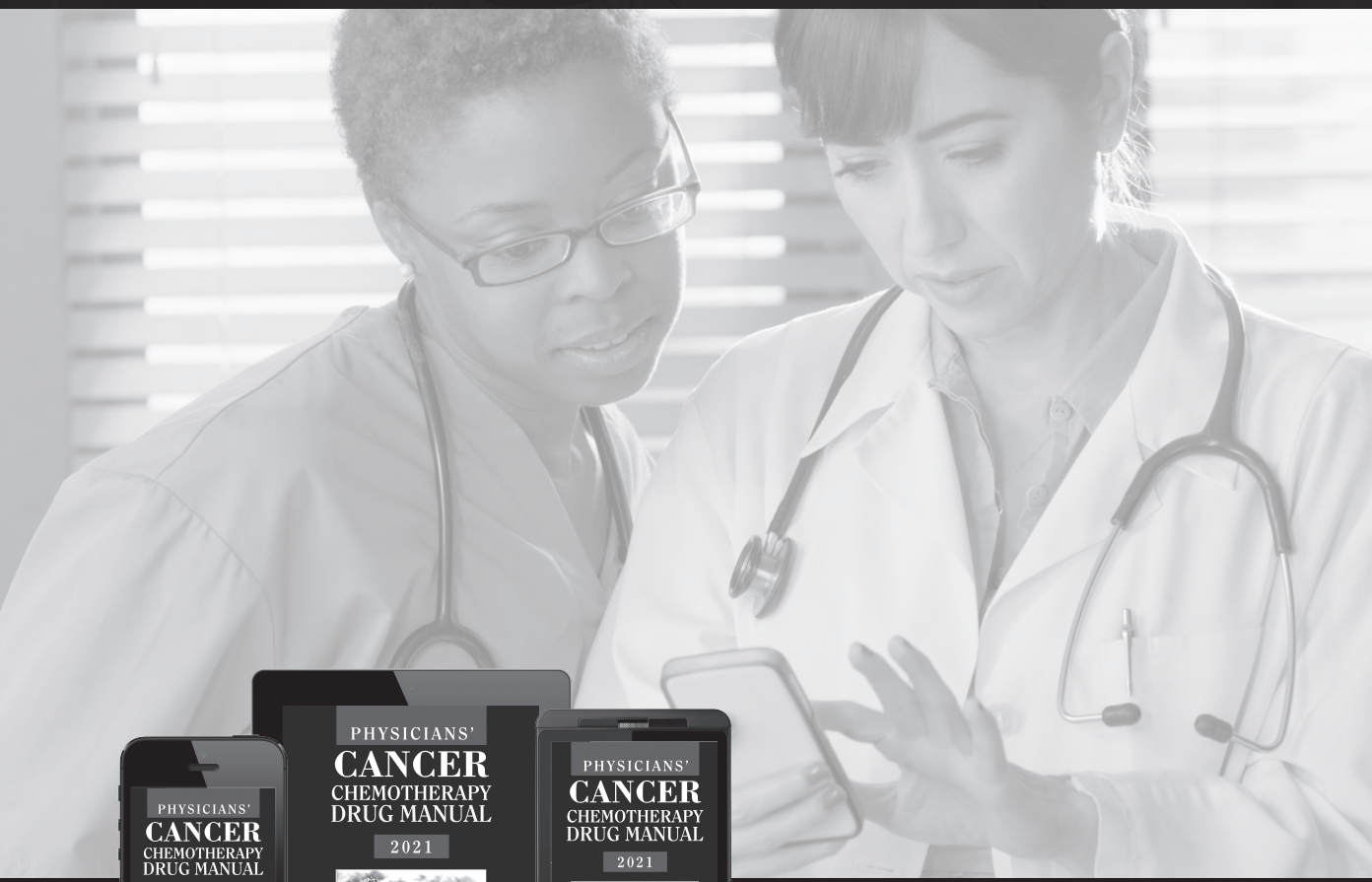
PHYSICIANS'
CANCER
CHEMOTHERAPY
DRUG MANUAL

2021

PHYSICIANS' CANCER CHEMOTHERAPY DRUG MANUAL

Access Anywhere, Anytime!

Download the app for convenient and affordable access to up-to-date information on standard therapy and recent advances in oncology medication.



Try the app free for 30 days!

ANDROID APP ON Google play

Available on the App Store

PHYSICIANS'
CANCER
CHEMOTHERAPY
DRUG MANUAL

2021

Edward Chu, MD, FACP

Professor of Medicine and Molecular Pharmacology
Carol and Roger Einiger Professor of Cancer Medicine
Director, Albert Einstein Cancer Center
Vice-President for Cancer Medicine, Montefiore Medicine
Albert Einstein College of Medicine
New York, NY

Vincent T. DeVita, Jr., MD

Amy and Joseph Perella Professor of Medicine
Professor of Epidemiology and Public Health
Yale Cancer Center
Yale University School of Medicine
New Haven, Connecticut

JONES & BARTLETT
LEARNING

World Headquarters
Jones & Bartlett Learning
5 Wall Street
Burlington, MA 01803
978-443-5000
info@jblearning.com
www.jblearning.com

Jones & Bartlett Learning books and products are available through most bookstores and online booksellers. To contact Jones & Bartlett Learning directly, call 800-832-0034, fax 978-443-8000, or visit our website, www.jblearning.com.

Substantial discounts on bulk quantities of Jones & Bartlett Learning publications are available to corporations, professional associations, and other qualified organizations. For details and specific discount information, contact the special sales department at Jones & Bartlett Learning via the above contact information or send an email to specialsales@jblearning.com.

ISBN: 978-1-284-23013-0
ISSN: 1536-0008

Production Credits
VP, Product Management: Christine Emerton
Director of Product Management: Matthew Kane
Product Manager: Joanna Gallant
Content Strategist: Melina Leon
Content Coordinator: Andrew LaBelle
Project Manager: Lori Mortimer
Project Specialist: John Coakley
Senior Digital Project Specialist: Angela Dooley
Digital Project Specialist: Rachel DiMaggio
Director of Marketing: Andrea DeFronzo
Senior Marketing Manager: Lindsay White
Production Services Manager: Colleen Lamy
VP, Manufacturing and Inventory Control: Therese Connell
Product Fulfillment Manager: Wendy Kilborn
Composition: S4Carlisle Publishing Services
Project Management: S4Carlisle Publishing Services
Cover Design: Brianna Yates
Senior Media Development Editor: Troy Liston
Rights & Permissions Manager: John Rusk
Rights Specialist: Maria Leon Maimone
Cover Image (Title Page, Part Opener, Chapter Opener): © crystal light/Shutterstock
Printing and Binding: McNaughton & Gunn

6048

Printed in the United States of America
24 23 22 21 20 10 9 8 7 6 5 4 3 2 1

© crystal light/Shutterstock

Contents

	Editors	vi
	Contributing Authors	vii
	Preface	viii
	Acknowledgments	ix
CHAPTER 1	Principles of Cancer Chemotherapy	1
	Introduction	1
	The Role of Chemotherapy in the Treatment of Cancer	2
	Principles of Combination Chemotherapy	3
CHAPTER 2	Chemotherapeutic and Biologic Drugs	5
CHAPTER 3	Guidelines for Chemotherapy and Dosing Modifications	591
CHAPTER 4	Common Chemotherapy Regimens in Clinical Practice	621
CHAPTER 5	Antiemetic Agents for the Treatment of Chemotherapy-Induced Nausea and Vomiting	799
	Index	815

Editors

Edward Chu, MD, FACP
Professor of Medicine and Molecular Pharmacology
Carol and Roger Einiger Professor of Cancer Medicine
Director, Albert Einstein Cancer Center
Vice-President for Cancer Medicine, Montefiore Medicine
Albert Einstein College of Medicine
New York, NY

Vincent T. DeVita, Jr., MD
Amy and Joseph Perella Professor of Medicine
Professor of Epidemiology and Public Health
Yale Cancer Center
Yale University School of Medicine
New Haven, CT

Contributing Authors

M. Sitki Copur, MD, FACP
Adjunct Professor of Medicine
University of Nebraska
Medical Director, Morrison Cancer Center
Mary Lanning Healthcare
Hastings, NE

Laurie J. Harrold, MD
Staff Medical Oncologist
Clinical Assistant Professor of Medicine
VA Pittsburgh Healthcare System
University of Pittsburgh School of Medicine
Pittsburgh, PA

Chaoyuan Kuang, MD, PhD
Instructor of Medicine, Division of Hematology-Oncology
UPMC Hillman Cancer Center
University of Pittsburgh School of Medicine
Pittsburgh, PA

William Maguire, MD, PhD
Senior Hematology-Oncology Fellow
UPMC Hillman Cancer Center
University of Pittsburgh School of Medicine
Pittsburgh, PA

Preface

The development of effective drugs for the treatment of cancer represents a significant achievement beginning with the discovery of the antimetabolites and alkylating agents in the 1940s and 1950s. The success of that effort can be attributed in large measure to the close collaboration and interaction between basic scientists, synthetic organic chemists, pharmacologists, and clinicians. This tradition continues to flourish, especially as we now enter the world of pharmacogenomics, genomics, proteomics, and other omics science along with the rapid identification of new molecular targets for drug design and development.

In this, our 21st edition, we have condensed and summarized a wealth of information on chemotherapeutic and biologic agents in current clinical practice into a reference guide that presents essential information in a practical and readable format. The primary indications, drug doses and schedules, toxicities, and special considerations for each agent have been expanded and revised to take into account new information that has been gathered over the past year. In this edition, we have included 16 new agents and a whole host of supplemental indications that have all been approved by the FDA for previously approved agents within the past year.

This drug manual is divided into five chapters. Chapter 1 gives a brief overview of the key principles of cancer chemotherapy and reviews the clinical settings where chemotherapy is used. Chapter 2 reviews individual chemotherapeutic and biologic agents that are in current clinical use; these agents are presented in alphabetical order according to their generic name. In this chapter, specific details are provided regarding drug classification and category, key mechanisms of action and resistance, critical aspects of clinical pharmacology and pharmacokinetics, clinical indications, special precautions and considerations, and toxicity. Chapter 3 includes recommendations for dose modifications that are required in the setting of myelosuppression and/or liver and renal dysfunction. Relevant information is also provided highlighting the teratogenic potential of various agents. Chapter 4 presents a review of the combination drug regimens and selected single-agent regimens for solid tumors and hematologic malignancies that are used commonly in daily clinical practice. This section is organized alphabetically by specific cancer type. Finally, Chapter 5 reviews commonly used antiemetic agents and regimens used to treat chemotherapy-induced nausea and vomiting, which is a significant toxicity observed with many of the anticancer agents in current practice.

Our hope remains for this book to continue to serve as both an in-depth reference and an immediate source of practical information that can be used by physicians and other healthcare professionals actively involved in the daily care of cancer patients. This drug manual continues to be a work in progress, and our goal is to continue to provide new updates on an annual basis and to incorporate new drugs and treatment regimens that reflect the rapid advances in the field of cancer drug development.

Edward Chu, MD
Vincent T. DeVita, Jr., MD

Acknowledgments

This book represents the efforts of many dedicated people. It reflects my own personal and professional roots in the field of cancer pharmacology and cancer drug development. It also reaffirms the teaching and support of my colleagues and mentors at Brown University, the National Cancer Institute (NCI), and the Yale Cancer Center. In particular, Bruce Chabner, Paul Calabresi, Robert Parks, Joseph Bertino, and Vince DeVita each had a major influence on my development as a cancer pharmacologist and medical oncologist. While at the NCI, I was fortunate to have been trained under the careful mentorship of Carmen Allegra, Bob Wittes, and Bruce Chabner. At Yale, I was privileged to work with a group of extraordinarily talented individuals including Yung-chi Cheng, William Prusoff, Alan Sartorelli, and Vince DeVita, all of whom graciously shared their scientific insights, wisdom, support, and friendship. I would also like to thank my co-author, colleague, mentor, and friend, Vince DeVita, who recruited me to the Yale Cancer Center and who has been so tremendously supportive of my professional and personal career. Special thanks go to my colleagues at Jones & Bartlett Learning for giving me the opportunity to develop this book and for their continued encouragement, support, and patience throughout this entire process. I wish to thank my wife, Laurie Harrold, for her love and patience, for her insights as a practicing medical oncologist, and for her help in writing and reviewing various sections of this book. I would also like to thank our two dogs, Mika and Lexi, who are no longer with us, but who live in our hearts forever, to our two new dogs, Rosie and Allie, and to our two beautiful children, Ashley and Joshua, who have brought great joy and pride to our family. Finally, this book is dedicated to my parents, Ming and Shih-Hsi Chu, for their constant and unconditional loyalty and love, support, and encouragement, and for instilling in me the desire, joy, and commitment to become a medical oncologist and cancer pharmacologist and who have shown me the way to be a better physician, scientist, and person. While they are no longer here with us, their spirit lives in our hearts forever.

Edward Chu, MD