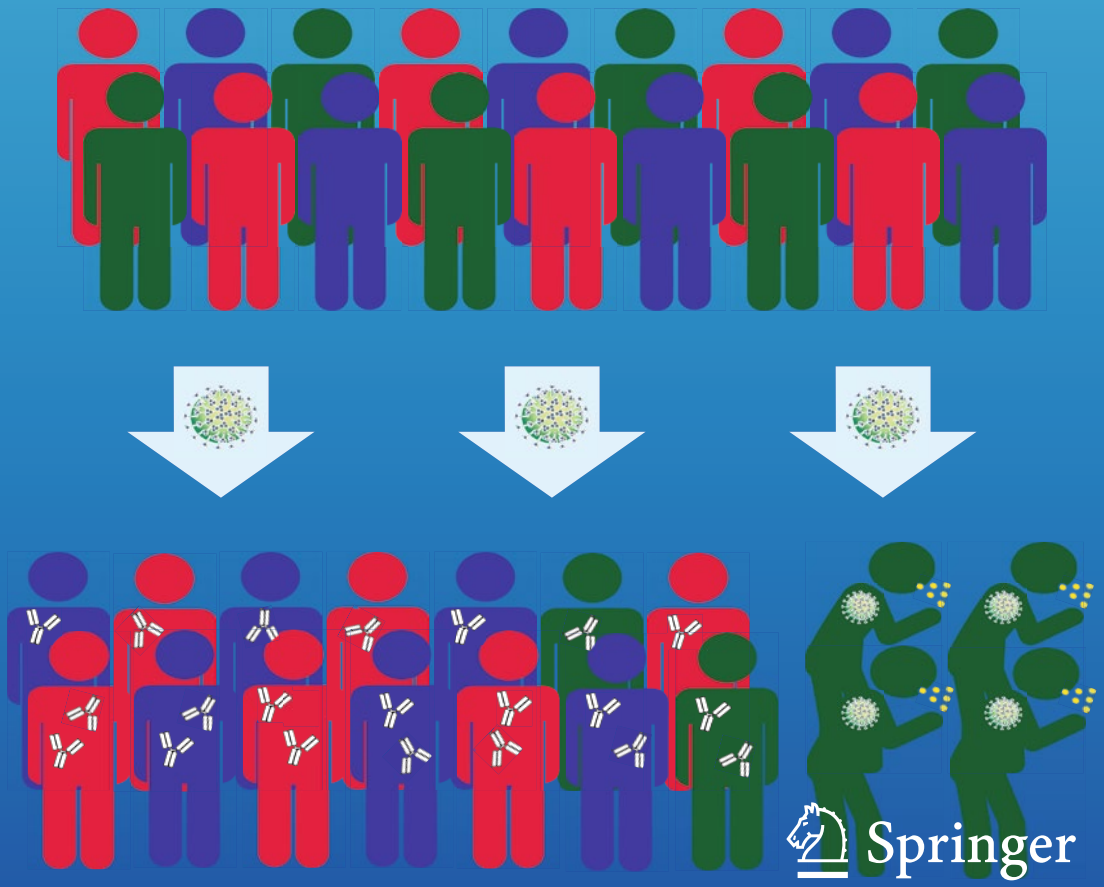
Peter J. Krause
Paula B. Kavathas
Nancy H. Ruddle
Editors

Immunoepidemiology



Springer

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We dedicate this book to our families and students

Preface

This textbook focuses on the nascent field of immunoepidemiology that addresses how differences in immune responses among individuals affect the epidemiology of infectious diseases, cancer, hypersensitivity, and autoimmunity. The idea for the book originated from a course entitled "Immunology for Epidemiologists" at the Yale School of Public Health that was required for MPH students in the Epidemiology of Microbial Diseases Department. While many fine textbooks are available that address the immunological responses of *individuals* to pathogens, these provided very little information regarding how immunological variation among *populations* affects the epidemiology of disease. And yet, it has long been recognized that there is great immunologic diversity among people, which can have a profound effect on the epidemiology of disease. Careful review of the immunologic and epidemiologic literature revealed that there have been relatively few publications concerning immunoepidemiology and that no textbook is available on the subject. This textbook, therefore, aims to fill this void by providing a much-needed tool to comprehensively and efficiently teach immunoepidemiology.

The emphasis of the book, as in the course that inspired it, is on infectious diseases, autoimmunity, and cancer. We recognize that many of the same immune principles can be applied to chronic diseases that are not covered here. The roles of acute and chronic inflammation are becoming ever more recognized in cardiovascular, metabolic, and neurologic diseases.

The book includes a section on the basic principles of immunology and then applies them to particular examples of disease in human populations. The primary target audience for this textbook is Masters of Public Health students. Others who should also find it of interest include PhD students in epidemiology and immunology, medical students, generalists, and specialists in immunology, infectious diseases, cancer, and rheumatology.

New Haven, CT, USA

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Abbreviations

β_2M	β_2-Microglobulin
ABPA	Allergic bronchopulmonary aspergillosis
ADA	Adenosine deaminase
ADCC	Antibody-dependent cellular cytotoxicity
ADCI	Antibody-mediated cellular inhibition
ADRB	Antibody-dependent respiratory burst
AIDS	Acquired immunodeficiency syndrome
AIRE	Autoimmune regulator
ALL	Acute lymphoblastic leukemia
ALPS	Autoimmune lymphoproliferative syndrome
Als3p	Agglutinin-like sequence 3 protein
Alum	$KAl(SO_4)_2 \cdot 12H_2O$
AMA-1	Apical membrane antigen-1
AMD	Adult onset macular degeneration
AML	Acute myeloid leukemia
APC	Antigen-presenting cell
APCED	Autoimmune polyendocrinopathy-candidiasis-ectodermal dystrophy
APO BEC3	Apolipoprotein B mRNA editing enzyme catalytic polypeptide-like 3
APS-1	Autoimmune polyendocrine syndrome type 1
ART	Antiretroviral therapy
ASC	Apoptosis-associated speck-like protein containing CARD
BALT	Bronchial-associated lymphoid tissue
BCG	Bacillus Calmette-Guérin
BCR	B-cell receptor
BMI	Body mass index
BTK	Bruton tyrosine kinase
CAR	Chimeric antigen receptor
CCL	CC ligand
CCR5	C-C motif receptor 5 gene
CCR5Δ32	A 32-base pair deletion within the coding region of CCR5
CD	Cluster of differentiation
CD	Crohn's disease
cDC	Conventional dendritic cell
CDC	US Center for Disease Control and Prevention
CDR	Complementarity determining region

CGA	Candidate gene analysis
cGAMP	Cyclic GMP-AMP
CGD	Chronic granulomatous disease
CHMI	Controlled human malaria infection
CLP	Common lymphoid progenitor
CLR	C-type lectin receptor
CMC	Chronic mucocutaneous candidiasis
CMP	Common myeloid precursor
CMV	Cytomegalovirus
CoP	Correlate of protection
CpG	Cytosine phosphate guanine dinucleotide
CSA	Chondroitinsulfate A
C-section	Cesarean section
CSP	Circumsporozoite protein
CSR	Class switch recombination
cTEC	Cortical thymic epithelial cell
CTL	Cytotoxic T-lymphocyte
CTLA-4	Cytotoxic T-lymphocyte-associated protein 4
CVID	Common variable immunodeficiency disease
CXCL	CXC ligand
DAMP	Danger-associated molecular pattern
DC	Dendritic cell
DMARDS	Disease modifying antirheumatic drugs
dMN	Dissolvable microneedles
EBV	Epstein-Barr virus
ER	Endoplasmic reticulum
ERAP1	Endoplasmic reticulum aminopeptidase 1
ERBB2	Human epidermal growth factor receptor 2
ESN	Exposed seronegative
Fab	Fragment antigen-binding
Fc	Fragment crystallizable
FDA	Food and Drug Administration
FDC	Follicular dendritic cell
FDEIA	Food-dependent exercise-induced allergy
FHF	Familial Hibernian fever
FKS	Formalin-killed spherule
FMF	Familial Mediterranean fever
G6PD	Glucose-6-phosphate dehydrogenase
GAFFI	Global Action Fund for Fungal Infections
GALT	Gut-associated lymphoid tissue
GAP	Genetically attenuated parasite
GC	Germinal center
GI	Gastrointestinal tract
GIA	Growth inhibition assay
GLA	Glucopyranosyl lipid A
GM-CSF	Granulocyte monocyte colony stimulating factor
GWAS	Genome-wide association study
HAART	Highly active antiretroviral therapy