



Mathematical Tools for Understanding Infectious Disease Dynamics (Princeton Series in Theoretical and Computational Biology)

By Odo Diekmann, Hans Heesterbeek, Tom Britton

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Mathematical modeling is critical to our understanding of how infectious diseases spread at the individual and population levels. This book gives readers the necessary skills to correctly formulate and analyze mathematical models in infectious disease epidemiology, and is the first treatment of the subject to integrate deterministic and stochastic models and methods.

Mathematical Tools for Understanding Infectious Disease Dynamics fully explains how to translate biological assumptions into mathematics to construct useful and consistent models, and how to use the biological interpretation and mathematical reasoning to analyze these models. It shows how to relate models to data through statistical inference, and how to gain important insights into infectious disease dynamics by translating mathematical results back to biology. This comprehensive and accessible book also features numerous detailed exercises throughout; full elaborations to all exercises are provided.

- Covers the latest research in mathematical modeling of infectious disease epidemiology
- Integrates deterministic and stochastic approaches
- Teaches skills in model construction, analysis, inference, and interpretation
- Features numerous exercises and their detailed elaborations
- Motivated by real-world applications throughout

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Editorial Review

Review

"A much needed book. *Mathematical Tools for Understanding Infectious Disease Dynamics* is a welcome addition to the current literature and will hopefully help to unify the many different views in the field."--

Laura Matrajt, *SIAM Review*

"The overtly pedagogical features of this text make it an outstanding choice for someone trying to learn the basic tools of the trade. The mathematician who makes a serious study of this text will be in an excellent position to work fruitfully with biologists or epidemiologists on either theoretical or data-driven problems of disease transmission."--**Carl A. Toews, *Mathematical Reviews***

"This book will soon be a classic in the theoretical epidemiology and modeling literature."--**Mirjam Kretzschmar, *Biometrical Journal***

From the Back Cover

"This landmark volume describes for readers how one should view the theoretical side of mathematical epidemiology as a whole. A particularly important need is for a book that integrates deterministic and stochastic epidemiological models, and this is the first one that does this. I know of no better overview of the subject. It belongs on the shelf of everyone working in mathematical epidemiology."--**Fred Brauer, University of British Columbia**

About the Author

Odo Diekmann is professor of mathematical analysis at Utrecht University. Hans Heesterbeek is professor of theoretical epidemiology at Utrecht University. Tom Britton is professor of mathematical statistics at Stockholm University.

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