apply the concepts in this book that pertain specifically to you.

The text discusses some of the most interesting and important elements of nutrition and food consumption to help you understand both how your body works and how your food choices affect your health.

### ■ FEATURES

#### Planning a New Way of Eating

Early in the text, many of the basic guidelines for planning a healthy diet are presented, including a description of the USDA Food Guide Pyramid, in Chapter 2. Later, in Chapter 13, the steps involved in setting nutritional goals and designing a diet plan to attain those goals are reviewed.

#### Understanding the World Around Us

In a college environment, it is often difficult to envision how real the problem of world hunger is. Chapter 20 examines the problem of undernutrition and the conditions that create it. The chapter allows you to explore possible solutions that offer hope for the future of our world.

#### Chemistry Review

Appendix B discusses in detail the critical chemistry concepts you need to know for an introductory study of nutrition. This information will give you a better understanding

of how nutrients work and how nutrition information applies to you.

### Pedagogy

The fifth edition of *Perspectives in Nutrition* incorporates some important tools (called pedagogy) to help you learn the nutrition concepts in this text. Following is a guide to those tools:

1. Each chapter begins with a Refresh Your Memory box reminding you of previous chapter content that will be helpful to know for understanding the current chapter. Following this is a case scenario, which allows you to apply knowledge gained from the chapter in a real-life setting. An answer to each case scenario is provided in the chapter at the point at which the specific content needed to answer the case scenario is covered.
2. **Key Chapter Concepts** then help you focus your attention on key ideas in the chapter.
3. Throughout each chapter are **boldfaced key terms**, many of which are defined in the margin. All boldfaced terms appear with their definitions and pronunciations in the glossary at the end of the text.
4. Also throughout each chapter are **margin notes**, which further explain ideas, provide references to other chapters, and provide the URLs to nutrition-related web sites.
5. The numerous **tables** throughout the text summarize major points.
6. The **Concept Checks**, which follow the major sections within each chapter, summarize key points. If you don't understand the material in the Concept Check, you should reread the preceding section.
7. Each chapter ends with a **summary**, which conveys the main ideas in the chapter, and **study questions**—both provide excellent review for examinations.
8. **References** with annotations are provided to back up material presented in the chapter. Much of the research cited has been published since the previous edition of the text came out in late 1998. If you are preparing a research paper for your class, or would just like more information on specific topics, consult these sources.
9. Also at the end of each chapter are **Take Action** boxes, which make major concepts presented in the chapter relevant to your own life. For example, you may be asked to look more carefully at your own diet, examine your family history, or apply information you've learned to friends or family.



10. In the **Expert Opinion** boxes, experts in the field of nutrition and health discuss information you need to understand regarding nutrition issues of our day. Think of these boxed discussions as “visiting speakers” who come into your classroom to talk about the latest research findings.
11. **Critical Thinking questions** ask you to apply information as you learn it. This fosters understanding of the material.
12. **Nutrition Perspective essays** at the end of each chapter develop current topics in nutrition, often covered earlier in the chapter, in greater detail.
14. A variety of supplements to this text, including a *FoodWorks* dietary analysis software, are available to you. These instructional aids are designed to help you learn the major concepts developed in the text and prepare for class examinations.
15. The web site <http://www.mmhe.com/wardlaw> contains an **online learning center**, with quizzes, flash cards, other activities, and web links designed to further help you learn about nutrition. This is organized according to each chapter in the book.

### **FoodWorks—Dietary Analysis Software**

This user-friendly dietary analysis program provides a variety of useful features, which allow you to track daily food intake, energy expenditure, and establish weight or body mass index (BMI) goals. Several different reports and pie charts allow you to see how calories from a specific food, meal, day, or daily average break out. For example, you can click on the fat pie chart to see what percentage of calories from saturated, monounsaturated, or polyunsaturated fat were in this morning’s breakfast.

#### **Features**

- *FoodWorks* has a database of nearly 7,500 foods; the database allows you to accurately record your intake, and to analyze a specific food, meal, day, or average.
- *FoodWorks* calculates recommended daily calories and body mass index (BMI) based on height, weight, and other information entered.
- You can track your daily activities—from sleeping to jogging—and *FoodWorks* will calculate daily energy expenditure.
- You can view a “personalized” food label in standard food label format for a given food.
- This colorful program is intuitively designed, making it easy to maneuver from one screen to another.
- Additional features include an easily accessible “Help” function, the ability to add your own foods to the database, and a link to the Nutrition Analysis web site.

## **A REQUEST TO STUDENTS WHO USE THIS BOOK**

We try our best but realize that sometimes we miss a side of an argument that deserves attention or do not make something perfectly clear. If as you read this book you find content that you question or needs a clearer explanation, feel free to contact us by mail, fax, or e-mail.

Gordon M. Wardlaw, Ph.D., R.D., L.D., C.N.S.D.  
 The Ohio State University  
 516H School of Allied Medical Professions  
 1583 Perry Street  
 Columbus, OH 43210  
 Fax: 614-292-0210  
 E-mail: wardlaw.1@osu.edu

Margaret W. Kessel, Ph.D., R.D., L.D.  
 The Ohio State University  
 Department of Human Nutrition and Food Management  
 1783 Neil Ave.  
 Columbus, OH 43210  
 Fax: 614-292-8880  
 E-mail: kessel.2@osu.edu



# Brief Contents

---

## ■ PART ONE NUTRITION BASICS 0

- 1 What Nourishes You? 000
- 2 The Basis of a Healthy Diet 000
- 3 Human Physiologic Processes 000
- 4 Metabolism 000

---

## ■ PART TWO THE ENERGY-YIELDING NUTRIENTS 0

- 5 Carbohydrates 000
- 6 Lipids 000
- 7 Proteins 000
- 8 Alcohol 000

---

## ■ PART THREE THE VITAMINS AND MINERALS 000

- 9 The Fat-Soluble Vitamins 000
- 10 The Water-Soluble Vitamins 000
- 11 Water and the Major Minerals 000
- 12 Trace Minerals 000

---

## ■ PART FOUR ENERGY BALANCE AND WEIGHT CONTROL 000

- 13 Energy Balance and Weight Control 000
- 14 Sports Nutrition 000
- 15 Anorexia Nervosa, Bulimia Nervosa, and Other Conditions 000

---

## ■ PART FIVE NUTRITION APPLICATIONS IN THE LIFE CYCLE 000

- 16 Pregnancy and Breastfeeding 000
- 17 Nutrition from Infancy Through Adolescence 000
- 18 Nutrition During Adulthood 000

---

## ■ PART SIX PUTTING NUTRITION KNOWLEDGE INTO PRACTICE 000

- 19 Food Safety 000
- 20 Undernutrition Throughout the World 000
- Appendixes 000
- Answers to Critical Thinking Questions 000
- Glossary 000
- Index 000