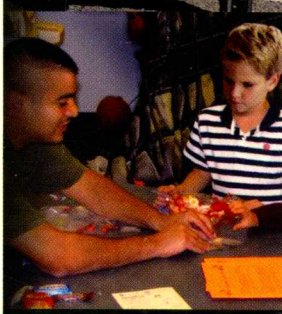

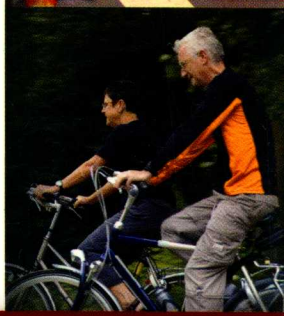

Pharmacy in Public Health

BASICS AND BEYOND

Jean Carter and Marion Slack

American Society of Health-System Pharmacists®

Pharmacy in Public Health

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Dedications

To my parents, Ruth and Richard Carter
Jean Carter

To my family—my husband, Don; my daughters, Jonel and Jennifer;
and my mother, Nona Kimball
Marion Slack

To the memory of Lon Larson, a colleague and role model who inspired us both with his intelligence, insight, and humanity.

Preface

What comes to mind when you think of pharmacy and public health? Immunizations? Medication safety? Is that everything? The answer is no. Pharmacists have the skills, knowledge, and opportunities to facilitate the public health agenda and improve the health of their patients. We chose to write this book because of the limited resources available to pharmacy students and practitioners who want to participate in activities to improve the health of their community. We wanted members of the pharmacy profession to have knowledge of the basic concepts and tools as well as a framework for recognizing public health problems and opportunities for participation in public health activities. We wanted them to know that, as pharmacists, they can be proactive and become leaders in addressing health issues. Finally, we wanted pharmacists to know that they do not have to wait to intervene until the patient develops a disease, which is treated by medication, but can participate in initiatives to improve health and prevent disease.

Because our goal is to make sure that pharmacy students and practitioners develop the knowledge and skills to participate in and lead public health activities, this book is not a comprehensive encyclopedia of facts and figures in public health or a compendium of every public health issue that involves the use of medication. It is instead focused on teaching pharmacists the basic concepts and tools of public health so that they have the understanding and skills to incorporate public health activities into their practice. Public health concepts and tools can be very different than those that govern the use of medications to treat disease. Public health is more concerned with the promotion of health and the prevention of disease in populations rather than the treatment of disease in individuals. This book is structured to provide the three types of knowledge required for public health: concepts, tools, and models of pharmacist participation in public health activities.

The book is divided into three sections that build on one another. This approach is based on the idea that readers will obtain a basic orientation to public health and what it involves in the first section. The second section introduces basic concepts and tools required for engaging in public health activities. The third section provides descriptions of models of public health programs in which pharmacists have participated.

The basic orientation to public health provided in the first section includes chapters on history, ethics, and laws of public health as well as a description of the public health system. The second section provides the underlying concepts of public health using an ecological model of health to describe those factors in the environment related to health and prevention of disease. The ecological model was chosen because it is oriented toward health and because it is useful at any population level from a neighborhood to the global level. The remaining chapters in this section delineate a framework to guide public health activities and provide specific tools, for example, basic epidemiological and statistical concepts. The third section of the book provides models of public health practice that involve pharmacists. We hope pharmacists can use the models to recognize opportunities for becoming involved so they can improve the health of their communities or their world.

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When developing each chapter, we decided to use an integrated case study approach. Each chapter is built around a case study. The case study is first introduced at the beginning of the chapter, and is then revisited throughout the chapter to illustrate concepts and applications of public health tools as well as provide a model for how pharmacists can address similar public health issues. Chapter questions are used to help readers focus on the learning outcomes. In the third section of the book, the chapters are entirely based on cases used to illustrate models of pharmacist involvement in various public health services. Additionally, an "Applying Your Knowledge" section provides thought-provoking questions for discussion or suggestions for activities that are intended to move learning from the textbook to the real world of public health. Throughout the book, an effort is made to provide suggestions for actively engaging in activities that will help students learn and enable them to become involved in public health. This book supports the belief that all health care professionals, because of their knowledge and position in the community, have a responsibility to improve health and prevent disease.

This book is designed primarily as a textbook but can be useful in numerous situations, including:

The classroom. The most obvious use of the book is in the classroom. Professors can use the book to introduce students to the basic concepts and tools of public health through the text and the suggested learner activities. (See the Note to Instructors below.)

Student experiential rotations. Students can take the book with them on rotations so that they get to know the community they serve—to understand the context of health and disease in which they practice pharmacy. By understanding the context of their practice, they can better meet the pharmacy-related needs of community residents as well as participate in local efforts to address health issues.

Pharmacy practice. Established practitioners who are interested in tailoring pharmacy services to the needs of community residents or participating in activities to improve health in their service area can use the book to learn the basic concepts and tools of public health.

In the community. In addition to pharmacy education and practice, pharmacists may use the information to become more involved in local, state, national, or international public health efforts that they find are personally or professionally rewarding.

Note to Instructors

This textbook and its supplemental materials can be used in several ways within a pharmacy curriculum. We recognize that some schools may have a single course dedicated to public health topics, while others may have the topics integrated into the curriculum through several courses. To help identify which chapters may be best used in different situations, several tracks have been created.

Track A: All topics covered in one course

If the text is used entirely within one course, then the three sections of the book are best presented in their current order. Within a single section, chapters may be moved around to accommodate the flow of the syllabus. The topics in the first section (chapters 1–5) should be used first, followed by the topics in chapters 6–12. These chapters can serve as the topic areas for lectures. The models in the third section (chapters 13–18) are probably best used as a basis for classroom discussions.

Track B: All or some topics covered in two or more courses

For programs where the topics must be integrated into the curriculum via two or more courses, it will probably be most helpful to present the information in several contiguous lectures. This approach is suggested because students will have to consider issues from a public health perspective rather than a pharmacy perspective. The first course in the curriculum, to include one or more chapters, should begin with the introductory chapter. If there is not sufficient time to use each chapter, the instructor could use the models in the last section (chapters 13–18) as cases or examples.

Ethics course. In addition to the introductory chapter, the instructor should use chapters 2 (history), 5 (ethics), and 7 (culture) to provide a historical context and introductions to public health ethical principles and cultural influences. These chapters set the stage for debates about inherent conflicts between public health and pharmacy ethics, including personal autonomy versus public welfare and privacy versus the public's right to know.

Drug literature course. The introductory chapter should set the tone, then chapters 10 (epidemiology), 11 (describing populations), and 12 (community health) should be included. The model chapters in the third section all include statistics and epidemiological data and results that can serve as examples.

Communication course. The introductory chapter is the logical place to begin before using chapters 6 (determinants of health) and 7 (culture). Although these chapters do not focus on communication per se, they provide background information about the many forces that shape human behavior and understanding of the world. If not covered elsewhere, chapters 8 (health promotion) and 9 (disease prevention) provide fine examples of how communication is used.

Introduction to pharmacy practice course. The introductory chapter and the models in the last chapters (13–18) can provide students with another avenue of practice to consider and provide the instructor with a valuable comparison of health care practice and public health practice.

Health systems course. The introductory chapter should be used first and then chapters 2 (history), 3 (public health systems), and 4 (public health law). Chapters 8 (health promotion) and chapter 9 (disease prevention) can be used to compare and contrast similar or different perspectives between health care and public health practices.

Pharmacy law course. The law chapter (chapter 4) by itself is not sufficient for teaching pharmacy law; however, it is a good way to introduce the students to why we need pharmacy laws and regulations. Complementary information about government roles and police power are found in chapters 2 (history) and 3 (public health systems), respectively.

Use of supplemental materials

In addition to the textbook, we have created instructional materials. Short slide sets that focus on major topic areas can be mixed and matched or incorporated into existing classroom lectures. These short sets of slides give the instructor more flexibility in arranging the order and allowing time for discussion. We included key figures and tables from the book in the slides. Additional and often more advanced cases are also provided to encourage deeper thinking and discussion of key concepts and applications. Cases may be adapted to the local community or used to illustrate cultural and health issues of other populations. Because new knowledge about health and disease emerge each year, the cases can be updated as needed and re-used for many years. Both the slide sets and cases will be available online to students and instructors.

Acknowlegments

The great fear in writing the acknowledgments is that we won't adequately represent everything the significant people in our professional and personal lives have contributed to this book.

Marion Slack:

I worked in an environment that provided lots of room for creativity but also supported me—the College of Pharmacy at the University of Arizona. Then I was lucky enough to be associated with Dr. Lon Larson in the days just after I received my Ph.D. and was looking for employment. Lon suggested that I participate in the federal grant for interdisciplinary training in rural areas that had just been awarded to the University of Arizona. It happened that the training program was focused on community health, so I learned about rural and community health as well as public or population health. I also began to work with Marylyn McEwen, Ph.D., from nursing and learned about Anderson and McFarlane and their "Community as Partner" model of public health. When the first grant cycle ended on the interdisciplinary training project, Marylyn and I decided that we would become the PIs and work with Nogales, Arizona as our collaborating community. Fortunately, Karen Halverson, the Executive Director of the Southeast Area Health Education Center, and her staff and Gail Randolph, the Director of Nursing at Mariposa Community Health Center, became our collaborators in the community. Joyce Latura and the promotoras (Spanish word for community health workers) taught us so much about the local culture and the issues of trying to be healthy on a low income.

Jean Carter:

As your co-author, I would like to thank you (Marion) for saying "Yes" when I asked if you wanted to write a book about pharmacy and public health. It has been a pleasure working with you. I want to recognize the public health professionals in the Missoula City/County Health Department, especially Ellen Leahy, for their ongoing involvement in our school's "Pharmacy in Public Health" course. I also received great support from the Montana Department of Health and Human Services, which came primarily from Dr. Todd Damrow who was serving as the state's epidemiologist at the time. Another important group of people who provided support for this textbook are my colleagues at The University of Montana. A special thanks goes to my department chair, Mike Rivey, who ensured that I had the time I needed to write; my dean, Dave Forbes, for having a vision for pharmacy involvement in public health; and my colleague, Donna Beall, for her various activities. Her campus TB clinic for students and a rural outreach screening program inspired several cases used in the chapters and provided sources for photographs. I would also like to acknowledge one of my nursing colleagues from Montana State University, Dr. Sandra Kuntz, whose enthusiasm for community and public health is downright infectious!

We would like to acknowledge our three reviewers for their hard work, insightful feedback, and ideas for the chapters, which they provided throughout the writing process. Finally, we both want to acknowledge our guides and editors at the American Society of Health-System Pharmacists. Dana Battaglia and Rebecca Olson provided a structure of support and guidance that helped us take our vision to a reality captured by words. Then Johnna Hershey put the finishing touches on it, so our words became a book of which we can be proud. We hope all those who helped us during this process will be pleased with the results of their influences.

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PART one

Foundations of Public Health

This section of the book focuses on the key concepts and foundational knowledge that pharmacists need to understand the public health perspective. Chapter 1 provides a framework or map of public health topics for the reader to use throughout the rest of the book. Chapter 2 covers important historical developments in public health to show how it has evolved into its current form and focus. Chapter 3 describes the structure of public health at local, state, national, and international levels. Chapter 4 explores public health law and how it is used to address issues such as faulty medication products and safe medication use. Finally, Chapter 5 compares the ethical foundations of health care practice and research to public health practice and research to provide contrasts and comparisons.

The first two chapters use mini-cases or examples to illustrate the information and ideas. More in-depth cases are used throughout the subsequent chapters to bring the concepts to life. At the end of this section of the book, the reader should have an understanding of the key concepts that guide public health actions and foundational knowledge of public health history, structure, law, and ethics.

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CHAPTER 1

Introduction

Learning Outcomes

1. Define public health.
2. Using the framework of the natural history of disease, compare the public health approach to the clinical treatment and clinical prevention approaches.
3. Discuss the population approach to health and the use of epidemiology and statistics in public health.
4. Describe the ecological approach to public health.
5. Identify who is responsible for public health, including whether pharmacy has a responsibility in public health.

Introduction

Public health is more than providing treatment for an illness; it is a concern for health and for the entire population and how to assure that the population is healthy. This chapter provides a framework for understanding the key concepts and tools used in public health, and it also differentiates public health and clinical prevention from clinical treatment. The chapter begins with four short fictitious case studies that involve public health issues. Three definitions are provided, and the role of pharmacy in public health related to medications is described. The definitions reflect the basic concepts of public health: (1) a focus that includes disease prevention and health promotion, (2) a concern that all members of a population have a basic need for health, and (3) knowledge that the environment external to the individual affects health.

The public health approach is differentiated from clinical prevention (focused on individuals) and clinical treatment (focused on treatment of disease in individuals). Because the focus is on the population rather than on the individual, specific tools known as epidemiology and statistics are required for public health. To include all aspects of the environment that are related to health, a public health approach known as ecological is presented and is based on the individual's interactions with his or her external environment. Responsibility for public health is presented by discussing the role of government, health care profes-

sionals, and community members in public health. The chapter ends with a discussion of how pharmacists who are already involved with clinical prevention can expand their role in community-based public health. The concepts presented form the basis of the discussion about pharmacists' participation in public health activities described in the remainder of the book.

CASE STUDY 1

Jim's first heart attack

Jim is a 51-year-old male who collapsed while enjoying conversation after dinner with his wife and friends, several of whom smoked. His friends performed CPR, while his wife called the ambulance. At the hospital, his wife was told that Jim had suffered a massive heart attack and his condition was critical. Jim began to respond to therapy after several anxious days and is now expected to recover, although his doctor tells him that he will need quadruple by-pass surgery. Was it necessary for Jim to experience a massive heart attack at age 51 or could it have been prevented? Assuming it could have been prevented, what could be done to prevent heart attacks? When in the disease process would it be best to intervene if the goal is to prevent the heart attack? What could Jim's pharmacist have done related to the prevention of heart attacks?

CASE STUDY 2

Fran experiences vomiting and diarrhea

Fran is a 34-year-old female who works as a pharmacist in a local chain pharmacy. Fran tries to live a healthy lifestyle and makes sure that she eats more than 5 servings of fruits and vegetables every day. Today Fran took a salad for lunch that she had made from fresh baby spinach, avocado, tangerine sections, pecans, and crumbled cheese with an oatmeal cookie for dessert. That evening, Fran became violently ill with vomiting and diarrhea; at 1 a.m., her husband went to the local 24-hour pharmacy to get medicine and fluids for rehydration. The pharmacist told him of one similar case the day before and two more earlier that night. Could this have been an outbreak of disease caused by eating contaminated foods? Whose responsibility is it to assure that foods are safe to eat? Should there be an investigation to see if other cases have been reported? Does the pharmacist have a responsibility beyond providing medication and counseling?

CASE STUDY 3

Daniel has asthma

Daniel is 3 years old and lives in a small apartment with his 22-year-old mother who is a student at the local junior college. Daniel has had asthma since he was 6 months old. After Daniel's most recent hospitalization for an exacerbation of his asthma, Daniel's mother was asked if she had cockroaches in her apartment because asthma can be triggered by cockroach droppings. His mother responded yes, but she didn't think she could do anything about them. She had repeatedly sprayed and tried to make sure no food or other scraps were left lying around. She also had left cockroach traps where she thought they wouldn't be a danger to Daniel. Who is responsible for taking care of the cockroach problem: Daniel's mother or the

owner of the apartment house? Would the cockroach problem in the apartment where Daniel lives be considered a public health problem? Could Daniel's mother have gotten advice or other assistance concerning her roach problem from her pharmacist?

CASE STUDY 4

Emily celebrates her 90th birthday

Emily is a 90-year-old female in remarkable health; she has some problem with arthritis and slightly elevated blood pressure, but otherwise has few health issues. Emily spent most of her adult life living on a farm and doing all the work associated with farming. She was famous in the neighborhood for her large vegetable gardens. Currently, Emily is fairly active; she walks the dog twice a day, and likes to go to garage sales with her friend. She also does volunteer work at the local hospital where she is known for her delicious oatmeal cookies. Emily has agreed to participate in a study being conducted by public health researchers from the state university who are studying residents 90 years or older. Why would public health researchers be interested in someone who is not sick? What could the researchers possibly learn from a healthy person? What can pharmacists learn about health and longevity from their patients?

Public Health Defined

Three definitions of public health

Three definitions of public health are shown in the box. These definitions reflect a focus on health and prevention of illness. Two definitions also identify governments (local, state, or national) as the entity primarily responsible for ensuring the health of a population. The definitions hint that the interests of public health are broad—concern with the conditions promoting health and all factors affecting health. These definitions indicate that public health may be concerned with factors such as education or food supply, which are usually considered outside the purview of health care services.

One definition uses the term *population health* rather than *public health.* Generally, population health is a broader concept than public health. Public health implies that government at some level is involved. Population health refers to any effort to address health issues in a population group and may not include a role for government. Community coalitions are examples of attempts to address population health; these coalitions are often formed to address health issues in a neighborhood or community, and typically involve residents who are interested in health but often have no expertise in

Definitions of public health

Public health is a role of local, state, and national governments in assuring conditions in which people can be healthy.[1,2]

Public health is concerned with improving health or preventing illness in a population, and it is usually implemented by a government or a group accountable to a community.[3]

Population health refers to a process of addressing the entire range of factors that determine health and is concerned with the entire population, not just ill or high-risk individuals.[4]

health. Health care professionals also participate in community coalitions even though they have not been trained in public health.

Health care in the context of public health

None of the definitions of public health specifically identify health care services, so how are these services related to public health? Health care services clearly are a necessary component of pubic health; however, these services are viewed from a different perspective. The public health perspective of health care services is a concern with access to services, including financial access and quality of services. From the public health perspective, concern with **primary health care services** is considerable. These services allow individuals to avoid suffering, pain, disability, and death.[5] However, the services must be available to all members of a population if they are to prevent them from having unnecessary illness or injury. Public health also is concerned with the quality of health care. As part of this issue, the licensing requirements of health care practitioners may be within the purview of state health departments.

Pharmacy in Public Health

Like other health care services, pharmacy services are not mentioned specifically in definitions of public health but obviously are an important component of it. The focus of clinical treatment is on identifying the most appropriate medication for a specific disease. In public health, the focus shifts to assuring access to medications; assuring medications are safe and effective; and assuring medications are used in a safe and effective manner, which includes identifying and resolving problems associated with the use of medications.

Assuring access to medications

Access to essential medications is one of the components of primary health care as defined by the World Health Organization (WHO).[5] They are the medications needed to alleviate suffering, for example, pain medications, and to prevent a readily treated disease from resulting in disability or death. A concern with access to essential medications is assuring they are adequately produced and distributed as well as assuring that they are affordable and can be obtained if needed by all members of a population.

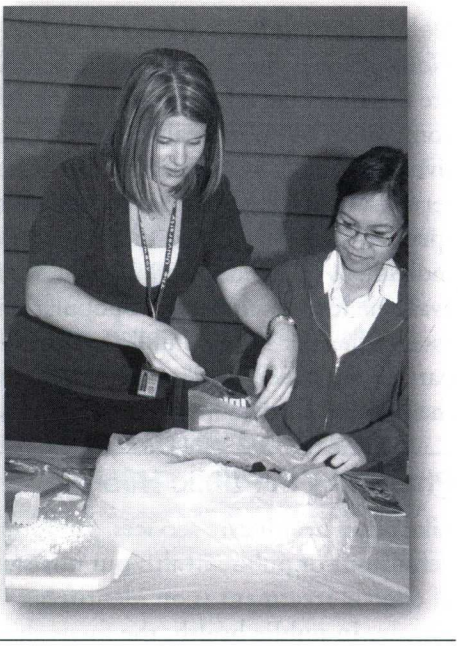
Assuring safe and effective medications

Assurance of safe and effective medications probably is the aspect of pharmacy and public health most familiar to the average person. Most people have heard news stories concerning medications being removed from the market because they resulted in deaths or serious side effects. Although the Food and Drug Administration (FDA) is responsible for assuring medications are safe and effective in the United States, many people might not recognize that these assurances are a public health issue.

Assuring medication use is safe

As every pharmacist knows, a large number of effective medications are available. However, these medications must be used in a safe and effective manner or they could result in harm. For example, aspirin is effective for treating headaches and other aches and pains as well as for reducing the risk of myocardial infarction but it is also poisonous, particularly to children, when taken in very high doses. The potential for poisoning is a public health problem. Proper disposal of unused medications is required to prevent poisonings (Figure 1.1). Other medications are effective when used in carefully controlled conditions, but can be harmful if used incorrectly. These are medications that require prescriptions so their use is restricted and the potential for harm reduced.

Figure 1.1—Pharmacy Students Disposing of Medications for Patients at a Health Fair



Key Concepts of Public Health

The key concepts of public health differ from those of traditional medical care or clinical treatment. In general, public health is much more focused on health and on maintaining health. Because the focus is on health and disease prevention, the timing of public health interventions will occur much earlier in the disease process than clinical treatment. Additionally, concerns include conditions or the types of environments that result in people being healthy and concerns that all members of the population, not just those seeking clinical treatment, benefit from public health interventions. This section introduces the key concepts of public health and describes how they differ from traditional medical care or clinical treatment.

World Health Organization's definition of health

As noted in the three definitions, public health is concerned with health; none of the definitions include the word "disease," reflecting the difference in focus of public health. Beginning with the World Health Organization (WHO) in 1948, efforts have been made to define health as something more than the absence of disease. WHO defined health as "...a state of complete physical, mental, and social well-being and not merely the absence of disease."[6,7] Therefore, the term "health" is associated with well-being, with the ability to function and to engage in activities for achieving goals. This definition of health implies that improving and maintaining health must involve something more than medical care for sick individuals.[4]

What is health?

- Health is the capacity to function physically, mentally, and socially.
- Health is a resource.
- Health is not just the absence of disease.

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