

formulations, once daily). However, studies have shown that one double dose of a quinolone may be equally effective. For diarrhea acquired in areas such as Thailand, where >90% of *Campylobacter* infections are quinolone resistant, azithromycin may be a better alternative. Rifaximin, a poorly absorbed rifampin derivative, is highly effective against noninvasive bacterial pathogens such as enterotoxigenic and enteroaggregative *E. coli*. The current approach to self-treatment of travelers' diarrhea for the typical short-term traveler is to carry three once-daily doses of an antibiotic and to use as many doses as necessary to resolve the illness. If neither high fever nor blood in the stool accompanies the diarrhea, loperamide should be taken in combination with the antibiotic; studies have shown that this combination is more effective than an antibiotic alone and does not prolong illness.

Prophylaxis Prophylaxis of travelers' diarrhea with bismuth subsalicylate is widely used but only ~60% effective. For certain individuals (e.g., athletes, persons with a repeated history of travelers' diarrhea, and persons with chronic diseases), a single daily dose of a quinolone, azithromycin, or rifaximin during travel of <1 month's duration is 75–90% efficacious in preventing travelers' diarrhea. Probiotics have been only ~20% effective as prophylaxis. In Europe and Canada, an oral subunit cholera vaccine that cross-protects against enterotoxigenic *E. coli* (Dukoral) has been shown to provide 30–50% protection against travelers' diarrhea.

Illness After Return Although extremely common, acute travelers' diarrhea is usually self-limited or amenable to antibiotic therapy. Persistent bowel problems after the traveler returns home have a less well-defined etiology and may require medical attention from a specialist. Infectious agents (e.g., *Giardia lamblia*, *Cyclospora cayotensis*, *Entamoeba histolytica*) appear to be responsible for only a small proportion of cases with persistent bowel symptoms. By far the most common causes of persistent diarrhea after travel are postinfectious sequelae such as lactose intolerance and irritable bowel syndrome. A meta-analysis showed that postinfectious irritable bowel syndrome lasting months to years may occur in as many as 4–13% of cases. When no infectious etiology can be identified, a trial of metronidazole therapy for presumed giardiasis, a strict lactose-free diet for 1 week, or a several-week trial of high-dose hydrophilic mucilloid (plus an osmotic laxative such as lactulose or PEG 3350 for persons with alternating diarrhea and constipation) relieves the symptoms of many patients.

PREVENTION OF OTHER TRAVEL-RELATED PROBLEMS

Travelers are at high risk for *sexually transmitted diseases* (Chap. 163). Surveys have shown that large numbers of travelers engage in casual sex, and there is a reluctance to use condoms consistently. An increasing number of travelers are being diagnosed with illnesses such as *schistosomiasis* (Chap. 259), *dengue* (Chap. 233), *chikungunya* (Chap. 233), and *tick-borne rickettsial disease* (Chap. 211). Travelers should be cautioned to avoid bathing, swimming, or wading in freshwater lakes, streams, or rivers in parts of northeastern South America, the Caribbean, Africa, and Southeast Asia. Insect repellents are important for prevention not only of malaria but also of other vector-borne diseases. Prevention of *travel-associated injury* depends mostly on common-sense precautions. Riding on motorcycles (especially without helmets) and in overcrowded public vehicles is not recommended; in developing countries, individuals should *never* travel by road in rural areas after dark. Of persons who die during travel, fewer than 1% die of infection, whereas 40% die in motor vehicle accidents. Excessive alcohol use has been a significant factor in motor vehicle accidents, drownings, assaults, and injuries. Travelers are cautioned to avoid walking barefoot because of the risk of hookworm and *Strongyloides* infections (Chap. 257) and snakebites (Chap. 474).

THE TRAVELER'S MEDICAL KIT

A traveler's medical kit is strongly advisable. The contents may vary widely, depending on the itinerary, duration of stay, style of travel, and local medical facilities. While many medications are available abroad (often over the counter), directions for their use may be nonexistent or in a foreign language, or a product may be outdated

or counterfeit. For example, a multicountry study in Southeast Asia showed that a mean of 53% (range, 21–92%) of antimalarial products were counterfeit or contained inadequate amounts of active drug. The sale and marketing of such medications constitute a growing industry. In the medical kit, the short-term traveler should consider carrying an analgesic; an antiarrheal agent and an antibiotic for self-treatment of travelers' diarrhea; antihistamines; a laxative; oral rehydration salts; a sunscreen with broad-spectrum protection (UVA and UVB, with the latter at a level of at least 30 SPF); a DEET-containing or equivalent insect repellent for the skin; an insecticide for clothing (permethrin); and, if necessary, an antimalarial drug. To these medications, the long-stay traveler might add a broad-spectrum general-purpose antibiotic (levofloxacin or azithromycin), an antibacterial eye and skin ointment, and a topical antifungal cream. Regardless of the duration of travel, a first-aid kit containing such items as scissors, tweezers, and bandages should be considered. A practical approach to self-treatment of infections in the long-stay traveler who carries a once-daily dose of antibiotics (e.g., levofloxacin) is to use 3 tablets "below the waist" (bowel and bladder infections) and 6 tablets "above the waist" (skin and respiratory infections).

TRAVEL AND SPECIAL HOSTS

PREGNANCY AND TRAVEL

(See also Chap. 8) A woman's medical history and itinerary, the quality of medical care at her destinations, and her degree of flexibility determine whether travel is wise during pregnancy. According to the American College of Obstetrics and Gynecology, the safest part of pregnancy in which to travel is between 18 and 24 weeks, when there is the least danger of spontaneous abortion or premature labor. Some obstetricians prefer that women stay within a few hundred miles of home after the 28th week of pregnancy in case problems arise. In general, however, healthy women may be advised that it is acceptable to travel.

Relative contraindications to international travel during pregnancy include a history of miscarriage, premature labor, incompetent cervix, or toxemia. General medical problems such as diabetes, heart failure, severe anemia, or a history of thromboembolic disease also should prompt the pregnant woman to postpone her travels. Finally, regions in which the pregnant woman and her fetus may be at excessive risk (e.g., those at high altitudes, those where live-virus vaccines are required, and those where multidrug-resistant malaria is endemic) are not ideal destinations during any trimester.

Malaria Malaria during pregnancy carries a significant risk of morbidity and death. Levels of parasitemia are highest and failure to clear the parasites after treatment is most frequent among primigravidae. Severe disease, with complications such as cerebral malaria, massive hemolysis, and renal failure, is especially likely in pregnancy. Fetal sequelae include spontaneous abortion, stillbirth, preterm delivery, and congenital infection. Chloroquine and mefloquine are considered to be safe in all trimesters.

Enteric Infections Pregnant travelers must be extremely cautious regarding their food and beverage intake. Dehydration due to travelers' diarrhea can lead to inadequate placental blood flow. Infections such as toxoplasmosis, hepatitis E, and listeriosis also can cause serious sequelae in pregnancy.

The mainstay of therapy for travelers' diarrhea is rehydration. Loperamide may be used if necessary. For self-treatment, azithromycin may be the best option. Although quinolones are increasingly being used safely during pregnancy and rifaximin is poorly absorbed from the gastrointestinal tract, these drugs are not approved for this indication.

Because of the serious problems encountered when infants are given local foods and beverages, women are strongly encouraged to breast-feed when traveling with a neonate. A nursing mother with travelers' diarrhea should not stop breast-feeding but should increase her fluid intake.

Air Travel and High-Altitude Destinations Commercial air travel is not a risk to the healthy pregnant woman or to the fetus. The higher radiation levels reported at altitudes of >10,500 m (>35,000 ft) should pose