



Measles

In the United States, most measles cases result from international travel, and measles remains a common disease in many parts of the world. Currently, measles vaccination is recommended at 15 months of age, with a second vaccination after age 5. Individuals born after 1956 who have no physician-documented record of immunization or who have not received a booster after early childhood should have a one-time booster before travel.

Meningococcal Meningitis

Vaccination for meningococcal disease is recommended to persons who travel to or reside in countries in which the bacterium *Neisseria meningitidis* is hyperendemic or epidemic, particularly if they will be in close contact with the local population. Vaccination is recommended for travelers to Saudi Arabia during the Hajj, along the meningitis belt of sub-Saharan Africa, and in other locations for which travel advisories have been issued (information available on the CDC website). The meningococcal conjugate vaccine (MCV4) is preferred for people age 9 months through 55 years, and the meningococcal polysaccharide vaccine (MPSV4) is the recommended vaccine for persons older than 55.

Polio

Polio remains endemic in some regions of Asia and Africa. Before traveling to areas where poliomyelitis cases are still occurring, travelers should ensure that they have completed the recommended age-appropriate polio vaccine series and have received a booster dose with the inactivated polio vaccine as an adult.

Typhoid

International travelers are at greatest risk for contracting typhoid in the Indian subcontinent, Central America, western South America, and sub-Saharan Africa. Vaccination is recommended for travel to endemic areas where exposure to contaminated food and water is likely. Both a live oral vaccine (four enteric-coated capsules given over 7 days) and an injectable vaccine (single-dose) are available; they are essentially equivalent in effectiveness, which ranges from 50% to 70%.

Yellow Fever

The yellow fever vaccine is a live, attenuated virus vaccine that is recommended for persons traveling to areas in South America and Africa where yellow fever is endemic. Vaccination is protective for at least 10 years and must be given at designated vaccination centers. Severe adverse events are rare and include yellow fever vaccine-associated viscerotropic and neurologic disease, both of which are more common in elderly persons and in those with thymus disease. Because the adverse events occur more commonly in people older than 60 years of age, a careful assessment of risks and benefits for these travelers should be made before vaccination.

Other Vaccines

Some individuals live for prolonged periods in developing countries or are at special risk for contracting certain highly contagious diseases. Consideration should be given to immunization against hepatitis B, plague, and rabies. Tetanus vaccinations

should be up to date: for travel, a tetanus booster within the previous 5 years is recommended. The cholera vaccine is not available in the United States. Worldwide, two oral cholera vaccines are available, but vaccination offers limited protection. Therefore, the vaccine is not recommended for travelers, but standard cholera prevention and control measures are emphasized.

Malaria Prophylaxis

Malaria infection is associated with significant morbidity and mortality, particularly if the causative agent is *Plasmodium falciparum*. The need for, as well as the type of, malaria prophylaxis depends on known resistance patterns and the exact itinerary within a given country because the risk of transmission is regional. In general, travelers to areas where chloroquine-sensitive *P. falciparum* strains are exclusively found (i.e., parts of Central America, the Caribbean, North Africa, and the Middle East) should take chloroquine phosphate (300-mg base or 500-mg salt) weekly, starting 1 week before travel to malarious areas and continuing during the trip and for 4 weeks after leaving the area.

Travelers to Southeast Asia, sub-Saharan Africa, South America, and South Asia, where chloroquine-resistant *P. falciparum* is common may take mefloquine (Lariam), atovaquone-proguanil (Malarone), or doxycycline. Mefloquine may be associated with neurologic side effects (dizziness, tinnitus, and vivid dreams) and, rarely, with significant neuropsychiatric side effects. A U.S. Food and Drug Administration (FDA) black box warning issued in 2013 indicated that the neurologic side effects can occur at any time and persist indefinitely; this has lent some caution to the prescription of mefloquine. Mefloquine is also not completely effective in Myanmar, rural Thailand, or some parts of East Africa, where resistance is a growing problem. Atovaquone-proguanil and doxycycline are effective in Southeast Asia and may be used in other areas of chloroquine resistance. Atovaquone-proguanil is well tolerated but must be taken every day. Daily doxycycline can be associated with photosensitivity, esophagitis, and, occasionally, vaginal candidiasis.

Where it is approved, primaquine can be used for primary prophylaxis in areas with higher rates of *Plasmodium vivax* or *Plasmodium ovale* infection. It has the advantage of both preventing acute infection from all malaria parasites and preventing the later recurrent infections of *P. vivax* and *P. ovale*. It cannot be used in individuals with glucose-6-phosphate dehydrogenase (G6PD) deficiency. Emphasis must also be given to the use of mosquito bite prevention measures, including netting, screens, permethrin for clothing, and insect repellents.

Traveler's Diarrhea

Each year between 20% and 50% of international travelers develop diarrhea. Bacterial infections such as enterotoxigenic *Escherichia coli* are most common, but other causes include parasites and viruses. The average duration of an episode of traveler's diarrhea is 3 to 6 days, but about 10% of episodes last longer than 1 week. The diarrhea may be accompanied by abdominal cramping, nausea, headache, low-grade fever, vomiting, or bloating. Travelers with fever greater than 101° F (38° C), bloody stools, or both should see a physician at once (see [Chapter 96](#)).