

WERNER W. K. HOEGER • SHARON A. HOEGER
AMBER L. FAWSON • CHERIE I. HOEGER



FOURTEENTH EDITION

Principles and Labs for Fitness & Wellness

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Principles and Labs for Fitness & Wellness

Werner W. K. Hoeger

Sharon A. Hoeger

Amber L. Fawson

Cherie I. Hoeger



Australia • Brazil • Mexico • Singapore • United Kingdom • United States

Principles and Labs for Fitness & Wellness,
Fourteenth Edition

Werner W. K. Hoeger, Sharon A. Hoeger,
Cherie I. Hoeger, Amber L. Fawson

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Product Manager: Krista Mastroianni

Content Developer: Kellie Petruzzelli

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Chapter Labs

Chapter 1

Physical Fitness and Wellness 1

- Lab 1A** Daily Physical Activity Log 35
- Lab 1B** Wellness Lifestyle Questionnaire 37
- Lab 1C** PAR-Q and Health History Questionnaire 40
- Lab 1D** Resting Heart Rate and Blood Pressure 42

Chapter 2

Behavior Modification 44

- Lab 2A** Exercising Control over Your Physical Activity and Nutrition Environment 72
- Lab 2B** Behavior Modification Plan 74
- Lab 2C** Setting SMART Goals 76

Chapter 3

Nutrition for Wellness 78

- Lab 3A** Nutrient Analysis 132
- Lab 3B** MyPlate Record Form 135

Chapter 4

Body Composition 137

- Lab 4A** Hydrostatic Weighing for Body Composition Assessment 160
- Lab 4B** Body Composition, Disease Risk Assessment, and Recommended Body Weight Determination 162

Chapter 5

Weight Management 164

- Lab 5A** Computing Your Daily Caloric Requirement 208
- Lab 5B** Weight-Loss Behavior Modification Plan 209
- Lab 5C** Calorie-Restricted Diet Plans 210
- Lab 5D** Healthy Plan for Weight Maintenance or Gain 214
- Lab 5E** Weight Management: Measuring Progress 216

Chapter 6

Cardiorespiratory Endurance 218

- Lab 6A** Cardiorespiratory Endurance Assessment 250

- Lab 6B** Caloric Expenditure and Exercise Heart Rate 252

- Lab 6C** Exercise Readiness Questionnaire 256

- Lab 6D** Cardiorespiratory Exercise Prescription 258

Chapter 7

Muscular Fitness: Strength and Endurance 260

- Lab 7A** Muscular Strength and Endurance Assessment 289
- Lab 7B** Strength-Training Program 291

Chapter 8

Muscular Flexibility 310

- Lab 8A** Muscular Flexibility Assessment 330
- Lab 8B** Posture Evaluation 332
- Lab 8C** Flexibility Development and Low Back Conditioning 334

Chapter 9

Fitness Programming and Skill Fitness 341

- Lab 9A** Personal Reflection on Exercise and Exercise Enjoyment 382
- Lab 9B** Assessment of Skill Fitness 386
- Lab 9C** Personal Fitness Plan 388

Chapter 10

Stress Assessment and Management Techniques 392

- Lab 10A** Stress Events Scale 419
- Lab 10B** Type A Personality and Hostility Assessment 421
- Lab 10C** Stress Vulnerability Questionnaire 423
- Lab 10D** Goals and Time Management Skills 425
- Lab 10E** Stress Management 429

Chapter 11

Preventing Cardiovascular Disease 431

- Lab 11A** Self-Assessment Coronary Heart Disease Risk Factor Analysis 464

Chapter 12

Cancer Prevention 466

Lab 12A Cancer Prevention Guidelines 496

Lab 12B Early Signs of Illness 497

Lab 12C Cancer Risk Profile 498

Chapter 13

Addictive Behavior 500

Lab 13A Addictive Behavior Questionnaires 531

Lab 13B Smoking Cessation Questionnaires 533

Chapter 14

Preventing Sexually Transmitted Infections 537

Lab 14A Self-Quiz on HIV and AIDS 557

Chapter 15

Lifetime Fitness and Wellness 559

Lab 15A Life Expectancy and Physiological Age Prediction
Questionnaire 578

Lab 15B Fitness and Wellness Community Resources 582

Lab 15C Self-Evaluation and Future Behavioral Goals 584

Contents

Chapter 1

Physical Fitness and Wellness 1

Life Expectancy	4
Leading Health Problems in the United States	6
Diseases of the Cardiovascular System	6
Cancer	7
Chronic Lower Respiratory Disease	7
Accidents	7
Lifestyle as a Health Problem	9
The Dose-Response Relationship between Physical Activity and Health	9
Exercise Is Medicine	12
Additional Benefits of a Comprehensive Fitness Program	12
Health Benefits	12
Exercise and Brain Function	13
Sitting Disease: A 21st-Century Chronic Disease	14
Physical Activity and Exercise Defined	16
Types of Physical Fitness	18
Fitness Standards: Health versus Physical Fitness	18
Health Fitness Standards	19
Physical Fitness Standards	20
Which Program Is Best?	21
Federal Guidelines for Physical Activity	21
Monitoring Daily Physical Activity	23
Pedometers and Activity Trackers	23
Recommended Steps per Day	24
Economic Benefits of Physical Activity	25
Wellness	26
The Seven Dimensions of Wellness	26



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The Wellness Challenge for Our Day	30
Wellness Education: Using This Book	30
A Personalized Approach	30
Exercise Safety	30
Assessment of Resting Heart Rate and Blood Pressure	31
Mean Blood Pressure	33
Assess Your Behavior	33
Assess Your Knowledge	33
Lab 1A Daily Physical Activity Log	35
Lab 1B Wellness Lifestyle Questionnaire	37
Lab 1C PAR-Q and Health History Questionnaire	40
Lab 1D Resting Heart Rate and Blood Pressure	42

Chapter 2

Behavior Modification 44

Living in a Toxic Health and Fitness Environment	46
Environmental Influence on Physical Activity	47
Environmental Influence on Diet and Nutrition	49
Keys to Changing Behavior	52
Personal Values and Behavior	52
Your Brain and Your Habits	52
Changing Habits through Mindfulness and Repetition	53
Changing Habits by Focusing on Long-Term Values	54
Planning and Willpower	54
Implementation Intentions	55
Barriers to Change	55
Self-Efficacy	56
Sources of Self-Efficacy	57
Motivation and Locus of Control	57
Behavior Change Theories	58
The Transtheoretical Model of Change	60
Relapse	62
The Process of Change	63
Goal Setting and Evaluation	68
SMART Goals	68
Goal Evaluation	70
Assess Your Behavior	70
Assess Your Knowledge	70
Lab 2A Exercising Control over Your Physical Activity and Nutrition Environment	72
Lab 2B Behavior Modification Plan	74
Lab 2C Setting SMART Goals	76



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Chapter 3

Nutrition for Wellness 78

Nutrients	84
Carbohydrates	84
Simple Carbohydrates	84
Complex Carbohydrates	85
Fiber	86
Types of Fiber	87
Computing Daily Carbohydrate Requirement	87
Fats (Lipids)	88
Simple Fats	88
Compound Fats	93
Derived Fats	93
Proteins	93
Vitamins	96
Minerals	97
Water	97
A Healthy Diet	98
Nutrition Standards	99
Dietary Reference Intakes	99
Nutrient Analysis	101
Achieving a Balanced Diet	105
Choosing Healthy Foods	107
Vegetarianism	107
Nutrient Concerns	108
Nuts	110
Soy Products	110
Probiotics	110
Advanced Glycation End Products	111
Diets From Other Cultures	111
Mediterranean Diet	111
Ethnic Diets	112

Nutrient Supplementation	113
Antioxidants	114
Multivitamins	116
Vitamin D	116
Folate	118
Benefits of Foods	119
Functional Foods	120
Organic Foods	121
Genetically Modified Crops	122
Energy Substrates for Physical Activity	122
Energy (ATP) Production	122
Nutrition for Athletes	123
Carbohydrate Loading	123
Strenuous Exercise and Strength Training	124
Hyponatremia	124
Creatine Supplementation	125
Bone Health and Osteoporosis	125
Iron Deficiency	128
2015–2020 Dietary Guidelines for Americans	128
Key Recommendations	129
Physical Activity Recommendation	129
Proper Nutrition: A Lifetime Prescription for Healthy Living	130
Assess Your Behavior	131
Assess Your Knowledge	131
Lab 3A Nutrient Analysis	132
Lab 3B MyPlate Record Form	135

Chapter 4

Body Composition 137

What Is Body Composition?	138
Essential and Storage Fat	140
Why Does Body Composition Matter?	140
Body Composition and Weight Loss	141
Avoiding Creeping Changes in Body Composition	141
Body Shape and Health Risk	141
Techniques to Assess Body Composition	142
Dual Energy X-ray Absorptiometry	143
Hydrostatic Weighing	143
Air Displacement	145
Skinfold Thickness	145
Girth Measurements	146
Bioelectrical Impedance	146
Metrics Used to Assess Body Size and Shape	149
Body Mass Index	149
Waist Circumference	153

- Waist-to-Height Ratio: “Keep your waist circumference to less than half your height.” 154
- Obtaining an Accurate Waist Measurement 155
- Determining Recommended Body Weight 156
 - Begin with Your Current Body Composition 156
 - Calculate Your Recommended Body Weight 157
- Importance of Regularly Assessing Body Composition 158
- Assess Your Behavior 158
- Assess Your Knowledge 159
- Lab 4A** Hydrostatic Weighing for Body Composition Assessment 160
- Lab 4B** Body Composition, Disease Risk Assessment, and Recommended Body Weight Determination 162

Chapter 5

Weight Management 164

- Weight Management in the Modern Environment 166
 - The Wellness Way to Lifetime Weight Management 167
- Overweight versus Obese 168
 - Body Weight Affects Wellness 168
- Tolerable Weight 169
 - Body Image and Acceptance 169
- The Weight Loss Dilemma 170
 - Health Consequences of Dieting 170
 - Diet Crazes 171
 - Low-Carb Diets 171
 - Exercise-Related Weight Loss Myths 174
 - Adopting Permanent Change 175
- Mental and Emotional Aspects of Weight Management 175
 - Willpower versus Planning 175
 - Mindful Eating versus Distracted Eating 176
 - Avoiding Perfectionism 177
 - Feelings of Satisfaction versus Deprivation 177
 - Eating and the Social Environment 177
 - Overcoming Emotional Eating 177
- Physiology of Weight Loss 181
 - Energy-Balancing Equation 181
 - Setpoint Theory 182
 - Maintaining Metabolism and Lean Body Mass 184
 - Rate of Weight Loss in Men versus Women 185
 - Protein, Fats, Fiber, and Feeling Satisfied 186
- Losing Weight the Sound and Sensible Way 186
 - Estimating Your Daily Energy Requirement 186
 - Adjusting Your Fat Intake 187
 - Reducing Evening Eating 188
 - The Importance of Breakfast 189
 - Drink Water and Avoid Liquid Calories 190



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- Reducing Your Eating Occasions 190
- Foods that Aid in Weight Loss 191
- Monitoring Your Diet with Daily Food Logs 192
- Nondietary Factors that Affect Weight Management 193
 - Sleep and Weight Management 193
 - Light Exposure and BMI 193
 - Monitoring Body Weight 193
- Physical Activity and Weight Management 194
 - Physical Activity and Energy Balance 194
 - Physical Activity Predicts Success at Weight Management 195
 - Amount of Physical Activity Needed for Weight Loss 195
 - Exercise and Body Composition Changes 196
 - Overweight and Fit Debate 197
- Types of Exercise Recommended 198
 - Strength-Training Increases Lean Body Mass 198
 - The Roles of Exercise Intensity and Duration in Weight Management 199
- Healthy Weight Gain 202
- Behavior Modification and Adherence to a Weight Management Program 203
 - The Simple Truth 203
- Assess Your Behavior 206
- Assess Your Knowledge 206
- Lab 5A** Computing Your Daily Caloric Requirement 208
- Lab 5B** Weight-Loss Behavior Modification Plan 209



Chris Black

- Lab 5C** Calorie-Restricted Diet Plans 210
Lab 5D Healthy Plan for Weight Maintenance or Gain 214
Lab 5E Weight Management: Measuring Progress 216

Chapter 6

Cardiorespiratory Endurance 218

- Basic Cardiorespiratory Physiology: A Quick Survey 221
 Aerobic and Anaerobic Exercise 222
 Benefits of Aerobic Exercise 223
 Assessing Physical Fitness 225
 Responders versus Nonresponders 226
 Assessing Cardiorespiratory Endurance 226
 Components of VO_2 226
 Tests to Estimate VO_{2max} 227
 Interpreting the Results of Your VO_{2max} 233
 Predicting VO_2 and Caloric Expenditure from Walking and Jogging 234
 Ready to Start an Exercise Program? 235
 Guidelines for Developing Cardiorespiratory Endurance 235
 Intensity 236
 Type (Mode) 239
 Time (Duration) 239
 Frequency 241
 “Physical Stillness:” A Deadly Proposition 241
 Volume 242
 Progression Rate 242
 Rating the Fitness Benefits of Aerobic Activities 243

- Getting Started and Adhering to a Lifetime Exercise Program 244

A Lifetime Commitment to Fitness 248

- Assess Your Behavior 248

- Assess Your Knowledge 248

- Lab 6A** Cardiorespiratory Endurance Assessment 250

- Lab 6B** Caloric Expenditure and Exercise Heart Rate 252

- Lab 6C** Exercise Readiness Questionnaire 256

- Lab 6D** Cardiorespiratory Exercise Prescription 258

Chapter 7

Muscular Fitness: Strength and Endurance 260

- Benefits of Strength-Training 263

Improves Functional Capacity 263

Improves Overall Health 263

Increases Muscle Mass and Resting Metabolism 263

Improves Body Composition 264

Helps Control Blood Sugar 264

Enhances Quality of Life as You Age 264

- Gender Differences 265

- Assessing Muscular Strength and Endurance 266

Muscular Strength: Hand Grip Strength Test 267

Muscular Endurance Test 267

Muscular Strength and Endurance Test 267

Basic Muscle Physiology 270

Types of Muscle Hypertrophy 271

- Factors that Affect Muscular Fitness 272

Neural Function 272

Types of Muscle Fiber 272

Overload 273

Specificity of Training 273

Training Volume 273

Periodization 273

- Guidelines for Strength-training 274

Type (Mode) of Training 274

Intensity (Resistance) 277

Time (Sets) 278

Frequency 279

Results in Strength Gain 280

- Dietary Guidelines for Muscular and Strength Development 280

- Strength-Training Exercises 281

Exercise Variations 281

Plyometric Exercise 281

Core Strength-training 283

Stability Exercise Balls 283

Elastic-Band Resistive Exercise 284

- Exercise Safety Guidelines 285



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Setting Up Your Own Strength-Training Program	285
Assess Your Behavior	288
Assess Your Knowledge	288
Lab 7A Muscular Strength and Endurance Assessment	289
Lab 7B Strength-Training Program	291
Strength-Training Exercises without Weights	293
Strength-Training Exercises with Weights	297
Stability Ball Exercises	307

Chapter 8

Muscular Flexibility 310

Benefits of Good Flexibility	312
Factors that Affect Flexibility	312
Joint Structure	313
Adipose Tissue	313
Muscular Elasticity and Genetics	313
Body Temperature	313
Age	313
Gender	313
Level of Physical Activity	313
Assessing Flexibility	313
Interpreting Flexibility Test Results	316
Guidelines for Developing Muscular Flexibility	318
Types of Stretching Exercises	318
Physiological Response to Stretching	319
Intensity	320
Time/Repetitions	320
Frequency	320
When to Stretch?	320
Flexibility Exercises	321
Contraindicated Exercises	321
Preventing and Rehabilitating Low Back Pain	323
Causes of Low Back Pain	323
Evaluating Body Posture	323
Effects of Stress	326

When to Call a Physician	326
Treatment Options	327
Personal Flexibility and Low Back Conditioning Program	328
Assess Your Behavior	329
Assess Your Knowledge	329
Lab 8A Muscular Flexibility Assessment	330
Lab 8B Posture Evaluation	332
Lab 8C Flexibility Development and Low Back Conditioning	334
Flexibility Exercises	336
Exercises For the Prevention and Rehabilitation of Low Back Pain	338

Chapter 9

Fitness Programming and Skill Fitness 341

Choosing an Exercise Program with Your Values in Mind	343
Being Flexible with Your Exercise Routine	344
Exercise Prescription for Health and Fitness	345
Basic Exercise Training Principles	345
Interval Training	347
High-Intensity Interval Training	347
Ultra-Short Workouts	348
Cross-Training	350
Overtraining	350
Periodization	351
Skill-Related Fitness	352
The Six Components of Skill-Related Fitness	352
Team Sports	356
Performance Tests for Skill-Related Fitness	356
Exercise Programming for Sport or Event Participation	360
Sport-Specific Training	360
Preparing for Sports Participation	360
General Exercise Considerations	363
Time of Day for Exercise	363
Exercise in Heat and Humidity	363
Exercise in Cold Weather	364
Exercising with the Cold or Flu	366
Nutrition and Hydration during Exercise	366
Fluid Replacement during Exercise	366
Meal Timing during Exercise	367
Exercise-Related Injuries	368
Muscle Soreness and Stiffness	368
Exercise Intolerance	368
Side Stitch	368
Shin Splints	369
Muscle Cramps	369
Acute Sports Injuries	369

Tailoring Exercise to Health Circumstances 370

- Asthma and Exercise 370
- Arthritis and Exercise 371
- Diabetes and Exercise 371
- Smoking and Exercise 372

Women's Health and Exercise 373

- Menstruation and Exercise 373
- The Female Athlete Triad 373
- Exercise and Dysmenorrhea 373
- Exercise during Pregnancy 373

Exercise and Aging 375

- Benefits of Lifelong Exercise 375
- Exercise Training for Seniors 375
- Body Composition in Seniors 378
- Exercise and Mental Health in Seniors 378
- Exercise Recommendations for Seniors 378

You Can Get It Done 378

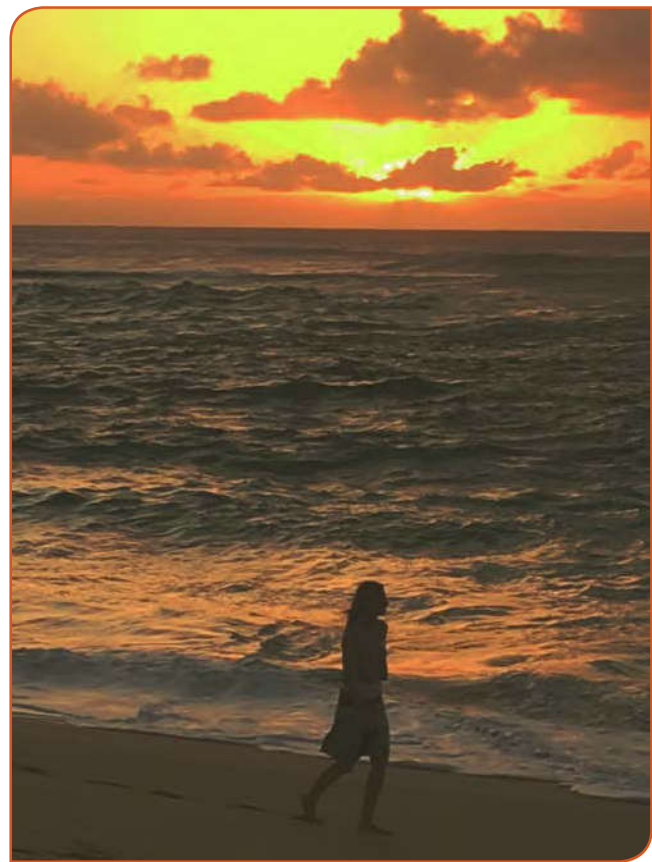
Assess Your Behavior 381

Assess Your Knowledge 381

Lab 9A Personal Reflection on Exercise and Exercise Enjoyment 382

Lab 9B Assessment of Skill Fitness 386

Lab 9C Personal Fitness Plan 388



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Chapter 10

Stress Assessment and Management Techniques 392

The Mind—Body Connection 394

- The Brain 394
- The Immune System 394

Stress 395

- Eustress and Distress 395
- Chronic Distress Leads to Illness 396

How the Body Adapts to Stress 396

- Alarm Reaction 396
- Resistance 396
- Exhaustion and Recovery 396

Sources of Stress 397

How Perception and Attitude Affect Health 398

- Self-Esteem 398
- Fighting Spirit 398

How Behavior Patterns Affect Health 399

Vulnerability to Stress 401

Sleep Management 402

- How Much Sleep Do I Need? 402
- What Happens If I Don't Get Enough Sleep? 402
- College Students Are Among the Most Sleep-Deprived 403
- Does It Help to "Catch up" on Sleep on Weekends? 403

Time Management 404

- Five Steps to Time Management 404
- Time-Management Skills 405

Managing Technostress 406

How the Body Responds to Stress 407

Coping with Stress 407

- Physical Activity 408
- Relaxation Techniques 411
- Meditation 416

Which Technique Is Best? 418

Assess Your Behavior 418

Assess Your Knowledge 418

Lab 10A Stress Events Scale 419

Lab 10B Type A Personality and Hostility Assessment 421

Lab 10C Stress Vulnerability Questionnaire 423

Lab 10D Goals and Time Management Skills 425

Lab 10E Stress Management 429

Chapter 11

Preventing Cardiovascular Disease 431

Cardiovascular Disease 434

Most Prevalent Forms of Cardiovascular Disease 434

Stroke	434
Coronary Heart Disease	435
Coronary Heart Disease Risk Profile	435
Leading Risk Factors for Coronary Heart Disease	436
Physical Inactivity	437
Abnormal Electrocardiograms	439
Abnormal Cholesterol Profile	441
Elevated Triglycerides	447
Elevated Homocysteine	448
Inflammation	449
Diabetes	450
Hypertension (High Blood Pressure)	453
Excessive Body Fat	459
Tobacco Use	459
Tension and Stress	460
Personal and Family History	461
Age	461
Cardiovascular Risk Reduction	462
Assess Your Behavior	463
Assess Your Knowledge	463
Lab 11A Self-Assessment Coronary Heart Disease Risk Factor Analysis	464

Chapter 12

Cancer Prevention 466

How Cancer Starts	468
DNA Mutations	468
Tumor Formation	469
Metastasis	470
Genetic versus Environmental Risk	471
Incidence of Cancer	472
Guidelines for Preventing Cancer	473
Ten Recommendations for a Cancer Prevention Lifestyle	473
How Can I Know Which Substances Cause Cancer?	476
Dietary Changes	476
Vegetables	476
Vitamin D	477
Antioxidants	478
Phytonutrients	478
Fiber	478
Tea	479
Spices	479
Sugar	479
Dietary Fat	479
Processed Meat and Protein	479
Soy	481
Alcohol Consumption	481
Nutrient Supplements	481



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Excessive Body Weight	482
Abstaining from Tobacco	482
Avoiding Excessive Exposure to Sun	483
Monitoring Estrogen, Radiation Exposure, and Potential Occupational Hazards	484
Physical Activity	485
Other Factors	485
Early Detection	485
Warning Signals of Cancer	486
Cancer: Assessing Your Risks	486
Risk Factors for Common Sites of Cancer	486
What Can You Do?	494
Assess Your Behavior	494
Assess Your Knowledge	494
Lab 12A Cancer Prevention Guidelines	496
Lab 12B Early Signs of Illness	497
Lab 12C Cancer Risk Profile	498

Chapter 13

Addictive Behavior 500

Addiction	502
How Addiction Develops	502



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- Drugs and Dependence 503
 - Caffeine 504
 - Nonmedical Use of Prescription Drugs 505
 - Inhalant Abuse 506
 - Marijuana 506
 - Cocaine 507
 - Methamphetamine 508
 - MDMA (Ecstasy) 510
 - Heroin 510
 - New Psychoactive Substances 512
 - Synthetic Cannabinoids (Fake Pot or Spice) 512
- Alcohol 513
 - Effects on the Body 514
 - Addictive and Social Consequences of Alcohol Abuse 514
 - Alcohol on Campus 515
 - How to Cut Down on Drinking 516
- Treatment of Addictions 517
- Tobacco 517
 - Types of Tobacco Products 518
 - Effects on the Cardiovascular System 519
 - Smoking and Cancer 519
 - Effects of Secondhand Smoke 520

- Health Care Costs of Smoking 521
- Morbidity and Mortality 521
- Trends 521
- Why People Smoke 522
 - Smoking Addiction and Dependency 522
 - Why Do You Smoke? Test 522
 - Smoking Cessation 523
 - Do You Want to Quit? Test 523
 - Breaking the Habit 524
 - Quitting Cold Turkey 525
 - Cutting Down Gradually 525
 - Nicotine-Substitution Products 526
 - Life after Cigarettes 527
- Assess Your Behavior 529
- Assess Your Knowledge 529
- Lab 13A** Addictive Behavior Questionnaires 531
- Lab 13B** Smoking Cessation Questionnaires 533

Chapter 14

Preventing Sexually Transmitted Infections 537

- Types and Causes of Sexually Transmitted Infections 540
- Four Most Common Bacterial STIs 540
 - Chlamydia 541
 - Gonorrhea 541
 - Syphilis 542
 - Trichomoniasis 542
- Four Most Common Viral STIs 543
 - Human Papillomavirus (HPV) and Genital Warts 543
 - Genital Herpes 544
 - Hepatitis 545
 - HIV and AIDS 546
- Preventing Sexually Transmitted Infections 552
 - Wise Dating 552
 - Monogamous Sexual Relationship 552
- Assess Your Behavior 555
- Assess Your Knowledge 555
- Lab 14A** Self-Quiz on HIV and AIDS 557

Chapter 15

Lifetime Fitness and Wellness 559

- Life Expectancy and Physiological Age 562
- Conventional Western Medicine 563
 - Finding a Physician 563
 - Searching for a Hospital 563



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Complementary and Alternative Medicine	564
Types of CAM Practices	565
Costs for CAM	566
CAM Shortcomings	566
Finding a CAM Practitioner	567

Integrative Medicine	568
Quackery and Fraud	568
Looking at Your Fitness Future	572
Health and Fitness Club Memberships	572
Personal Trainers	573
Purchasing Exercise Equipment	574
Self-Evaluation and Behavioral Goals for the Future	574
Self-Evaluation	574
Behavioral Goals for the Future	574
The Fitness and Wellness Experience and a Challenge for the Future	575
Assess Your Behavior	576
Assess Your Knowledge	577
Lab 15A Life Expectancy and Physiological Age Prediction Questionnaire	578
Lab 15B Fitness and Wellness Community Resources	582
Lab 15C Self-Evaluation and Future Behavioral Goals	584
Appendix A: Nutritive Value of Selected Foods	588
Notes and Suggested Readings	600
Answers to Assess Your Knowledge	612
Glossary	613
Index	622

Preface

The current American way of life does not provide people with sufficient physical activity to maintain good health and improve quality of life. Actually, our way of life is such a serious threat to our health that it increases the deterioration rate of the human body and leads to premature illness and mortality.

Data released by the Centers for Disease Control and Prevention (CDC) indicate that only about 20 percent of U.S. adults 18 and over meet the Federal Physical Activity Guidelines for both aerobic and muscular fitness activities, whereas slightly less than 50 percent meet the guidelines for aerobic fitness and just 23 percent do so for muscular fitness. Another third of Americans are completely inactive during their leisure time. Yet, most people in the United States say they believe that physical activity and positive lifestyle habits promote better health. However, many do not reap benefits because they simply do not know how to implement a sound fitness and wellness program that will yield the desired results.

The U.S. Surgeon General has determined that lack of physical activity is detrimental to good health. As a result, the importance of sound fitness and wellness programs has assumed an entirely new dimension. The Office of the Surgeon General has identified physical fitness as a top health priority by stating that the nation's top health goals in this century are exercise, increased consumption of fruits and vegetables, smoking cessation, and the practice of safe sex. All four of these fundamental healthy lifestyle factors are thoroughly addressed in this book.

Furthermore, the science of behavioral therapy has established that many behaviors we adopt are a product of our environment. Unfortunately, we live in a “toxic” health and fitness environment. Becoming aware of how the environment affects our health is vital if we wish to achieve and maintain wellness. Yet, we are so habituated to this modern-day environment that we miss the subtle ways in which it influences our behaviors, personal lifestyle, and health each day.

Along with the most up-to-date health, fitness, and nutrition guidelines, the information in this book provides extensive behavior modification strategies to help you abandon negative habits and adopt and maintain healthy behaviors. As you study and assess physical fitness and wellness parameters, you need to take a critical look at your behaviors and lifestyle—and most likely make selected permanent changes to promote your overall health and wellness.

Principles and Labs for Fitness & Wellness contains 15 chapters and 43 laboratories (labs) that serve as guides to implement a complete lifetime fitness and wellness program. The

book's contents point out the need to go beyond the basic components of fitness to achieve total well-being.

In addition to a thorough discussion of physical fitness—including all health- and skill-related components—extensive and up-to-date information is provided on behavior modification, nutrition, weight management, stress management, cardiovascular and cancer-risk reduction, exercise and aging, prevention of sexually transmitted infections (STIs), and substance abuse control (including tobacco, alcohol, and other psychoactive drugs). The information has been written to provide you with the necessary tools and guidelines for an active lifestyle and a wellness way of life.

Scientific evidence has clearly shown that improving the quality—and most likely the longevity—of your life is a matter of personal choice. As you work through the various chapters and laboratories in the book, you will be able to develop and regularly update your healthy lifestyle program to improve physical fitness and personal wellness. The emphasis throughout the book is on teaching you how to take control of your health and lifestyle habits so that you can make a constant and deliberate effort to stay healthy and achieve the highest potential for well-being.

New in the 14th Edition

For this 14th edition of *Principles and Labs for Fitness & Wellness*, the authors have reinvigorated the design to provide a modern and visually stimulating layout throughout the text and have developed and sourced many new figures, graphs, informational boxes, and photos in each chapter. Throughout the text, the authors have made substantial changes with the focus of finding new ways to help students understand and achieve a wellness way of life. New Hoeger Key to Wellness boxes have been added as a continuous chapter feature to highlight key concepts for students. Many chapters have been rethought and reorganized with new headings and enhanced introductory text. Chapter 1, for example, includes a new focus on the ways daily physical activity and exercise work together to increase lifetime wellness. Chapter 4 has been reorganized to help students better understand how body weight and shape affect lifetime health outcomes. Chapter 5 has been reorganized with new material to help students understand how thoughts and feelings affect weight maintenance. Chapter 9 has been restructured to be the capstone chapter of exercise programming—to sum up all students have learned about cardiorespiratory, strength, and flexibility training—and to give them complete confidence to write their own exercise programs throughout their lifetime. A new quick reference flow chart, the “Hoeger

Values-Based Quick-Reference Guide to Exercise Prescription,” has also been added to Chapter 9 to help students apply correct exercise prescription principles and see fitness progress through their exercise efforts.

All chapters have been revised and updated according to recent advances and recommendations in the field, including information reported in the literature and at professional health, fitness, and sports medicine conferences.

In addition to the new Hoeger Key to Wellness boxes, we continue to provide the MyProfile feature at the beginning of each chapter for students to evaluate their current knowledge of the chapter’s topic. Included also are the Confident Consumer and Diversity Considerations boxes to help students make healthier choices and be discerning fitness and wellness consumers. These features, along with the Real Life Story and FAQ sections, are intended to perk the students’ interest in the chapter contents.

Chapter Updates

Chapter 1, Physical Fitness and Wellness

- Reorganization of chapter material to better highlight the importance of daily physical activity and nonexercise activity thermogenesis (NEAT), with new figures and features
- A new feature box outlining the latest research on distracted driving accidents and the cognitive processes behind a variety of driving scenarios
- New data regarding exercise and brain function, including the role of exercise to combat cognitive decline and Alzheimer’s disease
- Exploration of the causes behind the United States’ lagging life expectancy
- New information on the leading causes of death for specific age groups
- A new feature explaining types of scientific studies
- A new section highlighting activity tracker options

Chapter 2, Behavior Modification

- New figures and updated data on the health risks of modern work and leisure habits, community design, and food quality and abundance
- New feature explaining the mechanisms behind cravings
- Updated and expanded information about the brain and habit formation and the role of the prefrontal cortex of the brain in carrying out value-centered behavior
- Addition of the latest research about willpower, planning, and the use of “implementation intentions” for changing behavior
- A new feature offering tools for using positive self-talk for goal achievement

Chapter 3, Nutrition for Wellness

- Editorial changes throughout the chapter to update nutrition concepts based on the most current research and reports in the field
- A more thorough description of the differences between refined and whole grains
- An enhanced description of types of fat based on the degree of hydrogen saturation
- New evidence on the detrimental effects of excessive sugar in the diet and the effects of liquid calories on health and weight control
- A broadened discussion on the concept of chronic and acute inflammation and the role of nutrition in its prevention
- New content about the current recommendations for saturated fat replacement in the diet for cardiovascular disease prevention
- Additional information on the key role of adequate protein intake throughout the day for health and weight management
- New updates on nutrient supplements, including Vitamin D supplementation
- Inclusion of the *2015–2020 Dietary Guidelines for Americans*

Chapter 4, Body Composition

- Reorganization of chapter material to better emphasize the risks of android obesity and the benefits of regular body composition assessments
- New global recommendations for health metrics, including a discussion of the way waist circumference, waist-to-height-ratio (WHtR), and BMI are being used in conjunction to prevent disease
- A new feature titled “Can I Influence My Bodyshape?”

Chapter 5, Weight Management

- Updated data on the obesity epidemic in the United States
- Recommendations for preventing the dreaded “Freshman 15” weight gain syndrome
- A discussion on the rate of weight loss in men versus women
- The latest information about light exposure and BMI
- A discussion on the role of strength-training on visceral fat loss
- An introduction to weight gain and fat cell size and number increase in the lower body and abdominal areas
- An enhanced section on the importance of proper caloric distribution throughout the day for adequate weight management
- Additional suggestions for weight loss strategies

Chapter 6, Cardiorespiratory Endurance

- Updates on the physiological benefits of aerobic exercise, an adequate cool-down phase following aerobic exercise, and the health consequences of physical stillness (sitting disease)
- The latest recommendations for a suitable rate of training progression for individuals suffering from chronic diseases
- Updates on tips to increase daily physical activity and for people who have been physically inactive

Chapter 7, Muscular Fitness

- An update on the myriad of health benefits obtained through proper strength-training
- Enhancements to the content on training order (aerobic-versus strength-training)
- Additional information on aging and sarcopenia and adequate protein intake for young and older adults
- Expanded information about timing, dose, and type of protein intake
- An updated discussion on strength-training and visceral fat
- An answer to the concern of heavy-resistance strength-training and arterial stiffness

Chapter 8, Muscular Flexibility

- New introductory information on how joint structure, genetics, age, gender, and other factors affect individual flexibility
- New tips to prevent the instance of “text neck” symptoms that stem from the overuse of smartphones and other mobile devices
- Expanded section on preventing and rehabilitating low back pain to include the importance of core-strengthening exercises

Chapter 9, Fitness Programming and Skill Fitness

- Reorganization of chapter to give students added confidence in their ability to understand and apply exercise prescription in their own lives
- Added review of basic exercise prescription principles and new quick-reference flow chart titled “Hoeger Values-Based Quick-Reference Guide to Exercise Prescription,” making Chapter 9 the capstone chapter of exercise prescription, topping off material from the cardiorespiratory, muscular, and flexibility chapters
- New information about exercise and behavior modification
- New suggestions to guide students in choosing fitness solutions that fit personal values
- A new lab titled “Personal Reflection on Exercise and Enjoyment”

- New suggestions for attending a group exercise class for the first time or trying a new sport for the first time
- Additional information on high-intensity interval training (HIIT) and its wide range of applications for peak performers, new exercisers, and patients of chronic illness alike
- Discussions of new fitness trends, including functional fitness, Cross-Fit, Suspension Training, HIIT, high-intensity circuit training (HICT), outdoor training, and senior fitness solutions, including tai chi
- New information about the “runner’s high”
- New updated information about choosing footwear and activewear

Chapter 10, Stress Assessment and Management Techniques

- New section on the damaging role of “technostress” in today’s technology-dependent age, including tips on managing tech-related stress at home, at school, and in the workplace
- New information on the importance of proper breathing as a natural approach to reduce stress
- Expanded information on the benefits of mindfulness meditation for stress management and the role adequate sleep plays in managing stress

Chapter 11, Preventing Cardiovascular Disease

- Up-to-date data on the prevalence of cardiovascular disease
- New information provided on the role of dietary cholesterol, saturated fat, and refined carbohydrates on heart disease risk; trans fat; and cardiovascular disease
- New content on the use of medications versus exercise for cardiovascular disease management
- An introduction to the PLAC blood test for heart disease and genetic testing for heart disease
- Further updates on exercise, nutrition and type 2 diabetes; stress and CHD; and high blood pressure
- Updates to the section on other less known possible risk factors for coronary heart disease

Chapter 12, Cancer Prevention

- New information detailing the way cancer develops at the cellular level to help students better understand the cause and effect of cancer risk and prevention
- A review of innovative breakthroughs regarding telomeres and their role in cancer and aging
- A new section about genetic versus environmental influences on cancer risk
- An introduction to the field of epigenetics, with a biological explanation of the epigenome and a discussion on the

- way lifestyle choices turn certain genes on or off, changing their expression
- New, practical, day-to-day suggestions for avoiding cancer risk
- New feature on cancer research agencies that provide lists of carcinogenic items
- Updated information and explanation about processed and red meat as risk factors for cancer
- Updated explanation on guidelines for mammography and breast cancer screenings, arming students with information on this controversial topic
- Updated data on the incidence and mortality rates of cancer, along with the most common site-specific cancer risk factors

Chapter 13, Addictive Behavior

- Updated data on the most recent trends in substance abuse reported in the *National Survey on Drug Use and Health* by the U.S. Department of Health and Human Services
- New figures reflecting data specific to addictive behaviors most prevalent in college students, including marijuana, heroin, and alcohol use
- Expanded section on the addictive and physiological effects of high caffeine intake
- Enhanced section on synthetic cannabinoids (known as synthetic marijuana or Spice), the most prevalent new psychoactive substances in the United States
- Discussions of recent trends in illicit drug use, energy drink consumption, and e-cigarette use have been updated and expanded

Chapter 14, Preventing Sexually Transmitted Infections

- Expanded introductory information detailing the types and causes of the eight most common STIs and whether they are curable or treatable
- New information on the success of pre-exposure prophylaxis (PrEP) in reducing the risk of HIV among those at highest risk for infection
- Current STI screening recommendations and graphs on the prevalence of STIs have been added and updated according to the newest data from the Centers for Disease Control and Prevention (CDC)

Chapter 15, Lifetime Fitness and Wellness

- New information on the growing trend of integrative medicine in hospitals, practices, and treatment centers
- Expanded guidelines for choosing a personal fitness trainer
- Updated resources for students to access credible research on health and wellness topics

- New data graph illustrating the prevalence of various types of complementary and alternative medicine (CAM) in the United States

Ancillaries

- **Health MindTap for Principles and Labs for Fitness & Wellness. Instant Access Code, ISBN-13: 978-1-305-25107-6.** MindTap is well beyond an eBook, a homework solution or digital supplement, a resource center website, a course delivery platform, or a Learning Management System. More than 70 percent of students surveyed said that it was unlike anything they have ever seen before. MindTap is a new personal learning experience that combines all of your digital assets—readings, multimedia, activities, and assessments—into a singular learning path to improve student outcomes.
- **Diet & Wellness Plus.** Diet & Wellness Plus helps you gain a better understanding of how nutrition relates to your personal health goals. It enables you to track your diet and activity, generate reports, and analyze the nutritional value of the food you eat! It includes more than 55,000 foods in the database, custom food and recipe features, and the latest Dietary References, as well as your goal and actual percentages of essential nutrients, vitamins, and minerals. It also helps you to identify a problem behavior and make a positive change. After completing a Wellness Profile questionnaire, Diet & Wellness Plus will rate the level of concern for eight different areas of wellness, helping you determine the areas where you are most at risk. It then helps you put together a plan for positive change by helping you select a goal to work toward, complete with a reward for all your hard work. Diet & Wellness Plus is also available as an App that can be accessed from the App dock in MindTap and can be used throughout the course for students to track their diet, activity, and behavior change.
- **Global Health Watch. Instant Access Code, ISBN: 978-1-111-37733-5. Printed Access Card, ISBN: 978-1-111-37731-1.** Updated with today's current headlines, Global Health Watch is your one-stop resource for classroom discussion and research projects. This resource center provides access to thousands of trusted health sources, including academic journals, magazines, newspapers, videos, podcasts, and more. It is updated daily to offer the most current news about topics related to your health course.
- **Cognero Test Bank. ISBN-13: 978-1-305-26544-8.** Cengage Learning Testing Powered by Cognero is a flexible, online system that allows you to:
 - Author, edit, and manage test bank content from multiple Cengage Learning solutions.
 - Create multiple test versions in an instant.
 - Deliver tests from your LMS, your classroom, or wherever you want.

- **Instructor's Companion Site.** Everything you need for your course in one place! This collection of book-specific lecture and class tools is available online via www.cengage.com/login. Access and download PowerPoint presentations, images, instructor's manual, videos, and more.
- **Careers in Health, Physical Education, and Sport, second edition. ISBN-13: 978-0-495-38839-5.** This unique booklet takes students through the complicated process of picking the type of career they want to pursue; explains how to prepare for the transition into the working world; and provides insight into different types of career paths, education requirements, and reasonable salary expectations. A designated chapter discusses some of the legal issues that surround the workplace, including discrimination and harassment. This supplement is complete with personal development activities designed to encourage students to focus on and develop better insight into their futures.



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Using his knowledge and personal experiences, Dr. Hoeger writes engaging, informative books that thoroughly address today's fitness and wellness issues in a format accessible to students. Since 1990, he has been the most widely read fitness and wellness college textbook author in the United States. He has published a total of 63 editions of his nine fitness and wellness-related titles. Among the textbooks

Brief Author Biographies

Werner W. K. Hoeger is a professor emeritus of the Department of Kinesiology at Boise State University, where he taught between 1986 and 2009. He had previously taught at the University of the Andes in Venezuela (1978–1982); served as Technical Director of the Fitness Monitoring Preventive Medicine Clinic in Rolling Meadows, Illinois (1982–1983); The University of Texas of the Permian Basin in Odessa, Texas (1983–1986); and briefly taught for one semester in 2012, 2013, and 2016 as an adjunct faculty at Brigham Young University Hawaii in Laie, Hawaii. He remains active in research and continues to lecture in the areas of exercise physiology, physical fitness, health, and wellness.

Dr. Hoeger completed his undergraduate and master's degrees in physical education at the age of 20 and received his doctorate degree with an emphasis in exercise physiology at the age of 24. He is a *Fellow of the American College of Sports Medicine* and also of the *Research Consortium of SHAPE America (Society of Health and Physical Educators)*. In 2002, he was recognized as the *Outstanding Alumnus* from the *College of Health and Human Performance* at *Brigham Young University*. He is the recipient of the first *Presidential Award for Research and Scholarship* in the *College of Education* at *Boise State University* in 2004.

In 2008, he was asked to be the *keynote speaker* at the *VII Iberoamerican Congress of Sports Medicine and Applied Sciences* in Mérida, Venezuela, and was presented with the *Distinguished Guest of the City* recognition. In 2010, he was also honored as the *keynote speaker* at the *Western Society for Kinesiology and Wellness* in Reno, Nevada.



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written for Wadsworth/Cengage Learning are *Lifetime Physical Fitness and Wellness: A Personalized Program*, 14th edition; *Fitness & Wellness*, 12th edition; *Principles and Labs for Physical Fitness*, 10th edition; *Wellness: Guidelines for a Healthy Lifestyle*, 4th edition; and *Water Aerobics for Fitness & Wellness*, 4th edition (with Terry-Ann Spitzer Gibson).

Dr. Hoeger was the first author to write a college fitness textbook that incorporated the wellness concept. In 1986, with the release of the first edition of *Lifetime Physical Fitness & Wellness*, he introduced the principle that to truly improve fitness, health, and quality of life and to achieve wellness, a person needed to go beyond the basic health-related components of physical fitness. His work was so well received that every fitness author in the field immediately followed his lead.



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As an innovator in the field, Dr. Hoeger has developed many fitness and wellness assessment tools, including fitness tests such as the Modified Sit-and-Reach, Total Body Rotation, Shoulder Rotation, Muscular Endurance, and Muscular Strength and Endurance and Soda Pop Coordination Tests.

Proving that he “practices what he preaches,” he was the oldest male competitor in the 2002 Winter Olympics in Salt Lake City, Utah, at the age of 48. He raced in the sport of luge along with his then 17-year-old son Christopher. It was the first, and so far only time, in Winter Olympics history that father and son competed in the same event. In 2006, at the age of 52, he was the oldest competitor at the Winter Olympics in Turin, Italy. In 2011, Dr. Hoeger raced in the 800-, 1,500-, and 5,000-meter events in track and field at the World Masters Athletic Championships held in Sacramento, California. At different times and in different distances in 2012, 2014, 2015, and 2016, he reached All-American standards for his age group by USA Track and Field (USATF). In 2015, he finished third in the one-mile run at the USATF Masters Indoor Track and Field National Championships, and third and fourth, respectively, in the 800- and 1,500-meter events at the Outdoor National Senior Games.

Sharon A. Hoeger is vice president of Fitness & Wellness, Inc., of Boise, Idaho. Sharon received her degree in computer science from Brigham Young University. In the 1980s, she served as a computer science instructor at the University of Texas of the Permian Basin. She is extensively involved in the research process used in retrieving the most current scientific information that goes into the revision of each textbook. She is also the author of the software that was written specifically for the fitness and wellness textbooks. Her innovations in this area since the publication of the first edition of *Lifetime Physical Fitness & Wellness* in 1986 set the standard for fitness and wellness computer software used in this market today.

Sharon is a coauthor of five of the seven fitness and wellness titles. She also served as chef de mission (chief of delegation) for the Venezuelan Olympic Team at the 2006 Winter Olympics in Turin, Italy. A former gymnast, she now participates in a variety of fitness activities to enjoy good health and maintain a high quality of life.

Husband and wife have been jogging and strength training together for more than 39 years. They are the proud parents of five children, all of whom are involved in sports and lifetime fitness activities. Their motto: “Families that exercise together, stay together.”

Amber L. Fawson and Cherie I. Hoeger received their degrees in English with an emphasis in editing for publication. For the past 15 years Amber has enjoyed working in the publication industry and has held positions as an Editorial Coordinator for *BYU Studies*, Assistant Editor for Cengage Learning, and freelance writer and editor for tertiary education textbooks and workbooks. During the last decade, Cherie has been working as a freelance writer and



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editor; writing research and marketing copy for client magazines, newsletters, and websites; and contracting as a textbook copy editor for Cengage Learning (previously under Thomson Learning and the Brooks/Cole brand).

Amber and Cherie have been working for Fitness & Wellness, Inc., for several years as writers and scientific literature reviewers for new editions. They have now taken on a more significant role as co-authors of all fitness & wellness textbooks. Their addition now constitutes an enthusiastic four-person author team to sort through and summarize the extensive literature available in the health, fitness, wellness, and sports medicine fields. Their work has greatly enhanced the excellent quality of these textbooks. They are firm believers in living a health and wellness lifestyle, regularly attend professional meetings in the field, and are active members of the American College of Sports Medicine.

Acknowledgments

This book is dedicated to Norman and Laverne Kaluhiokalani. Their lifetime friendship and kind help and unconditional support throughout the years is most sincerely appreciated.

The completion of the 14th edition of *Principles and Labs for Fitness & Wellness* was made possible through the contributions of many professionals throughout the country. In particular, we express our gratitude to the reviewers of the 14th edition; their valuable comments and suggestions are sincerely appreciated.

We would also like to thank Gina Jepson and Jessica Eakins for their kind help with new photography in this edition.

1

Physical Fitness and Wellness

The human body is extremely resilient during youth—not so during middle and older age. The power of prevention, nonetheless, is yours: It enables you to make healthy lifestyle choices today that will prevent disease in the future and increase the quality and length of your life.

Objectives

- > **Understand** the health and fitness consequences of physical inactivity.
- > **Identify** the major health problems in the United States.
- > **Learn** how to monitor daily physical activity.
- > **Learn** the Federal Physical Activity Guidelines for Americans.
- > **Define** wellness and list its dimensions.
- > **Define** physical fitness and list health-related and skill-related components.
- > **State** the differences among physical fitness, health promotion, and wellness.
- > **Distinguish** between health fitness standards and physical fitness standards.
- > **Understand** the benefits and significance of participating in a comprehensive wellness program.
- > **Determine** if you can safely initiate an exercise program.
- > **Learn** to assess resting heart rate and blood pressure.



Chris Black

FAQ

Why should I take a fitness and wellness course?

Most people go to college to learn how to make a living, but a fitness and wellness course will teach you how to *live*—how to truly live life to its fullest potential. Some people seem to think that success is measured by how much money they make. Making a good living will not help you unless you live a wellness lifestyle that will allow you to enjoy what you earn. You may want to ask yourself: Of what value are a nice income, a beautiful home, and a solid retirement portfolio if, at age 45, I suffer a massive heart attack that will seriously limit my physical capacity or end life itself?

Is the attainment of good physical fitness sufficient to ensure good health?

Regular participation in a sound physical fitness program will provide substantial health benefits and significantly decrease the risk of many chronic diseases. And although good fitness often motivates toward adoption of additional positive lifestyle behaviors, to maximize the benefits for a healthier, more productive, happier, and longer life we have to pay attention to all seven dimensions of wellness: physical, social, mental, emotional, occupational, environmental, and spiritual. These dimensions are interrelated, and one frequently affects the other. A wellness way of life requires a constant and deliberate effort to stay healthy and

achieve the highest potential for well-being within all dimensions of wellness.

If a person is going to do only one thing to improve health, what would it be?

This is a common question. It is a mistake to think, though, that you can modify just one factor and enjoy wellness. Wellness requires a constant and deliberate effort to change unhealthy behaviors and reinforce healthy behaviors. Although it is difficult to work on many lifestyle changes all at once, being involved in a regular physical activity program, avoiding excessive sitting, observing proper nutrition, and avoiding addictive behavior are lifestyle factors to work on first. Others should follow, depending on your current lifestyle behaviors.

REAL LIFE STORY | Jeremy's Experience

I was a multisport athlete in high school. I played soccer, football, basketball, and ran track. I was not the best athlete on these teams, and I didn't have a chance to make a college team, but I sure loved sports and athletic competition. To earn extra money for college, I worked for a fast-food chain that summer. I was so busy that I didn't do any fitness activities or play sports that summer, and I ate too much junk food, which caused me to gain some weight. Later in college, it took some time to get used to my new surroundings and the newfound freedom from my home life. My friends kept stressing that I needed to enjoy college life as much as possible and not worry so much about academics. We went to a lot of parties and watched sporting events. There was always plenty of

alcohol at these activities. I know we drank way too much, we didn't exercise, and my grades suffered as a result. I shouldn't have been so shocked when I saw my final grades. To add insult to injury, it really hit home when I signed up for the fitness and wellness class and found out I had gained more than 15 pounds since high school graduation. My fitness test results showed I was not even in an average fitness category for most components.

I am so glad the fitness course was a required class because I was able to correct my lifestyle before it spiraled out of control and I wasted more time in college. I started to



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exercise on an almost daily basis, and I learned so much about nutrition and healthy eating. Parties and alcohol were no longer important to me. I had a life to live and prepare for. It felt so good to once again become fit and eat a healthy/balanced diet. I rearranged my activities so that schoolwork and fitness were right at the top of my list. I stopped procrastinating on my schoolwork, and

I was doing cardio five times a week and lifting twice per week. My goal is to keep this up for the rest of my life. I now understand that if I want to enjoy wellness, I have to make fitness and healthy living a top priority in my life.

PERSONAL PROFILE: General Understanding of Fitness and Wellness

To the best of your ability, answer the following questions. If you do not know the answer(s), this chapter will guide you through them.

- I. Wellness implies making a constant and deliberate effort to stay healthy and achieve the highest potential for well-being. ___ True ___ False
- II. The minimum requirement in the *U.S. Federal Physical Activity Guidelines* is that you accumulate ___ minutes of moderate-intensity aerobic activity or ___ minutes of vigorous-intensity aerobic activity weekly.
- III. Cardiorespiratory endurance, strength, power, flexibility, agility, and speed are the basic components of health-related fitness. ___ True ___ False
- IV. My current blood pressure is ___/___ mm Hg, which is classified as (mark one) ___ normal, ___ prehypertension, or ___ hypertension.
- V. Are you aware of potential risk factors in your life and personal health family history that may increase your chances of developing disease? ___ Yes ___ No

Scientific findings have shown that physical inactivity and a negative lifestyle seriously threaten health and hasten the deterioration rate of the human body. Movement and physical activity are basic functions for which the human organism was created.

Advances in technology however, have almost completely eliminated the necessity for physical exertion in daily life. Physical activity is no longer a natural part of our existence. We live in an automated society where most of the activities that used to require strenuous exertion can be accomplished by machines with the simple push of a button.

Most nations, both developed and developing, are experiencing an epidemic of physical inactivity. In the United States, physical inactivity is the second greatest threat to public health (after tobacco use) and is often referenced in new concerns about *sitting disease*, **sedentary death syndrome (SeDS)**, and **hypokinetic diseases**.

At the beginning of the 20th century, **life expectancy** for a child born in the United States was only 47 years. The most common health problems in the Western world were infectious diseases, such as tuberculosis, diphtheria, influenza,

kidney disease, polio, and other diseases of infancy. Progress in the medical field largely eliminated these diseases. Then, as more people started to enjoy the “good life” (**sedentary** living, alcohol, fatty foods, excessive sweets, tobacco, and drugs), we saw a parallel increase in the incidence of **chronic diseases** such as cardiovascular disease, cancer, diabetes, and chronic respiratory diseases (Figure 1.1).

GLOSSARY

Sedentary death syndrome (SeDS) Cause of deaths attributed to a lack of regular physical activity.

Hypokinetic diseases *Hypo* denotes “lack of”; therefore, illnesses related to lack of physical activity.

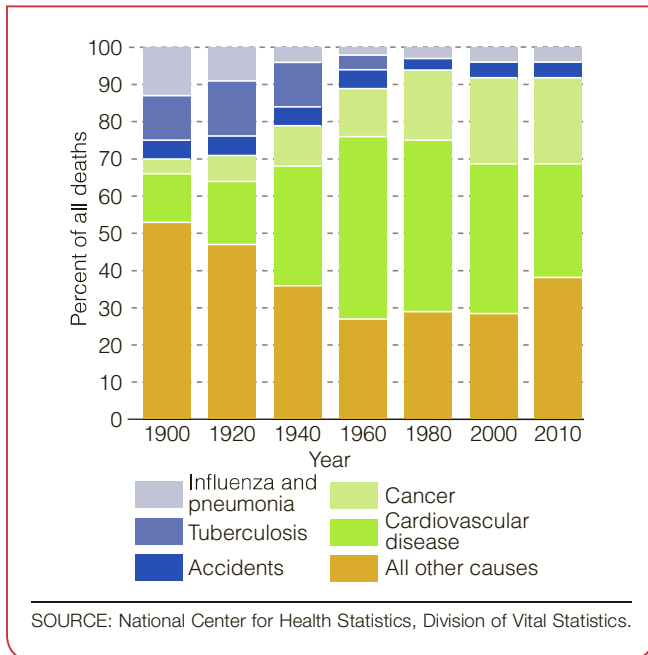
Life expectancy Number of years a person is expected to live based on the person’s birth year.

Sedentary Description of a person who is relatively inactive and whose lifestyle is characterized by a lot of sitting.

Chronic diseases Illnesses that develop as a result of an unhealthy lifestyle and last a long time.



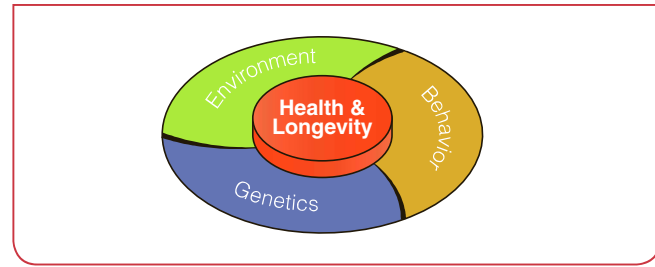
Modern-day conveniences lull people into a sedentary lifestyle.

Figure 1.1 Causes of death in the United States for selected years.

As the populations of the world have adopted a more sedentary lifestyle, the world has seen a steep incline in obesity rates. Before 1980, obesity rates throughout the world remained relatively steady. Then, beginning in the 1980s, obesity rates started to grow rapidly, especially in the United States, Australia, and England. Worldwide obesity now claims triple the number of victims as malnutrition. Overweight and obese people are now the majority in the 34 countries that make up the Organization for Economic Cooperation and Development (OECD). Over the last two decades, the world has transitioned from one where populations did not have enough to eat to one where, even in developing countries, an abundance of unhealthy food and inactivity is causing obesity, chronic diseases, and premature death.

As the incidence of chronic diseases climbed, we recognized that prevention is the best medicine. Consequently, a fitness and wellness movement developed gradually, beginning in the 1980s. People began to realize that good health is mostly self-controlled and that the leading causes of premature death and illness can be prevented by adhering to positive lifestyle habits.

Widespread interest in **health** and preventive medicine in recent years is motivating people to reexamine the foods they eat, incorporate more movement into activities of daily life, and participate in organized fitness and wellness programs. Since 2014, overweight and obesity rates have begun to stabilize in the United States, England, and Italy and are increasing at a slower pace than they once were in countries like Canada and Spain. We all desire to live a long life, and wellness programs seek to enhance the overall quality of life—for as long as we live.

Figure 1.2 Factors that affect health and longevity.

There are three basic factors that determine our health and longevity: genetics, the environment, and our behavior. In most cases, we cannot change our genetic circumstances, though the budding field of epigenetics is showing us that select genes can be switched on and off by lifestyle choices and environment. (For a more in-depth discussion on epigenetics see “Genetic versus Environmental Risk,” Chapter 12, pages 471–472.) We can certainly, however, exert control over the environment and our health behaviors so that we may reach our full physical potential based on our genetic code (see Figure 1.2). How we accomplish this goal will be thoroughly discussed through the chapters of this book.

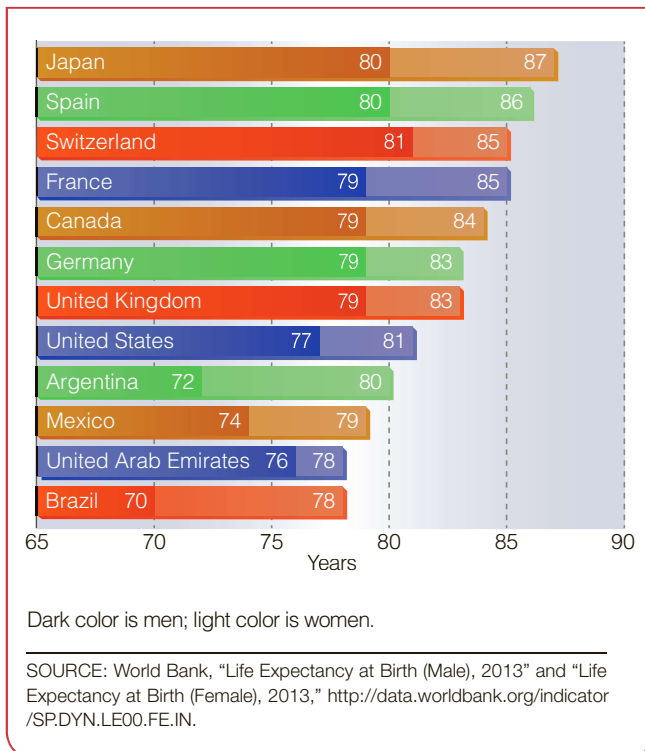
1.1 Life Expectancy

Currently, the average life expectancy in the United States is 78.8 years (76.5 years for men and 81.3 years for women).¹ In the past decade alone, life expectancy has increased by 1 year—the news, however, is not all good. The data show that people now spend an extra 1.2 years with a serious illness and an extra 2 years of disability. Mortality has been postponed because medical treatments allow people to live longer with various chronic ailments (cardiovascular disease, cancer, and diabetes).

Based on data from the World Health Organization (WHO), the United States ranks 33rd in the world for life expectancy (see Figure 1.3). Japan ranks first in the world with an overall life expectancy of 83.3 years.² While the United States was once a world leader in life expectancy, over recent years, the increase in life expectancy in the United States has not kept pace with that of other developed countries.

Several factors may account for the current U.S. life expectancy ranking, including the extremely poor health of some groups. This includes some Native American communities, rural African Americans, and the inner-city poor. This also includes poorly educated middle-aged Caucasians, a demographic group whose death rates have been rising since the late 1990s, while that of other groups have been falling.³ The United States also has fairly high levels of violence (notably, homicides), traffic fatalities, and suicide rates.⁴ The current trend is a widening disparity between those in the United

Figure 1.3 Life expectancy at birth for selected countries: 2005–2015 projections.



States with the highest and lowest life expectancy. For example, males in Fairfax County, Virginia, can expect to live as long as males in Japan, while those in Bolivar County, Mississippi, have the same life expectancy as males in countries with much lower life expectancies, like Pakistan. People with low socioeconomic status often lead more stressful lives, have more dangerous jobs, have less access to healthy food, are more likely to be exposed to environmental toxins, and live in neighborhoods that are not as safe or as conducive to physical activity. Physical activity trends by U.S. county, in most cases, are aligned with life expectancy trends.⁵

The United States also has not made the same headway with disease prevention as other countries. Some countries, like Australia, have made progress by arranging primary care to better detect and intervene with hypertension, for example. The latest data indicate that one in four adults in the United States have at least two chronic conditions. In terms of preventive health service, most of these patients do not receive 56 percent of the clinical recommendations from the U.S. Preventative Services Task Force. Eva H. DuGoff of Johns Hopkins Bloomberg School of Public Health has said, "Our system is not set up to care for people with so many different illnesses. Each one adds up and makes the burden of disease greater than the sum of its parts."⁶

A report by the OECD found that while the United States far outspent every other country in health care cost per capita, it also easily had the highest rates of obesity of all

34 OECD countries.⁷ In terms of average weight, the United States has the world's third heaviest population, trailing only Tonga and Micronesia. According to estimates from the Centers for Disease Control and Prevention, 35.1 percent of the adult population in the United States is obese. As a nation, we are seeing the consequences of these numbers unfold. Incidence of diabetes climbed dramatically in parallel step with the increased incidence of obesity.⁸ Today, nearly half of the people in the United States have diabetes or prediabetes.⁹ Thankfully, the rise in U.S. diabetes rates have begun to plateau, as obesity rates have done the same, providing one of the first glimmers of hope in our fight against chronic disease. Diabetes is the third most expensive chronic disease to treat, preceded only by angina (heart disease) and hypertension, respectively. All three of these chronic conditions are linked with obesity.¹⁰ Additional information on the obesity epidemic and its detrimental health consequences is given in Chapter 5.

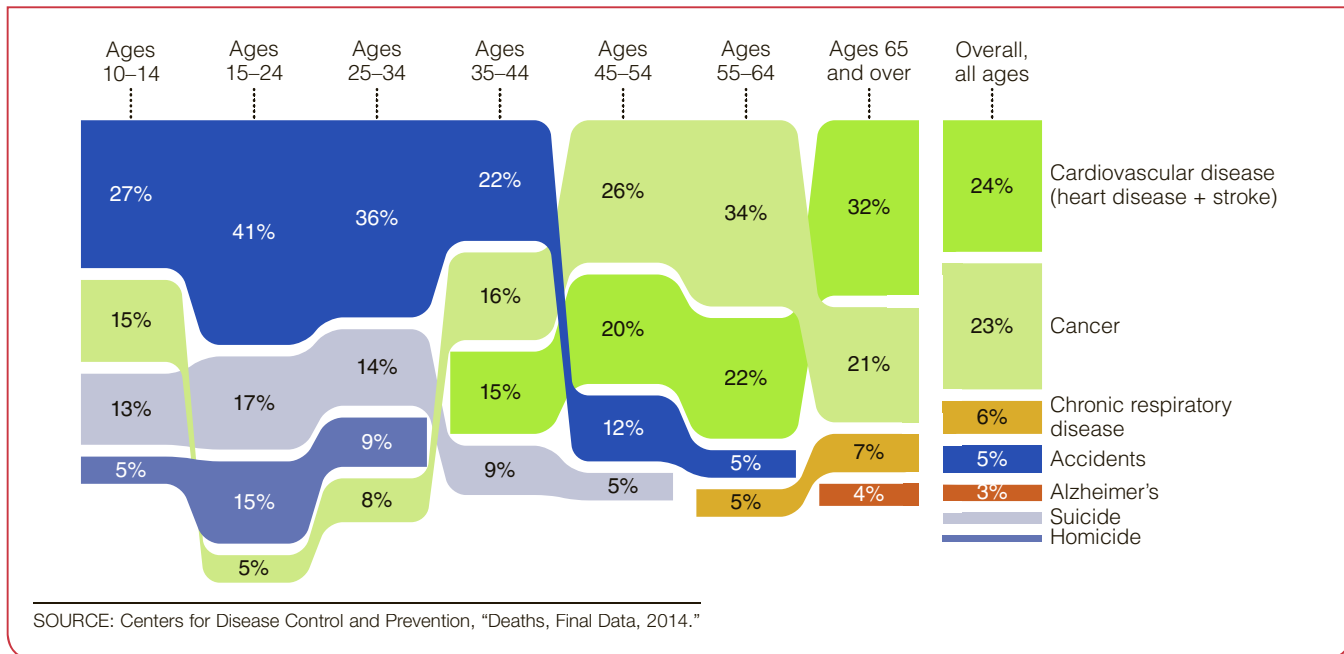
Life expectancy for men in the United States is almost 5 years lower than for women. For years it had been assumed that the difference is based on biology, but we are learning that most likely the gender gap is related to lifestyle behaviors most commonly observed in men. Around 1980, the gender gap in life expectancy was almost 8 years. The decrease in the gender gap is thought to be due to the fact that women are increasingly taking on jobs, habits, and stressors of men, including drinking and employment outside the home.

Men, nonetheless, still report higher stress on the job and are less likely to engage in stress management programs. Also, 95 percent of employees in the 10 most dangerous jobs are men. Furthermore, men's health is not given the same degree of attention in terms of public health policies. Thus, men need to take a more proactive role for their own health and public health policies.

"Masculinity" itself is also partially to blame. Studies have consistently shown that men are less likely to visit a physician when something is wrong and are less likely to have preventive care visits to be screened for potential risk factors such as hypertension, elevated cholesterol, diabetes, obesity, substance abuse, and depression or anxiety. It is a troubling paradox, considering that men are at greater risk for each of the top risk factors for chronic disease. As a result, chronic diseases in men are often diagnosed at a later stage, when a cure or adequate management is more difficult to achieve. Men also drive faster than women and are more likely to engage in risk-taking activities. Of all road traffic fatalities among countries studied in the most recent OECD report, a disparate 74 percent of victims were men.

GLOSSARY

Health State of complete well-being—not just the absence of disease or infirmity.

Figure 1.4 Leading causes of death in the United States by age.

1.2 Leading Health Problems in the United States

The leading causes of death in the United States today are largely related to lifestyle and personal choices (Figure 1.4). The U.S. Centers for Disease Control and Prevention have found that 7 of 10 Americans die of preventable chronic diseases. Specifically, about 48 percent of all deaths in the United States are caused by cardiovascular disease and cancer.¹¹ Almost 80 percent of the latter deaths could be prevented through a healthy lifestyle program. The third and fourth leading causes of death across all age groups, respectively, are chronic lower respiratory disease and accidents. From the age of 1 to 44, accidents are the leading cause of death, with automobile accidents being the leading cause of death in the 5-to-24 age group.¹²

HOEGER KEY TO WELLNESS



Scientists believe that a healthy lifestyle program has the power to prevent 80 percent of deaths from cardiovascular disease and cancer.

Diseases of the Cardiovascular System

The most prevalent degenerative diseases in the United States are those of the cardiovascular system. The umbrella of **cardiovascular diseases** includes such conditions as **coronary heart disease (CHD)**, **heart attacks**, and **strokes**. About 28.5 percent of all deaths in this country are attributed to diseases of the heart and blood vessels. According to the American Heart Association (AHA), more than one in three

adults in the United States are afflicted with diseases of the cardiovascular system, including one in three adults living with hypertension (high blood pressure) and 15.4 million with CHD. (Many of these people have more than one type of cardiovascular disease.) These numbers are devastating but can change. As we gained understanding of the effects of lifestyle on chronic disease during the second half of the 20th century, more people participated in wellness programs, and cardiovascular mortality rates dropped. The decline began in about 1963, and between 1969 and 2013, the incidence of heart disease dropped by 68 percent and the incidence of stroke by 77 percent. This decrease is credited to higher levels of wellness and better treatment modalities in the United States. A complete cardiovascular disease prevention program is outlined in Chapter 10.

Healthy Habits That Cut the Risk for Serious Disease

According to the Centers for Disease Control and Prevention, four health habits can reduce your risk of chronic diseases such as heart disease, cancer, and diabetes by almost 80 percent:

- Get at least 30 minutes of daily moderate-intensity physical activity.
- Don't ever smoke.
- Eat a healthy diet (ample fruits and vegetables, whole grain products, and low meat consumption).
- Maintain a body mass index (BMI) of less than 30.

The latest research would add one more crucial life-saving habit: Reduce the amount of time you spend sitting each day.

Cancer

The second overall leading cause of death in the United States is cancer. For Americans ages 45 to 64, however, it is the leading cause of death. Cancer is considered the number-one health fear of the American people. About 23 percent of all deaths in the United States are attributable to cancer. About 596,000 Americans died from this disease in 2016 (i.e., 1,674 each day), and more than 1.7 million new cases were reported the same year.¹³ The major contributor to the increase in the incidence of cancer deaths during the past five decades is lung cancer, of which 90 percent for males and 80 percent for females is caused by tobacco use.¹⁴ Furthermore, smoking accounts for almost 30 percent of all deaths from cancer. More than 30 percent of deaths are related to nutrition, physical inactivity, excessive body weight, and other faulty lifestyle habits. The American Cancer Society maintains that the most influential factor in fighting cancer today is prevention through health education programs. Lifestyle choices at a young age affect cancer risk throughout a lifetime. A comprehensive cancer-prevention program is presented in Chapter 12.

Chronic Lower Respiratory Disease

Chronic lower respiratory disease (CLRD), the third leading cause of death, is a general term that includes chronic obstructive pulmonary disease, emphysema, and chronic bronchitis (all diseases of the respiratory system). Although CLRD is related mostly to tobacco use (see Chapter 13 for discussion on how to stop smoking), lifetime nonsmokers also can develop CLRD.

Precautions to prevent CLRD include consuming a low-fat, low-sodium, nutrient-dense diet; staying physically active; not smoking and not breathing cigarette smoke; getting a pneumonia vaccine if older than age 50 and a current or ex-smoker; and avoiding swimming pools for individuals sensitive to chlorine vapor.

Accidents

Accidents are the fourth overall leading cause of death and the leading cause of death until age 44. Even though not all accidents are preventable, many are. Consider automobile accidents, the leading cause of death for teens. Across the United States, fewer than 15 percent of people taking trips in

automobiles choose not to wear seatbelts, yet these people account for half of all automobile deaths. As for the cause of automobile accidents themselves, fatal accidents are often related to failure to stay in the correct lane or yield the right of way due to driver distraction or alcohol use.¹⁵

Most people do not perceive accidents as a health problem. Even so, accidents affect the total well-being of millions of Americans each year. Accident prevention and personal safety are part of a health-enhancement program aimed at achieving a better quality of life. Proper nutrition, exercise, stress management, and abstinence from cigarette smoking are of little help if the person is involved in a disabling or fatal accident as a result of distraction, making a single reckless decision, or not wearing seat belts properly.

Accidents do not just happen. We cause accidents, and we are victims of accidents. Although some factors in life, such as earthquakes, tornadoes, and airplane accidents, are completely beyond our control, more often than not, personal safety and accident prevention are a matter of common sense. Most accidents stem from poor judgment and confused mental states, which occur when people are upset, mentally spent, not paying attention to the task at hand, trying to do too much at once, or abusing alcohol or other drugs.

With the advent of cell phones, distracted driving accidents have climbed. For teens, specifically, 6 in 10 of all moderate to severe automobile accidents result from driver distraction.¹⁶ On an average day in the United States, nine people are killed as a result of distracted driving, and more than 1,000 people are injured. As the Senior Director of Transportation Strategic Initiatives for the National Safety Council, David Teater, put it, “You never think it will happen to you—until it does.” Teater’s research has been motivated by the loss of his 12-year-old son in a cell phone-related accident. Research utilizing brain imaging has uncovered the cognitive workload and collision risk during multiple driving scenarios (see Distracted Driving Box on page 8).

Alcohol abuse is the number-one overall cause of all accidents. About half of accidental deaths and suicides in the United States are alcohol related. Further, alcohol intoxication remains the leading cause of fatal automobile accidents in the United States by taking the lives of 30 people every day. Other commonly abused drugs alter feelings and perceptions, generate mental confusion, and impair judgment and coordination, greatly enhancing the risk for accidental **morbidity** and mortality (Chapter 13).

GLOSSARY

Cardiovascular disease The array of conditions that affect the heart (cardio-) and the blood vessels (-vascular); often used interchangeably with the term heart disease. Under the cardiovascular disease umbrella are diseases including stroke and coronary heart disease (CHD). CHD, in turn, is an umbrella term for diseases that affect the heart and coronary arteries, which includes heart attacks.

Coronary heart disease (CHD) A disease in which plaque builds up in the arteries that supply blood to the heart (these are the coronary arteries, the term “coronary” evolved from the word for “crown or wreath,” referring to the arteries that circle the heart).

Heart attack Damage to an area of the myocardium (heart muscle) that is deprived

of oxygen, usually due to blockage of a diseased coronary artery.

Stroke A condition in which a blood vessel that feeds the brain is clogged, leading to blood flow disruption to the brain. Sometimes referred to as a brain attack.

Morbidity A condition related to or caused by illness or disease.

Distracted Driving

Automobile accidents are the number-one cause of death for teens in the United States. Recent studies on distracted driving have used new technology, including real-time brain imaging, to offer new insight about protecting ourselves behind the wheel. Following are insights for drivers.

1. *Listening to the radio is nearly as safe as driving with no distractions.*
2. *Having a cell phone conversation increases collision incidence fourfold. The risk is identical for a hands-free device and a hand held phone.^a*
3. *Having a cell phone conversation causes the brain to screen out 50 percent of visual cues. The ability to look directly at but not “see” an object is termed “inattention blindness.” It is not uncommon for a distracted driver running a red light to collide with the second or third car in an intersection, having not “seen” the first cars. Talking on a phone while driving decreases reaction time to pedestrians in a crosswalk by 40 percent.^b*
4. *Having a conversation with an adult passenger is safer than having a conversation on a cell phone. Passengers who are experienced drivers help the driver by pausing conversation and by pointing out cues as needed. For a teen driver, the incidence of collision resulting in death increases with the number of teen passengers.*
5. *Though crash risk is lower when talking with a passenger, cognitive workload can be the same as when talking on a cell phone. Topic of conversation and emotional involvement affect safety in both types of conversation.*
6. *The brain does not multitask, but rather switches attention between tasks. Some dual tasks do not cause a problem; others do. When driving and holding a conversation, the brain often recognizes conversation as the primary task. Switching is a complex process that requires events to be committed to short-term memory before they can be “encoded,” the stage when the brain chooses what to “see.” It is not uncommon for switching time to be tenths of a second, the difference of several car lengths when breaking. This is termed “reaction time switching costs.”*
7. *The brain remains somewhat distracted for up to 27 seconds following a phone conversation, text, or voice technology interaction.^c*
8. *Because the majority of trips do not involve a situation that requires split-second timing, drivers can gain a false sense of security about being able to multitask.*
9. *Making a left turn while talking on a cell phone or hands-free device is among the most dangerous driving activities.^d*
10. *Reaching for a moving object or turning in your seat increases collision incidence by eight to nine times.*
11. *Texting while driving increases collision incidence by 16 times. Driving while talking on a cell phone is done more frequently by more drivers for longer lengths of*

time than texting and so causes more deaths. Consider using your phone's do not disturb setting or an app that blocks texting while driving. Because our minds are social and curious, we find text alerts difficult to ignore.

12. *Parents driving children are just as likely to talk on the phone and use distractions, including navigation systems, as other drivers.^e*

13. *Using Apple's Siri while driving to get directions, send texts, post to social media, or check appointments can be as dangerous as texting while driving, even when hands-free.^f*

We cannot control what information our brain chooses to encode and screen out while driving. We can control our decision to use a cell phone or to speak up when a driver is putting passengers in danger.



AAA Foundation for Traffic Safety

^aTraining, Research, and Education for Driving Safety, “UC San Diego Joins Nationwide Efforts to Curb Phone Use While Driving,” released online December 4 2013, available at <http://health.ucsd.edu/news/releases/Pages/2013-12-04-TREDS-just-drive-program.aspx>; J. G. Gaspar, W. M. Street, M. B. Windsor, R. Carbonari, H. Kaczmarek, A. F. Kramer, and K. E. Mathewson, “Providing Conversation Partners Views of the Driving Scene Mitigates Cell Phone-Related Distraction,” *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* 57, no. 1 (2013).

^bJill U. Adams, “Talking on a Cellphone While Driving Is Risky. But simpler Distractions Can Also Cause Harm,” *Washington Post*, February 10, 2014.

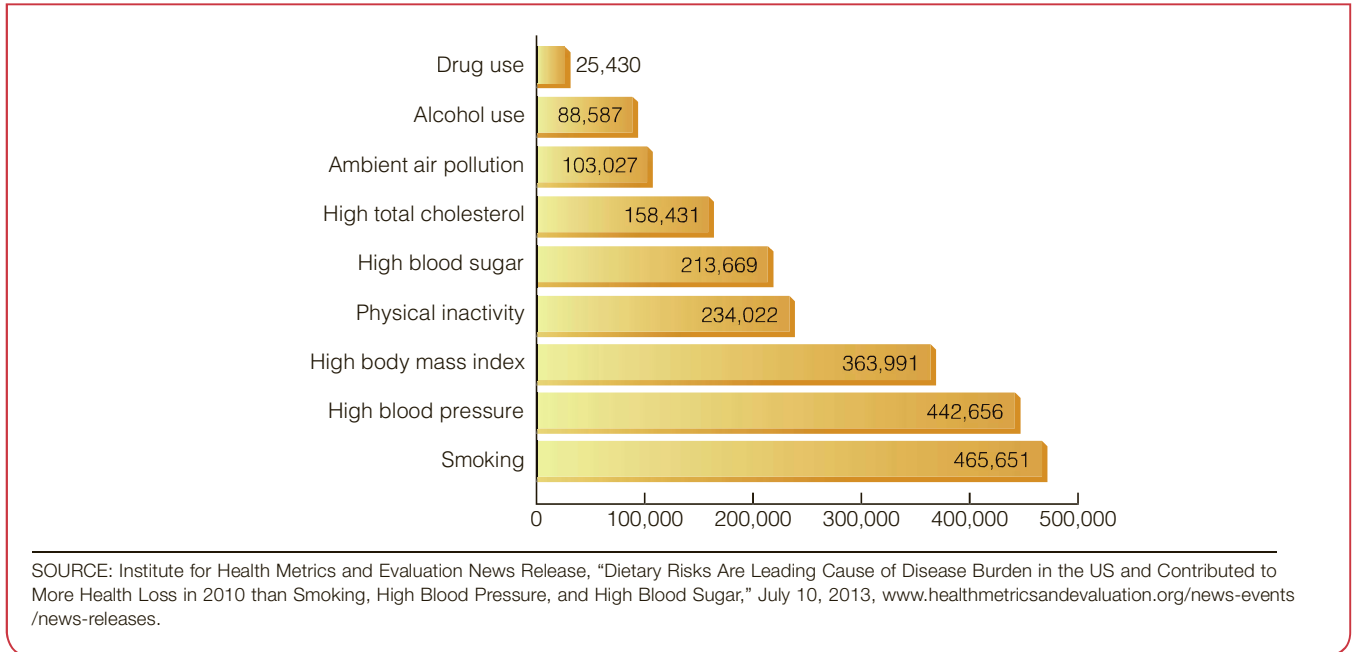
^c“Up to 27 Seconds of Inattention after Talking to Your Car or Smartphone,” The University of Utah UNews, October 27, 2015, available at <http://unews.utah.edu/up-to-27-seconds-of-inattention-after-talking-to-your-car-or-smart-phonel/>.

^dTom A. Schweizer, Karen Kan, Yuwen Hung, Fred Tarn, Gary Naglie, and Simon J. Graham, “Brain Activity during Driving with Distraction: An Immersive fMRI Study,” *Frontiers in Human Neuroscience*, February 28, 2013, doi:10.3389/fnhum.2013.00053.

^eMichelle L. Macy, Patrick M. Carter, C. Raymond Bingham, Rebecca M. Cunningham, and Gary L. Freed, “Potential Distractions and Unsafe Driving Behaviors Among Drivers of 1- to 12-Year-Old Children,” *Academic Pediatrics* 14, no. 3 (2014): 279.

^fUniversity of Utah News Center, “Talking to Your Car Is Often Distracting,” October 7, 2014, available online at http://unews.utah.edu/news_releases/talking-to-your-car-is-often-distracting/.

Figure 1.5 Death from all causes attributable to lifestyle-related risk factors for men and women in the United States.

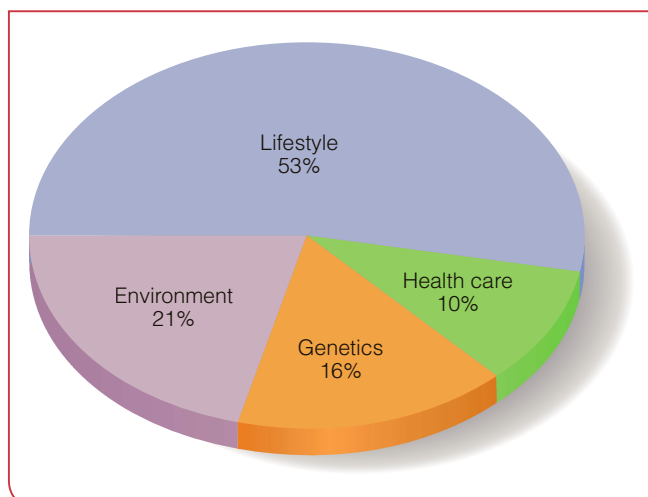


1.3 Lifestyle as a Health Problem

The underlying causes of death attributable to leading **risk factors** in the United States (Figure 1.5) indicate that most factors are related to lifestyle choices we make. Of the approximately 2.5 million yearly deaths in the United States, the “big five” factors—tobacco smoking, high blood pressure, overweight and obesity, physical inactivity, and high blood glucose—are responsible for almost 1.5 million deaths each year.

Based on estimates, more than half of disease is lifestyle related, a fifth is attributed to the environment, and a tenth is influenced by the health care the individual receives. Only 16 percent is related to genetic factors (Figure 1.6). Thus, the individual controls as much as 80 percent of his or her vulnerability to disease—and thus quality of life. In essence,

Figure 1.6 Estimated impact of the factors that affect health and well-being.



most people in the United States are threatened by the very lives they lead today.

Because of the unhealthy lifestyles that many young adults lead, their bodies may be middle-aged or older! Many school physical fitness programs do not emphasize the skills necessary for young people to maintain a high level of fitness and health throughout life. The intent of this book is to provide those skills and help to prepare you for a lifetime of physical fitness and wellness. A healthy lifestyle is self-controlled, and you can learn how to take charge of your own health and fitness. Healthy choices made today influence health for decades.

1.4 The Dose-Response Relationship between Physical Activity and Health

Among the benefits of regular physical activity and exercise are a significant reduction in premature mortality and decreased risks for developing heart disease, stroke, metabolic syndrome, type 2 diabetes, obesity, osteoporosis, colon and breast cancers, high blood pressure, depression, and even dementia and Alzheimer’s. But we did not always understand the relationship between physical activity and mortality rates, in particular, the dose-response relationship.

During the second half of the 20th century, scientists began to realize the importance of good fitness and improved lifestyle in the fight against chronic diseases, particularly those

GLOSSARY

Risk factors Lifestyle and genetic variables that may lead to disease.