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In the past two decades, informatics as a terminology has been widely disseminated. Within the health sciences context, medical informatics and bioinformatics have played an important role in advancing the health services domain as well as in discovering biological associations and informing new treatment discoveries. Population health informatics is a newer emerging science that promises to influence global health dynamics in a unique and significant way. This text elucidates the underpinnings of this terminology, and explains its unique parameters and singularly effective applications both from descriptive and interventional dimensions. The readership of this text will gain new insights and will be able to use newly acquired knowledge in both theoretical and applied context. Knowledge gained through this text will inform large data users, health scientists and researchers, health administrators, and policymakers, as well as economists and modelers. Many of the challenges associated with population health informatics relate to difficulties in assembling data, combining data sources, identifying innovative approaches to data analysis, and finally, extracting the most relevant and pertinent information toward predicting and resolving emergent and prevalent health problems. Many of these challenges are addressed and demystified in this text, in a way that is accessible to students, researchers, and practitioners in the field.

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Acknowledgments

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Ashish Joshi is an Associate Dean of the CUNY Graduate School of Public Health and Health Policy and an Associate Professor at CUNY Institute for Implementation Science in Population Health. Dr. Joshi’s combined training in medicine, public health, and informatics provides a unique combination to utilize innovative technology-enabled interventions at the intersection of clinical care and population health. Dr. Joshi’s journey has been that of an academician, applied researcher, administrator, innovator, and entrepreneur to implement sustainable, multi-sector, accessible, affordable, reimbursable, and tailored (SMAART) technology solutions to address the population health challenges of the 21st century. His research interest focuses on the design, development, implementation, and evaluation of contextually relevant informatics interventions to enhance population health outcomes. Dr. Joshi utilizes the principles of social cognitive theory, human-centered design, and information processing theory to develop culturally relevant health technology solutions that can be adapted to different settings, audiences, and health conditions. Dr. Joshi has done several population health informatics projects in various countries including the United States, Nigeria, India, Brazil, and Haiti. His research related to mobile and Internet-enabled interventions, population-based surveillance, consumer health informatics, and health dashboards has been widely funded by several national and international agencies.

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The rapid growth in digital data due to the increased usage of mobile phones and wearable sensors has created an urgent need to develop new, innovative tools and technologies that can make data meaningful. Population health informatics is an emerging field that aims to utilize technology to put into practice evidence-based solutions to improve population health outcomes across diverse settings. The goal of this book is to present a practical, step-by-step approach on how to implement evidence-based, data-driven informatics solutions to enhance population health. We aim to engage students and professionals across various disciplines who are interested in using technology as a medium to reduce health disparities and improve healthcare access and delivery in diverse settings.

The book is broadly divided into four parts:

Part 1: Overview of Population Health Informatics
Part 2: Setting the Stage for Population Health Informatics
Part 3: Specialized Population Health Informatics Applications
Part 4: Other Population Health Informatics Topical Areas

Part 1 begins by describing the need for population health informatics (Chapter 1) and then discusses the workforce's needs, competencies, and the various training programs (Chapter 2). Part 2 discusses differences among data, information, and knowledge (Chapter 3); health information exchange and related interoperability (Chapter 4); informatics-enabled population health surveillance (Chapter 5); statistical issues (Chapter 6); and opportunities and challenges related to big data due to the rapid increase in data volume, velocity, and variety (Chapter 7). Chapter 7 also examines the role of cloud computing and population health visual analytics to facilitate population health data storage, data analysis, and data visualization in a meaningful format. Part 3 describes the specialized population health informatics applications such as design, development, and system evaluation (Chapter 8); electronic health records and telehealth applications (Chapter 9); personal health records (Chapter 10); and the opportunities, challenges, and applications related to mobile health interventions (Chapter 11). Lastly, Part 4 discusses other key population health informatics topics related to the economic value of informatics applications in population health (Chapter 12); issues related to privacy, confidentiality, security, and ethics (Chapter 13); and the role of innovations and sustainability in population health technologies (Chapter 14).
We hope that the information and resources provided in this textbook help readers to better understand the utilization of information and communication technology–enabled interventions and innovations in the United States and beyond. The book fulfills a key component of the new Association of Schools and Programs of Public Health recommendations for “Critical Components for the Core of a 21st Century MPH Degree.” The book also equips a new generation of the workforce with the expertise necessary to make data meaningful and to design, develop, and evaluate accessible and affordable technology-enabled solutions to effectively address the population health challenges of the 21st century.

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