



SIXTEENTH EDITION

Handbook of Nonprescription Drugs

An Interactive Approach to Self-Care

Rosemary R. Berardi
Stefanie P. Ferreri
Anne L. Hume
Lisa A. Kroon
Gail D. Newton
Nicholas G. Popovich
Tami L. Remington
Carol J. Rollins
Leslie A. Shimp
Karen J. Tietze



American Pharmacists Association[®]
Improving medication use. Advancing patient care.

APhA

Handbook of
Nonprescription Drugs
An Interactive Approach to Self-Care

NOTICE

Drug therapy and other treatment information are evolving constantly, because of ongoing research and clinical experience, and are often subject to interpretation. The publisher, editors, authors, and other contributors have made every effort to ensure the accuracy and completeness of the information presented in this publication. However, these parties cannot be held responsible for the continued accuracy of the information, any inadvertent errors or omissions, or the application of this information, and shall have no liability to any person or entity with regard to claims, loss, or damage caused or alleged to be caused, directly or indirectly, by the use of the information contained herein. Readers are advised that decisions regarding any treatment, including drug therapy, must be based on the independent judgment of the clinician, changing information about a treatment or drug (e.g., as reflected in the literature and manufacturer's most current product information), and changing medical practices.

The authors and other contributors have written this book in their private capacities. No official support or endorsement by any federal or state agency or pharmaceutical company is intended or inferred.



SIXTEENTH EDITION

16

Handbook of Nonprescription Drugs

An Interactive Approach to Self-Care

Rosemary R. Berardi
Stefanie P. Ferreri
Anne L. Hume
Lisa A. Kroon
Gail D. Newton
Nicholas G. Popovich
Tami L. Remington
Carol J. Rollins
Leslie A. Shimp
Karen J. Tietze



American Pharmacists Association[®]
Improving medication use. Advancing patient care.

APhA
Washington, DC

MANAGING EDITOR

Linda L. Young

EDITORIAL SERVICES

DataMasters Professional Editing Services, Eileen Kramer, Linda Young, Potomac Indexing, LLC

COMPOSITION SERVICES

Circle Graphics Inc.

COVER DESIGNER

Scott Neitzke, APhA Creative Services

ANATOMIC DRAWINGS

Aaron Hilmers, Gray Matter Studio, Walter Hilmers, Jr.

© 2009 by the American Pharmacists Association
APhA was founded in 1852 as the American Pharmaceutical Association.

Published by the American Pharmacists Association
1100 15th Street, NW, Suite 400
Washington, DC 20005-1707
www.pharmacist.com

All rights reserved.

No part of this book may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without written permission from the publisher.

To comment on this book via e-mail, send your message to the publisher at aphabooks@aphanet.org.

Library of Congress Cataloging-in-Publication Data
Main entry under the title: Handbook of Nonprescription Drugs

ISSN 0889-7816
ISBN-13 978-1-58212-122-2

How to Order This Book

Online: www.pharmacist.com

By phone: 800-878-0729 (770-280-0085 from outside the United States and Canada)

VISA®, MasterCard®, and American Express® cards accepted.

Contents

Foreword	ix
Preface	xi
Editors	xiii
Contributors	xv
How to Use the Case Problem-Solving Model	xxiii

SECTION I: The Practitioner's Role in Self-Care

Editor: Nicholas G. Popovich

1 Self-Care and Nonprescription Pharmacotherapy	3
<i>Lawrence W. Davidow</i>	
2 Patient Assessment and Consultation	17
<i>Lawrence M. Brown and Brian J. Isetts</i>	
3 Multicultural Aspects of Self-Care	35
<i>Magaly Rodriguez de Bittner and Gloria J. Nichols-English</i>	
4 Legal and Regulatory Issues in Self-Care Pharmacy Practice	51
<i>Ilisa B. G. Bernstein and Edward D. Rickert</i>	

SECTION II: Pain and Fever Disorders

Editor: Tami L. Remington

5 Headache	65
<i>Tami L. Remington</i>	
6 Fever	83
<i>Brett Feret</i>	
7 Musculoskeletal Injuries and Disorders	95
<i>Eric Wright</i>	

SECTION III: Reproductive and Genital Disorders

Editor: Leslie A. Shimp

8 Vaginal and Vulvovaginal Disorders	117
<i>Nicole M. Lodise and Leslie A. Shimp</i>	
9 Disorders Related to Menstruation	137
<i>Leslie A. Shimp</i>	
10 Prevention of Pregnancy and Sexually Transmitted Infections	157
<i>Louise Parent-Stevens and Jennifer L. Hardman</i>	

SECTION IV: Respiratory Disorders

Editor: Karen J. Tietze

- | | | |
|-----------|--|-----|
| 11 | Disorders Related to Colds and Allergy | 177 |
| | <i>Kelly L. Scolaro</i> | |
| 12 | Cough | 203 |
| | <i>Karen J. Tietze</i> | |
| 13 | Asthma | 213 |
| | <i>Suzanne G. Bollmeier and Theresa R. Prosser</i> | |

SECTION V: Gastrointestinal Disorders

Editor: Rosemary R. Berardi

- | | | |
|-----------|---|-----|
| 14 | Heartburn and Dyspepsia | 231 |
| | <i>Ann Zweber and Rosemary R. Berardi</i> | |
| 15 | Intestinal Gas | 247 |
| | <i>Patrick D. Meek</i> | |
| 16 | Constipation | 263 |
| | <i>Clarence E. Curry, Jr., and Demetris M. Butler</i> | |
| 17 | Diarrhea | 289 |
| | <i>Paul C. Walker</i> | |
| 18 | Anorectal Disorders | 309 |
| | <i>Juliana Chan and Rosemary R. Berardi</i> | |
| 19 | Pinworm Infection | 325 |
| | <i>Jeffery A. Goad and Joycelyn Mallari</i> | |
| 20 | Nausea and Vomiting | 335 |
| | <i>Laura Shane-McWhorter and Lynda Oderda</i> | |
| 21 | Poisoning | 355 |
| | <i>Wendy Klein-Schwartz and Barbara Insley Crouch</i> | |
| 22 | Ostomy Care and Supplies | 367 |
| | <i>Joan Lemer Selekof and Sharon Wilson</i> | |

SECTION VI: Nutrition and Nutritional Supplementation

Editor: Carol J. Rollins

- | | | |
|-----------|--|-----|
| 23 | Essential and Conditionally Essential Nutrients | 389 |
| | <i>Yvonne Huckleberry and Carol J. Rollins</i> | |
| 24 | Functional and Meal Replacement Foods | 419 |
| | <i>Carol J. Rollins</i> | |
| 25 | Sports Nutrition and Performance-Enhancing Nutrients | 449 |
| | <i>Mark Newnham</i> | |
| 26 | Infant Nutrition and Special Nutritional Needs of Children | 467 |
| | <i>Katherine H. Chessman</i> | |
| 27 | Overweight and Obesity | 497 |
| | <i>Sarah J. Miller and Cathy L. Bartels</i> | |

SECTION VII: Ophthalmic, Otic, and Oral Disorders

Editor: Stefanie P. Ferreri

- | | | |
|-----------|--|-----|
| 28 | Ophthalmic Disorders | 519 |
| | <i>Richard G. Fiscella and Michael Kirk Jensen</i> | |
| 29 | Prevention of Contact Lens-Related Disorders | 545 |
| | <i>Janet P. Engle</i> | |
| 30 | Otic Disorders | 569 |
| | <i>Linda Krypel</i> | |
| 31 | Prevention of Hygiene-Related Oral Disorders | 581 |
| | <i>Amy L. Whitaker</i> | |
| 32 | Oral Pain and Discomfort | 601 |
| | <i>Macary Weck Marciniak</i> | |

SECTION VIII: Dermatologic Disorders

Editor: Gail D. Newton

33	Atopic Dermatitis and Dry Skin	627
	<i>Steven A. Scott</i>	
34	Scaly Dermatoses	643
	<i>Steven A. Scott</i>	
35	Contact Dermatitis	657
	<i>Kimberly S. Plake and Patricia L. Darbishire</i>	
36	Diaper Dermatitis and Prickly Heat	675
	<i>Nicholas E. Hagemeyer</i>	
37	Insect Bites and Stings and Pediculosis	689
	<i>Wayne Buff and Clifton Fuhrman</i>	
38	Acne	707
	<i>Kristi Quairoli and Karla T. Foster</i>	
39	Prevention of Sun-Induced Skin Disorders	719
	<i>Kimberly M. Crosby</i>	
40	Skin Hyperpigmentation and Photoaging	735
	<i>Kimberly M. Crosby</i>	
41	Minor Burns and Sunburn	745
	<i>Valerie T. Prince</i>	
42	Minor Wounds and Secondary Bacterial Skin Infections	759
	<i>Daphne B. Bernard</i>	
43	Fungal Skin Infections	775
	<i>Gail D. Newton and Nicholas G. Popovich</i>	
44	Warts	791
	<i>Nicholas G. Popovich and Gail D. Newton</i>	
45	Minor Foot Disorders	801
	<i>Cynthia W. Coffey and Karla T. Foster</i>	
46	Hair Loss	825
	<i>Michael D. Hogue</i>	

SECTION IX: Other Medical Disorders

Editor: Lisa A. Kroon

47	Diabetes Mellitus	837
	<i>Mitra Assemi and Candis M. Morello</i>	
48	Insomnia	869
	<i>Cynthia K. Kirkwood and Sarah T. Melton</i>	
49	Drowsiness and Fatigue	883
	<i>Michael Z. Wincor</i>	
50	Smoking Cessation	893
	<i>Lisa A. Kroon, Karen Suchanek Hudmon, and Robin L. Corelli</i>	

SECTION X: Home Medical Equipment

Editor: Leslie A. Shimp

51	Home Testing and Monitoring Devices	917
	<i>Geneva Clark Briggs and Holly Hurley</i>	
52	Adult Urinary Incontinence and Supplies	947
	<i>Christine K. O'Neil</i>	

SECTION XI: Complementary and Alternative Medicine*Editor: Anne Lamont Hume*

53	Introduction to Dietary Supplements	963
	<i>Candy Tsourounis and Cathi Dennehy</i>	
54	Natural Products	973
	<i>Cydney E. McQueen and Katherine Kelly Orr</i>	
55	Common Complementary and Alternative Medicine Health Systems	1015
	<i>Catherine Ulbricht and Erica Rusie-Seamon</i>	
	Index	1025
	Color Plates	Follow page 616

Foreword

The publication of the sixteenth edition of the American Pharmacists Association's *Handbook of Nonprescription Drugs: An Interactive Approach to Self-Care* could not be more timely. The Consumer Healthcare Products Association indicates that "retail sales of nonprescription medications in the United States in 2007 exceeded \$16.1 billion (excluding sales at Wal-Mart), reflecting an increase from \$3.1 billion in 1972 (http://www.chpa-info.org/OTC_Retail_Sales_1964_2007_.aspx?pid=77&cc=6; last accessed November 20, 2008). Other similar surveys confirm the increased use of nonprescription medications. Sales may also be boosted by the Internal Revenue Service Ruling 2003-102, which went into effect October 1, 2003. This ruling allows employers to reimburse properly substantiated nonprescription medication expenses, but not dietary supplements, from flexible health care spending accounts. (<http://www.irs.gov/pub/irs-drop/rr-03-102.pdf>; last accessed November 20, 2008). The anticipated increase in the number of prescription medications that will be reclassified as nonprescription will further confound the patient's dilemma in selecting appropriate self-treatment.

The use of complementary and alternative therapies, dietary supplements, nondrug measures, diagnostic tests, and medical devices is also an integral part of self-care. The paucity of clinical evidence as to their safety and effectiveness and the potential for serious adverse events when these products are combined with nonprescription or prescription medications demand that health care practitioners be knowledgeable about alternatives to traditional medications and be able to provide therapeutic information and guidance to the consumer. Unlike nonprescription medications, no federal regulatory agency evaluates the safety and effectiveness of complementary and alternative therapies.

Numerous other factors have contributed to the growing self-care movement in the United States, including an increase

in direct-to-consumer advertising of prescription and nonprescription medications. Information obtained from television commercials, newspaper and magazine advertisements, the Internet, and health-related articles serves to empower the consumer to make decisions about their own health care. However, individuals who wish to self-treat minor health disorders are faced with a staggering number of single-entity and combination nonprescription products and may not have adequate information to determine if their medical condition is amenable to self-treatment and if the self-selected treatment is appropriate for the condition.

All health care practitioners should be able to assist individuals in the management of their own self-care. However, pharmacists, because of their accessibility and expertise with respect to nonprescription and prescription medications, are in a unique position to fulfill the self-care needs of most individuals with minor health ailments. Thus, designing a self-care curriculum for pharmacy students with learning outcomes that ensure appropriate knowledge and skills is now more important than ever. The importance of this objective is reflected in the most recent Accreditation Council for Pharmacy Education's Accreditation Guidelines (<http://www.acpe-accredit.org/deans/standards.asp>; last accessed November 20, 2008) and the Competency Statements of the North American Pharmacist Licensure Examination (NAPLEX) taken by all United States pharmacy graduates prior to licensure (<http://www.nabp.net/ftpfiles/NABP01/updatednaplexblueprint.pdf>; last accessed November 20, 2008).

The sixteenth edition of the American Pharmacists Association's *Handbook of Nonprescription Drugs: An Interactive Approach to Self-Care* is an excellent and up-to-date resource for all health care educators, students, and practitioners engaged in self-care.

JOHN A. GANS, PHARM.D.
Executive Vice President & CEO
American Pharmacists Association

This page intentionally left blank.

Preface

The newly revised and updated sixteenth edition of the *Handbook of Nonprescription Drugs: An Interactive Approach to Self-Care* is a comprehensive and authoritative textbook on self-care and nonprescription medications. The goal for this edition was to produce an up-to-date reference that is not only helpful to all health care professionals and students—but is also user-friendly. This edition remains true to the spirit of previous editions, namely to assist practitioners and students in developing knowledge and problem-solving skills needed to:

- Assess a patient's health status, medical problems, and current practice of self-treatment including nonprescription and prescription medications, dietary supplements, and other self-care measures.
- Determine whether self-care and/or self-testing and monitoring are appropriate
- If appropriate, recommend safe and effective self-care measures, taking into account the patient's treatment preferences.

Written and reviewed by experts, this edition of the *Handbook* continues to serve as an authoritative source for students and practitioners who guide and care for individuals undertaking self-treatment.

Highlights of New Features and Revisions

Considerable time and effort have been invested in improving this edition. We are hopeful that the following changes continue to improve the quality and usability of the book, and to provide increased clarity and convenience for students and practitioners.

- **Complementary and Alternative Medicine (CAM) Chapters:** The CAM section consists of three chapters that have been significantly revised and reorganized. A new introductory chapter provides a foundation for understanding current issues with regard to natural products. This chapter also addresses quackery and provides tips to educate consumers on how to spot fraudulent claims. The botanical and nonbotanical CAM chapters in the previous edition have been combined into a single chapter and organized according to an organ system approach. In previous editions, the third CAM chapter focused solely on homeopathy. Although the home-

opathy chapter possessed valuable information, it has been revised to address key points related to six different types of CAM health systems/healing practices, including naturopathy and massage. The intent of these changes was to provide the reader with a broad overview of the different health systems/healing practices that a consumer may be using.

- **Standardization of CAM Discussions in Disease-Specific Chapters:** In addition to revising the CAM section, the discussions of natural products in the individual disease-specific chapters have been carefully evaluated and standardized to ensure greater consistency in the assessment of the evidence supporting or refuting the use of natural products.
- **Prevention of Pregnancy and Sexually Transmitted Infections Chapter:** This chapter has been updated to include new and expanded information on the emergency contraceptive Plan B that is now available as a nonprescription product for women 18 years of age and older.
- **Primary Drug/Therapy Chapters:** Selected chapters have been designated as the primary chapter to discuss the basic information about a drug or other therapy (such as fiber, nutrition, dietary supplements) when these agents are used to treat multiple disorders. Other chapters that discuss the use of these drugs or therapies will focus on information relevant to the specific disorder and will cross-reference the primary chapter for basic information.
- **Case Assessment Model:** New cases were developed for each disease-related chapter.

Chapter Content

All disease-oriented chapters in this edition include the following features and information:

- Up-to-date information on nonprescription medications including indications, dosages, interactions, supportive evidence for efficacy and safety, medical conditions or symptoms amenable to self-treatment, prescription-to-nonprescription reclassifications, and nonprescription drug withdrawals from the market.
- Treatment algorithms that outline triage and treatment.
- Controversies in self-care therapeutics.
- Self-care treatment or prevention guidelines.
- Product tables with examples of specific nonprescription products.

- New nonprescription medications and dietary supplements. Nutrition-related dietary supplements, such as vitamins and minerals, continue to be discussed in the nutrition section of the book.

Chapter Features

Most chapter features remain unchanged and are intended to promote an interactive approach to self-care. Students and practitioners can use these features to develop or improve problem-solving and critical thinking skills.

- Disease-oriented chapters are grouped primarily according to body systems. These chapters begin with a discussion of the epidemiologic, etiologic, and pathophysiologic characteristics and the clinical manifestations of the disorder. These discussions are followed by a comprehensive discussion of self-care options. The inclusion of dietary supplements, as well as nonpharmacologic and preventive measures, completes the discussion of self-care options.
- Case studies, treatment algorithms, comparisons of self-treatments, patient education boxes, and product selection guidelines foster an interactive therapeutic approach to learning.
- Sections on the evaluation of patient outcomes reinforce follow-up of patients who are self-treating. This section defines the parameters for confirming successful self-treatment and those that indicate the need for medical referral.
- Chapters include tables that list interactions (drug–drug, drug–supplement, drug–nutrient), as well as dosage and administration guidelines.
- Authors provide comparisons of agents based on clinical studies of safety and efficacy, as well as product selection guidelines based on patient factors and preferences.
- Authors discuss the role of nonprescription therapies among the available treatment options for a specific disorder and describe other options in the event that nonprescription therapy fails or is not appropriate.
- The book’s organization and content allow students and practitioners to quickly identify the information needed

to make a treatment recommendation and to counsel patients.

Acknowledgments

We would like to acknowledge the many individuals who contributed to the new edition of this textbook. We are grateful to the 77 authors and coauthors and 131 reviewers who contributed to this comprehensive and authoritative textbook. These individuals were selected from many practice settings and health professions throughout the country. Their scholarship and clinical experience reflect a broad perspective and interdisciplinary approach to patient care. The dedication of the authors and reviewers in ensuring that chapters were accurate, comprehensive, balanced, and relevant to practice and of the highest quality is deeply appreciated.

The editors acknowledge the work of Celtina K. Reinert, PharmD, in standardizing the discussion of natural products in the disease chapters in this edition. At that time, she was a Natural Product Information and Research Fellow, University of Missouri–Kansas City School of Pharmacy Drug Information Center.

The authors of Chapter 55 also respectfully acknowledge the work of members of the Natural Standard Research Collaboration for their support in the development of the chapter, especially the efforts of Dr. Wendy Chao, Dawn Costa, Wendy Weissner, and Jen Woods.

We would like to convey a special thanks to Linda Young, our managing editor. Ms. Young provided invaluable guidance and support to the editors and authors in all aspects related to the publication of this edition of the textbook. She contributed to the copyediting of chapters, and managed the design, editorial, and composition stages of the book. Without her experience and attention to detail, the improvements in this edition would not have been possible.

We are confident that the combined efforts of these individuals will ensure that the *Handbook of Nonprescription Drugs: An Interactive Approach to Self-Care* continues to serve as the worldwide practice and teaching resource on self-care and nonprescription products.

ROSEMARY R. BERARDI
STEFANIE P. FERRERI
ANNE L. HUME
LISA A. KROON
GAIL D. NEWTON
NICHOLAS G. POPOVICH
TAMI REMINGTON
CAROL J. ROLLINS
LESLIE A. SHIMP
KAREN J. TIETZE

February 2009

Editors

Editor in Chief and Section Editor

Rosemary R. Berardi, PharmD, FCCP, FASHP

Professor of Pharmacy, Department of Clinical Sciences,
The University of Michigan College of Pharmacy, Ann Arbor

Section Editors

Stefanie P. Ferreri, PharmD, CDE

Clinical Assistant Professor and Director, Community
Pharmacy Residency Program, University of North Carolina
Eshelman School of Pharmacy, Chapel Hill

Anne Lamont Hume, PharmD, FCCP, BCPS

Professor of Pharmacy, Department of Pharmacy Practice,
University of Rhode Island College of Pharmacy, Kingston;
Adjunct Professor of Family Medicine, Brown
University/Memorial Hospital of Rhode Island, Providence

Lisa A. Kroon, PharmD, CDE

Associate Professor of Clinical Pharmacy, Department of
Clinical Pharmacy, University of California at San Francisco
School of Pharmacy

Gail D. Newton, PhD, RPh

Associate Professor, Department of Pharmacy Practice,
Purdue University School of Pharmacy and Pharmaceutical
Sciences, West Lafayette, Indiana

Nicholas G. Popovich, PhD

Professor and Head, Department of Pharmacy Administration,
University of Illinois at Chicago College of Pharmacy

Tami L. Remington, PharmD

Clinical Pharmacist, Department of Pharmacy, The
University of Michigan Hospitals and Health System; Clinical
Associate Professor, Department of Clinical Sciences, The
University of Michigan College of Pharmacy, Ann Arbor

Carol J. Rollins, MS, RD, PharmD, BCNSP

Coordinator, Nutrition Support Pharmacy, University
Medical Center, Tucson; Associate Clinical Professor,
Department of Pharmacy Practice and Science, University of
Arizona College of Pharmacy, Tucson

Leslie A. Shimp, PharmD, MS

Professor of Pharmacy, The University of Michigan College
of Pharmacy, Ann Arbor

Karen J. Tietze, PharmD

Professor of Clinical Pharmacy, Department of Pharmacy
Practice and Pharmacy Administration, Philadelphia College
of Pharmacy, University of the Sciences in Philadelphia,
Philadelphia, Pennsylvania

This page intentionally left blank.

Contributors

Authors

Note: Numbers in parentheses denote the chapter(s) authored or co-authored.

Mitra Assemi, PharmD (47)

Director, UCSF Fresno Pharmacy Education Program, Fresno, California; Associate Professor of Clinical Pharmacy, Department of Clinical Pharmacy, University of California at San Francisco School of Pharmacy

Cathy L. Bartels, PharmD, FAAIM (27)

Associate Professor, Department of Pharmacy Practice, Creighton University School of Pharmacy and Health Professions, Omaha, Nebraska

Rosemary R. Berardi, PharmD, FCCP, FASHP (14, 18)

Professor of Pharmacy, Department of Clinical Sciences, The University of Michigan College of Pharmacy, Ann Arbor

Daphne B. Bernard, PharmD, CACP (42)

Associate Professor, Department of Pharmacy Practice, Howard University College of Pharmacy, Nursing, and Allied Health Sciences, Washington, DC

Ilisa B. G. Bernstein, PharmD, JD (4)

Senior Advisor for Regulatory Policy, Office of Policy, Food and Drug Administration, Rockville, Maryland

Suzanne G. Bollmeier, PharmD, BCPS, AE-C (13)

Associate Professor of Pharmacy Practice, St. Louis College of Pharmacy, St. Louis, Missouri

Geneva Clark Briggs, PharmD, BCPS (51)

Clinical Associate, MedOutcomes, Inc., Richmond, Virginia

Lawrence M. Brown, PharmD, PhD (2)

Assistant Professor, Department of Pharmaceutical Sciences, College of Pharmacy; Assistant Professor, Department of Preventive Medicine, College of Medicine, University of Tennessee Health Sciences Center, Memphis

Wayne Buff, PharmD (37)

Associate Dean and Clinical Associate Professor, Department of Pharmacy Practice and Outcomes Sciences, South Carolina College of Pharmacy, University of South Carolina Campus, Columbia

Demetris M. Butler, PharmD (16)

Director of Clinical Pharmacy Programs, Clinical Pharmacy Associates, Inc., Laurel, Maryland

Juliana Chan, PharmD (18)

Clinical Assistant Professor, Department of Pharmacy Practice, College of Pharmacy; Department of Medicine, Sections of Digestive Diseases & Nutrition and Section of Hepatology, University of Illinois at Chicago

Katherine H. Chessman, PharmD, FCCP, BCNSP, BCPS (26)

Associate Professor, Department of Pharmacy Practice and Clinical Sciences, Clinical Pharmacy Specialist, Pediatrics/Pediatric Surgery, and Residency Program Director, Pediatric Pharmacy Practice, South Carolina College of Pharmacy, Medical University of South Carolina Campus, Charleston

Cynthia W. Coffey, PharmD (45)

Clinical Pharmacist, Pride Medical Pharmacy, Atlanta, Georgia

Robin L. Corelli, PharmD (50)

Professor of Clinical Pharmacy, Department of Clinical Pharmacy, University of California at San Francisco School of Pharmacy

Kimberly M. Crosby, PharmD, BCPS (39, 40)

Clinical Assistant Professor, Department of Clinical and Administrative Sciences, The University of Oklahoma College of Pharmacy—Tulsa; Clinical Pharmacist, USA Drug, Tulsa

Barbara Insley Crouch, PharmD, MSPH (21)

Director, Utah Poison Control Center and Professor (Clinical) and Vice Chair, Department of Pharmacotherapy, University of Utah College of Pharmacy, Salt Lake City

Clarence E. Curry, Jr., PharmD (16)

Associate Professor of Pharmacy Practice, Department of Clinical and Administrative Pharmacy Sciences, Howard University College of Pharmacy, Nursing and Allied Health Sciences, Washington, DC

Patricia L. Darbishire, PharmD (35)

Clinical Assistant Professor, Department of Pharmacy Practice, Purdue University School of Pharmacy and Pharmaceutical Sciences, West Lafayette, Indiana

Lawrence W. Davidow, PhD (1)

Director, Pharmacy Skills Laboratory, Clinical Assistant Professor, Department of Pharmacy Practice, and Director, Integrated Laboratory, Kansas University School of Pharmacy, Lawrence

Cathi Dennehy, PharmD (53)

Department of Clinical Pharmacy, University of California at San Francisco School of Pharmacy

Janet P. Engle, PharmD, RPh, FAPhA (29)

Associate Dean for Academic Affairs and Clinical Professor of Pharmacy Practice, University of Illinois at Chicago College of Pharmacy

Brett Feret, PharmD (6)

Clinical Associate Professor, University of Rhode Island College of Pharmacy, Kingston

Richard G. Fiscella, RPh, MPH (28)

Clinical Professor, Department of Pharmacy Practice, College of Pharmacy; Adjunctive Assistant Professor, Department of Ophthalmology, University of Illinois at Chicago

Karla T. Foster, PharmD (38, 45)

Clinical Assistant Professor, Department of Clinical and Administrative Sciences, Mercer University Southern School of Pharmacy, Atlanta, Georgia

Cliff Fuhrman, PhD (37)

Clinical Associate Professor, Department of Pharmaceutics and Biomedical Sciences, South Carolina College of Pharmacy, University of South Carolina Campus, Columbia

Jeffery A. Goad, PharmD, MPH (19)

Associate Professor of Clinical Pharmacy, Coordinator, Community Pharmacy Program, and Director, Community Pharmacy Practice Residence, University of Southern California School of Pharmacy; Travel Health Consultant, University of Southern California Pharmacy, Student Health and Family Medicine, Los Angeles

Nicholas E. Hagemeyer, PharmD, MS (36)

Pharmacist, Cowan Drugs, Inc., Lebanon, Indiana

Jennifer L. Hardman, PharmD (10)

Clinical Pharmacist and Clinical Assistant Professor, Department of Pharmacy Practice, University of Illinois at Chicago College of Pharmacy (1999–2007)

Michael D. Hogue, PharmD (46)

Assistant Professor, Department of Pharmacy Practice, Samford University McWhorter School of Pharmacy, Birmingham, Alabama

Yvonne Huckleberry, RD, PharmD (23)

Clinical Staff Pharmacist, Department of Pharmacy, University Medical Center, Tucson; Clinical Assistant Professor, College of Pharmacy, University of Arizona, Tucson

Karen Suchanek Hudmon, DrPH, MS, RPh (50)

Associate Professor, Department of Pharmacy Practice, Purdue University School of Pharmacy and Pharmaceutical Sciences, Indianapolis, Indiana

Holly Hurley, PharmD (51)

Assistant Professor of Pharmacy Practice, University of Appalachia College of Pharmacy, Grundy, Virginia

Brian J. Isetts, PhD, BCPS, FAPhA (2)

Associate Professor, Peters Institute of Pharmaceutical Care, Department of Pharmaceutical Care and Health Systems, University of Minnesota College of Pharmacy, Minneapolis

Michael Kirk Jensen, RPh, MS (28)

Clinical Associate Professor of Pharmacy Practice, University of Utah College of Pharmacy; Clinical Ophthalmic Pharmacy Specialist, John A. Moran Eye Center, Salt Lake City, Utah

Cynthia K. Kirkwood, PharmD, BCPP (48)

Vice Chair for Education and Associate Professor of Pharmacy, Virginia Commonwealth University, Richmond

Wendy Klein-Schwartz, PharmD, MPH (21)

Coordinator of Research and Education, Maryland Poison Center and Associate Professor, Department of Pharmacy Practice and Science, University of Maryland School of Pharmacy, Baltimore

Lisa A. Kroon, PharmD, CDE (50)

Associate Professor of Clinical Pharmacy, Department of Clinical Pharmacy, University of California at San Francisco School of Pharmacy

Linda Krypel, PharmD, FAPhA (30)

Professor of Pharmacy Practice, Department of Pharmacy Practice, Drake University College of Pharmacy and Health Sciences, Des Moines, Iowa

Nicole M. Lodise, PharmD (8)

Assistant Professor of Pharmacy Practice–Women's Health/Tobacco Cessation, Union University Albany College of Pharmacy; Clinical Pharmacy Specialist, Albany Medical Center, Albany, New York

Joycelyn Mallari, PharmD (19)

Assistant Professor, Department of Pharmacotherapy and Outcome Sciences, Loma Linda University School of Pharmacy, Loma Linda, California

Macary Weck Marciniak, PharmD, BCPS (32)

Clinical Associate Professor, University of North Carolina Eshelman School of Pharmacy, Chapel Hill

Cydney E. McQueen, PharmD (54)

Assistant Director, Natural Product Information and Assistant Clinical Professor, Pharmacy Practice, University of Missouri-Kansas City Drug Information Center

Patrick D. Meek, PharmD, MS (15)

Assistant Professor, Department of Pharmacy Practice, Union University Albany College of Pharmacy, Albany, New York

Sarah T. Melton, PharmD, BCPP, CGP (48)

Associate Professor of Pharmacy Practice, University of Appalachia College of Pharmacy, Oakwood, Virginia

Sarah J. Miller, PharmD (27)

Professor of Clinical Pharmacy, Department of Pharmacy Practice, University of Montana Skaggs School of Pharmacy, Missoula

Candis M. Morello, PharmD, CDE (47)

Assistant Professor of Clinical Pharmacy, Skaggs School of Pharmacy and Pharmaceutical Sciences, University of California San Diego; Clinical Pharmacist, Veterans Affairs San Diego Healthcare System, La Jolla, California

Mark Newnham, PharmD, BCPS, BCNSP (25)

Clinical Affiliate Assistant Professor, College of Pharmacy, NOVA Southeastern University, Fort Lauderdale, Florida; Clinical Coordinator, Lawnwood Regional Medical Center, Fort Pierce, Florida

Gail D. Newton, PhD, RPh (43, 44)

Associate Professor, Department of Pharmacy Practice, Purdue University School of Pharmacy and Pharmaceutical Sciences, West Lafayette, Indiana

Gloria J. Nichols-English, BSP, MED, PhD (3)

Associate Professor and Senior Fellow, Center for Minority Health Services Research, Department of Clinical and Administrative Pharmacy Sciences, Howard University College of Pharmacy, Nursing, and Allied Health Sciences, Washington, DC

Lynda Oderda, PharmD (20)

Clinical Assistant Professor, Department of Pharmacy Practice, University of Utah College of Pharmacy, Salt Lake City

Christine K. O'Neil, PharmD, BCPS, FCCP, CGP (52)

Professor of Clinical Pharmacy, Department of Pharmacy Practice, Duquesne University Mylan School of Pharmacy, Pittsburgh, Pennsylvania

Katherine Kelly Orr, PharmD (54)

Clinical Assistant Professor, University of Rhode Island College of Pharmacy, Kingston

Louise Parent-Stevens, PharmD, BCPS (10)

Clinical Assistant Professor, Department of Pharmacy Practice and Clinical Pharmacist, Family Medicine Center; University of Illinois at Chicago College of Pharmacy

Kimberly S. Plake, PhD (35)

Assistant Professor, Department of Pharmacy Practice, Purdue University School of Pharmacy and Pharmaceutical Sciences, West Lafayette, Indiana

Nicholas G. Popovich, PhD (43, 44)

Professor and Head, Department of Pharmacy Administration, University of Illinois at Chicago College of Pharmacy, University of Illinois at Chicago

Valerie T. Prince, PharmD, FAPhA, BCPS (41)

Assistant Professor of Pharmacy Practice, Samford University McWhorter School of Pharmacy; Family Practice Pharmacist, Medical Center East Family Practice Residency Program, Birmingham, Alabama

Theresa R. Prosser, PharmD, FCCP, BCPS, AE-C (13)

Professor of Pharmacy Practice, St. Louis College of Pharmacy, St. Louis, Missouri

Kristi Quairoli, PharmD (38)

Primary Care Clinical Pharmacist, Grady Health System, Atlanta, Georgia; At the time of writing: Clinical Assistant Professor and Director, Community Practice Residency, Department of Pharmacy Practice, Mercer University College of Pharmacy and Health Sciences, Atlanta, Georgia

Tami L. Remington, PharmD (5)

Clinical Pharmacist, Department of Pharmacy, The University of Michigan Hospitals and Health System; Clinical Associate Professor, Department of Clinical Sciences, The University of Michigan College of Pharmacy, Ann Arbor

Edward D. Rickert, JD, RPh (4)

Partner, Smith, Rickert, and Smith, Downers Grove, Illinois; Instructor, Adjunct Professor, Pharmacy Law, Department of Pharmacy Administration, University of Illinois at Chicago College of Pharmacy

Magaly Rodriguez de Bittner, PharmD, BCPS, CDE (3)

Chair and Professor, Department of Pharmacy Practice and Science, University of Maryland School of Pharmacy, Baltimore

Carol J. Rollins, MS, RD, PharmD, BCNSP (23, 24)

Coordinator, Nutrition Support Pharmacy, University Medical Center, Tucson; Associate Clinical Professor, Department of Pharmacy Practice and Science, University of Arizona College of Pharmacy, Tucson

Erica Rusie-Seamon, PharmD (55)

Clinical Research Associate, Natural Standard, Washington, DC

Kelly L. Scolaro, PharmD (11)

Clinical Assistant Professor and Director of Pharmaceutical Care Laboratory, Division of Pharmacy Practice and Experiential Education, The University of North Carolina Eshelman School of Pharmacy, Chapel Hill

Steven A. Scott, PharmD (33, 34)

Associate Professor of Clinical Pharmacy and Associate Head, Department of Pharmacy Practice, Purdue University School of Pharmacy and Pharmaceutical Sciences, West Lafayette, Indiana

Joan Lerner Selekof, BSN, RN, CWOCN (22)

Certified Wound Ostomy Continence Nurse, University of Maryland Medical Center, Baltimore

Laura Shane-McWhorter, PharmD, BCPS, FASCP, CDE, BC-ADM (20)

Professor (Clinical), Department of Pharmacotherapy, University of Utah College of Pharmacy, Salt Lake City

Leslie A. Shimp, PharmD, MS (8, 9)

Professor of Pharmacy, The University of Michigan College of Pharmacy, Ann Arbor

Karen J. Tietze, PharmD (12)

Professor of Clinical Pharmacy, Department of Pharmacy Practice and Pharmacy Administration, Philadelphia College of Pharmacy, University of the Sciences in Philadelphia, Philadelphia, Pennsylvania

Candy Tsourounis, PharmD (53)

Associate Professor of Clinical Pharmacy, Department of Clinical Pharmacy, University of California at San Francisco School of Pharmacy

Catherine Ulbricht, PharmD, MBA [c] (55)

Founder, Natural Standard, Editor-in-Chief, *Journal of Herbal Pharmacotherapy*, and Senior Attending Pharmacist, Massachusetts General Hospital, Cambridge

Paul C. Walker, PharmD (17)

Clinical Associate Professor, College of Pharmacy, Department of Clinical Sciences, The University of Michigan College of Pharmacy; Manager of Clinical Services, Department of Pharmacy, The University of Michigan Health System, Ann Arbor

Amy L. Whitaker, PharmD (31)

Assistant Professor, Department of Pharmacy, Virginia Commonwealth University School of Pharmacy, Richmond

Sharon Wilson, PharmD (22)

Clinical Specialist-Surgery/Transplantation, University of Maryland Medical Center; Clinical Assistant Professor, Department of Pharmacy Services, University of Maryland School of Pharmacy, Baltimore

Michael Z. Wincor, PharmD, BCPP (49)

Director of External Programs and Associate Professor of Clinical Pharmacy, Psychiatry, and the Behavioral Sciences, Schools of Pharmacy and Medicine, University of Southern California, Los Angeles

Eric Wright, PharmD, BCPS (7)

Associate Professor, Department of Pharmacy Practice, Wilkes University Nesbitt School of Pharmacy, Wilkes-Barre, Pennsylvania

Ann Zweber, B. Pharm (14)

Senior Instructor, Department of Pharmacy Practice, Oregon State University College of Pharmacy, Corvallis

Reviewers

Note: Numbers in parentheses denote the chapter(s) reviewed.

Stephen R. Abel, PharmD (28, 29)

Assistant Dean for Clinical Programs, and Bucke Professor and Head, Department of Pharmacy Practice, Purdue University School of Pharmacy and Pharmaceutical Sciences, Indianapolis, Indiana

Renee Ahrens, PharmD, MBA (12, 18)

Associate Professor, Shenandoah University Bernard J. Dunn School of Pharmacy, Winchester, Virginia

Nicole Paolini Albanese, PharmD (31, 32)

Clinical Assistant Professor, Department of Pharmacy Practice, The State University of New York at Buffalo School of Pharmacy and Pharmaceutical Sciences; Director, Buffalo Medical Group-PGY1: Primary Care; Director, Lifetime Health - PGY1: Managed Care, Buffalo

Emily M. Ambizas, PharmD (30)

Assistant Clinical Professor, St. John's University College of Pharmacy and Allied Health Professions, Jamaica, New York; Clinical Specialist, Brooks Eckerd Pharmacy, Whitestone, New York

Kenneth A. Bachmann, PhD, FCP (49)

Distinguished University Professor (Emeritus), Department of Pharmacology, The University of Toledo College of Pharmacy; Interim Chief Executive Officer, CeutiCare, LLC, Toledo, Ohio

Becky K. Baer, BS, PharmD (40)

Associate Professor, South Dakota State University College of Pharmacy, Brookings

Daniel E. Baker, PharmD, FASHP, FASCP (2)

Associate Dean for Clinical Programs, Professor of Pharmacotherapy, Department of Pharmacotherapy, Washington State University Spokane College of Pharmacy

Erin Ballard, PharmD, BCNSP (27)

University of Arizona College of Pharmacy, Tucson

Veronica T. Bandy, PharmD (30)

Clinical Assistant Professor, Pharmacy Practice Department, University of the Pacific Thomas J. Long School of Pharmacy and Health Sciences, Stockton, California

Jeffrey L. Barnett, MD (18)

Private Practitioner, Huron Gastroenterology Associates, Ypsilanti, Michigan

Cathy L. Bartels, PharmD, FAAIM (53)
Associate Professor of Pharmacy Practice,
Creighton University School of Pharmacy and
Health Professions, Omaha, Nebraska

**Hildegard J. Berdine, BS, PharmD,
BCPS (7)**

Assistant Professor of Pharmacy Practice,
Department of Clinical, Social, and Administrative
Sciences, Duquesne University Mylan School of
Pharmacy, Pittsburgh, Pennsylvania

Tricia M. Berry, PharmD, BCPS (43, 46)

Associate Professor, Division of Pharmacy
Practice, St. Louis College of Pharmacy,
St. Louis, Missouri

**Elizabeth Ewing Betchick, PharmD,
BCPS, BCNSP (23)**

Assistant Professor, Department of Pharmacy,
University of Tennessee College of Pharmacy,
Memphis; Clinical Pharmacy Specialist,
Methodist LeBonheur Healthcare—Germantown,
Germantown, Tennessee

Missy L. Blue, RPh, JD (4)

Staff Pharmacist, Walgreens, Lebanon, Indiana

Karen Beth Bohan, PharmD, BCPS (45)

Assistant Professor, Wilkes University Nesbitt
College of Pharmacy and Nursing,
Wilkes-Barre, Pennsylvania

Donald J. Brideau Jr., MD, MMM (50)

Family Physician, Springfield Family Medicine,
Alexandria, Virginia; Assistant Clinical Professor,
Georgetown University and George Washington
University Schools of Medicine, Washington, DC

Tina Penick Brock, RPh, MS, EdD (50)

Management Sciences for Health, Arlington,
Virginia

Wayne Buff, PharmD (1)

Associate Dean, and Clinical Associate Professor,
Department of Pharmacy Practice and Outcomes
Sciences, South Carolina College of Pharmacy,
University of South Carolina Campus, Columbia

Stephen M. Caiola, MS, FRSH (15, 51)

Associate Professor and Director,
Postgraduate/Continuing Education Program,
University of North Carolina Eshelman School
of Pharmacy, Chapel Hill

**Lingtak-Neander Chan, PharmD,
BCNSP (24)**

Associate Professor, School of Pharmacy and
Graduate Program in Nutritional Sciences,
University of Washington, Seattle

Hae Mi Choe, PharmD, CDE (12)

Clinical Assistant Professor, Department of
Pharmacy Practice, The University of Michigan
College of Pharmacy, Ann Arbor

Peter A. Chyka, PharmD (21)

Professor and Associate Dean, University of
Tennessee College of Pharmacy, Knoxville
Campus

Martha D. Cobb, MS, MEd, CWOCN (22)
Clinical Associate Professor (Emeritus), University
of Arizona College of Nursing, Tucson

Mary Petrea Cober, PharmD (6)

Clinical Pharmacist—Pediatric Surgery/Intestinal
Failure Program, University of Michigan CS
Mott Children's Hospital; Clinical Adjunct
Assistant Professor, University of Michigan
College of Pharmacy, Ann Arbor

**Andrea D. Collaro, PharmD, CDM,
RPh (47)**

Category Manager-Diagnostics, Walgreens
Company, Deerfield, Illinois; Adjunctive
Faculty, Clinical Assistant Professor, Department
of Pharmacy Practice, University of Illinois at
Chicago

Janice C. Colwell, MS, RN, CWOCN (22)

University of Chicago Medical Center, Chicago,
Illinois

Susan Cornell, PharmD, CDE, CDM (47)

Assistant Director of Experiential Education and
Assistant Professor of Pharmacy Practice,
Midwestern University Chicago College of
Pharmacy, Downers Grove, Illinois

**Catherine M. Crill, PharmD, BCPS,
BCNSP (26)**

Associate Professor, Department of Clinical
Pharmacy, The University of Tennessee Health
Science Center, Memphis

Lourdes M. Cuellar, MS, RPH, FASHP (3)

Director, Pharmacy Department and Patient
Safety Officer, Memorial Hermann—TIRR,
Houston, Texas

**Jeffrey C. Delafuente, MS, FCCP,
FASCP (11)**

Associate Dean for Professional Education,
Professor of Pharmacy and Director of Geriatric
Programs, Virginia Commonwealth University
School of Pharmacy, Richmond

Thomas Scott Devetski, OD (29)

Associate Optometrist, Alamance Eye Center,
Burlington/Chapel Hill; Clinical Assistant
Professor, Department of Ophthalmology,
University of North Carolina, Chapel Hill

Joseph T. DiPiro, PharmD (17)

Executive Dean, South Carolina College of
Pharmacy, The Medical University of
South Carolina Campus, Charleston, and The
University of South Carolina Campus, Columbia

Michael B. Doherty, PharmD (47)

Director of Experiential Training and Assistant
Professor of Clinical Pharmacy Practice,
University of Cincinnati College of Pharmacy,
Cincinnati, Ohio

Janell Norris Downing, PharmD (32)

Community Pharmacist and Medication
Therapy Management Coordinator, Bear Drug,
Kitty Hawk, North Carolina; Pharmacy Student
Preceptor, University of North Carolina
Eshelman School of Pharmacy, Chapel Hill

Jeremiah Duby, PharmD, BCPS (25)

Critical Care Clinical Pharmacist, Department of
Pharmacy, U.C. Davis Medical Center,
Sacramento, California; Clinical Associate
Professor, College of Pharmacy, Touro
University, Mare Island, Vallejo, California

B. DeeAnn Dugan, PharmD (6)

Assistant Professor of Community Pharmacy
Practice, Lloyd L. Gregory School of Pharmacy,
Palm Beach Atlantic University, West Palm
Beach, Florida

Kaelen C. Dunican, PharmD, RPh (43)

Assistant Professor, Pharmacy Practice,
Massachusetts College of Pharmacy and Health
Sciences School of Pharmacy, Worcester,
Massachusetts

Herbert L. DuPont, MD (17)

Chief, Internal Medicine Service, St. Luke's
Episcopal Hospital; Director, Center for
Infectious Diseases, University of Texas School
of Public Health; Clinical Professor and Vice-
Chairman of the Department of Medicine,
Baylor College of Medicine, Houston, Texas

Marilyn S. Edwards, PhD, RD (25)

Professor, Department of Internal Medicine,
Division of Gastroenterology, Hepatology, and
Nutrition, The University of Texas Medical
School at Houston

Patricia M. Elsner, PharmD (42, 43)

Staff Pharmacist, Walgreens 10974, Lafayette,
Indiana

**Carl F. Emswiler Jr, BS Pharmacy,
FACA (30)**

Pharmacist (Retired), Leesburg, Virginia

Linda M. Farho, PharmD (16)

Assistant Professor, Pharmacy Practice,
University of Nebraska Medical Center College
of Pharmacy, Omaha

Stefanie P. Ferreri, PharmD, CDE (16)

Clinical Assistant Professor and Director,
Community Pharmacy Residency Program,
University of North Carolina Eshelman School
of Pharmacy, Chapel Hill

Richard Finkel, PharmD (48)

Assistant Professor, Department of
Pharmaceutical and Administrative Sciences,
College of Pharmacy, Nova Southeastern
University, Fort Lauderdale, Florida

Daniel Forrister, PharmD (31)

Clinical Assistant Professor, Department of
Clinical and Administrative Pharmacy, The
University of Georgia College of Pharmacy,
Athens

Karla T. Foster, PharmD (20, 33)

Clinical Assistant Professor, Department of
Clinical and Administrative Sciences, Mercer
University Southern School of Pharmacy,
Atlanta, Georgia

Andrea R. Franks, PharmD, BCPS (18)
Associate Professor, Departments of Clinical Pharmacy and Family Medicine, University of Tennessee Health Science Center Colleges of Pharmacy and Medicine, Knoxville Campus

Conchetta White Fulton, PharmD (7)
Clinical Associate Professor, Department of Pharmacy Practice, Xavier University of Louisiana College of Pharmacy, New Orleans

Candice Garwood, PharmD, BCPS (53)
Clinical Assistant Professor, Department of Pharmaceutics/Pharmacy, Wayne State University Eugene Applebaum College of Pharmacy and Health Sciences; Clinical Pharmacy Specialist, Ambulatory Care, Harper University Hospital, Detroit Medical Center, Detroit, Michigan

Diane B. Ginsburg, MS, RPh, FASHP (3)
Clinical Professor, Division of Pharmacy Practice, Assistant Dean for Student Affairs, and Regional Director, Internship Program, The University of Texas at Austin College of Pharmacy

Jeffery A. Goad, PharmD, MPH (17)
Associate Professor of Clinical Pharmacy, Coordinator, Community Pharmacy Program, and Director, Community Pharmacy Practice Residence, University of Southern California School of Pharmacy, Los Angeles; Travel Health Consultant, University of Southern California Pharmacy, Student Health and Family Medicine, Los Angeles

William C. Gong, PharmD, FASHP, FCSHP (2)
Associate Professor of Clinical Pharmacy, and Director, Residency and Fellowship Training, University of Southern California School of Pharmacy, Los Angeles

Philip Gregory, PharmD (54)
Assistant Professor, Department of Pharmacy Practice, Creighton University, Omaha

Nicholas E. Hagemeyer, PharmD, MS (39, 41)
Pharmacist, Cowan Drugs, Inc., Lebanon, Indiana

Judy Sommers Hanson, PharmD, CDM (30)
Manager, Clinical Education and Shared Faculty, Walgreens Health Initiatives, Deerfield, Illinois

Ila M. Harris, PharmD, FCCP, BCPS (55)
Associate Professor, Department of Pharmaceutical Care and Health Systems, College of Pharmacy; Adjunct Associate Professor, Medical School, Department of Family Medicine and Community Health, University of Minnesota, Minneapolis

Jan K. Hastings, PharmD (3)
Associate Professor, Department of Pharmacy Practice, University of Arkansas for Medical Services College of Pharmacy, Little Rock

Katherine Heller, PharmD (7)
Assistant Professor of Pharmacy Practice, Lloyd L. Gregory School of Pharmacy, Palm Beach Atlantic University, West Palm Beach, Florida

Metta Lou Henderson, RPh, PhD (1)
Professor Emerita of Pharmacy, Raabe College of Pharmacy, Ohio Northern University, Ada, Ohio

Karl Hess, PharmD (19)
Assistant Professor of Pharmacy Practice, Western University of Health Sciences College of Pharmacy, Pomona, California

Michelle L. Hilaire, PharmD, CDE (28)
Clinical Assistant Professor, Department of Pharmacy Practice, University of Wyoming School of Pharmacy, Laramie; Clinical Pharmacist, Fort Collins Family Medicine Residency Program, Fort Collins, Colorado

Thomas J. Holmes Jr, PhD (44)
Associate Dean and Professor, Medicinal/Pharmaceutical Chemistry/Pharmacognosy, Campbell University School of Pharmacy, Buies Creek, North Carolina

James P. Hoover, DPM (44)
Private Practitioner, Lafayette, Indiana

Daniel A. Hussar, BS Pharmacy, MS, PhD (2)
Remington Professor of Pharmacy, Philadelphia College of Pharmacy, University of the Sciences in Philadelphia, Philadelphia, Pennsylvania

Eric Jackson, PharmD, BCPS (54, 55)
Associate Professor of Family Medicine, Family Medicine Center at Asylum Hill, University of Connecticut School of Medicine and Saint Francis Hospital and Medical Center, Hartford

Pramodini B. Kale-Pradhan, PharmD (12, 20)
Associate Clinical Professor, Department of Pharmacy Practice, Eugene Applebaum College of Pharmacy and Health Sciences, Wayne State University; Clinical Specialist—Surgery, Department of Pharmacy Services, St. John Hospital and Medical Center, Detroit, Michigan

William D. King, RPh, MPH, DrPH (20)
Division Director and Professor of Pediatrics, Department of Pediatrics, The University of Alabama at Birmingham

Erika Kleppinger, PharmD, BCPS, CDE (29)
Assistant Clinical Professor, Department of Pharmacy Practice, Auburn University Harrison School of Pharmacy, Auburn, Alabama

Teresa B. Klepser, PharmD, BCPS (35)
Associate Professor, Department of Pharmacy Practice, Ferris State University College of Pharmacy, Kalamazoo, Michigan; Clinical Pharmacist, Borgess at Woodbridge Hills, ProMed Family Practice, Portage, Michigan

Erin Koopman, PharmD, BCNSP (23)
Clinical Pharmacy Specialist in Nutrition Support, Saint Marys Hospital, Mayo Clinic, Rochester, Minnesota

Jeffrey Kreitman, PharmD (6)
Regional Clinical Pharmacist, AmeriHealth Mercy Health Plan, Harrisburg, Pennsylvania

Thomas E. Lackner, PharmD (52)
Professor, Experimental and Clinical Pharmacology and Institute for the Study of Geriatric Pharmacotherapy, University of Minnesota College of Pharmacy, Minneapolis

J. Kyle Lawson, PharmD (35, 37, 38)
Pharmacist, Kroger Pharmacy J-81, Crawfordsville, Indiana

Cherokee Layson-Wolf, PharmD, CGP (28)
Assistant Professor, Department of Pharmacy Practice and Science, and Director, Community Residency Program, University of Maryland School of Pharmacy; Patient Care Program Coordinator, NeighborCare Professional Pharmacies, Baltimore, Maryland

Karen W. Lee, PharmD, CDM (11)
Associate Director of Professional Development, Clinical Pharmacy Services of Commonwealth Medicine and University of Massachusetts Medical School, Shrewsbury

Howard Madsen, RD, PharmD, CNSD (23)
Nutrition Support/Clinical Pharmacist, Samaritan Health Services, Lebanon, Oregon

Patricia Marshik, PharmD (13)
Director, Pediatric Asthma Outreach Clinics and Associate Professor of Pharmacy, University of New Mexico Health Sciences Center School of Pharmacy, Albuquerque

Beth A. Martin, PhD, RPh (50)
Assistant Professor (CHS), University of Wisconsin—Madison School of Pharmacy

Linda Gore Martin, PharmD, MBA, BCPS (8, 9)
Associate Professor, Department of Social and Administrative Pharmacy, University of Wyoming School of Pharmacy, Laramie

Marsha McFalls-Stringert, RPh, PharmD (41)
Assistant Professor of Pharmacy Practice, and Director, Academic Center for Pharmacy Practice, Department of Clinical, Social, and Administrative Sciences, Duquesne University Mylan School of Pharmacy, Pittsburgh, Pennsylvania

Emily K. Meuleman, RN, C, MS (8, 9)
Family Nurse Practitioner, Department of Family Medicine, University of Michigan, Chelsea

Susan M. Meyer, BS Pharmacy, MS, PhD (51)
Associate Dean for Education and Professor, University of Pittsburgh School of Pharmacy, Pittsburgh, Pennsylvania

Jill E. Michels, PharmD (21)

Managing Director, Palmetto Poison Center and Clinical Assistant Professor, South Carolina College of Pharmacy, University of South Carolina Campus, Columbia

Janis Miller, RN, PhD (52)

Assistant Professor of Nursing and Associate Research Scientist, Nursing, The University of Michigan School of Nursing; Research Assistant Professor of Obstetrics and Gynecology, The University of Michigan Medical School, Ann Arbor

Brad A. Miller, PharmD (5)

Clinical Specialist-Emergency Medicine, Pharmacy Department, Spectrum Health System, Grand Rapids, Michigan

Jane R. Mort, PharmD (16)

Professor of Pharmacy Practice, South Dakota State University College of Pharmacy, Brookings

David Paquette, DMD, MPH, DMSc (31, 32)

Associate Professor and Graduate Program Director, Department of Periodontology, University of North Carolina School of Dentistry, Chapel Hill

Jeegisha Patel, PharmD (28)

Clinical Assistant Professor, Department of Pharmacy Practice, Oregon State University College of Pharmacy, Oregon Health & Science University, Portland

Karen Steinmetz Pater, PharmD, BCPS, CDE (5)

Assistant Professor, University of Pittsburgh School of Pharmacy, Pittsburgh, Pennsylvania

Roy Alton Pleasants II, PharmD, BCPS (13)

Associate Professor, Campbell University School of Pharmacy, Buies Creek, North Carolina; Clinical Pharmacist in Pulmonary Medicine, Division of Pulmonary, Allergy, and Critical Care Medicine, Department of Medicine, Duke University, Durham, North Carolina

Charles D. Ponte, PharmD, BC-ADM, BCPS, CDE, FAPhA, FASHP, FCCP (10, 38)

Professor of Clinical Pharmacy and Family Medicine, Departments of Clinical Pharmacy and Family Medicine, West Virginia University Robert C. Byrd Health Sciences Center Schools of Pharmacy and Medicine, Morgantown

David R. Potts, MD (42)

Private Practitioner, Unity Healthcare, Lafayette, Indiana

Pamela Ringor, MBA, RPh (37, 39)

Staff Pharmacist, PayLess Pharmacy, Lafayette, Indiana

Ronald J. Ruggiero, PharmD (9, 10)

Clinical Professor (Emeritus), Departments of Clinical Pharmacy and Obstetrics, Gynecology, and Reproductive Sciences, Schools of Pharmacy and Medicine, The UCSF National Center of Excellence in Women's Health, The Medical Center at University of California, San Francisco

Gina J. Ryan, PharmD, BCPS, CDE (3)

Clinical Assistant Professor of Pharmacy Practice, Mercer University College of Pharmacy and Health Sciences, Atlanta, Georgia

Jasmine K. Sahni, PharmD (26)

Assistant Professor, Department of Clinical Pharmacy, University of Tennessee College of Pharmacy, Memphis

Elizabeth J. Scharman, PharmD, ABAT, BCPS, FAACT (21)

Director, West Virginia Poison Center; Professor, Department of Clinical Pharmacy, West Virginia University School of Pharmacy, Charleston

Philip Schneider, PharmD (16, 20)

Director of Pharmacy, Olathe Medical Center, Olathe, Kansas; Adjunct Clinical Assistant Professor, Department of Pharmacy Practice, University of Kansas School of Pharmacy, Lawrence

Kelly L. Scolaro, PharmD (51)

Clinical Assistant Professor and Director of Pharmaceutical Care Laboratory, Division of Pharmacy Practice and Experiential Education, The University of North Carolina Eshelman School of Pharmacy, Chapel Hill

Steven A. Scott, PharmD (45)

Associate Professor of Clinical Pharmacy and Associate Head, Department of Pharmacy Practice, Purdue University School of Pharmacy and Pharmaceutical Sciences, West Lafayette, Indiana

Chad Shedron, PharmD (33, 34)

Owner, Family Pharmacare, Lafayette, Indiana

Debra Sibbald, BSc Phm, ACPR, MA, PhD [candidate] (36)

Coordinator, Pharmaceutical Care I, University of Toronto Faculty of Pharmacy, Mississauga, Ontario, Canada

John K. Siepler, PharmD, BCNSP, FCCP (14)

Research Specialist, Nutrishare, Inc., Elk Grove, California; Clinical Professor, University of California at San Francisco School of Pharmacy

Heather Skillman, MS, RD, CSP, CNSD (26)

Pediatric Critical Care Dietitian, The Children's Hospital, Denver, Colorado

Susan Claire Smolinske, PharmD (21)

Poison Control Center, Children's Hospital of Michigan, Detroit

Jenelle L. Sobotka, PharmD (1)

Manager, Professional Relations, The Procter and Gamble Company, Cincinnati, Ohio

Vanessa A. Stanford, MS, RD, CSCS (25)

Research Specialist, Sr., Department of Nutritional Sciences, University of Arizona College of Agriculture and Life Sciences, Tucson

Scott K. Stolte, PharmD (17)

Chair, Department of Pharmacy Practice, Shenandoah University Bernard J. Dunn School of Pharmacy, Winchester, Virginia

Donald L. Sullivan, PhD (51)

Associate Professor of Pharmacy Practice, Department of Pharmacy Practice, Ohio Northern University College of Pharmacy, Ada

Keith A. Swanson, PharmD (48)

Associate Professor, Department of Pharmacy Practice, University of Oklahoma College of Pharmacy, Oklahoma City

Larry N. Swanson, PharmD, FASHP (34)

Professor and Chairman, Department of Pharmacy Practice, Campbell University School of Pharmacy, Buies Creek, North Carolina

Sahar Swidan, PharmD (5)

Clinical Associate Professor, Department of Clinical Sciences, The University of Michigan College of Pharmacy; President and CEO, Pharmacy Solutions, Ann Arbor, Michigan

Jane Takagi, PharmD, FCSHP, FASHP (27)

Adjunct Associate Professor of Pharmacy Practice, University of Southern California School of Pharmacy, Los Angeles; Assistant Clinical Professor, Department of Clinical Pharmacy, University of California at San Francisco School of Pharmacy; Kaiser Permanente Drug Information Services, Downey, California

Jeff G. Taylor, PhD (11)

Associate Professor of Pharmacy, University of Saskatchewan College of Pharmacy and Nutrition, Saskatoon

Jeremy Lynn Thomas, PharmD (15)

Assistant Professor, Department of Clinical Pharmacy, University of Tennessee Health Science Center College of Pharmacy, Memphis

Cynthia Thomson, RD, PhD (24)

Associate Professor, Department of Nutritional Sciences, University of Arizona, Tucson

Michael S. Torre, MS, RPh, CDE (47)

Clinical Professor of Pharmacy, Department of Clinical Pharmacy Practice, College of Pharmacy and Allied Health Professions, St. John's University, Jamaica, New York

Dominic P. Trombetta, PharmD, BCPS, CGP (46)

Associate Professor of Pharmacy Practice, Wilkes University Nesbitt School of Pharmacy, Wilkes-Barre, Pennsylvania; Allied Services Rehabilitation Hospital & Outpatient Centers, Scranton, Pennsylvania

Candy Tsourounis, PharmD (48, 49)

Associate Professor of Clinical Pharmacy, Department of of Clinical Pharmacy, University of California at San Francisco School of Pharmacy

Angela R. Vinti, PharmD, BCPS (30)

Assistant Clinical Professor, Department of Pharmacy Practice, Auburn University Harrison School of Pharmacy, Mobile Satellite Campus; Adjunct Assistant Professor, Department of Family Medicine, University of South Alabama College of Medicine, Mobile

Paul C. Walker, PharmD (19, 36)

Clinical Associate Professor, College of Pharmacy, Department of Clinical Sciences, The University of Michigan; Manager of Clinical Services, Department of Pharmacy, The University of Michigan Health Systems, Ann Arbor

Geoffrey C. Wall, RPh, PharmD, BCPS, CGP (14)

Associate Professor of Pharmacy Practice, College of Pharmacy and Health Sciences, Drake University; Internal Medicine Clinical Pharmacist and Director, Pharmacy Practice Residency Program, Iowa Methodist Medical Center; Clinical Assistant Professor of Pharmacology/Physiology, Des Moines University College of Osteopathic Medicine, Des Moines, Iowa

C. Wayne Weart, PharmD (14)

Professor, Department of Pharmacy and Clinical Sciences, South Carolina College of Pharmacy, Medical University of South Carolina Campus; Associate Professor of Family Medicine, Medical University of South Carolina, Charleston

Kristin Weitzl, PharmD (19)

Assistant Editor, *Pharmacist's Letter* and *Prescriber's Letter*, Stockton, California; Clinical Associate Professor (Adjunct), Department of Pharmacy Practice, University of Florida College of Pharmacy, Gainesville, Florida

Amy L. Whitaker, PharmD (40)

Assistant Professor, Department of Pharmacy, Virginia Commonwealth University School of Pharmacy, Richmond

G. Thomas Wilson, BS Pharm, JD (4)

Associate Professor of Pharmacy Practice and Law, Department of Pharmacy Practice, Purdue University School of Pharmacy and Pharmaceutical Sciences, West Lafayette, Indiana

Kenneth W. Witte, PharmD (24)

Adjunct Clinical Associate Professor, University of Illinois at Chicago College of Pharmacy; President, Clinical Pharmacy Consultants, Inc., LaGrange, Illinois

Supakit Wongwiwatthanakut, PharmD, PhD (50)

Assistant Professor, Department of Pharmacy Practice, College of Pharmacy, University of Hawaii, Hilo

John R. Yuen, PharmD, BCNP (28, 29)

Board Certified Nuclear Pharmacist, Oncology Pharmacist Specialist (Hospital and Ambulatory Care), Kaiser Permanente Los Angeles Medical Center; Adjunct Assistant Professor of Pharmacy Practice, University of Southern California School of Pharmacy, Los Angeles

Ann Zweber, B. Pharm (15)

Senior Instructor, Department of Pharmacy Practice, Oregon State University College of Pharmacy, Corvallis

This page intentionally left blank.

How to Use the Case Problem-Solving Model

Rationale for Case Format

Use of a problem-solving model is one mechanism for developing problem-solving skills. Repeated exposure to the model in a variety of contexts aids students in learning the model and applying it in various circumstances. Use of the model in each diseases-related chapter in this text provides repeated exposure and reinforces learning.

Case Format Description

The case format is based on the guided-design instructional format that models the steps of decision making. This format facilitates student development of a framework for the organization and application of acquired information to the solution of novel problems. The basic steps used in the guided-design decision-making format are as follows.

- Gather information pertinent to the problem and its solution.
- Identify the problem.
- Identify exclusions for self-treatment.
- Perform patient assessment and triage.
- Identify alternative solutions.
- Select an optimal solution.
- Prepare and implement a plan to solve the problem.
- Provide patient education.
- Evaluate patient outcome.
- When outcomes do not achieve the self-treatment goal, start the process again from the beginning.

Steps 1 and 2: Gather Information

When a patient presents to a practitioner and is in need of self-care advice, the practitioner must collect information about the patient that may be pertinent to solving the patient's problem. This information falls into two general categories: (1) information about the symptoms that prompted the patient to seek assistance and (2) information about the patient's background characteristics (history). The first two steps in the case format direct the student to elicit this type of information.

It may be argued that it is unnecessary to collect all the patient's background characteristics to solve every patient problem. However, it should be remembered that novice problem solvers do not yet have the expertise to selectively elicit the

most pertinent information to a specific situation. Thus, the model prompts them to ask about all of the listed characteristics to avoid overlooking information that is critical to the solution of the problem.

Step 3: Identify the Problem

The third step involves the evaluation of information gathered in the previous steps to identify the patient's problem, its severity, and its most probable cause. Clear articulation of the problem is critical to (1) assist with differentiation among conditions with similar symptoms and (2) determine the goals of self-treatment. A comparison of the patient's symptoms to the usual or typical presentation of symptoms for a particular disease will help to differentiate and determine the most likely primary problem. For example, it is inadequate to conclude that a patient's problem is a common cold. In this instance, the therapeutic goal—to relieve the cold—is too vague to be useful, because there are dozens of symptoms that may or may not be associated with the common cold and there are even more alternatives for symptomatic relief. On the other hand, if the patient's problem is nasal congestion, the goal would be to relieve the congestion: This goal is a much more useful criterion against which to evaluate a more limited set of potential therapeutic options.

Step 4: Identify Exclusions for Self-Treatment

There are several reasons why it may be inappropriate for an individual to self-treat the symptoms or problems they are experiencing, which include (1) symptoms should not be self-treated because medical referral is necessary (e.g., eye pain); (2) patient is not an appropriate candidate for self-care (e.g., a woman with diabetes who develops a vaginal candidal infection); (3) symptoms are too severe or long-lasting for self-treatment; or (4) effective nonprescription therapy is not available, or nonprescription dosages or duration of treatment is inadequate to treat the disorder.

Assessing the severity and determining the most likely primary problem that a patient is experiencing are essential in making appropriate recommendations for treatment or referral. For example, a patient who complains of a cough associated with a cold is often a candidate for self-care. However, if the cough is significantly hampering the patient's ability to sleep or carry out routine activities, or if the cough produces pain in the chest

area, referral to a primary care provider may be appropriate. In another instance, a patient who complains of a mild cough may not be a candidate for self-care if other information about the condition (e.g., history of tobacco use and emphysema) suggests an etiology that is not amenable to self-management.

Step 5: Identify Alternative Solutions

The fifth step involves formulation of a list of possible approaches to the patient's problem. At this point, no alternative is prejudged or omitted. Four general options are available to practitioners who are advising patients about self-care: (1) recommend self-care with drug, nondrug, and/or alternative/complementary therapies; (2) refer patient to an appropriate primary care provider for treatment; (3) recommend self-care until an appropriate primary care provider can be consulted; and (4) take no action. In the context of self-treatment, all potentially plausible product categories, dosage forms, and nondrug products and measures should be included in the list. In the context of self-treatment, all potentially plausible product categories, dosage forms, and nondrug products and measures should be included in the list. Similarly, all potentially useful sources of primary care (e.g., urgent care clinic, dentist, or emergency department) should be considered.

Critics of this approach have sometimes indicated that including no action as an option is unconscionable or not in the best interest of patients. In fact, there are situations in which this option may be preferred. For example, consider a situation involving a patient on a limited income who suffers from an asymptomatic, common wart that is in a location where it is neither noticeable nor likely to be spread easily to others. Because most common warts resolve spontaneously without treatment and the patient has limited income to pay for a nonprescription product, taking no action may indeed be an optimal solution in this instance. Furthermore, the crucial point often overlooked by critics is that, at this point in the decision-making process, all ideas are listed and none are prejudged. Thus, it is entirely appropriate to consider no action, even if it turns out to be an inappropriate alternative. Again, this format is targeted at novice problem solvers who have little experience in identifying alternative therapeutic options. Thus, the model prompts them to formulate a list of all possi-

ble alternatives to prevent them from prematurely ruling out appropriate options.

Step 6: Select an Optimal Solution

During the sixth step, each of the plausible solutions is evaluated to determine whether and to what extent each achieves the intended goal and is concordant with the patient's preferences in terms of goals of therapy, cost of therapy, and overall approach (e.g., personal philosophy, health beliefs) to self-care. Next, one of the alternatives that may adequately achieve the goal is selected on the basis of a variety of patient-specific and therapy-specific variables. Therapy-specific variables include dosage forms, ingredients, side effects, adverse reactions, relative effectiveness, and price. Patient-specific variables may include age, sex, medication history, concurrent medical conditions, patient preferences, and economic status.

Steps 7 and 8: Prepare and Implement a Plan

These steps involve the communication of a therapeutic plan to the patient. The plan should include a summary of the condition and the reasons for treatment. The patient should be made aware of the available treatment options and their relative merits should also be included in the plan. When the recommended solution involves drug therapy, the plan should include monitoring parameters.

Steps 9-11: Educate Patient

Patient education is designed to provide a clear and concise description of administration of the treatment, side effects and precautions, expected outcome, and guidelines for appropriate use. When appropriate, the plan should also include nondrug measures, lifestyle changes, and additional information resources.

The practitioner should ensure that the patient understands the plan by having the patient repeat it and by correcting any misunderstandings. Finally, after answering any remaining questions from the patient, the practitioner should encourage the patient to call or return if the symptoms fail to resolve. If symptoms are not resolved, the entire decision-making procedure begins anew.