PREFACE

This is a book for students, public health practitioners, people who aim to become public health practitioners, and people who want to learn about evidence-based public health because of its importance to local, national, and world health.

The book's readers may include people studying for, or who already have, degrees in public health, but physicians, nurses, social workers, occupational and physical therapists, and anyone else in the health professions or working in the health professions will find its contents useful. A partial list of professions for which the book is intended includes the following:

- Health Services Administration
- Health Services Research
- Biostatistics
- Epidemiology
- Health Education/Behavioral Science
- Environmental Health
- International Health
- Global Health
- Nutrition
- Public Health Practice/Program Management
- Biomedical Laboratory

Public health practitioners work in the public and private sectors. Practitioners who are interested in working for a nonprofit organization can find jobs in health advocacy or policy, or they may do research for organizations such as the American Cancer Society or the Red Cross. Public health practitioners in the private sector may be employed by pharmaceutical or health insurance companies. For practitioners who prefer the public sector, their jobs are often in local, state, or federal health departments or clinics.

And last, but certainly not least, some public health practitioners work in university systems as researchers.

Ideally, public health practitioners, regardless of discipline (epidemiologist, health services, gerontology, nutrition) or workplace (local health department, World Health Organization, university), will always incorporate scientific evidence in selecting and implementing programs, developing policies, and evaluating progress. This book aims to give you the skills to do just that.

❖ WHY IS THIS BOOK DIFFERENT FROM OTHERS?

This book differs from others with similar aims in many specific ways. Most important, it differs from other textbooks on evidence-based methods because of its contents and format.

Practical Orientation. The book is designed for students and practitioners, and so it is practical, with an emphasis on how to *do* evidence-based public health. Each chapter beings with specific learning objectives and concludes with practice exercises geared to the objectives. Each chapter is accompanied by a brief introduction and a summary, and all contain a list of key terms that are an essential part of an evidence-based public health practitioner's vocabulary. There is a comprehensive glossary as well. The book has hundreds of online and print references, examples, and charts.

Print and Online Partnership. An underlying assumption is that readers will be spending almost as much time online as offline, so the book contains dozens of links to websites. These provide supplemental information and technical information from around the world. The sites have been selected because they are part of the public health enterprise (such as the U.S. Centers for Disease Control) and because they are unlikely to disappear with time.

Public Health–Centered Content and Vocabulary. The book is about how to do evidence-based public health, and it pays specific attention to the particular characteristics and vocabulary of public health. It acknowledges the extraordinary history and contribution of evidence-based medicine, but moves forward to encompass public health's particular emphasis on communities and populations, the prediction and prevention of risks, and the promotion of well-being.

Public Health–Centered Methods. The book explains how to use techniques that are particularly appropriate for evidence-based public health

practice and that do not appear in other texts. It includes extensive discussions of how to use research reporting checklists such as CONSORT (randomized trials), TREND (nonrandomized trials), STROBE (observational studies), PRISMA (systematic reviews and meta-analysis), and MOOS (meta-analysis of observational studies) It also discusses the Institute of Medicine's guidelines for systematic reviews.

Synthesis of Information From Many Sources and Countries. The book synthesizes information from numerous sources that have never been brought together.

Focus on How to Do (and not Just Think About or Advocate) Evidence-Based Public Health. The book contains step-by-step instructions for doing key activities, including identifying community needs and values, using search terms based on questioning techniques (e.g., PICO), identifying articles and program databases, and evaluating the effects of new programs. It also provides information on how to report improvement evaluation results using reporting guidelines such as SQUIRE.

Step-by-Step Instructions for Identifying Community Health Needs, Risks, and Needs for Services. A major public health goal is to change community health behavior, and so to reduce risks for disease and to promote well-being. The book provides detailed information on how to evaluate community health needs and needs for health services. It also explains how to use health behavior change models as part of program planning and evaluation.

The Reviewer's Perspective Rather Than the Researcher's. The book clearly differentiates between the skills that researchers need to produce evidence and the skills that evidence-based public health practitioners need to evaluate the quality of the evidence. The book aims to teach readers to use evaluation research, epidemiology, and health services research in their search for best available evidence.

Presentation of Leading Systems for Evaluating Evidence. The book provides information on how to evaluate the quality of the literature and score the consistency and strength of the available evidence by using systems such as GRADE and the U.S. Preventive Services Task Force's techniques.

Discussion of Program Planning and Evaluation. Almost all writers agree that careful planning and evaluation of programs are essential. This book discusses models for program planning and methods for evaluating the impact of newly implemented programs.

Presentation of Useful Forms and Questionnaires. The book provides detailed examples of the forms used to record data as the reviewer does an abstraction. In addition, examples from the literature are presented to show how systematic literature reviews should be reported.

Emphasis on the Importance of Ethical Research. The book discusses the ethics of research with human subjects, research misconduct, and concerns associated specifically with evidence-based practice.

❖ WHAT ARE THE CONTENTS OF THE BOOK?

Chapter 1. Public Health Practice and the Best Available Evidence

This chapter discusses evidence-based public health's defining characteristics, including how to evaluate community health and health service needs and cultural values and how to use the best available evidence to meet the needs. It also explains the differences between evidence-based medicine and evidence-based public health. The distinction is important. Evidence-based public health practice is concerned with reducing risks and promoting health regardless of disease and focuses on communities and populations, whereas evidence-based medicine is primarily interested in preventing disease and curing illness in individuals. Chapter 1 is also concerned with explaining where evidence originates, with a particular emphasis on evidence collected from evaluation and effectiveness research. Other types of research used in evidence-based public health practice are also discussed, including epidemiology and health services research.

Because current evidence-based practices are often found on the web, Chapter 1 provides an extensive list of websites to go for information and differing perspectives on evidence-based public health

Chapter 2. Community Health and Health Service Needs and Evidence-Based Programs

This chapter explains the differences among seven categories of health needs or risks: social, behavioral, administrative, environmental, communal, physical, and educational. It describes the characteristics of commonly used methods for identifying and assessing needs and priorities, including analysis of large statistical databases, key informant techniques, community forums,

focus groups, the nominal group process, the Delphi technique, the RAND/ UCLA Appropriateness Method, surveys, asset mapping, and consensus development conferences.

Once community health and health services needs are identified, the search for relevant programs begins. Chapter 2 describes how to identify and evaluate online evidence-based program databases, such as those maintained by the U.S. Agency for Healthcare Research and Quality and the Centers for Disease Control, and explains how to evaluate the quality of online health information websites.

Chapter 3. Finding the Best Available Evidence: Questions, Practical Concerns, and Ethics

This chapter focuses on finding the best available evidence. It teaches the steps in conducting a research literature review, and it explains how to choose an online bibliographic database that is likely to result in articles on evaluated public health programs and practices, use the PICO method to formulate questions to focus a literature review search, create search terms from the research questions to guide the literature review, and use Boolean operators (e.g., *and, or, not*) when searching the research literature. Chapter 3 also discusses how to identify the components of two practical literature review screens, such as language; research design; the characteristics of the experimental and comparison programs; data collection dates and duration; and study sponsorship, outcomes, participants, and settings.

The best available evidence comes from ethical research, and Chapter 3 discusses ethical issues that accompany research with human subjects, describes the characteristics of research misconduct, and explains the ethical concerns associated with evidence-based public health practice.

Chapter 4. Research Design, Validity, and Best Available Evidence

The goal of this chapter is to teach readers how to review research design and threats to the validity of the results because of the design. It therefore tells readers what to look for rather than how to do it.

Chapter 4 explains the characteristics of commonly used research designs in studies to define and meet public health program needs and describes the methods that statisticians, epidemiologists, and other health researchers use to ensure that experimental and control groups are equivalent

before they participate in research. The chapter also discusses the many threats to internal and external validity that can result from the choice and implementation of a study's research design.

Chapter 5. Wanted! Valid and Meaningful Data as Proof of Best Available Evidence

This chapter's emphasis is on learning how to determine the appropriateness and validity of the measures used in a research study to a public health practice setting. It explains the advantages and limitations of commonly used measures to gather evidence about programs to improve public health. These measures include self-administered written and online surveys and questionnaires, multiple-choice tests of knowledge and achievement, reviews of medical and other records, observations, in-person and telephone interviews, vignettes, and physical examinations. It also explains how to identify the main measures cited in reports about program outcomes and effectiveness.

Study measures are often chosen to reflect the variables included in health behavior change models, so Chapter 5 discusses the main characteristics of five commonly used models of health behavior change (Health Belief Model, Theory of Reasoned Action and Theory of Planned Behavior, Social Learning/Social Cognitive Theory, Transtheoretical Model, Socio-Ecological Model). Health behavior change models are sometimes used to guide program development and measurement, and Chapter 5 explains how this works.

Chapter 5 distinguishes between measurement reliability and validity, and discusses how to identify the characteristics of each, including test-retest reliability, internal consistency, split-half, alternative form, and intra- and inter-rater reliability as well as content, predictive, concurrent, and construct validity. The chapter also explains the characteristics of sensitivity, specificity, and false positive and false negative results, and it compares methods for handling missing data and assessing the effects of missing data on measurement reliability and validity. Chapter 5 concludes with a discussion of how to distinguish between the statistical and practical significance of the data, including the use of confidence intervals and number-needed-to-treat.

Chapter 6. The Best Available Evidence: Quality, Strength, Implementation, and Evaluation

This chapter explains the characteristics of high-quality research as they apply to each of the following domains: derivation and clarity of the

research questions; criteria for including participants and settings; methods for ensuring comparability of participants; and justification for and description of the program, its outcomes, data collection measures, statistical analysis, results, discussion, and funding or sponsorship. Chapter 6 also explains how to use standardized reporting checklists as a basis for evaluating study quality and evidence strength. Among the checklists are CONSORT (randomized controlled trials), TREND (nonrandomized trials), and STROBE (observational studies).

Chapter 6 describes the features and uses of formal reporting checklists for systematic literature reviews and meta-analyses such as PRISMA (systematic reviews and meta-analysis), MOOS (meta-analysis of observational studies), and the standards issued by the Institute of Medicine. It also compares the advantages and limitations of systems for grading study quality and the strength of the evidence. The systems include those developed by the U.S. Preventive Services Task Force and GRADE.

Chapter 6 explains how to prepare an abstraction form or questionnaire to extract data from the research literature on programs to improve health, describes the main features of charts and tables to display the results of research literature reviews, and discusses how to identify the important characteristics to look for in high-quality systematic research literature reviews and meta-analyses.

Before evidence-based programs are implemented, criteria for selection need to be set, and Chapter 6 discusses which ones to consider. Logic models for program planning, implementation, and evaluation are discussed, as are differences and similarities between effectiveness and improvement evaluations. The chapter also provides information on methods for evaluating improvement and adhering to reporting guidelines such as SQUIRE.