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Health and Safety Issues for Travelers Attending the World Cup and Summer Olympic and Paralympic Games in Brazil, 2014 to 2016

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Abstract

IMPORTANCE—Travelers from around the globe will attend the 2014 Fédération Internationale de Football Association (FIFA) World Cup and the 2016 Olympic and Paralympic Games in Brazil. Travelers to these mass gathering events may be exposed to a range of health risks, including a variety of infectious diseases. Most travelers who become ill will present to their primary care physicians, and thus it is important that clinicians are aware of the risks their patients encountered.

OBJECTIVE—To highlight health and safety concerns for people traveling to these events in Brazil so that health care practitioners can better prepare travelers before they travel and more effectively diagnose and treat travelers after they return.

EVIDENCE REVIEW—We reviewed both peer-reviewed and gray literature to identify health outcomes associated with travel to Brazil and mass gatherings. Thirteen specific infectious diseases are described in terms of signs, symptoms, and treatment. Relevant safety and security concerns are also discussed.

FINDINGS—Travelers to Brazil for mass gathering events face unique health risks associated with their travel.

CONCLUSIONS AND RELEVANCE—Travelers should consult a health care practitioner 4 to 6 weeks before travel to Brazil and seek up-to-date information regarding their specific itineraries. For the most up-to-date information, health care practitioners can visit the Centers for Disease

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Control and Prevention (CDC) Travelers' Health website (<http://wwwnc.cdc.gov/travel>) or review CDC's Yellow Book online (<http://wwwnc.cdc.gov/travel/page/yellowbook-home-2014>).

Brazil will host millions of travelers at 3 major mass gathering events: the 2014 Fédération Internationale de Football Association (FIFA) World Cup, and the 2016 Olympic Games and Paralympic Games.^{1,2} Mass gathering pose complex public health challenges, and with these events being held in the same country within a limited time span, these challenges may be exacerbated. Venues are located across Brazil. FIFA's World Cup will be held in 12 cities (Figure 1A)¹ and the Olympic and Paralympic Games will be located near Rio de Janeiro (Figure 1B).²

Mass gatherings have been associated with adverse health events and can increase infectious disease transmission because of the influx of travelers, crowding at venues, poor hygiene from temporary food and sanitation facilities, challenging security situations, and unfamiliar public infrastructure.³⁻⁵ During the 2008 World Youth Day in Sydney, Australia, an influenza outbreak was caused by at least 6 distinct influenza viruses.⁶ Meningococcal disease outbreaks followed a 1997 football tournament in Belgium⁷ and the 2000 Hajj in Saudi Arabia.⁸ During the 1996 Atlanta Olympic Games, more than 1000 people received health care for heat-related conditions.⁹

Because the Centers for Disease Control and Prevention (CDC) recommends all travelers visit a medical practitioner 4 to 6 weeks prior to travel, we provide information for health care practitioners, including an overview of Brazil, relevant medical conditions and preventive measures, and general safety and security issues.

Brazil—The Host Country

Brazil is the largest country in South America, covering 8 514 877 km².¹⁰ Brazil has a population of more than 200 million; 87% lived in urban areas in 2010. Many host cities for events are overcrowded, including São Paulo (approximately 20 million population) and Rio de Janeiro (approximately 12 million). Portuguese is the official language.^{10,11} Transportation conditions vary throughout Brazil: only 13.5% of roads are paved.¹⁰ Urban subways are available in São Paulo, Rio de Janeiro, and Recife.¹¹

Infectious Disease Risks for Travelers to Brazil and Disease-Specific Prevention Recommendations

Routine Vaccines

Diseases prevented by routine vaccination are prevalent in Brazil. Medical practitioners can ensure travelers are current on all routine vaccines (Table 1).

Hepatitis A and B

Hepatitis A, transmitted by food, water, or direct person-to-person contact,¹⁶ is characterized by any combination of the following symptoms: fever, anorexia, jaundice, nausea, vomiting, and abdominal pain. Diagnosis typically involves a compatible clinical picture, elevations of hepatic enzyme levels, and detection of IgM antibodies to hepatitis A.

Treatment is supportive. Domestic incidence of hepatitis A varies across Brazil and was approximately 7.5 to 11 cases per 100 000 persons during 2000 through 2005.¹⁷ The CDC recommends all travelers receive hepatitis A vaccine. The first of the 2-dose series can be administered up to departure, providing most travelers adequate protection. For long-term protection, the second dose should be given after 6 months. For those suspected of having had illness previously, a serological test for IgG to hepatitis A may be performed prior to vaccination.^{16,18} Hepatitis B virus is transmitted through blood or other body fluids.¹⁹ Acute hepatitis B virus may cause a febrile illness including nausea, vomiting, rashes, joint pain, and jaundice; chronic infection can lead to liver disease, including cirrhosis and liver cancer.¹⁹ Diagnosis involves recognition of the clinical syndrome along with laboratory evidence for hepatitis B.²⁰ Treatment of acute illness is supportive. The prevalence of chronic carriers of hepatitis B virus in Brazil is 2% to 7%.²⁰ The CDC recommends all travelers to Brazil be vaccinated for hepatitis B.¹⁹ Travelers should have as many doses of the series as possible before travel. An accelerated regimen and a hepatitis A and B combined vaccine are available.^{19,21}

Typhoid and Paratyphoid Fever

Typhoid, also a risk for travelers to Brazil, is transmitted via contaminated food or water. Symptoms range from fever to more severe disease that includes abdominal pain, headache, myalgia, nausea, and anorexia.²² Serious complications include intestinal hemorrhage, perforation, or even death.²² Paratyphoid fever is a similar but typically less severe form of typhoid fever. Because many patients present with fever and other nondiagnostic constitutional symptoms, diagnosis is often difficult. Blood, urine, or stool cultures may be positive, but bone marrow cultures, now very rarely done, are most sensitive. If either diagnosis is suspected, patients may be treated with broad-spectrum antibiotics,²² including a quinolone (there may be some resistance to these), azithromycin, or a third-generation cephalosporin until a diagnosis is confirmed.

The CDC recommends typhoid fever vaccine for all travelers to Brazil.²² Two vaccines are licensed: an inactivated injectable vaccine and a live, attenuated vaccine taken orally. Both provide 55% to 70% protection.²³ No vaccine is available for paratyphoid fever. Other preventive measures include food and beverage precautions (described in the “Gastrointestinal Illness and Travelers’ Diarrhea” section).²²

Yellow Fever

Yellow fever virus is transmitted by the bite of an infected mosquito, primarily *Aedes* or *Haemagogus* species. Yellow fever virus infection is often asymptomatic; when disease occurs it can range from a nonspecific viral syndrome to severe disease with jaundice, multiorgan failure, hemorrhage, and death. Yellow fever should be suspected when an unimmunized traveler returns with fever from an endemic area. Clinicians suspecting yellow fever should contact their state or local health department or call the CDC Arboviral Disease Branch (Table 2). Treatment is exclusively supportive. Yellow fever vaccine is recommended for all travelers 9 months or older traveling to areas within Brazil with risk of yellow fever virus transmission (Figure 1A).^{24,25} The live, attenuated yellow fever vaccine is rarely associated with serious or fatal adverse events.²⁶ Contraindications include, but are

not limited to, age younger than 6 months, allergy to any vaccine component, and altered immune status.²⁵⁻²⁷ Precautions include age 6 to 8 months, age 60 years or older, a symptomatic human immunodeficiency virus infection with moderate immune suppression, pregnancy, and breastfeeding.²⁵ Clinicians should review each traveler's medical history and itinerary to evaluate risk of yellow fever disease vs risk from vaccine. The online Yellow Fever Vaccination Center Registry lists US clinics authorized to administer vaccine (<http://wwwnc.cdc.gov/travel/yellow-fever-vaccination-clinics/search>). Clinicians should educate travelers on preventive measures against mosquito bites, including using insect repellents, wearing long-sleeved permethrin-treated clothing, choosing rooms with air conditioning or intact screens, and sleeping under an insecticide-treated bed net.²⁸

Meningococcal Disease

Caused by *Neisseria meningitidis*, meningococcal disease is endemic in Brazil. Meningococcal disease, characterized by headache, fever, stiff neck, nausea, and altered mental status, can result in severe disease and death.²⁹ Outbreaks in Brazil have been primarily due to serotypes B and C.³⁰ Travelers suspected of having meningitis should be treated aggressively with broad-spectrum antibiotic coverage, such as third-generation cephalosporin and vancomycin. Vaccines currently available in the United States are not protective against serogroup B.³⁰ Because *N meningitidis* is transmissible via close contact with respiratory secretions, travelers staying in crowded housing (eg, hostels) may benefit from a meningococcal conjugate vaccine.

Rabies

Rabies is an acute, progressive, fatal encephalomyelitis that is endemic in Brazil.³¹ Illness generally occurs after a bite from a rabid mammal; nonbite transmissions are rare but can occur, such as via aerosol from bats in caves.³² The CDC recommends the preexposure vaccination of 3 doses (administered on days 0, 7, and 21 or 28) for some travelers, including those who might be in direct contact with bats or stray animals.³¹ Review of a traveler's itinerary may help identify potential exposures, such as a trip that involves handling animals in the Amazon rain forest.³³ The CDC does not recommend that travelers begin the 3-dose series if they are unable to complete it before departure. Because preexposure vaccine is not entirely protective³¹ and the disease highly fatal, health care practitioners should educate travelers about animal avoidance and the importance of prompt health care for postexposure prophylaxis and immediate and thorough wound cleaning with soap and water should any bite occur.

Malaria

Malaria is transmitted by mosquito bites (*Anopheles* species). Infection, characterized by fever, chills, headache, myalgia, and malaise, can result in severe illness and death.³⁴ Nearly all malaria cases in Brazil occur in the Amazon region, where the 2014 World Cup host cities Cuiaba and Manaus are located (Figure 1A).^{24,35}

Medical practitioners should advise travelers about malaria chemoprophylaxis based on travel itineraries. Because of widespread chloroquine resistance in Brazil, atovaquone-proguanil hydrochloride (Malarone; GlaxoSmithKline), doxycycline, or mefloquine

hydrochloride (Lariam [Roche] and generic) are recommended for chemoprophylaxis.²⁴ Determination of which medication to use is based on age, underlying medical conditions, and cost.³⁴ Travelers should follow the mosquito bite prevention measures detailed in the “Yellow Fever” section. The Department of State (<http://www.usembassy.gov>) and some travel health insurance companies can assist with identifying local medical services for travelers who develop a fever while traveling. Health care practitioners should inform travelers to urgently seek medical care if they develop fever following travel to a malaria-endemic area. A rapid malaria antigen detection test along with three blood smears at 8-hour intervals should be evaluated for parasites. Assistance in diagnosis and treatment can be obtained from an infectious diseases or tropical medicine clinician, as well as from the CDC malaria branch (Table 2).

Dengue

Dengue is endemic to Brazil and is transmitted by the bite of a mosquito (primarily *Aedes aegypti*). *Aedes* mosquitoes feed during the day and typically live indoors in dark, cool places.³⁶ More than 4 million cases of dengue were reported in Brazil during 1986 through 2006.³⁷ Patients may have a mild, nonspecific febrile syndrome with headache and myalgia, although up to 5% may develop severe, life threatening disease with hemorrhagic signs and symptoms.³⁶ Treatment is supportive; early recognition of severe dengue is critical to reducing morbidity. Neither a vaccine nor chemoprophylaxis is available to prevent dengue. Healthcare practitioners should educate travelers on the mosquito bite prevention measures previously described.

Gastrointestinal Illness and Travelers’ Diarrhea

Pathogens such as *Escherichia coli*, *Campylobacter* species, *Giardia* species, and norovirus are common causes of travelers’ diarrhea.^{38,39} A review of ill travelers returning from Brazil between 1997 and 2013 found that gastrointestinal illness accounted for 34% of all diagnoses.⁴⁰ Healthcare practitioners should educate travelers on the importance of frequent handwashing with soap and water and use of alcohol-based hand sanitizers to decrease their risk of gastrointestinal illness.^{39,41} Other recommended approaches to reduce risk include food and water precautions and the use of nonantimicrobial drugs for prophylaxis.³⁹ Freshly cooked food that is served hot is less likely to be contaminated than foods that have been sitting out. Travelers should avoid raw foods, such as salads, unpeeled fruits, or uncooked vegetables. Tap water may contain viruses, bacteria, or parasites and may be unsafe for drinking, preparing food, or for making ice. Travelers may choose to boil, filter, or otherwise treat water for consumption, although this may not remove chemical contaminants.⁴¹ Choosing unopened, factory-sealed beverages and avoiding ice in drinks may decrease the risk of travelers’ diarrhea.

Travelers’ diarrhea usually resolves within 48 hours.³⁹ Ill travelers should maintain a high intake of nonalcoholic fluids to prevent dehydration and avoid dairy products. The effectiveness of a single dose or 3 days of antibiotic therapy with a fluoroquinolone or azithromycin, along with over-the-counter loperamide hydrochloride to ease symptoms, is well established for self-treatment. Bismuth subsalicylate, the active ingredient in Pepto-Bismol (Procter & Gamble), is a nonantimicrobial drug useful for mild travelers’ diarrhea if

it has not been used for prophylaxis. Health care practitioners should review a traveler's medical history as those taking anticoagulants, probenecid, or methotrexate and travelers with aspirin allergy, renal insufficiency, and gout should avoid taking bismuth subsalicylate.³⁹

If travelers' diarrhea does not resolve, is not responsive to self-treatment, or is accompanied by high fever or bloody diarrhea, travelers should immediately seek medical attention. Because travelers' diarrhea leads to fluid and electrolyte loss, oral rehydration salts should be considered if diarrhea and/or vomiting occur. Both bismuth subsalicylate and rehydration salts are widely available at stores and pharmacies.³⁹

Leishmaniasis

Leishmaniasis is caused by the protozoan parasite *Leishmania* species, spread primarily through the bite of infected sand flies.⁴² It has rarely been seen in travelers returning from Brazil.⁴⁰ The most common form of leishmaniasis in travelers is a dermatologic infection called cutaneous leishmaniasis, which is characterized by skin lesions that may develop weeks or months after infection as small papules or nodular plaques, progressing to ulcers that may scale or crust (Figure 2). No vaccines or drugs are available to prevent leishmaniasis; healthcare practitioners should educate travelers on vector prevention practices, such as those described in the yellow fever section. Diagnosis usually involves identification of the parasites in a skin biopsy. A number of treatment regimens are available depending on the species identified. See Table 2 for medical practitioner resources.

Schistosomiasis

Schistosomiasis is caused by *Schistosoma* species parasites. Infection occurs when the larval form penetrates the skin, typically when a person swims or bathes in fresh water.⁴³ Brazil is endemic for schistosomiasis, and outbreaks have been reported, including one in the 2014 World Cup site of Belo Horizonte.⁴⁴ Patients with acute schistosomiasis (Katayama syndrome) may have fever, headache, myalgia, diarrhea, painful hepatomegaly or splenomegaly, and respiratory symptoms.⁴⁵ Diagnosis is confirmed by microscopic identification of parasite eggs in stool or urine or by serological testing. Serological testing should be done at least 3 months following exposure. Referral to someone with expertise in treating schistosomiasis is recommended (Table 2).^{43,45}

Leptospirosis

Leptospirosis is a bacterial infection transmitted through breaks in the skin or through conjunctiva and mucous membranes via contact with urine or reproductive fluids from infected animals or by contact with water or soil contaminated by these fluids.⁴⁶ Symptoms include an acute febrile illness with headache (potentially severe with retroorbital pain and photophobia), which can progress to severe disease (Weil disease). Diagnosis is typically based on clinical recognition of the often biphasic illness. Blood, urine, or spinal fluid cultures may yield results, along with serological testing. Nucleic acid amplification (polymerase chain reaction) may also be available.⁴⁶ Treatment includes antibiotics such as penicillins and tetracyclines (Table 2).

Skin Conditions

Dermatologic issues are common among travelers to Brazil.⁴⁰ Wearing appropriate clothing and using insect repellent can limit insect bites.²⁸ The use of high-UV protection factor (UV protection factor >30) sunscreen and clothing is recommended to prevent sunburn.⁴⁷

Bed bugs (*Cimex lectularius*) are common worldwide; infestations can occur in hotels.^{28,48} Travelers who see evidence of bed bugs, such as blood spotting on bed linens or the bugs themselves (reddish brown, 1-7mm long) should request alternate lodging.²⁸

Cutaneous larva migrans, known as hookworm, is transmitted via contaminated soil or sand and has been documented in travelers to Brazil.^{40,49,50} Infected travelers may have a creeping eruption (Figure 2). Most often, skin on the foot and buttocks is affected. Larva migrans can be treated by using albendazole or ivermectin.^{50,51} Travelers can reduce their risk of infection by wearing shoes and using barriers (eg, towels) when sitting on the ground.⁵⁰ Various treatment regimens exist, most notably oral albendazole or ivermectin.

Tungiasis is caused by the flea *Tunga penetrans*. These parasites become embedded in the epidermis, where they mature and produce eggs until their death up to 5 weeks later (Figure 2). Because the fleas remain partially extruded from the skin, pathogens can enter through the break in the skin. The periungual regions of the toes are the preferred penetration site of *T penetrans*, but they can penetrate skin anywhere on the body.⁵² Tungiasis is common in impoverished areas of Brazil.⁵³ Wearing closed-toe shoes may limit exposure; treatment requires extraction of the parasite.

Sexually Transmitted Infections

A systematic review of studies of travel-associated sexual behavior calculated a pooled prevalence of 20.4% for casual sex, of which 49.4% is unprotected.⁵⁴ Health care practitioners should advise travelers to avoid unprotected sex with new partners while traveling. Condoms can decrease risk and should be purchased prior to departure to ensure they are of sufficient quality. Assessment of a traveler with a suspected sexually transmitted disease includes screening for others such as human immunodeficiency virus and hepatitis B.

Psychological Stress and Mental Health

Travel may lead to psychological stress, which can intensify symptoms in persons with preexisting mental health conditions such as depression or anxiety disorders.^{55,56} Health care practitioners should consider psychiatric history, recent life stressors, and the use of any medication that may have adverse central nervous system effects. People with preexisting mental health conditions should not use mefloquine for malaria chemoprophylaxis because this may have adverse effects.^{34,55}

Safety and Security Issues

The crime rate is high in most of urban Brazil, with murder and other crime rates more than 4 times higher than in the United States.⁵⁷ Travelers are often the targets of street crime,

especially during evening hours. A review of general safety issues when traveling has been published elsewhere.⁵⁸ Before beginning international travel, US citizens should register their itineraries with the Smart Traveler Enrollment Program (STEP), a free service that allows the US Department of State to better assist travelers in the event of an emergency; travelers can enroll online at <https://step.state.gov/step/>.

Road Safety

In 2008, 39 211 deaths due to road traffic were documented in Brazil.⁵⁹ The Brazilian federal government maintains a Portuguese language website with information on road conditions and downloadable roadmaps.^{60,61} Travelers who drive should familiarize themselves with local laws. Traffic signs may be written in Portuguese. Travelers should ensure all cars include basic safety equipment, such as seat belts, which should always be worn. Travelers can dial 190 to seek assistance from local police departments; this service is in Portuguese only.⁵⁷

Pretravel and Posttravel Health Care and Travel Insurance

Travelers to Brazil should visit a medical practitioner for a pretravel consultation 4 to 6 weeks before departure. Consultations should include a review of the traveler's medical history and itinerary, administration of immunizations and chemoprophylaxis, and discussion of other preventive measures.⁶² Health care practitioners who are not comfortable providing pretravel consultations or who do not have necessary vaccines in stock should refer patients to a travel medicine specialist⁶³; a listing of travel clinics is available online at <http://www.istm.org>. For the most current health information, health care practitioners can visit the CDC Travelers' Health website (<http://wwwnc.cdc.gov/travel>) or review CDC's Yellow Book online (<http://wwwnc.cdc.gov/travel/page/yellowbook-home-2014>).

Before departure, travelers should contact their health insurance company to determine whether their policy includes coverage overseas and for emergency expenses such as aeromedical evacuation. Travelers are advised to consider supplemental travel health insurance with specific overseas coverage, including 24-hour access to assistance for health care and medical evacuation contingency plans.^{64,65}

Travelers who become sick or injured while traveling should seek immediate health care if they have fever, diarrhea with high fever, bloody diarrhea, or an animal bite or scratch or have been involved in an automobile accident or assaulted. Several illnesses associated with fever, including malaria, dengue, influenza, and typhoid fever, can become symptomatic in the first 2 weeks on returning from travel.^{66,67}

Conclusions

Travel to Brazil for mass gatherings has potential health risks. Travelers should consult their health care practitioner 4 to 6 weeks before travel. Because health advice may need to be adapted quickly in response to environmental conditions, disease outbreaks, and political situations, the CDC recommends that travelers seek up-to-date health and safety information at <http://wwwnc.cdc.gov/travel>. Lastly, travelers who develop fever during or after travel to

Brazil should immediately seek health care. Health care practitioners should ask patients presenting with illness about any travel history.

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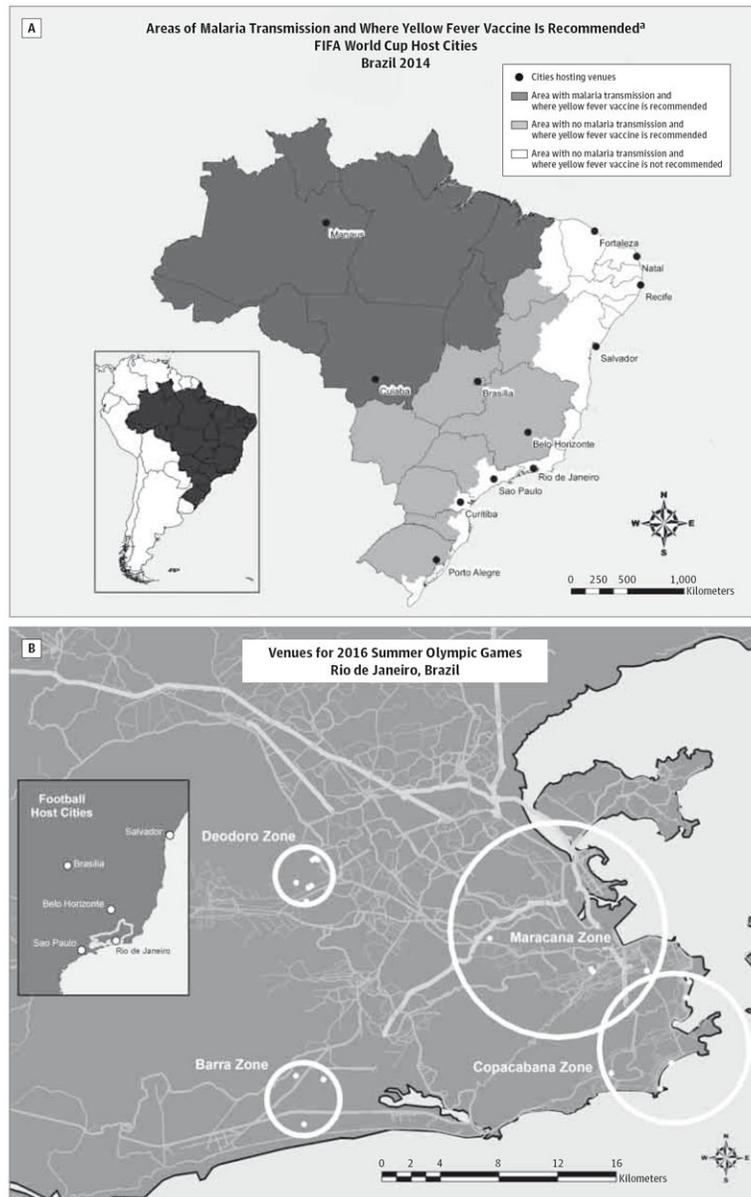


Figure 1. Venue Maps

A, Fédération Internationale de Football Association (FIFA) World Cup host cities with areas with malaria transmission and where yellow fever vaccine is recommended, Brazil, 2014. B, Venues for 2016 Olympic and Paralympic Games.

^aCDC Health Information for International Travel, 2014.

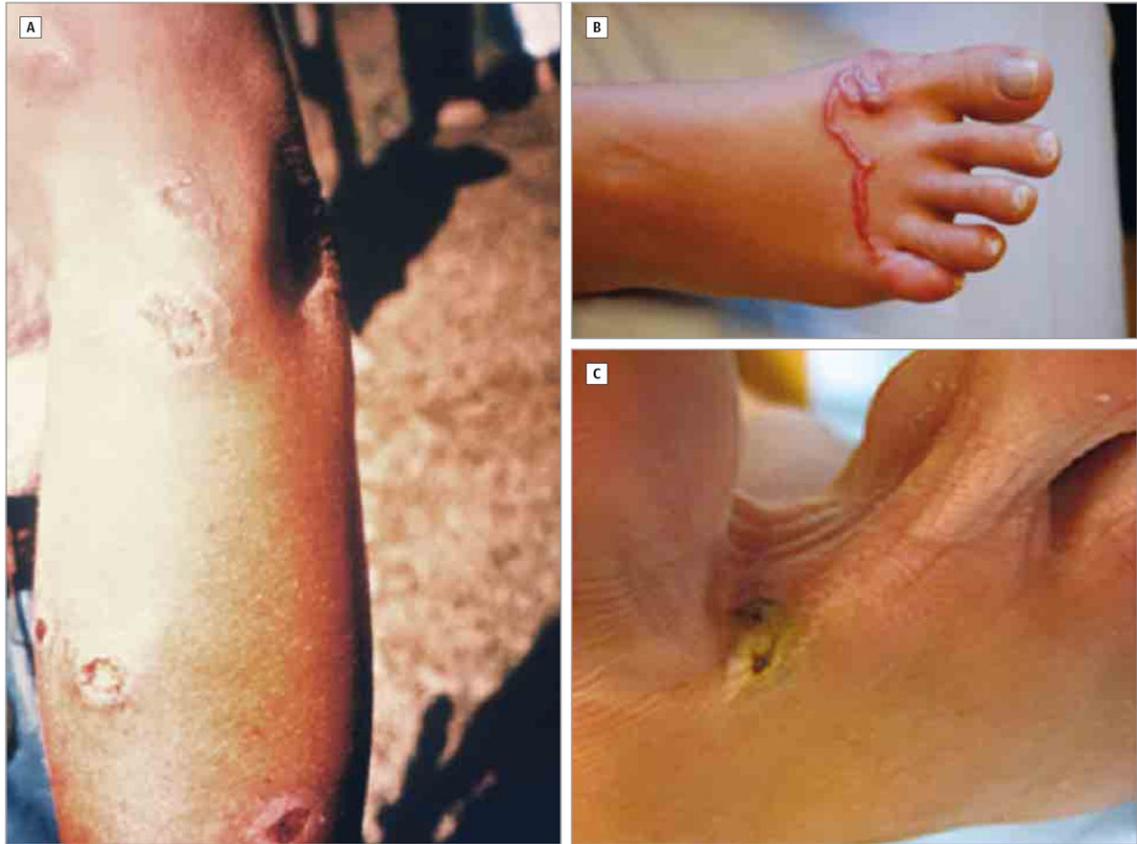


Figure 2. Dermatomic Conditions Found in Brazil

Crater ulcers of various stages due to cutaneous leishmaniasis on the arm (A) (source: Centers for Disease Control and Prevention/Mae Melvin, MD); cutaneous larva migrans (B) (source: Jay Keystone, University of Toronto); and tungiasis (C) (source: Mohammed Asmal and RocioM. Hurtado [this image was first published on Partners' Infectious Disease Images website, whose content is copyrighted by Partners Healthcare System Inc and is used with permission. All rights reserved]).

Table 1

Routine Vaccine Recommendations for Travelers to Brazil, Advisory Council for Immunization Practices, 2013

Vaccine	Acceptable Presumptive Evidence of Immunity	Recommendations for International Travelers
Influenza ¹²	Because of seasonal variation in circulating influenza strain, annual immunizations are needed.	All travelers should receive seasonal influenza vaccine unless contraindicated.
MMR ¹³	Adults born before 1957. Laboratory evidence of immunity OR laboratory confirmation of disease.	Children aged 6-11 mo should receive 1 dose of MMR vaccine.
	Documentation of age-appropriate vaccination with a live measles virus-containing vaccine.	Children aged 12 mo and adults should receive 2 doses of MMR vaccine separated by at least 28 d if not previously immunized.
Tetanus, diphtheria, pertussis ¹⁴	Documentation of age-appropriate vaccination for tetanus, diphtheria, pertussis.	Children aged 11-18 y should receive 1 dose of tetanus toxoid, reduced Tdap vaccine.
		All adults who have not previously received Tdap vaccine should receive 1 dose.
		Adults aged 19 y who have received 1-time dose of Tdap vaccine should receive booster with Td vaccine every 10 y afterwards.
Varicella ¹⁵	History of varicella or herpes zoster based on diagnosis by a health care practitioner. Laboratory evidence of immunity OR laboratory confirmation of disease. Documentation of vaccination.	2 doses of vaccine 4 wk apart for persons aged 13 y.

Abbreviations: MMR, measles, mumps, rubella; OR, operating room; Td, tetanus and diphtheria; Tdap, combined tetanus, diphtheria, and pertussis.

Table 2

Diagnostic and Treatment Resources for Health Care Practitioners

Resource	Contact Information	Assistance Available
American Society of Tropical Medicine and Hygiene	http://www.astmh.org/Home1.htm	Identify a nearby physician with clinical consultative service in tropical medicine, medical parasitology, travelers' health
CDC's Arboviral Diseases Branch	Telephone: 970-221-6400	Yellow fever diagnostic testing; assessment of antibody response to yellow fever vaccination
CDC's Dengue Branch	Telephone: 800-232-4636 or 888-232-6348 http://www.cdc.gov/Dengue/	Clinical and laboratory guidance for dengue; resources for clinicians and laboratorians
International Society of Travel Medicine	http://www.istm.org	TravelMed listserv allows discussion of clinical cases, pretravel and posttravel medical issues; identify a nearby physician with expertise in travelers' health, and some with tropical medicine experience
CDC's Malaria Branch	EST working hours, Monday-Friday: CDC Malaria Hotline at 770-488-7788 or 855-856-4713; After hours: Emergency Operations Center: 770-488-7100	Malaria diagnostics; treatment of malaria.
CDC's Parasitic Disease Inquiries	Telephone: 404-718-7475 http://www.cdc.gov/parasites	Diagnostics for leishmaniasis, schistosomiasis; treatment for leishmaniasis, schistosomiasis
CDC's Travelers' Health Branch	http://wwwnc.cdc.gov/travel	Access CDC Health Information for International Travel 2014 online

Abbreviation: CDC, Centers for Disease Control and Prevention.