
Manual of Travel Medicine

Joseph Torresi • Sarah McGuinness
Karin Leder • Daniel O'Brien
Tilman Ruff • Mike Starr
Katherine Gibney

Manual of Travel Medicine

Fourth Edition 2019

 Springer

Joseph Torresi
Professor of Medicine
Infectious Diseases Physician University
of Melbourne
Department of Microbiology and Immunology
The Peter Doherty Institute for Infection and
Immunity
The University of Melbourne
Melbourne, VIC
Australia

Knox Private Hospital
Melbourne, VIC
Australia

Epworth Eastern Hospital
Melbourne, VIC
Australia

Austin Hospital
Melbourne, VIC
Australia

Karin Leder
Professor of Medicine, Infectious Diseases
Physician
Head of Infectious Disease Epidemiology
School of Public Health and Preventive
Medicine
Monash University
Melbourne, VIC
Australia

Head of Travel Medicine and Immigrant Health
Victorian Infectious Disease Service
Royal Melbourne Hospital Peter Doherty
Institute for Infection and Immunity
Melbourne, VIC
Australia

Sarah McGuinness
Infectious Diseases Physician
Department of Infectious Diseases
The Alfred Hospital and Monash University
Melbourne, VIC
Australia

Lecturer
Infectious Disease Epidemiology Unit
School of Public Health and Preventive
Medicine
Monash University
Melbourne, VIC
Australia

Daniel O'Brien
Associate Professor
Victorian Infectious Diseases Service
Royal Melbourne Hospital
Melbourne, VIC
Australia

Department of Infectious Diseases
University Hospital Geelong
Geelong, VIC
Australia

ISBN 978-981-13-7251-3

ISBN 978-981-13-7252-0 (eBook)

<https://doi.org/10.1007/978-981-13-7252-0>

© Springer Nature Singapore Pte Ltd. 2019

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors, and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Singapore Pte Ltd. The registered company address is: 152 Beach Road, #21-01/04 Gateway East, Singapore 189721, Singapore

Tilman Ruff, AO
Associate Professor
Nossal Institute for Global Health
School of Population and Global Health
The University of Melbourne
Melbourne, VIC
Australia

International Medical Advisor
Australian Red Cross (1996–2019)
Founding Head of Travel Medicine at Fairfield
and Royal Melbourne Hospitals
Melbourne, VIC
Australia

Mike Starr
Paediatrician, Infectious Diseases Physician
Consultant in Emergency Medicine
Director of Paediatric Education
Royal Children's Hospital Melbourne
Honorary Clinical Associate Professor
University of Melbourne
Melbourne, VIC
Australia

Katherine Gibney
Infectious Diseases Physician, Public Health
Physician and Senior Research Fellow
The Austin Hospital, The Royal Melbourne
Hospital, and The University of Melbourne, at
The Peter Doherty Institute for Infection and
Immunity
Melbourne, VIC
Australia

Preface

The first edition of the *Manual of Travel Medicine* was published in 1999 through the Victorian Infectious Diseases Service at the Royal Melbourne Hospital, when the discipline of travel medicine in Australia was only in its infancy. At that time, there were few high-quality travel medicine information and education resources available. The *Manual of Travel Medicine* was a response to a perceived need for an authoritative and up-to-date resource to support good travel medicine practice. The first edition was written by Allen Yung and Tilman Ruff who together pioneered the growth of travel medicine in Australia. An expanded second edition saw the inclusion of three new authors, Joseph Torresi, Daniel O'Brien and Karin Leder, and was published in 2004. This was followed by an extensively revised third edition in 2011 which saw the inclusion of further two authors, Mike Starr and Jim Black. With the increasing availability of many excellent travel health resources, it became essential to proceed with a fourth edition of the *manual* in order to deliver a concise up-to-date travel medicine book.

Travel medicine has changed significantly since 2004. In 2017, the World Tourism Organization reported that international tourist arrivals reached 1323 million, with a growth in international arrivals of 84 million compared to 2016. Almost ten million outbound trips were taken by Australians in 2017. A rising volume of travel is also being undertaken by high-risk groups, such as immunocompromised individuals including transplant recipients and HIV-positive people, the elderly, pregnant women and young children, which increase complexities surrounding health issues and disease risks. Travel medicine as a discipline has also evolved substantially, with an increasing body of knowledge in the international literature and the recognition of the need to make recommendations based on the best available evidence. Accordingly, there has been an intensified surveillance of health problems among travellers as well as a tremendous growth in original research in the field. Previous recommendations were often based on case reports, case series or small descriptive studies done by single institutions. Currently, more global and generalisable data is being analysed as a basis for updating travel advice. The research has been performed by large multicentre surveillance and collaborative networks such as the GeoSentinel Surveillance Network, TropNet Europe, EuroTropNet, CanTravNet in Canada and the US-based Boston Area Travel Medicine Network (BATMN). Comprehensive guidelines developed by the Centers for Disease Control (CDC) in Atlanta, the World Health Organization (WHO) and

the International Society of Travel Medicine (ISTM) around the growing body of data have now become widely available.

The explosion of travel health information is making it increasingly difficult to keep abreast of the latest advances in the field. The growing number of resources tends to complicate rather than simplify travel guidance, especially since there is lack of consensus between different resources on many aspects of travel health advice. For example, the European perspective on antimalarials is markedly different from the US perspective. There is also no national website providing detailed Australian consensus travel guidelines.

For this fourth edition of the *Manual of Travel Medicine*, we retain the best features of its predecessors, with its focus being a user-friendly, practical handbook and desktop reference for travel health practitioners in Australasia. Two new authors, Sarah McGuinness and Katherine Gibney, joined the team, providing important contributions. The fourth edition remains a handy reference tool and not a comprehensive textbook. Recognising the controversies and different approaches advocated by different authorities, we endeavour to explain what *we* think and do. The *Manual of Travel Medicine* makes reference to advice given in other resources and provides practical recommendations on how to decide between various pretravel advice options. It is aimed at all Australian healthcare workers interested in and involved in the care of travellers, including doctors, nurses and pharmacists.

All the information within the *Manual of Travel Medicine* has been extensively revised and updated with the latest data available in the literature. Recommendations, changes, guidelines and controversies on antimalarial prophylaxis, (including new drugs such as tafenoquine), Japanese encephalitis, pneumococcal, meningococcal, rabies and yellow fever vaccines are comprehensively discussed.

The *Manual's* prime objectives are to provide:

- A clear reference for recommendations regarding immunisations, malaria prophylaxis and other key travel health areas
- A practical approach to management of most issues that arise in the medical care of travellers

How to Use the Manual

The *Manual of Travel Medicine* is designed to provide essential information about pretravel medicine. Its organisation reflects what is needed during a consultation, progressing from principles to:

- Immunisation
- Prevention and management of malaria
- Prevention and management of travellers' diarrhoea
- Specific infectious and non-infectious conditions that may require discussion

- Specific groups of travellers
- Health issues in returned travellers
- Additional resources

As in the previous editions, we summarise:

- Our recommendations for common travel destinations
- Immunisation and malaria recommendations by country

We also include up-to-date maps for a wide range of infections. We have made every effort to ensure that the information contained in the *Manual of Travel Medicine* is accurate and current at the time of writing. Readers must be aware that in travel medicine—as in every field of medicine, but in this area more than in most—disease patterns, country requirements, available vaccines and drugs, and specific recommendations for their use frequently change over time. Thus, practitioners should supplement the *Manual* with other up-to-date authoritative information.

Melbourne, VIC, Australia
Melbourne, VIC, Australia
Melbourne, VIC, Australia
Parkville, VIC, Australia
Parkville, VIC, Australia
Parkville, VIC, Australia
Melbourne, VIC, Australia

Joseph Torresi
Sarah McGuinness
Karin Leder
Daniel O'Brien
Tilman Ruff
Mike Starr
Katherine Gibney

Contents

1	Principles of Pre-travel Healthcare	1
1.1	Understand the Epidemiology of Travel and Travel-Related Conditions.	2
1.2	Provide Up-to-Date Information and Advice.	3
1.3	Start Early	3
1.4	Allow Sufficient Time for the Consultation.	4
1.5	Individualise Advice	4
1.6	Identify High-Risk Travellers	5
1.6.1	Travellers with Chronic Conditions.	5
1.7	Encourage Personal Responsibility for Safe Behaviour	6
1.7.1	Food and Drink	7
1.7.2	Insects	7
1.7.3	Environmental Exposures	7
1.7.4	Animal Bites	8
1.7.5	Substance Abuse	8
1.7.6	Sex	9
1.7.7	Traffic Accidents	9
1.7.8	Aquatic Injury	10
1.7.9	Assaults	10
1.7.10	Blood-Borne Infections	10
1.8	Consider Costs	11
1.9	Provide Supplementary Information	12
1.10	Recommend a Medical Kit	12
1.11	Recommend Health Insurance	14
1.12	Provide Advice on Medications and Medical Devices	14
	Key Reading	17
2	Immunisation.	19
2.1	Introduction to Pre-travel Vaccination	19
2.1.1	Categories of Vaccines	19
2.1.2	Delay in Vaccine Doses	22
2.1.3	Simultaneous Administration of Different Vaccines	24
2.1.4	Vaccine Interactions.	24
2.1.5	Interchangeability of Vaccine Products	26
2.1.6	Practical Aspects of Immunisation.	27

2.2	Cholera	30
2.2.1	Disease	30
2.2.2	Epidemiology	30
2.2.3	Vaccine	31
2.2.4	Recommendations	32
2.3	Diphtheria and Tetanus	33
2.3.1	Background and Epidemiology: Diphtheria	33
2.3.2	Background and Epidemiology: Tetanus	33
2.3.3	Diphtheria- and Tetanus-Containing Vaccines	34
2.4	Hepatitis A	37
2.4.1	Disease	37
2.4.2	Epidemiology	37
2.4.3	Hepatitis A immunisation	39
2.4.4	Combined Hepatitis A and B Immunisation	45
2.4.5	Combined Hepatitis A and Typhoid Immunisation	48
2.4.6	Choice of Hepatitis A Vaccine	49
2.5	Hepatitis B	49
2.5.1	Disease	49
2.5.2	Epidemiology	50
2.5.3	Vaccines	52
2.5.4	Recommendations	56
2.6	Influenza	59
2.6.1	Epidemiology	59
2.6.2	Vaccine	60
2.6.3	Recommendations	61
2.6.4	Avian Influenza	62
2.6.5	Pandemic H1N1 Influenza (2009)	64
2.7	Japanese Encephalitis (JE)	64
2.7.1	Disease	64
2.7.2	Epidemiology	65
2.7.3	Patterns of Transmission	66
2.7.4	JE in Torres Strait and Northern Australia	66
2.7.5	Travellers and Expatriates	71
2.7.6	Risk Factors for Acquiring JE Infection During Travel to Asia	71
2.7.7	Vaccines	72
2.7.8	JESPECT (IXIARO in the United States and Europe; IC51, Seqirus)	72
2.7.9	IMOJEV (JE ChimeriVax, JE-CV, Sanofi-Aventis)	73
2.7.10	Recommendations	74
2.8	MMR	76
2.8.1	Background and Epidemiology	76
2.8.2	Vaccine	76
2.9	Meningococcal Disease	78
2.9.1	Disease	78
2.9.2	Epidemiology	79

2.9.3	Annual Islamic Pilgrimage to Mecca and Medina in Saudi Arabia (the Hajj)	80
2.9.4	Vaccines	81
2.9.5	Recommendations	83
2.10	Pertussis	84
2.10.1	Background and Epidemiology	84
2.10.2	Vaccines	85
2.10.3	Recommendations	86
2.11	Pneumococcal Disease.	87
2.11.1	Background and Epidemiology	87
2.11.2	Vaccines	88
2.11.3	Pneumococcal Polysaccharide Vaccine, 23-Valent (23vPPV).	88
2.11.4	Pneumococcal Conjugate Vaccine, 13-Valent (13vPCV).	90
2.12	Poliomyelitis	93
2.12.1	Epidemiology.	93
2.12.2	Inactivated Poliomyelitis Vaccine (Salk Type or IPV).	95
2.12.3	Live Oral Poliomyelitis Vaccine (Sabin-Type or OPV).	96
2.12.4	Recommendations for Travellers	98
2.13	Rabies.	99
2.13.1	Disease	99
2.13.2	Epidemiology.	102
2.13.3	Vaccines	103
2.13.4	Pre-exposure Vaccination.	104
2.13.5	Post-exposure Treatment	109
2.14	Rotavirus Infection.	116
2.14.1	Background and Epidemiology	116
2.14.2	Vaccines	116
2.14.3	Recommendations	118
2.15	Tick-Borne Encephalitis (TBE).	118
2.15.1	Disease	118
2.15.2	Epidemiology.	119
2.15.3	Austrian and German Vaccines	120
2.15.4	Russian and Chinese Vaccines	122
2.15.5	Recommendations	122
2.16	Tuberculosis.	123
2.16.1	Disease	123
2.16.2	Epidemiology.	124
2.16.3	Risk to Travellers and Expatriates	124
2.16.4	Vaccine.	126
2.16.5	Recommendations for BCG for travellers	128
2.17	Typhoid	130
2.17.1	Disease.	130
2.17.2	Epidemiology.	131

2.17.3	Vaccines	132
2.17.4	Vi Polysaccharide Typhoid Vaccine	133
2.17.5	Live Attenuated <i>S. Typhi</i> Oral Vaccine Ty21a (Vivotif Oral)	134
2.17.6	New Conjugate <i>S. Typhi</i> Vaccines	137
2.17.7	Recommendations for Use of Typhoid Vaccines	137
2.18	Varicella Zoster Virus.	139
2.18.1	Varicella (Chickenpox): Background and Epidemiology	139
2.18.2	Vaccines	140
2.18.3	Herpes Zoster (Shingles): Background and Epidemiology	143
2.18.4	Shingles (Zoster) Vaccine	144
2.19	Yellow Fever	147
2.19.1	Disease	147
2.19.2	Epidemiology.	148
2.19.3	Yellow Fever Vaccine (Stamaril)	148
2.19.4	Recommendations	153
2.19.5	Accreditation and Documentation	156
	Key Reading	158
3	Malaria Prevention	171
3.1	Introduction	171
3.2	Preventive Measures	174
3.2.1	Awareness of Risks	175
3.2.2	Early Diagnosis and Treatment	175
3.2.3	Minimising Exposure to Mosquitoes.	176
3.3	Prophylactic Drugs.	179
3.3.1	General Considerations	179
3.3.2	Doxycycline.	181
3.3.3	Mefloquine.	183
3.3.4	Atovaquone-Proguanil (Malarone)	187
3.3.5	Chloroquine/Hydroxychloroquine	189
3.3.6	Primaquine.	190
3.3.7	Tafenoquine	191
3.3.8	How to Choose Malarial Prophylaxis	193
3.3.9	Special Situations.	195
3.4	Standby Emergency Self-Treatment	200
3.4.1	Artemether-Lumefantrine (Riamet/Coartem)	201
3.4.2	Atovaquone-Proguanil	202
3.4.3	Steps to Take When Prescribing SBET	203
3.5	Summary	203
	Key Readings	204
4	Travellers' Diarrhoea	207
4.1	Incidence	207

4.2	Aetiology	208
4.3	Prevention	210
4.3.1	General Measures.	210
4.3.2	Water Treatment.	211
4.3.3	Vaccination.	212
4.3.4	Nonantibiotic Interventions	212
4.4	Management of Travellers' Diarrhoea	213
4.4.1	Fluids	213
4.4.2	Food	214
4.4.3	Self-Treatment	214
4.4.4	Controversies Regarding Initiation of Antibiotics	215
4.4.5	When Should Antibiotics for Self-Treatment Be Advised?	216
4.4.6	Antibiotic Options	218
4.4.7	Other agents	220
4.4.8	Self-Treatment for Prolonged Diarrhoea	220
4.4.9	Other Forms of Chronic Diarrhoea	221
4.5	Chemoprophylaxis	222
4.6	Managing Diarrhoea After Return	223
	Key Reading	223
5	Non-vaccine-Preventable Infections	225
5.1	Destination	225
5.2	Types of Activities	225
5.2.1	Infections Acquired Via Ingestion	229
5.2.2	Vector-Borne Diseases	229
5.2.3	Diseases Transmitted Via Recreational and Occupational Activities	229
5.2.4	Diseases Transmitted Via Sexual or Parenteral Exposure	230
5.3	Specific Infections	230
5.3.1	African Trypanosomiasis ('Sleeping Sickness')	230
5.3.2	American Trypanosomiasis (Chagas' Disease)	231
5.3.3	Amoebiasis.	232
5.3.4	Brucellosis	232
5.3.5	Buruli Ulcer	233
5.3.6	Chikungunya Virus.	234
5.3.7	Ciguatera	235
5.3.8	Cutaneous Larva Migrans (CLM)	237
5.3.9	Cysticercosis	237
5.3.10	Dengue Fever	238
5.3.11	Hepatitis C	241
5.3.12	Hepatitis E	242
5.3.13	Human Immunodeficiency Virus (HIV).	243
5.3.14	Legionellosis (Legionnaires' Disease).	246

5.3.15	Leishmaniasis (Cutaneous and Visceral)	246
5.3.16	Leptospirosis	247
5.3.17	Lyme Disease.	248
5.3.18	Lymphatic Filariasis, Loiasis and Onchocerciasis.	249
5.3.19	Melioidosis.	250
5.3.20	MERS (Middle Eastern Respiratory Syndrome)	251
5.3.21	Myiasis (Cutaneous)	252
5.3.22	Q Fever.	253
5.3.23	Rickettsial Infections	254
5.3.24	SARS (Severe Acute Respiratory Syndrome)	255
5.3.25	Schistosomiasis ('Bilharzia').	256
5.3.26	Strongyloidiasis	258
5.3.27	Viral Haemorrhagic Fevers	259
5.3.28	West Nile Fever	260
5.3.29	Zika Virus.	261
	Key Reading	263
6	Non-infectious Problems.	265
6.1	Fitness to Fly	265
6.1.1	Air Travel.	265
6.1.2	Health Effects of Flying.	265
6.2	Motion Sickness.	267
6.2.1	Incidence and Risk Factors	267
6.2.2	Symptoms and Progression	268
6.2.3	Prevention	269
6.2.4	Recommendations	273
6.3	Jet Lag	274
6.3.1	Preparation.	275
6.3.2	During the Flight	277
6.3.3	On Arrival	277
6.3.4	Melatonin.	277
6.3.5	Hypnotics.	279
6.3.6	Drugs that Promote Alertness	279
6.4	Venous Thromboembolism	279
6.4.1	Background	279
6.4.2	Possible Predisposing Factors	280
6.4.3	What Are the Risks?.	280
6.4.4	Recommendations for Prevention	281
6.5	Altitude Illness.	282
6.5.1	Altitude Physiology.	282
6.5.2	Normal Symptoms at Altitude	282
6.5.3	What Is Altitude Illness?	283
6.5.4	Incidence of Altitude Illness	284
6.5.5	Acute Mountain Illness (AMS)	284
6.5.6	Severe Altitude Illness	286
6.5.7	Warning Signs for Travellers	287

6.5.8	Prevention of Altitude Illness	287
6.5.9	Preventive Medications	288
6.5.10	Treatment of Altitude Illness	291
6.5.11	Altitude Illness in Children	293
6.5.12	Pre-existing Medical Conditions	293
	References	294
7	Travellers with Special Needs	297
7.1	The Pregnant Traveller	297
7.1.1	Potential Contraindications to Travel	297
7.1.2	General Advice	298
7.1.3	Air Travel	298
7.1.4	Activities	299
7.1.5	Nausea and Vomiting	299
7.1.6	Immunisation	300
7.1.7	Routine Immunisations	300
7.1.8	Travel-Specific Immunisations	302
7.1.9	Malaria	303
7.1.10	Zika	304
7.1.11	Food- and Water-Borne Illness	304
7.1.12	Other Infections	305
7.1.13	Childbirth	306
7.1.14	Breastfeeding	306
7.1.15	After Delivery	306
7.1.16	Contraception	306
7.2	Children	307
7.2.1	Immunisations	308
7.2.2	Travel-Specific Immunisation	310
7.2.3	Japanese Encephalitis Vaccine	311
7.2.4	Typhoid Vaccine	312
7.2.5	Travellers' Diarrhoea	312
7.2.6	Malaria	314
7.2.7	Special Considerations	316
7.3	Older Travellers	316
7.3.1	Characteristics of Older Travellers	317
7.3.2	Age-Related Vulnerability to Diseases	317
7.3.3	Greater Severity of Travel-Related Illnesses	318
7.3.4	Diminished Response to Vaccination	318
7.3.5	Increased Side Effects from Vaccination	320
7.3.6	Pre-travel Advice to Older Travellers	320
7.4	Expatriates and Long-Term Travellers	321
7.4.1	Health Risks for Expatriates and Long-Term Travellers	321
7.4.2	Preparation of Expatriates and Long-Term Travellers	322
7.4.3	The Pre-travel Assessment	323
7.4.4	Baseline Health Assessment	323
7.4.5	Psychosocial Assessment	324

7.4.6	Culture Shock	324
7.4.7	Immunisations	325
7.4.8	Malaria Prevention	327
7.4.9	Diarrhoeal Diseases	328
7.4.10	Sexually Transmitted Infections	328
7.4.11	Other Infectious Diseases	328
7.4.12	Other Health Risks	329
7.4.13	Conclusion	329
7.5	Humanitarian and Health Workers	329
7.5.1	Humanitarian Workers	329
7.5.2	Health Workers	335
7.6	Travellers Visiting Friends and Relatives	338
7.6.1	Pre-travel Advice	338
7.6.2	Malaria	338
7.6.3	Hepatitis A	339
7.6.4	Enteric Fever	339
7.6.5	Tuberculosis	339
7.6.6	Other Infections	339
7.7	Travellers with Cardiovascular Problems	340
7.7.1	Patients with Coronary Artery Disease	340
7.7.2	Severe Angina or Heart Failure	341
7.7.3	Pacemakers	341
7.7.4	Malaria	341
7.8	Travellers with Chronic Lung Disease	342
7.8.1	Air Travel	342
7.8.2	Fitness to Fly	342
7.8.3	Before Travel	343
7.8.4	In-Flight Oxygen	344
7.8.5	During Air Travel	344
7.9	Travellers with Diabetes	344
7.9.1	General Advice	345
7.9.2	Insulin Dosage	346
7.10	The HIV-Infected Traveller	348
7.10.1	General Considerations	348
7.10.2	International Travel Restrictions	349
7.10.3	Immunisations	349
7.10.4	Routine Immunisations	350
7.10.5	Travel-Specific Immunisations	353
7.10.6	Malaria	355
7.10.7	Travellers' Diarrhoea	356
7.10.8	Other Infections	357
7.10.9	Preparation for Possible Illness	358
7.11	The Immunocompromised Traveller	358
7.11.1	Immunocompromised Patients and Travel	359
7.11.2	Types of Immunocompromised Travellers	359

7.11.3	Immunisation	361
7.11.4	Household Contacts of Immunocompromised Persons	365
7.11.5	Malaria Prevention	365
7.11.6	Travellers' Diarrhoea	365
7.11.7	Other Health Hazards	366
7.11.8	Preparation for Possible Illness	366
7.11.9	Travel Insurance	366
7.12	The Splenectomised Traveller	366
7.12.1	Infections and Asplenia	366
7.12.2	Bacterial Infections	367
7.12.3	Antibiotic Prophylaxis	367
7.12.4	Immunisation	368
7.12.5	Malaria	369
7.12.6	Tick Bites	369
7.12.7	Spleen Australia	369
7.13	Medical Tourism	370
	Key Reading	371
8	Health Issues in Returned Travellers	377
8.1	Infections in Travellers	377
8.1.1	Frequency of Illness Among Travellers	378
8.1.2	History and Physical Examination	379
8.2	Clinical Syndromes	381
8.2.1	Fever	381
8.2.2	Malaria	383
8.2.3	Enteric Fever	383
8.2.4	Viral Haemorrhagic Fevers (VHF)	384
8.2.5	Dengue Fever, Chikungunya and Zika Virus	384
8.2.6	Rickettsial Infections	384
8.2.7	Diarrhoea	384
8.2.8	Respiratory Infections	385
8.2.9	Skin Problems	386
8.2.10	Neurological Infections	387
8.2.11	Hepatitis	387
8.3	Screening the Returned Traveller Who Is Well	388
8.4	The Returned Traveller Who Is Unwell/Febrile	388
8.4.1	Issues to Consider in the Unwell Returned Traveller	390
8.4.2	Initial Laboratory Tests to Consider in the Unwell/Febrile Traveller	390
	References	391
9	Resources for Travel Health Information	393
9.1	Resources Offering Greater Depth and Detail	394
9.1.1	Resources for Advising the Traveller	394
9.2	Resources Offering Up-to-Date Information on Changing Risks, Including Surveillance and Outbreak Information	398

9.3 Resources for Travellers Themselves.	399
Appendix A: Common Travel Destinations	401
Appendix B: Malaria Risk by Country and Recommendations for Chemoprophylaxis	405
Appendix C: Vaccines: Route, Schedule, Lower Age Limit and Accelerated Regimens.	419
Appendix D: Vaccine Introduction and Use in Australia	425
Key Reading	431

Vaccine Terminology and Abbreviations

Different vaccine components that are formulated together in the same presentation (vial or prefilled syringe) are listed separated by a ‘-’. Vaccines that are mixed by the immunisation provider before administration are listed separated by a ‘/’. Thus, the combined co-formulated hepatitis A and B vaccine is designated HA-HB, and the combined HA and typhoid vaccine, which is mixed by the provider, is designated HA/Vi. The paediatric vaccine DTPa-HB-IPV used to reconstitute lyophilised Hib vaccine is designated DTPa-HB-IPV/Hib.

Vaccines of higher antigen content are designated by capitals; those containing the same antigens in substantially lower amounts are referred to using lower case. For example, paediatric diphtheria-tetanus-acellular pertussis vaccine is designated DTPa, while the corresponding lower antigen vaccine for adolescent and adult use is designated dTpa.

Antibody to a particular antigen ‘...’ is designated as ‘anti...’. For example, antibody to hepatitis B surface antigen is designated antiHBs, and antibody to hepatitis A is designated antiHA.

ABL	Australian bat lyssavirus
ADT	Adsorbed diphtheria-tetanus vaccine
AIH	Australian Immunisation Handbook
AMS	Acute mountain sickness
antiHBc	Hepatitis B core antibody
antiHBs	Hepatitis B surface antibody
ART	Antiretroviral therapy
AS	Altitude sickness
AUC	Area under the curve
BCG	Bacillus Calmette-Guérin
bid	Twice daily
CCV	Cell culture vaccine
CDC	Centers for Disease Control and Prevention (US unless otherwise specified)
CHF	Congestive heart failure
CLM	Cutaneous larva migrans
CMV	Cytomegalovirus

cVDPV	Circulating vaccine-derived poliovirus
D	Diphtheria
DEET	<i>N,N</i> -diethylmetatoluamide
DHF	Dengue haemorrhagic fever
DSS	Dengue shock syndrome
dT	Diphtheria-tetanus vaccine (adult formulation)
DT	Diphtheria-tetanus vaccine (paediatric)
dTpa	Diphtheria-tetanus-acellular pertussis vaccine (lower-dose adolescent/adult formulation)
DTPa	Diphtheria-tetanus-acellular pertussis vaccine (higher-dose paediatric formulation)
DVT	Deep vein thrombosis
EBV	Epstein-Barr virus
ELISA/EIA	Enzyme-linked immunosorbent assay
EIA U	ELISA units
ERIG	Equine rabies immunoglobulin
ETEC	Enterotoxigenic <i>Escherichia coli</i>
FHA	Filamentous haemagglutinin
GBS	Guillain-Barré syndrome
GMT	Geometric mean titre (the antilog of the mean of the logs of a set of antibody titres)
HA	Hepatitis A
HACE	High-altitude cerebral oedema
HAPE	High-altitude pulmonary oedema
HB	Hepatitis B
HbOC	Hib PRP conjugated to non-toxic diphtheria mutant protein CRM ₁₉₇
HBsAg	Hepatitis B surface antigen
HDCV	Human diploid cell (rabies) vaccine
Hib	<i>Haemophilus influenzae</i> type b
HIV	Human immunodeficiency virus
HPV	Human papilloma virus
HZ	Herpes zoster
ID	Intradermal
IG	Immunoglobulin (normal unless otherwise specified)
IM	Intramuscular
INR	International normalised ratio
IPD	Invasive pneumococcal disease
IPV	Inactivated polio vaccine
IU	International units
JE	Japanese encephalitis
LT-ETEC	Heat-labile toxin-producing enterotoxigenic <i>Escherichia coli</i>
MenACWY	4-valent ACYW135 meningococcal conjugate vaccine
MenCCV	Meningococcal C conjugate vaccine
4vMenPV	4-valent (ACYW135) meningococcal polysaccharide vaccine
µg	Microgram

mg	Milligram
MMR	Measles-mumps-rubella vaccine
MMRV	Measles-mumps-rubella-varicella vaccine
NHMRC	(Australian) National Health and Medical Research Council
NHIG	Normal human immunoglobulin
NIP	National Immunisation Program
OMP	Outer membrane protein
OPV	Oral polio vaccine
ORS	Oral rehydration solution
Pa	Acellular pertussis vaccine
PCECV	Purified chick embryo cell (rabies) vaccine
PCV	Pneumococcal conjugate vaccine
PDEV	Purified duck embryo cell (rabies) vaccine
PE	Pulmonary embolism
PEP	Post-exposure prophylaxis
Pf	<i>Plasmodium falciparum</i>
Pv	<i>Plasmodium vivax</i>
PI	Product information
PPD	Purified protein derivative (of <i>Mycobacterium tuberculosis</i>)
PPV	Pneumococcal polysaccharide vaccine (23-valent)
PRN	Pertactin
PRP	Polyribosylribitol phosphate (outer polysaccharide and major virulence factor of Hib)
PRP-OMP	Hib vaccine in which PRP is conjugated to meningococcal group B OMP
PRP-T	Hib vaccine in which PRP is conjugated to tetanus toxoid
PS	Polysaccharide
PT	Pertussis toxin
PVRV	Purified Vero cell rabies vaccine
qid	Four times a day
rCTB	Recombinant cholera toxin B subunit
RIG	Rabies immunoglobulin
RR	Relative risk
SARS	Severe acute respiratory syndrome
SBET	Standby emergency treatment
SC	Subcutaneous
STI	Sexually transmitted infection
T	Tetanus
TB	Tuberculosis
TBE	Tick-borne encephalitis
TD	Travellers' diarrhoea
TGA	Therapeutic Goods Administration, Australian regulatory authority for medicines and medical devices
TST	Tuberculin skin test
Ty	Typhoid

VAPP	Vaccine-associated paralytic poliomyelitis
VDPV	Vaccine-derived poliovirus
VFR	Visiting friends and relatives
VHF	Viral haemorrhagic fever
Vi	Vi capsular polysaccharide of <i>Salmonella Typhi</i>
VTE	Venous thromboembolism
VV	Varicella vaccine
VZ	Varicella-zoster
WC/rBS	Whole cell/recombinant B subunit
WHO	World Health Organization
WTO	World Travel Organization
YF	Yellow fever
YEL-AND	Yellow fever vaccine-associated neurotropic disease
YEL-AVD	Yellow fever vaccine-associated viscerotropic disease