A Practical Guide to Prevention Strategies for International Travelers

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A Practical Guide to Prevention Strategies for International Travelers
Helping Travelers Prepare for Their Trip Abroad

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Part 2 of 2

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NEEDS STATEMENT

The number of Americans traveling abroad continues to grow, including to developing areas of the world that were rarely visited. In many cases primary-care physicians, pediatricians, and pharmacists are travelers’ first—and possibly only—contact with the health-care system before departure. These pre-travel consultations are crucial for preventing travel-related illnesses.

The Centers for Disease Control and Prevention recommends that virtually all travelers—including those to European countries and other developed nations—have up-to-date immunizations so that they are adequately protected against infectious diseases such as influenza, measles, diphtheria, pertussis, tetanus, and hepatitis A. The pre-travel consult also represents an opportunity for health-care providers to counsel patients regarding mosquito avoidance, self-treatment for traveler’s diarrhea, and the prevention of deep-vein thrombosis and other noninfectious illnesses. Additionally, children, the elderly, pregnant women, and immunocompromised patients may be particularly vulnerable to certain problems while traveling and may require special counseling.

Studies suggest that patients who undergo pre-travel consultations are more informed when it comes to health promotion and disease prevention. Unfortunately, only about a third of international travelers seek out pre-travel advice. Therefore, health-care providers should screen for travel during every patient encounter. Even if travel is imminent, some vaccine schedules may be accelerated to provide protection, and information to reduce health risk could still be beneficial.

Dependent on their precise destination, travelers to Latin America, Asia, and Africa may be exposed to diseases that are rare or nonexistent in the United States. Chief among these is malaria, the most common cause of fever among returned travelers. Some travelers dangerously underestimate the seriousness of the infection, and misconceptions and misinformation about malaria abound, especially among immigrants who grew up with the disease in their native country.

References


LEARNING OBJECTIVES

After taking part in this educational activity, participants should be able to:

• Identify and take advantage of opportunities for the provision of effective pre-travel care
• List the most common diseases for which an individual traveler is at risk
• Administer routine, recommended, and required vaccines in accordance with each patient’s itinerary, season of travel, and anticipated activities
• Counsel patients regarding mosquito avoidance, self-treatment for traveler’s diarrhea, and the prevention of altitude illness and deep-vein thrombosis
• Recommend appropriate vaccines and chemoprophylaxis that are available from travel clinics for such diseases as malaria, yellow fever, and Japanese encephalitis
• Correct travelers’ common misconceptions about malaria and malaria prophylaxis

TARGET AUDIENCE

Primary-care physicians, pediatricians, and pharmacists

designates this educational activity for a maximum of 1.0 AMA PRA Category 1 Credit(s)™. Physicians should only claim credit commensurate with the extent of their participation in the activity.

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CME/CE credit will be awarded provided that this activity is used and completed according to instructions and a score of 70% or better is achieved. A certificate of credit will be sent within 6 weeks of receipt of the test answers to those who successfully complete the examination.

Estimated time to complete this activity is 1.0 hour.

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A Practical Guide to Prevention Strategies for International Travelers
For the international traveler, sound medical advice can help ensure a safe trip unmarred by illness. When you learn that a patient is planning a trip abroad, two of the most important things you need to do are make sure that the traveler is immunized against vaccine-preventable diseases that he or she may be exposed to and offer counseling on how to avoid other potential travel hazards. If appropriate, chemoprophylaxis against malaria should also be initiated.

Before you can provide helpful advice, of course, you must be aware of the patient’s travel plans. Because most patients do not seek health advice before departure, that means taking advantage of every medical encounter to ask about travel. A 2003 survey of travelers leaving from a New York airport, for instance, found that only 36% had sought pre-travel health counseling, including many who had planned their trip at least a month in advance. A 2006 survey identified only 31% of respondents who
had visited any health practitioner for advice before departure and only 13% who saw a travel-medicine specialist.²

**IS THE TRAVELER HEALTHY ENOUGH TO FLY?**

When you learn that a patient will be traveling abroad, review his or her current health status and medical history. Patients who may not tolerate the lower oxygen levels and pressure changes in airplane cabins should be counseled not to fly. They include those who can’t walk at least 50 m (164 feet) and climb a flight of stairs without suffering angina or severe dyspnea, those who have had a recent myocardial infarction or coronary artery bypass (1 or 2 weeks before travel), and those with conditions such as unstable angina, decompensated heart failure, exacerbation of obstructive-restrictive lung disease, a large pleural effusion, or pneumothorax 3 weeks before travel.³ Recent studies suggest that travelers with nonobstructive lung disease generally can fly safely.⁴

Pregnant women, especially if they plan to fly during the third trimester, should consult their obstetrician about possible risks, including the risk of going into labor during or after the flight. Women with a complicated pregnancy should not fly.³

**ARE ROUTINE IMMUNIZATIONS UP TO DATE?**

The pre-travel visit provides a golden opportunity to bring routine vaccinations up to date. Try to determine whether the patient has received all routine immunizations recommended by the Advisory Committee on Immunization Practices (ACIP) of the Centers for Disease Control and Prevention (CDC). (See www.cdc.gov/vaccines/recs/schedules/.)⁶ Because the schedules change from year to year, you may need to administer recently added vaccines, such as human papillomavirus (HPV) vaccine; herpes zoster vaccine; tetanus toxoid, diphtheria toxoid, and acellular pertussis vaccine (Tdap); and influenza vaccine.

Routine immunizations are especially important for children because many vaccine-preventable diseases are more prevalent when traveling abroad, especially in developing countries. Moreover, traveling with children can increase the parents’ risk of exposure.⁷ Children too young to have received all primary vaccines should complete as much of the primary series as possible before departure, using accelerated dosing schedules.⁸ (The CDC’s Health Information for International Travel [“Yellow Book”] contains guidance on accelerated vaccination schedules in Chapter 2 at www.cdc.gov/travel/yellowbook/2010/table-of-contents.aspx.)⁹

When possible, give needed vaccinations before the patient leaves the office; if more than one dose is required, schedule a follow-up appointment. If departure is imminent, use an accelerated vaccine schedule.

**WHAT OTHER VACCINATIONS DOES THE TRAVELER NEED?**

The patient’s itinerary, age, and medical condition may call for recommended or required vaccinations beyond the routine schedule.

**Hepatitis A** is one of most common vaccine-preventable infections acquired during travel. Infected people shed the virus in feces. It can spread by person-to-person contact or via contaminated food and water. Boiling liquids and cooking food to 185º F inactivate the virus.⁹
Vaccination is recommended for travel to areas with potentially poor sanitation and hygiene, but could be considered for all travelers. Although hepatitis A is usually self-limited, it accounted for the most time lost from work in a study of returned travelers, and it has a mortality rate higher than 2% in people older than 40 years. Vaccination of children has been part of the routine immunization schedule since 2006.

The hepatitis A vaccine (HAV) is given in two intramuscular doses of vaccine at least 6 months apart. The 2007 revised ACIP recommendations state that a first dose any time before departure (instead of the previously recommended 2 to 4 weeks) adequately protects healthy travelers between 12 months and 40 years of age.

**Hepatitis B** virus is transmitted by contact with infected blood or body fluids through skin punctures, open lesions, or mucous membranes. Infection in travelers occurs mainly among adults through sexual contact and intravenous drug use. Health-care workers are also at risk. The virus can spread by medical procedures, blood transfusion, and cosmetic procedures such as tattooing and body piercing. The vaccine is included in the routine immunization schedule for children from birth to 18 years and is recommended for adults at risk.

Hepatitis B vaccine (HBV) is available as a single-antigen formulation or in fixed combinations with other vaccines. One combination (HBV plus HAV) is licensed for adults and two others for children (HBV plus Haemophilus influenzae type b and HBV plus DTaP and inactivated polio virus [IPV]). The vaccine is usually given in three IM doses at 0, 1, and 6 months, but alternate accelerated schedules have been FDA-approved (www.cdc.gov/vaccines/upd-vac/hepb/default.htm).

The CDC recommends immunization against hepatitis B for travelers visiting areas with intermediate and high prevalence of the virus (≥2%), which includes Asia, Africa, and large sections of South America. Patients in a risk group or from an area with a prevalence greater than 2% (see map in the “Yellow Book” at wwwnc.cdc. gov/travel/content/yellowbook/home-2010.aspx) should be tested for hepatitis B surface antigen not only to avoid unnecessarily vaccinating an infected person but to provide them with the opportunity to become more aware of hepatitis B infection should they require medical care for the infection.

**Meningococcal disease.** The bacterium Neisseria meningitidis spreads from person to person via droplets from the nasopharynx. The CDC recommends a quadrivalent vaccine for travelers to the meningitis belt of sub-Saharan Africa—from Senegal in the west to parts of Ethiopia and Eritrea in the east—during the dry season (December to June).

Meningococcal conjugate vaccine (MCV4) is preferred to meningococcal polysaccharide vaccine (MPSV4) for patients 2 years through 55 years of age. For more information, see the ACIP recommended immunization schedules.

Everyone older than 2 years traveling to Saudi Arabia for the hajj or umrah must receive one dose of quadrivalent meningococcal vaccine. Travelers must produce a certificate of vaccination issued at least 10 days (and no longer than 3 years) before arrival in the country.

**Typhoid fever,** an acute, potentially life-threatening bacterial disease caused by Salmonella typhi, is spread by food and water...
A Practical Guide to Prevention Strategies for International Travelers

contaminated with infected feces. The risk of infection is highest in developing countries in Asia, Africa, the Caribbean, and Central and South America; those visiting friends and relatives, especially in India, are more likely to contract the disease than other travelers. Resistance of \textit{S. typhi} to antibiotics is growing, and some people who contract typhoid become carriers who can transmit disease to others, increasing the importance of prevention.

The CDC recommends vaccination for travelers to Central and South America, Asia, and Africa, especially those headed to smaller cities and rural areas with poor sanitation and hygiene. Two vaccines, oral and intramuscular, are available; they are 50% to 80% effective. The oral vaccine, a live attenuated strain of \textit{S. typhi} Ty21a, is taken in four doses, one capsule every other day, the final dose at least a week before departure. The minimum age for vaccination is 6 years. Because of uncertainty about whether the oral vaccine can be given concurrently with mefloquine, the vaccination series is usually completed 3 days before starting mefloquine or atovaquone/proguanil prophylaxis. Doxycycline should not be given concomitantly, while chloroquine can be given with oral typhoid vaccine.

The IM Vi capsular polysaccharide vaccine is given in a single dose at least 2 weeks before departure. It can be administered to children as young as 2 years. Studies suggest that, when departure is imminent, the vaccine can be given as late as 1 week before the traveler leaves.

**Rabies** is highly endemic in areas of Africa, Asia, and Central and South America. Most deaths occur in Southeast Asia and the Indian subcontinent. Pre-exposure vaccination is generally recommended for travelers to places with a high prevalence of rabies—especially rural areas—who risk exposure to animals through occupational or outdoor recreational activities and may not have access to prompt post-exposure prophylaxis.

Children are at high risk—accounting for almost half of rabies deaths—because they are more likely than adults to play with animals, more vulnerable to bites on the head and neck, and less likely to report exposures.

Pre-exposure immunization with killed rabies virus is given in three doses on days 0, 7, and 21 or 28. Pre-exposure immunization does not eliminate the need for post-exposure immunization, but it does eliminate the need for rabies immune globulin (RIG), an important consideration during international travel as RIG is rarely available. Pregnancy is not a contraindication. The usual minimum age is 12 months, but the vaccine can be given to children as young as 2 months under special circumstances.

**Japanese encephalitis** virus, spread by \textit{Culex} mosquitoes, occurs throughout most of Asia, where it is the primary cause of viral neurologic illness and disability. About 1 in 250 infected people develop clinical illness, usually encephalitis. Mortality can run as high as 60%, and as many as 50% of survivors have neurologic sequelae.

The risk of infection is highest for long-term travelers to rural areas and travelers engaging in extensive outdoor activity (hikers, bikers, campers), so it is important to ask about itineraries and planned activities when considering whether to immunize. Short-term travelers in urban areas are at very low risk, although infection has been reported occasionally outside rural areas and among short-term tourists.

Vaccination is not recommended for all trav-
elers to Asia. ACIP advises immunizing those who plan to spend a month or more in endemic regions, especially rural areas, during the transmission season (which varies by season of the year and location) and shorter-term travelers engaging in extensive outdoor activity. Advanced age and pregnancy carry a high risk of complications for symptomatic illness and fetal death. However, the safety of the vaccine for use in pregnant women is unknown.

The first-generation inactivated vaccine (JE-VAX) was approved for adults and children in the United States but has not been manufactured since 2006. Existing stockpiles should last for several years and can be prescribed for children. In March 2009, the US Food and Drug Administration approved a new inactivated vaccine, IXIARO, which will replace JE-VAX. IXIARO is a modern cell-based vaccine and should prove safer and better tolerated than the old vaccine, which was derived from infected mouse brains. The new vaccine is given in two doses (instead of three) 28 days apart and should be completed at least a week before exposure. It is not approved for children younger than 17 years.

Yellow fever virus is transmitted by the _Aedes_ mosquito in sub-Saharan Africa and tropical South America. (Table 1) The incidence is greatest in Africa, but the CDC reports that the disease is spreading to new regions in South America. For updates, see the CDC Travelers’ Health Travel Notices Web site (www.cdc.gov/travel/notices.aspx). Vaccination is required for entry to some countries, recommended for others. A complete list of requirements and recom-

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<tr>
<th>Africa</th>
<th>Central and South America</th>
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<td>Angola</td>
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<td>Burkina Faso</td>
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<td>Sao Tome and Principe</td>
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<td>Senegal</td>
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<td>Uganda</td>
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*Only a portion of the country is at risk
Yellow fever can be prevented by a single subcutaneous injection of live attenuated vaccine at least 10 days before entry into a country where there is a risk. Only certified providers can give the vaccine. A list of providers is available at www.cdc.gov/travel/content/yellowbook/home-2010/aspx.

Notably, although the vaccine is generally safe and effective, some precautions and contraindications apply. Do not inoculate infants younger than 9 months (6 months if travel is unavoidable to an area with ongoing transmission) because of the risk of yellow fever-associated neurologic disease. Pregnant women should be immunized only after weighing the risk against the benefit. Patients with thymus disease or thymectomy should not receive the vaccine because they have an increased risk of yellow fever-associated viscerotropic disease—febrile multiple-organ-system failure. Travelers older than 60 years also may be at risk of viscerotropic disease and should discuss vaccination with their provider. Inoculation is contraindicated for immunosuppressed patients and patients with hypersensitivity to eggs.

Because of these caveats, some practitioners recommend vaccinating only travelers truly at risk of exposure, as determined by epidemiologic data for specific geographic areas as well as countries. However, transit between countries with risk of yellow fever may necessitate proof of vaccination regardless of actual risk. Travelers with medical contraindications should have that fact noted on the international vaccination certificate and carry a letter of exemption.

TWO OTHER VECTOR-BORNE DISEASES

There are two other vector-borne diseases for which no vaccines are available—malaria and dengue fever. But chemoprophylaxis can help prevent malaria and good prevention strategies, such as insect repellent and insecticide-treated clothing, can help the traveler avoid both dengue fever and malaria.

**Malaria** is the most frequent cause of fever among returned overseas travelers—two thirds of whom have the most severe form caused by the protozoan parasite *Plasmodium falciparum*. Immigrant travelers visiting friends and relatives in their native land account for most cases.

Malaria is spread by night-biting *Anopheles* mosquitoes in all or part of more than 100 countries. It is endemic in areas of the Caribbean, Central and South America, Mexico, Africa, the Middle East, and Asia. (See the CDC Travelers’ Health Web site: www.cdc.gov/travel/content/yellowbook/home-2010/aspx.)

*P falciparum* malaria usually causes symptoms 9 to 14 days after transmission but may not appear for months. The most common manifestations are fever—which often occurs in an irregular pattern throughout the day—and influenza-like symptoms, including headache and back pain. Patients may also experience vomiting, diarrhea, abdominal cramping, and cough, which can result in confusion with other diseases. If *P falciparum* malaria is not treated promptly, it can lead to severe disease and death. The other three types of malaria—caused by *P vivax*, *P ovale*, and *P malariae* protozoa—are rarely fatal.

Chemoprophylaxis effectively protects travelers against malaria—but only if they follow the
regimen strictly. Travelers should begin taking medication before departure and continue it after leaving the area of risk. The specific agent prescribed depends on the traveler’s itinerary and individual characteristics, including age, medical history, pregnancy, drug intolerance, and economic considerations. See Table 2 for drugs recommended by the CDC.

Table 2. Malaria Chemoprophylaxis: Drug Options

<table>
<thead>
<tr>
<th>Drug dose</th>
<th>Usage</th>
<th>Adult dose</th>
<th>Pediatric dose</th>
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<tr>
<td>Atovaquone/</td>
<td>Prophylaxis in areas with chloroquine-resistant</td>
<td>250 mg atovaquone/100 mg proguanil in</td>
<td>Tablet contains 62.5 mg atovaquone, 25 mg proguanil. Dosage of 1/2 to 3</td>
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<tr>
<td>proguanil</td>
<td>or mefloquine-resistant <em>P falciparum</em></td>
<td>1 tablet orally daily</td>
<td>tablets daily depending on weight; &gt;40 kg, 1 adult tablet daily</td>
</tr>
<tr>
<td>Chloroquine</td>
<td>Prophylaxis only in areas with chloroquine-susceptible</td>
<td>300 mg (base) orally once a week*</td>
<td>5 mg/kg weekly orally up to a maximum of 300 mg</td>
</tr>
<tr>
<td>phosphate</td>
<td><em>P falciparum</em></td>
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</tr>
<tr>
<td>Doxycycline</td>
<td>Prophylaxis in areas with chloroquine-resistant</td>
<td>100 mg orally daily</td>
<td>≥8 yrs, 2 mg/kg up to 100 mg daily, orally (not recommended during pregnancy)</td>
</tr>
<tr>
<td></td>
<td>or mefloquine-resistant <em>P falciparum</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydroxychloro-</td>
<td>An alternative to chloroquine for prophylaxis</td>
<td>310 mg orally, once a week</td>
<td>5 mg/kg orally weekly up to 310 mg maximum</td>
</tr>
<tr>
<td>quine sulfate</td>
<td>only in areas with chloroquine-sensitive *P</td>
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<tr>
<td></td>
<td>falciparum</td>
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<tr>
<td>Mefloquine</td>
<td>Prophylaxis in areas with chloroquine-resistant</td>
<td>250 mg orally once a week</td>
<td>≤9 kg: 5 mg/kg orally weekly. 10 kg-46 kg: 1/4-1 tablet weekly</td>
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<tr>
<td></td>
<td><em>P falciparum</em></td>
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<tr>
<td>Primaquine†</td>
<td>An option for prophylaxis in areas where *P</td>
<td>30 mg orally daily†</td>
<td>0.5 mg/kg up to adult dose, orally daily</td>
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<tr>
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<td>vivax malaria predominates</td>
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*Each 500 mg tablet of chloroquine contains the equivalent of 300 mg chloroquine base. †Use only if glucose-6-phosphate dehydrogenase (G6PD) status is normal. For information, call the CDC malaria hotline at 770-488-7788. ‡In the US, this is two tablets. One tablet is equivalent to 15 mg base.

*P falciparum* is resistant to chloroquine nearly everywhere except Mexico, areas of Central America west and north of the Panama Canal, Haiti and the Dominican Republic, and parts of North Africa, the Middle East and China. Mefloquine resistance occurs in certain areas of Southeast Asia.

Notably, mefloquine is associated with neu-
ropsychiatric effects—insomnia, nightmares, confusion, irritability, anxiety, depression, and, rarely, seizures or psychosis—in some patients. Those with a personal history of seizures, manic-depressive illness, depression, or other major psychiatric disorder should not take the drug. Mefloquine is also contraindicated in patients with cardiac comorbidities such as arrhythmias and sinus bradycardia. Side effects are generally mild and self-limited, but to be on the safe side, travelers should start taking mefloquine 2 or 3 weeks before departure to allow time to assess for adverse reactions and to prescribe an alternative if necessary.

Mefloquine does not interfere with flying, driving, or diving in persons who tolerate the drug.

Misconceptions and misinformation about malaria abound, especially among immigrants who grew up with the disease in their native country. Some travelers dangerously underestimate the seriousness of the infection. Emphasize that malaria is a medical emergency that can become life-threatening without prompt, expert treatment, especially in children. Symptoms may progress rapidly.

Warn travelers that herbal medications and homeopathic remedies do not work against malaria. Antimalarial drugs obtained overseas also may be ineffective, counterfeit, and dangerous, so travelers should purchase chemoprophylactic medications before departure.

Make sure patients understand that they must continue the medication for a time after they have left the area of risk. Chemoprophylaxis does not prevent infection—a common misconception—but only attacks parasites once they have entered the liver (which calls for causal prophylaxis with atovaquone–proguanil or primaquine) or moved from the liver into the blood (which calls for suppressive prophylaxis with mefloquine, A/P, chloroquine, or doxycycline). Chloroquine, doxycycline, and mefloquine must be continued for 4 weeks after the last exposure; atovaquone-proguanil can be stopped 1 week post exposure because it both attacks parasites in the blood and interrupts
their primary development in the liver.

**Dengue fever**, a viral infection for which no vaccine or chemoprophylaxis exists, has emerged as a major international health problem, in part because of increased international travel. Dengue has expanded its range dramatically in the last 20 years and is now endemic in 100 countries in Africa, the Americas, the eastern Mediterranean, Southeast Asia, and the western Pacific. Dengue hemorrhagic fever—the more serious, often fatal form—has increased significantly in Southeast Asia, the South Pacific, Latin America, and the Caribbean, and cases have been reported along the Texas-Mexico border. Large outbreaks occur often, most recently in South America and the Pacific region. Symptons of the disease, which has an incubation period of 3-14 days, include high fevers, severe frontal headache, and muscle and joint pain. Many patients also experience nausea, vomiting, and a maculopapular rash. About one in 100 patients progresses to hemorrhagic fever.

Because of the lack of a vaccine, pre-travel precautionary advice, particularly mosquito avoidance, is essential. The mosquitoes that spread dengue (*Aedes aegypti* and *Aedes albopictus*) thrive in urban areas; *Aedes albopictus* is expanding into temperate zones. Unlike many other mosquitoes, *Aedes* species bite during the day. Avoiding mosquito bites is key to preventing both malaria and dengue fever. Start with an insect repellent. One containing N,N-diethylmetatoluamide (DEET) is generally considered the most reliable and long-lasting, but there are effective CDC-recommended alternatives registered with the US Environmental Protection Agency, notably picaridin (KBR 3023) in concentrations of 7%, and now 20%, IR3535, and para-menthane 3,8-diol (PMD, or oil of lemon eucalyptus).

Travelers not staying at air-conditioned or well-screened hotels should sleep under a bed net, preferably one treated with the insecticide permethrin. In addition, the exposed skin of anyone older than 2 months, including pregnant women, should be sprayed with a repellent containing either DEET or picaridin. Infants younger than 2 months should be placed in a carrier covered with mosquito netting with an elastic edge.

Wearing a hat, long-sleeved shirt (tucked in), and long-sleeved pants tucked into socks provides maximum outdoor protection against mosquito and tick bites.

**WHAT FURTHER PRECAUTIONS SHOULD YOU RECOMMEND?**

**Minimizing motion sickness**

Motion sickness is not confined to children, although they are frequent sufferers. Adults who are prone to severe motion sickness, or seasickness, may get relief from the transdermal scopolamine patch, which prevents or minimizes symptoms for as long as 72 hours. It should be applied behind the ear 4 hours before departure and replaced after 72 hours if necessary.

**Lowering the risk of altitude illness**

Warn travelers to altitudes above 6,000 feet of the risk of altitude illness. The condition typically occurs above 8,000 feet, but symptoms may appear at lower altitudes. Travelers who fly directly to high-altitude destinations are at greater risk than travelers who ascend gradually by car or on foot. Symptoms of acute mountain sickness (AMS)—headache, fatigue, loss of appetite,
nausea, and difficulty sleeping—usually appear in the first 6 to 12 hours after arrival but can occur as late as 24 hours. Travelers who experience even mild symptoms should stay at the same altitude until symptoms resolve or, if symptoms persist after resting, descend immediately. Severe complications of AMS include high-altitude pulmonary edema and cerebral edema.

The best way to prevent AMS is to acclimate by ascending slowly, 1,000 to 1,500 feet per day if possible. Acetazolamide accelerates acclimation and may help prevent AMS or treat symptoms. The best dosage is uncertain: Current recommendations range from 125 mg/bid to 250 mg/bid daily, starting the day before ascent and for 2 days at altitude. Side effects include increased urination and paresthesia in the fingers, toes, and around the mouth. Avoid use in those with severe sulfa allergies.

Guarding against deep-vein thrombosis
Restricted mobility during long airplane flights increases the risk of deep-vein thrombosis (DVT), which can lead to pulmonary embolism (PE). Studies suggest that the risk begins to increase on flights longer than 4 hours and peaks on flights longer than 8 hours. A recent analysis of data from studies of the association between travel and venous thromboembolism (VTE) found a nearly 3-fold higher risk of VTE with a dose-response of 18% higher of risk for each 2-hour increase in travel duration.

A few simple precautions can reduce the risk: Wear loose-fitting clothing; drink plenty of fluids, but not alcohol, which can contribute to dehydration and sluggish circulation; and walk and stretch the legs and arms regularly.

Fitted compression stockings can reduce swelling and promote blood flow in the deep veins of the leg in travelers with additional risk factors for DVT. Prophylactic anticoagulation with low-molecular-weight heparin may be appropriate for higher-risk patients. Aspirin is not recommended as DVT prophylaxis for any air traveler.

Factors that increase the risk of DVT include a history of DVT or PE; recent surgery, especially abdominal or orthopedic; paralysis or recent injury of the leg; heart disease; recent stroke; cancer; ongoing chemotherapy; pregnancy; oral contraceptives or hormone replacement therapy; smoking; varicose veins; age over 40 years; and genetic blood clotting abnormalities.

All long-distance air travelers should be aware of the symptoms of DVT (swelling, pain, redness or discoloration, increased warmth of skin) and PE (chest pain, shortness of breath, dizziness, fainting, anxiety, rapid pulse), which can occur during or after travel.

Observing sensible food and water precautions
Exercising caution when eating and drinking can provide some protection against traveler’s diarrhea and other food- and water-borne illness. Most important, advise travelers to wash their hands often or use an alcohol-based hand sanitizer, especially before eating.

Although the old adage, “Boil it, cook it, peel it, or forget it” is often used to warn travelers about the risk of diarrhea with certain foods, studies have shown that the major risk of diarrhea is associated with poor hygiene in local establishments that serve food, even high-end restaurants and resorts. When eating out, travelers should keep that in mind. Nevertheless, it is still recommended that they avoid salads...
and raw or undercooked food.

In areas without chlorinated tap water and with questionable hygiene and sanitation, travelers should not brush their teeth with tap water. They should drink tea or coffee made with boiled water and canned or unopened bottled beverages (make sure the seal has not been tampered with) without ice.9

CONCLUSION

Primary-care physicians, pediatricians, and pharmacists can protect overseas travelers by providing pre-travel immunization and preventive counseling about potential hazards. Effective preparation depends on a proactive approach.

REFERENCES

1. Which travelers should be warned against air travel?
   A. Travelers with diabetes
   B. Travelers with nonobstructive lung disease
   C. Travelers with unstable angina
   D. Travelers with rheumatoid arthritis

2. Which of the following diseases is spread by contaminated food and water?
   A. Meningococcal disease
   B. Hepatitis A
   C. Yellow fever
   D. Japanese encephalitis

3. The Centers for Disease Control and Prevention recommends hepatitis B immunization for travelers to intermediate- and high-prevalence areas, including:
   A. Asia
   B. Australia
   C. Mexico
   D. Scandinavia

4. Oral vaccination against typhoid fever should be completed 3 days before giving:
   A. Chloroquine
   B. Hepatitis A vaccine
   C. Yellow fever vaccine
   D. Mefloquine

5. The new IXYARO vaccine against Japanese encephalitis is not approved for:
   A. People older than 65 years
   B. Children younger than 17 years
   C. Pregnant women
   D. People with allergies to eggs

6. Which overseas travelers account for most cases of malaria?
   A. Tourists
   B. Humanitarian workers
   C. Adventure travelers
   D. Travelers visiting friends and relatives in their native countries

7. When counseling travelers about malaria prophylaxis, clinicians should point out that:
   A. They must continue to take medication after leaving the area of risk
   B. Mefloquine can interfere with driving
   C. Herbal preparations may be a reasonable alternative to prophylactic drugs
   D. It’s ok to buy antimalarial drugs when the traveler arrives at his or her destination

8. What is the best defense against dengue fever?
   A. Vaccination
   B. Chemoprophylaxis
   C. Mosquito avoidance
   D. A carefully planned itinerary

9. What is the best way to avoid altitude illness?
   A. Drink plenty of fluids
   B. Eat small, frequent meals
   C. Take prophylactic aspirin
   D. Ascend slowly

10. Side effects of acetazolamide taken for altitude illness include which of the following?
    A. Dizziness
    B. Paresthesias
    C. Nausea
    D. Constipation

11. Travelers with risk factors for deep-vein thrombosis should avoid which of the following during air travel?
    A. Napping
    B. Alcohol
    C. Carbonated beverages
    D. Wearing support hose

12. What advice should you be sure to give travelers to prevent food- and water-borne illness?
    A. Wash their hands often
    B. Eat only at high-end restaurants or hotels
    C. Take antibiotics
    D. Cook all their own food
Answer Sheet

Helping Travelers Prepare for Their Trip Abroad
A Practical Guide to Prevention Strategies for International Travelers

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(Please darken the single best answer)

1. A  B  C  D  7. A  B  C  D
2. A  B  C  D  8. A  B  C  D
3. A  B  C  D  9. A  B  C  D
4. A  B  C  D  10. A  B  C  D
5. A  B  C  D  11. A  B  C  D
6. A  B  C  D  12. A  B  C  D

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   Objective 4   ☐ Yes ☐ No ☐ Partially ☐ N/A
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   ________________________________
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   5 4 3 2 1
   Relevant to your practice?  
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8. General comments: __________________________________________________________
   __________________________________________________________
   __________________________________________________________
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