



ESSENTIAL PUBLIC HEALTH

Essentials of **Public Health Research Methods**

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To the students for whom this book is intended. They are the future, and their passion and commitment to helping others will help put an end to health disparities.

–R. A. C. and L. F. S.

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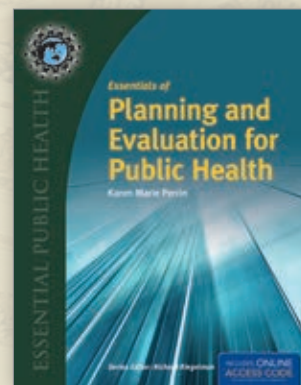
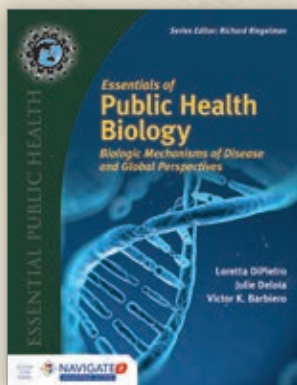
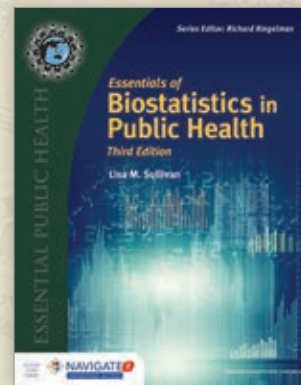
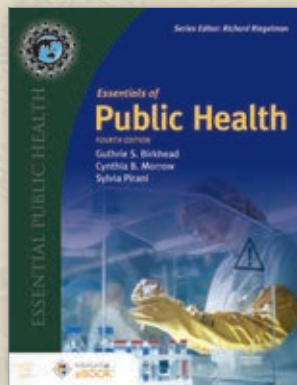
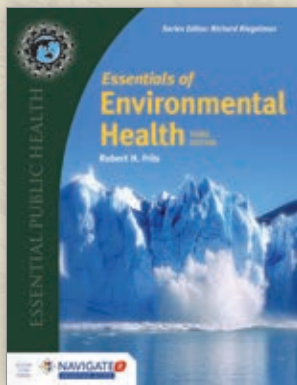
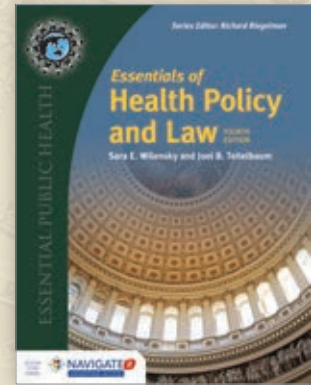
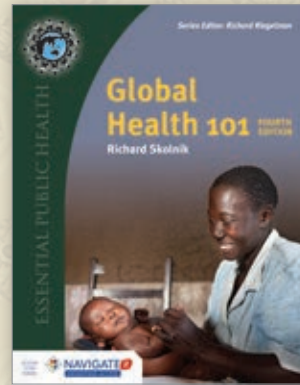
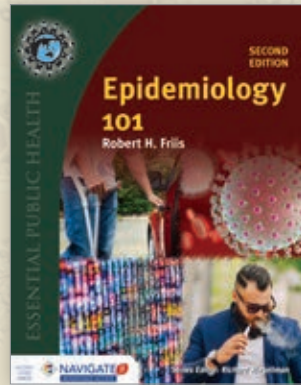
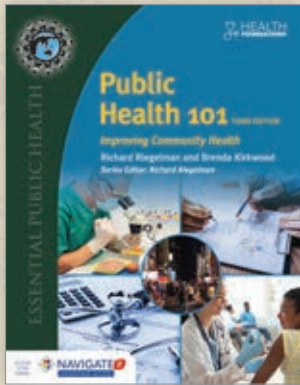
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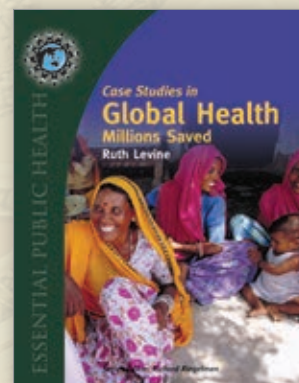
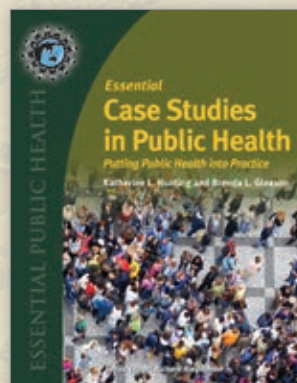
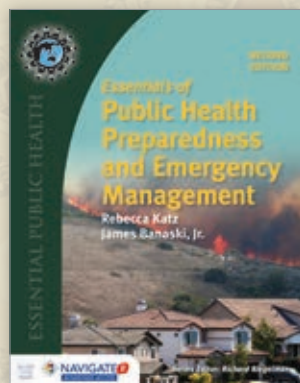
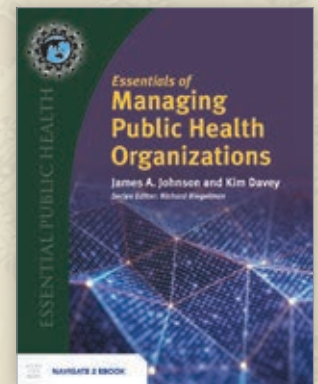
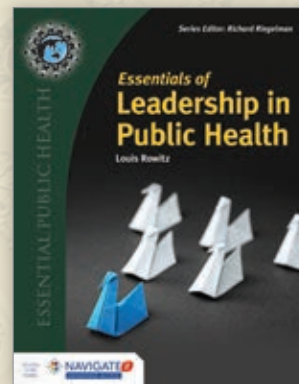
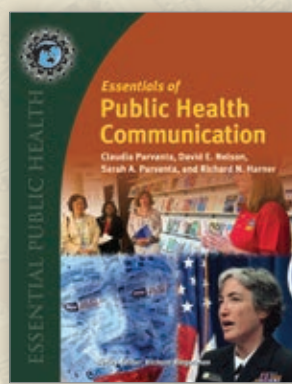
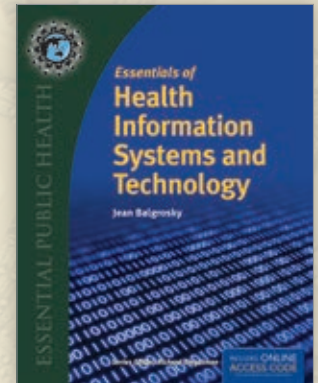
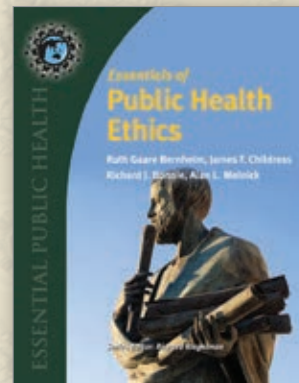
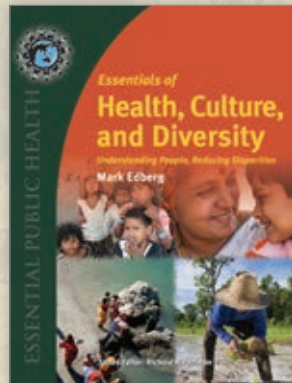
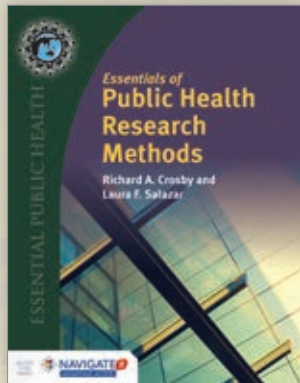
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ABOUT THE EDITOR

Richard K. Riegelman, MD, MPH, PhD, is Professor of Epidemiology-Biostatistics, Medicine, and Health Policy, and Founding Dean of The George Washington University Milken Institute School of Public Health in Washington, DC. He has taken a lead role in developing the Educated Citizen and Public Health initiative which has brought together arts and sciences and public health education associations to implement the

Institute of Medicine of the National Academies' recommendation that "...all undergraduates should have access to education in public health." Dr. Riegelman also led the development of The George Washington's undergraduate major and minor and currently teaches "Public Health 101" and "Epidemiology 101" to undergraduates.

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Foreword

Public health is often a career that is discovered after a first career is explored. A nurse, doctor, or other health professional may embrace the prevention and population dynamics in public health. A behavioral scientist may be attracted to the questions inherent in health maintenance, advocacy, and communication. Discovery of the cause of a given disease or condition lures biologists and social scientists alike to assess risk factors and etiologies. From a variety of backgrounds and interests, persons interested in environmental protection or in health equity and access to care may choose public health studies. When I did my own masters degree studies in public health almost 40 years ago, I was one of the youngest members of my class of 30, even though I had already completed my pediatrics training. For me, it is a source of immense satisfaction to see undergraduate programs in public and global health spring up, reflecting how students at colleges and universities are discovering the extraordinary preventive health challenges that need attention through the study of public health.

Not all undergraduate public health majors will become public health practitioners or researchers. But they come to their diverse careers in health care, policy, government service, or a variety of other fields with knowledge of social determinants of disease and how prevention can be more efficient and effective than application of a more limited, curative medical paradigm. They can apply their methodological expertise to a wide variety of topics, including that of the informed citizen and voter. As I write this foreword in 2020, we have entered a time of skepticism of science and its methods. “AntiVax” forces discourage childhood immunizations. Anti-regulatory forces lobby for the roll-back of environmental protection

laws. Research into high-priority public health topics is inhibited or even blocked by special interests, as with gun violence or global climate change. It is more essential than ever that an informed citizenry study and interpret scientific data to make informed policy judgments.

This textbook now in your hands seeks to introduce population science methods to undergraduate public health students. Graduate students wishing a quick methods introduction will also find it useful. I predict that attorneys, journalists, healthcare workers, and policymakers will also find the introductory methodological material illuminating. Hence, its timely release helps empower us all to better dissect the fake news from the real science, the opinion from the fact, and the obfuscating from the elucidating.

I hope each reader will enjoy learning these methods. A value of methodological study is to see how one can distinguish a chance finding from one that may illustrate a causal relationship. The beauty of methods is to see how the same approaches might be applied across many topics and questions. The excitement of methods is to enable us to assess a question that might truly make a difference for humankind and Mother Earth. Top public health scientists have come together to present the core topics that underpin public health research and data interpretation. Your understanding of these topics will empower you for a lifetime, regardless of profession or avocation.

Sten H. Vermund, MD, PhD
Dean and Anna M.L. Lauder
Professor of Public Health
Yale School of Public Health
Professor of Pediatrics
Yale School of Medicine

Editor's Preface

Undergraduate public health education has grown exponentially during the first two decades of the 21st century. As majors and minors have developed, the need to introduce students to public health research methods has gained increasing importance.

Richard A. Crosby and Laura F. Salazar have written a unique book that fills this need. It provides an introduction to the full spectrum of knowledge and skills needed to research public health issues and apply them in practice. Their approach is based on what they call the *circular model of public health research*, which provides an organizing structure for their textbook, including framing the questions, identifying the study design, choosing methodology, data collection and analysis, and disseminating research findings.

Using the metaphor of building a house, Crosby and Salazar systematically examine each component of the building process. They begin with an overview chapter that provides the framework for the textbook. The chapters follow a logical order, beginning with framing the research questions and ethical issues. The authors then examine the range of study types used in public health research, including community-based participatory research, qualitative research, observational research designs, experimental research designs, and quasi-experimental designs.

The chapters continue with a look at methods for data collection, including defining the study population, sampling techniques, and measurement. The data-analysis chapters start with data cleaning and management and continue on to introduce parametric and nonparametric approaches to data analysis. The text concludes with a chapter devoted to dissemination of research and defining follow-up research issues.

Crosby and Salazar bring their own research and experiences to writing the textbook, using extensive examples that bring the text to life. Their writing

is approachable and does not require extensive quantitative coursework. Their creative mascots, Snow and Hamilton, help emphasize their key points.

The authors aim to provide students with what they refer to as a *working knowledge*. The use of this textbook provides the basis for an introductory public health research course that can stand on its own and provide the foundation for students to understand a comprehensive approach to public health research along with a solid grounding for more advanced education in research design and analysis.

Examples of research illustrating each component of the process are provided. The emphasis is on developing evidence-based practice, which requires practice-based evidence. Thus, Crosby and Salazar's text goes beyond the traditional approach to research, which stops with efficacy or how well an intervention works under research conditions. It goes on to address questions of effectiveness or how well interventions work in practice.

As the series editor of the *Essential Public Health* series, I am pleased that *Essentials of Public Health Research Methods* is now part of the series. It adds an increasingly important approach to teaching public health research not only as a technical skill but also as a way of looking at the connections between research and practice. I am confident that you will find the book provides an organized, thought-provoking, and widely applicable approach to public health research.

Richard Riegelman, MD, MPH, PhD
Professor and Founding Dean
Milken Institute School of Public Health
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Jones and Bartlett Learning
Essential Public Health Series Editor

Authors' Preface

As the idea of treating disease after it occurs slowly erodes and yields to the emerging paradigm of prevention, it becomes more important than ever to refine public health practice through rigorous research. This volume in the *Essential Public Health* series is designed to provide a road map to conducting basic research that can inform the practices, procedures, and policies of public health. Throughout the chapters, we embrace the concept that public health activities span the fields of epidemiology (the study of determinants, conditions, and patterns that influence health and disease), public health management (the design and oversight of healthcare systems), public health policy (leadership and regulation of public health practice and environmental influences on health and disease), and health promotion (the prevention of disease through the application of the social and behavioral sciences).

The explicit goal of learning the content presented in the following chapters is to build your professional acumen to understand the research you “consume” and to conduct your own research when opportunities arise. The implicit goal is to become inspired by the endless possibilities to constantly improve public

health practice through the use of creative ideas that are tested empirically. As you read each chapter, please consider how the concepts apply specifically to work that you are (or will) take on as part of your role in protecting the health of the public. As noted in the *Framing the Future* initiative (as sponsored by the Association of Schools and Programs of Public Health), students preparing for careers in public health are expected to possess abilities relative to planning research, data collection, and data analysis and applying these research skills to evidence-based practice.

As a final suggestion before you begin learning about the various methodologies of public health research, please consider this volume as your guide to starting and completing a highly successful capstone, thesis, or honors paper. Indeed, in our experience, students often have trepidations about a culminating research experience, with their concerns typically focused on the question of “How do I conduct a research study?” In many ways, it is for this very reason that we have constructed the following chapters: We want you to be inspired by the importance of public health research and simultaneously empowered to take on a project that you can call your own.

Acknowledgments

First and foremost, we both wish to acknowledge and—more important—thank an incredible person and an amazing scholar who patiently mentored each of us during our postdoc years and then (almost imperceptibly) guided our careers as the years unfolded. His name is Ralph J. DiClemente, a name known widely in public health circles both domestically and abroad. His dedication to public health always inspired us, and his love of “getting it right” constantly kept us finding new and better ways to make a difference. Like so many other professors who work in public health practice and research, we are merely two people among hundreds who have been taught, inspired, and moved by this wonderful man.

We would also like to acknowledge our former editor at Jones & Bartlett Learning, Mike Brown, who has been our greatest supporter and a champion of this book. Also, we wish to acknowledge our new Jones & Bartlett Learning editor, Sophie

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About the Authors

Richard A. Crosby, PhD, is an endowed professor of public health at the University of Kentucky. Dr. Crosby's research has been highly focused on promoting condom use for populations most at risk of HIV and STD acquisition. Dr. Crosby's PhD is from the School of Public Health at Indiana University (1998). After receiving his doctorate, he completed a 3-year postdoctoral fellowship (2001), funded by the American Association of Teachers of Preventive Medicine and occurring at the Centers for Disease Control and Prevention (CDC), as well as Emory University's Rollins School of Public Health. Since completing this postdoctoral fellowship, Dr. Crosby has been consistently funded by the National Institutes of Health (NIH) and by the CDC. In recent years, his research has expanded to include work with sexual and gender minority youth pertaining to food security, low-income rural women at elevated risk of cervical cancer, and pregnancy prevention among young minority males residing in urban foster care facilities. Having published more than 400 peer-reviewed journal articles and book chapters, Dr. Crosby's current passion lies in writing textbooks that greatly aid the teaching and learning process for students who have dedicated their careers to public health practice and research.

Laura F. Salazar, PhD, is a Professor and Director of the PhD Program at Georgia State University's School of Public Health. Dr. Salazar's research has been devoted to helping prevent and ameliorate violence against women and HIV and AIDS. She was trained as a community psychologist at Georgia State University (GSU) where she received her PhD (2001). She also completed a National Research Service Award postdoctoral fellowship in HIV and

AIDS at Emory University's School of Medicine (2003). Before joining the faculty at GSU in 2011, Dr. Salazar was a member of the faculty at Emory University's Rollins School of Public Health. Her research has been funded by the NIH and the CDC and includes the use of educational entertainment in the form of serial drama episodes, social media marketing, and web-based approaches to expand the reach of public health efforts. Most recently, Dr. Salazar's research has expanded to focus on understanding the determinants of mental and physical health disparities experienced by sexual and gender minorities with an emphasis on contextual and structural-level factors. Dr. Salazar has published more than 150 journal articles in medical, public health, and social science journals and is the author of more than 30 book chapters and coauthor of four other public health textbooks. Dr. Salazar teaches advanced research methods and intervention development and evaluation for public health.

► Contributor

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