

Computational Epidemiology

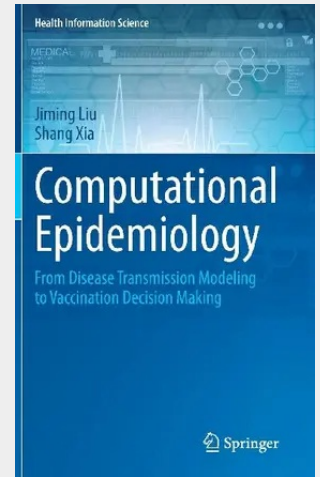
From Disease Transmission Modeling to Vaccination Decision Making

This book provides a comprehensive introduction to computational epidemiology, highlighting its major methodological paradigms throughout the development of the field while emphasizing the needs for a new paradigm shift in order to most effectively address the increasingly complex real-world challenges in disease control and prevention. Specifically, the book presents the basic concepts, related computational models, and tools that are useful for characterizing disease transmission dynamics with respect to a heterogeneous host population. In addition, it shows how to develop and apply computational methods to tackle the challenges involved in population-level intervention, such as prioritized vaccine allocation. A unique feature of this book is that its examination on the issues of vaccination decision-making is not confined only to the question of how to develop strategic policies on prioritized interventions, as it further approaches the issues from the perspective of individuals, offering a well integrated cost-benefit and social-influence account for voluntary vaccination decisions. One of the most important contributions of this book lies in it offers a blueprint on a novel methodological paradigm in epidemiology, namely, systems epidemiology, with detailed systems modeling principles, as well as practical steps and real-world examples, which can readily be applied in addressing future systems epidemiological challenges.

The book is intended to serve as a reference book for researchers and practitioners in the fields of computer science and epidemiology. Together with the provided references on the key concepts, methods, and examples being introduced, the book can also readily be adopted as an introductory text for undergraduate and graduate courses in computational epidemiology as well as systems epidemiology, and as training materials for practitioners and field workers.

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