



## 2022 Health Advisory #27: Travel-Acquired Mosquito-Borne and Enteric Diseases

Please distribute to Emergency Medicine, Family Medicine, Primary Care Physicians, Infectious Disease, Travel Health, and Internal Medicine Staff

- Healthcare providers should always obtain a travel history from febrile patients. When residents return to New York City (NYC) following international travel, consider the more common travel-associated diseases reported each year in NYC:
  - Mosquito-borne diseases such as dengue and malaria
    - Dengue is endemic in many popular travel destinations including the Caribbean
    - The Centers for Disease Control and Prevention (CDC) is monitoring ongoing dengue outbreaks occurring in [several regions](#) around the world
  - Enteric diseases such as hepatitis A infection, typhoid fever, and paratyphoid fever
    - An ongoing outbreak of extensively drug-resistant typhoid fever is occurring in Pakistan
- Provider resources and personalized travel advice for disease prevention are available on the [Heading Home Healthy](#) website, a collaborative effort supported by CDC
- As a reminder, advise patients to avoid nonessential travel to the districts in Uganda where there is an evolving [Ebola outbreak](#). Visit the [CDC website](#) for more information

Dear Colleagues,

October 20, 2022

New York City (NYC) has a large, diverse population, many of whom travel internationally. Nearly one-third of New Yorkers are born outside the United States (U.S.) and may periodically travel back to their countries of origin to visit friends and relatives. In addition, over 13.5 million international travelers arrive into NYC annually. Every year, hundreds of NYC residents are diagnosed with mosquito-, food- or waterborne infections after traveling to or coming from areas where diseases such as malaria, dengue, hepatitis A infection, typhoid fever, and paratyphoid fever are endemic (Table 1). The Centers for Disease Control and Prevention (CDC) offers a [comprehensive disease list by country](#).

**Table 1: Diseases Associated with Non-Domestic Travel  
Among NYC Residents, 2017-2021**

DISEASE		2017	2018	2019	2020*	2021*
<b>Mosquito-borne</b>	<b>Chikungunya</b>	13	7	6	6	1
	<b>Dengue</b>	32	22	108	34	19
	<b>Zika</b>	148	19	13	1	0
	<b>Malaria</b>	228	203	243	61	211
<b>Enteric</b>	<b>Typhoid fever</b>	36	39	30	15	11
	<b>Paratyphoid fever</b>	13	13	15	5	5
	<b>Hepatitis A infection</b>	45	23	29	14	12

\*The decrease in reported cases in 2020-2021 is likely a result of less international travel and changes in healthcare-seeking behavior during the COVID-19 pandemic.

inquire about upcoming travel during scheduled appointments and to consider the following reportable travel-associated diseases in patients who are ill with a recent history of travel. Provider resources and personalized travel advice are available on the [Heading Home Healthy](#) website, a collaborative effort supported by CDC.

### **Mosquito-Borne Diseases**

**Dengue** is the most frequently reported cause of acute febrile illness among returning U.S. travelers, with outbreaks recently reported from the Caribbean, Central and South America, Africa, the Middle East, Asia, and the Pacific Islands. Dengue is usually a mild illness with more common symptoms including fever, aches and pains (headache, retroorbital pain, myalgias, and arthralgias), nausea and vomiting, and rash or petechiae following an incubation period of 5 to 7 days. About 5% of people with dengue will progress to severe disease with associated shock, severe bleeding, or organ impairment. Warning signs include persistent vomiting, severe abdominal pain, extravascular fluid accumulation (e.g., pleural effusion, ascites), mucosal bleeding, lethargy/restlessness, postural hypotension, liver enlargement, and a progressive increase in hematocrit which typically occurs following 1 to 2 days of defervescence. Mortality can be as high as 13% in untreated patients. Intravenous (IV) fluid therapy and management of complications are the mainstay of treatment. There are currently no specific antivirals recommended for dengue treatment or vaccines available to protect people who are traveling. Avoid aspirin, aspirin-containing drugs, and other nonsteroidal anti-inflammatory drugs such as ibuprofen in patients with possible dengue because of their anticoagulant properties. The FDA-approved dengue vaccine is only recommended for children living in areas where dengue is endemic, and not approved for travelers.

Following large outbreaks of **chikungunya** in 2015 and **Zika** virus infection in 2016-2017, few cases have been reported among NYC residents. There are no large outbreaks of chikungunya at this time, but the virus has been detected in areas of the Caribbean, Central and South America, Africa, Asia, and the Pacific Islands. Most people infected with [chikungunya](#) virus will develop symptoms within 3 to 7 days of an infected mosquito bite. The most common symptoms are fever and joint pain, other symptoms may include headache, muscle pain, joint swelling, or rash. Most patients feel better within a week; however, joint pain can be severe and disabling and may persist for months. At this time, there are no countries or U.S. territories currently reporting an outbreak of Zika.

Testing is commercially available for [dengue](#) and [chikungunya](#). Polymerase chain reaction (PCR) testing is the optimal method for diagnosing patients tested within 7 days of illness onset and should be done concurrently with serology (IgM). IgM should be performed for anyone tested more than 7 days after illness onset. Given the limited risk of transmission, Zika testing is not recommended, except for people who develop [symptoms](#) of Zika and traveled to an area with risk of Zika while they are pregnant, in which case testing should be performed using commercially available PCR.

**Malaria** is a leading cause of illness worldwide. It is common in tropical or subtropical areas of Africa, Asia, and Central and South America. The incubation period in most cases varies from 7 to 30 days and malaria disease can be categorized as uncomplicated or severe. In general, malaria is a curable disease if diagnosed and treated promptly and correctly. Patients typically present with a combination of any of the following symptoms: fever, chills, sweats, headache, nausea and vomiting, myalgia, and malaise. On physical exam patients may have an enlarged spleen, liver and mild jaundice. Severe malaria may manifest as cerebral malaria, severe anemia, hemoglobinuria, and acute respiratory distress syndrome. Once the diagnosis of malaria has been made, appropriate antimalarial treatment must be initiated immediately. Use the [Malaria Treatment Tables](#) to guide appropriate treatment; all patients with severe malaria, regardless of infecting species, should be treated with [IV artesunate](#). With the closure of the CDC IV artesunate access program on September 30, 2022, information will soon be available through the [Greater New York Hospital Association](#) about a regional approach for accessing the drug in NYC.

Laboratory diagnosis can be made via microscopic examination of thick and thin blood smears. Antigen detection tests (also called rapid diagnostic tests) offer rapid results, but their use should be



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accompanied by microscopy to confirm results and, if positive, confirm the species and quantify parasitemia. Providers can consult the CDC [DPDx website](#), [malaria treatment website](#), or malaria hotline (770-488-7788 or 855-856-4713) for anti-malarial preventive and treatment recommendations.

### **Enteric Diseases**

**Typhoid fever** and **paratyphoid fever** are caused by *Salmonella* serotype Typhi and *Salmonella* serotype Paratyphi, respectively. Most patients with typhoid fever and paratyphoid fever report travel to Southern Asia (Bangladesh, India, and Pakistan), though patients have also reported travel to Africa, the Caribbean, Central and South America, and the Middle East. Relapse, reinfection, and chronic carriage can occasionally occur. Antibiotic treatment for typhoid fever and paratyphoid fever should be based on results from antimicrobial susceptibility testing. In the U.S., more than 90% of *S. Typhi* and *S. Paratyphi* infections in travelers to South Asia are fluoroquinolone-nonsusceptible or naladixic acid-resistant; therefore, patients returning from South Asia with *S. Typhi* or *S. Paratyphi* infections should not be empirically treated with fluoroquinolones and other options such as azithromycin or third generation cephalosporins should be considered. There is an ongoing outbreak of [extensively drug-resistant \(XDR\) typhoid fever in Pakistan](#). Currently XDR *S. Typhi* strains are susceptible to azithromycin or carbapenem.

**Hepatitis A virus (HAV)** infection should be considered for patients with [compatible illness](#) who traveled to the Caribbean, Mexico, Central and South America, Africa, Eastern Europe, and parts of Asia. Commercial laboratories offer hepatitis A IgM testing in serum; a positive IgM with both a consistent clinical presentation and elevated liver enzymes indicates acute infection, whereas a positive IgG or total anti-HAV with a negative IgM indicates past infection or immunity. Patients with hepatitis A infections should avoid taking drugs that can cause liver damage, such as acetaminophen.

**Vaccines** are available to prevent hepatitis A and typhoid fever (visit <https://wwwnc.cdc.gov/travel> for a full list of recommended vaccines by country). The typhoid fever vaccine is not 100% effective and is not effective for preventing paratyphoid fever. For other indications for hepatitis A vaccine visit the [NYC Department of Health and Mental Hygiene \(Health Department\)](#) or [CDC](#) websites.

### **Ebola outbreak in Uganda**

As a reminder, there is an evolving [Ebola outbreak](#) in Uganda. Advise patients to avoid non-essential travel to the affected areas. Healthcare providers who evaluate patients with [symptoms of EVD](#) such as fever, headache, muscle and joint pain, fatigue, loss of appetite, gastrointestinal symptoms, and unexplained bleeding should be prompted to take a travel history. Report any patients suspected of having EVD, and who report recent travel to [affected areas in Uganda](#) by calling the Provider Access Line at 866-692-3641. If the patient does not have a travel history to affected areas in Uganda, EVD is extremely unlikely and there is no need to call the Health Department. To stay up to date on the current affected areas, check the [CDC website](#)

As always, we appreciate your continued collaboration with our efforts to identify patients with these reportable diseases and monitor trends to help inform prevention guidance and direct any mitigation efforts that may be needed in NYC.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Celia Quinn'.

Celia Quinn, MD, MPH  
Deputy Commissioner  
Division of Disease Control