Essential Travel Medicine
Contents

List of contributors, vii
Preface, xv
Acknowledgments, xvii

Section 1: Travel medicine
1 Basic epidemiology of infectious diseases, 3
   Mark J. Sotir & David O. Freedman
2 Basic epidemiology of non-infectious diseases, 9
   Richard C. Franklin & Peter A. Leggat
3 Pre-travel health risk assessment, 23
   Peter A. Leggat & Jane N. Zuckerman
4 Setting up a travel clinic, 35
   Marc T.M. Shaw & Claire S. Wong
5 Travel medicine resources, 45
   Peter A. Leggat, Gary W. Brunette, Gilles Poumerol, & Jane N. Zuckerman

Section 2: Travel-related infectious diseases
6 Travelers’ diarrhea, 57
   Charles D. Ericsson
7 Vector-borne diseases, 65
   Annelies Wilder-Smith
8 Yellow fever, 75
   Mark D. Gershman & J. Erin Staples
9 Malaria, 83
   Tomas Jelinek
10 Respiratory disease, 95
    Regina LaRocque & Edward T. Ryan
11 Sexually transmitted infections, 103
    Alberto Matteelli, Anna Cristina C. Carvalho, & Patricia Schlagenhaft
12 Tropical skin infections, 115
    Francisco Vega-López & Sara Ritchie
13 Rabies, 121
    Mary J. Warrell
14 Vaccine-preventable diseases, 131
    Joseph Torresi, Abinash Virk & Jane N. Zuckerman
Section 3: Travelers with underlying medical problems and special needs

15 Women’s health and travel, 167
I. Dale Carroll

16 Traveling with children, 173
Karl Neumann, Andrea P. Summer, & Philip R. Fischer

17 Travelers with underlying medical conditions, 187
Anne E. McCarthy & Kathryn N. Suh

18 The older traveler and traveling with disability, 199
Kathryn N. Suh & Anne E. McCarthy

19 Visiting friends and relatives, 209
Karin Leder & Sarah L. McGuinness

20 Migrants, refugees, and travel medicine, 215
Louis Loutan

21 Study-abroad programs: student health and safety issues, 221
Gary Rhodes & Gary W. Brunette

22 Humanitarian aid workers, disaster relief workers, and missionaries, 227
Brian D. Gushulak & Douglas W. MacPherson

23 Long-term travelers, 235
Claire Davies & Ted Lankester

Section 4: Environmental travel health risks

24 Aviation and travel medicine, 243
Michael Bagshaw, Ian C. Cheng & Robert Bor

25 Expedition and wilderness medicine, 257
Sean T. Hudson, Will Smith, David R. Shlim, Caroline J. Knox & Karen J. Marienau

26 Venomous poisonous animals and toxins, 279
Mark A. Read

27 Cruise ships and travel medicine, 285
Sally S.J. Bell & Eilif Dahl

28 Mass gatherings and travel medicine, 293
Joanna Gaines & Gary W. Brunette

29 Emergency care whilst abroad, 301
Peter A. Leggat & Marc T.M. Shaw

Section 5: Post-travel medicine

30 The returning traveler, 313
Tamar Lachish, Alfons Van Gompel & Eli Schwartz

Index, 327
List of contributors

**Michael Bagshaw, MB, BCh, MRCS, FFOM, DAvMed, DFFP, FRAeS**
Visiting Professor of Aviation Medicine
Honorary Civilian Consultant Adviser in Aviation Medicine to the Army
King’s College London
London, UK;
Cranfield University
Cranfield, UK

**Sally S.J. Bell, MB BS, Master in Maritime Medicine**
Clinical Quality Consultant
London, UK

**Robert Bor, DPhil, CPsychol, CSci, FBPsS, UKCP, Reg FRAeS**
Professor, Lead Consultant Clinical, Counselling and Health Psychologist
Royal Free London NHS Foundation Trust;
Director, Dynamic Change Consultants
London, UK

**Gary W. Brunette, MD, MS, FTFM**
Chief, Travelers’ Health Branch
Division of Global Migration and Quarantine
Centers for Disease Control and Prevention
Atlanta, GA, USA

**I. Dale Carroll, MD, FACOG, DTM&H, FTFM RCPS (Glasgow)**
Medical Director
The Pregnant Traveler
Spring Lake, MI, USA

**Ian C. Cheng, BE, BMed, DipOccEnvironHealth, DAvMed, MPH, FAFOEM, FACAsM**
Adjunct Associate Professor
College of Public Health, Medical and Veterinary Sciences
James Cook University
Townsville, Queensland, Australia;
Staff Specialist - Occupational Medicine
Royal North Shore Hospital
Sydney, NSW, Australia
Anna Cristina C. Carvalho, MD, PhD
Researcher in Public Health
Laboratory of Innovations in Therapies, Education and Bioproducts
Oswaldo Cruz Institute, FioCruz
Rio de Janeiro, Brazil

Eilif Dahl, MD, MHA, PhD
Professor Emeritus, University of Bergen
Norwegian Centre for Maritime Medicine
Haukeland University Hospital
5021 Bergen
Norway

Claire Davies, MRCP, MRCGO, DTM&H, MFTM RCPS (Glasgow)
Medical Team Manager/Travel Health Clinician
InterHealth Worldwide
London, UK

Charles D. Ericsson, MD
Professor of Medicine and Dr. and Mrs. Carl V. Vartian Professor of Infectious Diseases;
Head, Clinical Infectious Diseases
University of Texas Medical School at Houston
Houston, TX, USA

Philip R. Fischer, MD, DTM&H
Professor of Pediatrics
Mayo Clinic
Rochester, MN, USA

Richard C. Franklin, BSc, MSocSc, PhD
Associate Professor, College of Public Health, Medical and Veterinary Sciences
James Cook University
Townsville, Queensland, Australia;
Royal Life Saving Society, Australia

David O. Freedman, MD
Professor of Medicine and Epidemiology
Division of Infectious Diseases
University of Alabama at Birmingham
Birmingham, AL, USA

Joanna Gaines, PhD, MPH
Doctoral Epidemiologist
Travelers’ Health Branch
Division of Global Migration and Quarantine
Centers for Disease Control and Prevention
Atlanta, GA, USA
Mark D. Gershman, MD  
Medical Epidemiologist  
Travelers’ Health Branch  
Division of Global Migration and Quarantine  
Centers for Disease Control and Prevention  
Atlanta, GA, USA

Brian D. Gushulak, BSc (Hon), MD  
Medical Consultant  
Migration Health Consultants, Inc.  
P.O. Box 463  
Qualicum Beach, BC, Canada

Sean T. Hudson, MBBS, MSc, FAWM, Dip Mtn Med  
General Practitioner and Honorary Consultant  
Accident and Emergency  
Maryport Health Centre  
West Cumberland Hospital  
Maryport, Cumbria, UK;  
Director and Founder, Expedition Medicine  
Cumbria, UK

Tomas Jelinek, MD  
Medical Director  
Berlin Center for Travel and Tropical Medicine  
Berlin, Germany

Caroline J. Knox, MBBS MSc MRCGP  
General Practitioner, Castlegate Surgery  
Cockermouth, Cumbria, UK;  
Founder, Expedition Medicine  
Cumbria, UK

Tamar Lachish, MD  
Senior Doctor, Infectious Diseases Unit and the Internal Medicine Ward  
Shaare-Zedek Medical Center  
Jerusalem, Israel

Ted Lankester, MA, MB, Bchir, MRCGP, FFTM, RSPSG  
Director of Health Services  
InterHealth Worldwide  
London, UK

Regina LaRocque, MD, MPH  
Co-Director, Global TravEpiNet (GTEN) Program  
Massachusetts General Hospital;  
Assistant Professor of Medicine, Harvard Medical School  
Boston, MA, USA
List of contributors

Karin Leder, MBBS, FRACP, PhD, MPH, DTMH
Associate Professor, Head of Infectious Disease Epidemiology Unit
Department of Epidemiology and Preventive Medicine
School of Public Health and Preventive Medicine
Monash University
Melbourne, VIC, Australia;
Head of Travel Medicine and Immigrant Health
Royal Melbourne Hospital at the Doherty Institute for Infection and Immunity
Melbourne, VIC, Australia;
Victorian Infectious Diseases Service
Royal Melbourne Hospital
Parkville, VIC, Australia

Peter A. Leggat, AM. MD, PhD, DrPH, FAFPHM, FFPH, FFPM(Hon), FACTM(Hon), FFTM, FACAsM
Professor and Dean, College of Public Health, Medical and Veterinary Sciences
James Cook University
Townsville, Queensland, Australia;
Visiting Professor, School of Public Health, Faculty of Health Sciences
University of the Witwatersrand
Johannesburg, South Africa;
Conjoint Professor, School of Health Sciences
Faculty of Health
University of Newcastle
Newcastle, New South Wales, Australia;
Adjunct Professor, Research School of Population Health
College of Medicine, Biology and Environment
Australian National University
Canberra, ACT, Australia

Louis Loutan, MD, MPH
Professor, Division of International and Humanitarian Medicine
Department of Community Medicine and Primary Care
University Hospital of Geneva
Geneva, Switzerland

Douglas W. MacPherson, MD, MSc(CTM), FRCPC
Migration Health Consultants, Inc.
Qualicum Beach, BC, Canada;
Associate Professor, Pathology and Molecular Medicine
McMaster University
Hamilton, ON, Canada
Karen J. Marienau, MD, MPH
Medical Consultant and Advisor
St. Paul, MN, USA;
Formerly Division of Global Migration and Quarantine
US Centers for Disease Control and Prevention
Atlanta, GA, USA

Alberto Matteelli, MD
Head of Community Infection Unit
Clinic of Infectious and Tropical Diseases
Spedali Civili Hospital
University of Brescia
Brescia, Italy

Anne E. McCarthy, MD, MSc, FRCPC, DTM&H, FASTMH
Professor of Medicine, University of Ottawa;
Director, Tropical Medicine and International Health Clinic
University of Ottawa
Ottawa, Canada

Sarah L. McGuinness, MBBS, BMedSc, DTMH
Infectious Diseases Registrar
Victorian Infectious Diseases Service
Royal Melbourne Hospital
Parkville, VIC, Australia

Karl Neumann, MD, FAAP, CTM
Clinical Associate Professor of Pediatrics
Weill Medical College of Cornell University, USA;
Clinical Associate Attending Pediatrician
New York Presbyterian Hospital–Cornell Medical Center
New York, (emeritus) USA;
Attending Pediatrician
Long Island Jewish Hospital, USA;
Director
Family Travel and Immunization Clinic of Forest Hills, Queens, USA

Gilles Poumerol, MD
Medical Officer
Travel Health, Information & Communication
Global Capacities Alert & Response
World Health Organization
Geneva, Switzerland
List of contributors

Mark A. Read, PhD
Senior Instructor, Expedition and Wilderness Medicine
Thuringowa Central. Queensland, Australia

Gary Rhodes, PhD
Director, Center for Global Education
Graduate School of Education and Information Studies
University of California at Los Angeles
Los Angeles, CA, USA

Sara Ritchie, MBChB, MRCGP, DFFP, DTM&H, MPH, Dip Derm
Honorary Clinical Fellow in Tropical and HIV Dermatology
University College London Hospitals NHS Foundation Trust London, UK

Edward T. Ryan, MD, FACP, FIDSA, FASTMH
Co-Director, Global TravEpiNet (GTEN) Program
Director, Travelers’ Advice and Immunization Center
Massachusetts General Hospital;
Professor of Medicine, Harvard Medical School;
Professor of Immunology and Infectious Diseases, Harvard School of Public Health
Boston, MA, USA

Patricia Schlagenhauf, PhD
Professor, University of Zürich Centre for Travel Medicine
Zürich, Switzerland

Eli Schwartz, MD, DTMH
Professor, Director of the Center for Geographic Medicine
The Chaim Sheba Medical Center
Tel-Hashomer, Israel;
Sackler School of Medicine
Tel-Aviv University
Tel-Aviv, Israel.

Marc T.M. Shaw, DrPH, FRGS, FRNZCGP, FFTM (ACTM), FFTM RCPS (Glasgow),
DipTravMed
Adjunct Professor, College of Public Health, Medical and Veterinary Sciences
James Cook University
Townsville, Queensland, Australia;
Medical Director, WORLDWISE Travellers Health Centres
Auckland, New Zealand

David R. Shlim, MD
Medical Director
Jackson Hole Travel and Tropical Medicine
Wilson Medical Center
Wilson, WY, USA
**Will Smith, MD**  
Medical Director, Grand Teton National Park, Teton County Search and Rescue;  
Clinical Faculty, University of Washington School of Medicine;  
Emergency Medicine, St. John’s Medical Center  
Jackson, WY, USA

**Mark J. Sotir, PhD, MPH**  
Lead, Surveillance and Epidemiology Team  
Travelers’ Health Branch  
Division of Global Migration and Quarantine  
Centers for Disease Control and Prevention  
Atlanta, GA, USA

**J. Erin Staples, MD, PhD**  
Medical Epidemiologist  
Arbovirus Disease Branch  
Division of Vector Borne Diseases  
Centers for Disease Control and Prevention  
Fort Collins, CO, USA

**Kathryn N. Suh, MD, MSc, FRCP**  
Associate Professor of Medicine  
University of Ottawa;  
Division of infectious Diseases  
University of Ottawa  
Ottawa, Canada

**Andrea P. Summer, MD, MSCR**  
Associate Professor of Pediatrics  
Medical University of South Carolina  
Charleston, SC, USA

**Joseph Torresi, MBBS, BMedSci, FRACP, PhD**  
NHMRC Practitioner Fellow  
Department of Microbiology and Immunology  
The Peter Doherty Institute for Infection and Immunity  
University of Melbourne;  
Associate Professor, Department of Infectious Diseases  
Austin Hospital  
Melbourne, VIC, Australia

**Alfons Van Gompel, MD, DTM**  
Specialist in Internal Medicine and Tropical Medicine  
Associate Professor, Tropical Medicine  
Chief Physician of the Medical Services and Travel Clinic of the Institute for Tropical Medicine  
Antwerp, Belgium
List of contributors

Francisco Vega-López, MD, MSc, PhD, FRCP, FFTM, RCPSG
Consultant Dermatologist and Honorary Professor
University College London Hospitals NHS Foundation Trust
London, UK

Abinash Virk, MD
Associate Professor, Internal Medicine
Mayo Medical School
Division of Infectious Diseases
Mayo Clinic
Rochester, MN, USA

Mary J. Warrell, MB BS, FRCP, FRCPath
Honorary Research Associate
Oxford Vaccine Group
University of Oxford;
Centre for Clinical Vaccinology and Tropical Medicine
Churchill Hospital
Oxford, UK

Annelies Wilder-Smith, MD, PhD
Professor in Infectious Diseases
Lee Kong Chian School of Medicine
Nanyang Technological University
Singapore

Claire S. Wong, RN, MSc, FFTM RCPS (Glasgow)
Travel Health Specialist Nurse
WORLDWISE Travellers Health Centres
Auckland, New Zealand

Jane N. Zuckerman, MD, FRCP, FRCPath, FFPH, FFPM, FFTM
Consultant in Travel Medicine;
Honorary Senior Lecturer, UCL Medical School
University College London, London, UK;
Honorary Consultant, Royal Free London NHS Foundation Trust and Great Ormond Street Hospital for Children NHS Foundation Trust, London, UK;
Adjunct Professor, College of Public Health, Medical and Veterinary Sciences
James Cook University
Townsville, Queensland, Australia
Preface

The discipline of travel medicine continues to develop with established roots and structures worldwide. The necessity for the clinical practice of travel medicine in the prevention of ill health has never been more understood than now, with ever-increasing numbers of people traveling and criss-crossing the world alongside the potential hazards that travelers themselves may be exposed to and also the potential inherent risk to public health and populations internationally as a consequence of travel. Protecting travelers and, concomitantly, communities and populations requires the skill and expertise of travel medicine practitioners whose knowledge base is underpinned by continued professional development. Knowledge and education go hand in hand, with specialist training being an essential element, so enabling best clinical practice in a constantly evolving specialty.

The purpose of this book is to support those studying for a qualification or higher degree in travel medicine, and it is hoped that it will be used alongside and complement travel medicine reference books. This book is designed not only to support postgraduate training in the discipline but also to encourage undergraduate training in travel medicine in the curriculum of multidisciplinary healthcare training programs. It has been written in a style to complement lectures, with easily accessible information on the core topics required to enable the day-to-day clinical practice of travel medicine. Authors from different continents were chosen specifically in order to represent a range of views reflecting clinical practice and training courses that are available in different countries through the world.

It is hoped that this book will become a useful aide for those furthering their knowledge in addition to being a practical guide that will enhance the clinical practice and profile of travel medicine as a specialty. For those new to the growing discipline of travel medicine, an aspiration is that this book will stimulate interest and enthusiasm for the discipline for the next generation of travel medicine practitioners.

Jane N. Zuckerman
Gary W. Brunette
Peter A. Leggat
Acknowledgments

The Editors would like to thank Maria Khan and Oliver Walter of Wiley-Blackwell for their enthusiasm, patience, and commitment that enabled the publication of this new book in travel medicine. In addition, we would like to thank Jennifer Seward and Jasmine Chang, also of Wiley-Blackwell, for all their help in the preparation of this edition. We would also like to thank all the authors for contributing to this book and to supporting the future development of the discipline of travel medicine. In particular, we would like to thank our families for their unfailing support and understanding, specifically Eugene, Tunde, and Pan, without whom this new textbook would not have been realized.