

## Preface

In 1995, the US Centers for Disease Control and Prevention (CDC) partnered with the University of Washington (UW) School of Public Health and Community Medicine to develop a training resource for a new and (at that time) practically unknown field: *public health informatics*. That the field of informatics was new to public health is not to say that computers, networks, databases, and so forth were unknown to public health—far from it. Computers had been used by public health scientists for generations; by 1995, personal computers were being enthusiastically adopted by public health scientists all over the world. But with the advent of large-scale *networked* computing (from local-area networks to the global Internet), traditional seat-of-the-pants methods for developing public health information systems were proving untenable. A much more systematic, experience-based, and research-grounded approach to systems development was demanded by the complex, multi-user nature of applications such as national electronic surveillance systems and immunization registries. Indeed, the CDC-UW public health informatics training course was originally developed to support public health managers tasked with the development of statewide immunization registries.

The development of that training course was the beginning of the development of this textbook. Defining the scope and nature of that first public health informatics curriculum required us to define the scope and nature of public health informatics itself. That definition has changed over time, and many others (including many who have contributed to this volume) have enormously broadened and deepened the field of public health informatics since then. But the goal and the essential nature of public health informatics remains unchanged. Its goal is to harness the power of computers, networks, and other information technologies to improve the public's health. Its essential nature is a set of time- and research-proven principles and practices that maximize one's chances of success when developing new public health information systems or technologies.

Here at the outset of the 21st century, few public health professionals have received any formal training in informatics. Indeed, most are still unfamiliar with the nature and purpose of informatics as a discipline and are only partly aware of the potential that information technology has to improve and even to transform public health practice. The goal of this textbook is to help address this important knowledge gap. This book is intended to provide both students of public health and working public health professionals with an introduction to the new and rapidly growing field of public health informatics. The reader will become familiar with the principles and practices of informatics, gain an understanding of the sciences underlying this new discipline, recognize key informatics challenges facing public health professionals, and explore emerging information systems currently in development. The reader will also be introduced to the major public health

information systems that form the scientific underpinnings of public health assessment and research and that inform the development of public health policy.

One of the challenges of teaching informatics is that its scientific and practical bases are drawn from multiple disciplines and domains. Thus, informatics-relevant material is to be found in textbooks and journals on information science, computer science, technology, management, psychology, and a dozen other domains. A primary purpose of this book is to consolidate key information currently scattered over many media and locations or else residing only in the minds of a few experts. By pulling this information together into a textbook on public health informatics, we hope to provide a coherent and readable resource for use by faculty and students in schools of public health across the United States. We also hope that this resource will be of use to the practicing public health professional. Many public health leaders and managers have found themselves making critical information technology decisions or managing complex information technology projects—tasks for which few of us ever received formal informatics training heretofore.

## **Nature and Organization of This Book**

This book is not intended to be a review of cutting-edge information technology. After all, such a book would be doomed to obsolescence before the first production run was shipped. In fact, the term *Internet years* was coined to refer to a time span of a few months to a few weeks, an apt reflection of the dizzying pace at which information technology evolves.

Instead, this book is intended to promote a strategic approach to information systems use and development. Such a strategic approach is based on well-established informatics principles and practices that will remain valid long after today's technologies are supplanted by those of tomorrow. To use an analogy, in the practice of medicine, disease treatment regimens change constantly, but the principles and practices of medicine are stable and time-tested. The principles and practices of informatics are similarly time-tested and do not change dramatically from year to year.

The material in this book is presented in five parts:

- Part I, *The Context for Public Health Informatics*, provides important background and context for the rest of the book. After an introductory chapter, this section reviews a variety of recent social, legislative, and technical developments that, taken together, create both an imperative and a historic opportunity to apply information technology to the improvement of the public's health effectively and systematically. This section summarizes the history and significance of the development of computerized information systems in public health and provides a snapshot of the governmental and legislative context of public health informatics.
- Part II is titled *The Science of Public Health Informatics*. As noted, today's public health students and practitioners

generally have never had formal training in the scientific underpinnings and principles of public health informatics. This section reviews the key scientific and technical elements of this new and developing discipline and clarifies the need for and the nature of the role of an “informatician” (sometimes called an “informaticist”) in the public health enterprise. It also explores organizational and management issues related to information systems development and addresses the ethics of information use.

- Part III, *Key Public Health Information Systems*, reviews key information systems relevant to public health research and practice. These systems include vital statistics systems, morbidity data systems, risk factor data systems, and environmental data systems. The review of numerous data systems is complemented by an exploration of knowledge-based information systems for public health, as exemplified by peer-reviewed journal articles, meta-analyses, prevention guidelines, and a plethora of other information resources that are increasingly available on-line on the World Wide Web.
- Part IV is *New Challenges, Emerging Systems*. In view of the evident promise of information technology, the public health community has embraced certain systems development challenges that are apparently straightforward (e.g., immunization registries) but are in fact enormously challenging. This section describes several important areas of opportunity afforded by modern information technology, such as new means of data collection and new means of increasing data accessibility. This section also addresses key information technology challenges with which the public health community is currently grappling, including geographic information systems, expert systems for public health, and the use of information technology to promote the delivery of preventive medicine in primary care.
- Part V is *Case Studies: Applications of Information Systems Development*. The promise of information technology is widely appreciated, but the true value of information technology lies in bringing that promise to fulfillment. This section presents a variety of real-world case studies, each of which is designed either to exemplify a particular kind of value derived from the deployment of actual information systems (e.g., the value of using scientific data to drive policy) or to illustrate critical issues associated with the development of new information systems (e.g., dealing with the policy and privacy issues raised by electronic disease surveillance). This section is intended to illustrate the value of applying informatics principles and practices as well as cutting-edge information technologies to both new and traditional public health information applications. These case studies illustrate and amplify the meaning and importance of informatics and effective information systems to modern public health practice.

At the end of each chapter is a section titled “Questions for Review.” These questions focus on many of the most important concepts discussed in a chapter. In many instances, they are based on a short case that demonstrates and requires a student to recognize and apply the concepts in action.

Public Health Informatics and Information Systems

O'Carroll, P.W.; Yasnoff, W.A.; Ward, M.E.; Ripp, L.H.;  
Martin, E.L. (Eds.)

2003, XXVII, 792 p. 55 illus., Hardcover

ISBN: 978-0-387-95474-5