

Introduction to **Epidemiologic Research Methods** IN PUBLIC HEALTH PRACTICE

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Table of Contents

	Acknowledgments	vii
	Preface.....	ix
	About the Authors.....	xi
Chapter 1	Overview of the Research Process.....	1
	Introduction	2
	Definition of Research	2
	Research Process	3
	Conclusion	5
	Further Reading.....	5
Chapter 2	Research Goals in Epidemiology	7
	Introduction	8
	Types and Examples of Research Goals	8
	Practical Limitations of a Research Goal	24
	Conclusion	24
	Vocabulary.....	25
	Study Questions and Exercises	25
	References.....	26
Chapter 3	Overview of Epidemiologic Study Designs.....	31
	Introduction	32
	Elements of a Study Design (HUIT).....	32
	Treatment of HUIT Elements in Study Designs	34
	Conclusion	48
	Vocabulary.....	50
	Study Questions and Exercises	50
	References.....	52
Chapter 4	Research Ethics.....	53
	Introduction	54

	Historical Development of Human Subjects Protection in Research.....	55
	Practical Applications of Current Human Subjects Regulations	58
	Special Needs for Protection	67
	Conclusion	70
	Vocabulary	71
	Study Questions and Exercises	71
	References.....	72
Chapter 5	Formulating a Research Question	73
	Introduction	74
	Types of Research Questions.....	74
	Generating Research Questions.....	77
	Formulating the Specific Research Question	81
	Conclusion	83
	Vocabulary	83
	Study Questions and Exercises	84
	Further Reading.....	84
	References.....	85
Chapter 6	Reviewing the Literature	87
	Introduction	88
	Conducting the Literature Search	88
	Writing the Literature Review	94
	Conclusion	101
	Vocabulary	101
	Study Questions and Exercises	101
	References.....	102
Chapter 7	Obtaining Subjects.....	103
	Introduction	104
	Target/Theoretical Population and Sample.....	104
	Sample Population and Sampling Frame.....	106
	Sampling Methods.....	110
	Sample Recruitment and Retention	117
	Internal and External Validity	124
	Statistical Power Analysis	126
	Conclusion	129
	Vocabulary	129
	Study Questions and Exercises	130
	References.....	131

Chapter 8	Measuring Concepts.....	133
	Introduction	134
	Survey Data Collection	136
	Validity and Reliability of Measures	141
	Scales	143
	Clinical Data Collection	146
	Follow-Up Data Collection.....	146
	Secondary Sources	148
	Conclusion	154
	Vocabulary	155
	Study Questions and Exercises	155
	References.....	157
Chapter 9	Analyzing Data.....	159
	Introduction	160
	From Raw Data to Variables	161
	Getting to Know (and Like) the Variables	164
	Describing the Data	171
	Testing Inferences, Relationships, and Effects.....	177
	Interpreting the Results (Appropriately)	196
	Conclusion	198
	Vocabulary	199
	Study Questions and Exercises	200
	References.....	201
Chapter 10	Interpreting Results.....	203
	Introduction	204
	Confronting a Bunch of Numbers	204
	Picking and Choosing (Appropriately)	211
	Adjusting Expectations	213
	Answering the Research Question(s)	215
	Conclusion	217
	Vocabulary	218
	Reference	218
Chapter 11	Reporting Results.....	219
	Introduction	220
	Shape of the Report	221
	Introduction and Literature Review	222
	Methods	225
	Results	227

	Tables and Graphs	229
	Discussion	234
	Citations and References.....	236
	Title and Abstract	237
	Acknowledgments.....	238
	CONSORT and STROBE	238
	Conclusion	239
	Vocabulary.....	241
	References.....	241
Chapter 12	Getting Accepted: Funding, Presentation, Publication	243
	Introduction	244
	Funding.....	244
	Presenting Results	250
	Publishing Results.....	255
	Conclusion	258
	Vocabulary.....	259
	Study Questions and Exercises	259
	References.....	259
	Appendix A Suggested Resources	261
	Appendix B Search Engines and Public Health Sites ...	267
	Appendix C Exercise: Data Analysis.....	271
	Answers to Selected Study Questions	275
	Glossary.....	279
	Index	301

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Preface

You are reading this preface for one of two reasons: (1) your instructor has chosen this text for your class on research methods, or (2) you are considering choosing this text as a resource or guide for your own research study. This text is written to serve both purposes. Details about research procedures are presented in a way to educate you as a student and to serve as a road map for you as a researcher to navigate the options, limitations, necessary assumptions, and realistic expectations of your research study. Take a deep breath and move through the process systematically.

If you are a novice researcher, your most important goals are to determine what is possible in your study (overreaching is a common problem for the inexperienced investigator) and to focus on doing everything possible to conduct the strongest study in terms of validity. More simply, the best initial lesson is to learn how to make the absolute best of what is available to you.

Most likely you have some background in research as a student, or perhaps as a research assistant on a study being run by someone else. In this case, you need the bigger picture of an entire study, from formulating the research question to reporting the results. This book is meant to serve as a guide for you to conduct your own study, whether a research project for a class, a thesis or dissertation or capstone, or an independent investigation as part of your career.

The study questions and exercises at the end of chapters are intended to be used for these two different purposes: At one level, the exercises are pedagogic with the goal of learning and applying new information. On a more advanced level, the exercises are intended to stimulate the development of your own study details from beginning to end.

The overall focus of this text is on quantitative methods in the field of epidemiology. Quantitative studies are not the only type of studies useful in epidemiology, but they are the primary designs for a field of study developed to

“count things”—outbreaks, deaths, injuries, and diseases. As such, it is expected that you have some general knowledge about statistics or biostatistics and about epidemiology as a field. We do review the basics of these areas, but for the purpose of choosing and initiating the use of them, not learning them anew. Throughout the book, you are given suggestions of books to consult for more detail about concepts and procedures that may be somewhat new to you.

A potentially useful analogy is to think of this book as a cookbook. The necessary ingredients are listed and the procedures explained to prepare a dish or a component of a research study. The novice researcher, like the aspiring chef, will follow the recipes exactly to the letter to maximize the probability of preparing a successful dish or conducting a successful study. With experience, both the veteran researcher and professional chef know how to adapt recipes (studies) to the tastes of diners (research audience), the available ingredients (money, time, research subjects, measures), and the appropriate possible procedures (sampling techniques, retention procedures, analysis plans). Occasionally, the experienced chef consults the cookbook when she wishes to refresh a technique or prepare a new dish. Likewise, this book can be used as a reference for researchers who wish to use a new study design or statistical technique.

Unlike culinary projects, research studies rarely come out exactly as anticipated. The researcher rarely has as much control over the details of her study in the real world as does a chef over the cooking process. Especially when studying people, it is impossible to anticipate every aspect of the study. You may get a smaller than anticipated sample. Your follow-up sample may be biased in unexpected ways. There may be a confounder you did not think to measure. With knowledge of the research process and experience with it, you will learn to anticipate and prevent likely problems and address and hopefully overcome the unlikely ones.

About the Authors

Susan L. Bailey, PhD is an Assistant Professor of Public Health at Benedictine University in Lisle, Illinois, where she teaches biostatistics, epidemiology, and research methods in the master of public health program. Her more than 20-year professional career has been devoted to public health research. Dr. Bailey has numerous publications in professional journals, including the *American Journal of Public Health*, *American Journal of Epidemiology*, *Journal of Health and Social Behavior*, *Journal of Studies on Alcohol*, and *Journal of Acquired Immunity Deficiency Syndrome*. She has served on the editorial board of the *Journal of Health and Social Behavior* and as an ad hoc reviewer for many journals. Dr. Bailey has also served as Principal and Co-Investigator on several NIH and CDC R01 grants and as a reviewer on numerous NIH grant review committees. Her general areas of research interest are risky health behaviors among adolescents and the risk of HIV and HCV infection among young injection drug users. She began her career at the Research Triangle Institute in North Carolina, where she received hands-on training in the conduct of research, from question to publication of results. Dr. Bailey's research focus at this time was adolescent drug and alcohol use. She then served as a Research Assistant Professor of Psychiatry at the University of Pittsburgh Medical Center, where she studied substance use disorders among adolescents. Before accepting her current position at Benedictine University, Dr. Bailey served as a Research Associate Professor of Epidemiology and Biostatistics at the University of Illinois at Chicago. In this role, she was the Research Director of the Community Outreach Intervention Projects, a service and research effort serving and studying injection drug users in Chicago.

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Dr. Handu has delivered presentations at national professional conferences, and as coauthor of many research studies, she has a number of publications to her credit and several works in progress. Dr. Handu was selected as a 2009 Recognized Young Dietitian of the Year by the Illinois Dietetic Association. She is a past recipient of the following grant awards for research activities: Consortium to Lower Obesity in Chicago Children (2006); African American Family Initiative Project Grant (2003); Blue Cross Blue Shield Student Research Award (2001); and Council on Renal Nutrition Grant, National Kidney Foundation (2000).