

## CHAPTER 1

# Approach to Travel Medicine and Contents of a Personal Travel Medicine Kit

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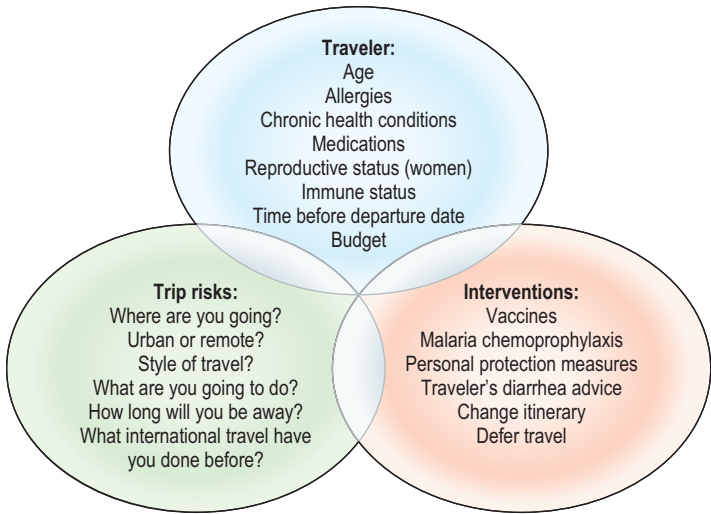
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A new medical specialty, travel medicine, emerged in the 1980s in response to the health needs of increasing numbers of international travelers—a phenomenon resulting from the rapid expansion and growing accessibility of commercial jet transportation. In 1990, the World Tourism Organization (WTO) reported approximately 457 million international arrivals per year. In 2014, the WTO reported 1138 million international arrivals per year, and just under half of these involved countries outside Europe. The upward trend in international travel is projected to continue.

When travel involves geographic translocations of people going from relatively sanitary and industrialized countries in northern temperate zones to destinations in countries with developing economies and tropical environments, potential exposures to exotic diseases and exacerbations of chronic health conditions during travel create unique health concerns for both individuals and societies. Travel medicine is interdisciplinary: it involves a spectrum of knowledge across the health specialties of epidemiology, preventive medicine, primary care, emergency medicine, infectious diseases, tropical medicine, gastroenterology, dermatology, and others. Travel health providers apply a heightened geographic awareness of destination-specific diseases and environmental conditions, as well as considerations of personal safety and well-being to individuals and their journeys.

As international travelers pursue their exploration of the world for recreational, educational, business, religious, and humanitarian purposes, physicians and other healthcare providers need to know how to counsel their traveling patients with regard to a wide variety of health issues. It has been reported that only 1-3.6% of deaths in travelers are due to infectious diseases; however, the risks for acute and chronic morbidity in the individual traveler and the potential for global spread of common as well as exotic human pathogens means that continued attention to transmission, treatment, prevention, and control of communicable diseases are essential considerations for international travelers (Chapters 3-9). Travel health issues involving environmental factors, from time zone changes to air pollution, temperature extremes, and barometric influences at high altitude and undersea are covered in Chapters 2 and 9-11. The psychological and emotional well-being of international travelers is increasingly recognized as a factor contributing to travelers' health (Chapters 2 and 17).

Personal safety has emerged as another important issue in travelers' health. Studies have shown that motor vehicle accidents (25%) and other injuries and accidents (15%, including drownings and falls from height) accounted for more deaths in American travelers than infectious diseases and other illnesses (10%). Heart attacks and other cardiovascular problems in male travelers over 60 years of age accounted for 50% of reported deaths but probably do not represent a preventable consequence of travel. Recommendations for travelers with special needs are given in Chapters 12-19.



**Fig. 1.1** The travel medicine triad.

## APPROACH TO TRAVEL MEDICINE

Travel medicine practice involves the “travel medicine triad” consisting of the traveler, the trip, and the proposed health interventions (Fig. 1.1). The health status of the traveler is the starting point: the very young and the very old are at increased risk from certain infectious diseases due to age-related changes in the immune system; travelers with underlying medical conditions may need more assistance in the health maintenance strategies during travel and may even need to alter their desired itineraries based on access to healthcare at the destination.

Assessment of trip risks is related to the destination(s), with travel to rural tropical areas, communities with high prevalence or outbreaks of diseases that are not preventable by vaccine, extreme environments, and remote regions presenting more challenges than trips on standard tourist routes. Updated information on outbreaks, epidemics, and health conditions abroad are posted on the websites of the Centers for Disease Control and Prevention (CDC, [www.cdc.gov](http://www.cdc.gov)) in Atlanta, Georgia, and the World Health Organization (WHO, [www.who.int](http://www.who.int)) in Geneva, Switzerland. In addition to the CDC and WHO, regional health agencies and public and private health information services also issue periodic guidelines and health information for international travelers. However, many guidelines are by necessity very general; the optimal practice of travel medicine calls for individualized recommendations for each traveler and trip based on the travel health assessment described by the “travel medicine triad” above. Whenever possible, international travelers should seek medical advice 4–6 weeks in advance of their departure date. *This allows adequate time for immunizations to be scheduled, for advice and prescriptions to be given, and for special information to be obtained when needed.*

The medical approach to travel becomes even more complex when the traveler plans a long-term trip lasting months to years, often involving multiple destinations. Such travelers may need to start 3 or more months in advance of anticipated trip departure in order to complete vaccine series and other health examinations needed for issuance of visas, permits, school registrations, and other required documents. Table 1.1 summarizes the steps for pre-travel medical preparation.

**TABLE 1.1 Pre-Travel Medical Recommendations**

1. Consult personal physician, local Public Health Department, or travel clinic about recommendations for immunizations and malaria chemoprophylaxis after selection of the travel itinerary, preferably 4-6 weeks in advance of departure.
2. Prepare a Traveler's Health History (Table 1.2) and a Traveler's Personal Medical Kit (Table 1.7).
3. Carry a satellite phone or a telephone credit card that can be used for international telephone calls or make sure that the friends or relatives listed in the health history would accept an international collect call in case of an emergency.
4. Make sure to have the telephone number of your personal physician, including office and after-hours numbers and a fax number, if available.
5. Check medical insurance policy or health plan for coverage for illness or accidents occurring outside the country of origin (home country).
6. Specifically inquire if the regular insurance policy or health plan will cover emergency medical evacuation by an air ambulance.
7. Arrange for additional medical insurance coverage or for a line of credit as necessary for a medical emergency situation.

**TABLE 1.2 Traveler's Health History**

*International travelers should assemble the following information in a concise and clearly written form to carry with them:*

1. An up-to-date immunization record (preferably the International Certificate of Vaccination).
2. A list of current medications giving both trade names and generic names as well as the dose and dosing schedule.
3. A list of all medical problems, such as hypertension, diabetes, asthma, and heart disease (cardiac patients should carry a copy of the most recent electrocardiogram).
4. A list of known drug allergies and other allergies (e.g., bee stings, peanuts).
5. ABO blood type and Rh factor type.
6. Name and telephone number (and fax number, if available) of the traveler's regular doctor.
7. Name and telephone number of the closest relative or friend in the home country who might assist if the traveler incurs serious illness while out of the country.

All travelers should be advised to assemble the information listed in Table 1.2 in a concise and clearly written form to carry with them. In addition, travelers should plan to carry a supply of medications adequate to last the duration of the trip in their carry-on (not checked) luggage and an extra pair of eyeglasses even if contact lenses are usually worn, along with a copy of the prescription for the corrective lenses.

Health interventions in travel clinics include health education on the trip risks identified for a particular traveler and trip and, at a minimum, recommendations on immunizations, malaria chemoprophylaxis, management of traveler's diarrhea, and prevention of insect-vector-borne diseases.

### **Immunizations for Travel**

Travelers going to destinations in tropical and developing countries from countries in North America and Western Europe are exposed to communicable diseases that are infrequently encountered at home due to a generally high standard of sanitation and mandatory childhood immunization programs. For example, adult travelers have acquired measles and chickenpox

on trips abroad. Paralytic polio is transmitted outside the Western Hemisphere in countries where sanitary conditions favor oral-fecal transmission and routine immunizations do not reach a high level of coverage among susceptible populations. Thus all travelers should be questioned about their status with regard to the routine immunizations of childhood—tetanus, diphtheria, measles, mumps, rubella, and polio—and a primary series or booster doses of the vaccines should be given as appropriate. Vaccines against *Haemophilus influenzae* type b, hepatitis A, hepatitis B, human papillomavirus, meningococcal disease, pertussis, pneumococcal disease, and varicella are also included in the current childhood and pre-adolescent immunization schedules in the United States. Older children and adult travelers should be up-to-date with age-appropriate booster doses or receive a primary series of these standard immunizations if travel will place them at risk (Chapter 5). Travel immunizations for children are covered in Chapter 12.

The vaccinations administered to travelers should be recorded in a copy of the yellow booklet, the “International Certificate of Vaccination or Prophylaxis,” which is recognized by the WHO. This record should be kept in a secure place with the passport, as it becomes a lifelong immunization record. There is a special page for validation of the yellow fever vaccine, which must be done in an official vaccination center, as well as additional pages to record the other vaccines.

Up-to-date information on areas where cholera and yellow fever are reported is best obtained from the CDC ([www.cdc.gov/travel](http://www.cdc.gov/travel)) or the WHO ([www.who.int](http://www.who.int)) websites. Smallpox and cholera vaccines are no longer required for international travel, according to WHO regulations. Proof of meningococcal vaccine receipt is required for visa applications to Saudi Arabia during the time of the Hajj. In the United States, owing to relatively limited supplies and the fact that it must be given within 1 hour after reconstitution of the vaccine, the yellow fever vaccine is available only from official vaccination centers registered by the Department of Public Health in each state.

Some confusion exists over the difference between *required* vaccinations and *recommended* vaccinations. In the CDC publication *Health Information for International Travel* (commonly called “The Yellow Book”), there is a country-by-country listing of vaccines required for entry. The Yellow Book can be accessed through the CDC website or purchased in printed format. Someone calling a travel clinic to ask which shots are required for a trip to Kenya or Venezuela, for instance, would be told by staff consulting the Yellow Book that yellow fever vaccine is not required for a traveler arriving from North America. Yet if one refers to maps showing where yellow fever is endemic, one can see that Kenya and Venezuela both lie within the endemic zones. Thus, yellow fever vaccine might be *recommended* to a traveler to those countries even though the vaccine is not a requirement for entry, depending on that traveler’s intended activities and in-country itinerary.

Other vaccines may be recommended to travelers, depending on their destinations, degree of rural exposure during travel, eating habits, purpose of the trip, and state of health. In this group are the vaccines against hepatitis A, typhoid fever, cholera, meningococcal disease, rabies, Japanese encephalitis, and influenza. Certain travelers, such as healthcare workers, missionaries, Peace Corps volunteers, students, and any person likely to have household or sexual contact with residents in tropical or developing countries should consider immunization against hepatitis B. Persons who are going to tour rural areas or live or work in the People’s Republic of China, India, Thailand, Republic of Korea, and other Asian countries need to consider Japanese encephalitis B vaccine. Travel immunizations are considered in detail in Chapter 5.

### **Malaria Chemoprophylaxis**

In addition to travel immunizations, a major consideration for international travelers is whether their travel will take them to an area where malaria is transmitted. Malaria has a worldwide distribution in tropical and subtropical areas. It is reemerging in areas once considered to be free from risk and continues to be a serious problem for the traveler because of the emergence of new drug-resistant strains in areas where the use of chloroquine

**TABLE 1.3 Recommendations to Avoid Mosquito Bites**

1. Remain in well-screened areas, especially during the hours between dusk and dawn.
2. Sleep under mosquito netting if the room is unscreened.
3. Wear clothing that adequately covers the arms and legs when outdoors.
4. Apply mosquito repellent to exposed areas of skin when outdoors and wear permethrin-treated outer clothing. The most effective mosquito repellents for application to skin surfaces contain *N,N*-diethyl-3-methylbenzamide (DEET) (formerly known as *N,N*-diethyl-*m*-toluamide), which is also effective against biting flies, chiggers, fleas, and ticks. Clothing as well as mosquito netting can be sprayed with products containing permethrin. Permethrin does not repel insects but works as a contact insecticide that leads to the death of the insect.

phosphate and other antimalarial drugs were formerly highly effective for malaria prevention and treatment.

In Africa, South America, Asia, and the South Pacific, infections with chloroquine-resistant *Plasmodium falciparum* malaria (CRPF) are a significant risk to travelers because falciparum malaria can rapidly progress to serious morbidity and mortality if not promptly diagnosed and treated. Updated information on the risk of CRPF is published in the CDC publication *Morbidity and Mortality Weekly Report*, but the CDC website should be consulted for the most current information on a given travel destination. Chemoprophylaxis, or the taking of drugs to prevent clinical attacks of malaria, is recommended to travelers going to areas of malaria transmission, in addition to personal insect precautions. Drugs currently used for the prevention of chloroquine-resistant malaria include mefloquine (Larium®), doxycycline (Doryx®, Vibramycin®), and atovaquone/proguanil (Malarone®). These and other antimalarial drugs are discussed in Chapters 6 and 20.

Malaria is a protozoan parasite transmitted to humans by nighttime biting female anopheline mosquitoes. Since the risk of infection is related to the number of bites sustained, and since current malaria chemoprophylaxis regimens are not completely protective, all travelers should follow certain simple precautions when visiting or staying in malarious areas (Tables 1.3 and 1.4). In addition to preventing bites from mosquitoes spreading malaria, these precautions will help the traveler avoid bites from other mosquito species and insects that spread a variety of diseases in tropical and subtropical areas, for which there are no prophylactic drugs nor vaccines (dengue fever, hemorrhagic fevers, viral encephalitis, leishmaniasis, trypanosomiasis, filariasis, etc.) (Table 1.5). In an analysis of travel-associated illnesses among 17,353 returned travelers reporting to a GeoSentinel Site by Freedman and co-authors, vector-borne diseases accounted for almost 40% of the case reports, exceeding respiratory transmitted diseases and food- and water-borne diseases, respectively.

### Traveler's Diarrhea

Between 30 and 60% of travelers to tropical countries are affected by traveler's diarrhea. This illness is characterized by sudden onset of four to five movements of watery diarrhea per day, sometimes accompanied by abdominal cramps, malaise, nausea, and vomiting. An attack typically lasts 3–6 days. The pathogens causing gastrointestinal disease are acquired mostly through fecal-oral contamination, and preventive strategies to avoid illness include careful selection of food and water (Chapter 8).

Adequate means for purification of water vary depending on the water source. Bringing water to a boil is probably the most reliable way to kill pathogens up to 20,000 ft above sea level. Water purification tablets are convenient and commercially available, and are almost as effective as boiling when the water is at 68°F (20°C). Portable water purification filters have become a popular alternative employed by many travelers; the devices using iodine–resin technology have proved to be effective against the broadest range of pathogens. Heating, chemical, and filtration methods of water purification are discussed in detail in Chapter 7.

**TABLE 1.4 Insect Repellents and Insecticides<sup>a</sup>**

Examples of Insect Repellents Containing DEET for Skin Application

**Ultra 30™ Lotion Insect Repellent:** 30% DEET in a liposome base, up to 12 h protection against mosquitoes; DEET is also effective against ticks, gnats, no-see-ums, sandflies, biting flies, deer flies, stable flies, black flies, chiggers, red bugs, and fleas (Sawyer Products, Safety Harbor, FL; distributed by Recreational Equipment Inc [REI])

**Off! Deep Woods™:** 23.7% DEET, up to 6 h of protection against mosquitoes and other insects (SC Johnson, Racine, WI)

**Off! Skintastic™:** 6.65% DEET, up to 3 h of protection against mosquitoes and other insects (SC Johnson)

**Sawyer Premium Broad Spectrum Insect Repellent Spray™:** contains DEET plus a special fly repellent additive, R-326; use according to package directions (Sawyer Products)

Examples of Permethrin-Containing Insecticides for Application to External Clothing and Mosquito Nets (see [Fig. 1.2](#))

**Permethrin for Clothing Tick Repellent:** contains permethrin in a non-aerosol pump spray can; repels ticks, chiggers, mosquitoes, and other bugs (Sawyer Products). One application lasts 4 weeks or through six washings.

**PermaKill Solution:** 13.3% permethrin liquid concentrate supplied in 8-oz bottle; can be diluted (1/3 oz permethrin concentrate in 16 oz water) to be used with a manual pump spray bottle or diluted 2 oz in 1 1/2 cups of water to be used to impregnate outer clothing, mosquito nets, and curtains (Sawyer Products). Permethrin impregnation of garments or mosquito netting will achieve protection for up to 1 year or good for 30 launderings.

<sup>a</sup>Brand names are given for identification purposes only and do not constitute an endorsement.

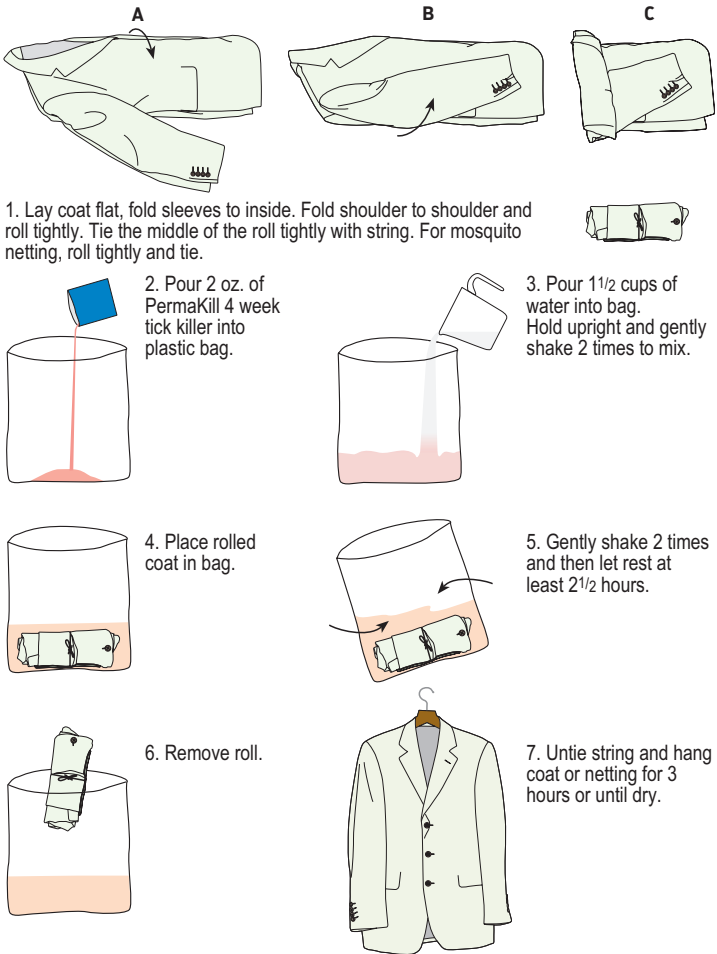
**TABLE 1.5 Important Arthropod-Borne Diseases**

Arthropod Vector	Biting Characteristics	Disease
<i>Anopheles</i> mosquitoes	Evening and nighttime Indoors and outdoors Mainly rural	Malaria Lymphatic filariasis ( <i>Wuchereria bancrofti</i> , <i>Brugia malayi</i> , <i>Brugia timori</i> ) Rift Valley fever O'nyong-nyong fever
<i>Aedes</i> mosquitoes	Daytime (dusk, dawn) Usually outdoors Mostly urban	Dengue fever Yellow fever Chikungunya fever Lymphatic filariasis Rift Valley fever Ross River fever Venezuelan equine encephalitis
<i>Culex</i> mosquitoes	Usually evening and nighttime Mostly outdoors Rural and urban	Japanese encephalitis Lymphatic filariasis Venezuelan equine encephalitis St. Louis encephalitis West Nile encephalitis Murray Valley encephalitis Ross River fever Rift Valley fever Chikungunya fever

**TABLE 1.5 Important Arthropod-Borne Diseases—cont'd**

Arthropod Vector	Biting Characteristics	Disease
<i>Mansonia</i> mosquitoes	Usually nighttime Usually outdoor Rural and urban	Venezuelan equine encephalitis Chikungunya fever Lymphatic filariasis
Fleas	Night or daytime Indoors or outdoors Urban and rural	Plague Endemic (murine or flea-borne) typhus
Body lice	Night or daytime Indoors or outdoors Urban and rural	Trench fever Louse-borne relapsing fever Epidemic (louse-borne) typhus
Ticks	Day and nighttime Outdoors Rural	Mediterranean spotted fever African tick typhus Rocky mountain spotted fever Queensland tick typhus Congo Crimean hemorrhagic fever Omsk hemorrhagic fever Lyme disease Ehrlichiosis Tularemia Babesiosis Tick-borne relapsing fever Tick paralysis
Mites	Day or nighttime Indoors or outdoors Urban or rural	Scrub (mite-borne) typhus Rickettsialpox
<i>Culicoides</i> midges (no-see-ums)	Day or nighttime Usually outdoors Rural	Mansonellosis
Deer and horseflies (Tabanids)	Daytime Outdoors Rural	Loiasis Tularemia
Black flies ( <i>Simulium</i> )	Daytime Outdoors Rural	Onchocerciasis (river blindness)
Sandflies ( <i>Phlebotomus</i> , <i>Lutzomyia</i> )	Nighttime Usually outdoors Urban and rural	Cutaneous leishmaniasis Visceral leishmaniasis (Kala azar) Bartonellosis (Oroya fever) Sandfly fever
Tsetse flies ( <i>Glossina</i> )	Daytime Outdoors Rural	African trypanosomiasis (African sleeping sickness)
Triatomine/reduviid bugs	Nighttime Indoors Rural and urban	American trypanosomiasis (Chagas disease)

Source: Vernon Ansdell, personal communication, 2007.



**A**

1. Lay coat flat, fold sleeves to inside. Fold shoulder to shoulder and roll tightly. Tie the middle of the roll tightly with string. For mosquito netting, roll tightly and tie.

**B**

2. Pour 2 oz. of PermaKill 4 week tick killer into plastic bag.

**C**

3. Pour 1 1/2 cups of water into bag. Hold upright and gently shake 2 times to mix.

4. Place rolled coat in bag.

5. Gently shake 2 times and then let rest at least 2 1/2 hours.

6. Remove roll.

7. Untie string and hang coat or netting for 3 hours or until dry.

**Fig. 1.2** How to apply permethrin to your clothing. (Courtesy of Rose, S.R., 1993. International Travel Health Guide. Travel Medicine, Northampton, MA.)

Owing to widespread publicity in the lay press, many travelers want to know more about the use of antibiotics to prevent diarrhea while traveling. Most travel health experts advise against using drugs as a preventive measure for traveler's diarrhea, the chief objections being the potential for undesirable side effects, allergic reactions, and possible occurrence of antibiotic-associated colitis. However, in selected travelers with time-sensitive mission-critical objectives, prevention of traveler's diarrhea might warrant the use of antibiotic prophylaxis involving daily oral doses of antibiotics for a limited time. Antibiotic prophylaxis and empiric self-treatment of traveler's diarrhea are discussed in detail in Chapter 8.



## MEDICAL EMERGENCIES DURING TRAVEL

Emergency medical care abroad is not a subject likely to be broached by the average travel agent, for fear of alarming the potential traveler. Yet all travelers, especially those planning long-term travel (trips of 3 weeks or longer), the very young and the very old, and those with special medical conditions (cardiac, pulmonary, gastrointestinal, or hematologic problems; pregnancy; human immunodeficiency virus [HIV] infection; organ transplant; etc.) need to have a plan in case the need for emergency medical care arises. Even the young traveler in perfect health can break a leg, be involved in a motor vehicle accident, or be bitten by a rabid dog.

People planning trips to exotic places but who will stay in urban, first-class hotels may have relatively easy access to English-speaking physicians with biomedical training at a level seen in high-income nations. However, many places where modern tourists go are far from English-speaking medical practitioners and modern hospitals. At some travel destinations, medications for treatment of certain infections and special medical conditions may not be available under any circumstances. Thus, for such travelers, pre-travel counseling, preparation of the traveler's medical kit, and a medical emergency evacuation plan are of great importance.

### Finding a Physician in a Foreign Country

For travelers with specific medical conditions, the treating physician at home will often be able to supply the names of colleagues in foreign countries who could be consulted in case of emergency. Professional associations such as the International Society of Travel Medicine (ISTM, [www.istm.org](http://www.istm.org)) and the American Society of Tropical Medicine and Hygiene (ASTMH, [www.astmh.org](http://www.astmh.org)) maintain membership directories that include clinical members working in many destination countries. Foreign embassies often have lists of local physicians that have provided care to their staff. University or other teaching hospitals can be relied on to provide quality care and are likely to have staff members who speak English and other languages. The International Association for Medical Assistance to Travellers (IAMAT, [www.iamat.org](http://www.iamat.org)) is another resource for travelers. Among its many services, this nonprofit organization provides to its members names of English-speaking physicians who have agreed to care for travelers in many countries around the world (Table 1.6).

### Emergency Information Needed

The Traveler's Health History (Table 1.2) and the International Certificate of Vaccination or Prophylaxis should be carried with the passport at all times. Although a medical-alert

**TABLE 1.6 Methods for Purification of Water<sup>a</sup>**

Method	Brand Name	Quantity to Be Added to 1 Quart or 1 Liter of Water
Iodine compound tablets <sup>b</sup>	Potable Aqua®	Two tablets are added to water at 20° C, and the mixture is agitated every 5 min for a total of 30 min.
Chlorine solution, 2-4%	Common laundry bleach	Two to four drops are added to water at 20° C, and after mixing, the solution is kept for 30 min before drinking.
Iodine solution <sup>b</sup>	(2% tincture of iodine)	Five to ten drops of iodine are added to water at 20° C, and after mixing, the solution is kept for 30 min before drinking.
Heat		Water is heated to above 65° C for at least 3 min (at 20,000 ft altitude or 6000 m, water boils at 80° C).

<sup>a</sup>The methods presented here are sufficient to kill *Giardia* cysts in most situations. Heat is the best method when tested in a laboratory situation. (See Chapter 7 for more detailed information.)

<sup>b</sup>Iodine-containing compounds should be used with caution during pregnancy.

bracelet or necklace (available for order in most pharmacies or from Internet vendors) is recommended to travelers with life-threatening allergies or medical conditions, people offering assistance in some countries may not recognize the significance of, or even look for, such identification.

### Payment for Services

Coverage for emergency medical services abroad should be verified with the traveler's regular insurance company or healthcare plan before the trip. Medicare will not cover services provided in foreign countries, with the exception of an urgent problem arising en route from the United States to Alaska that requires medical treatment in Canada. Several companies specializing in medical insurance and emergency medical evacuation for travelers are listed in the Appendix. Payment for medical services abroad is customarily due when care is given, but travelers will need to save the receipts for reimbursement by their health coverage plan. Insurance companies are unlikely to pay for procedures or treatments that are experimental or not available in the United States.

### Emergency Medical Care en Route

At the time of writing, most international commercial aircraft carry an emergency first-aid kit, with supplies and equipment for a basic life-support response. Advanced life-support equipment and drugs may not be available for passengers with acute cardiac or pulmonary emergencies, although some aircraft do carry automatic external defibrillator units. Generally, oxygen is available only in the event of cabin decompression, although some airlines carry small portable tanks for medical emergencies. Patients with chronic pulmonary conditions requiring supplemental oxygen must make arrangements at the time of reservation for supplies of in-flight portable oxygen tanks. In the event of a serious medical emergency that occurs during flight, most commercial aircraft will reroute and land at the closest commercial airport. Chapter 4 presents further details of air carrier health issues, and Chapter 16 further explores medical issues for travel with chronic medical conditions.

Commercial international cruise ship lines carrying fee-paying passengers are required by maritime law to have a physician on board at sea. The qualifications of the ship's physicians and the availability of advanced life-support equipment and drugs may vary from line to line, so specific inquiries should be made.

### Emergency Evacuation Home

Contingency plans for a medical emergency should be discussed openly and the need for special travel insurance coverage considered with all travelers regardless of underlying health. Even a healthy young traveler is at risk for contracting a serious illness or accidental injury during travel.

Some commercial airlines will allow passage of a seriously ill person back to the United States only when that person is accompanied by a licensed physician. Payment of the physician and purchase of his or her round-trip airfare must be provided in such cases. In other cases, emergency evacuation home must proceed by way of specially equipped aircraft (helicopters and fixed-wing aircraft), which usually carry their own teams of medical personnel, including physicians and nurses. Costs for such evacuations can run to tens of thousands of dollars, depending on geographic location, weather conditions, and medical needs.

Emergency evacuation insurance is available; however, prospective subscribers need to read the terms carefully, as some plans provide only for evacuation to the nearest regional medical center, not for transport back to a medical facility in the traveler's home country. Given that very ill people would prefer to receive a customary standard of care, evacuation of a patient to a foreign medical center, where English and other Western languages may be spoken as a second language and where medical protocols are different, may not be as satisfactory as evacuation back to the traveler's country of origin. Names and addresses of organizations arranging international emergency transport services for their members are given in the Appendix.

### Emergency Blood Transfusion

The traveler's blood type, if known, should be listed in the Traveler's Health History and/or in the space provided in the International Certificate of Vaccination or Prophylaxis booklet. If an urgent blood transfusion becomes necessary, however, and the blood type is unknown, the traveler's blood can be quickly typed and then tested against the donor's blood. However, in certain parts of the world, certain blood types may not be easily obtainable. For instance, in the People's Republic of China, the predominant blood type is A-positive among the resident population.

Travelers with bleeding conditions or tendencies (e.g., those on anticoagulation therapy or those with a history of bleeding peptic ulcers) should get information before their trip from their local blood bank about resources in the countries to be visited.

### WILDERNESS AND ADVENTURE TRAVEL

The more remote from access to established medical care facilities, the more the traveler has to anticipate self-care or peer care for medical problems that might occur. Many of the medical concerns arising during adventure travel are covered throughout this book. However, the treatment of serious injuries and trauma in the wilderness and the approach to survival skills is beyond the scope of this book and are the focus of the Wilderness Medical Society ([www.wms.org](http://www.wms.org)). Specific training and equipment may be needed for survival in wilderness settings or extreme environments.

The adventure or expedition traveler planning a remote and/or challenging route is advised to get accurate information regarding the physical difficulty and inherent environmental risks associated with the trip itinerary, to carefully review the qualifications and personalities of the trip leader(s) and fellow adventurers, to query the dietary arrangements for the trip, and to verify the possibilities for emergency evacuation. In addition, adventure travelers should acquire advanced first-aid skills and prepare themselves to be in optimal physical condition prior to departure.

### THE TRAVELER'S MEDICAL KIT

**Table 1.7** presents recommendations for a traveler's medical kit for a short-term international trip. Depending on geographic location(s), type(s) of activities planned, and underlying health, the traveler may augment the kit with regular prescription medications, medication for high-altitude sickness, antifungal preparations, treatment for ectoparasites, and additional antiparasitic drugs. Pulmonary patients may need to make arrangements for portable oxygen supplies and even oxygen concentrator machines, and peritoneal dialysis patients may travel with dialysate fluids and accessories and may need advance reservations for access to dialysis services at the destination (see Chapter 16).

### Prescription Medications

At least a few days' supply of necessary medications should be taken in hand-held luggage. Preferably, the entire supply of usual prescription medications, enough to last the whole trip, should be taken in the hand-held luggage. If possible, travelers should not pack their prescription medications in checked luggage, as the baggage could be lost or pilfered in transit. Travelers should not plan to purchase prescription medications abroad as a cost-reducing strategy: expired, improperly stored, and counterfeit drugs are a growing problem worldwide, or the traveler's usual medications may simply not be available.

### SUMMARY OF CONSIDERATIONS FOR HEALTH AND TRAVEL

In addition to travel immunizations, malaria chemoprophylaxis, possibility of traveler's diarrhea, and prevention of insect-vector-borne diseases, travelers need to be counseled about common medical problems of international travel that may be related to the mode of transportation, changes in altitude, changes in time zones, increased exposure to sun, taking of new drugs, and changes in climate and humidity (Chapters 2, 4, 6, and 9-11).

**TABLE 1.7 The Traveler's Personal Medical Kit<sup>a</sup>**

Below are listed some of the suggested items for the traveler's personal medical kit. Not all of these items are necessary or appropriate for every traveler; items should be selected based on the style of travel and destination(s).

**Prescription items<sup>b</sup>**

**Antibiotics:** Antibiotics may be useful for travelers at risk for skin infections, upper respiratory infections (URIs), and/or urinary tract infections (UTIs), as well as for treatment of traveler's diarrhea.

*Skin infections*

Mupirocin 2% (Bactroban) topical antibiotic ointment, 15-gm tube or 1-gm foil packets. Apply to infected skin lesions three times a day.

*Upper respiratory tract infections (sinusitis, bronchitis):*

Azithromycin, 250-mg tablet. Two tablets PO first dose, followed by one tablet PO q24 h × 4 additional days; or

Amoxicillin 875 mg/clavulanate 125-mg tablet. One tablet PO q12 hr × 7 days.

*Urinary tract infections (uncomplicated):*

TMP/SMX DS tablet: One tablet PO q12 h × 3 days; or

Ciprofloxacin, 250-mg tablet: One PO q12 h × 3 days.

**Antibiotics, Multipurpose:** These provide empiric coverage for skin infections, URI, and UTI. (Note that ciprofloxacin and levofloxacin are commonly used for treatment of traveler's diarrhea as well.)

Amoxicillin 875 mg plus clavulanate 125-mg tablet (Augmentin 875 mg). One tablet PO q12 h × 3-7 days; or

Ciprofloxacin (Cipro), 500-mg tablet. One tablet PO q12 h × 3-7 days; or

Levofloxacin (Levaquin), 500-mg tablet. One tablet PO q24 h × 3-7 days.

**Allergic Reactions** (bee, wasp, or hornet stings; food; etc.):

*EpiPen emergency injection of epinephrine:*

Use according to package directions for severe reaction to bee sting or for other allergic reaction causing shortness of breath, wheezing, or swelling of the lips, eyes, or throat. This will give short-acting relief. As soon as the afflicted person can swallow, administer Benadryl tablets as directed below.

*Benadryl (diphenhydramine), 25-mg tablet (non-prescription):*

Take two tablets by mouth immediately, then one to two tabs q6 h × 2 days following an allergic reaction. Use Benadryl alone for mild to moderate allergic skin reactions and itching, and take Benadryl following the use of the EpiPen.

*Medrol Dosepak (methylprednisolone):*

For use with severe and persistent allergic reactions such as hives (urticaria) and/or angioedema (swelling under the skin). Follow the instructions for the tapering dose schedule in the packet. May be required in addition to Benadryl for severe allergic reactions.

**Bronchospasm/asthma:** Albuterol or salbutamol inhaler (multidose inhaler):

Use for asthma attacks or for allergic reactions that cause persistent wheezing. Two puffs 2 minutes apart, each inhaled as deeply as possible into the lungs, up to four times a day.

**Cough Suppressant:** A small bottle of prescription cough syrup or a few tablets of codeine-containing medication (Tylenol #3 tablets will serve this purpose as well as that of treatment for severe headache or pain).

**Diarrhea Treatment:** An antimotility drug such as loperamide (Imodium) (non-prescription) plus an antibiotic (e.g., ciprofloxacin, levofloxacin, azithromycin) may be prescribed for self-treatment (see Chapter 8). *Note: Ciprofloxacin and levofloxacin are not licensed for age under 18 years.*

**Eyeglasses:** If corrective lenses are used, bring along an extra pair of eyeglasses and the prescription.

**High-Altitude Illness:** Acetazolamide (Diamox) may be prescribed for prophylaxis of high-altitude illness for high-altitude destinations (see Chapter 10).

**Jet Lag:** In some cases, a short-acting sleeping medication is helpful in treating sleeping problems associated with jet lag (see Chapter 9).

**TABLE 1.7 The Traveler's Personal Medical Kit—cont'd**

**Malaria Pills:** As the malaria situation in many countries continues to change, malaria chemoprophylaxis changes as well. Updated information on the malaria situation for specific destination(s) needs to be carefully reviewed, and appropriate medications prescribed (see Chapter 6).

**Motion Sickness:** Travelers who experience motion sickness may be prescribed a medication for this (Chapter 9) or may purchase over-the-counter medications (Dramamine, Marezine).

**Nausea and Vomiting:** Compazine (prochlorperazine), 25-mg rectal suppository. This may be helpful when oral medications cannot be tolerated and an injectable antiemetic is not available.

**Pain Relief:** A modest supply of prescriptive pain medication may be needed for headache, toothache, or musculoskeletal injury, especially for rural travel or extended trips.

Tylenol #3 (acetaminophen with 30 mg codeine) tablets: one to two tablets PO q4-6 h prn severe headache or pain.

**Antibiotic Ointment:** Triple antibiotic ointment (Neosporin) for topical application on minor cuts and abrasions.

**Antifungal Powder or Cream:** For travelers prone to athlete's foot and/or other fungal skin problems.

**Antifungal Vaginal Cream or Troches:** For women prone to yeast vaginitis associated with changes in climate or following antibiotic use (see Chapter 14).

**Antihistamine tablets (diphenhydramine, chlorpheniramine, cetirizine, loratadine, etc.):** For relief of nasal and skin symptoms due to allergies.

**Decongestant Tablets (pseudoephedrine, etc.):** For nasal congestion due to colds, allergies, or water sports.

**Diarrhea, Traveler's:** Bismuth subsalicylate (Pepto-Bismol) or loperamide (Imodium) tablets may be taken to manage symptoms of traveler's diarrhea (see Chapter 8).

**Hydrocortisone 1% Cream:** For topical relief of itching due to insect bites or sunburn.

**Laxative:** For relief of "traveler's constipation" due to changes in diet and schedule. Patients with a history of this problem may need to take a fiber supplement and/or stool softener.

**Oral Rehydration Salts:** WHO-ORS (Jianas Brothers, Kansas City, MO) or CeraLyte (Cera Products, Columbia, MD): packets of balanced oral rehydration salts and sugar to be mixed in purified water safe for drinking for fluid replacement and rehydration during severe diarrhea (see Chapter 8).

**Throat Lozenges:** For relief of throat irritation due to air pollution or upper respiratory infection.

#### *General health and first-aid supplies*

**Antiseptic Solution:** Topical solution for cleansing of minor cuts and abrasions (Hibiclens, Mönlycke Health Care, Norcross, GA).

**Bandages:** Adhesive bandage strips with sterile pad (BandAids), 4 × 4-inch sterile gauze pads, 2-inch roll gauze dressing, 2-inch elastic bandage (Ace wrap).

**Blister Pads or Moleskin:** For prevention of blisters on feet

**Ear Plugs:** For ear protection in noisy environments and to aid sleep in the presence of snoring companions or noisy hotel accommodations.

**Case (Waterproof):** To hold and organize medications and supplies; zipper-lock plastic bags can serve this purpose.

**Condoms (Latex):** For prevention of sexually transmitted diseases.

**Hand Sanitizer (Waterless) or Pre-moistened Towelettes:** For hand cleansing on the go.

**Insect Repellent (with DEET):** For topical application to exposed areas of skin (see Tables 1.3 and 1.4).

**Insecticide Spray (with Permethrin):** For application to external clothing, mosquito nets, curtains, etc. (see Tables 1.3 and 1.4).

**Safety Pins:** Rustproof baby diaper pins are useful for all kinds of emergency repairs, pinning room curtains shut, hanging laundry on wire hangers, etc.

*Continued*

**TABLE 1.7 The Traveler's Personal Medical Kit—cont'd**

**Sanitary Supplies (for Menstruating Women):** Tampons and/or sanitary napkins (these may not be readily available in tropical and developing parts of the world). (See Chapter 14 for other useful components of a travel medicine kit for women.)

**Scissors:** For general use, if not included in pocket knife.

**Skin Glue:** For repair of minor lacerations, in place of sutures.

**Swiss Army Knife, SOG Multi-tool, or Similar:** An all-purpose gadget, especially useful if tweezers and scissors are included. (Check airline guidelines for transporting in carry-on or checked bags.)

**Sunglasses:** With UV light protective lenses.

**Sunscreen:** Any brand with sun-protective factor (SPF) sufficient to protect against UV-A and UV-B.

**Tape, Duct:** For general equipment repairs, creating splints, etc.

**Tick Pliers:** For participants in outdoor activities, to remove ticks safely and completely (see Fig. 1.3).

**Toilet Paper:** Often not available in public rest facilities when one is in desperate need (compact rolls are available in sporting supply stores).

**Thermometer, Oral:** Very important for assessment of illness while traveling.

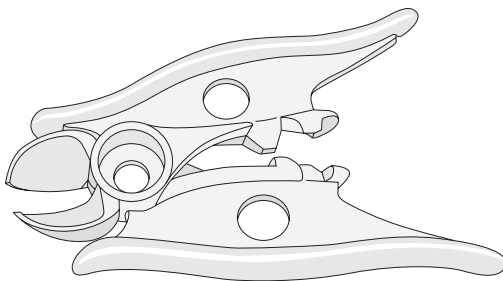
**Urinary Deflector or Funnel:** Device allowing women to urinate from a standing position (see Chapter 14).

**Water Disinfection Chemicals:** See Table 1.6 and Chapter 7.

**Water Disinfection Device, Portable:** See Chapter 7.

\*Trademark names are provided for identification only and do not constitute an endorsement.

<sup>b</sup>Dosage information applies to adults in good health without contraindications to the given drug. PO, orally; prn, as needed.



**Fig. 1.3 The tick pliers. A lightweight plastic device for safe and complete removal of ticks.**

It is important to know the female traveler's reproductive plans or if she is possibly pregnant. The physical demands and geographic factors of travel may influence the pregnancy. Additionally, certain required or recommended vaccines may be contraindicated, as may some drugs used for malaria chemoprophylaxis or for the relief of common traveler's ailments (Chapter 14).

Travelers with HIV infection need thoughtful pre-travel counseling on vaccines, potential drug interactions, geographic infectious disease hazards, and access to medical care during travel (Chapter 15). When the traveler has an underlying medical condition, travel arrangements and health recommendations become increasingly important (Chapter 16). Travelers' mental and emotional health may be challenged by being away from home, being among relative strangers, and adaptation to new dietary and cultural customs (Chapters 17–19).

If an extended stay abroad is anticipated (6 months or more), even generally healthy persons should have a routine physical examination, including routine screening laboratory

tests, blood typing, and evaluation of tuberculosis status (skin test or screening chest radiograph). The long-term traveler should also have a complete dental examination. Sometimes the form and content of the pre-travel medical evaluation will be dictated by the requirements of the sponsoring employer or agency, the health insurance carrier, or even the application for a foreign student visa, foreign resident status, or a foreign work permit. Requests from foreign governments for pre-travel syphilis serology, HIV serology, examination of a stool specimen for ova and parasites, and chest radiograph are not uncommon when individuals apply for temporary residency (Chapter 18).

Diseases spread by sexual and intimate contact should also be discussed with the international traveler, especially those going abroad for an extended stay. In addition to the sexually transmitted diseases (STDs) frequently seen in Northern temperate climates (gonorrhea, syphilis, chlamydia, hepatitis B, herpes simplex, and HIV), lymphogranuloma venereum, chancroid, and granuloma inguinale are a risk in many tropical and developing countries.

The prevalence of HIV infection is many times higher than the number of acquired immunodeficiency disease syndrome (AIDS) cases reported, and the infection is present in all countries. In Africa and Asia, heterosexual intercourse is a major mode of transmission of HIV. Recent reports suggest that sexual contact with residents of developing countries occurs with surprising frequency among tourists, business travelers, and expatriate workers. International travelers need to be warned of the risk of sexual contact with strangers, regardless of sexual orientation, and particularly of contact with sex-industry workers, in whom HIV infection and other STDs are more prevalent (Chapters 41–44). Travelers who might engage in sex with new partners should be advised to purchase high-quality latex condoms and to use them during intercourse.

Finally, when the traveler returns home with a significant change in health, providers of medical care need to be acquainted with the signs and symptoms of serious tropical diseases. For example, misdiagnosis of a case of *P. falciparum* malaria as the “flu” can lead to tragic consequences for the patient, or an occult infection with *Strongyloides stercoralis* may threaten the health of a patient who has survived organ transplantation but must be maintained on immunosuppressive drugs. A patient passing a large intestinal worm, while usually not facing a life-threatening situation, may still present to an emergency room in a state of extreme anxiety and fright. An appreciation of the geographic distribution of tropical and exotic diseases and the risk factors contributing to the transmission of disease can help the healthcare provider to generate an appropriate differential diagnosis for illness occurring in the returned traveler (Chapters 3 and 20–49). A similar approach is used for the health screening of immigrants, refugees, and international adoptees, because they, too, are members of the population of international travelers (Chapter 19).

Although behavior modification and compliance with travel health recommendations may be just as important in optimizing the health of travelers as receiving travel vaccines and taking the recommended malaria chemoprophylaxis, communicating and motivating desired behavior changes among travelers seeking pre-trip medical advice is one of the biggest challenges facing travel health advisors today.

## FURTHER READING

Auerbach, P.S. (Ed.), 2011. *Management of Wilderness and Environmental Emergencies*, sixth ed. CV Mosby Company, Baltimore.

*This textbook is in its sixth edition and remains the ultimate resource for medical information on wilderness and environmental health issues. With ample illustrations and wilderness lore, it also makes fascinating reading for arm-chair adventure travelers.*

CDC, 2016. *CDC Health Information for International Travel—2014*. Oxford University Press, New York.

*Also known as “The Yellow Book,” the CDC HIFIT is issued every 2 years by the Centers for Disease Control and Prevention and provides authoritative guidance for international travel health from a US public health and regulatory perspective. The Yellow Book may be purchased in print, and the content is also freely accessible at*

*[www.cdc.gov/travel](http://www.cdc.gov/travel) and through mobile applications for Android and iOS devices. The website [www.cdc.gov](http://www.cdc.gov) is an invaluable source for the latest information on global health emergencies and disease outbreaks and has links to travel and tropical medicine clinic directories maintained by the ASTMH and the ISTM.*

Freedman, D.O., Weld, L.H., Kozarsky, P., et al., 2006. Spectrum of disease and relation to place of exposure among ill returned travelers. *New Engl. J. Med.* 354, 119–130.

Steffen, R., Rickenbach, M., Wilhelm, U., et al., 1987. Health problems after travel to developing countries. *J. Infect. Dis.* 156, 84–91.

*Research on travel-related illnesses is difficult to conduct as travelers are on the move, becoming ill in one location and seeking care in another.*

Jong, E.C., Terry, A.C., Marcolongo, T., 2016. The IAMAT Guide to Healthy Travel. International Association for Medical Assistance to Travellers (IAMAT), Toronto.

*The IAMAT Guide to Healthy Travel is written to educate the traveler and features a countdown for pre-travel preparations, a check-list for travel medicine kit supplies, and a glossary of common travel ailments along with guidance for self-care. The printed booklet is pocket-sized to be taken on a trip; content may be accessed through the eLibrary at [www.iamat.org](http://www.iamat.org).*

Keystone, J.S., Freedman, D.O., Kozarsky, P. (Eds.), 2013. *Travel Medicine: Expert Consult—Online and Print*, third ed. Saunders, Philadelphia.

*This comprehensive and detailed textbook covers all aspects of travel health and has searchable content and downloadable images at [expertconsult.com](http://expertconsult.com). It serves as a valuable reference book for clinicians providing pre-travel services including immunizations, malaria chemoprophylaxis, and advice for traveler's diarrhea, as well as other health issues, and for those caring for returned travelers with travel-related illnesses.*

Hargarten, S.W., Baker, S.P., 1985. Fatalities in the Peace Corps: a retrospective study: 1962–1983. *JAMA* 254, 1326–1329.

Hargarten, S.W., Baker, T.D., Guptill, K., 1991. Overseas fatalities of United States citizen travelers: an analysis of deaths related to international travel. *Ann. Emerg. Med.* 20 (6), 622–626.

Paixao, M.L.T., Dewar, R.D., Cossar, J.H., et al., 1991. What do Scots die of when abroad? *Scott. Med. J.* 36, 114–116.

Procriv, P., 1995. Deaths of Australian travelers overseas. *Med. J. Aust.* 163, 27–30.

*Data on overseas fatalities are relatively scarce, but the four articles listed above suggest that citizen travelers can succumb to accidental trauma and pre-existing cardiovascular disease.*