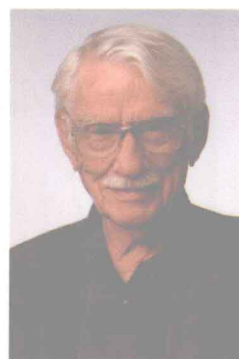


Nutrition Through the Life Cycle



Judith E. Brown

with

Janet Sugarman Isaacs

U. Beate Krinke

Maureen A. Murtaugh

Jamie Stang

Nancy H. Wooldridge



Nutrition through the Life Cycle

Judith E. Brown

Ph.D., M.P.H., R.D.
Public Health Nutrition
Division of Epidemiology, School of Public Health
University of Minnesota

Janet Sugarman Isaacs, Ph.D., R.D.
Department of Nutrition Science,
School of Health-Related Professions and
Civitan International Research Center, Sparks Clinics
University of Alabama at Birmingham

U. Beate Krinke, Ph.D., M.P.H., R.D.
Public Health Nutrition
Division of Epidemiology, School of Public Health
University of Minnesota

Maureen A. Murtaugh, Ph.D., R.D.
Postdoctoral Fellow
Division of Epidemiology, School of Public Health
University of Minnesota

Jamie Stang, Ph.D., M.P.H., R.D.
Public Health Nutrition
Division of Epidemiology, School of Public Health
University of Minnesota

Nancy H. Wooldridge, M.S., R.D., L.D.
Pediatric Pulmonary Center
Department of Pediatrics
University of Alabama at Birmingham

Contributors

Carolyn Sharbaugh, M.S., R.D.
Consultant

Denise Sofka, M.P.H., R.D.
DHHS Health Resources and Services Administration
Maternal and Child Health Bureau

Lori Roth-Yousey, M.P.H., R.D., L.N., Consultant

WADSWORTH

THOMSON LEARNING

Australia • Canada • Mexico • Singapore • Spain
United Kingdom • United States

PUBLISHER: Peter Marshall
DEVELOPMENT EDITOR: Elizabeth Howe
ASSISTANT EDITOR: John Boyd
EDITORIAL ASSISTANT: Andrea Kesterke
MARKETING MANAGER: Jennifer Somerville
ADVERTISING PROJECT MANAGER: Stacey Purviance
PROJECT MANAGER: Sandra Craig
PRINT/MEDIA BUYER: Barbara Britton
PERMISSIONS EDITOR: Robert Kauser
DESIGN AND PRODUCTION: Ann Borman
COPY EDITORS: Ben Shriver; Cheryl Welms,
Ann Whetstone
ILLUSTRATOR: Stan Maddock
INDEX: Terry Casey
COVER IMAGES: Photo Disc
COMPOSITOR: Parkwood Composition
PRINTER: Quebecor World, Iowa

COPYRIGHT © 2002 Wadsworth Group.
Wadsworth is an imprint of the Wadsworth Group, a
division of Thomson Learning, Inc. Thomson Learning™ is a
trademark used herein under license.

ALL RIGHTS RESERVED. No part of this work covered by the
copyright hereon may be reproduced or used in any form or by
any means—graphic, electronic, or mechanical, including but not
limited to photocopying, recording, taping, Web distribution,
information networks, or information storage and retrieval
systems—without the written permission of the publisher.

Printed in the United States of America
2 3 4 5 6 7 05 04 03 02

For more information about our products, contact us at:
Thomson Learning Academic Resource Center
1-800-423-0563

For permission to use material from this text, contact us by:
Phone: 1-800-730-2214
Fax: 1-800-730-2215
Web: <http://www.thomsonrights.com>

Wadsworth/Thomson Learning
10 Davis Drive
Belmont, CA 94002-3098
USA

ASIA
Thomson Learning
60 Albert Street, #15-01
Albert Complex
Singapore 189969

AUSTRALIA
Nelson Thomson Learning
102 Dodds Street
South Melbourne, Victoria 3205
Australia

CANADA
Nelson Thomson Learning
1120 Birchmount Road
Toronto, Ontario M1K 5G4
Canada

EUROPE/MIDDLE EAST/AFRICA
Thomson Learning
Berkshire House
168-173 High Holborn
London WC1V7AA
United Kingdom

LATIN AMERICA
Thomson Learning
Seneca, 53
Colonia Polanco
11560 Mexico D.F.
Mexico

SPAIN
Paraninfo Thomson Learning
Calle/Magallanes, 25
28015 Madrid, Spain

Library of Congress Cataloging-in-Publication Data
Brown, Judith E.

Nutrition through the life cycle / by Judith E. Brown with Janet S. Isaacs . . . [et.al.].
p.cm.

Includes bibliographic references and index.

ISBN 0-534-58986-3

I. Nutrition. 2. Children—Nutrition. 3. Aged—Nutrition. I. Isaacs, Janet S. II. Title

QP141 .B8742002
612.3'9—dc21

2001046932

The Dietary Reference Intakes (DRI) include two sets of values that serve as goals for nutrient intake—Recommended Dietary Allowances (RDA) and Adequate Intakes (AI). The RDA reflect the average daily amount of a nutrient considered adequate to meet the needs of most healthy people. If there is insufficient evidence to determine an RDA, an AI is set. AI are more tentative than RDA, but both may be used as goals for nutrient intakes.

1997–2001 Recommended Dietary Allowances (RDA) and Adequate Intakes (AI)

Age (yr)	Vitamins											
	Thiamin RDA (mg/day)	Riboflavin RDA (mg/day)	Niacin RDA (mg/day) ^a	Biotin AI (μg/day)	Pantothenic acid AI (mg/day)	Vitamin B ₆ RDA (mg/day)	Folate RDA (μg/day)	Vitamin B ₁₂ RDA (μg/day)	Choline AI (mg/day)	Vitamin C RDA (mg/day)	Vitamin A RDA (μg/day) ^c	Vitamin D AI (μg/day) ^d
Infants												
0–5	0.2	0.3	2	5	1.7	0.1	65	0.4	125	40	400	5
6–11	0.3	0.4	4	6	1.8	0.3	80	0.5	150	50	500	5
Children												
1–3	0.5	0.5	6	8	2	0.5	150	0.9	200	15	300	5
4–8	0.6	0.6	8	12	3	0.6	200	1.2	250	25	400	5
Males												
9–13	0.9	0.9	12	20	4	1.0	300	1.8	375	45	600	5
14–18	1.2	1.3	16	25	5	1.3	400	2.4	550	75	900	5
19–30	1.2	1.3	16	30	5	1.3	400	2.4	550	90	900	5
31–50	1.2	1.3	16	30	5	1.3	400	2.4	550	90	900	5
51–70	1.2	1.3	16	30	5	1.7	400	2.4	550	90	900	10
>70	1.2	1.3	16	30	5	1.7	400	2.4	550	90	900	15
Females												
9–13	0.9	0.9	12	20	4	1.0	300	1.8	375	45	600	5
14–18	1.0	1.0	14	25	5	1.2	400	2.4	400	65	700	5
19–30	1.1	1.1	14	30	5	1.3	400	2.4	425	75	700	5
31–50	1.1	1.1	14	30	5	1.3	400	2.4	425	75	700	5
51–70	1.1	1.1	14	30	5	1.5	400	2.4	425	75	700	10
>70	1.1	1.1	14	30	5	1.5	400	2.4	425	75	700	15
Pregnancy												
<18	1.4	1.4	18	30	6	1.9	600	2.6	450	80	750	5
19–30	1.4	1.4	18	30	6	1.9	600	2.6	450	85	770	5
31–50	1.4	1.4	18	30	6	1.9	600	2.6	450	85	770	5
Lactation												
<18	1.4	1.6	17	35	7	2.0	500	2.8	550	115	1200	5
19–30	1.4	1.6	17	35	7	2.0	500	2.8	550	120	1300	5
31–50	1.4	1.6	17	35	7	2.0	500	2.8	550	120	1300	5

NOTE: For all nutrients, values for infants are AI. The glossary on the inside back cover defines units of nutrient measure.

^a Niacin recommendations are expressed as niacin equivalents (NE), except for recommendations for infants younger than 6 months, which are expressed as preformed niacin.

^b Folate recommendations are expressed as dietary folate equivalents (DFE).

^c Vitamin A recommendations are expressed as retinol activity equivalents (RAE).

^d Vitamin D recommendations are expressed as cholecalciferol and assume an absence of adequate exposure to sunlight.

In addition to the values that serve as goals for nutrient intakes (presented in the table above), the Dietary Reference Intakes (DRI) include a set of values called Tolerable Upper Intake Levels (UL). The UL represent the maximum amount of a nutrient that appears safe for most healthy people to consume on a regular basis.

1997–2001 Tolerable Upper Intake Levels (UL)

Age (yr)	Vitamins								Minerals			
	Niacin (mg/day) ^a	Vitamin B ₆ (mg/day)	Folate (μg/day) ^b	Choline (mg/day)	Vitamin C (mg/day)	Vitamin A (μg/day) ^c	Vitamin D (μg/day)	Vitamin E (mg/day) ^e	Calcium (mg/day)	Phosphorus (mg/day)	Magnesium (mg/day) ^d	Iron (mg/day)
Infants												
0–5	—	—	—	—	—	600	25	—	—	—	—	40
6–11	—	—	—	—	—	600	25	—	—	—	—	40
Children												
1–3	10	30	300	1000	400	600	50	200	2500	3000	65	40
4–8	15	40	400	1000	650	900	50	300	2500	3000	110	40
9–13	20	60	600	2000	1200	1700	50	600	2500	4000	350	40
Adolescents												
14–18	30	80	800	3000	1800	2800	50	800	2500	4000	350	45
Adults												
19–70	35	100	1000	3500	2000	3000	50	1000	2500	4000	350	45
>70	35	100	1000	3500	2000	3000	50	1000	2500	3000	350	45
Pregnancy												
<18	30	80	800	3000	1800	2800	50	800	2500	3500	350	45
19–50	35	100	1000	3500	2000	3000	50	1000	2500	3500	350	45
Lactation												
<18	30	80	800	3000	1800	2800	50	800	2500	4000	350	45
19–50	35	100	1000	3500	2000	3000	50	1000	2500	4000	350	45

^a The UL for niacin and folate apply to synthetic forms obtained from supplements, fortified foods, or a combination of the two.

^b The UL for vitamin A applies to the preformed vitamin only.

^c The UL for vitamin E applies to any form of supplemental α -tocopherol, fortified foods, or a combination of the two.

^d The UL for magnesium applies to synthetic forms obtained from supplements or drugs only.

Vitamins		Minerals												
Vitamin E RDA (mg/day) ^e	Vitamin K AI (μg/day)	Calcium AI (mg/day)	Phosphorus RDA (mg/day)	Magnesium RDA (mg/day)	Iron RDA (mg/day)	Zinc RDA (mg/day)	Iodine RDA (μg/day)	Selenium RDA (μg/day)	Copper RDA (μg/day)	Manganese AI (mg/day)	Fluoride AI (mg/day)	Chromium AI (μg/day)	Molybdenum RDA (μg/day)	
4	2.0	210	100	30	0.27	2	110	15	200	0.003	0.01	0.2	2	
5	2.5	270	275	75	11	3	130	20	220	0.6	0.5	5.5	3	
6	30	500	460	80	7	3	90	20	340	1.2	0.7	11	17	
7	55	800	500	130	10	5	90	30	440	1.5	1.0	15	22	
11	60	1300	1250	240	8	8	120	40	700	1.9	2	25	34	
15	75	1300	1250	410	11	11	150	55	890	2.2	3	35	43	
15	120	1000	700	400	8	11	150	55	900	2.3	4	35	45	
15	120	1000	700	420	8	11	150	55	900	2.3	4	35	45	
15	120	1200	700	420	8	11	150	55	900	2.3	4	30	45	
15	120	1200	700	420	8	11	150	55	900	2.3	4	30	45	
11	60	1300	1250	240	8	8	120	40	700	1.6	2	21	34	
15	75	1300	1250	360	15	9	150	55	890	1.6	3	24	43	
15	90	1000	700	310	18	8	150	55	900	1.8	3	25	45	
15	90	1000	700	320	18	8	150	55	900	1.8	3	25	45	
15	90	1200	700	320	8	8	150	55	900	1.8	3	20	45	
15	90	1200	700	320	8	8	150	55	900	1.8	3	20	45	
15	75	1300	1250	400	27	13	220	60	1000	2.0	3	29	50	
15	90	1000	700	350	27	11	220	60	1000	2.0	3	30	50	
15	90	1000	700	360	27	11	220	60	1000	2.0	3	30	50	
19	75	1300	1250	360	10	14	290	70	1300	2.6	3	44	50	
19	90	1000	700	310	9	12	290	70	1300	2.6	3	45	50	
19	90	1000	700	320	9	12	290	70	1300	2.6	3	45	50	

^e Vitamin E recommendations are expressed as α-tocopherol.

Source: Adapted with permission from the *Dietary Reference Intakes* series, National Academy Press. Copyright 1997, 1998, 2000, 2001, by the National Academy of Sciences. Courtesy of the National Academy Press, Washington, D.C.

Minerals										
Zinc (mg/day)	Iodine (μg/day)	Selenium (μg/day)	Copper (μg/day)	Manganese (mg/day)	Fluoride (mg/day)	Molybdenum (μg/day)	Boron (mg/day)	Nickel (mg/day)	Vanadium (mg/day)	
4	—	45	—	—	0.7	—	—	—	—	
5	—	60	—	—	0.9	—	—	—	—	
7	200	90	1000	2	1.3	300	3	0.2	—	
12	300	150	3000	3	2.2	600	6	0.3	—	
23	600	280	5000	6	10	1100	11	0.6	—	
34	900	400	8000	9	10	1700	17	1.0	—	
40	1100	400	10,000	11	10	2000	20	1.0	1.8	
40	1100	400	10,000	11	10	2000	20	1.0	1.8	
34	900	400	8000	9	10	1700	17	1.0	—	
40	1100	400	10,000	11	10	2000	20	1.0	—	
34	900	400	8000	9	10	1700	17	1.0	—	
40	1100	400	10,000	11	10	2000	20	1.0	—	

NOTE: An Upper Limit was not established for vitamins and minerals not listed and for those age groups listed with a dash (—) because of a lack of data, not because these nutrients are safe to consume at any level of intake. All nutrients can have adverse effects when intakes are excessive.

SOURCE: Adapted with permission from the *Dietary Reference Intakes* series, National Academy Press. Copyright 1997, 1998, 2000, 2001, by the National Academy of Sciences. Courtesy of the National Academy Press, Washington, D.C.

PREFACE

On behalf of the expert authors represented in this text, welcome to the first edition of *Nutrition through the Life Cycle*. May you find the text to represent the innovative, comprehensive, and engaging approach to life cycle nutrition education it is intended to be.

Nutrition through the Life Cycle was developed with the needs of instructors teaching, and students taking, a two-to-four credit course in life cycle nutrition in mind. It is written at a level that assumes students have had an introductory nutrition course. Chapter 1 summarizes key elements of introductory nutrition and gives students who need it a chance to update or renew their knowledge. Subsequent chapters for *Nutrition through the Life Cycle* were developed by a cadre of expert authors who are actively engaged in clinical practice, teaching, or research related to nutrition during specific phases of the life cycle. All of us remained totally dedicated to the goals established for the text at its conception: to make the text comprehensive, logically organized, science-based, and realistic.

Coverage of the life cycle begins with preconceptional nutrition and continues with each major phase of the life cycle through adulthood and the special needs of the elderly. Each of these 18 chapters was developed from a common organizational framework that includes key nutrition concepts, public health statistics, physiological principles, nutritional needs and recommendations, model programs, case studies, and recommended practices. To meet the knowledge needs of students with the variety of career goals represented in many life cycle nutrition courses, we developed two chapters for each life cycle phase.

The first chapter for each life cycle phase covers normal nutrition topics and the second nutrition-related conditions and interventions. Every chapter focuses on scientifically based information and employs the most up-to-date resources and references available. Each chapter ends with a list of electronic

and/or print resources that will lead students to reliable information on scientific and applied aspects of life cycle nutrition.

Overall, the text is intended to give instructors a tool they can happily use to enhance their teaching efforts, and to give students an engaging and rewarding educational experience they will carry with them throughout their lives.

Resources for Students and Instructors

An electronic *Instructor's Manual with Test Bank*, available via the Web, contains a test bank, classroom activities, chapter outlines, and more.

Acknowledgments

Development of *Nutrition through the Life Cycle* was made possible by Peter Marshall, the Publisher of Wadsworth Nutrition titles. His excitement for the project was contagious, and his vision for the text delighted us all. A thousand thanks go out to Beth Howe, the developmental editor on the project, who steadfastly guided us through problem areas while engendering the respect and admiration of all of us. Ann Borman, Senior Production Editor, designed the text and cover. Thanks to her, our unattractive manuscript pages turned miraculously into the text you are holding. We were fortunate to have many other capable Wadsworth professionals contribute to this text, including Jennifer Somerville, Marketing Manager.

Reviewers

Many thanks to the following reviewers whose careful reading and thoughtful comments helped shape this first edition.

Betty Alford
Texas Women's University

Leta Aljadir
University of Delaware

Dea Hanson Baxter
Georgia State University

Shelley Hancock
University of Alabama

Tay Seacord Kennedy
Oklahoma State University

Younghee Kim
Bowling Green State University

Barbara Kirks
California State University, Chico

Kaye Stanek Krogstrand
University of Nebraska

Sally Ann Lederman
Columbia University

Richard Lewis
University of Georgia

Harriet McCoy
University of Arkansas
Cherie Moore
Cuesta College

Sharon McWhinney
Prairie View A&M University

Robert Reynolds
University of Illinois at Chicago

Sharon Nickols-Richardson
Virginia Polytechnic Institute and
State University

Adria Sherman
Rutgers University

Carmen R. Roman-Shriver
Texas Tech University

Joanne Slavin
University of Minnesota

Joanne Spaide
Professor Emeritus University of
Northern Iowa

Diana-Marie Spillman
Miami University,
Oxford Ohio

Wendy Stuhldreher
Slippery Rock University of
Pennsylvania

Anne VanBeber
Texas Christian University

Phyllis Moser-Veillon
University of Maryland

Janelle Walter
Baylor University

Suzy Weems
Stephen F. Austin State University

Kay Wilder
Point Loma Nazarene College

Judith E. Brown, August 2001

CONTENTS IN BRIEF

Preface

Chapter 1

Nutrition Basics 1

Chapter 2

Preconception Nutrition 35

Chapter 3

**Preconception Nutrition
Conditions and Interventions 53**

Chapter 4

Nutrition during Pregnancy 61

Chapter 5

**Nutrition during Pregnancy
Conditions and Interventions 107**

Chapter 6

Nutrition during Lactation 135

Chapter 7

**Nutrition during Lactation
Conditions and Interventions 169**

Chapter 8

Infant Nutrition 191

Chapter 9

**Infant Nutrition
Conditions and Interventions 221**

Chapter 10

**Toddler and
Preschooler Nutrition 241**

Chapter 11

**Toddler and
Preschooler Nutrition
Conditions and Interventions 269**

Chapter 12

**Child and Preadolescent
Nutrition 283**

Chapter 13

**Child and Preadolescent Nutrition
Conditions and Interventions 307**

Chapter 14

**Adolescent Nutrition
Conditions and Interventions 325**

Chapter 15

**Adolescent Nutrition
Conditions and Interventions 355**

Chapter 16

Adult Nutrition 383

Chapter 17

**Adult Nutrition
Conditions and Interventions 409**

Chapter 18

Nutrition and the Elderly 421

Chapter 19

**Nutrition and the Elderly
Conditions and Interventions 451**

Appendix A:

CDC Growth Charts 481

Appendix B:

**BMI Charts for Adults with Silhouettes
489**

Appendix C:

**Nutrient Intakes of Adults
Aged 70 and Older 490**

Glossary 491

Index 499

CONTENTS

Preface

Chapter 1 NUTRITION BASICS I

INTRODUCTION 2

PRINCIPLES OF THE
SCIENCE OF NUTRITION 2

Essential and Nonessential Nutrients 3 Dietary Intake
Standards 3 Carbohydrates 3 Protein 5 Fats 6
Vitamins 8 Other Substances in Food 11 Minerals 11
Water 19

NUTRITIONAL ASSESSMENT 29

Community-Level Assessment 29 Individual-Level
Nutritional Assessment 30 Dietary Assessment 30
Anthropometric Assessment 30 Biochemical Assessment 31

PUBLIC FOOD AND NUTRITION PROGRAMS 31

NATIONWIDE PRIORITIES FOR
IMPROVEMENTS IN NUTRITIONAL HEALTH 31

Food Intake Recommendations 32

Chapter 2 PRECONCEPTION NUTRITION 35

INTRODUCTION 36

PRECONCEPTION OVERVIEW 36

2010 Nutrition Objectives for the Nation Related to the
Preconceptional Period 36

REPRODUCTIVE PHYSIOLOGY 37

Female Reproductive System 37 Male Reproductive
System 40

SOURCES OF DISRUPTIONS IN FERTILITY 40

NUTRITION-RELATED DISRUPTIONS
IN FERTILITY 41

Undernutrition and Fertility 41 Body Fat, Weight, and
Fertility 42 Weight Loss and Fertility 42 Weight Loss in
Males and Infertility 43 Exercise and Infertility 43 Diet
and Fertility 43 Vegetarian Diets and Fertility 43
Carotenemia and Fertility 44 Caffeine and Fertility 44
Alcohol and Fertility 44 Other Factors Contributing to
Infertility in Males 45

NUTRITION AND CONTRACEPTIVES 46

Oral Contraceptives and Nutritional Status 46
Contraceptive Injections 47 Contraceptive Implants 47
Contraceptive Patches 47

OTHER PRECONCEPTIONAL
NUTRITION CONCERNS 47

Very Early Pregnancy Nutrition Exposures 47 Folate Status
Prior to Conception and Neural Tube Defects 47
Recommended Dietary Intakes for Preconceptional Women 48
Herbal Remedies for Fertility-Related Problems 48

MODEL PRECONCEPTIONAL NUTRITION
PROGRAMS 49

Preconceptional Benefits of WIC 49
Decreasing Iron Deficiency in Preconceptional Women in
Indonesia 49 Preconception Care 49

Chapter 3 PRECONCEPTION NUTRITION Conditions and Interventions 53

INTRODUCTION 54

PREMENSTRUAL SYNDROME 54

Caffeine Intake and PMS 54 Exercise and Stress
Reduction 54 Magnesium, Calcium, and Vitamin B6
Supplements and PMS Symptoms 54

OBESITY AND FERTILITY 55

Central Body Fat and Fertility 55

EATING DISORDERS AND FERTILITY 56

Interventions for Women with Anorexia Nervosa or Bulimia
Nervosa 56

DIABETES MELLITUS PRIOR TO PREGNANCY 56

What Is Insulin Resistance? 57 Management of Type 2
Diabetes 57 Reducing the Risk of Type 2 Diabetes 57

POLYCYSTIC OVARY SYNDROME 58

Nutrition Interventions for Women with PCOS 58

INBORN ERRORS OF METABOLISM 58

PKU (Phenylketonuria) 58 Nutrition Intervention for
Women with PKU 58 Celiac Disease 59 Nutrition
Management of Women with Celiac Disease 59

Chapter 4 NUTRITION DURING PREGNANCY 61

INTRODUCTION 62

THE STATUS OF PREGNANCY OUTCOMES 62

Infant Mortality 62 Health Objectives for the Year 2010 66

PHYSIOLOGY OF PREGNANCY 66

Maternal Physiology **67** Normal Physiological Changes During Pregnancy **67** Common Health Problems During Pregnancy **71** The Placenta **72**

EMBRYONIC AND FETAL GROWTH AND DEVELOPMENT 73

Critical Periods of Growth and Development **74** Fetal Body Composition **76** Variation in Fetal Growth **76** Nutrition, Miscarriages, and Preterm Delivery **78** The Fetal Origins Hypothesis of Chronic Disease Risk **78** Other Inutero Exposures That May Be Related to Later Disease Risk **79** Limitations of the Fetal Origins Hypothesis **79**

PREGNANCY WEIGHT GAIN 80

Pregnancy Weight Gain Recommendations **80** Composition of Weight Gain in Pregnancy **81** Postpartum Weight Retention **83**

NUTRITION AND THE COURSE AND OUTCOME OF PREGNANCY 83

Famine and Pregnancy Outcome **83** Contemporary Prenatal Nutrition Research Results **84** Energy Requirement in Pregnancy **84** Carbohydrate Intake during Pregnancy **86** Alcohol and Pregnancy Outcome **86** Protein Requirement **87** Vegetarian Diets in Pregnancy **88** Maternal Intake of Essential Fatty Acids and Pregnancy Outcome **89** The Need for Water during Pregnancy **89** Folate and Pregnancy Outcome **90** Folate and Congenital Abnormalities **90** Vitamin A and Pregnancy Outcome **92** Vitamin D Requirement **92** Calcium Requirements in Pregnancy **92** Iron Status and the Course and Outcome of Pregnancy **93** Zinc Requirement in Pregnancy **95** Iodine and Pregnancy Outcome **96** The Need for Sodium during Pregnancy **96** Caffeine Use in Pregnancy **96** Healthy Diets for Pregnancy **96** Effect of Taste and Smell Changes during Pregnancy on Dietary Intake **97** Pica **97** Assessment of Dietary Intake during Pregnancy **98** Vitamin and Mineral Supplementation during Pregnancy **98** Herbal Remedies and Pregnancy **99** Exercise and Pregnancy Outcome **100** Food Safety Issues during Pregnancy **100**

MODEL NUTRITION PROGRAMS FOR RISK REDUCTION IN PREGNANCY 101

The Montreal Diet Dispensary **101** The WIC Program **101**

Chapter 5

NUTRITION DURING PREGNANCY

Conditions and Interventions 107

INTRODUCTION 108**HYPERTENSIVE DISORDERS OF PREGNANCY 108**

Chronic Hypertension **108** Gestational Hypertension **109** Preeclampsia-Eclampsia **109** Preeclampsia Case Presentation **112** Nutritional Recommendations and Interventions for Preeclampsia **112**

DIABETES IN PREGNANCY 113

Gestational Diabetes **114** Consequences of Poorly Controlled Gestational Diabetes **114** Risk Factors for Gestational Diabetes **115** Diagnosis of Gestational Diabetes **115** Treatment of Gestational Diabetes **116** Presentation of a Case Study **116** Exercise Benefits and Recommendations **118** Nutritional Management of Women with Gestational Diabetes **118** Consumption of Low-Glycemic-Index Foods **120** Postpartum Follow-up **121** Prevention of Gestational Diabetes during Pregnancy **121** Type I Diabetes during Pregnancy **121**

MULTIFETAL PREGNANCIES 121

Background Information about Multiple Fetuses **123** Risks Associated with Multifetal Pregnancy **124** Interventions and Services for Risk Reduction **124** Nutrition and the Outcome of Multifetal Pregnancy **125** Dietary Intake in Twin Pregnancy **126** Nutritional Recommendations for Women with Multifetal Pregnancy **126** Case Example **127**

HIV/AIDS DURING PREGNANCY 127

Treatment of HIV/AIDS **127** Consequences of HIV/AIDS during Pregnancy **127** Nutritional Factors and HIV/AIDS During Pregnancy **128** Nutritional Management of Women with HIV/AIDS during Pregnancy **129**

EATING DISORDERS IN PREGNANCY 129

Consequences of Eating Disorders in Pregnancy **129** Treatment of Women with Eating Disorders during Pregnancy **130** Nutritional Interventions for Women with Eating Disorders **130**

NUTRITION AND ADOLESCENT PREGNANCY 130

Dietary Recommendations for Pregnant Adolescents **131**

EVIDENCE-BASED PRACTICE 131

Chapter 6

NUTRITION DURING LACTATION 135

INTRODUCTION 136**BENEFITS OF BREASTFEEDING 136**

Breastfeeding Benefits for Mothers **136** Breastfeeding Benefits for Infants **136**

BREASTFEEDING GOALS FOR THE UNITED STATES 138**LACTATION PHYSIOLOGY 139**

Mammary Gland Anatomy **139** Functional Unit of the Mammary Gland **139** Mammary Gland Development **139** Lactogenesis **140** Hormonal Control of Lactation **140** Secretion of Milk **141** The Letdown Reflex **142**

BREAST MILK SUPPLY AND DEMAND 142

Can Women Make Enough Milk? **142** Does the Size of the Breast Limit a Woman's Ability to Nurse Her Infant? **142** Is Feeding Frequency Related to the Amount of Milk a Woman Can Make? **143** Pumping or Expressing Milk **144**

HUMAN MILK COMPOSITION 144

Colostrum **144** Water **144** Energy **144** Lipids **145**
 Protein **145** Milk Carbohydrates **146** Fat-Soluble
 Vitamins **146** Water-Soluble Vitamins **146** Minerals in
 Human Milk **147** Taste of Human Milk **147**

THE BREASTFEEDING INFANT **148**

Optimal Duration of Breastfeeding **148** Reflexes **148**
 Breastfeeding Positioning **148** Identifying Hunger and
 Satiety **148** Feeding Frequency **149** Identifying
 Breastfeeding Malnutrition **149** Infant Supplements **149**
 Tooth Decay **150**

MATERNAL DIET **151**

Energy and Nutrient Needs **151**

MATERNAL ENERGY BALANCE AND MILK COMPOSITION **152**

Weight Loss during Breastfeeding **152** Exercise and
 Breastfeeding **152** Diet Supplements **153** Fluids **154**
 Vegetarian Diets **154** Herbal Preparations **154**

FACTORS INFLUENCING BREASTFEEDING INITIATION AND DURATION **154**

BREASTFEEDING PROMOTION, FACILITATION, AND SUPPORT **156**

Role of the Health Care System in Supporting Breastfeeding
156 Lactation Support after Discharge **159** The
 Workplace **159** The Community **160**

PUBLIC FOOD AND NUTRITION PROGRAMS **160**

National Breastfeeding Policy **160** USDA WIC
 Program **161**

MODEL BREASTFEEDING PROMOTION PROGRAMS **162**

WIC National Breastfeeding Promotion Project—Loving
 Support Makes Breastfeeding Work **162** Wellstart
 International **162** Conclusion **163**

Chapter 7 NUTRITION DURING LACTATION Conditions and Interventions **169**

INTRODUCTION **170**

COMMON BREASTFEEDING CONDITIONS **170**

Sore Nipples **170** Letdown Failure **170** Overactive
 Letdown **170** Engorgement **170** Plugged Duct **172**
 Infection **172**

MATERNAL MEDICATIONS **172**

Herbal Remedies **174** Alcohol **175** Nicotine (Smoking
 Cigarettes) **176** Marijuana **176** Caffeine **177** Other
 Drugs of Abuse **177**

HYPERBILIRUBINEMIA AND JAUNDICE **177**

Pathological Jaundice **177** Normal Newborn Jaundice **178**
 Treatment for Jaundice **178** Hyperbilirubinemia and
 Breastfeeding **178** Breast Milk Jaundice Syndrome **179**

BREASTFEEDING MULTIPLES **180**

INFANT ALLERGIES **180**

Food Intolerance **181**

HUMAN MILK AND PRETERM INFANTS **181**

MEDICAL CONTRAINDICATIONS

TO BREASTFEEDING **183**

Breastfeeding and HIV Infection **183** Recommendations **184**

HUMAN MILK COLLECTION AND STORAGE **184**

Milk Banking **185**

MODEL PROGRAMS

Loving Support for a Bright Future Breastfeeding Support
 Kits **186** The Rush Mothers' Milk Club **186**

Chapter 8 INFANT NUTRITION **191**

INTRODUCTION **192**

ASSESSING NEWBORN HEALTH **192**

Birthweight As an Outcome **192** Infant Mortality **192**
 Combating Infant Mortality **193** Standard Newborn
 Assessment Tests **193**

INFANT DEVELOPMENT **194**

Motor Development **194** Critical Periods **195** Cognitive
 Development **195** Genetics and Development **196**
 Digestion and Development **196** Parenting **197**

ENERGY AND NUTRIENT NEEDS **197**

Caloric Needs **197** Protein Needs **197** Fats **198**
 Metabolic Rate, Calories, Fats, and Protein—How Do They
 All Tie Together? **198** Other Nutrients **199**

PHYSICAL GROWTH **200**

Why Is It Important to Track Infant Growth? **200**
 Interpretation of Growth Data **200**

FEEDING IN EARLY INFANCY **202**

Breast Milk and Formula **202**
 Cow's Milk During Infancy **203**

DEVELOPMENT OF INFANT FEEDING SKILLS **203**

The Importance of Infant Feeding Position **204** Preparing
 for Drinking from a Cup **205** Food Texture and
 Development **206** What Infants Eat **206** Water **208**
 How Much is Enough? **209** How Infants Learn Food
 Preferences **209** Billy: A Hard-to-Feed Infant **210**

NUTRITION GUIDANCE **210**

Inappropriate and Unsafe Food Choices **210** Infants and
 Exercise **211** Supplements for Infants **211**

COMMON NUTRITIONAL PROBLEMS AND CONCERNS **211**

Failure to Thrive **211** FTT Nutrition Intervention **212**
 Colic **212** Iron-Deficiency Anemia **213** Constipation and
 Diarrhea **213** Prevention of Baby Bottle Caries and Ear
 Infections **213** Food Allergies and Intolerances **214** How
 Parents Respond to Suspected Food Allergies or Intolerance
214 Lactose Intolerance **214**

CROSS-CULTURAL CONSIDERATIONS **215**

VEGETARIAN DIETS 215**NUTRITION INTERVENTION FOR RISK REDUCTION 216**

Model Program: Newborn Screening and Expanded Newborn Screening **216** WIC **216**

Chapter 9**INFANT NUTRITION****Conditions and Interventions 221****INTRODUCTION 222****INFANTS AT RISK 222**

Families of Infants with Special Health Care Needs **223**

ENERGY AND NUTRIENT NEEDS 223

Energy Needs **223** Protein Requirements **223** Fats **224**
Vitamins and Minerals **224**

GROWTH 225

Growth in Preterm Infants **225** Does Intrauterine Growth Predict Growth Outside? **226** Interpretation of Growth **227**

COMMON NUTRITION PROBLEMS 227

Nutrition Risks and Development **228**

PRETERM INFANTS AND INFANTS**WITH SPECIAL HEALTH CARE NEEDS 229****SEVERE PRETERM BIRTH 229**

Delivering Nutrients **230** How Sick Babies Are Fed **230**
What to Feed Preterm Infants **231** Preterm Infants and Feeding **232**

INFANTS WITH CHRONIC ILLNESS 232

Infants with Spina Bifida **234** Infants with Genetic Disorders **234**

FEEDING PROBLEMS 235

Do Infant Feeding Guidelines Apply? **235**

NUTRITION INTERVENTIONS 237**NUTRITION SERVICES 238****Chapter 10****TODDLER AND PRESCHOOLER NUTRITION 241****INTRODUCTION 242**

Definitions of the Life Cycle Stage **242** Importance of Nutrition **242**

TRACKING TODDLER AND PRESCHOOLER HEALTH 242

Healthy People 2010 **242**

NORMAL GROWTH AND DEVELOPMENT 242

The 2000 CDC Growth Charts **243** Common Problems with Measuring and Plotting Growth Data **244**

PHYSIOLOGICAL AND COGNITIVE DEVELOPMENT 244

Toddlers **244** Preschool Age Children **247** Temperament Differences **249** Food Preference Development, Appetite, and Satiety **249**

ENERGY AND NUTRIENT NEEDS 250

Energy Needs **251** Protein **251** Vitamins and Minerals **252**

COMMON NUTRITION PROBLEMS 252

Iron Deficiency Anemia **252** Dental Caries **253**
Constipation **254** Lead Poisoning **254** Food Security **255**
Food Safety **255**

PREVENTION OF NUTRITION-RELATED DISORDERS 255

Overweight and Obesity in Toddlers and Preschoolers **255**
Prevention and Treatment of Overweight and Obesity **256**
Nutrition and Prevention of Cardiovascular Disease in Toddlers and Preschoolers **256** Vitamin and Mineral Supplements **257** Herbal Supplements **257**

DIETARY AND PHYSICAL ACTIVITY RECOMMENDATIONS 258

Dietary Guidelines **258** Food Guide Pyramid **258**
Recommendations for Intake of Iron, Fiber, Fat, and Calcium **259** Fluids **260** Recommended vs. Actual Food Intake **261** Cross-Cultural Considerations **262** Vegetarian Diets **262** Child Care Nutrition Standards **263** Physical Activity Recommendations **263**

NUTRITION INTERVENTION FOR RISK REDUCTION 264

Model Program **264**

PUBLIC FOOD AND NUTRITION PROGRAMS

WIC **264** WIC's Farmers' Market Nutrition Program **265**
Head Start and Early Head Start **265** Food Stamps **265**

Chapter 11**TODDLER AND PRESCHOOLER NUTRITION****Conditions and Interventions 269****INTRODUCTION 270****WHO ARE CHILDREN WITH SPECIAL HEALTH CARE NEEDS? 270****NUTRITION NEEDS OF TODDLERS AND PRESCHOOLERS WITH CHRONIC CONDITIONS 271****GROWTH ASSESSMENT 272****FEEDING PROBLEMS 273**

Behavioral Feeding Problems **273**

NUTRITION-RELATED CONDITIONS 274

Failure to Thrive **275** Toddler Diarrhea and Celiac Disease **275** Muscle Coordination Problems **275** Pulmonary Problems **277** Developmental Delay and Evaluations **277** Food Allergies and Intolerance **278**

DIETARY SUPPLEMENTS AND HERBAL REMEDIES 278**SOURCES OF NUTRITION SERVICES 279****Chapter 12****CHILD AND PREADOLESCENT NUTRITION 283****INTRODUCTION 284**

Definitions of the Life Cycle Stage **284** Importance of Nutrition **284**

TRACKING CHILD AND PREADOLESCENT HEALTH 284

Healthy People 2010 **284**

NORMAL GROWTH AND DEVELOPMENT 285

The 2000 CDC Growth Charts **285**

PHYSIOLOGICAL AND COGNITIVE DEVELOPMENT OF SCHOOL-AGE CHILDREN 286

Physiological Development **286** Cognitive Development **287** Development of Feeding Skills **288**

ENERGY AND NUTRIENT NEEDS OF SCHOOL-AGE CHILDREN 290

Energy Needs **290** Protein **290** Vitamins and Minerals **290**

COMMON NUTRITION PROBLEMS 290

Iron Deficiency **290** Dental Caries **290**

PREVENTION OF NUTRITION-RELATED DISORDERS IN SCHOOL-AGE CHILDREN 291

Overweight and Obesity in School-Age Children **291** Nutrition and Prevention of Cardiovascular Disease in School-Age Children **294** The Child and Adolescent Trial for Cardiovascular Health (CATCH) **294** The Dietary Intervention Study in Children (DISC) **294** Vitamin and Mineral Supplements **295**

DIETARY RECOMMENDATIONS 295

Recommendations for Intake of Iron, Fiber, Fat, and Calcium **295** Recommended vs. Actual Food Intake **297** Cross-Cultural Considerations **298** Vegetarian Diets **298**

PHYSICAL ACTIVITY RECOMMENDATIONS 298

Recommendations vs. Actual **298** Determinants of Physical Activity **299** Organized Sports **300**

NUTRITION INTERVENTION FOR RISK REDUCTION 300

Nutrition Education **300** Nutrition Integrity in Schools **301** Model Programs **301**

PUBLIC FOOD AND NUTRITION PROGRAMS 301

The National School Lunch Program **302** School Breakfast Program **303** Summer Food Service Program **304** Nutrition Education and Training Program (NET) **304**

Chapter 13**CHILD AND PREADOLESCENT NUTRITION****Conditions and Interventions 307****INTRODUCTION 308****“CHILDREN ARE CHILDREN FIRST”—WHAT DOES THAT MEAN? 308****NUTRITION REQUIREMENTS OF CHILDREN WITH SPECIAL HEALTH CARE NEEDS 308**

Energy Needs **309** Protein Needs **309** Other Nutrients **309**

GROWTH ASSESSMENT 310

Growth Assessment and Interpretation in Children with Chronic Conditions **310** Body Composition and Growth **310**

NUTRITION RECOMMENDATIONS 311

Methods of Meeting Nutritional Requirements **312** Fluids **313**

NUTRITION-RELATED CONDITIONS 314

Eating and Feeding Problems in Children with Special Health Care Needs **314**

DIETARY SUPPLEMENTS AND HERBAL REMEDIES 319**SOURCES OF NUTRITION SERVICES 319**

Child Nutrition Program of the U.S. Department of Agriculture (USDA) **319** Maternal and Child Health Block Program of the U.S. Department of Health and Human Services (HHS) **319** Public Schools Regulations: 504 Accommodation and IDEA **320** Nutrition Intervention Model Program **321**

Chapter 14**ADOLESCENT NUTRITION 325****INTRODUCTION 326****NUTRITIONAL NEEDS IN A TIME OF CHANGE 326****NORMAL PHYSICAL GROWTH AND DEVELOPMENT 326**

Changes in Weight, Body Composition, and Skeletal Mass **328**

NORMAL PSYCHOSOCIAL DEVELOPMENT 329

HEALTH AND EATING-RELATED BEHAVIORS DURING ADOLESCENCE 330

Vegetarian Diets **332** Dietary Intake and Adequacy among Adolescents **333**

ENERGY AND NUTRIENT REQUIREMENTS OF ADOLESCENTS 334

Energy **335** Protein **336** Carbohydrates **336** Dietary Fiber **336** Fat **337** Calcium **337** Iron **338** Zinc **339** Folate **339** Vitamin A **340** Vitamin E **340** Vitamin C **340**

NUTRITION SCREENING, ASSESSMENT, AND INTERVENTIONS 340

Nutrition Education and Counseling **345**

PHYSICAL ACTIVITY AND SPORTS 346

Factors Affecting Physical Activity **346**

PROMOTING HEALTHY EATING AND PHYSICAL ACTIVITY BEHAVIORS 348

Effective Nutrition Messages for Youth **348** Parent Involvement **349** School Programs **349** Community Involvement in Nutritionally Supportive Environments **351** Model Nutrition Program **351**

DISCUSSION POINTS 351

Chapter 15

ADOLESCENT NUTRITION

Conditions and Interventions 355

INTRODUCTION 356

OVERWEIGHT AND OBESITY 356

Health Implications of Adolescent Overweight **356**

SPECIAL CONCERNS AMONG ADOLESCENT ATHLETES 357

Fluids and Hydration **357** Special Dietary Practices **359** Dietary Supplements **360**

ADOLESCENT PREGNANCY 360

Energy and Nutrient Needs **361** Vitamin and Mineral Supplements **362** Pregnancy Weight Gain **362**

SUBSTANCE USE 363

DIETARY SUPPLEMENTS 364

Vitamin-Mineral Supplements **364** Herbal Remedies **364**

IRON DEFICIENCY ANEMIA 365

HYPERTENSION 365

HYPERLIPIDEMIA 366

EATING DISORDERS 367

The Continuum of Eating Concerns and Disorders **367** Prevalence of Eating Disorders **367** Anorexia Nervosa **367** Bulimia Nervosa **367** Binge Eating Disorder **368** Other Disordered Eating Behaviors **369** Dieting Behaviors **370** Body Dissatisfaction **370** Etiology of Eating Disorders **370** Treating Eating Disorders **372** Preventing Eating Disorders

372 Eating Disorders Among Adolescents: Summing Things Up **373**

CHILDREN AND ADOLESCENTS WITH CHRONIC HEALTH CONDITIONS 373

Chapter 16

ADULT NUTRITION 383

INTRODUCTION 384

Definition of Adulthood in the Lifecycle **384** Importance of Nutrition **384**

YEAR 2010 HEALTH OBJECTIVES 384

PHYSIOLOGICAL CHANGES OVERALL 384

Physiological Changes in Males: Climacteric **385** Physiological Changes in Females: Menopause **385** Nutritional Remedies for Symptoms of Menopause **385** Benefits of Phytoestrogens in Soy Foods **386** Disadvantages of Adding Soy to the Diet **387** Other Alternatives **387**

COMMON NUTRITIONAL CONCERNS: MAINTAINING A HEALTHY BODY 387

Energy for Weight Management **387** Determining Energy Needs **388** Calculations for Body Weight **389** Energy for Weight Change **389** Actual Energy Intake **389** Achieving Wellness: Linking Food, Nutrition, and Disease **389** Diet and Health **391**

DIETARY RECOMMENDATIONS 391

Dietary Recommendations to Combat Nutritional Concerns **392** Food Advice **392** The Pyramid **393** Food Advice Reflects Cultural Food Patterns **394** Alcohol: Food, Drug, and Nutrient **394** Fluids **395** Diuretic Effects of Caffeine and Alcohol **396** International Guidance Related to Fluids **396**

NUTRIENT RECOMMENDATIONS 397

Nutrients of Public Health Concern **397** Actual Intake of Food **399** Supplements: Vitamins and Minerals **399** Supplements: Herbal Products **399** Cross-Cultural Considerations **400** Cross-Cultural Dietary Guidance **401** Vegetarian Diets **402**

PHYSICAL ACTIVITY RECOMMENDATIONS 403

NUTRITION INTERVENTION FOR RISK REDUCTION 403

A Model Health-Promotion Program **403** Public Food and Nutrition Programs **404** Nutrition and Health Promotion **404**

Chapter 17

ADULT NUTRITION

Conditions and Interventions 409

INTRODUCTION 410

IMPORTANCE OF NUTRITION 410

HEART DISEASE/CARDIOVASCULAR DISEASES (CVD) 411

Definition 411 Prevalence 411 Etiology 411 Effects 412 Risk Factors 412 Nutritional Remedies 413

OVERWEIGHT AND OBESITY 417

Definition 417 BMI Charts 417 Prevalence 418 Etiology 418 Effects 418 Nutrition-Related Risk Factors 418

Chapter 18

NUTRITION AND THE ELDERLY 421

INTRODUCTION 422

What Counts As Old? 422 Food Matters: Nutrition Contributes to a Long and Healthy Life 422

A PICTURE OF THE AGING POPULATION: RELEVANT VITAL STATISTICS 423

Global Population Trends: Life Expectancy and Life Span 423 Nutrition: A Component of Health Objectives for the Older Adult Population 424

THEORIES OF AGING 425

Programmed Aging 425 Wear and Tear Theories of Aging 425 Calorie Restriction and Longevity 426

PHYSIOLOGICAL CHANGES 426

Body Composition Changes 426 Changing Sensual Awareness: Taste and Smell, Appetite and Thirst 428

NUTRITIONAL RISK FACTORS 429

DIETARY RECOMMENDATIONS 431

Food-based Guidance: The Pyramid 431 Actual Food Group Intake 431 Eating Occasions 432

NUTRIENT RECOMMENDATIONS 433

Energy Intake: A Measure of Macronutrients 433 Nutrient Recommendations: Macro- and Micronutrients of Concern 433 Macronutrients 433 Recommendations for Fluid 436 Micronutrients: Vitamins and Minerals 436 Age-Associated Changes in Metabolism: Nutrients of Concern 436 Low Dietary Intake: Nutrients of Concern 438 Micronutrient Supplements: Why, When, What? 439 Dietary Supplements and Functional Foods 440 "Non-nutrient" Intakes: Special Interest for Older Adults 441 Nutrient Recommendations: Using the Food Label 441 Cross-cultural Considerations in Making Dietary Recommendations 442

PHYSICAL ACTIVITY RECOMMENDATIONS 433

Exercise Guidelines 443

NUTRITION POLICY AND INTERVENTION FOR RISK REDUCTION 444

Nutrition Education 444 Model Programs Exemplify Intervention Goals 445

COMMUNITY FOOD AND NUTRITION PROGRAMS 446

Elderly Nutrition Programs 446 Senior Nutrition Program 446 The Promise of Prevention: Health Promotion 447

Chapter 19

NUTRITION AND THE ELDERLY

Conditions and Interventions 451

INTRODUCTION 452

Importance of Nutrition 452

NUTRITION AND HEALTH 452

NUTRITION-RELATED CONDITIONS 452

Heart Disease 452 Stroke 453 Hypertension 454

CANCERS 455

Definition 455 Prevalence 455 Etiology 455 Effects 455 Risk Factors 456 Nutritional Remedies 456

DIABETES 457

Definition 457 Prevalence 457 Etiology 457 Effects 458 Risk Factors 458 Nutritional Remedies 458

INSULIN RESISTANCE SYNDROME (METABOLIC SYNDROME) 460

Definition 460 Prevalence 460 Etiology 460 Effects 460 Risk Factors 460 Nutritional Remedies 461

OSTEOPOROSIS 461

Definition 461 Prevalence 461 Etiology 462 Effects 462 Risk Factors 463 Nutritional Remedies 463 Other Issues Impacting Nutritional Remedies 464

ORAL HEALTH 465

Definition 465 Prevalence 465 Etiology and Effects 465 Risk Factors 465 Nutritional Remedies 466

GASTROINTESTINAL DISEASES 466

Gastroesophageal Reflux Disease (GERD) 466 Constipation 466 Inflammatory Diseases 467 Complementary and Traditional Medications 469

MENTAL HEALTH AND COGNITIVE DISORDERS 469

Definition 469 Prevalence 469 Etiology 469 Effects 470 Nutritional Remedies 470

OBESITY AND LOW BODY WEIGHT/UNDERWEIGHT 470

Obesity 470 Low Body Weight/Underweight 470

VITAMIN B₁₂ DEFICIENCY 471

Definition and Etiology 471 Pernicious Anemia 471 Inadequate Dietary Intake or Absorption (Protein-bound Vitamin B₁₂ Deficiency) 472

FOODBORNE ILLNESS AND FOOD SAFETY 473Definition **473** Prevalence **473** Etiology/Effects **473**Risk Factors **473** Nutritional Remedies **474****DEHYDRATION 474**Definition **474** Prevalence **474** Etiology **474** Effects**475** Dehydration at End-of-Life **475** Nutritional Remedies **475****BEREAVEMENT 476****Appendix A:****CDC Growth Charts 481****Appendix B: BMI****Charts for Adults with Silhouettes 489****Appendix C:****Nutrient Intakes of Adults
Aged 70 and Older 490**

Glossary 491

Index 499

CHAPTER 1



Photo Disc

To be surprised, to wonder, is to begin to understand.

José Ortega y Gasset

NUTRITION BASICS

Prepared by **Judith E. Brown**

CHAPTER OUTLINE

- Introduction
- Principles of the Science of Nutrition
- Nutritional Assessment
- Public Food and Nutrition Programs
- Nationwide Priorities for Improvements in Nutritional Health

KEY NUTRITION CONCEPTS

- 1 Nutrition is the study of foods, their nutrients and other chemical constituents, and the effects of food constituents on health.
- 2 Nutrition is an interdisciplinary science.
- 3 Nutrition recommendations for the public change as new knowledge about nutrition and health relationships is gained.
- 4 At the core of the science of nutrition are principles that represent basic truths and serve as the foundation of our understanding about nutrition.