

Cambridge University Press

978-1-107-16617-2 — Practical Implementation of an Antibiotic Stewardship Program

Edited by Tamar F. Barlam , Melinda M. Neuhauser , Pranita D. Tamma , Kavita K. Trivedi

Frontmatter

[More Information](#)

Practical Implementation of an Antibiotic Stewardship Program

Cambridge University Press

978-1-107-16617-2 — Practical Implementation of an Antibiotic Stewardship Program

Edited by Tamar F. Barlam , Melinda M. Neuhauser , Pranita D. Tamma , Kavita K. Trivedi

Frontmatter

[More Information](#)

Cambridge University Press

978-1-107-16617-2 — Practical Implementation of an Antibiotic Stewardship Program

Edited by Tamar F. Barlam , Melinda M. Neuhauser , Pranita D. Tamma , Kavita K. Trivedi

Frontmatter

[More Information](#)

Practical Implementation of an Antibiotic Stewardship Program

Edited by

Tamar F. Barlam

Boston University School of Medicine

Melinda M. Neuhauser

Office of Antibiotic Stewardship, Centers for Disease Control and Prevention

Pranita D. Tamma

Johns Hopkins University School of Medicine

Kavita K. Trivedi

Trivedi Consults, LLC



CAMBRIDGE
UNIVERSITY PRESS

Cambridge University Press
978-1-107-16617-2 — Practical Implementation of an Antibiotic Stewardship Program
Edited by Tamar F. Barlam , Melinda M. Neuhauser , Pranita D. Tamma , Kavita K. Trivedi
Frontmatter
[More Information](#)

CAMBRIDGE
UNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, United Kingdom
One Liberty Plaza, 20th Floor, New York, NY 10006, USA
477 Williamstown Road, Port Melbourne, VIC 3207, Australia
314–321, 3rd Floor, Plot 3, Splendor Forum, Jasola District Centre,
New Delhi – 110025, India
79 Anson Road, #06–04/06, Singapore 079906

Cambridge University Press is part of the University of Cambridge.
It furthers the University’s mission by disseminating knowledge in the
pursuit of education, learning, and research at the highest international
levels of excellence.

www.cambridge.org
Information on this title: www.cambridge.org/9781107166172
DOI: 10.1017/9781316694411

© The Society for Healthcare Epidemiology of America (SHEA) 2018

This publication is in copyright. Subject to statutory exception and
to the provisions of relevant collective licensing agreements,
no reproduction of any part may take place without the written
permission of Cambridge University Press.

First published 2018

Printed in the United Kingdom by TJ International Ltd. Padstow
Cornwall

*A catalogue record for this publication is available from the British
Library.*

ISBN 978-1-107-16617-2 Hardback

Cambridge University Press has no responsibility for the persistence or
accuracy of URLs for external or third-party internet websites referred
to in this publication and does not guarantee that any content on such
websites is, or will remain, accurate or appropriate.

.....

Every effort has been made in preparing this book to provide accurate and
up-to-date information that is in accord with accepted standards and
practice at the time of publication. Although case histories are drawn from
actual cases, every effort has been made to disguise the identities of the
individuals involved. Nevertheless, the authors, editors, and publishers can
make no warranties that the information contained herein is totally free
from error, not least because clinical standards are constantly changing
through research and regulation. The authors, editors, and publishers
therefore disclaim all liability for direct or consequential damages resulting
from the use of material contained in this book. Readers are strongly
advised to pay careful attention to information provided by the
manufacturer of any drugs or equipment that they plan to use.

Contents

List of Contributors vi
Preface ix

1	The Need for Antibiotic Stewardship Programs: An Introduction 1	9	Collaborating with the Microbiology Laboratory 175
	Emily S. Spivak, Lauri A. Hicks, and Arjun Srinivasan		Graeme N. Forrest and Denise Kirsch
2	Structure of an Antibiotic Stewardship Team and Core Competencies 24	10	Informatics and Stewardship 206
	Whitney R. Buckel and Sara E. Cosgrove		Francesca Lee and Kristi M. Kuper
3	The Social Determinants of Antibiotic Prescribing: Implications for the Development and Implementation of Stewardship Interventions 45	11	Antibiotic Allergies and Antibiotic Stewardship 220
	Julia E. Szymczak and Jason G. Newland		Keith W. Hamilton and Holly D. Maples
4	Selecting and Applying Antibiotic Stewardship Strategies 63	12	Antibiotic Stewardship in Post-Acute Care Facilities 237
	Rebekah W. Moehring and Whitney J. Nesbitt		Anurag N. Malani and Christopher J. Crnich
5	Syndrome-Based Antibiotic Stewardship 85	13	Outpatient Antibiotic Stewardship 273
	Trevor C. Van Schooneveld and Emily L. Heil		Larissa May and Matthew P. Kronman
6	Duration of Therapy: Our Role as Stewards 111	14	Maintaining an Antibiotic Stewardship Program: Keeping Everyone Happy and Remaining Relevant 293
	George E. Nelson and Annie Wong-Beringer		Marisa Holubar, B. Joseph Guglielmo, and Stan Deresinski
7	Measurement in Antibiotic Stewardship 131	15	Practical Antibiotic Stewardship: Implementing an Antibiotic Stewardship Program 303
	Elizabeth S. Dodds Ashley and Edward A. Stenehjem		Richard H. Drew and Rebekah W. Moehring
8	What Every Steward Should Know About Pharmacokinetics and Pharmacodynamics 155		
	Jason M. Pogue and Marc H. Scheetz		
			<i>Index</i> 322

Contributors

**Whitney R. Buckel, PharmD,
BCPS-AQ ID**

System Antimicrobial Stewardship
Pharmacist Manager, Intermountain
Healthcare, Murray, UT.

Sara E. Cosgrove, MD, MS

Professor of Medicine, Johns Hopkins
University School of Medicine,
Baltimore, MD,
Director, Department of Antimicrobial
Stewardship, Johns Hopkins Hospital,
Baltimore, MD.

Christopher J. Crnich, MD, PhD

Associate Professor, University of
Wisconsin School of Medicine and Public
Health, Madison, WI,
Chief of Medicine, Hospital Epidemiologist
and Director of Antibiotic Stewardship
Program, William S. Middleton VA
Hospital, Madison, WI.

Stan Deresinski, MD, FACP, FIDSA

Clinical Professor of Medicine, Stanford
University School of Medicine,
Stanford, CA,
Director, Antimicrobial Stewardship
Program, Stanford Health Care,
Stanford, CA.

**Elizabeth S. Dodds Ashley, PharmD,
MHS**

Associate Professor of Medicine, Duke
University School of Medicine,
Durham, NC,
Director of Operations, Duke
Antimicrobial Stewardship Outreach
Network, Durham, NC.

**Richard H. Drew, PharmD, MS,
BCPS, FCCP**

Associate Professor of Medicine (Infectious
Diseases), Duke University School of

Medicine, Durham, NC,

Professor and Vice Chair of Research and
Scholarship, Campbell University College
of Pharmacy and Health Sciences, Buies
Creek, NC.

Graeme N. Forrest, MBBS, FIDSA

Associate Professor of Medicine, Veterans
Affairs Portland Healthcare System,
Portland, OR,
Director, Antimicrobial Stewardship
Programs, Oregon Health and Science
University, Portland, OR.

**B. Joseph Guglielmo, PharmD,
FIDSA, FCCP**

Professor and Dean, School of Pharmacy,
University California San Francisco,
San Francisco, CA.

Keith W. Hamilton, MD

Assistant Professor of Clinical Medicine,
Perelman School of Medicine at the
University of Pennsylvania,
Philadelphia, PA,
Director, Antimicrobial Stewardship
Program, Hospital of the
University of Pennsylvania,
Philadelphia, PA.

Emily Heil, PharmD, BCPS-AQ ID

Assistant Professor of Pharmacy,
University of Maryland School of
Pharmacy, Baltimore, MD,
Pharmacy Director, Antimicrobial
Stewardship Program, University
of Maryland Medical Center,
Baltimore, MD.

Lauri A. Hicks, DO

Director, Office of Antibiotic Stewardship,
Division of Healthcare Quality Promotion,
Centers for Disease Control and
Prevention, Atlanta, GA.

Cambridge University Press
978-1-107-16617-2 — Practical Implementation of an Antibiotic Stewardship Program
Edited by Tamar F. Barlam , Melinda M. Neuhauser , Pranita D. Tamma , Kavita K. Trivedi
Frontmatter
[More Information](#)

	Contributors	vii
Marisa Holubar, MD, MS Clinical Assistant Professor of Medicine, Stanford University School of Medicine, Stanford, CA, Associate Director, Antimicrobial Stewardship Program, Stanford Health Care, Stanford, CA.	Sciences College of Pharmacy, Little Rock, AR, Director, Antimicrobial Stewardship Program, Arkansas Children’s Hospitals, Little Rock, AR, Associate Professor and the Jeff and Kathy Lewis Sanders College of Pharmacy Chair, Pediatrics, University of Arkansas for Medical Sciences, Little Rock, AR.	
Denise Kirsch, MD Division of Infectious Diseases, Oregon Health and Sciences University, Portland, OR.	Larissa May, MD, MSPH, MSHS Professor of Emergency Medicine, University of California-Davis, Sacramento, CA, Director of Emergency Department Antibiotic Stewardship, University of California-Davis, Sacramento, CA.	
Matthew P. Kronman, MD, MSCE Associate Professor of Pediatrics, University of Washington School of Medicine, Seattle, WA, Associate Medical Director, Infection Prevention, Seattle Children’s Hospital, Seattle, WA.	Rebekah W. Moehring, MD, MPH Assistant Professor of Medicine, Duke University, Durham, NC, Medical Director, Duke Antimicrobial Stewardship and Evaluation Team, Duke University Hospital, Durham, NC.	
Kristi M. Kuper, PharmD, BCPS Sr. Clinical Manager, Infectious Diseases Center for Pharmacy Practice Excellence, Vizient, Irving, TX.	George E. Nelson, MD Assistant Professor of Medicine, Vanderbilt University, Nashville, TN, Director, Antimicrobial Stewardship Program, Vanderbilt University Medical Center, Nashville, TN.	
Francesca M. Lee, MD Assistant Professor, Departments of Internal Medicine and Pathology, University of Texas Southwestern Medical Center, Dallas, TX, Medical Director, Antimicrobial Stewardship Program, University of Texas Southwestern University Hospitals, Dallas, TX.	Whitney J. Nesbitt, PharmD, BCPS Antimicrobial Stewardship Pharmacist, Vanderbilt University Medical Center, Nashville, TN.	
Anurag N. Malani, MD Medical Director, Infection Prevention and Antimicrobial Stewardship Programs, St. Joseph Mercy Health System, Ann Arbor, MI, Adjunct Clinical Associate Professor of Internal Medicine, University of Michigan Medical School, Ann Arbor, MI.	Jason G. Newland, MD, Med Associate Professor of Pediatrics, Washington University School of Medicine, St. Louis, MO, Director, Pediatric Antimicrobial Stewardship Program, St. Louis Children’s Hospital, St. Louis, MO.	
Holly Maples, PharmD Associate Professor of Pharmacy Practice, University of Arkansas for Medical	Jason M. Pogue, PharmD Clinical Pharmacist, Infectious Diseases, Sinai-Grace Hospital, Detroit, MI,	

Cambridge University Press
978-1-107-16617-2 — Practical Implementation of an Antibiotic Stewardship Program
Edited by Tamar F. Barlam , Melinda M. Neuhauser , Pranita D. Tamma , Kavita K. Trivedi
Frontmatter
[More Information](#)

viii	Contributors
	<p>Clinical Pharmacist, Detroit Medical Center, Detroit, MI, Clinical Assistant Professor of Medicine, Wayne State University School of Medicine, Detroit, MI.</p> <p>Emily S. Spivak, MD, MHS Assistant Professor of Medicine, University of Utah School of Medicine, Salt Lake City, UT, Director, Antimicrobial Stewardship Program, University of Utah Hospitals and Clinics, VA Salt Lake City Healthcare System, Salt Lake City, UT.</p> <p>Edward Stenehjem, MD, MSc Associate Professor of Medicine, Intermountain Healthcare, Murray, UT, Director, Antibiotic Stewardship Program, Intermountain Medical Center, Murray, UT.</p> <p>Marc H. Scheetz, PharmD, MSc, BCPS AQ-ID Associate Professor of Pharmacy Practice, Chicago College of Pharmacy, Midwestern University, Chicago, IL, Infectious Diseases Pharmacist, Northwestern Medicine, Chicago, IL.</p> <p>Trevor C. Van Schooneveld, MD Associate Professor of Medicine, University of Nebraska Medical Center, Omaha, NE, Medical Director, Antimicrobial Stewardship Program, Nebraska Medicine, Omaha, NE.</p> <p>Arjun Srinivasan, MD Associate Director for Healthcare Associated Infection Prevention Programs, Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention, Atlanta, GA.</p> <p>Julia E. Szymczak, PhD Assistant Professor of Epidemiology, University of Pennsylvania Perelman School of Medicine, Philadelphia, PA.</p> <p>Annie Wong-Beringer, PharmD, FIDSA Professor of Clinical Pharmacy, University of Southern California, Los Angeles, CA, Associate Dean for Research and Graduate Education, University of Southern California School of Pharmacy, Los Angeles, CA, Co-Director, Antimicrobial Stewardship Program, Huntington Memorial Hospital, Los Angeles, CA.</p>

The findings and conclusions in this book are those of the authors and editors and do not necessarily represent the official position of the Centers for Disease Control and Prevention (CDC) or Department of Veterans Affairs (VA).

Preface

As antibiotic resistance becomes an increasingly urgent public health crisis, there is growing recognition that antibiotic stewardship interventions are of central importance. Government and accreditation agencies are incorporating implementation of antibiotic stewardship programs (ASP) as requirements for quality healthcare. This textbook provides a core curriculum for antibiotic stewardship for both new and experienced stewards. It is designed to be of use across the spectrum of healthcare settings. Chapters discuss how to develop a needs assessment and request resources from administrators, how to leverage the work of the microbiology laboratory and informatics to improve antibiotic use and reduce adverse outcomes, and how to fulfill the basic rules of antibiotic stewardship – prescribing the right drug at the right dose via the right route, and only when indicated.

Most of the chapters of this textbook are coauthored by both a physician and a pharmacist. We believe the physician–pharmacist working relationship is central to the success of an ASP; their roles are complementary and they must work together to lead successful antibiotic stewardship interventions across the healthcare spectrum. Through shared authorship, we have highlighted the importance of a multidisciplinary ASP and captured both the physician and pharmacy perspectives, making each chapter useful for both disciplines.

It is our goal for this textbook to be a valuable resource for any ASP, ranging from those just beginning the process (Chapters 1–4) to established programs looking for new ideas and metrics to measure (Chapters 5–11) or to ensure continued commitment to their program from facility administrators (Chapter 14). There are illustrative examples that should resonate with the reader (Chapter 15) and specific advice for post-acute care and outpatient settings (Chapters 12 and 13). Although there is not a specific chapter focusing on antibiotic stewardship as it relates to the pediatric population, most of the tenets of antibiotic stewardship are identical for children and adults. For scenarios where there may be nuances specific to the pediatric population, they are addressed within relevant chapters (Chapters 6 and 13).

To our authors, thank you for your diligent work on these chapters over the past two years. To our readers, we hope you enjoy this text as much as we enjoyed editing it.

Cambridge University Press

978-1-107-16617-2 — Practical Implementation of an Antibiotic Stewardship Program

Edited by Tamar F. Barlam , Melinda M. Neuhauser , Pranita D. Tamma , Kavita K. Trivedi

Frontmatter

[More Information](#)
