no problem for the healthy pregnant traveler. Since each airline has a policy regarding pregnancy and flying, it is best to check with the specific carrier when booking reservations. Domestic air travel is usually permitted until the 36th week, whereas international air travel is generally curtailed after the 32nd week.

There are no known risks for pregnant women who travel to high-altitude destinations and stay for short periods. However, there are likewise no data on the safety of pregnant women at altitudes of >4500 m (15,000 ft).

THE HIV-INFECTED TRAVELER

(See also Chap. 226) The HIV-infected traveler is at special risk of serious infections due to a number of pathogens that may be more prevalent at travel destinations than at home. However, the degree of risk depends primarily on the state of the immune system at the time of travel. For persons whose CD4+ T cell counts are normal or >500/μL, data suggest no greater risk during travel than for persons without HIV infection. Individuals with AIDS (CD4+ T cell counts of <200/μL) and others who are symptomatic need special counseling and should visit a travel medicine practitioner before departure, especially when traveling to the developing world.

Several countries routinely deny entry to HIV-positive individuals for prolonged stay, even though these restrictions do not appear to decrease rates of transmission of the virus. In general, HIV testing is required for individuals who wish to stay abroad >3 months or who intend to work or study abroad. Some countries will accept an HIV serologic test done within 6 months of departure, whereas others will not accept a blood test done at any time in the traveler's home country. Border officials often have the authority to make inquiries of individuals entering a country and to check the medications they are carrying. If antiretroviral drugs are identified, the person may be barred from entering the country. Information on testing requirements for specific countries is available from consular offices but is subject to frequent change.

Immunizations All of the HIV-infected traveler's routine immunizations should be up to date (Chap. 148). The response to immunization may be impaired at CD4+ T cell counts of <200/μL and in some cases at even higher counts. Thus HIV-infected persons should be vaccinated as early as possible to ensure adequate immune responses. For patients receiving antiretroviral therapy, at least 3 months must elapse before regenerated CD4+ T cells can be considered fully functional; therefore, vaccination of these patients should be delayed. However, when the risk of illness is high or the sequelae of illness are serious, immunization is recommended. In certain circumstances, it may be prudent to check the adequacy of the serum antibody response before departure.

Because of the increased risk of infections due to Streptococcus pneumoniae and other bacterial pathogens that cause pneumonia after influenza, the conjugate pneumococcal vaccine (Prevnar 13) followed by the 23-valent polysaccharide vaccine (Pneumovax) as well as influenza vaccine should be administered. The estimated rates of response to influenza vaccine are >80% among persons with asymptomatic HIV infection and <50% among those with AIDS.

In general, live attenuated vaccines are contraindicated for persons with immune dysfunction. Because measles (rubeola) can be a severe or lethal infection in HIV-positive patients, these patients should receive the measles vaccine (or the combination MMR vaccine) unless the CD4+ T cell count is <200/μL. Between 18% and 58% of symptomatic HIV-infected vaccinees develop adequate measles antibody titers, and 50–100% of asymptomatic HIV-infected persons seroconvert.

It is recommended that the live yellow fever vaccine not be given to HIV-infected travelers. Although the potential adverse effects of a live vaccine in an HIV-infected individual are always a consideration, there appear to have been no reported cases of illness in those who have inadvertently received this vaccine. Nonetheless, if the CD4+ T cell count is <200/μL, an alternative itinerary that poses no risk of exposure to yellow fever is recommended. If the traveler is passing through or traveling to an area where the vaccine is required but the disease risk is low, a physician's waiver should be issued.

A transient increase in HIV viremia (lasting days to weeks) has been demonstrated in HIV-infected individuals after immunization against influenza, pneumococcal infection, and tetanus (Chap. 226). At this point, however, no evidence indicates that this transient increase is detrimental.

Gastrointestinal Illness Decreased levels of gastric acid, abnormal gastrointestinal mucosal immunity, other complications of HIV infection, and medications taken by HIV-infected patients make travelers' diarrhea especially problematic in these individuals. Travelers' diarrhea is likely to occur more frequently, to be more severe, to be accompanied by bacteremia, and to be more difficult to treat. *Cryptosporidium*, *Isospora belli*, and *Microsporidium* infections, although uncommon, are associated with increased morbidity and mortality rates in AIDS patients.

The HIV-infected traveler must be careful to consume only appropriately prepared foods and beverages and may benefit from antibiotic prophylaxis for travelers' diarrhea. Sulfonamides (as used to prevent pneumocystosis) are ineffective because of widespread resistance.

Other Travel-Related Infections Data are lacking on the severity of many vector-borne diseases in HIV-infected individuals. Malaria is especially severe in asplenic persons and in those with AIDS. The HIV load doubles during malaria, with subsidence in ~8–9 weeks; the significance of this increase in viral load is unknown.

Visceral leishmaniasis (Chap. 251) has been reported in numerous HIV-infected travelers. Diagnosis may be difficult, given that splenomegaly and hyperglobulinemia are often lacking and serologic results are frequently negative. Sandfly bites may be prevented by evening use of insect repellents.

Certain respiratory illnesses, such as histoplasmosis and coccidioidomycosis, cause greater morbidity and mortality among patients with AIDS. Although tuberculosis is common among HIV-infected persons (especially in developing countries), its acquisition by the short-term HIV-infected traveler has not been reported as a major problem. From a prospective study, it is estimated that for travelers not engaged in health care the risk of tuberculosis infection is ~3% per year of travel.

Medications Adverse events due to medications and drug interactions are common and raise complex issues for HIV-infected persons. Rates of cutaneous reaction (e.g., increased cutaneous sensitivity to sulfonamides) are unusually high among patients with AIDS. Since zidovudine is metabolized by hepatic glucuronidation, inhibitors of this process may elevate serum levels of the drug. Concomitant administration of the antimalarial drug mefloquine and the antiretroviral agent ritonavir may result in decreased plasma levels of ritonavir; mefloquine may also interact with many of the other protease inhibitors. In contrast, no significant influence of concomitant mefloquine administration on plasma levels of indinavir or nelfinavir was detected in two HIV-infected travelers. Serum levels of mefloquine may be lowered with the use of efavirenz or nevirapine. There are also potential interactions between atovaquone-proguanil (Malarone) and many of the protease inhibitors as well as between Malarone and the nonnucleoside reverse transcriptase inhibitors (NNRTIs). Because of the increase in antiretroviral agents and the lack of accumulated data on their interactions with antimalarial agents, decisions about malaria chemoprophylaxis continue to be difficult; with a short duration of travel, an interaction may be inconsequential. However, doxycycline appears to have no clinically significant interactions with either the protease inhibitors or the NNRTIs. With regard to malaria treatment, a great hypothetical concern is that the antimalarial drugs lumefantrine (combined with artemisinin in Coartem) and halofantrine may interact with HIV protease inhibitors and NNRTIs since drugs in the latter two categories are known to be potent inhibitors of cytochrome P450. In keeping current with antiretroviral drug interactions, a website from the University of Liverpool (*www.hiv-druginteractions.org*) is helpful.

CHRONIC ILLNESS, DISABILITY, AND TRAVEL

Chronic health problems need not prevent travel, but special measures can make the journey safer and more comfortable.