

# TABLE OF CONTENTS

## A Historical Introduction to Mathematical Modeling of Infectious Diseases Seminal Papers in Epidemiology

- Dedication
- Introduction
  - Motivation and short history (of this book)
  - Structure and suggested use of the book
  - Target audience
  - Mathematical background
  - Miscellaneous remarks
  - References
- Acknowledgments
- 1: D. Bernoulli: A pioneer of epidemiologic modeling (1760)
  - Abstract
  - 1.1. Bernoulli and the “speckled monster”
  - Appendix 1.A. Answers
  - Appendix 1.B. Supplementary material
  - References
- 2: P.D. En'ko: An early transmission model (1889)
  - Abstract
  - 2.1. Introduction
  - 2.2. Assumptions
  - 2.3. The model
  - 2.4. Simulation model
  - Appendix 2.A. Answers
  - Appendix 2.B. Supplementary material
  - References
- 3: W.H. Hamer (1906) and H. Soper (1929): Why diseases come and go
  - Abstract
  - 3.1. Introduction
  - 3.2. Hamer: Variability and persistence
  - 3.3. Soper: Periodicity in disease prevalence
  - Appendix 3.A.
  - Appendix 3.B. Answers
  - Appendix 3.C. Supplementary material
  - References
- 4: W.O. Kermack and A.G. McKendrick: A seminal contribution to the mathematical theory of epidemics (1927)
  - Abstract
  - 4.1. Introduction

- 4.2. General theory: (2) through (7)
  - 4.3. Special cases: (8) through (13)
  - Appendix 4.A.
  - Appendix 4.B. Answers
  - Appendix 4.C. Supplementary material
  - References
- 5: R. Ross (1910, 1911) and G. Macdonald (1952) on the persistence of malaria
  - Abstract
  - 5.1. Introduction
  - 5.2. Ross: What keeps malaria going?
  - 5.3. George Macdonald: Malaria equilibrium beyond Ross
  - Appendix 5.A. Answers
  - References
- 6: M. Bartlett (1949), N.T. Bailey (1950, 1953) and P. Whittle (1955): Pioneers of stochastic transmission models
  - Abstract
  - 6.1. Introduction: Stochastic transmission models
  - 6.2. Bailey: A simple stochastic transmission model
  - 6.3. M.S. Bartlett: Infectious disease transmission as stochastic process
  - 6.4. Bailey revisited: Final size of a stochastic epidemic
  - 6.5. P. Whittle: Comment on Bailey
  - Appendix 6.A. Answers
  - Appendix 6.B. Supplementary material
  - References
- 7: O. Diekmann, J. Heesterbeek, and J.A. Metz (1991) and P. Van den Driessche and J. Watmough (2002): The spread of infectious diseases in heterogeneous populations
  - Abstract
  - 7.1. Introduction: Non-homogeneous transmission
  - 7.2. Diekmann, Heesterbeek and Metz: The basic reproduction number in heterogeneous populations I
  - 7.3. P. Van den Driessche and J. Watmough: Reproduction numbers and sub-threshold endemic equilibria for compartmental models of disease transmission
  - Appendix 7.A. Answers
  - Appendix 7.B. Supplementary material
  - References
- Index.