

INFECTIOUS DISEASE EPIDEMIOLOGY

Theory and Practice

THIRD EDITION

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Production Credits

Publisher: Michael Brown
Managing Editor: Maro Gartside
Editorial Assistant: Chloe Falivene
Associate Production Editor: Rebekah Linga
Senior Marketing Manager: Sophie Fleck Teague
Manufacturing and Inventory Control Supervisor: Amy Bacus
Composition: CAE Solutions Corp.
Cover Design: Michael O'Donnell
Cover Image: © Fenton/Shutterstock, Inc.
Printing and Binding: Courier Companies
Cover Printing: Courier Companies

To order this product, use ISBN: 978-1-4496-8379-5

Library of Congress Cataloging-in-Publication Data

Infectious disease epidemiology : theory and practice / [edited by] Kenrad E. Nelson and Carolyn Masters Williams. — 3rd ed.
p. ; cm.

Includes bibliographical references and index.

ISBN 978-0-7637-9533-7 (hard cover) — ISBN 0-7637-9533-X (hard cover)

I. Nelson, Kenrad E. II. Williams, Carolyn Masters.

[DNLM: 1. Communicable Diseases—epidemiology. 2. Disease Outbreaks. 3. Epidemiologic Methods. WC 100]

614.5—dc23

2012039132

6048

Printed in the United States of America

17 16 15 14 13 10 9 8 7 6 5 4 3 2 1

Contents

Contributors xiii
Preface to the Third Edition xvii

PART 1—METHODS IN INFECTIOUS DISEASE EPIDEMIOLOGY 1

Chapter 1 Early History of Infectious Disease: Epidemiology and Control of Infectious Diseases 3

Kenrad E. Nelson and Carolyn Masters Williams

Introduction 3
The Era of Plagues 3
Early Epidemiology 4
The Observation and Care of Patients 6
The Development of Statistics and Surveillance 7
The Discovery of Microorganisms 8
The Twentieth Century 12
What Lies Ahead 13
The Infectious Diseases Challenge 15
References 16

Chapter 2 Epidemiology of Infectious Disease: General Principles 19

Kenrad E. Nelson

Introduction 19
The Classification of Infectious Diseases 19
Epidemiologic Characteristics of Infectious Diseases 25
Surveillance of Infectious Diseases 33
Temporal Trends of Infectious Diseases 33
Recent Trends in Infectious Disease Morbidity and Mortality
in the United States 40
Recent Worldwide Trends in Infectious Disease Morbidity
and Mortality 40
References 42

Chapter 3 Study Design 45

Stephen J. Gange and Elizabeth T. Golub

-
- Introduction 45
 - Populations 46
 - Epidemiologic Study Designs 48
 - Measurement and Measures of Disease Occurrence 65
 - Population Comparisons and Epidemiologic Inference 69
 - References 72

Chapter 4 Prevention of Infectious Diseases 77

Catherine G. Sutcliffe, Wendy W. Davis, and David D. Celentano

-
- Introduction 77
 - Individual Prevention Measures 77
 - Community Prevention Measures 88
 - Conclusions 96
 - References 97

Chapter 5 Outbreak Epidemiology 105

Diane M. Dwyer, Carmela Groves, and David Blythe

-
- Introduction 105
 - Surveillance and Outbreak Detection 106
 - Outbreak Investigation 107
 - Conclusion 127
 - References 127

Chapter 6 Infectious Disease Dynamics 131

Derek A. T. Cummings and Justin Lessler

-
- Introduction 131
 - A Brief History 131
 - Determinants of Epidemic Growth 133
 - Elements of the Course of Infection 135
 - Dynamic Models of the Epidemic Process 136
 - Host Population Structure 139
 - Types of Pathogens 141
 - Dynamic Populations and Pathogens 145
 - Stochasticity and Randomness 149
 - Methods of Estimation 150
 - Infectious Disease Dynamics and Public Health 152
 - Future Trends 158
 - References 158

Chapter 7	Geographic Information Systems 167
	<i>Gregory E. Glass</i>
	Overview 170
	Application Examples 173
	Conclusion 184
	References 185
Chapter 8	Microbiology Tools for the Epidemiologist 187
	<i>Nicole M. Parrish and Stefan Riedel</i>
	Taxonomy, Classification, and Structure of Infectious Agents 188
	Viruses 189
	Bacteria 191
	Fungi 198
	Medical Parasitology 204
	Diagnostic Microbiology 210
	References 218
Chapter 9	Molecular Epidemiology and Infectious Diseases 219
	<i>Susan M. Harrington, John S. Francis, William R. Bisbai, and Karen C. Carroll</i>
	Application of Typing Techniques 219
	Definitions and Background 220
	Molecular Biology Tools Available to the Molecular Epidemiologist 223
	Specific Techniques of Molecular Epidemiology 229
	New Methodologies 243
	Conclusion 245
	References 245
Chapter 10	The Immune System and Host Defense Against Infections 253
	<i>Joseph B. Margolick, Richard B. Markham, and Alan L. Scott</i>
	Introduction 253
	Recognition of Pathogens 255
	After Antigen Binding: Immune Activation 259
	Dealing with the Pathogen: Immune Effector Mechanisms 259
	Cytokines of the Innate and Adaptive Immune Systems 262
	The Role of Cytokine Expression in Defining Functionally Different Effector CD4 T-Cell Lineages 265
	Mucosal Immunity 265
	Respiratory Immune Environment 267
	Common Mucosal Immune System 267
	Tolerance and the Regulation of the Immune Response 267
	Selective Immune Deficiencies: Windows into the Normal Roles and Functions of the Immune System 267
	Conclusion 269
	Recommended Textbooks of Immunology 269
	References 270

Chapter 11 Vaccines: Past, Present, and Future 273

Anita M. Loughlin and Steffanie A. Strathdee

-
- Introduction 273
 - Active Versus Passive Immunization 274
 - Types of Vaccines 274
 - Immunization Schedules 280
 - Vaccine Development 282
 - Vaccine Efficacy and Vaccine Effectiveness 284
 - Epidemiologic Studies 286
 - Monitoring Adverse Events and Vaccine Safety 288
 - Direct Impact of Vaccination 290
 - The Role of Vaccines in Eradication of Specific Diseases 295
 - Barriers to Vaccine Implementation and Coverage 299
 - References 300

Chapter 12 Nutrition and Infection 305

Alice M. Tang, Ellen Smit, and Richard D. Semba

-
- Introduction 305
 - The Effects of Infection on Nutritional Status 305
 - The Effects of Malnutrition on Host Defense Mechanisms 306
 - Malnutrition and Specific Infectious Diseases 306
 - Micronutrients and Immunity to Infectious Diseases 308
 - Assessment of Nutritional Status 312
 - Conclusion 318
 - References 318

Chapter 13 Emerging and New Infectious Diseases 329

Kenrad E. Nelson

-
- Responses to the Threat of Emerging Infections 329
 - Factors in the Emergence of Infectious Diseases 330
 - Notable Emerging Infectious Diseases 346
 - Newly Discovered Pathogens 359
 - References 360

Chapter 14 Healthcare-Associated Infections 369

Leilani Paitoonpong, Chun Kwan Bonnie Wong, and Trish M. Perl

-
- Introduction 369
 - The Magnitude of Problem of HAIs 370
 - History 371
 - Surveillance for HAIs 373
 - Pathophysiology and Risk Factors 377
 - Etiology and Transmission 379
 - Major Types of HAIs 380

Epidemiologically Important Pathogens and Emerging Pathogens	387
Control and Preventive Strategies	398
The Need for Integrated Infection Control Programs	401
Conclusion	403
References	403

PART 2—AIRBORNE TRANSMISSION 465

Chapter 15 Epidemiology and Prevention of Influenza 467

Mark C. Steinboff

Introduction	467
Clinical Features of Influenza	467
Transmission	467
Diagnosis	468
The Virus	468
Nomenclature	469
Epidemiology of Epidemics and Pandemics	469
Influenza in Tropical and Subtropical Regions	472
Mechanisms of Antigenic Variation	474
Epizootic Infections and Evolutionary History	476
Prevention Strategies and Treatment	477
Pandemic 2009 H1N1 Virus	480
Avian Influenza Virus	481
References	482

Chapter 16 Measles 485

William J. Moss and Martin O. Ota

Introduction	485
Disease Burden	485
Biologic Characteristics of the Measles Virus	487
Pathogenesis	488
Laboratory Diagnosis of Measles	491
Epidemiologic Characteristics	491
Geographic Distribution	492
Population Size and Measles Virus Transmission	492
Measles Mortality and Case Fatality	494
Measles Vaccines	495
Measles Control, Elimination, and Eradication	497
Conclusion	503
Acknowledgments	503
References	503

Chapter 17 Global Epidemiology of Meningococcal Infections 509

Mark C. Steinhoff and Kenrad E. Nelson

Introduction	509
The Organism	509
Acquisition and Carriage	510
Disease	510
Treatment	510
Risk Factors	511
Epidemiology	511
The Meningococcal Belt	513
Vaccines	514
Vaccine Strategies	516
References	517
For Further Reading	521

Chapter 18 Tuberculosis 523

Jonathan E. Golub, Jacqueline S. Coberly, and Richard E. Chaisson

Introduction	523
The Organism	524
History	527
Clinical Manifestations	528
Diagnosis	528
Therapy	532
Epidemiology: Global Prevalence and Incidence	533
Natural History of Tuberculosis	536
Mechanism of Transmission	537
Risk Factors Associated with Infection	538
Risk Factors Associated with Development of Disease	538
Bacillus Calmette-Guérin	545
Tuberculosis Control Strategies: Case Finding and Treatment	547
Conclusion	550
References	551

Chapter 19 The Epidemiology of Acute Respiratory Infections 561

Kenrad E. Nelson and Mark C. Steinhoff

Introduction	561
Impact on Public Health	561
Classification of Acute Respiratory Infections	567
Pathogens Responsible for Acute Respiratory Infections	569
Risk Factors	573
Efficient Methods of Data Collection to Evaluate Respiratory Epidemiology	585
Prevention of Respiratory Infections	587
Summary	593
References	595

PART 3—ORAL TRANSMISSION OF INFECTION 611**Chapter 20 Diarrheal Diseases 613***Robert E. Black, Christa L. Fischer Walker, and Claudio F. Lanata*

-
- Introduction 613
 - General Epidemiology Definitions 613
 - Sources of Data 614
 - Incidence 614
 - Impact of Diarrhea 616
 - Microbial Etiologies 617
 - Transmission Routes 623
 - Host Risk Factors 625
 - Antimicrobial Resistance 626
 - Strategies for Control 626
 - References 627

Chapter 21 Transmissible Spongiform Encephalopathies 635*Kenrad E. Nelson*

-
- Introduction 635
 - Scrapie 635
 - Kuru 636
 - Creutzfeldt-Jakob Disease 637
 - Chronic Wasting Disease
of Mule Deer and Elk 645
 - References 646

PART 4—BLOOD AND BODY FLUID AS A RESERVOIR OF INFECTIOUS DISEASES 649**Chapter 22 Human Immunodeficiency Virus Infections and the Acquired Immunodeficiency Syndrome 651***Kenrad E. Nelson and David D. Celentano*

-
- Introduction 651
 - The AIDS Pandemic 652
 - The HIV Virus 652
 - HIV Natural History 654
 - AIDS-Related Opportunistic Infections 657
 - Host Factors in Susceptibility or Resistance to HIV Infection
and Disease Progression 659
 - Inflammation and Microbial Translocation 662
 - HIV Genotypes 662
 - Impact of Coinfections on HIV 663
 - Antiretroviral Therapy 666
 - Modes of Transmission and Risk Factors 673
 - Global Prevalence of HIV 682

Estimating HIV Incidence 688
Social and Cultural Factors 690
Prevention of HIV/AIDS 690
Addressing the AIDS Pandemic 699
The Future 701
References 702

Chapter 23 Viral Hepatitis 723

Kenrad E. Nelson and David L. Thomas

.....
Introduction 723
Biologic Basis for Transmission 724
Clinical Syndrome 724
Hepatitis A Virus 725
Hepatitis B Virus 730
Delta Hepatitis Virus 743
Hepatitis C Virus 745
Hepatitis E Virus 755
Other Viruses 758
References 758

Chapter 24 Sexually Transmitted Diseases 781

Charlotte A. Gaydos

.....
Introduction 781
Transmission Modes: The Definition of a Sexually Transmitted Disease 781
Chlamydia 782
Gonorrhea 783
Pelvic Inflammatory Disease 786
Syphilis 787
Genital Herpes Infection 790
Chancroid 793
Human Papillomavirus Infection 794
Vaginal Infections 796
Control of Sexually Transmitted Diseases as an HIV Prevention Intervention 799
Epidemiology and Behavior 800
Education 802
Prevention Issues Specific to Women 803
Core Groups and Targeting 803
Practical Issues 805
Innovative STD Control Methods 806
Future Considerations 807
Summary 807
References 808

PART 5—VECTOR-BORNE AND PARASITE DISEASES 823**Chapter 25 Emerging Vector-Borne Diseases 825***Kenrad E. Nelson*

Introduction	825
Arthropod-Borne Virus Infections	825
Flaviviruses	826
Dengue and Other Mosquito-Borne Infections	826
West Nile Virus in North America	831
Japanese Encephalitis Virus	841
Yellow Fever	843
Chikungunya Virus	845
Tick-Borne Encephalitis Virus	846
Other Mosquito-Borne Encephalitis Viruses in North America	846
Other Tick-Borne Infections	852
Trypanosomiasis	853
Rift Valley Fever	855
Summary	855
References	855

Chapter 26 Lyme Disease 861*Diane E. Griffin*

Introduction	861
Clinical Picture and Biological Information	862
Clinical Manifestations	866
Diagnosis	868
Treatment	868
Epidemiology	868
Exposure/Risk Factors	871
Control Measures	871
Vaccine	872
Conclusions	872
References	873

Chapter 27 The Epidemiology and Control of Malaria 881*William J. Moss and Richard H. Morrow*

Background, History, and Public Health Importance	881
The Biology of Malaria Parasites and Anopheline Vectors	884
Malaria Metrics	888
Pathogenesis in Individual Humans	890
The Diversity of <i>Falciparum</i> Malaria Disease	892
Human Activities, Climate Change with Global Warming, and the Epidemiology of Malaria	896

xii CONTENTS

Diagnosis and Treatment 897
Drug Resistance 899
Vaccines Against Malaria 901
Approaches to Control 903
The Future of Malaria Control and Elimination 906
References 908

Chapter 28 Epidemiology of Helminth Infections 917

Clive J. Shiff

.....
Introduction 917
Hookworm Parasites of Humans 917
Schistosome Parasites in Humans 920
Other Geohelminths 925
Control of Neglected Tropical Diseases 928
References 928

INDEX 931

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Preface to the Third Edition

Although the second edition of this book was published only 5 years ago, it is apparent that another edition is needed to keep pace with important recent advances in epidemiology and the prevention of infectious diseases. The chapters in the third edition have been revised to reflect current knowledge, concepts, and approaches to understand and investigate the epidemiology of infectious diseases so as to develop effective prevention strategies.

- Among the recent beneficial changes to preventing many important infectious diseases is the recent focus of attention on global health by academic institutions, international funding agencies, governmental organizations, and nongovernmental organizations (NGOs). The global pandemics of severe acute respiratory syndrome (SARS), influenza, human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS), tuberculosis, and other infectious diseases have taught us once again that infectious diseases do not respect borders, socioeconomic classes, or geopolitical divisions. Nevertheless, as a result of the refocusing of these scientific efforts and financial commitments, millions of lives have been saved. There is now talk of eventually ending the HIV/AIDS pandemic in the next 40–50 years and shrinking the region where malaria is endemic. One very important victory over a recurring infectious disease was the control of meningitis epidemics in the African meningitis belt with the development and massive deployment of an effective meningococcal type A vaccine to millions of persons in the target population in central Africa, thereby averting the tragedy so often associated with this disease in the past.
- Despite these important successes, new infectious disease challenges have continued to emerge and some chronic infectious disease problems have become more serious. During the last 5 years, ongoing problems with antibiotic-resistant pathogens have become more serious. We are now confronted with the specter of multidrug-resistant (MDR) tuberculosis

and extremely resistant (X-DR) strains of *Mycobacterium tuberculosis*. Methicillin-resistant *Staphylococcus aureus* (MRSA) infections have become a major health issue, and the distinction between hospital/healthcare-associated and community-associated strains has become blurred. Emerging resistance to multiple available antibiotics has complicated the effective treatment of *Neisseria gonorrhoea* infections. Moreover, although the arsenal of effective antiretroviral drugs and drug combinations to treat HIV has grown impressively, inadequate adherence to therapy after patients' symptoms are controlled has led to treatment failure and the emergence of resistant viruses among many patients. The concepts of "treatment as prevention" and prophylactic treatment (PREP) to prevent infection are important new strategies that have emerged in the past few years as a means to control the spread of HIV infections. Unfortunately, the effectiveness of PREP, as well as vaginal microbicides to prevent HIV transmission, has often been seriously compromised by poor adherence to the drug regimens. Although an HIV/AIDS vaccine remains a hope, an effective vaccine that will provide meaningful long-term protection is not likely to be launched in the foreseeable future. Therefore, many challenges remain for the control of existing and emerging infectious diseases.

- The chapters in this text have all been updated since the second edition, and many have been completely rewritten. We have also added a new chapter, which reviews the methods and principles of the prevention of infections acquired by various means, including contact, foodborne, vector-borne, and airborne routes of transmission. We believe this critical review of prevention strategies is a valuable addition to the book.
- The HIV/AIDS chapter reviews and evaluates the global epidemiology of HIV. In addition, it assesses the many prevention trials that have been published in the last few years.

xviii **PREFACE TO THE THIRD EDITION**

- The chapter on hepatitis has been updated to include recently published information on the genetic polymorphisms affecting host susceptibility to hepatitis C virus infection and the virus's natural history. In addition, new information on the natural history, reservoirs, and risks factors for infection with the other four human hepatitis viruses (A, B, D, E) has been included in this chapter.
- The chapter on emerging infectious disease has been updated to include several newly recognized infections. The chapter on infectious disease dynamics has been rewritten and expanded to include methods of modeling the dynamics of infectious disease transmission in populations where various scenarios for transmission, natural history, and immunity prevail. The use and importance of mathematical models has increased in recent years as epide-

miologists have sought to better understand infectious disease dynamics. Models are now commonly employed to estimate the potential efficacy and possible consequences of a prevention strategy or the consequences of delaying the age of infection with a specific pathogen. We believe it is important for infectious disease specialists and students to understand the interpretation and use of various models to describe the dynamics of an infection in a population.

We hope that those individuals who read and use our text will find it useful and informative. We enjoyed and learned from the process of reviewing and analyzing the mass of relevant information to assemble this book. We continue to find the pursuits of research and application of infectious disease epidemiology to be very exciting, rewarding, and important.