

Travel medicine: Part 1–The basics

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Abstract

International travels for tourism and business purposes continue to increase annually, while the global terrorism and the risk of lethal viral infections are currently real concerns. It is important that primary care physicians assess travel risk and adequately prepare the prospective traveler for trips. Appropriate vaccines should be administered and an emergency self-kit recommended. Patient should be educated about safe travel habits and a posttravel follow-up process established. Further, traveling health-care professionals may be called upon to assist an ill patient at any time during their journey. In these 2-part special articles, we provide a practical brief summary of up-to-date travel medicine basics for primary care physicians.

KEYWORDS

infectious disease, international traveler, travel medication, tropical infection, vaccination

1 | TRAVELERS' TREND

The number of international travelers annually is continuously growing, although there was a dip in travelers, following the World Trade Center Terrorism Attack at New York City on 9/11/2001. Most international travelers go to developed countries, particularly Europe, but a substantial number of expatriates and adventure travelers go to developing countries around the world. It is expected that both trends will continue to increase over the next decade. Primary care physician is likely to be consulted by prospective travelers with respect to required vaccines, health hazards in host countries and adequate preparation to avoid illness.^{1,2}

2 | PREPARATIONS

All prospective travelers should have their health history reviewed for the possible health risks of the planned itinerary. Information such as the dates, duration, routes, style of travel (eg, budget vs luxury), accommodations, and activities (eg, business vs leisure) should be collected.³

It is important to let the prospective traveler understand that he/she has a 15% chance of becoming sick during their trip in average,⁴ but the chance of a serious illness or death is very small (Table 1). A

study about the incidence of health problems during a stay in developing countries 2008 indicates that travelers' diarrhea has the greatest incidence (20%-60% of all travelers).⁵

Additional risks include accidental injury, environmental hazards (eg, hypo- or hyperthermia), crime and assault, underlying medical and psychiatric problems, animal bites, stings and envenomations, and altitude-related illness.⁶ The greatest cause for mortality among travelers is cardiovascular disease. The highest external cause for mortality among travelers is motor vehicle accident, followed by drowning.

On the other hand, infectious disease causes only 1% death among travelers.⁶ Despite the low mortality, the incidence of infectious disease is very high among travelers, and common infectious diseases with risks to international travelers are listed in Table 2. *Enterotoxigenic E. coli* (ETEC) is the leading pathogen in travelers' diarrhea.⁵ Common health problems among travelers include circadian desynchronization (jet lag), sunburn, dehydration, and water-related problems (eg, exposure to infectious agents, near-drowning, boating, and diving accidents).

A focused past medical history and review of systems should be performed, emphasizing age specific issues, underlying illness, and immunosuppression (eg, splenectomy, certain medications), allergies, and vaccinations.⁷ Individuals with inflammatory bowel disease do not have

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increased bouts of traveler's diarrhea compared to normal travelers, but when it occurs it is often severe. Travelers with congestive heart failure or chronic obstructive pulmonary disease may decompensate at altitude including a long haul flight. During pregnancy, or its possibility, risk-taking behaviors (eg, off-road trekking and adventure.) should be avoided.⁸

The physical examination should be updated particularly whether the patient has a chronic illness such as diabetes or cardiovascular pathology. Medications should be reviewed and adequate prescriptions provided for a secondary travel supply. Ideally, a summary of the patient's health data should accompany her/him in case the patient becomes ill while traveling. Not only the destination but also mode of travel should be considered. Open jaw stopovers may expose the unwary traveler to an infectious or traumatic event since the patient may have to get commercial sexual contacts or ride a reckless vehicle unexpectedly in cities the patient does not prospectively collect information on.

3 | PATIENT EDUCATION

Sufficient time should be allowed for tailored patient education. The session should summarize the visit with a clear discussion of traveler's fitness for travel, important precautions, health insurance coverage for hospitalization, and evacuation, the availability of healthcare in the planned destination and the importance of a follow-up visit, particularly for long-term stays, such as expatriates working in developing countries or adventure travelers upon return to home.

Personal hygiene, especially hand washing, should be stressed. Food and water precautions include the use of bottled water, eating food that is cooked hot, and cold food when it is cold. All fresh fruit should be eaten after peeling. Unpasteurized dairy products should be avoided unless it was prepared from bottled water.

TABLE 1 Estimated disease frequency of 100 000 travelers to a developing country for 1 mo

50 000 will develop some health problem
8000 will see a physician
5000 will be confined to bed
1100 will be incapacitated in their work
300 will be admitted to hospital
50 will be air evacuated
1 will die

TABLE 2 Common infectious diseases with risks to international travelers

Malaria	Schistosomiasis
Leishmaniasis	Tuberculosis
Diarrhea	Leptospirosis
Rabies	Poliomyelitis
Dengue	Yellow Fever
Meningococcal Meningitis	Measles
Japanese Encephalitis	Ebola

Vector precautions include covering exposed skin (ie, blousing) using insect repellent containing DEET (N, N-diethyl-meta-toluamide) 25%-50%, treating outer clothing with permethrin, using permethrin-impregnated bed netting, insect screens over open windows, when possible staying in air-conditioned rooms, using aerosol insecticide indoors and pyrethroid coils outdoors and inspecting for ticks. Exposure to sexually transmitted diseases, hepatitis B and C and HIV can occur with unprotected sexual activity, tattooing and body piercing, the administration of blood products, and dental and surgical procedures.⁹ Visitors (eg, veterinarians) to countries with elevated rabies risk should receive the vaccine and those who are bitten or scratched should be advised to immediately seek medical help and postexposure immunization and immunoglobulin.¹⁰

Travelers should be clearly warned that unsafe pedestrian activities in developing countries carry a high risk of injury. Night travel should be avoided and when traveling by motorized vehicle seat belts should be used (car seat with infants and small children). Alcohol should be used with discretion and only in a controlled environment. It accelerates dehydration on an airplane. Lastly, a clear understanding of local crime risks is essential.¹¹ This should include scam awareness, situational awareness, and location avoidance.¹²

4 | PREVENTIVE CARE

Table 3 lists the vaccines commonly indicated for a traveler.¹³⁻¹⁵ Ideally, there should be sufficient time to provide the necessary vaccines so that their efficacy is maximized. Individuals with liver disease such as cirrhosis should receive all hepatitis vaccinations.⁹ Special

TABLE 3 Vaccines commonly indicated for a traveler

Routine recommendation	Travel-related recommendation
Diphtheria	Hepatitis A
Tetanus	Hepatitis B
Pertussis	Typhoid fever
Measles	Rabies
Mumps	Meningococcus
Rubella	Poliomyelitis
Varicella	Japanese encephalitis
Pneumococcus	Yellow Fever
Influenza	

TABLE 4 Travel Medications: Prophylaxis and Self-Care

Malaria
chloroquine, atovaquone/proguanil, doxycycline, mefloquine, primaquine
Altitude
Acetazolamide, dexamethasone
Motion sickness
scopolamine, dimenhydrinate

TABLE 5 Recommended list of healthcare information resources in travel medicine

World Health Organization (www.who.int/int)
International Travel and Health (WHO "Green Book")
US CDC Travelers' Health Website (www.cdc.gov/travel)
Health Information for International Travel (CDC "Yellow Book")
Ministry of Foreign Affairs, Japan Government (http://www.anzen.mofa.go.jp/)
US State Department (travel.state.gov)
International Society of Travel Medicine (www.istm.org)

TABLE 6 Major journals and textbooks for travel medicine

Journals:
Bulletin of the World Health Organization
American Journal of Tropical Medicine and Hygiene
Emerging Infectious Diseases Journal
Eurosurveillance Weekly
Infectious Disease Society of North America
Journal of Travel Medicine
Morbidity and Mortality Weekly Report
Tropical Medicine and International Health
Vaccine
Textbooks:
Travel Medicine
Keystone, J.S., Kozarsky, P.E., et al., 2013.
The Travel and Tropical Medicine Manual, 4th Ed.
Jong, E.C., Sanford, C. et al., 2008.
Textbook of Travel Medicine and Health, 2nd Ed.
DuPont, H.L. and Steffen R. et al., 2001.
Wilderness Medicine, 6th Ed.
Auerbach, P.S., 2012

consideration should be given for rabies vaccine if the traveler is planning to a prolonged visit or work in an indigenous area.¹⁰ Live virus vaccines (eg, measles, mumps, rubella, and varicella) are generally contraindicated in the pregnant female, or one who may conceive while traveling.¹⁶

However, risk and benefit need to be examined in some individual cases. Contraception for 2 months after the vaccination of live viruses should be advised. Yellow fever vaccination may be considered after the 6th month of pregnancy, when the risk of exposure is deemed greater than the risk to the fetus. Pregnant women should be advised not to travel to areas where there is a risk of exposure to yellow fever.¹⁷

Chemoprophylaxis and self-care medications are listed in Table 4. These include medications for malaria, diarrheal illnesses, high altitude, and motion sickness.¹⁸⁻²³ The patient should be instructed on the appropriate use of these medications and when to seek help should illness occur. Mefloquine has been known to exacerbate

depression.^{24,25} Scopolamine can lead to dysuria or urinary obstruction in male travelers with benign prostatic hypertrophy.²⁶

A travel emergency kit can also be discussed with the patients. Content suggestions include a copy of medical records and extra pair of glasses, prescription medications, over-the counter medicines and supplies (eg, analgesics, decongestant, cold medicine, cough suppressant, antibiotic/antifungal/hydrocortisone creams, antacids), gauze bandages, tape, self-adhering elastic bandages, moleskin, insect repellent, sunscreen, lip balm, tweezers, scissors, and a thermometer.²⁷

5 | HEALTHCARE INFORMATION RESOURCES

There are a number of reliable sources available for healthcare professionals and travelers.²⁸ A number of them provide regular updates, travel notices and warnings based on infectious outbreaks, environmental dangers, or political unrest. A recommended list is provided in Table 5. A number of textbooks and journals are also available if more detailed information is required (Table 6).

CONFLICT OF INTEREST

The authors have stated explicitly that there are no conflicts of interest in connection with this article.

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