Mathematical and Statistical Modeling for Emerging and Re-Emerging Infectious Diseases: The Ultimate Guide

As the world faces the ongoing threat of emerging and re-emerging infectious diseases, mathematical and statistical modeling has become an indispensable tool for understanding, predicting, and mitigating their impact. This comprehensive guide provides a deep dive into the mathematical and statistical techniques used to model the dynamics of infectious diseases, empowering readers with the knowledge and skills to tackle these global health challenges.

Chapter 1: to Mathematical and Statistical Modeling

- Importance and applications of mathematical and statistical modeling in infectious disease epidemiology
- Basic concepts of probability, statistics, and differential equations
- to compartmental models and their use in modeling disease transmission

Chapter 2: Deterministic Compartmental Models

- Derivation and analysis of simple deterministic compartmental models (SIR, SIS, SIRS)
- Modeling disease transmission with age-structure and spatial heterogeneity
- Applications in outbreak analysis and forecasting

Chapter 3: Stochastic Compartmental Models

- to stochastic processes and their applications in infectious disease modeling
- Development and analysis of stochastic compartmental models
- Applications in modeling disease outbreaks, vaccine efficacy, and intervention strategies

Chapter 4: Statistical Methods for Infectious Disease Data

- Overview of statistical methods for analyzing infectious disease data
- Estimation of transmission parameters, incubation periods, and reproductive numbers
- Statistical modeling of outbreak data and surveillance systems

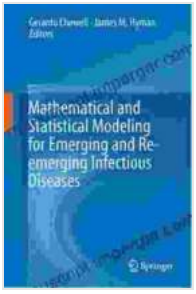
Chapter 5: Model Fitting and Validation

- Techniques for fitting mathematical models to infectious disease data
- Model selection and validation criteria
- Uncertainty quantification and sensitivity analysis

Chapter 6: Applications in Public Health and Policy

- Use of mathematical and statistical models to inform public health policies
- Developing intervention strategies for outbreak control and prevention
- Predicting the spread and impact of emerging and re-emerging infectious diseases

Mathematical and Statistical Modeling for Emerging and Re-Emerging Infectious Diseases provides a comprehensive and up-to-date resource for researchers, public health professionals, and students seeking to understand and address the challenges posed by these global health threats. With its clear explanations, practical examples, and state-of-the-art techniques, this book empowers readers to make informed decisions and contribute to the fight against infectious diseases.



Mathematical and Statistical Modeling for Emerging and Re-emerging Infectious Diseases by Mei Zhang

★★★★★ 5 out of 5

Language	: English
File size	: 13242 KB
Screen Reader	: Supported
Print length	: 365 pages

Unlock the power of mathematical and statistical modeling today and make a lasting impact on global health.

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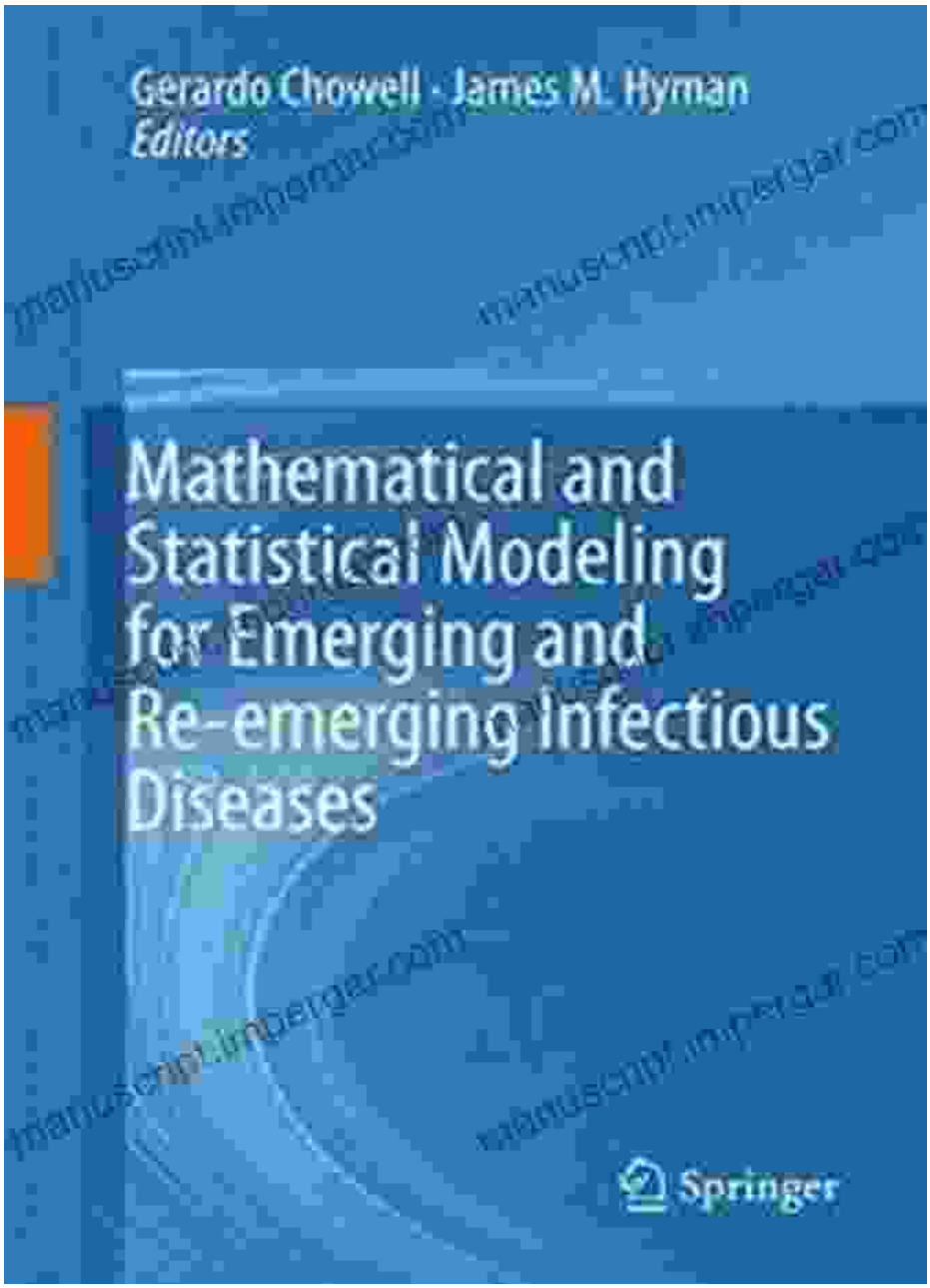

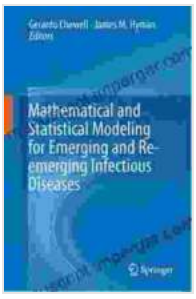

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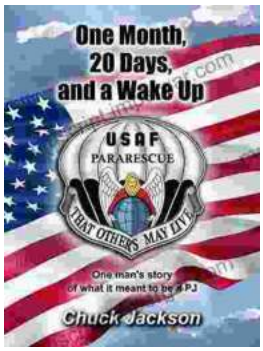

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