

Travax[®] Traveler Health Report

Prepared for The Inmans

Health Concerns Summary

The following may pose a risk or require preventive measures based on this itinerary. See the report sections below for details.

- **Vaccine-Preventable Diseases:** cholera, hepatitis A, hepatitis B, influenza, meningococcal meningitis, polio, rabies, typhoid, yellow fever
- **Malaria**
- **Other Diseases:** African trypanosomiasis, schistosomiasis, traveler's diarrhea, tuberculosis, viral hemorrhagic fevers

Country Profile(s)

UGANDA

General Information

Uganda is a developing nation in the lowest 25% of the world's economies. Located north of Lake Victoria in eastern Africa, its climate is mostly tropical with 2 distinct dry seasons. The northeast is semiarid.

Traveler's Diarrhea

- High risk throughout the country including deluxe accommodations in major cities. Food and beverage precautions are essential in order to reduce chance of illness.
- Travelers should carry loperamide and/or a quinolone antibiotic for presumptive self-treatment of diarrhea if it occurs.

Other Concerns

- **HIV/AIDS** is estimated to be present in 5% of the adult population putting this country in the top tier of all countries. Travelers should clearly understand STD concepts and risks for HIV transmission.
- **Tuberculosis** is common in all developing countries. However, this country has an incidence of over 100 cases per 100,000 population, the highest risk category. Travelers planning to stay more than 1 month should have pre-departure PPD skin test status documented. Travelers should avoid crowded public places and public transportation whenever possible. Domestic help should be screened for TB.
- **African trypanosomiasis** presents risk in the northwestern districts of Adjumani, Amuru, Arua, Koboko, Maracha, Moyo, and Yumbe; the central districts of Dokolo, Kaberamaido, Lira, and Soroti; and the southeastern districts (primarily Igonga) between Lake Kyoga and Lake Victoria. Sporadic cases have also occurred around Lake Victoria and Queen Elizabeth National Park in the southwest. Conventional insect repellents (DEET and permethrin) are ineffective. Wearing of light-colored (not blue) heavyweight clothing is recommended.
- **Schistosomiasis**, transmitted by waterborne larvae that penetrate intact skin, presents significant risk throughout the country. Highest risk occurs in Lake Victoria, Lake Albert, Lake Kyoga, and the surrounding

areas. Travelers should avoid freshwater exposure.

- **Marburg:** Sporadic, rare Marburg activity occurs (a viral hemorrhagic fever). Transmission is via contact with bats in caves and direct contact with blood or body fluids of acutely ill patients. Travelers should not enter any cave in this country and in particular the python cave in the Imaramagambo Forest adjacent to Queen Elizabeth National Park.
- **Ebola:** Sporadic, rare Ebola activity occurs (a viral hemorrhagic fever). Transmission is via direct contact with blood or body fluids of acutely ill patients.

Medical Care

- Medical care is substandard throughout the country including Kampala. Adequate evacuation coverage for all travelers is a high priority. In the event of a serious medical condition, medical evacuation to Nairobi or Johannesburg/Pretoria is likely to be necessary. Shortages of routine medications and supplies may be encountered.
- For emergency services, dial 999.
- Because this is primarily a cash economy, credit cards may not be accepted for medical care.

Travel Advisory

The material below has been compiled or quoted verbatim from the consular websites of the United States, United Kingdom, Canada, and Australia and, in some cases, the U.S. Overseas Security Advisory Council and internationally recognized media sources. Standard safety precautions that apply to all international travel are not included in this advisory. Please refer to the "Safety and Security" handout for standard precautions.

Consular Travel Warning

Due to ongoing violence, an Australian consular warning currently advises against all travel to the Karamoja region of northeastern Uganda (including Kidepo National Park), all travel to areas bordering South Sudan, and all non-essential travel to areas bordering the Democratic Republic of the Congo. Other governments advise against all travel to Karamoja region in northeastern Uganda (Kotido, Moroto, Nakapiripirit, Katakwi, Kaabong, Abim, Kapchorwa and Bukwa Districts), with the exception of trips to Kidepo Valley National Park.

Visa/HIV Testing

- Visa applicants may need to meet specific requirements. Review the application and contact the appropriate embassy or consulate with questions. The U.S. Department of State is unaware of any HIV/AIDS entry restrictions for visitors to or foreign residents of Uganda.

Terrorism Risk

- Potential for terrorist activity from extremist organizations such as al-Shabaab remains high. Attacks could be indiscriminate. Places known to be terrorist targets include places of worship, clubs, hotels, restaurants, airports, and marketplaces.

Consider Avoiding

- Ethnic tensions have led to clashes and attacks in the rural areas of the western district of Hoima.
- Travel by road to areas bordering the DRC (Yumbe, Moyo, and Adjumani from Arua) should be avoided due to sporadic banditry.
- Travelers may visit Mount Elgon National Park by road; however, the Ugandan government periodically closes tourist areas considered to be at risk.
- Overland travel to and within the Karamoja region of northeastern Uganda should be avoided, particularly the districts of Kotido, Nakapiripirit, and Moroto and the adjoining district of Katakwi due to banditry and clashes between ethnic communities.

Crime

- Banditry and carjacking occur throughout the country. Petty crime, including pickpocketing, purse and jewelry snatching, and theft from hotel rooms and vehicles, is common. Armed robberies of pedestrians occur. Women traveling alone are particularly susceptible to crime.
- Fraud involving credit cards, traveler's checks, and wire transfers is common in Uganda. Business fraud also occurs frequently.

Civil Unrest

- Demonstrations sometimes occur in Uganda and some have led to violence.

Miscellaneous Safety

- Visits to game parks and reserves should be undertaken only with a reputable tour company.

Road Conditions and Hazards

- Local driving habits, wandering animals, pedestrians, poor road conditions, and a lack of traffic signs pose risks. Pedestrians should exercise caution when crossing roads.
- Highway travel is dangerous, particularly after dark, because of banditry and poor road conditions.
- There are many road accidents causing death in Uganda. Alcohol is often a contributing factor, particularly at night.

Driving Laws

- Traffic drives on the left.
- In the event of an accident, Ugandan law requires drivers to stop and exchange information and assistance.
- An International Driving Permit (IDP) is required.

Public Transportation

- Intercity bus or van service should be avoided.
- There is no passenger rail service.
- Though cheap, matatus (minibus taxis) and boda-bodas (motorbike taxis) are generally in poor condition and badly driven. Accidents are common.

Natural Disasters and Climate

- The rainy seasons extend from March to May and from October to November. Flooding and mudslides may occur during these months.
- Uganda is located in a seismic zone.

Other Laws

- Penalties for possession, use, or trafficking of illegal drugs are strict, and convicted offenders can expect jail sentences and heavy fines.
- Serious crimes, such as treason and murder, carry the death penalty.
- Penalties for some crimes, including rape and robbery, include corporal punishment.
- Homosexual activity is illegal.
- Photography of security forces, diplomatic sites, government installations, airports, or Owen Falls Dam is prohibited.
- Wearing military-style or camouflage clothing is prohibited and may result in a jail sentence.

Availability of Basic Infrastructure and Tourist Facilities

- Tourist facilities and infrastructure are adequate in Kampala but limited elsewhere in the country.

Dual Citizenship

- Uganda does not recognize dual nationality.

Currency

- The currency is the Uganda shilling (UGX). Credit cards are accepted only by major hotels, airlines, and some car rental agencies. Foreign exchange bureaus are located at most border posts and in all major cities.

Import and Export Information

- There are no restrictions on the import of foreign currencies.

Consular Information

Selected Embassies or Consulates in Uganda

- U.S. Embassy: Tel.: [+256] 414 306001, kampala.usembassy.gov
- Canadian Consulate: Tel.: [+256] 414-258-141
- UK Embassy: Tel.: [+256] 312-312000, ukinuganda.fco.gov.uk/en
- Australian Consulate: Tel.: [+256] 31-2515-865

Uganda's Embassies or Consulates in Selected Countries

- In the U.S.: www.ugandaembassy.com
- In Canada: www.ugandahighcommission.com
- In the UK: www.ugandahighcommission.co.uk
- In Australia: Tel.: [+61] 02-6286-1234

Basic Preventive Measures

Most travel-related health problems can be significantly reduced through appropriate behavior by the traveler. Risk can be minimized by adherence to the following measures.

INSECT PRECAUTIONS

- Significant or potentially life-threatening illnesses transmitted by insects are a threat in the tropics and are best prevented by personal protective measures.
- Clothe yourself to reduce as much exposed skin as practicable.
- Apply a repellent containing DEET (concentration 30 to 35%) or picaridin (concentration 20% or greater). The repellent should be applied to all exposed non-sensitive areas of the body. Frequent application ensures continuous protection. The time of day and type of insects to be avoided determine when the repellent should be applied.
- Treat outer clothing with permethrin (or other pyrethroid) when at risk of malaria or other mosquito-borne or tick-borne diseases.
- Sleep under a permethrin impregnated bed net when at risk of malaria.
- If not in a sealed air-conditioned room, ensure all open windows have insect screens.
- Use an aerosol insecticide before going to bed and a vaporizer device throughout the night.
- Outdoors, a smoldering pyrethroid coil can be used to reduce flying insects.

SAFE FOOD and WATER

- Traveler's diarrhea is always caused by something you ate or drank.
- Always wash hands with soap before eating and after using the toilet.
- Avoid purchasing food from dubious eating places, markets, and roadside vendors.
- Flies feed on both feces and food. Avoid buffets where there are no food covers or fly controls.
- Avoid high risk food such as shellfish, undercooked meats and poultry, dairy products, mayonnaise, unpeeled fruits, and salads.
- Avoid both tap water and drinks or ice made from tap water, unless you are advised by a reliable fellow foreigner that they are safe.
- Use sealed bottled water or chemically treated, filtered, or boiled water for drinking and brushing teeth.

BLOOD-BORNE and SEXUALLY TRANSMITTED DISEASES (STDs)

- STDs, hepatitis B, and HIV are generally more prevalent in developing countries. Unprotected casual sex whether with the local population or with fellow travelers is always high risk.
- Inhibitions are diminished when traveling away from the social constraints of home. In addition, excess alcohol and other recreational drugs can influence behavior and encourage unintentional risk exposure.
- HIV and hepatitis B may be transmitted through blood, blood products, and contaminated surgical or dental instruments. These may be required following accidents or trauma. Consider carrying a needle and suture kit for high risk areas. If possible, defer medical treatment and travel to a facility where safety can be assured. Tattooing and body piercing carry similar risks.

SAFETY and CRIME AVOIDANCE

- Make sure at least one other person knows your whereabouts and expected schedule at all times.
- Use extra caution in tourist sites, market places, elevators, crowded subways, train stations and festivals, and avoid marginal areas of cities.
- Use only "registered" taxis, preferably radio taxis.
- Avoid visible signs of wealth in dress or jewelry.
- Be constantly attentive to surroundings and be wary of any stranger who engages you in any form of conversation or touches you in any way no matter how accidental the contact may appear to be.
- Carry only a photocopy of your passport face page and legal entry stamp; leave the actual passport in a hotel safe or at your residence.
- Wear your hand bag across your chest to prevent it from being snatched.
- Familiarize yourself with common local scams and distraction techniques.
- If you are confronted, give up your valuables. Money and passports can be replaced; you cannot.
- U.S. citizens can register foreign trip and residence information with the Department of State at travelregistration.state.gov/ibrs, which facilitates communication and assistance in case of an emergency.

Safety In the Hotel

- Keep your hotel door locked at all times.
- Look for fire safety instructions in your hotel room. Familiarize yourself with escape routes upon arrival.
- Keep valuables in the room safe or the hotel safe.

Safety When You Drive

- Try to drive with windows closed.
- Keep car doors locked at all times.
- Wear seat belts at all times.
- Avoid driving at night or alone, and never drive outside urban areas after dark.
- Don't drink and drive.
- Never drive a motorcycle or scooter abroad.
- If available, long-stay and business travelers should arrange a locally purchased mobile phone to be in the vehicle whenever traveling.

SWIMMING and WATER EXPOSURE

- Currents, tides, and underwater hazards put swimmers at risk of drowning. Heed posted warnings at

- organized beaches, and do not bathe at unmarked, unpatrolled beaches.
- Avoid any exposure, even wading, in any part of any body of water known to be infected with schistosomiasis (bilharzia).
- Do not swim in water where there is sewage contamination or algae present.
- Do not walk on any beach after dark no matter how apparently busy, well-lit, or patrolled.

RABIES

- Never presume an animal is free of rabies.
- Don't stroke or handle pets or unknown animals. Children need to be closely supervised.
- If bitten, scratched, or licked on broken skin, cleanse the wound immediately with soapy water and seek postexposure treatment for rabies.

SKIN/WOUND CARE

- Broken skin may become infected and lead to serious problems. Any bite, cut, or broken skin should be cleaned with safe water. Apply an antiseptic as a solution or spray. Avoid creams since they can trap dirt.
- Increasing pain, redness, or discharge from a cut suggests a spreading infection and may require antibiotic treatment. Seek medical help.

TUBERCULOSIS

- Tuberculosis is prevalent in most developing countries and also presents risk in certain developed countries. Avoid crowded public transportation or crowded public places which are poorly ventilated.
- Distance yourself immediately from anyone with a chronic or heavy cough.
- Screen domestic help for tuberculosis.
- Long-stay residents should have a TB skin test pre-departure and once per year thereafter.

PRE-TRAVEL CHECKLIST

- Before departure, if you are using medication or have a medical condition, ensure adequate supplies of medication for the full journey and that they are securely packaged in their original containers and carried in more than one place. You should have a letter from your physician, stating your condition and the medications and/or medical supplies you are carrying.
- Always arrange adequate medical and evacuation insurance when traveling. Ensure all pre-existing medical issues are declared to the insurer so that non-covered conditions are ascertained in advance. Have the contact details recorded and accessible at all times during travel.
- Pre-departure medical and dental exams are advised.
- Pack a spare pair of eyeglasses or contact lenses, and adequate cleansing solution if applicable.
- If you have concerns about jet lag, altitude illness, or motion sickness ask your travel health provider about medications that may be suitable for you.
- Pack sunglasses, wide-brimmed hats, sunscreen lotions, and lip protection to avoid sun exposure problems during travel.

Other Health Information

FOOD AND BEVERAGE PRECAUTIONS

It is difficult, if not impossible, to guarantee the safety of food and beverages when traveling, especially in developing countries. Without strict public health standards, bacteria or parasites in food or water may go undetected and cause illness such as traveler's diarrhea. However, travelers can continue to enjoy local foods—this is part of the pleasure of international travel. Just be sure to follow food and water precautions and concentrate on eating the types of food that tend to be safest.

Traveler's diarrhea is caused by something the traveler ate or drank. While it may not be possible to avoid

diarrhea in certain high-risk destinations even with the strictest adherence to preventive measures, the risk can be minimized by following the guidelines below.

FOOD PRECAUTIONS

Travelers should:

- Eat at establishments that are known to cater to foreigners or that are specifically known by other foreigners to be safe.
- Eat foods that are well-cooked and served steaming hot.
- Eat breads, tortillas, crackers, biscuits, and other baked goods.
- Eat fruits, nuts, and vegetables with thick skins, peels, or shells that you remove yourself.
- Eat canned foods.
- Always wash your hands with soap before eating and after using the toilet.

Travelers should NOT:

- Eat any food from street vendors or market stalls.
- Eat leafy or uncooked vegetables and salads. Some organisms in soil and water are not destroyed by normal cleaning methods.
- Eat undercooked, raw, or cold meat, seafood, and fish.
- Eat large carnivorous fish, especially from reef areas. Many contain concentrated toxins.
- Eat or drink unpasteurized dairy products such as cheese, yogurt, and milk. Be particularly wary of ice cream and other frozen confections that may have been made or stored in contaminated containers.
- Eat cold sauces such as mayonnaise, salad dressing, chutneys, or salsas, which are usually raw and made by hand.
- Eat buffet foods such as lasagna, casseroles, and quiches—unless you know they are fresh (not reheated) and have been kept steaming hot. Avoid buffets where there are no food covers or fly controls.
- Eat creamy desserts, custards, or sauces that may not have been adequately refrigerated.

BEVERAGE PRECAUTIONS

In developed countries, clean drinking water is available right out of the tap and breakdowns in the system are rare. Developing countries, however, don't always have the resources needed to ensure a pure water supply, and consequently tap water is not safe to drink. Even if the people who live there can drink the water, travelers should not assume that they can. Local residents have built up immunity to organisms in the water, but visitors have not. As a result, tap water can make travelers sick.

When traveling through areas with less than adequate sanitation or with water sources of unknown purity, travelers can reduce the chance of illness by following these precautions.

Travelers should:

- Use sealed bottled water or chemically treated, filtered, or boiled water for drinking and for brushing teeth.
- Drink beverages made only with boiled water whenever possible (such as hot tea and coffee). Water boiled for any length of time (even 1 minute), at any altitude, is safe to drink.
- Drink canned, boxed, or commercially bottled carbonated water and drinks. International brands are safest. Beware of unsealed containers that may have been re-filled.
- Safely drink beer and wine; however, alcohol added to beverages does not render them safe.
- Purify your own water (see "*Treating Water*," below) if one of these options is not available. Decide which method to use for water purification and bring along the appropriate equipment.
- Carry safe water with you if you are going out for the day and where availability of safe water is not assured.
- Breast-feeding is the safest food source for infants who are still nursing. If formula is used, it must be prepared with boiled water and sterilized containers.

Travelers should NOT:

- Drink tap water.
- Rinse toothbrush in tap water.
- Use ice unless it is made from boiled, bottled, or purified water. Freezing does not kill the organisms that cause diarrhea.
- Assume that water is safe because it is chlorinated. Chlorination does not destroy all the organisms that can make you ill.
- Drink from wet cans or bottles-the water on them may be contaminated. Dry wet cans/bottles before opening and clean all surfaces that will have contact with the mouth.
- Drink fruit juice unless it comes directly from a sealed container; otherwise it may have been diluted with tap water.

TREATING WATER

Chemical disinfection

If it is not possible to boil water, chemical disinfection is an alternative. Most (but not all) diarrhea pathogens are susceptible to being killed by iodine, which can be used to disinfect water, leafy vegetables, and fruits. Add 5 drops of 2% iodine to 1 liter of water and let stand for 30 minutes.

- Travelers who have thyroid problems or iodine allergies or who are pregnant should NOT use iodine for water purification.
- For those travelers who wish to avoid the taste and smell of iodine in their disinfected water, vitamin C (ascorbic acid) can be added to the water after the iodine has been in contact with the water for 30 minutes or more. Add about 50 mg of vitamin C to a liter of water and shake briefly to eliminate the iodine taste and odor.
- Tetraglycine hydroperiodide tablets (e.g., Globaline, Potable-Aqua, Coghlan's) are available from pharmacies and sporting goods stores. The manufacturer's instructions should be followed

Chlorine also can be used, but its germicidal activity varies greatly with temperature and other factors; thus it is less reliable than iodine.

Portable filters

It cannot be assumed that portable filters will make drinking water safe; most authorities make no recommendation regarding their use because of insufficient independent verification of efficacy.

However, in areas where it is not practical to boil all drinking water, a good quality filter with a pore size of 0.2 microns will eliminate the risk of pathogens. The filtered water should then be treated chemically as well.

Boiling

Urban travelers may choose an immersion coil for boiling water (a plug adapter and current converter might be necessary).

HEPATITIS A

GENERAL INFORMATION

Hepatitis A is a viral infection of the liver. Poor personal hygiene, poor sanitation, and intimate contact are all factors that allow for transmission of the virus, which is shed in the feces of infected persons.

Most people acquire the disease by drinking fecally-contaminated water or ice, eating contaminated food (such as uncooked fruits and vegetables or shellfish caught in contaminated water), or ingesting the virus directly from their own hands after touching a contaminated object (like a dirty diaper) or the hands of an infected person who failed to wash his or her hands after a bowel movement.

Symptoms include fever, general physical discomfort, lack of appetite, nausea, vomiting, dark urine, and jaundice (a condition in which the skin, eyes and urine become abnormally yellowish). The potential severity of hepatitis A increases with the age of the infected individual, particularly for those over age 50 years. Most infected adults develop the usual symptoms, including jaundice. However, most children experience symptomless infections and rarely develop jaundice. About 0.3% of all reported hepatitis A cases are fatal; however, 1.8% of reported cases are fatal in persons aged 50 years and older.

DISEASE RISK

Your risk of acquiring hepatitis A while traveling abroad depends upon the living conditions, length of stay, and incidence of hepatitis A infection in the areas visited.

- For travelers to countries with intermediate or high transmission rates, risk of infection increases with duration of travel and is highest for those who live in or visit rural areas, trek in back country, eat or drink under unsanitary conditions, or have close contact with local persons (especially young children) in settings of poor sanitation.
- In general, travelers to industrialized countries with low rates of transmission are at little to no risk of infection. However, many cases of travel-related hepatitis A occur in travelers with "standard" tourist itineraries, accommodations, and food consumption behaviors.

PRIMARY PROTECTION MEASURES

In areas with poor sanitation and hygiene, you should assume that the only safe drinks are canned or bottled carbonated drinks, beer, wine, and beverages made with boiled water. In some places the possibility exists that commercial water bottles may have been filled with tap water and recapped; therefore, carbonated bottled water is the safest option (although be aware that some brands may be high in sodium).

Always avoid ice cubes, and remember that alcohol will not make mixed drinks made with plain tap water safe. Consider non-disposable glasses and cups unsafe, too. Skip formalities and drink from the original beverage containers using sanitary straws.

Boil your own safe water supply for hygienic purposes such as brushing your teeth, washing near your mouth, and so on. You may want to take along an inexpensive immersion coil for boiling.

If bottled carbonated water is not available and boiling is not practical, your best alternative is to treat water with either iodine additives or tetracycline hydroperiodide tablets. Remember to filter cloudy water through a clean cloth or coffee filter to remove sediment before treating.

Food presents risks as well. You should avoid leafy and uncooked vegetables and salads. Fruits, nuts, and vegetables can be safe if they are well cleaned and have an intact thick skin or shell, which you should peel yourself, taking care not to contaminate the inside.

Order meats, fish, and other seafood cooked well done and served piping hot. Bread is safest when served fresh from the oven. Avoid moist grain dishes (like rice) that have been allowed to sit at room temperature for prolonged periods.

Always avoid cold meat platters, mayonnaise, and creamy desserts, as well as buffets and products from street vendors. Don't eat or drink unpasteurized dairy products, including cheese and yogurt. To protect against any attempts by local vendors to "stretch" pasteurized milk by adding water or unpasteurized milk to cartons or bottles, stick to canned milk.

Don't swim or fish in polluted waters, and don't eat fish that may have been caught in such waters.

When you are out and about, try to keep your hands away from your face. Always wash your hands when you return, and always wash your hands before eating.

VACCINATION

Hepatitis A vaccine is highly effective and safe; in the U.S., it can be given to persons as young as age 1 year.

Hepatitis A vaccine is routinely given to children at age 1 year (12-23 months) in the U.S., with a second dose given at least 6 months later. Certain travelers and adults may also receive this vaccine; see "*Who Should Receive the Vaccine.*"

Combination hepatitis A/B vaccine is available in the U.S. (requires a series of 3 injections) for persons 18 years and older.

- A pediatric form of hepatitis A/B vaccine is available in Canada and Europe. In Canada this vaccine can be used by persons as young as 1 year of age.

Immune globulin (IG), a human blood-derived product, is given for *temporary* protection against hepatitis A and is considered very safe. There are no age restrictions for the use of IG.

- IG's protective value is greatest when given *before* exposure to the hepatitis A virus, although it is also used to prevent infection from developing in unprotected persons after exposure to the virus or a carrier.

If you have a history of hepatitis A infection, and/or if you're over age 50, you should consider being tested for antibodies to hepatitis A. The likelihood of exposure to hepatitis A increases with age and other risk factors, such as whether you've traveled to or lived in a high risk area. If you have already been exposed to hepatitis A, you may already be immune. (However, if you've received blood or blood products in the past 6 months, be sure to tell your doctor; this could make antibodies show up on your screening test, but you may not really be immune.)

WHO SHOULD RECEIVE THE VACCINE

Travelers

A single dose of hepatitis A vaccine given at any time before travel will provide adequate protection for most healthy persons.

- Travelers who are immunocompromised or who have chronic liver disease or other chronic medical conditions and are departing in less than 2 weeks should receive the first dose of hepatitis A vaccine and a dose of IG.
 - Travelers who cannot receive the vaccine should receive immune globulin, if at risk.

If you are traveling to a developing country, you should be immunized with hepatitis A vaccine, because hepatitis A virus (HAV) infection is moderately to highly endemic in these areas.

- Risk is highest if you are a long-stay traveler, have adventurous eating habits, travel outside pre-arranged, fixed itineraries (including common tourist packages), especially in rural areas, and/or if you eat or drink frequently in settings of poor sanitation.

Travelers to some non-developing countries may have an increased risk of hepatitis A because of risk behaviors (including those listed above); in this situation you should consider vaccination.

Travelers who desire maximum pre-travel protection can be vaccinated.

Even if you do not think that your itinerary warrants hepatitis A vaccine, you should consider vaccination because many cases of travel-related hepatitis A occur in travelers staying at deluxe accommodation in major cities and on "standard" tourist or resort itineraries, even those who exhibit caution in food- and beverage-consumption behaviors.

The combination hepatitis A/B vaccine is recommended for travelers and other persons 18 years of age or older who are at risk for both forms of hepatitis.

Note: These recommendations reflect a synthesis of available advice from the Centers for Disease Control

(CDC), the CDC's Advisory Committee on Immunization Practices), American Academy of Pediatrics, and the World Health Organization, as well as ongoing global surveillance and the published literature; these recommendations may differ from those of individual countries' public health authorities.

Others who should be vaccinated

Other persons who should be vaccinated—regardless of travel considerations—include:

- all children at age 1 year (12-23 months) with a second dose given at least 6 months later
 - Children not fully vaccinated by age 2 years can be given the vaccine at subsequent visits.
 - children 2 years and older who: live in areas where vaccination programs target older children; are at increased risk for infection; or for whom immunity is desired
- unvaccinated children 2-18 years of age who live in U.S. communities, counties, or states where the rate of hepatitis A infection is high (for example, American Indian, Alaska Native, and Pacific Islander communities, and some religious communities) or communities that have prolonged outbreaks of hepatitis A
- men who have sex with men
- persons who use injection drugs
- persons with chronic liver disease (including those waiting for transplant or post-transplant)
- persons with occupational risk (e.g., persons working the HAV-infected primates or with HAV in a research setting)
- persons receiving clotting factor concentrates
- unvaccinated persons who anticipate close contact with an international adoptee from a country with medium or high endemicity
- some food handlers
- any person seeking protection against hepatitis A virus

WHO SHOULD NOT USE THE VACCINE

Be sure to discuss any allergies with your doctor. Persons with hypersensitivity to any of the vaccine components, such as aluminum or aluminum hydroxide, or the preservative 2-phenoxyethanol should not be immunized.

Because the vaccine's safety during pregnancy has not been evaluated, talk to your doctor if pregnancy is an issue and ask if your risk of contracting the disease justifies being vaccinated.

If you have a moderate or severe illness, your doctor is likely to postpone vaccination until you have recovered in order to minimize any potential adverse effects.

Persons with any bleeding disorder should discuss their options for receiving hepatitis A or A/B combined vaccines, which are given intramuscularly, with their health provider.

Hepatitis A vaccine is not licensed for use in children younger than age 12 months; however, risk of clinical disease is practically nonexistent for infants younger than age 12 months who are staying in settings with good hygiene (i.e., babies who are breast-fed or bottle-fed using safe water for formula reconstitution and babies eating commercial baby food who have no exposure to locally prepared food adults would eat).

In the U.S., combination hepatitis A/B vaccine is not licensed for persons younger than 18 years of age.

Who should use IG

Some travelers who cannot receive hepatitis A vaccine might be given IG, such as persons who are allergic to the vaccine.

- Rarely, IG might be given to infants younger than 12 months of age who are staying in situations where there is significant exposure to local foods that adults would eat—but only if there is a concern about transmission of hepatitis A to unvaccinated household contacts. Risk of mild clinical illness is low for these infants.

Who should not receive IG

If you have isolated immunoglobulin A (IgA) deficiency, you should not receive IG.

Persons with any bleeding disorder should discuss their options for receiving IG, which is given intramuscularly, with their health provider.

IG contains a preservative called thimerosal, which has a very small amount of mercury. If you know from experience that you are allergic to mercury or thimerosal, be sure to mention this to your doctor before receiving IG.

- The fact that you have this allergy does not necessarily mean you cannot receive IG. Your doctor will make that decision with you and may want to take some additional precautions when giving you IG.

Pregnant women or nursing mothers may receive IG *if it is clearly needed*.

RISKS AND SIDE EFFECTS

Hepatitis A Vaccines

The most common side effect of hepatitis A vaccination is soreness at the site where the shot is given. Sometimes headache and fatigue may occur, and some children may have temporary loss of appetite. Serious side effects are rare.

Immune Globulin

IG is considered very safe. Because of its special preparation and monitoring, intramuscular IG has never been shown to transmit infectious blood-borne viruses.

Serious side effects from IG are rare. However, some people may experience soreness and swelling at the injection site and, in some cases, hives.

Other Potential Problems

There is a rare chance that serious problems or even death could occur after receiving any medicine, vaccine or IG. **As with any serious medical problem, if the person has a significant or unusual problem after receiving IG or vaccine, call a doctor or bring the person to a health care provider promptly.**

TIMING

Hepatitis A Vaccine

Hepatitis A vaccine is given as 2 shots, with the second shot given 6 to 18 months after the first shot, depending on the brand of vaccine used and the age of the recipient.

- For routine vaccination, children receive their first dose of hepatitis A vaccine at age 1 year (12-23 months), and the second dose is given at least 6 months later.
 - Children who did not receive hepatitis A vaccine at age 12-23 months can be given the first dose of vaccine at a subsequent visit, with a second dose given at least 6 months later.
- For travelers, the first dose of hepatitis A vaccine should be administered as soon as travel is considered. Most healthy travelers will be adequately protected after a single dose. (A second dose will still be needed 6-18 months later.)
 - Travelers who are older adults, immune compromised, have chronic liver disease, or other chronic medical conditions who are planning to depart in 2 weeks or less should receive both the initial dose of hepatitis A vaccine and IG.

For routine vaccination, the combined hepatitis A/hepatitis B vaccine is given in a series of 3 shots; the second shot is given 1 month after the first and the third shot is given 6 months after the first.

- An accelerated schedule for combined hepatitis A/B vaccine is available and can be considered for travelers who are departing in less than 6 months. It consists of 4 doses of the combined hepatitis A/B vaccine. The second dose is given 7 days after the first dose, and the third dose is given 21-30 days after the first dose (at least 14 days after the second dose); a fourth dose is given 12 months after the first dose.

There are no known problems in administering hepatitis A vaccine at the same time as other vaccines.

Immune Globulin

IG is administered in a single dose and protection lasts for about 3 to 5 months.

INSECT PRECAUTIONS

In the tropics, insects can transmit significant illnesses such as malaria, dengue, yellow fever, and rickettsial disease—some potentially life-threatening. These diseases are best prevented by personal protective measures. In some cases (e.g., malaria or yellow fever), a preventive drug or vaccine is available as well but should never replace personal protection measures. Travelers to areas where insects that transmit these diseases may be present can help minimize their risk by following the insect precautions and protective measures discussed below.

PERSONAL PROTECTION MEASURES

- Wear clothing that exposes as little skin as is practicable.
- Apply a repellent containing the insecticide DEET (concentration 30 to 35%) or picaridin (concentration 20% or greater for tropical travelers).
 - Picaridin products in the U.S. with 20% concentration include Natrapel (Tendercorp) and Picaridin Insect Repellent (Sawyer). Picaridin is also known as Icaridin in some countries.
 - Picaridin has a pleasant smell, an advantage over DEET.
- The repellent should be applied to all exposed nonsensitive areas of the body. Frequent application ensures continuous protection.
- The time of day and type of insects to be avoided determine when the repellent should be applied.
 - Mosquitoes that transmit malaria (*Anopheles* mosquitoes) are generally night biters. Thus, if traveling in a malarious area, be especially vigilant in applying repellent from dusk to dawn.
 - Mosquitoes that transmit dengue (*Aedes* mosquitoes) are generally day biters, and travelers need to be especially vigilant applying repellent during daytime hours when in areas of dengue risk. Peak biting times are usually during the early morning hours and again from late afternoon to dusk.
- Treat outer clothing with permethrin (or other pyrethroid) when traveling in an area of high risk for malaria or other mosquito-borne or tick-borne diseases.
- If you are not sleeping in a sealed, air-conditioned room, sleep under a permethrin-impregnated bed net when at risk of malaria. Regularly check the net for rips and tears, and keep it tucked in around the bed at all times. Ensure that all open windows have insect screens.
- Use an aerosol insecticide before going to bed and a vaporizer device throughout the night.
- Outdoors, a smoldering pyrethroid coil can be used to reduce flying insects.
- In areas where tick-borne disease is a risk, perform a full body check at least once a day.

INSECTICIDES

The most effective repellents contain **DEET** (N, N diethylmeta-toluamide) or **picaridin** (Natrapel, Picaridin Insect Repellent, Cutter Advanced*, Cutter Advanced Sport*, KBR3023, Bayrepel, Autan, (RS)-sec-butyl 2-(2-hydroxyethyl)). Picaridin is now considered to have comparable efficacy and duration of protection to DEET *at the same concentration*. Both compounds have now been shown to be effective under actual field conditions in tropical countries against both *Anopheles* and *Aedes aegypti* mosquitoes.

Duration of protection: With both DEET and picaridin, the duration of effectiveness increases as the

concentration of repellent increases. With DEET, the effect on duration of protection plateaus at about 50% concentration. Products with less than about 20% picaridin or DEET have a relatively short duration of protection and should be discouraged for use in tropical travelers. The optimal concentration of DEET is considered to be 30-35%. When used by tropical travelers in *appropriate concentrations* (that is, 20% or greater), picaridin should be applied every 4-6 hours. In the U.S., there are 2 products containing 20% picaridin: Natrapel (Tendercorp) and Picaridin Insect Repellent (Sawyer).

Use in children: Both DEET and picaridin-containing repellents can be used in children \geq 2 months of age. The maximum concentration of DEET that should be used in children is 30%. There is no information on the maximum concentration of picaridin for children. Picaridin is more pleasant smelling than DEET.

Use in pregnancy and breastfeeding: DEET and picaridin can be used by pregnant and breastfeeding women but should not be applied directly to the abdomen or nipple area. While DEET has been shown in 1 short-term study to be safe in the second and third trimesters of pregnancy when used at concentrations of 20% or lower, the use of DEET in the first trimester has not been well studied. If extensive exposure is anticipated, pregnant women should consider more frequent repellent application because lower concentrations are often used. Although there is no evidence that the use of DEET or picaridin by pregnant or lactating women poses a health hazard to unborn babies or children who are breastfeeding, there are no long-term follow-up studies available.

Safety: DEET is effective against mosquitoes, ticks, fleas, and chiggers and is a remarkably safe insect repellent; only 30 cases of severe toxicity have been reported among billions of uses over 30 years. Most cases of toxic encephalopathy or seizures were reported in young children in whom excessive amounts were used over prolonged periods. There is no long-term information available on the use of picaridin but toxicity tests in animals have shown it to be extremely safe.

The use of another repellent, **IR3535** (3-(N-acetyl-N-butyl) aminopropionic acid ethyl ester; Bug Guard Plus*), is more controversial, and conflicting data exist over its effectiveness. IR3535 is recommended by WHO as equivalent to picaridin at the same concentration. IR3535 repellents can be used in children \geq 6 months of age, but due to a lack of data, they should not be used by pregnant or nursing women. In the U.S., IR3535 repellents are available in a range of concentrations up to 20%.

An increasing number of botanical repellents containing eucalyptus, citronella, soybean oil, geranium oil, castor oil, and 2-undecanone are marketed. At present insufficient evidence exists that these are viable alternatives to DEET or picaridin.

The following precautionary measures can minimize the possibility of adverse reactions to insect repellent containing DEET or picaridin:

- Use repellents according to label directions.
- Apply repellents sparingly and only to exposed skin or clothing.
- Repellents should not be inhaled or ingested and contact with the eyes should be avoided.
- Avoid applying repellents to portions of children's hands that are likely to have contact with eyes or mouth.
- Never use repellents on wounds or irritated skin.
- Wash repellent-treated skin after coming indoors if there is no further risk of exposure to insects.
- If a suspected reaction to insect repellent occurs, wash treated skin and seek medical attention.
- Pregnant and nursing women should minimize use of repellents since about 6-9% of the chemical is absorbed through the skin.

Travelers also should purchase a pyrethroid-containing flying-insect spray to use in living and sleeping areas during evening and nighttime hours.

For added protection against mosquitoes, bednets and clothing may be soaked in or sprayed with permethrin. Permethrin is an insecticide licensed for use on clothing; when applied according to directions it can be effective on clothing for several months and on bednets for half a year. Permethrin physically binds to the fabric, which then can be repeatedly washed without loss of effect; this also prevents absorption through skin. In some countries, deltamethrin liquid is available.

* Use of brand names is for informational purposes only and does not constitute preference for one brand over

another.

MALARIA

SHORELAND'S RECOMMENDATIONS FOR MALARIA PREVENTION

- Chloroquine is the drug of choice for malaria prevention in areas of the world where there is no resistance to this drug. (If you are unable to take chloroquine, one of the 4 drugs mentioned below can be used, as they are effective against chloroquine-sensitive *P. falciparum* malaria.)
- In areas of chloroquine resistance, mefloquine, atovaquone/proguanil (Malarone), and doxycycline are equally effective drugs of choice against chloroquine-resistant *P. falciparum*. Primaquine can be considered as a second-line drug choice in special circumstances.
- For short-term travelers (less than 2-3 weeks), atovaquone/proguanil may be preferable to mefloquine or doxycycline because you can stop taking the drug just 7 days after leaving the malarious area. Longer courses of atovaquone/proguanil appear safe but are more costly than mefloquine or doxycycline.
- For long-term travelers, mefloquine is preferable—if tolerated—due to lower cost and the fact that the drug is taken once weekly (rather than daily).

WHAT'S NEW

Use of either Malarone or co-artemether (combination artemether-lumefantrine; called Coartem in the U.S. and Riamet in Europe) is preferred for standby emergency treatment, if this strategy is chosen by the traveler. However, co-artemether should not be used in areas where there is resistance to artemisinin, from which one of the components of co-artemether is derived.

GENERAL INFORMATION

Malaria is an infection caused by a single-celled blood parasite that lives within red blood cells and is transmitted through the bite of the *Anopheles* mosquito. (Occasionally malaria is transmitted through blood transfusion, congenitally from mother to fetus, or through contaminated needles and syringes.) Malaria remains the most important infectious disease and most frequent infectious cause of death for persons traveling to countries in the tropics and subtropics.

Malaria occurs in more than 100 countries, including those in Africa, Central and South America, the Indian subcontinent, Southeast Asia, the Middle East, and islands of the South Pacific. Most of the world's malaria occurs in sub-Saharan Africa and risk is considerably higher there than anywhere else.

While there is no vaccine available, malaria usually (but not always) can be prevented by the use of antimalarial drugs and personal protection measures against mosquito bites (see "*Insect Precautions*") each time you are exposed to malaria.

SYMPTOMS

Malaria symptoms can develop within days of being exposed or, less commonly, can present weeks or months (or rarely, even years) after leaving a malarious area, when use of preventive drugs has been stopped. Symptoms always include fever and may also include flu-like symptoms that may come and go, such as chills, sweats, headache, muscle aches, and/or a vague feeling of illness. Vomiting, abdominal pain, diarrhea, cough, anemia, and jaundice (yellowing of the skin and the whites of the eyes) can occur. The symptoms of malaria can mimic almost any other infection that causes fever.

Malaria caused by the malaria strain called *P. falciparum* usually occurs about 10 to 12 days after infection and is **a medical emergency**. If *falciparum* malaria is not treated immediately and properly, it can proceed to shock, lung and kidney failure, coma, and death. While illness caused by other milder strains (*P. vivax*, *P. ovale*, and *P. malariae*) is not usually life-threatening, there may be serious health risks to very young or very old persons or to those with underlying illness. Malaria due to *P. vivax* and *P. ovale* may eventually resolve without treatment but can relapse periodically until properly treated. Malaria is always completely curable when the appropriate drug is used.

DISEASE RISK

In most parts of the world, malaria is a rural disease with minimal or no risk in urban areas. However, as a general rule, malaria risk occurs in both rural *and* urban areas of sub-Saharan Africa and the Indian subcontinent. Malaria is less common above a certain altitude (varies by country, but usually around 5,000 feet), during dry seasons, and among those who stay in air-conditioned and/or screened accommodations.

The risk of getting malaria can vary greatly even within the same country, depending on the intensity of transmission, the season, duration of travel, type of travel, the location within a country (e.g., urban vs. rural), and where you will spend the evening and nighttime hours. (Malaria is usually transmitted only between dusk and dawn, the time that *Anopheles* mosquitoes generally feed on humans.) You can obtain country-specific malaria risk information from your health care provider in the form of a Travax country report or a malaria risk map (where available).

For example, short-term travelers living in urban centers and staying in air-conditioned hotels will be at much lower risk than long-stay, adventurous travelers living in rural areas. However, even if your exposure will be brief, such as a 1-night stay in a malarious area or a night-time train trip through a malarious area, you should take protective measures, including insect precautions and a full course of prescription anti-malarial drugs. It is also possible to contract malaria during brief stopovers at airports in malarious zones if health officials have not taken proper measures to rid the area of mosquitoes. Airports off the main international circuit are particularly suspect.

Adults who grew up in malarious areas should be aware that immunity to malaria disappears within 6 months of the last exposure to malaria. Malaria preventive medications are indicated for these individuals just as for first-time travelers to the region.

PREVENTIVE THERAPY

The use of preventive medications ("chemoprophylaxis") and personal protection measures against mosquito bites are important safeguards if you are traveling to malarious areas. (See "*Insect Precautions*.") If you will be traveling to a malarious area, you should get expert medical advice regarding malaria prevention; travel medicine advisors are the most qualified to provide this advice. They can inform you of which destinations require preventive measures and will choose an appropriate anti-malarial drug for that destination.

In some areas of the world, where it is still effective against the malaria parasite, chloroquine is the drug of choice for malaria prevention. In many other areas, however, the parasite has become resistant to chloroquine, and other drugs must be prescribed. In these cases, there are 3 drugs that are considered to be equally effective in preventing *P. falciparum* malaria: atovaquone/proguanil (Malarone), mefloquine, and doxycycline. Choice of drug depends on patient, itinerary, and economic factors, and each drug has advantages and disadvantages in this regard. Primaquine is a second-line option only when all other choices have been eliminated, and then only for short-term travel to areas where *P. vivax* constitutes all or nearly all of the malaria cases.

Let your doctor know if you have any serious underlying health problems (such as kidney, heart, or liver disease, or allergies) so that these problems can be taken into consideration in choosing the drug for malaria prevention. If you have a serious, unusual, or unexpected reaction after taking an antimalarial drug, seek medical attention promptly and indicate to your health care provider that you have taken such medication. An overdose of antimalarial drugs (particularly chloroquine) can be fatal. Medicine should be stored in childproof containers, out of children's reach.

Remember that there is always the risk of potential side effects, no matter which medication is used to prevent malaria. However, any possible minor side effects of antimalarial medications must always be weighed against the risk of severe and potentially fatal infection with *Plasmodium falciparum*. Disabling side effects are uncommon with most antimalarial drugs.

In addition, remember that although the use of preventive drugs and insect precautions will decrease your chances of getting malaria by up to 97%, such measures do not guarantee protection.

Travelers will encounter fellow travelers en route who have been prescribed a wide variety of regimens, some highly effective but many others much less so. This may include drugs not available in the U.S. Travelers should

be instructed to stick to their own regimen at all times. If intolerable side effects arise, they should make every effort to contact the original prescribing health provider by e-mail, fax, or telephone for advice. Should medications need to be changed mid-course due to side effects, special considerations apply with respect to duration of therapy; a knowledgeable physician needs to review your case with you.

TIMING OF ANTIMALARIAL DRUGS

Malaria chemoprophylaxis needs to be started before you enter a malarious area and continued while you are in the risk area and for a time after leaving the area. Different drugs must be started at different times with respect to the beginning of travel. This has to do with the time it takes to build up effective blood levels as well as the need to assess for any serious side effects prior to departure.

Not all malarious countries have malaria in all areas of that country. The timing of when you start the drug does not always correspond to when you arrive at your first destination; rather it depends on when you will first arrive in an actual malarious area of that country or a subsequent country on your itinerary. For example, if you will be traveling to a major city where there is no risk of malaria for several days or weeks before you enter a malarious area, you don't need to start taking the drug until the appropriate time before the actual malaria exposure starts. You should continue to take antimalarials for as long as malaria risk occurs, in some cases months or even years. It is also important to continue taking your antimalarial drugs for a period of time after you leave the malaria risk area. Please see the information below for the drug you have been prescribed. Some long-term travelers or expatriates, who may be overseas for months or years, may be traveling into malarious areas only periodically and may need to take antimalarials only periodically. Discuss the best individual strategy for this with your health care provider.

ANTIMALARIAL DRUGS

Atovaquone/proguanil (Malarone)

Malarone (a combination of atovaquone and proguanil) is available in a single tablet. The recommended adult dose is a 250 mg/100 mg tablet, taken orally once a day. You should start taking Malarone 1 day before arriving in a malarious area, take it each day that you are in the risk area, and continue taking it daily for 1 week after you leave the malarious area. If you miss a dose, you can take it later the day, but do not double the next day's dose if you miss a dose completely. Malarone should be taken with a meal or milk, at the same meal time each day.

This drug works equally as well as mefloquine, doxycycline, or primaquine. It appears to be very safe and effective, but somewhat expensive for a long-stay traveler.

When Malarone is used for malaria *prevention*, no definite side effects are evident. However, nausea, vomiting, abdominal pain, and diarrhea may occur when higher doses of the drug are used for treatment. Convulsions and rash have rarely been reported.

Malarone should not be used by pregnant women, persons with severe renal failure, or persons with an allergy to either drug that make up Malarone (atovaquone and proguanil).

In South Africa, Malarone is called Malanil.

Chloroquine (Aralen and generics)

Chloroquine is a safe and effective medication that may be used to prevent malaria in areas where chloroquine-resistance has not occurred. The adult dose of chloroquine (brand name Aralen) is 500 mg taken orally once a week. Start taking chloroquine 1 week before arrival in a malarious area, take it continuously (weekly) while in the risk area, and continue to take it (weekly) for 4 weeks after you leave the malarious area. If you miss a dose, take it as soon as possible that same week and resume the next week's schedule on the normally scheduled day. Do not take a double dose if you completely missed a dose one week. Most people find Sunday the most convenient and easy day to remember for weekly medication.

Do not take chloroquine if you are allergic to the drug or have eye problems called retinopathy. If you take chloroquine for long periods of time, you may need regular eye check-ups, periodic blood work, or periodic check-

ups for muscle weakness. Chloroquine can worsen psoriasis or porphyria (a disorder that causes abnormalities in the production of a component of hemoglobin) and should be used with caution if you have preexisting hearing damage, liver disease, alcoholism, or a blood deficiency called G6PD.

Serious side effects of chloroquine are uncommon. Minor side effects may occur, such as upset stomach, headache, dizziness, blurred vision, and itching (the latter most often in African Americans). If you have epilepsy, you might be at risk for seizures. Rarely, hematological or cardiac changes can occur; serious side effects such as seizures, psychosis, and encephalopathy have also occurred with chloroquine use. The few people who experience stomach upset may tolerate chloroquine better by taking it with meals or in divided, twice-weekly doses. Chloroquine has been shown to be safe for infants and pregnant women. Chloroquine tablets should be kept in child-proof containers, well out of reach of children; as few as 2 tablets can be fatal to a young child.

In some countries, chloroquine may be prescribed in combination with proguanil (a drug that is not available by itself in the U.S.) if you are going to chloroquine-resistant areas and cannot take mefloquine, doxycycline, atovaquone/proguanil, or primaquine. Proguanil may be purchased in Canada, Europe, and in many countries in Africa. However, the chloroquine plus proguanil combination is much less effective than the drugs mentioned above.

Mefloquine hydrochloride (Lariam* and generics)

For travel to risk areas where there is chloroquine-resistant malaria, mefloquine is one of the drugs of choice. The adult dose of mefloquine is 1 tablet containing 250 mg taken orally once a week. Start taking mefloquine 2-3 weeks before arrival in a malarious area, take it continuously (weekly) while in the risk area, and continue taking it (weekly) for 4 weeks after you leave the malarious area. If you miss a dose, take it as soon as possible that same week and then resume your normal schedule the next week. Do not double the dose the next week if you completely missed a dose one week.

Mefloquine usually is well tolerated but may cause gastrointestinal, neurological, and (occasionally) psychological side effects. The adverse effects of mefloquine have received considerable media attention, much of it exaggerated and unwarranted, although a small percentage of people do have significant problems with mefloquine. Minor side effects include headache, stomach upset, dizziness, and bad dreams, which tend to be mild or temporary. (If you plan to drive, pilot a plane, or operate machinery, be aware that mild dizziness is a possible side effect.) About 5% of users develop disabling anxiety, dizziness, depression, insomnia, or irritability that is bad enough to make them stop taking the drug. However, it is important to remember that about 95% of mefloquine users tolerate the drug without discontinuing it, and for long stay travelers to chloroquine-resistant areas, this weekly medication is the most convenient regimen. Severe adverse events, such as psychosis, seizures, and encephalopathy may occur in about 1 out of 6,000 to 10,000 users, most of whom had a previous history of one of these problems. Very rarely, mefloquine can cause inflammation of the lung tissue.

You should not take mefloquine if you have an allergy to the drug, history of epilepsy, current depression, or a history of depression, anxiety disorder, psychosis, schizophrenia, or other major psychiatric disorder. Stop taking the drug if you experience the following symptoms while taking the drug for malaria prevention: acute anxiety, depression, restlessness, or confusion. In this case, you will need to obtain an alternative medication from your health care provider.

*Lariam (Roche brand of mefloquine) is no longer available in the U.S.; generic mefloquine remains available.

Doxycycline

Travelers to areas of resistance to chloroquine or mefloquine can use doxycycline. The adult dose of doxycycline is a 100 mg tablet, taken orally once a day. Start taking doxycycline 1 day before entering a malaria risk area, continue taking it (daily) while in the risk area, and continue the drug (daily) for 4 weeks after you leave the malarious area. Late doses can be made up on the same day, resuming the normal schedule the following day. Do not double the dose the next day if you completely missed a dose one day. Doxycycline should be taken while sitting or standing in an upright position, and it should be taken with food or a liberal amount of fluid. Do not lie down for 30 minutes after taking this drug. Do not take Pepto Bismol or antacids while taking this drug, as they can interfere with absorption of doxycycline.

Skin sensitivity to sunlight is an uncommon side effect but can be annoying and can lead to severe sunburn. You can lower your risk of this complication if you use a sunscreen that blocks both UVA and UVB rays, avoid prolonged exposure to sunlight, and wear protective clothing, including a hat. Women who take doxycycline may develop vaginal yeast infections and therefore should carry an antifungal drug for self-treatment.

Do not take doxycycline if you are pregnant, younger than 8 years of age in the U.S. or younger than 12 years of age in the U.K., or have an allergy to doxycycline or tetracycline.

Persons taking long-term minocycline or related medications should not use these drugs for malaria chemoprophylaxis; these persons should switch to doxycycline 1-2 days before travel. Minocycline should be restarted only after the full course of doxycycline has been completed.

Primaquine

Primaquine is a second-line choice for primary malaria prevention when all other options have been eliminated, and then only for short-term travel to areas where all or nearly all the malaria cases are caused by *P. vivax*. The adult dose of primaquine, when used for prevention, is 30 mg taken orally once a day. Primaquine must be started 1 day before arrival in a malarious area, taken daily while in the risk area, and continued (daily) for 1 week after you leave the malarious area. Primaquine should be taken with food in order to reduce stomach upset. Late doses can be made up on the same day. Do not double the dose the next day if you completely miss a dose.)

Your physician may also prescribe primaquine for use after leaving certain malarious areas, to prevent certain kinds of malaria (*P. vivax* or *P. ovale*) from occurring ("relapsing") weeks or months (or rarely even years) after routine preventive medications have been stopped—this is generally for persons who have had prolonged exposure (more than 6 months) in certain malarious areas.

Do not take this drug if you are pregnant or if you have low levels of glucose-6-phosphate dehydrogenase (G6PD) (it can cause severe anemia in persons who are deficient in this blood enzyme). This enzyme deficiency is most common in African Americans, Mediterraneans, South Asians, and Orientals. Primaquine should be used only after a blood test for G6PD deficiency has been performed and found to be normal. If you have a genetic deficiency of methemoglobin reductase, you may experience a condition called methemoglobinemia when taking primaquine.

PREGNANCY

In general, if you are pregnant you should not travel to a malarious area unless the travel is absolutely unavoidable, because malaria poses a very serious threat to you and to your fetus. In fact, it can cause more severe problems in pregnant women than in those who are not pregnant; malaria increases the risk of maternal death and fetal prematurity, miscarriage, and stillbirth. If you are pregnant and travel to a malaria risk area is unavoidable, it is very important that you consult your health care provider or travel medicine advisor, take preventive medication, and take measures to protect against mosquito bites. (See "*Insect Precautions*.")

In malaria risk areas where chloroquine is still effective, it is the preferred drug for pregnant women. Chloroquine has not been shown to be harmful to the fetus during pregnancy.

In areas of chloroquine-resistance, mefloquine is the drug of choice and can be used during all trimesters, although there are less data available on mefloquine use during the first trimester.

Doxycycline, atovaquone/proguanil, and primaquine should not be used during pregnancy.

An alternative to mefloquine is the combination of chloroquine and proguanil. However, this alternative regimen has relatively low efficacy and therefore should be avoided if possible.

BREASTFEEDING

Very small amounts of antimalarial drugs can be passed on to breastfed infants, but the amount received by the infant in the breast milk is not thought to be harmful. However, it is also not enough to protect infants against

malaria; therefore, infants need to be given appropriate drugs in dosages according to their weight.

INFANTS AND CHILDREN

All children (including young infants) who travel to malaria risk areas should be protected against insects and should take drugs to prevent malaria. The dosage will depend on the child's age and/or weight. Young children should avoid travel to areas of chloroquine-resistant falciparum malaria unless they can take an effective drug such as mefloquine, doxycycline, atovaquone/proguanil, or primaquine.

Doxycycline should not be given to infants and children younger than 8 years of age (in the U.S.). If a physician prescribes chloroquine or mefloquine for a child, the pharmacist can crush the tablets (which have a bitter flavor) and place the powder in gelatin capsules with calculated pediatric doses. Children may tolerate antimalarial medications more readily if the crushed powder is mixed in food (for example, ice cream, jam, honey, or chocolate sauce) or drink. Malarone is available (in the U.S. and Canada) in a pediatric tablet that is one-fourth the strength of the adult tablet. Using pediatric-strength tablets, the dose is based on weight.

Dosage will need to be adjusted according to the increasing weight of a growing child, if he or she is a long-term traveler or expatriate. Ask your travel medicine provider before you leave for long-term travel to advise you on adjusting the child's dosage.

WHEN TO SEEK MEDICAL ATTENTION

If you think you might have symptoms of malaria (especially fever and/or "flu"-like symptoms), you should seek medical attention immediately. Delay of appropriate therapy can have serious—even fatal—consequences. Inform your health care provider that you might be at risk of malaria and where you have traveled. Request "thick and thin blood films" or a malaria rapid diagnostic card test for diagnosis. One negative blood film does not rule out malaria; if symptoms persist, 2 additional films should be performed 12 to 24 hours apart. Similarly, a negative rapid malaria test should be followed with up to 3 thick/thin blood films.

- Certain strains of malaria can lie dormant in the liver and cause malaria symptoms long after you leave the malaria risk area (months or even years later) and stop taking malaria drugs. If you develop a fever or flu-like symptoms—even months after your return—be sure you seek medical attention and advise your health care provider of previous travel to a malarious area.

SELF-TREATMENT OF PRESUMPTIVE MALARIA

In most cases you will not need to carry standby self-treatment drugs when using an appropriate, recommended medication to prevent malaria. However, in rare situations where you must use a less effective medication and may not have access to medical care within 24 hours of developing a fever while in a malarious area, it may be prudent to carry a drug for self-treatment. **The treatment drug should not be the same as the prevention drug.**

Coartem (co-artemether; artemether/lumefantrine) and Malarone are available in the U.S. and either drug can be used for self-treatment, as long as you did not use the same drug for prevention. However, Coartem should not be used in areas where there is resistance to artemisinin, from which one of the components of Coartem is derived. Consult your travel medicine provider.

- Adult self-treatment using Coartem consists of 6 doses taken over 3 days. The first day, 4 tablets are taken, followed by 4 more tablets 8 hours later. On the second and third days, 4 tablets are taken every 12 hours.
 - Coartem needs to be taken with food. (Do not take with grapefruit juice.)
 - Coartem should not be used by pregnant women, persons with a heart condition called QTc prolongation, or those with an allergy to either component of the drug (artemether/lumefantrine).
 - The most frequently reported side effects in adults include loss of appetite, muscle aches, and joint pain; the most common side effects in children are fever, cough, vomiting, loss of appetite, and headache.
- The adult self-treatment dose for Malarone consists of 4 tablets taken once daily for 3 days.
 - Malarone should be taken with food.
 - Malarone should not be used by pregnant women, persons with renal failure, or those who are

allergic to either component of the drug.

The drug should be taken promptly (according to your health care provider's instructions) if fever and illness occur during travel and medical care is not available within 24 hours. Remember that self-treatment is only a temporary measure and you should seek medical attention as soon as possible.

An alternative to Coartem or Malarone for self-treatment is quinine plus doxycycline, but this drug has a much more complex schedule of doses and is frequently associated with adverse effects.

Mefloquine should not be used for self treatment unless there is no other alternative.

PACKING A MEDICAL KIT

PRE-TRAVEL PLANNING

Before you go, list all your medications and their generic names and keep this list with you in case you need to replace any of the medications. Also keep a copy of the drug information leaflets (package inserts) from the manufacturers. If you are allergic to any drugs or have a medical condition (for example, diabetes), you should carry medical alert information, preferably a Medical Alert wristband or tags listing the medical condition and/or allergies.

WHAT TO PACK FOR A SHORT TRIP TO THE TROPICS

Medications

- Analgesics (acetaminophen or aspirin). Also consider taking a stronger painkiller and anti-inflammatory such as ibuprofen.
- Antidiarrheal agents such as loperamide
- Antibiotics for treating diarrhea
- Oral rehydration packets
- Antihistamine tablets for hay fever, itching, and other allergies
- Sting relief spray or hydrocortisone cream for insect bites
- Calamine lotion for sunburn and other skin rashes
- Eye drops for sore eyes
- DEET- or picaridin-containing insect repellent

Optional Medications / Supplies

- Hypnotics such as zolpidem or zopiclon for time-zone travel and jetlag
- Melatonin for time-zone travel and jetlag
- Anti-motion sickness remedies
- Soluble fiber for constipation
- Medication to prevent altitude sickness
- Condoms

Simple First Aid Kit

- Thermometer
- Scissors
- Tweezers to remove splinters and ticks
- Adhesive bandages of various sizes
- Gauze swabs and adhesive tape
- Bandages and safety pins to fasten them
- Nonadhesive dressings (such as Telfa or Melolin)
- Antiseptic powder or solution (e.g., povidone-iodine), antiseptic wipes
- Wound closure strips (steri-strips) or butterfly strips

ADDITIONS FOR LONG JOURNEYS, TREKKING, OR CAMPING

- A course of broad spectrum antibiotics for infections of the chest, ear, skin, etc.
- Antibiotics to treat cystitis and a treatment for vaginal yeast infection
- Antibiotics drops for eyes and ears
- Topical antifungal cream or powder
- Elasticized support bandage or crepe bandage
- Triangular bandage for making an arm sling
- Dental first aid kit
- Sterile kit, including needles, syringes, suture kit, intravenous cannula for IV fluids

ADDITIONS FOR HIGHLY MALARIOUS REGIONS

- Permethrin to treat clothes and bed nets
- Course of standby treatment for malaria if more than 24 hours from medical care

CARRYING MEDICINES THROUGH CUSTOMS

Customs officials can be suspicious of medications. Help to ensure that your medications are acceptable by following these recommendations:

- Keep medicines in their original packaging or container when possible.
- Obtain and carry with you a letter from your physician on letterhead stationary, appropriately signed and dated, stating your medical history and medication requirements.
- If you are a diabetic, obtain a letter from your doctor explaining why you need to carry needles and syringes. Carry this letter with you at all times.
- First aid kits, especially those with needles and syringes, should be accompanied by an official document endorsing their use as a medical kit.

TRAVELING WITH MEDICATIONS

- Keep all medications in their original containers. Use re-sealable plastic bags for storing medical supplies and place them in a waterproof and squash-proof container, such as a clear plastic box.
- Keep medicines as cool as possible and out of direct sunlight.
- Keep all medicines out of reach of babies, children, and pets.
- Carry twice as much medication as you will need, preferably split up into 2 separate bags, in case you lose one. Carry some in your hand luggage and some in the checked luggage.
- Take along copies of prescriptions for the most important drugs.
- Have all prescriptions written using generic names, since trade names vary in different parts of the world.
- If you are diabetic, see *"The Diabetic Traveler"* for tips on carrying insulin, etc.

Medicines can be dangerous if misused. For all medications, ensure that they are within their expiry date, are labeled for use, and have the drug name on the packaging.

POLIO

GENERAL INFORMATION

Introduction

Polio is a highly infectious disease caused by viruses that invade the nervous system, causing irreversible paralysis and even death in some persons. Humans are the only known reservoir of the polio virus.

There are no drugs or treatments that will cure polio. Most people who are paralyzed by polio will have some weakness in an arm or leg for the rest of their lives; many will be seriously disabled.

Transmission

The virus that causes polio is excreted in the feces of infected persons and can infect food or water through poor sanitary habits; the virus is then transmitted to others through consumption of the contaminated food or water. When the virus enters through the mouth, it multiplies in the cells of the throat and intestinal tract.

Transmission can also occur through pharyngeal secretions early in the course of infection, permitting mouth-to-mouth transmission.

Transmission occurs year-round in infected countries in the tropics; transmission peaks in the summer in temperate climates. In endemic countries, children are most commonly affected. Transmission is greatest in countries with poor standards of hygiene.

Epidemiology

Polio has been eradicated from most of the world but still circulates in some developing countries, particularly in Africa, the Indian sub-continent, and a remote area of China. Polio is still endemic in Pakistan, Afghanistan, and Nigeria, and small numbers of cases are found in other countries due to re-establishment of the infection in local populations through importation of the virus by foreigners.

Risk

Risk to travelers is low. Travelers who have completed a primary series of polio are at almost no risk. However, vaccination prevents the polio virus from entering into countries by travelers who have asymptomatic new infections or low-grade infections.

Symptoms

The incubation period is normally 6-20 days. Most infections do not result in symptoms but the virus can be shed in stool for several weeks.

Mild cases can cause fever, sore throat, stomach ache, and flu-like symptoms that may last only a few days. More serious cases result in headache and stiffness of neck, back, and legs, or can result in paralysis, which occurs most commonly in the legs; however, 1 in 5 cases involves throat and chest muscles, affecting swallowing and breathing. Fatality rates range from 2% to 75%. Complete recovery seldom occurs.

Need for Medical Assistance

An unimmunized traveler to countries where polio still occurs should seek urgent medical assistance if he or she develops headache and stiffness of neck, back, and legs, or paralysis. Polio that affects breathing can be rapidly fatal.

PREVENTION

Non-Vaccine: Observe standard food and beverage hygiene practices.

- See *Food and Beverage Precautions*.

Vaccine: Polio vaccine prevents travelers from becoming infected when traveling in a risk area and prevents travelers from bringing the virus into areas that are currently free of polio.

An inactivated (killed) polio vaccine (IPV) is available in the United States and is given routinely in childhood vaccination and to certain at-risk travelers. Live oral polio vaccine (OPV) is no longer available in the U.S. (although is still used in some countries).

- The complete 4-dose schedule of IPV offers the best protection. Nearly 99-100% of those who receive 3 or

more vaccine doses will be protected.

Combination polio vaccines are also available in the U.S. for use in children:

- a combination vaccine that protects against polio, hepatitis B, and diphtheria, tetanus, and pertussis
- a combination vaccine that protects against polio, Hib, and diphtheria, tetanus, and pertussis
- a combination vaccine that protects against polio and diphtheria, tetanus, and pertussis

Who Should Receive IPV

Vaccination is recommended for:

- all children younger than age 18 years
- unvaccinated or incompletely vaccinated travelers to areas where naturally occurring polio virus is still circulating
- travelers from endemic areas traveling to other countries
- lab workers who handle the polio virus (consider immunization)
- health care workers caring for persons who might be excreting poliovirus (consider immunization)

Vaccination is required for:

- some travelers to Saudi Arabia
 - See "Special Considerations, Entry Requirements."

Who Should Not Use IPV

Persons who are moderately or severely ill usually should wait until they recover before getting this vaccine.

IPV should not be given to:

- any person who has had a serious allergic reaction after getting polio vaccine
- any person who has had an allergy problem with or severe reaction to neomycin, streptomycin, or polymyxin B
- pregnant women, unless immediate protection is needed
 - Although there is no convincing evidence that polio vaccine causes any problems to the unborn babies of pregnant women, doctors usually do not recommend giving any drugs or vaccines during pregnancy unless there is a special need.

The combination vaccine containing polio/hepatitis B/DTaP should not be given to:

- any person who has an allergy to yeast, neomycin, or polymyxin B

The combination vaccines containing polio/Hib/DTaP and polio/DTaP should not be given to:

- any person who has an allergy to neomycin or polymyxin B

Persons with a bleeding disorder should discuss with their health care provider options for receiving IPV, which can be given either IM or subcutaneously.

Risks and Side Effects

Minor local reactions (pain or redness) may occur at the injections site.

There is a rare chance that serious problems or even death could occur after receiving any medicine or vaccine. If a significant or unusual problem occurs after receiving the vaccine, the patient should call or visit the health care provider.

Timing

IPV

The routine childhood schedule consists of 3 primary doses given at ages 2 months, 4 months, and 6-18 months followed by a fourth dose (booster dose) at age 4-6 years.

- If an accelerated schedule is needed (e.g., for travel), the 3 primary doses may be given as early as age 6 weeks with 4 weeks between doses. Dose 4 should be given at least 6 months after dose 3.
- The early start and accelerated schedules should be used in children less than 6 months of age *only when necessary*, as they do not induce as good a response as the 2, 4, and 6 month regimen.

Travelers to risk areas

Primary series: Travelers who have not completed the primary series should begin or complete the series.

- Adults: 2 doses given 4-8 weeks apart and a third dose given 6-12 months after the second dose.
- Children: see above for accelerated schedule.

Booster (for travelers who have completed the primary series):

- Children ages 4-18 years who completed the primary series but did not receive the 4-6 year booster need 1 pre-travel dose.
- Adolescents who completed the childhood series need a one-time booster dose if more than 10 years have elapsed since the last dose of the childhood series.
- Adults who completed the primary series during childhood need a one-time pre-travel dose.
- Adults who completed a primary series after childhood need a one-time booster dose if more than 10 years have elapsed since completion of the primary series.

Travelers from endemic areas:

- These travelers should have a complete primary series plus 1 adult dose.

Combination vaccines:

- The combination vaccine that protects against polio, hepatitis B, and diphtheria, tetanus, and pertussis can be given at ages 2, 4, and 6 months. (It cannot be used for the booster dose at age 4-6 years.)
- The combination vaccine that protects against polio, Hib, and diphtheria, tetanus, and pertussis can be given at ages 2, 4, 6, and 15-18 months.
- The combination vaccine that protects against polio and diphtheria, tetanus, and pertussis can be used for the fifth dose in the DTaP series and the fourth dose of the polio series.

Special Considerations

Entry Requirements

Saudi Arabia requires proof of polio immunization for some travelers:

- All travelers (regardless of age and vaccination status) coming from polio-endemic countries or countries in which polio has been re-established must show proof that polio vaccine was given at least 6 weeks prior to departure. These travelers will also receive a dose of OPV upon arrival.
- All travelers aged less than 15 years traveling to Saudi Arabia from countries with imported cases of polio or circulating vaccine-derived polioviruses in the previous 12 months should be vaccinated with OPV or IPV 6 weeks prior to visa application. These travelers will also receive a dose of OPV at border points.

TYPHOID AND PARATYPHOID

GENERAL INFORMATION

Introduction

Typhoid fever and paratyphoid fever are bacterial infections known as "enteric" (intestinal) fevers. They are caused by *Salmonella enterica* (*S. enterica*) serovars Typhi and Paratyphi A, B, and C. Typhoid and paratyphoid A are the most important serovars. Worldwide, they cause 30 million cases of enteric fever annually, mainly in countries with a poor standard of hygiene. Moderately effective vaccines are available for typhoid, but not for paratyphoid fever.

Transmission

S. enterica is excreted in feces and urine. Infection occurs commonly through drinking or eating contaminated water or food. The bacteria are transmitted by person-to-person contact (especially through food handlers).

Gastric acid in the stomach is the body's first line of defense against *S. enterica*. The risk of contracting an enteric fever may be increased by vagotomy (surgical cutting of the vagus nerve to reduce acid secretion in the stomach) or by taking drugs that suppress gastric acid, such as antacids, H₂-antagonists, and proton pump inhibitors.

Epidemiology

The enteric fevers are endemic in most of the developing world.

- Prevalence is highest in countries with warm climates and poor sanitary facilities for sewage disposal and water treatment.
- Transmission is greatest in the dry season and at the beginning of the rains, and is exacerbated by antibiotic resistance.
- Among travelers, paratyphoid A is as common as typhoid fever, perhaps because many travelers have been vaccinated against typhoid.

In highly industrialized countries, enteric fevers typically occur as sporadic or imported cases, and some countries are virtually free of typhoid. However, outbreaks have occurred in developed countries, for example, in Zermatt, Switzerland, a tourism destination whose water supply was contaminated in 1963.

Risk

Eating or drinking contaminated food or water is the main risk factor for infection.

- Risk is highest for travelers to southern Asia (e.g., India, Nepal, Pakistan, Bangladesh).
- Other areas of risk include East and Southeast Asia, the Caribbean, Central and South America, and sub-Saharan Africa.
- In any endemic country, even the most hygienic restaurant may be risky because of a healthy, silent typhoid carrier.

The risk of disease varies with the number of organisms ingested and the health of gastric acid secretion.

Symptoms

The incubation period is 1-3 weeks. Fever is the chief presenting symptom, leading gradually to abdominal pain and diarrhea. If typhoid is left untreated, fatal complications can occur. Typhoid and paratyphoid have the same symptoms but typhoid is the more dangerous of the 2 diseases.

Need for Medical Assistance

Any traveler who develops fever on returning from the tropics should seek medical assistance. Gradual onset of prolonged fever with malaise and abdominal symptoms is suggestive of enteric fever.

PREVENTION

Non-Vaccine: Food and beverage precautions should be observed to avoid contaminated food and drink, regardless of vaccination status. A large intake of bacteria can overwhelm even the best response to the vaccine.

- See *Food and Beverage Precautions*.

Vaccine: Typhoid vaccines are recommended for the majority of travelers to endemic countries.

- Two typhoid vaccines are available in the United States, a live oral vaccine and an inactivated (killed) injectable vaccine.
 - Typhoid vaccines are about 60-70% protective against typhoid in people living in endemic areas.
 - Protection may last longer with the oral vaccine.
- There are no paratyphoid vaccines available. However, oral typhoid vaccine may also offer some protection against paratyphoid B.

Who Should Receive the Vaccine

Persons who should receive typhoid vaccine:

- travelers to developing or endemic countries, who are:
 - long-stay travelers
 - travelers with adventurous eating habits
 - persons who travel outside pre-arranged, fixed itineraries (including common tourist packages), especially in rural areas
 - travelers who visit relatives or friends (who may be less likely to eat safe foods)
 - travelers to smaller cities, villages, and rural areas off the usual tourist itineraries, where food and beverage choices may be more limited
 - travelers who have already had typhoid disease (Because typhoid is a bacterial infection, it does not confer long-term protection.)
- persons with intimate exposure to a documented *S. typhi* carrier
- microbiology laboratory technologists who work frequently with *S. typhi*

Who Should Not Use the Vaccine

Persons who are moderately or severely ill usually should wait until they recover before getting this vaccine.

Persons who have had a severe allergic reaction to a previous dose of 1 of these vaccines should not receive that same vaccine.

Oral vaccine should not be given to:

- children less than age 6 years
- persons with altered immune status
- persons with acute diarrhea or vomiting
- travelers receiving certain antibiotics and antimalaria drugs (see "Timing" for information on taking oral typhoid and antimalarial drugs)
- pregnant women unless the journey is necessary and the risk of contracting the disease is so substantial

as to outweigh the theoretical risk to the fetus

Injectable vaccine should not be given to:

- children less than age 2 years

The vaccine's effectiveness could be lowered in persons with immune disorders or those receiving treatment that lowers their immunity.

Persons with any bleeding disorder should discuss with their health provider their options for receiving the injectable vaccine, because it is given intramuscularly.

Risks and Side Effects

Oral vaccine: Fewer side effects are experienced than with the injectable vaccine; side effects can include abdominal pain and cramps, vomiting, fever, headache, and rash or hives.

Injectable vaccine: The most common side effects are redness and tenderness at the injection site. Occasionally, fever, headache, flu-like episodes, abdominal pain, vomiting, and diarrhea occur.

There is a rare chance that serious problems or even death could occur after receiving any medicine or vaccine. If a significant or unusual problem occurs after receiving the vaccine, the patient should call or visit the health care provider.

Timing

Travelers who will receive other vaccines in addition to typhoid should allow at least 1 month before travel for scheduling the vaccines to achieve best results.

Oral vaccine

Primary series: The primary series (4 doses) should be completed at least 1 week before arrival at high-risk areas.

- One dose (1 capsule) is taken every other day (days 0, 2, 4, and 6).
- Each dose should be taken 1 hour before a meal with cool or lukewarm water (no warmer than body temperature).
- The capsules should not be taken with milk or alcohol.
- Capsules should be kept refrigerated.

Booster series (4 doses) is recommended every 5 years under conditions of repeated or continuous exposure.

Oral vaccine and medications and other vaccines

- The malaria drugs chloroquine, mefloquine, and Malarone (atovaquone/proguanil) can be taken at the same time as oral typhoid vaccine. Persons taking proguanil alone (a drug used alone in some countries to protect against malaria) should wait at least 10 days after the final dose of oral typhoid vaccine before beginning this drug.
- Anti-bacterial drugs should be avoided for 7 days *before the first dose* of oral typhoid vaccine and for 7 days *after the fourth dose*.
- Oral typhoid vaccine can be given at the same time as or at any time before or after other live vaccines and immune globulins.

Injectable vaccine

Primary vaccination consists of a single intramuscular injection.

- This vaccine should be given at least 2 weeks before arrival at a high-risk area.

A booster (1 dose) is recommended every 2 years under conditions of repeated or continuous exposure.

Injectable vaccine and medications

- The injectable vaccine can be given with other vaccines and drugs, including antibiotics or antimalarials.

YELLOW FEVER

GENERAL INFORMATION

Yellow fever is a viral disease that is transmitted to humans by mosquitoes. The major areas of risk for yellow fever are in parts of Africa (mostly west Africa, with fewer outbreaks in central and east Africa) and South America (mostly in the Orinoco, Amazon, and Araguaia river basins). Yellow fever can be fatal, but it is preventable through the use of yellow fever vaccine, which is nearly 100% effective.

PRIMARY PROTECTION MEASURES

Whether or not you receive yellow fever vaccine, you should take personal protective measures against mosquitoes. (See *"Insect Precautions."*) Depending on your itinerary, there may be a risk of contracting other mosquito-borne illnesses, in addition to yellow fever.

Wear an effective mosquito repellent (one containing 30-35% DEET or 20% or more picaridin) and stay in air-conditioned or well-screened rooms. If you use a repellent containing DEET on children, do so with care; there is some evidence of a potential for neurological side effects associated with overdoses.

Reduce skin exposure when outdoors by wearing socks, long pants, and long-sleeved shirts. When traveling in rural areas, bring aerosol room insecticides to kill indoor mosquitoes and a portable bed net, which you can buy at backpacking and army-navy surplus stores. Apply permethrin (mosquito repellent/insecticide) to clothing and mosquito netting.

VACCINATION

Yellow fever vaccine is a weakened live-virus vaccine that is prepared in eggs. It is nearly 100% effective in preventing yellow fever. In the U.S., immunization is available only at centers designated by state health departments.

You may need yellow fever vaccine to protect yourself from yellow fever **or** because proof of vaccination is required by the country to which you are traveling (in order to prevent introduction of yellow fever into that country).

ENTRY REQUIREMENTS

Entry requirements are determined by each country, and there are different types of yellow fever entry requirements. Many countries have no entry requirements, while others require proof of yellow fever vaccination for all arriving travelers. Other countries require proof of vaccination only if you came from or traveled through (including airport transit) a country that has a risk of transmission of yellow fever or that is maintained on a list and regarded as a risk area (although this latter information may be inaccurate).

For countries that require yellow fever vaccination, you need to have **proof of immunization** before you are allowed into the country. This information must be recorded and validated in an official form called the *"International Certificate of Vaccination or Prophylaxis"* (ICVP). You must receive the yellow fever immunization at least 10 days before entering the country, but not more than 10 years previously, as the certificate is valid only for 10 years.

If proof of vaccination against yellow fever is required for entry into a country and you do not have valid documentation of vaccination on the official ICVP, you could be denied entry, quarantined, or vaccinated at the point of entry (which is not desirable, because you risk being vaccinated with contaminated needles or syringes).

Local health and customs officials in some developing countries may require proof of vaccination even when it is not needed and may try to administer yellow fever vaccine to you before allowing you to enter the country. Border officials in a small number of African countries may request a bribe for failure to produce proof of yellow fever vaccination despite the lack of an entry requirement. If you find yourself in this situation, you should make every possible protest against vaccination, because you risk being vaccinated with contaminated needles or syringes; deportation may be preferable to receiving vaccine in this manner.

In the event that you cannot receive yellow fever vaccine due to a medical reason and the vaccine is required for entry, your physician will provide you with an "exemption letter" (sometimes called a waiver letter), which is a signed, dated statement of the reasons you cannot be immunized. This letter should be written on the physician's letterhead stationery, and your physician should make a corresponding entry in your ICVP.

An exemption letter may not be accepted by some countries, and, in this case, deportation might be preferable to vaccination at the destination, if that is what is being proposed. Countries also can quarantine unvaccinated persons, even if you have a valid exemption letter.

WHO SHOULD RECEIVE THE VACCINE

Vaccine may be needed for personal protection against yellow fever or because it is required as a condition of entry into a country. The best way to know if you need the vaccine is to check with your travel medicine provider. Based on your itinerary, your travel medicine provider can review entry requirements, assess potential disease risk, and determine your need for vaccination. You should take precautions against insects whether you receive yellow fever vaccine or not; depending on the itinerary, there may be a risk of other mosquito-borne illnesses.

The following persons should be vaccinated:

- All travelers 9 months of age and older who are traveling to areas of South America or Sub-Saharan Africa that have risk of yellow fever transmission should be vaccinated. (In *very rare* cases, travelers as young as age 6 months may be vaccinated.)
 - Travelers to non-risk areas of countries where risk exists in some other areas of that country but who do not have fixed travel plans should also be vaccinated.
 - Long-stay travelers to any country, any part of which has risk of yellow fever, should be vaccinated.
 - If you cannot receive yellow fever vaccine due to a medical reason, you should not travel to an area that has a risk of yellow fever transmission.
- Travelers to a country which requires yellow fever vaccine for entry should be vaccinated. (See "Entry Requirements.")
 - If you cannot receive yellow fever vaccine due to a medical reason and the only reason for vaccination was to meet an entry requirement *and* you do not plan to travel to a risk area of the country in question, you can be given a waiver letter by your health care provider. (See "Entry Requirements.")

Note: These recommendations reflect a synthesis of available advice from the Centers for Disease Control (CDC), CDC's Advisory Committee on Immunization Practices, American Academy of Pediatrics, and the World Health Organization, as well as ongoing global surveillance and the published literature; these recommendations may differ from those of individual countries' public health authorities.

WHO SHOULD NOT USE THE VACCINE

The following persons should **not** receive yellow fever vaccine:

- persons who have had a previous severe reaction to yellow fever vaccine or any of its components
- persons who are extremely allergic to eggs
- persons with a history of thymus disorders associated with abnormal immune functions, such as thymoma or myasthenia gravis—but not including incidental surgical removal of thymus or distant radiation therapy.

(The *thymus* is the central gland of the lymphatic system; it is separate and different from the *thyroid* gland.)

- children younger than 9 months of age (except in very unusual circumstances):
 - Infants aged 6 to 8 months may be able to receive the vaccine, but *only* if they will be unavoidably exposed to an area of risk for yellow fever and the health care provider recommends vaccination after consultation with CDC.
 - Children less than 6 months of age should *never* receive this vaccine. (See "*Risks and Side Effects.*")
- persons with primary immunodeficiencies or malignant neoplasms, or who are post-organ transplant
- persons on immunosuppressive therapies or drugs or immunomodulatory drugs, including TNF- α inhibitors, IL-1 blocking agents, monoclonal antibodies targeting immune cells, alkylating agents, antimetabolites, high-dose corticosteroids, radiation therapy, or chemotherapy
- persons with AIDS or other symptoms of HIV infection with severe immunosuppression

The following are "precautions" to receiving yellow fever vaccine:

- pregnancy: Vaccination of pregnant women should be avoided as the safety of the vaccine during pregnancy has not been established.
 - The only circumstance under which yellow fever vaccine should be administered during pregnancy is when the journey is unavoidable and the risk of contracting the disease is very substantial.
 - If possible, postpone travel until 9 months after delivery, at which time both the mother and infant can be immunized.
 - Women should avoid getting pregnant for at least 28 days after receiving this vaccine.
- Breastfeeding: Women who are breastfeeding should *not* receive this vaccine except in the rare case where travel to an area of high risk is absolutely unavoidable. Yellow fever vaccine virus may be transmitted through breast milk and has caused 1 case of severe neurologic disease in a breastfed infant.
- Persons with an acute or moderate to severe illness (with or without fever) should delay vaccination until they have recovered. Low-grade fever is not usually a reason to postpone vaccination.
- People with HIV infection with moderate immune suppression and no symptoms should discuss the risks and benefits of this vaccine carefully with their health care provider.
- Persons 60 years of age and older, especially those who are being vaccinated for the first time, should discuss the risks and benefits of this vaccine with their health care provider, as they are at higher risk for adverse effects following vaccination. However, if true risk of yellow fever exists, the vaccine is strongly recommended.
- Persons with multiple sclerosis (MS) should not receive this vaccine except in very high-risk circumstances where travel is unavoidable and after thorough discussion with their health care provider.

RISKS AND SIDE EFFECTS

Reactions to this vaccine are generally mild and can include pain, warmth, or swelling at the injection site, mild headache, and muscle ache. Most of these reactions occur within the first 2-3 days after vaccination but can occur up to 14 days later.

Serious side effects are rare.

- Children less than 6 months of age are at risk for vaccine-related encephalitis, although this is rare.
- Other neurological reactions or viscerotropic reactions (fever and multi-organ failure) can also occur but are very rare.
- Anaphylaxis can occur, although this is rare.
- tenfold increase in the risk of relapse in persons with MS

However, travelers should be aware of potential risks and should receive yellow fever vaccine only if clearly indicated. Any person who chooses not to receive this vaccine should not travel to risk areas.

There is a rare chance that serious problems or even death could occur after receiving any medicine or vaccine. **As with any serious medical problem, if a person has a significant or unusual problem after receiving a vaccine, the person should call or be taken to a health care provider promptly.**

TIMING

Yellow fever vaccine is given as a single injection.

- If a country requires the vaccine for entry, the vaccine must be given at least 10 days before you enter the country. For requirement purposes, the vaccine is valid for 10 years.
- If other live-virus vaccines (such as varicella) are necessary for travel, they should be given on the same day as the yellow fever vaccination, if possible; otherwise they must be given at least 30 days apart, in which case travelers might have to allow up to 4-8 weeks before travel for completion of the administration of all live-virus vaccines. Two exceptions are oral typhoid vaccine and measles vaccine, either of which can be given at the same time as yellow fever vaccine or at any time before or after yellow fever vaccine.

A booster dose is needed every 10 years for purposes of fulfilling entry requirements. For personal protection, however, studies have indicated that yellow fever immunity (after 1 dose of vaccine) can persist for 30-35 years and perhaps for life.

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