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Alimuddin Zumla, Ronald H. Behrens, and Ziad A. Memish

Travel Clinic Consultation and Risk Assessment  575
Lorraine M. Noble, Adrienne Willcox, and Ronald H. Behrens

A significant number of travelers sustain travel-related injury or illness, despite receiving pretravel advice. This appears to be due to a combination of inconsistent guidance about risks and recommendations, and partial adherence. This article considers perceptions and attitudes to risk, factors affecting uptake of advice, and features of an effective consultation. A framework is proposed for a pretravel consultation, using a shared decision-making approach. Engaging the traveler as an active participant in maintaining their own health and providing balanced, evidence-based information about risks and benefits is predicted to enhance the effectiveness of the pretravel consultation.

Vaccine-Preventable Diseases and Their Prophylaxis  595
Joanna S. Herman and David R. Hill

Global uptake of new vaccines shapes the epidemiology of infections, and in turn this changing epidemiology guides vaccine development. Once introduced, surveillance and monitoring of the impact of vaccines on disease and adverse events is vital for further development. This article reviews the use of vaccines as part of routine health care, vaccines that may be required for entry into a destination country, and vaccines that are recommended because of risk during travel. Considerations and advances in the vaccination of travelers are addressed.

The Immunosuppressed Traveler  609
L.G. Visser

This article reviews the normal immune response to vaccines. It describes the effect of different immunosuppressive therapies (glucocorticoids, inhibitors of calcineurin and mTOR, azathioprine, mycophenolate acid, methotrexate, depleting and nondepleting monoclonal antibodies, and tumor necrosis factor antagonists) on critical steps in the cellular and humoral immune responses to vaccines. The impact of age-related involution of thymus and bone marrow on the immune reconstitution in allogeneic hematopoietic cell transplant recipients and human immunodeficiency virus is covered. A practical approach to vaccinating and preparing travelers with severe immunosuppression is proposed.

Visiting Relatives and Friends (VFR), Pregnant, and Other Vulnerable Travelers  625
Alberto Matteelli, Anna Cristina C. Carvalho, and Sara Bigoni

With industrial development and expanding tourism, many people now have an opportunity to travel to many previously unreachable foreign destinations. Travelers with medical or physical conditions or who are
vulnerable because of pregnancy or age (pediatric or elderly traveler),
require specialist support and advice before traveling. Immigrants who
return to their country of birth to visit relatives and friends should be clas-
sified as vulnerable travelers, as they have been shown to carry a dispro-
portionate burden of travel-related morbidity. In this article, we explore the
major risks to health and the main preventive strategies appropriate to the
most vulnerable travelers.

Malaria Prevention in Travelers
Blaise Genton and Valérie D’Acremont

A common approach to malaria prevention is to follow the “A, B, C, D” rule:
Awareness of risk, Bite avoidance, Compliance with chemoprophylaxis,
and prompt Diagnosis in case of fever. The risk of acquiring malaria
depends on the length and intensity of exposure; the risk of developing
severe disease is primarily determined by the health status of the traveler.
These parameters need to be assessed before recommending chemopro-
phylaxis and/or stand-by emergency treatment. This review discusses the
different strategies and drug options available for the prevention of malaria
during and post travel.

Insect Bite Prevention
Sarah J. Moore, Anne Jennifer Mordue (Luntz), and James G. Logan

Protection from the bites of arthropod (insect and acarine) vectors of dis-
ease is the first line of defense against disease transmission and should be
advised in all cases when traveling abroad. Details are described of the
main approaches for the prevention of bites, including topical or skin repel-
lents, impregnated clothing, bed nets, and spatial or aerial repellents and
aerosols. The bionomics of the main arthropod vectors of disease are
described along with photographic plates and tabulated advice to give
the traveler. An in-depth treatment of the different protection methodolo-
gies provides an up-to-date overview of the technologies involved.

Travel-Associated Skin Disease
Rachael Morris-Jones and Stephen Morris-Jones

Travel associated skin disease is extremely common and a frequent cause
of the returning traveller seeking medical attention. Widespread cutaneous
eruptions usually represent reactive rashes, indicating an underlying sys-
temic infection or allergic reaction. Patients with disseminated or spreading
rashes following travel often present with fever and malaise. In contrast,
those presenting with localised skin disease such as a blister, nodule, pla-
que, ulcer etc are usually well in themselves but have sustained a bite/sting/penetrating injury or introduction of infection directly into the skin at
the affected site. As a general rule widespread rashes are investigated
with blood tests/serology and localised lesions with a skin biopsy for cul-
ture and histology.

Traveler’s Diarrhea
Herwig Kollaritsch, Maria Paulke-Korinek, and Ursula Wiedermann

Travelers’ diarrhea (TD) is the most important health issue among interna-
tional travelers. In high risk areas, 50–90% of travelers may experience an
episode of TD. The risk of acquiring TD is influenced by factors such as the destination, duration of stay, standard of accommodation, type of travel, age of the traveler, and also by individual risk factors. Most cases of TD are caused by bacteria; treatment for TD are loperamide and antibiotics. Preventive strategies such as hygiene measures have limited impact. Prophylactic intake of antibiotics or vaccines to prevent from TD can be considered in special situations.

Environmental Hazards, Hot, Cold, Altitude, and Sun

Sundeep Dhillon

There has been an increase in both recreational and adventure travel to extreme environments. Humans can successfully acclimatize to and perform reasonably well in extreme environments, provided that sufficient time is given for acclimatization (where possible) and that they use appropriate behavior. This is aided by a knowledge of the problems likely to be encountered and their prevention, recognition, and treatment.

Mass Gatherings and Infectious Diseases: Prevention, Detection, and Control

Jaffar A. Al-Tawfiq and Ziad A. Memish

Mass gatherings have attracted the attention of the medical community because of the increased demand made on existing services and the potential for public health problems resulting from changes in population dynamics and behaviors. Crowding, lack of hygiene, and rapid population movement at mass gatherings can lead to the emergence of infectious diseases, with the potential for spread across the globe. Numerous infections pose considerable challenges to organizers of mass gatherings and the hosts of these events. This review highlights the risks of infectious diseases, and key interventions for their prevention, at mass gatherings.

Rabies: Relevance, Prevention, and Management in Travel Medicine

Christoph F.R. Hatz, Esther Kuenzli, and Maia Funk

Rabies is a zoonotic viral disease, transmitted only in mammals. Terrestrial rabies, predominantly transmitted by dogs, is the most important rabies cycle threatening humans. The causative neurotropic virus is a negative-stranded RNA virus of the family Rhabdoviridae, genus Lyssavirus. This genus contains several rabies-related viruses. All variants are known or suspected to cause rabies-like diseases. Transmission occurs by the virus entering through the skin or the mucosa after bites, scratches, or preexisting injuries contaminated by the saliva of an infected mammal. Only 51 human rabies cases that have not been transmitted by animal bites are described.

Parasitic Liver Disease in Travelers

Wilson W. Chan, Adrienne Showler, and Andrea K. Boggild

Liver disease is an important source of morbidity among ill returning travelers. Jaundice is one of the most common and obvious symptoms of liver disease, the differential diagnosis of which is extensive, especially in travelers. Jaundice in travelers can arise from both infectious and non-infectious causes. We herein summarize the most common parasitic
etiolologies that may lead to jaundice in the returned traveler, visitors of friends and relatives, or new immigrants, and describe the etiology, epidemiology, and pathogenesis of clinical features of each.

**Eosinophilia in the Returning Traveler**

Andrew Ustianowski and Alimuddin Zumla

An elevated eosinophil count is a common, frequently underrecognized finding in travelers returning from the tropics and elsewhere. Although there are multiple causes of eosinophilia in a traveler, it is often related to an acquired helminth infection. In some cases these infections can be benign and self-limiting, but in others it may lead to severe sequelae for the individual or others. This article outlines the etiology and diagnosis of eosinophilia concentrating on helminth infections.

**Travel Trends and Patterns of Travel-Associated Morbidity**

Ronald H. Behrens and Bernadette Carroll

Improved data collection methods have produced a clearer picture of travel-associated health risks and at-risk travelers. Examination of the causes of mortality and morbidity has led to a change in emphasis on ways of reducing morbidity. There are unanswered questions that relate to the contribution of medical comorbidities on travel-associated illness, how communication can enhance or influence behavior change, and the best strategies to influence the travelers at greatest risk. Enhanced data collection methods and better denominator data are necessary to provide more precise risk information and help inform policy and thereby reduce morbidity in tourists and travelers.

**Laboratory Investigations and Diagnosis of Tropical Diseases in Travelers**

Rosemarie Daly and Peter L. Chiodini

Evaluation of an individual traveler returned from the tropics requires consideration of a greater range of possible diagnoses than would be entertained at home. In trying rapidly to identify the cause of a presenting illness in the traveler, knowledge of their natural history and a carefully taken account of the location of the trip undertaken and potential exposure to exotic infections helps narrow the range of possibilities and thus the amount of laboratory investigation and imaging needed to confirm a diagnosis.

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