# Clinical Scenarios In Surgery

DECISION MAKING AND OPERATIVE TECHNIQUE



JUSTIN B. DIMICK
GILBERT R. UPCHURCH, JR.
CHRISTOPHER J. SONNENDAY
LILLIAN S. KAO



Clinical Scenarios in Surgery

Decision Making and Operative Technique
SECOND EDITION

## Clinical Scenarios in Surgery

# Decision Making and Operative Technique

#### **SECOND EDITION**

Justin B. Dimick, MD, MPH
George D. Zuidema Professor of Surgery
Chief, Division of Minimally Invasive Surgery
Department of Surgery
University of Michigan
Ann Arbor, Michigan

Gilbert R. Upchurch Jr., MD Woodward Professor & Chair Department of Surgery University of Florida Professor of Surgery Vascular Surgery Division UF Health Shands Hospital Gainesville, Florida

Christopher J. Sonnenday, MD, MHS Associate Professor of Surgery, Health Management & Policy Department of Surgery University of Michigan Ann Arbor, Michigan

Lillian S. Kao, MD, MS Professor Department of Surgery McGovern Medical School at the University of Texas Health Science Center at Houston Houston, Texas



Philadelphia • Baltimore • New York • London Buenos Aires • Hong Kong • Sydney • Tokyo Senior Acquisitions Editor: Keith Donnellan Editorial Coordinator: Lauren Pecarich Marketing Managers: Rachel Mante Leung Production Project Manager: Joan Sinclair Design Coordinator: Stephen Druding Manufacturing Coordinator: Beth Welsh Prepress Vendor: SPi Global

Second Edition

Copyright © 2019 Wolters Kluwer

First edition copyright © 2012 by Lippincott Williams & Wilkins, a Wolters Kluwer business. All rights reserved. This book is protected by copyright. No part of this book may be reproduced or transmitted in any form or by any means, including as photocopies or scanned-in or other electronic copies, or utilized by any information storage and retrieval system without written permission from the copyright owner, except for brief quotations embodied in critical articles and reviews. Materials appearing in this book prepared by individuals as part of their official duties as U.S. government employees are not covered by the above-mentioned copyright. To request permission, please contact Wolters Kluwer at Two Commerce Square, 2001 Market Street, Philadelphia, PA 19103, via email at permissions@lww.com, or via our website at lww.com (products and services).

987654321

Printed in China

Library of Congress Cataloging-in-Publication Data

Names: Dimick, Justin B., editor. | Upchurch, Gilbert R., editor. | Sonnenday, Christopher J., editor. | Kao, Lillian S., editor.

Title: Clinical scenarios in surgery: decision making and operative technique / [edited by] Justin B. Dimick, Gilbert R. Upchurch Jr., Christopher J. Sonnenday, Lillian S. Kao.

Other titles: Clinical scenarios in surgery.

Description: Second edition. | Philadelphia: Wolters Kluwer, [2019] | Preceded by Clinical scenarios in surgery / editors, Justin B. Dimick, Gilbert R. Upchurch Jr., Christophr J. Sonnenday. c2013. | Includes bibliographical references and index.

Identifiers: LCCN 2018036067 | ISBN 9781496349071 (hardback)

Subjects: | MESH: Surgical Procedures, Operative—methods | Decision Making | Case Reports

Classification: LCC RD34 | NLM WO 16.1 | DDC 617—dc23 LC record available at https://lccn.loc.gov/2018036067

This work is provided "as is," and the publisher disclaims any and all warranties, express or implied, including any warranties as to accuracy, comprehensiveness, or currency of the content of this work.

This work is no substitute for individual patient assessment based upon healthcare professionals' examination of each patient and consideration of, among other things, age, weight, gender, current or prior medical conditions, medication history, laboratory data and other factors unique to the patient. The publisher does not provide medical advice or guidance and this work is merely a reference tool. Healthcare professionals, and not the publisher, are solely responsible for the use of this work including all medical judgments and for any resulting diagnosis and treatments.

Given continuous, rapid advances in medical science and health information, independent professional verification of medical diagnoses, indications, appropriate pharmaceutical selections and dosages, and treatment options should be made and healthcare professionals should consult a variety of sources. When prescribing medication, healthcare professionals are advised to consult the product information sheet (the manufacturer's package insert) accompanying each drug to verify, among other things, conditions of use, warnings and side effects and identify any changes in dosage schedule or contraindications, particularly if the medication to be administered is new, infrequently used or has a narrow therapeutic range. To the maximum extent permitted under applicable law, no responsibility is assumed by the publisher for any injury and/or damage to persons or property, as a matter of products liability, negligence law or otherwise, or from any reference to or use by any person of this work.

shop.lww.com

To my wife, Anastasia, and our children, Mary and Paul, for their love and support. To the dedicated general surgery residents, who will use the contents of this book to heal and comfort our patients.

—Justin B. Dimick

To the faculty and residents at the University of Florida for accepting me as a Gator.

-Gilbert R. Upchurch Jr.

To the general surgery residents of the University of Michigan, for their constant inspiration and dedication to patient care.

—Christopher J. Sonnenday

To the general surgery faculty and residents at McGovern Medical School at the University of Texas Health Science Center at Houston and to the providers at Red Duke Trauma Institute and Memorial Hermann Hospital-Texas Medical Center for their dedication to high-quality, patient-centered surgical care.

—Lillian S. Kao

### **CONTRIBUTORS**

Daniel Albo, MD, PhD
Chief, Division of Surgical Oncology
Department of Surgery
Baylor College of Medicine
Director, GI Oncology Program
Dan L. Duncan Cancer Center
Baylor College of Medicine
Houston, Texas

Christina V. Angeles, MD
Assistant Professor of Surgery
Division of Surgical Oncology
Geisel School of Medicine
Attending Surgeon
Dartmouth-Hitchcock Medical Center
Lebanon, New Hampshire

Stanley W. Ashley, MD Instructor of Surgery Department of Surgery Harvard Medical School Brigham and Women's Hospital Boston, Massachusetts

Naira Baregamian, MD Assistant Professor of Surgery Division of Surgical Oncology & Endocrine Surgery Vanderbilt University Medical Center Nashville, Tennessee

Carlton C. Barnett Jr., MD
Professor of Surgery
Department of Surgery
University of Colorado
Position Chief, Surgical Oncology VAMC
Rocky Mountain Regional VA Medical Center
Denver, Colorado

Douglas C. Barnhart, MD, MSPH Professor, Division of Pediatric Surgery University of Utah School of Medicine Program Director, Pediatric Surgery Fellowship Medical Director for Surgical Patient Safety and Quality Primary Children's Hospital Salt Lake City, Utah Meredith Barrett, MD General Surgery House Officer University of Michigan Ann Arbor, Michigan

Jessica M. Bensenhaver, MD, MS, FACS
Director of Breast Oncology
Research Director, International Center for the Study of Breast Cancer Subtypes
Department of Surgery
Henry Ford Health System
Detroit, Michigan

Noelle L. Bertelson, MD, FACS, FASCRS Attending Surgeon Colon and Rectal Surgery Colon and Rectal Clinic of Colorado St. Joseph Hospital Denver, Colorado

Kunjan S. Bhakta, MD Clinical Lecturer of Surgery Department of Surgery University of Michigan Ann Arbor, Michigan

James H. Black III, MD, FACS
The David Goldfarb, MD Associate Professor of Surgery
Director, Division of Vascular Surgery and Endovascular Therapy
Johns Hopkins Hospital
Baltimore, Maryland

Jeffrey A. Blatnik, MD Assistant Professor Department of Surgery Washington University in St. Louis Barnes-Jewish Hospital St. Louis, Missouri

Melissa M. Boltz, DO, MBA Assistant Professor of Surgery Penn State Milton S. Hershey Medical Center Hershey, Pennsylvania

Judy C. Boughey, MD
Vice Chair for Research
Department of Surgery
Professor of Surgery
Mayo Clinic
Mayo Clinic Hospital, Methodist Campus
Rochester, Minnesota

Brooke C. Bredbeck, MD Department of Surgery University of Michigan Ann Arbor, Michigan

Steven W. Bruch, MD, MSc Clinical Associate Professor Department of Surgery University of Michigan CS Mott Children's Hospital Pediatric Surgery Ann Arbor, Michigan

Terry Lynn Buchmiller, MD Associate Professor Harvard Medical School and Boston Children's Hospital Boston, Massachusetts

Richard A. Burkhart, MD Assistant Professor Department of Surgery and Oncology, Johns Hopkins University & Hospital Baltimore, Maryland

Clay Cothren Burlew, MD, FACS Professor of Surgery Department of Surgery University of Colorado Director, Surgical Intensive Care Unit Denver Health Medical Center Denver, Colorado

Richard E. Burney, MD Professor Emeritus of Surgery Department of Surgery Michigan Medicine University of Michigan Hospitals Ann Arbor, Michigan

William R. Burns, MD Assistant Professor Department of Surgery University of Michigan Surgeon, Michigan Medicine Ann Arbor, Michigan

John C. Byrn, MD Clinical Associate Professor of Surgery Division of Colorectal Surgery Department of Surgery University of Michigan Health System Ann Arbor, Michigan Jeremy Cannon, MD, FACS Associate Professor of Surgery Division of Trauma, Critical Care and Emergency Surgery Department of Surgery Perelman School of Medicine, University of Pennsylvania Philadelphia, Pennsylvania

Benjamin David Carr, MD House Officer Department of Surgery University of Michigan, Michigan Medicine Ann Arbor, Michigan

Stacey A. Carter, MD Assistant Professor Michael E. DeBakey Department of Surgery Baylor College of Medicine Houston, Texas

Eugene P. Ceppa, MD Associate Professor of Surgery Indiana University School of Medicine Indianapolis, Indiana

William Z. Chancellor, MD Resident Department of Surgery University of Virginia School of Medicine Charlottesville, Virginia

Andrew C. Chang, MD Associate Professor and Head Section of Thoracic Surgery University of Michigan, Michigan Medicine Ann Arbor, Michigan

Alfred E. Chang, MD Hugh Cabot Professor of Surgery Division of Surgical Oncology, Department of Surgery University of Michigan Health Systems Ann Arbor, Michigan

Anthony Charles, MD, MPH, FACS Associate Professor of Surgery School of Medicine Director, UNC-ECMO Program University of North Carolina Chapel Hill, North Carolina

Herbert Chen, MD, FACS Fay Fletcher Kerner Endowed Chair and Professor Chairman and Surgeon-in-Chief Department of Surgery University of Alabama at Birmingham Health University of Alabama at Birmingham Birmingham, Alabama

Sonia Cohen, MD, PhD Surgery Resident Department of Surgery Masachusetts General Hospital Boston, Masachusetts

Bryan A. Cotton, MD, MPH
John B. Holmes Professor in Clinical Sciences
McGovern Medical School at the University of Texas Health
Trauma Surgeon
Red Duke Trauma Institute at Memorial Hermann Hospital-TMC
Houston, Texas

Robert A. Cowles, MD Associate Professor of Surgery Yale School of Medicine New Haven, Connecticut

Christopher J. Crellin, MD Resident Physician Obstetrics and Gynecology Tripler Army Medical Center Honolulu, Hawaii

Michael W. Cripps, MD, MSCS, FACS Assistant Professor Division of General and Acute Care Surgery Department of Surgery University of Texas Southwestern Medical Center at Dallas Medical Director, Surgical Intensive Care Unit Parkland Memorial Hospital Dallas, Texas

James M. Cross, MD, FACS Professor of Surgery Director, Burn Center University of Texas Health Science Center at Houston Houston, Texas

Stephen W. Davies, MD Department of Surgery University of Virginia Charlottesville, Virginia

Priya H. Dedhia, MD, PhD

Endocrine Surgery Fellow Department of Surgery University of Wisconsin School of Medicine and Public Health University of Wisconsin Hospital and Clinics Madison, Wisconsin

Ronald P. DeMatteo, MD Vice Chair Department of Surgery Memorial Sloan-Kettering Cancer Center New York, New York

Danielle K. DePeralta, MD Surgical Oncology Fellow Moffitt Cancer Center Tampa, Florida

Emilia J. Diego, MD, FACS
Assistant Professor
Department of Surgery
University of Pittsburgh School of Medicine
Section Chief
Breast Surgery
Magee Women's Hospital–University of Pittsburgh Medical Center
Pittsburgh, Pennsylvania

Charles S. Dietrich III, MD
Associate Professor
Department of Obstetrics and Gynecology
Uniformed Services University of the Health Sciences
Bethesda, Maryland
Chief
Gynecologic Oncology Service
Tripler Army Medical Center
Honolulu, Hawaii

Anastasia Dimick, MD Laing & Dimick Dermatology Ann Arbor, Michigan

Justin B. Dimick, MD, MPH George D. Zuidema Professor of Surgery Chief, Division of Minimally Invasive Surgery Department of Surgery University of Michigan Ann Arbor, Michigan

Sharmila Dissanaike, MD, FACS, FCCM Peter C. Canizaro Chair & Professor Department of Surgery Texas Tech University Health Sciences Center Chief, University Medical Center Lubbock, Texas

Gerard M. Doherty, MD Moseley Professor of Surgery, Harvard Medical School Surgeon-in-Chief, Brigham and Women's Health Care Boston, Massachusetts

Michael J. Englesbe, MD Darling Professor of Surgery Associate Professor of Surgery – Transplantation University of Michigan Medical School Ann Arbor, Michigan

Cecilia G. Ethun, MD, MSCR
Post-Doctoral Research Fellow
Division of Surgical Oncology, Department of Surgery
Winship Cancer Institute, Emory University
Resident in General Surgery
Emory University
Atlanta, Georgia

David A. Etzioni, MD, MSHS Associate Professor Surgery, Mayo Clinic College of Medicine Consultant, Mayo Clinic Arizona Phoenix, Arizona

Heather Leigh Evans, MD, MS
Professor
Department of Surgery
Medical University of South Carolina
Vice Chair of Clinical Research and Applied Informatics
Charleston, South Carolina

Carole Fakhry, MD, MPH Associate Professor Department of Otolaryngology-Head and Neck Surgery Johns Hopkins University Baltimore, Maryland

Gavin A. Falk, MD Pediatric Surgery Kalispell Regional Medical Center Kalispell, Montana

Anna Z. Fashandi, MD Department of Surgery University of Virginia Charlottesville, Virginia Joseph Fernandez-Moure, MD, PhD Division of Trauma, Critical Care and Emergency Surgery Department of Surgery Perelman School of Medicine, University of Pennsylvania Philadelphia, Pennsylvania

Cristina R. Ferrone, MD Associate Professor and Director of Liver Program Department of Surgery Massachusetts General Hospital Boston, Massachusetts

Jonathan F. Finks, MD Associate Professor of Surgery University of Michigan Ann Arbor, Michigan

Emily Finlayson, MD, MS
Professor in Residence
Department of Surgery, Medicine, and Health Policy
University of California
Professor of Surgery
Division of General Surgery
UCSF Medical Center
San Francisco, California

Samuel R.G. Finlayson, MD, MPH, FACS Chair and Professor Department of Surgery University of Utah School of Medicine University of Utah Health Salt Lake City, Utah

Emily M. Fontenot, MD Department of Surgery University of North Carolina at Chapel Hill Chapel Hill, North Carolina

Danielle M. Fritze, MD Assistant Professor of Surgery Transplant Surgery University of Texas Health Science Center San Antonio, Texas

Sara Amelia Gaines, MD General Surgery Resident Department of Surgery University of Chicago Medical Center Chicago, Illinois

Wolfgang B. Gaertner, MD, MSc, FACS, FASCRS

Assistant Professor Division of Colon & Rectal Surgery Department of Surgery University of Minnesota Minneapolis, Minnesota

Paul G. Gauger, MD Professor of Surgery, Professor of Learning Health Sciences Dept of Surgery, Michigan Medicine Attending Surgeon, University of Michigan Hospital Ann Arbor, Michigan

Mitchell J. George, MD General Surgery Resident Department of Surgery McGovern Medical School Memorial Herman Hospital Houston, Texas

Tonya George, PA-C, PhD Instructor of Surgery McGovern Medical School University of Texas Health Science Center at Houston Houston, Texas

Amir A. Ghaferi, MD, MS Associate Professor Department of Surgery University of Michigan Medical School University of Michigan Ann Arbor, Michigan

Ian C. Glenn, MD Department of Surgery Akron Children's HospitalAkron, Ohio

Philip P. Goodney, MD Associate Professor of Vascular Surgery Dartmouth-Hitchcock Medical Center Lebanon, New Hampshire

Zhen Gooi, MBBS Assistant Professor Section of Otolaryngology-Head and Neck Surgery Department of Surgery University of Chicago Chicago, Illinois

Jessica S. Koller Gorham, MD Instructor of Surgery Geisel School of Medicine Hanover, New Hampshire Fellow, Minimally Invasive Surgery Dartmouth-Hitchcock Medical Center Lebanon, New Hampshire

Jon Gould, MD Chief and Alonzo P. Walker Chair of General Surgery Vice Chair for Quality, Department of Surgery Professor of Surgery, Medical College of Wisconsin Senior Medical Director for Clinical Affairs Froedtert Hospital Milwaukee, Wisconsin

Jacob A. Greenberg, MD, EdM Associate Professor of Surgery Department of Surgery University of Wisconsin Madison, Mississippi

Sarah E. Greer, MD Director Institute for Trauma Research and Injury Prevention Princeton, New Jersey

Chasen J. Greig, MD Research Fellow, Pediatric Surgery Yale School of Medicine New Haven, Connecticut

Tyler R. Grenda, MD Fellow, Cardiothoracic Surgery Section of Thoracic Surgery Department of Surgery University of Michigan Ann Arbor, Michigan

Rebecca L. Gunter, MD, MS General Surgery Resident Department of Surgery University of Wisconsin Madison, Wisconsin

Oliver L. Gunter Jr., MD Assistant Professor of Surgery Director, Emergency General Surgery Vanderbilt University Medical Center Nashville, Tennessee

Adil H. Haider, MD, MPH, FACS Kessler Director and Associate Chair for Research The Center for Surgery and Public Health Brigham and Women's Hospital Harvard Medical School, and the Harvard T.H. Chan School of Public Health Boston, Massachusetts

Ihab Halaweish, MD House Officer VII, General Surgery University of Michigan Ann Arbor, Michigan

Amy L. Halverson, MD Professor of Surgery Chief, Section of Colon and Rectal Surgery Northwestern University, Feinberg School of Medicine Northwestern Memorial Hospital Chicago, Illinois

Allen Hamdan, MD
Associate Professor of Surgery
Department of Surgery
Harvard Medical School
Attending Surgeon
Division of Vascular and Endovascular Surgery
Beth Israel Deaconess Medical Center
Boston, Massachusetts

Audrey F. Hand, MD General Surgery Resident Texas tech University Health Sciences Center university Medical Center Lubbock, Texas

Natasha Hansraj, MD Department of Surgery, Baltimore VA Medical Center and University of Maryland School of Medicine Baltimore, Maryland

John A. Harvin, MD, FACS Assistant Professor Division of Acute Care Surgery, Department of Surgery McGovern Medical School at UT Health University of Texas Health Science Center at Houston Houston, Texas

Elliott R. Haut, MD, PhD, FACS
Vice Chair of Quality, Safety & Service, Department of Surgery
Associate Professor of Surgery, Anesthesiology/Critical Care Medicine (ACCM) and Emergency
Medicine
Division of Acute Care Surgery, Department of Surgery
The Johns Hopkins University School of Medicine
Associate Professor of Health Policy & Management
The Johns Hopkins University Bloomberg School of Public Health

Core Faculty, The Armstrong Institute for Patient Safety and Quality, JHM Baltimore, Maryland

Harold Heah, MBBS, M Med, MRCSEd Adjunct Instructor, Head & Neck Centre Duke-NUS Medical School Consultant, Department of Otolaryngology Singapore General Hospital Singapore

David W. Healy, MD, MRCP, FRCA
Assistant Professor
Anesthesiology
University of Michigan
Director, Head & Neck Anesthesia
Department of Anesthesiology Health Systems
University of Michigan Hospital and Health Systems
Ann Arbor, Michigan

Mark R. Hemmila, MD, FACS Professor of Surgery Trauma Medical Director University of Michigan Medical School Michigan Medicine Ann Arbor, Michigan

Samantha Hendren, MD, MPH Associate Professor of Surgery University of Michigan Attending Surgeon University HospitalAnn Arbor, Michigan

Richard J. Hendrickson, MD, FACS, FAAP Department of Surgery, Children's Mercy Hospital Kansas City, Missouri

Peter K. Henke, MD Leland Ira Doan Professor of Surgery Section of Vascular Surgery Department of Surgery University of Michigan Ann Arbor, Michigan

H. Andrew Hopper, MD Instructor in Clinical Surgery Vanderbilt University Medical Center Nashville, Tennessee

Michael G. House, MD Associate Professor of Surgery Department of Surgery Indiana University School of Medicine Indianapolis, Indiana

Thomas S. Huber, MD, PhD Professor and Chief Department of Surgery Division of Vascular Surgery University of Florida Gainesville, Florida

David T. Hughes, MD Assistant Professor of Surgery Division of Endocrine Surgery Department of Surgery University of Michigan Hospitals and Health Centers Ann Arbor, Michigan

JoAnna L. Hunter-Squires, MD Assistant Professor of Surgery Indiana University School of Medicine Indianapolis, Indiana Indiana University Health Avon, Indiana

Justin B. Hurie, MD, MBA
Associate Professor
Dept of Vascular and Endovascular Surgery
Wake Forest university
Attending Surgeon
Wake Forest University Hospital
Winston-Salem, North Carolina

Todd F. Huzar, MD, FACS Assistant Professor of Surgery University of Texas Health Science Center at Houston Houston, Texas

Neil Hyman, MD Professor Department of Surgery University of Chicago School of Medicine Chief, Colorectal Surgery Codirector, Digestive Disease Center Chicago, Illinois

Kenji Inaba, MD, FRCSC, FACS Professor University of Southern California Vice Chair & Program Director of Surgery LAC and USC Medical Center Department of Surgery

#### Los Angeles, California

Angela M. Ingraham, MD, MS Assistant Professor of Surgery Trauma and Acute Care Surgery University of Wisconsin Madison, Wisconsin

Alexis D. Jacob, MD Assistant Professor Department of Surgery/Vascular University of Texas Southwestern Medical Center and Hospital Dallas, Texas

Kevin N. Johnson, MD Clinical Lecturer Department of Surgery University of Michigan Staff, Mott Children's Hospital Ann Arbor, Michigan

Lily E. Johnston, MD, MPH Department of Surgery University of Virginia Charlottesville, Virginia

Douglas Jones, MD Boston Medical Center Boston, Massachusetts

Jussuf T. Kaifi, MD, PhD Assistant Professor of Surgery Chief, Thoracic Surgery Department of Surgery University of Missouri

Jeffrey Kalish, MD Laszlo N. Tauber Assistant Professor Department of Surgery Boston University School of Medicine Director of Endovascular Surgery Department of Surgery Boston Medical Center Boston, Massachusetts

Bartholomew J. Kane, MD, PhD, FACS Assistant Professor Department of Surgery Kansas University Medical Center Kansas City, Kansas Arielle E. Kanters, MD, MS General Surgery Resident Department of Surgery University of Michigan - Michigan Medicine Ann Arbor, Michigan

Lillian S. Kao, MD, MS

Professor

Department of Surgery

McGovern Medical School at the University of Texas Health Science Center at Houston

Houston, Texas

Muneera R. Kapadia, MD Clinical Associate Professor Department of Surgery University of Iowa Carver College of Medicine University of Iowa Hospital & Clinics University of Iowa Iowa City, Iowa

Lewis J. Kaplan, MD, FACS, FCCM, FCCP Associate Professor of Surgery Division of Trauma, Critical Care and Emergency Surgery Department of Surgery Perelman School of Medicine, University of Pennsylvania Philadelphia, Pennsylvania Section Chief, Surgical Critical Care

Corporal Michael J Crescenz VA Medical Center

Philadelphia, Pennsylvania

Alex C. Kim, MD, PhD Chief Resident Division of General Surgery Department of Surgery University of Michigan Medical School Ann Arbor, Michigan

Eric T. Kimchi, MD, MBA Associate Professor of Surgery Chief, Division of Oncologic and General Surgery Medical Director, Ellis Fischel Cancer Center Department of Surgery University of Missouri Columbia, Missouri

Martyn Knowles, MD Adjunct Assistant Professor Department of Surgery University of North Carolina Holly Springs, North Carolina Attending Vascular Surgeon University of North Carolina Rex Hospital Raleigh, North Carolina

Bona Ko, MD Resident Department of Surgery Northwestern University Northwestern University Hospital Chicago, Illinois

Lisa M. Kodadek, MD Fellow, Department of Surgery Johns Hopkins University School of Medicine Baltimore, Maryland

Carla Kohoyda-Inglis, MPA Program Director, International Center for Automotive Medicine Department of General Surgery University of Michigan Health System Ann Arbor, Michigan

Geoffrey W. Krampitz, MD, PhD Fellow, Complex General Surgical Oncology Department of Surgical Oncology University of Texas, MD Anderson Cancer Center Houston, Texas

David M. Krpata, MD Assistant Professor Department of Surgery Cleveland Clinic Lerner College of Medicine Cleveland, Ohio

Henry Kuerer, MD, PhD, FACS Robinson Distinguished Endowed Professor Executive Director, Breast Programs Department of Surgical Oncology Program MD Anderson Cancer Center Houston, Texas

Michael E. Kupferman, MD, MBA Senior Vice President, Clinical and Academic Network Development, Cancer Network Professor, Head & Neck Surgery The University of Texan MD Anderson Cancer Center Houston, Texas

Kate Lak, MD Attending Physician Department of Surgery Froedtert Memorial Lutheran Hospital Milwaukee, Wisconsin Christine L. Lau, MD Associate Professor of Surgery Division of Thoracic and Cardiovascular Surgery University of Virginia Charlottesville, Virginia

Anne Laux, MD Texas Vascular Associates Dallas, Texas

Yeranui Ledesma, MD General Surgery Resident Department of Surgery University of California UCSF Bakar Cancer Hospital San Francisco, California

Marie Catherine Lee, MD
Associate Professor
Departments of Interdisciplinary Oncology and Surgery
University of South Florida Morsani School of Medicine
Associate Member
Comprehensive Breast Program
Moffitt Cancer Center
Tampa, Florida

Suzie S. Lee, MD Transplant Fellow Washington University School of Medicine St. Louis, Missouri

Anthony J. Lewis, MD, MSc Chief Resident Department of Surgery University of Pittsburgh Medical Center Pittsburgh, Pennsylvania

Patric Liang, MD Beth Israel Deaconess Medical Center Boston, Massachusetts

Jules Lin, MD, FACS
Associate Professor, Mark B. Orringer Professor
Surgical Director, Lung Transplant
Section of Thoracic Surgery
University of Michigan
University of Michigan Hospital
Ann Arbor, Michigan

Pamela A. Lipsett, MD, MHPE, MCCM Warfield M. Firor Endowed Professorship in Surgery Professor of Surgery, Anesthesiology, and Critical Care Medicine Program Director, General Surgery and Surgical Critical Care Co-Director, Surgical Intensive Care Units Johns Hopkins University School of Medicine Baltimore, Maryland

Roy Lirov, MD General and Endocrine Surgeon Department of Surgery Seton Medical Center Austin, Texas

Ann C. Lowry, MD Clinical Professor of Surgery Division of Colon and Rectal Surgery University of Minnesota St. Paul, Minnesota

Hubert Yiu-Wei Luu, MD, MS Resident Physician Department of Surgery University of California San Francisco, California

Paul M. Maggio, MD, MBA, FACS Associate Professor of Surgery Vice Chair of Surgery for Clinical Affairs Associate Chief Medical Officer Stanford University Medical Center Stanford, California

Shishir K. Maithel, MD, FACS Associate Professor of Surgery Scientific Director, Emory Liver and Pancreas Center Winship Cancer Institute, Division of Surgical Oncology Department of Surgery, Emory University Atlanta, Georgia

Julie A. Margenthaler, MD
Professor of Surgery
Department of Surgery
Washington University School of Medicine
Attending Physician
Barnes-Jewish Hospital
St. Louis, Missouri

Linda W. Martin, MD, MPH Associate Professor Division of Thoracic Surgery, Department of Surgery University of Virginia School of Medicine Charlottesville, Virginia Kazuhide Matsushima, MD Assistant Professor of Clinical Surgery Division of Acute Care Surgery University of Southern California

Jeffrey B. Matthews, MD, FACS Surgeon-in-Chief and Chairman Dallas B. Phemister Professor of Surgery The University of Chicago Medicine Chicago, Illinois

Anne E. Mattingly, MD Breast Surgical Oncologist Hendricks Regional Health Breast Center Danville, Indiana

Haggi Mazeh, MD Associate Professor with tenure Department of Surgery Hadassah-Hebrew University Medical Center Jerusalem, Israel

Greg J. McKenna, MD, FRCS(C), FACS Associate Professor of Surgery Texas A&M College of Medicine Multiorgan Abdominal Transplant Surgeon Simmons Transplant Institute Baylor University Medical Center Dallas, Texas

Sean E. McLean, MD Associate Professor Division of Pediatric Surgery Department of Surgery University of North Carolina at Chapel Hill University of North Carolina Children's Hospital Chapel Hill, North Carolina

Ashley D. Meagher, MD, MPH Assistant Professor University of Indiana School of Medicine Indianapolis, Indiana

Benjamin D. Medina, MD Research Fellow Department of Surgery Memorial Sloan-Kettering Cancer Center New York, New York

Patrick D. Melmer, MD General Surgery Resident, PDY-2Department of Surgery University of South Carolina Columbia, South Carolina Grand Strand Medical Center Myrtle Beach, South Carolina

Genevieve B. Melton-Meaux, MD, PhD Professor of Surgery and Health Informatics Core Faculty University of Minnesota Chief Data and Health Informatics Officer Fairview Health Services Minneapolis, Minnesota

Joseph Melvin, MD Chief Surgical Resident Department of Surgery University of Missouri Columbia, Missouri

David E. Meyer, MD, MS, FACS Assistant Professor of Surgery McGovern Medical School at UT Health Memorial Hermann Hospital - Texas Medical Center Houston, Texas

Stacey A. Milan, MD, FACS Assistant Professor of Surgery Texas Tech University Health Sciences Center, El Paso El Paso, Texas

Barbra S. Miller, MD, FACS Assistant Professor Department of Surgery University of Michigan Michigan MedicineAnn Arbor, Michigan

Katrina B. Mitchell, MD Clinical Assistant Professor Department of Surgery University of New Mexico Breast Surgical Oncologist Surgical Oncology Presbyterian Healthcare Services-MD Anderson Cancer Network Albuquerque, New Mexico

Omeed Moaven, MD Clinical Fellow Division of Surgical Oncology Department of Surgery Wake Forest University Winston-Salem, North Carolina Adeyiza O. Momoh, MD, FACS Associate Professor of Surgery Section of Plastic Surgery Department of Surgery University of Michigan Ann Arbor, Michigan

Derek Moore, MD, MPH Associate Professor University of Tennessee Health Science Center Program Director St. Thomas West Nashville, Tennessee

Arden M. Morris, MD, MPH
Professor and Vice Chair for Clinical Research
Section of Colorectal Surgery
Department of Surgery
Stanford University School of Medicine
Stanford Hospital
Stanford, California

Monica Morrow, MD
Professor of Surgery
Weill Medical College of Cornell University
New York, New York
Chief, Breast Service
Department of Surgery
Anne Burnett Windfohr Chair of Clinical Oncology
Memorial Sloan-Kettering Cancer Center
New York, New York

Rori E. Morrow, MD Vascular Fellow Division of Vascular and Endovascular Surgery University of Virginia Charlottesville, Virginia

Michael W. Mulholland, MD, PhD Professor of Surgery Chair, Department of Surgery University of Michigan Ann Arbor, Michigan

Shilpa S. Murthy, MD, MPH Oncology Fellow Fox Chase Cancer Center Philadelphia, Pennsylvania

Alykhan S. Nagji, MD General Thoracic Surgeon Assistant Professor Department of Cardiovascular and Thoracic Surgery Associate Program Director – Cardiothoracic Surgery Fellowship The University of Kansas Health System Kansas City, Kansas

Avery B. Nathens, MD, MPH, PhD Professor Department of Surgery University of Toronto Chief of Surgery Sunnybrook Health Sciences Centre Toronto, Ontario, Canada

Nicole Nevarez, MD Surgical Resident University of Texas – Southwestern Dallas, Texas

Lisa A. Newman, MD, MPH, FACS, FASCO
Director, Henry Ford Health System Breast Oncology Program
Medical Director, International Center for the Study of Breast Cancer Subtypes
Adjunct Professor of Surgery, MD Anderson Cancer Center
Adjunct Professor, Health Management and Policy, University of Michigan School of Public Health
Detroit, Michigan

Erika A. Newman, MD Assistant Professor, Pediatric Surgery University of Michigan C.S. Mott Children's Hospital Ann Arbor, Michigan

Stephanie Nitzschke, MD Instructor of Surgery Harvard Medical School Associate Surgeon Brigham and Women's Hospital Boston, Massachusetts

Jeffrey A. Norton, MD Professor of Surgery Stanford University, School of Medicine Stanford, California

Yuri W. Novitsky, MD, FACS Professor of Surgery Director, Columbia Comprehensive Hernia Center Columbia University Medical Center New York, New York

Nabeel R. Obeid, MD

Assistant Professor of Surgery Minimally-Invasive and Bariatric Surgeon University of Michigan Medical School Michigan Medicine Ann Arbor, Michigan

Robert W. O'Rourke, MD Professor Department of Surgery University of Michigan Medical School Chief, Division of General Surgery Ann Arbor Veteran's Administration Hospital Ann Arbor, Michigan

Carlos H. Palacio, MD
Fellow Surgical Critical Care
Division of Acute Care Surgery
Michael E. DeBakey Department of Surgery
Baylor College of Medicine
Houston, Texas

Lucian Panait, MD Minimally Invasive Surgeon Department of Surgery AtlantiCare Regional Medical Center Atlantic City, New Jersey

Timothy M. Pawlik, MD, MPH, PhD Professor and Chair The Ohio State University School of Medicine Chair of Surgery Department of Surgery Wexner Medical Center Columbus, Ohio

Christian Perez, MD Medical Director of Metabolic and Bariatric Surgery Department of Surgery, Carle Foundation Hospital Urbana, Illinois

Lindsay Petersen, MD Surgeon, Henry Ford Health System Breast Oncology Program Clinical Assistant Professor, Wayne State University School of Medicine Detroit, Michigan

Benjamin K. Poulose, MD, MPH Robert M. Zollinger Lecrone-Baxter Professor of Surgery Chief, Division of General and Gastrointestinal Surgery The Ohio State University College of Medicine, Wexner Medical Center Columbus, Ohio Michael J. Pucci, MD, FACS Assistant Professor of Surgery Department of Surgery Sidney Kimmel Medical College Thomas Jefferson University Philadelphia, Pennsylvania

Jennifer Racz, MD Assistant Professor of Surgery Department of Surgery Mayo Clinic Mayo Clinic Hospital, Methodist Campus Rochester, Minnesota

Krishnan Raghavendran, MD Professor of Surgery; Division Chief, Acute Care Surgery Director, Michigan Center for Global Surgery Department of Surgery, Michigan Medicine University of Michigan Ann Arbor, Michigan

Matthew W. Ralls, MD Assistant Professor, Pediatric Surgery Department of Surgery University of Michigan Ann Arbor, Michigan

Sara K. Rasmussen, MD, PhD, FACS Assistant Professor of Surgery Department of Surgery University of Virginia Health SystemCharlottesville, Virginia

Scott E. Regenbogen, MD, MPH Department of Colon and Rectal Surgery Lahey Clinic Burlington, Massachusetts

William P. Robinson III, MD Associate Professor Division of Vascular and Endovascular Surgery University of Virginia School of Medicine University of Virginia Health System Charlottesville, Virginia

Michael J. Rosen, MD, FACS Professor of Surgery Department of General Surgery Cleveland Clinic Foundation Cleveland, Ohio

Kelly Joyce Rosso, MD

Breast Surgical Oncologist Department of Surgical Oncology Banner MD Anderson Cancer Center Gilbert, Arizona

Campbell S. Roxburgh, PhD, FRCS Clinical Senior Lecturer Institute of Cancer Sciences University of Glasgow Consultant Colorectal Surgeon Department of Colorectal Surgery Glasgow Royal Infirmary Glasgow, United Kingdom

Michael S. Sabel, MD William W. Coon Collegiate Professor of Surgery Chief of Surgical Oncology Division of Surgical Oncology, Department of Surgery University of Michigan Health Systems Ann Arbor, Michigan

Ian C. Sando, MD Plastic and Reconstructive Surgery St. Vincent Medical Group Carmel, Indiana

George A. Sarosi Jr., MD Robert H. Hux Professor of Surgery Vice Chairman for Education University of Florida College of Medicine Gainesville, Florida

Brian D. Saunders, MD, FACS Associate Professor of Surgery and Medicine Penn State College of Medicine Penn State Milton S. Hershey Medical Center Hershey, Pennsylvania

Sara Scarlet, MD Department of Surgery University of North Carolina at Chapel Hill Chapel Hill, North Carolina

Samuel A. Schechtman, MD Clinical Assistant Professor Director of Head and Neck Anesthesiology & Airway Management Faculty Anesthesiologist Michigan Medicine—University of Michigan Department of Anesthesiology Ann Arbor, Michigan Randall P. Scheri, MD Associate Professor of Surgery Department of Surgery Duke University Medical Center Duke University Durham, North Carolina

Andrew B. SchneiderMD , General Surgery Resident Department of Surgery The University of Chicago Medicine Chicago, Illinois

Stephanie Sea, MD Critical Care Fellow University of Southern California Los Angeles, California

Shinil K. Shah, DO, FACS Assistant Professor of Surgery Department of Surgery University of Texas Health McGovern Medical School Houston, Texas

Mihir M. Shah, MD Department of Surgery Emory University Hospital Atlanta, Georgia

Miraj G. Shah-Khan, MD, FACS Assistant Professor of Surgery Division of Surgical Oncology Medical College of Wisconsin Milwaukee, Wisconsin

Scott S. Short, MD Assistant Professor of Pediatric Surgery Primary Children's Hospital University of Utah School of Medicine Salt Lake City, Utah

Sarah P. Shubeck, MD, MS House Officer, General Surgery Department of Surgery University of Michigan Ann Arbor, Michigan

Matthew J. Sideman, MD Associate ProfessorDepartment of Surgery University of Texas Health Science Center at San Antonio San Antonio, Texas Rebecca S. Sippel, MD Associate Professor of Surgery University of Wisconsin School of Medicine and Public Health Chief of Division of Endocrine Surgery Department of Surgery University of Wisconsin Hospitals and Clinics Madison, Wisconsin

Jeffrey J. Skubic, DO Instructor of Surgery Harvard Medical School Fellow in Trauma and Acute Care Surgery Brigham and Women's Hospital Boston, Massachusetts

Oliver S. Soldes, MD, FACS, FAAP Associate Professor of Surgery Division of Pediatric Surgery Dayton Children's Hospital Dayton, Ohio

Carmen C. Solórzano, MD Professor of Surgery Chief, Division of Surgical Oncology & Endocrine Surgery Vanderbilt University Medical Center Nashville, Tennessee

Vernon K. Sondak, MD Department of Cutaneous Oncology H. Lee Moffitt Cancer Center Tampa, Florida

Christopher J. Sonnenday, MD, MHS Associate Professor of Surgery, Health Management & Policy Department of Surgery University of Michigan Ann Arbor, Michigan

Julie Ann Sosa, MD, MA, FACS Leon Goldman MD Distinguished Professor of Surgery and Chair Department of Surgery University of California, San Francisco San Francisco, California

Jason L. Sperry, MD, MPH Professor of Surgery and Critical Care Director of Acute Care Surgery Fellowship University of Pittsburgh Medical Center Pittsburgh, Pennsylvania

Kevin F. Staveley-O'Carroll, MD, PhD

Professor of Surgery, Medicine, Microbiology and Immunology Department of Surgery Penn State College of Medicine Penn State Hershey Medical Center Hershey, Pennsylvania

Scott R. Steele, MD Professor of Surgery Chairman, Department of Colorectal Surgery Cleveland Clinic Lerner College of Medicine at Case Western Reserve University Cleveland, Ohio

Melissa K. Stewart, MD Instructor Acute and Critical Care Surgery Washington University Barnes Jewish Hospital St. Louis, Missouri

Kimberly S. Stone, MD Clinical Assistant Professor Department of Surgery Stanford University Medical Center Stanford, California Medical Director Stanford Cancer Center South Bay San Jose, California

Erin A. Strong, MD, MBA, MPH Resident in Surgery, Department of Surgery Medical College of Wisconsin Affiliated Hospitals Milwaukee, Wisconsin

Ryan M. Svoboda, MD Resident, Vascular Surgery Dartmouth-Hitchcock Medical Center Lebanon, New Hampshire

John F. Sweeney, MD W. Dean Warren Distinguished Professor of Surgery Department of Surgery Emory University School of Medicine Atlanta, Georgia

Dana A. Telem, MD, MPH Associate Professor of Surgery Division of Minimally-Invasive Surgery Michigan Medicine Ann Arbor, Michigan

Pierre R. Theodore, MD

Vice President, Thoracic Surgical Oncology Johnson & Johnson Medical Devices Companies UCSF Health Sciences Associate Professor of Surgery UCSF Van Auken Endowed Chair, Thoacic Surgery San Francisco, California

Jonathan R. Thompson, MD Assistant Professor of Surgery Associate Program Director, Vascular Surgery Fellowship University of Nebraska Medical Center Omaha, Nebraska

Nirav C. Thosani, MD, MHA Artilla Ertan MD Chair in Gastroenterology, Hepatology & Nutrition Assistant Professor, Gastroenterology, Hepatology & Nutrition McGovern Medical School, University of Texas Health Science Center at Houston Houston, Texas

Carlos H. Timaran, MD
Professor
Department of Surgery
UT Southwestern Medical Center
Dallas, Texas
Adjunct Assistant Professor
Department of Surgery
University of North Carolina Rex Hospital
Raleigh, North Carolina

Thadeus Trus, MD Associate Professor of Surgery Department of Surgery Dartmouth Medical School Lebanon, New Hampshire

Susan Tsai, MD, MHS
Associate Professor
Division of Surgical Oncology
Department of Surgery
Medical College of Wisconsin
Froedtert Memorial Lutheran Hospital
Milwaukee, Wisconsin

Douglas J. Turner, MD, FACS Division of General Surgery Baltimore VA Medical Center Baltimore, Maryland

Anna Tyson, MD, MPH Chief Surgical Resident Carolinas Medical Center Charlotte, North Carolina Gilbert R. Upchurch Jr., MD
Woodward Professor & Chair
Department of Surgery
University of Florida
Professor of Surgery
Vascular Surgery Division
UF Health Shands HospitalGainesville, Florida

Eva Maria Urrechaga, MD Resident in General Surgery Department of Surgery University of Miami Miami, Florida

Kyle J. Van Arendonk, MD, PhD Assistant Professor Department of Surgery Medical College of Wisconsin Pediatric Surgeon, Children's Hospital of Wisconsin Milwaukee, Wisconsin

Oliver A. Varban, MD Assistant Professor of Surgery Michigan Medicine, University Hospital University of Michigan Ann Arbor, Michigan

Seth A. Waits, MD Clinical Lecturer of Surgery – Transplantation University of Michigan Ann Arbor, Michigan

Peter A. Walker, MD Assistant Professor, Surgery McGovern Medical School, University of Texas Health Science Center at Houston Houston, Texas

Stewart C. Wang, MD, PhD Endowed Professor of Burn Surgery & Professor of Surgery Department of General Surgery University of Michigan Health Systems Ann Arbor, Michigan

Jeremy L. Ward, MD Assistant Professor of Surgery Michael E. DeBakey Department of Surgery Baylor College of Medicine Attending Surgeon, General Surgery, Ben Taub Hospital Houston, Texas

Martin R. Weiser, MD

Professor
Department of Surgery
Weill Cornell Medical College
Vice Chairman
Department of Surgery
Memorial Sloan Kettering Cancer Center
New York, New York

Bradford P. Whitcomb, MD Associate Professor of Obstetrics and Gynecology UConn School of Medicine Division Chief, Gynecologic Oncology, Obstetrics and Gynecology Carole and Ray Neag Comprehensive Cancer Center UConn Health Farmington, Connecticut

Joseph M. White, MD, FACS
MAJ(P), United States Army
Associate Program Director, Vascular Surgery Fellowship
Assistant Professor of Surgery
Department of Surgery at Uniformed Services University of the Health Sciences
Walter Reed National Military Medical Center
Bethesda, Maryland

David R. Whittaker, MD, FACS Chief of Vascular and Endovascular Surgery Uniformed Services University of the Health Sciences and Walter Reed National Military Medical Center Bethesda, Maryland

Carlin Williams, MD University of Virginia Charlottesville, Virginia

Emily R. Winslow, MD, FACS Associate Professor of Surgery Department of Surgery University of Wisconsin Health University of Wisconsin Madison, Wisconsin

Kevin B. Wise, MD Assistant Professor of Surgery Department of Surgery Mayo Clinic Rochester, Minnesota

Sandra L. Wong, MD, MS
Professor of Surgery
Chair, Department of Surgery
Geisel School of Medicine
Dartmouth-Hitchcock Medical Center

### Lebanon, New Hampshire

Derek T. Woodrum, MD Associate Professor, Attending Anesthesiologist Department of Anesthesiology University of Michigan Medical School, Michigan Medicine Ann Arbor, Michigan

Charles J. Yeo, MD, FACS Samuel D. Gross Professor Department of Surgery Thomas Jefferson University Chair, Department of Surgery Thomas Jefferson University Hospital Philadelphia, Pennsylvania

Jason B. Young, MD, PharmD
Assistant Professor of Surgery (Clinical Track)
Division of General Surgery, Department of Surgery
University of Utah School of Medicine
Surgeon, University of Utah Health
Salt Lake City, Utah

Jennifer Yu, MD Resident, General Surgery Washington University School of Medicine Housestaff, General Surgery Barnes-Jewish Hospital Department of Surgery St. Louis, Missouri

Brian S. Zuckerbraun, MD, FACS Henry T. Bahnson Professor of Surgery Chief, Division of General and Trauma Surgery University of Pittsburgh University of Pittsburgh Medical Center and VA Pittsburgh Healthcare System Pittsburgh, Pennsylvania

### • CONTRIBUTORS TO THE PREVIOUS EDITION

Edouard Aboian, MD

Daniel Albo, MD, PhD

Amy K. Alderman, MD, MPH

Steven R. Allen, MD

John B. Ammori, MD

Christopher D. Anderson, MD

Stanley W. Ashley, MD

Samir S. Awad, MD

Douglas C. Barnhart, MD, MSPH

William C. Beck, MD

Natasha S. Becker, MD, MPH

Filip Bednar, MD

Jessica M. Bensenhaver, MD

Noelle L. Bertelson, MD, FACS, FASCRS

Avi Bhavaraju, MD

James H. Black III, MD, FACS

Brendan J. Boland, MD

Melissa Boltz, DO, MBA

Tara M. Breslin, MD

Adam S. Brinkman, MD

Malcolm V. Brock, MD

James T. Broome, MD

Steven W. Bruch, MD, MSc

Terry Lynn Buchmiller, MD

Richard E. Burney, MD

Marisa Cevasco, MD, MPH

Alfred E. Chang, MD

Anthony G. Charles, MD, MPH

Herbert Chen, MD, FACS

Steven Chen, MD, MBA

Hueylan Chern, MD

Albert Chi, MD

Sara E. Clark, MD

Robert A. Cowles, MD

Eric J. Culbertson, MD

Lillian G. Dawes, MD

Sebastian G. De la fuente, MD

Ronald P. DeMatteo, MD

Charles S. Dietrich III, MD

Anastasia Dimick, MD

Justin B. Dimick, MD, MPH

Paul D. Dimusto, MD

Gerard M. Doherty, MD

Bernard J. Dubray, MD

Gregory Ara Dumanian, MD

Guillermo A. Escobar, MD

David A. Etzioni, MD, MSHS

Heather L. Evans, MD, MS

Gavin A. Falk, MD

Jonathan F. Finks, MD

Emily Finlayson, MD, MS

Samuel R.G. Finlayson, MD, MPH, FACS

Emily M. Fontenot, MD

Heidi L. Frankel, MD

Timothy L. Frankel, MD

Michael G. Franz, MD

Danielle Fritze, MD

Samir K. Gadepalli, MD

Wolfgang B. Gaertner, MS, MD

Paul G. Gauger, MD

James D. Geiger, MD

Philip P. Goodney, MD, MS

Sarah E. Greer, MD, MPH

Tyler Grenda, MD, MS

Erica R. Gross, MD

Travis E. Grotz, MD

Oliver L. Gunter, MD, MPH

Jeffrey S. Guy, MD, MSc, MMHC

Adil H. Haider, MD, MPH

Ihab Halaweish, MD

A.L. Halverson, MD

Allen Hamdan, MD

James Harris Jr., MD

Elliott R. Haut, MD

A.V. Hayman, MD

David W. Healy, MD, MRCP, FRCA

Mark R. Hemmila, MD, FACS

Samantha Hendren, MD, MPH

Peter K. Henke, MD

Richard Herman, MD

Michael G. House, MD

Gina M.S. Howell, MD

Thomas S. Huber, MD, PhD

David T. Hughes, MD

Alicia Hulbert, MD

Justin Hurie, MD

Neil Hyman, MD

Angela M. Ingraham, MD, MS, FACS

Kamal M.F. Itani, MD

Alexis D. Jacob, MD

Lisa K. Jacobs, MD

James W. Jakub, MD

Jennifer E. Joh, MD

Jussuf T. Kaifi, MD, PhD

Jeffrey Kalish, MD

Lillian S. Kao, MD, MS

Muneera R. Kapadia, MD, MME

Srinivas Kavuturu, MD, FRCS

Sajid A. Khan, MD

Hyaehwan Kim, MD

Andrew S. Klein, MD, MBA

Carla Kohoyda-Inglis, MPA

Geoffrey W. Krampitz, MD

Andrew Kroeker, MD

Hari R. Kumar, MD

Adriana Laser, MD

Christine L. Lau, MD, MBA

Constance W. Lee, MD

Marie Catherine Lee, MD

Jules Lin, MD

Peter H. Lin, MD

Pamela A. Lipsett, MD, MHPE

Ann C. Lowry, MD

Dennis P. Lund, MD

Paul M. Maggio, MD, MBA

Ali F. Mallat, MD, MS

Sean T. Martin, MD

Jeffrey B. Matthews, MD, FACS

Haggi Mazeh, MD

Timothy W. McCardle, MD

Erin McKean, MD

Sean E. McLean, MD

Michelle K. McNutt, MD

Genevieve Melton-Meaux, MD, MA

April E. Mendoza, MD

Evangelos Messaris, MD, PhD

Stacey A. Milan, MD

Barbra S. Miller, MD

Judiann Miskulin, MD

Derek Moore, MD, MPH

Arden M. Morris, MD

Monica Morrow, MD

John Morton, MD, MPH

Michael Mulholland, MD, PhD

Alykhan S. Nagji, MD

Lena M. Napolitano, MD

Avery B. Nathens, MD, MPH, PhD

Erika Newman, MD

Lisa A. Newman, MD, MPH

Jeffrey A. Norton, MD

Babak J. Orandi, MD, MSc

Mark B. Orringer, MD

Paul Park, MD, MA

Pauline K. Park, MD

Timothy M. Pawlik, MD, MPH

Shawn J. Pelletier, MD

Peter D. Peng, MD, MS

Catherine E. Pesce, MD

Rebecca Plevin, MD

Benjamin K. Poulose, MD, MPH

Sandhya Pruthi, MD

Krishnan Raghavendran, MDJulie Ann Sosa, MD, MA

Matthew W. Ralls, MD

John Rectenwald, MD

Scott E. Regenbogen, MD, MPH

Amy L. Rezak, MD

William P. Robinson III, MD

Michael J. Rosen, MD

Michael S. Sabel, MD

Vivian M. Sanchez, MD

George A. Sarosi Jr., MD

Brian D. Saunders, MD

C. Max Schmidt, MD, PhD, MBA

Maureen K. Sheehan, MD

Terry Shih, MD

Andrew Shuman, MD

Sabina Siddiqui, MD

Matthew J. Sideman, MD

Rebecca S. Sippel, MD

Alexis D. Smith, MD

Vance L. Smith, MD, MBA

Oliver S. Soldes, MD

Vernon K. Sondak, MD

Christopher J. Sonnenday, MD, MHS

Matthew Spector, MD

Jason L. Sperry, MD, MPH

Kevin F. Staveley-O'Carroll, MD, PhD

John F. Sweeney, MD

Kevin E. Taubman, MD

Daniel H. Teitelbaum, MD

Pierre Theodore, MD

Thadeus Trus, MD

Douglas J. Turner, MD

Gilbert R. Upchurch Jr., MD

Kyle J. Van Arendonk, MD

Chandu Vemuri, MD

Jon D. Vogel, MD

Wendy L. Wahl, MD

Thomas W. Wakefield, MD

Jennifer F. Waljee, MD, MS

Stewart C. Wang, MD, PhD

Joshua A. Waters, MD

Sarah M. Weakley, MD

Walter P. Weber, MD

Martin R. Weiser, MD

Bradford P. Whitcomb, MD

Elizabeth C. Wick, MD

Sandra L. Wong, MD, MS

Derek T. Woodrum, MD

Leslie S. Wu, MD

Charles J. Yeo, MD

Barbara Zarebczan, MD

# **FOREWORD**

In preparing a generation of surgical residents to enter practice, there are some thoughts on reading that I may offer. There are also some rules that I have found useful while writing and editing chapters for surgical textbooks. Most of us are not born surgeons; we become surgeons through dedicated effort. If you are the exception—accomplished, articulate, and confident; if surgical principles come effortlessly, you may stop reading now. Still, you might want to take a look. Here are three thoughts:

#### 1. Start reading right away

For most surgeons, the most difficult reading assignment is the first assignment. The problem lies not in realizing the high stakes of a board exam; the trouble comes with the commitment that board preparation requires. The form of most contemporary texts is part of the problem. A glance shows the chapters to be long, devoid of illustrations, a daunting proposition. *Clinical Scenarios in Surgery* is so inviting with its crisp writing, generous illustrations, and telegenic presentation that it begs to be read. Get started.

#### 2. Look to the future

Modern surgery is forward looking, seeking to improve the care of current patients and to prevent disease in potential future patients. Given the pace of modern biomedical research, no individual can be expected to find, read, synthesize, and apply all new knowledge relevant to any clinical problem. All surgeons need an occasional guide through the surgical literature. In the midst of this information overload, the experienced, energetic editors of *Clinical Scenarios in Surgery* strike just the right balance. Keep going.

#### 3. Keep reading, even just a little bit, every day

Reading is a skill, sharpened with practice, perfected by *continuous* practice. Operative surgery reinforces this notion. The physical skills, sense of prioritized organization, personal confidence, and intuition of the accomplished surgeon result from attention to the craft. That is the reason it is called the practice of surgery. A book becomes much friendlier with frequent use. Enjoy the journey.

Michael W. Mulholland, MD, PhD

# **PREFACE**

Despite remarkable technical advances and rapid scientific progress, it has never been more challenging to become a safe and proficient surgeon.

Young surgeons are challenged both by the pace of change and the subspecialization of surgery. Traditional surgical textbooks, which have grown to keep pace with these changes, are becoming encyclopedic reference books, which we turn to only when we need a comprehensive overview. With the vast amount of information available, it is often difficult to sort out the basic principles of safe surgery for a given clinical scenario. The mismatch between existing education materials and the need for a solid understanding of general surgical principles becomes most apparent when young surgeons sit down to prepare to take their written and oral board exams.

Young surgeons also learn differently than those in the past. Modern surgical trainees do not sit down and read for hours at a time. They are multitaskers who demand efficiency and immediate relevance in their learning materials. Most medical schools have responded to these changes by transitioning to curricula based on case-based learning. Clinical narratives are extremely effective learning tools because they use patient stories to teach essential surgical principles. Most existing surgical textbooks have not kept pace with these broader changes in medical education.

We wrote this book to fill these gaps. We have created a case-based text that communicates core principles of general surgery and its specialties. We believe the patient stories in these clinical scenarios will provide context to facilitate learning the principles of safe surgical care. Students, residents, and other young surgeons should find the chapters short enough to read between cases or after a long day in the hospital. We hope this book will be particularly useful for senior surgical residents and recent graduates as they prepare for the American Board of Surgery oral examination.

Justin B. Dimick Gilbert R. Upchurch Jr. Christopher J. Sonnenday Lillian S. Kao

# **CONTENTS**

Contributors Foreword Preface

### **SECTION 1: ABDOMINAL WALL**

# 1 Symptomatic Primary Inguinal Hernia

Rebecca L. Gunter and Jacob A. Greenberg

# 2 Recurrent Inguinal Hernia (Transabdominal Preperitoneal Repair)

Jonathan F. Finks

# 3 Incarcerated/Strangulated Inguinal Hernia

Sarah P. Shubeck, Matthew W. Ralls, and Justin B. Dimick

### 4 Ventral Incisional Hernia

Melissa K. Stewart and Benjamin K. Poulose

# 5 Complex Abdominal Wall Reconstruction

David M. Krpata and Michael J. Rosen

### 6 Enterocutaneous Fistula

Lucian Panait and Yuri W. Novitsky

### 7 Infected Ventral Hernia Mesh

Jeffrey A. Blatnik

### 8 Postoperative Dehiscence

Angela M. Ingraham and Avery B. Nathens

### **SECTION 2: UPPER GASTROINTESTINAL**

# 9 Paraesophageal Hernia

Thadeus Trus and Jessica S. Koller Gorham

# 10 Gastroesophageal Reflux Disease

Jonathan F. Finks

### 11 Gastric Cancer

Joseph Melvin, Jussuf T. Kaifi, Eric T. Kimchi, and Kevin F. Staveley-O'Carroll

### 12 Gastrointestinal Stromal Tumor

Benjamin D. Medina and Ronald P. DeMatteo

## 13 Splenectomy for Hematologic Disease

Mihir M. Shah and John F. Sweeney

# 14 Morbid Obesity

Nabeel R. Obeid and Dana A. Telem

# 15 Surgical Treatment of Gastroesophageal Reflux Disease in the Obese Patient

Amir A. Ghaferi and Robert W. O'Rourke

# 16 Gastroesophageal Reflux Disease After Sleeve Gastrectomy

Kate Lak and Jon Gould

# 17 Leak After Bariatric Surgery

Oliver A. Varban

### **SECTION 3: EMERGENCY GENERAL SURGERY**

# 18 Acute Appendicitis

Jason B. Young, Sarah E. Greer, and Samuel R.G. Finlayson

# 19 Perforated Appendicitis

Benjamin David Carr and Mark R. Hemmila

### 20 Perforated Duodenal Ulcer

George A. Sarosi Jr.

# 21 Gynecologic Causes of Lower Abdominal Pain

Charles S. Dietrich III, Bradford P. Whitcomb, and Christopher J. Crellin

### 22 Small Bowel Obstruction

David E. Meyer

# 23 Acute Cholecystitis

Meredith Barrett and Danielle M. Fritze

# 24 Cholangitis

Michael W. Cripps

# 25 Symptomatic Cholelithiasis in Pregnancy

Kimberly S. Stone and Paul M. Maggio

# 26 Surgery and Clostridium Difficile Colitis

Eva Maria Urrechaga and Brian S. Zuckerbraun

# 27 Complicated Diverticulitis

Bona Ko and Scott R. Steele

### 28 Colonic Volvulus

Arden M. Morris

# 29 Necrotizing Soft Tissue Infections (NSTIs)

Audrey F. Hand and Sharmila Dissanaike

# 30 Bleeding Gastric Ulcer

#### Alex C. Kim and Michael W. Mulholland

### 31 Bleeding Duodenal Ulcer

Christian Perez, Nirav C. Thosani, Peter A. Walker, and Shinil K. Shah

# 32 Lower Gastrointestinal Bleeding

Scott E. Regenbogen

### **SECTION 4: HEPATOBILIARY**

### 33 Bile Duct Injury

Emily R. Winslow and Christopher J. Sonnenday

#### 34 Severe Acute Pancreatitis

Stephanie Nitzschke and Stanley W. Ashley

### 35 Incidental Liver Mass

Cecilia G. Ethun and Shishir K. Maithel

### 36 Liver Mass in Chronic Liver Disease

Nicole Nevarez and Christopher J. Sonnenday

### 37 Metastatic Colorectal Cancer

Richard A. Burkhart and Timothy M. Pawlik

### 38 Obstructive Jaundice

Erin A. Strong and Susan Tsai

# 39 Management of Incidental Pancreatic Cysts

Sonia Cohen and Cristina R. Ferrone

# 40 Refractory Pain from Chronic Pancreatitis

Andrew B. Schneider and Jeffrey B. Matthews

### 41 Symptomatic Pancreatic Pseudocyst

Michael G. House and Shilpa S. Murthy

#### 42 Gallstone Ileus

JoAnna L. Hunter-Squires and Eugene P. Ceppa

### **SECTION 5: COLORECTAL**

# 43 Splenic Flexure Colon Cancer

Daniel Albo

### 44 Anastomotic Leak After Colectomy

Sara Amelia Gaines and Neil Hyman

### 45 Large Bowel Obstruction from Colon Cancer

Noelle L. Bertelson and David A. Etzioni

# 46 Recurrent Uncomplicated (Sigmoid) Diverticulitis

#### John C. Byrn

### 47 Ischemic Colitis

Muneera R. Kapadia and Ann C. Lowry

# 48 Medically Refractory Ulcerative Colitis

Arielle E. Kanters and Samantha Hendren

### 49 Crohn's Disease with Small Bowel Stricture

Yeranui Ledesma and Emily Finlayson

# 50 Neuroendocrine Tumor of the Appendix

Wolfgang B. Gaertner and Genevieve B. Melton-Meaux

### 51 Rectal Cancer

Campbell S. Roxburgh and Martin R. Weiser

### 52 Anal Carcinoma

Amy L. Halverson

### 53 Anal and Rectal Abscess

Richard E. Burney

### 54 Thrombosed Hemorrhoids

Richard E. Burney

### **SECTION 6: BREAST**

# 55 Palpable Breast Mass

Jennifer Yu and Julie A. Margenthaler

# 56 Suspicious Mammographic Abnormality

Emilia J. Diego

### 57 Ductal Carcinoma In Situ

Kelly Joyce Rosso and Jessica M. Bensenhaver

#### 58 Lobular Carcinoma In Situ

Lindsay Petersen and Lisa A. Newman

## 59 Early Stage Breast Cancer

Stacey A. Carter, Katrina B. Mitchell, and Henry Kuerer

### 60 Advanced Breast Cancer

Judy C. Boughey and Jennifer Racz

### 61 Inflammatory Breast Cancer

Miraj G. Shah-Khan and Monica Morrow

### 62 Breast Cancer During Pregnancy

Anne E. Mattingly and Marie Catherine Lee

### 63 Breast Reconstruction

### **SECTION 7: ENDOCRINE**

# 64 Palpable Thyroid Nodule

Haggi Mazeh and Rebecca S. Sippel

# 65 Papillary Thyroid Carcinoma

Gerard M. Doherty

# 66 Medullary Thyroid Cancer

Omeed Moaven and Herbert Chen

# 67 Primary Hyperparathyroidism

Randall P. Scheri and Julie Ann Sosa

# 68 Persistent and Recurrent Primary Hyperparathyroidism

David T. Hughes

### 69 Incidental Adrenal Mass

Brian D. Saunders and Melissa M. Boltz

### 70 Adrenocortical Carcinoma

Roy Lirov and Paul G. Gauger

# 71 Cortisol-secreting Adrenal Tumor

Naira Baregamian and Carmen C. Solórzano

# 72 Primary Aldosteronism

Priya H. Dedhia and Barbra S. Miller

# 73 Pheochromocytoma

Natasha Hansraj and Douglas J. Turner

### 74 Pancreatic Neuroendocrine Tumors

Michael J. Pucci, Stacey A. Milan, and Charles J. Yeo

### 75 Gastrinoma

Geoffrey W. Krampitz and Jeffrey A. Norton

### **SECTION 8: THORACIC**

### 76 Esophageal Cancer

Tyler R. Grenda and Andrew C. Chang

# 77 Esophageal Perforation

Stephen W. Davies, Alykhan S. Nagji, and Christine L. Lau

#### 78 Achalasia

Tyler R. Grenda and Jules Lin

# 79 Solitary Pulmonary Nodule

# 80 Spontaneous Pneumothorax

Hubert Yiu-Wei Luu and Pierre R. Theodore

### **SECTION 9: VASCULAR**

### 81 Pulsatile Abdominal Mass

Anna Z. Fashandi and Gilbert R. Upchurch Jr.

# 82 Ruptured Abdominal Aortic Aneurysm

Lily E. Johnston and Gilbert R. Upchurch Jr.

# 83 Lifestyle-Limiting Claudication

Ryan M. Svoboda and Philip P. Goodney

# 84 Tissue Loss from Arterial Insufficiency

Rori E. Morrow and William P. Robinson III

### 85 Acute Limb Ischemia

Jonathan R. Thompson and Peter K. Henke

### 86 Asymptomatic Carotid Artery Stenosis

Carlin Williams and Gilbert R. Upchurch Jr.

### 87 Symptomatic Carotid Artery Stenosis

Martyn Knowles and Carlos H. Timaran

### 88 Diabetic Foot Infection

Patric Liang, Douglas Jones, Jeffrey Kalish, and Allen Hamdan

### 89 Acute Mesenteric Ischemia

Joseph M. White, David R. Whittaker, and James H. Black III

### 90 Chronic Mesenteric Ischemia

Anne Laux and Matthew J. Sideman

# 91 Deep Venous Thrombosis

Justin B. Hurie

# 92 Need for Hemodialysis Access

Alexis D. Jacob and Thomas S. Huber

### **SECTION 10: PEDIATRIC**

### 93 Emesis in an Infant

Chasen J. Greig and Robert A. Cowles

## 94 Malrotation and Midgut Volvulus

Richard J. Hendrickson and Bartholomew J. Kane

### 95 Neuroblastoma

#### Ihab Halaweish and Erika A. Newman

# 96 Palpable Abdominal Mass in a Toddler

Scott S. Short and Douglas C. Barnhart

# 97 Hepatoblastoma

Terry Lynn Buchmiller

## 98 Intussusception

Kevin N. Johnson and James D. Geiger

# 99 Necrotizing Enterocolitis

Patrick Melmer and Sara K. Rasmussen

# 100 Rectal Bleeding in a Young Child

Ian C. Glenn, Gavin A. Falk, and Oliver S. Soldes

# 101 Omphalocele

Sara Scarlet, Emily M. Fontenot, and Sean E. McLean

### 102 Gastroschisis

Kevin N. Johnson and James D. Geiger

# 103 Tracheoesophageal Fistula

Steven W. Bruch

### **SECTION 11: SKIN AND SOFT TISSUE**

#### 104 Melanoma

Danielle K. DePeralta and Vernon K. Sondak

# 105 Melanoma Presenting with Regional Lymph Node Involvement

William R. Burns and Michael S. Sabel

### 106 Merkel Cell Carcinoma

William R. Burns and Michael S. Sabel

### 107 Nonmelanoma Skin Cancer

Anastasia Dimick

### 108 Extremity Mass (Sarcoma)

William R. Burns and Alfred E. Chang

# 109 Retroperitoneal Sarcoma

Christina V. Angeles and Sandra L. Wong

### **SECTION 12: TRAUMA**

### 110 Hemostatic Resuscitation

Kevin B. Wise and Bryan A. Cotton

## 111 Emergency Department Thoracotomy

#### Stephanie Sea and Kenji Inaba

# 112 Penetrating Chest Injury

Jeffrey J. Skubic and Adil H. Haider

### 113 Stab Wound to the Neck

Anthony J. Lewis and Jason L. Sperry

#### 114 Burns

James M. Cross, Todd F. Huzar, and Tonya George

### 115 Blunt Abdominal Trauma from Motor Vehicle Crash

Carla Kohoyda-Inglis and Stewart C. Wang

# 116 Damage Control Laparotomy

Mitchell J. George and John A. Harvin

# 117 The Abdominal Compartment Syndrome and Management of the Open Abdomen

Clay Cothren Burlew

# 118 Complex Liver Injury

Jeremy L. Ward and Carlos H. Palacio

### 119 Duodenal Injury

Benjamin David Carr and Mark R. Hemmila

### 120 Pancreatic and Duodenal Trauma

Brooke C. Bredbeck and Carlton C. Barnett Jr.

### 121 Pelvic Fracture

Oliver L. Gunter Jr. and H. Andrew Hopper

### **SECTION 13: CRITICAL CARE**

### 122 Airway Emergency

Samuel A. Schechtman, Derek T. Woodrum, and David W. Healy

### 123 Cardiovascular Failure

Joseph Fernandez-Moure, Jeremy Cannon, and Lewis J. Kaplan

# 124 Acute Kidney Injury (Acute Renal Failure)

Anna Tyson and Anthony Charles

# 125 Adrenal Insufficiency

Kazuhide Matsushima and Heidi L. Frankel

# 126 Acute Respiratory Distress Syndrome (ARDS)

Lillian S. Kao

### 127 Ventilator-Associated Pneumonia

Kunjan S. Bhakta and Krishnan Raghavendran

# 128 Sepsis and Septic Shock

Lisa M. Kodadek and Pamela A. Lipsett

# 129 Abdominal Compartment Syndrome

Ashley D. Meagher and Heather Leigh Evans

# 130 Nutritional Support in the Critically Ill Patient

Kyle J. Van Arendonk and Elliott R. Haut

### **SECTION 14: TRANSPLANT**

### 131 Acute Liver Failure

Greg J. McKenna

# 132 Variceal Bleeding and Portal Hypertension

Michael J. Englesbe and Seth A. Waits

# 133 End-Stage Renal Disease (Renal Transplantation)

Suzie S. Lee and Derek Moore

### **SECTION 15: HEAD AND NECK**

### 134 Melanoma of the Head and Neck

Harold Heah and Michael E. Kupferman

### 135 Head and Neck Cancer

Zhen Gooi and Carole Fakhry

*Index* 

# SECTION 1 Abdominal Wall