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	Titolo	Quantitative Methods for Investigating Infectious Disease Outbreaks / / by Ping Yan, Gerardo Chowell
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	Edizione	[1st ed. 2019.]
	Descrizione fisica	1 online resource (XIII, 354 p. 104 illus., 93 illus. in color.)
	Collana	Texts in Applied Mathematics, , 0939-2475 ; ; 70
	Disciplina	614.4072 614.4
	Soggetti	Mathematics Mathematical models Biomathematics Infectious diseases Epidemiology Mathematics of Planet Earth Mathematical Modeling and Industrial Mathematics Mathematical and Computational Biology Infectious Diseases
	Lingua di pubblicazione	Inglese
	Formato	Materiale a stampa
	Livello bibliografico	Monografia
	Nota di contenuto	Introduction -- Shapes of hazard functions and lifetime distributions -- Random counts and counting processes -- The initial phase of an outbreak -- Compartment models -- More complex models and control measures -- Some statistical issues -- Outbreak trajectories -- Spatial structures and behavior change.
	Sommario/riassunto	This book provides a systematic treatment of the mathematical underpinnings of work in the theory of outbreak dynamics and their control, covering balanced perspectives between theory and practice including new material on contemporary topics in the field of infectious disease modelling. Specifically, it presents a unified mathematical framework linked to the distribution theory of non-negative random variables; the many examples used in the text, are introduced and discussed in light of theoretical perspectives. The book is organized

into 9 chapters: The first motivates the presentation of the material on subsequent chapters; Chapter 2-3 provides a review of basic concepts of probability and statistical models for the distributions of continuous lifetime data and the distributions of random counts and counting processes, which are linked to phenomenological models. Chapters 4 focuses on dynamic behaviors of a disease outbreak during the initial phase while Chapters 5-6 broadly cover compartment models to investigate the consequences of epidemics as the outbreak moves beyond the initial phase. Chapter 7 provides a transition between mostly theoretical topics in earlier chapters and Chapters 8 and 9 where the focus is on the data generating processes and statistical issues of fitting models to data as well as specific mathematical epidemic modeling applications, respectively. This book is aimed at a wide audience ranging from graduate students to established scientists from quantitatively-oriented fields of epidemiology, mathematics and statistics. The numerous examples and illustrations make understanding of the mathematics of disease transmission and control accessible. Furthermore, the examples and exercises, make the book suitable for motivated students in applied mathematics, either through a lecture course, or through self-study. This text could be used in graduate schools or special summer schools covering research problems in mathematical biology.