

Malaria Advisory: Locally Acquired Malaria Cases Identified in the United States

Date: June 28, 2023

Public Health Message Type: Alert Advisory Update Information

Intended Audience: All public health partners Healthcare providers Infection preventionists
 Local health departments Schools/Childcare centers ACOs
 Animal health professionals Other: Clinical laboratories

Key Points:

- Locally acquired *Plasmodium vivax* malaria cases have been identified in Florida (four cases) and Texas (one case). The cases between Texas and Florida are unrelated.
- Locally acquired mosquito-borne malaria has not occurred in the United States since 2003.
- There is concern about a potential increase in imported malaria cases due to increased international travel in summer 2023.

Actions:

- Healthcare providers should continue to obtain a travel history from febrile patients. Fever in a person who has recently traveled in a malaria-endemic area should be immediately evaluated using the appropriate diagnostic tests for malaria.
- Healthcare providers should discuss travel plans with patients; prescribe a CDC-recommended malaria chemoprophylaxis regimen and discuss mosquito bite prevention for those traveling to an international area with malaria.
- Hospitals should review their plans for rapid diagnosis and treatment of malaria. Hospitals are encouraged to stock intravenous artesunate and review their emergency procurement plan.
- Confirmation and speciation of thick and thin Giemsa-stained blood smears is available at NJDOH Public Health Laboratory (PHEL). Hospitals are encouraged to send questionable blood smears to PHEL along with a completed BACT-109 form (<https://www.nj.gov/health/forms/bact-109.pdf>).
- Confirmed cases of malaria should be reported within 24 hours to the [local health department](#) where the patient lives, or if unknown, where the diagnosis is made.
- Local health departments should promptly investigate reports of malaria, obtain a complete international travel history as well as travel to any areas with local malaria transmission, and notify CDS immediately should local transmission be suspected.

Resources:

- NJDOH VBD Dashboard: https://dashboards.doh.nj.gov/views/public_dashboard/Intro
- NJDOH Malaria: <https://www.nj.gov/health/cd/topics/malaria.shtml>
- Purchasing Artesunate for Injection™: <https://ivartesunate.com/> or call (855) 5AM-IVAS
- Treatment of severe malaria: https://www.cdc.gov/malaria/diagnosis_treatment/artesunate.html

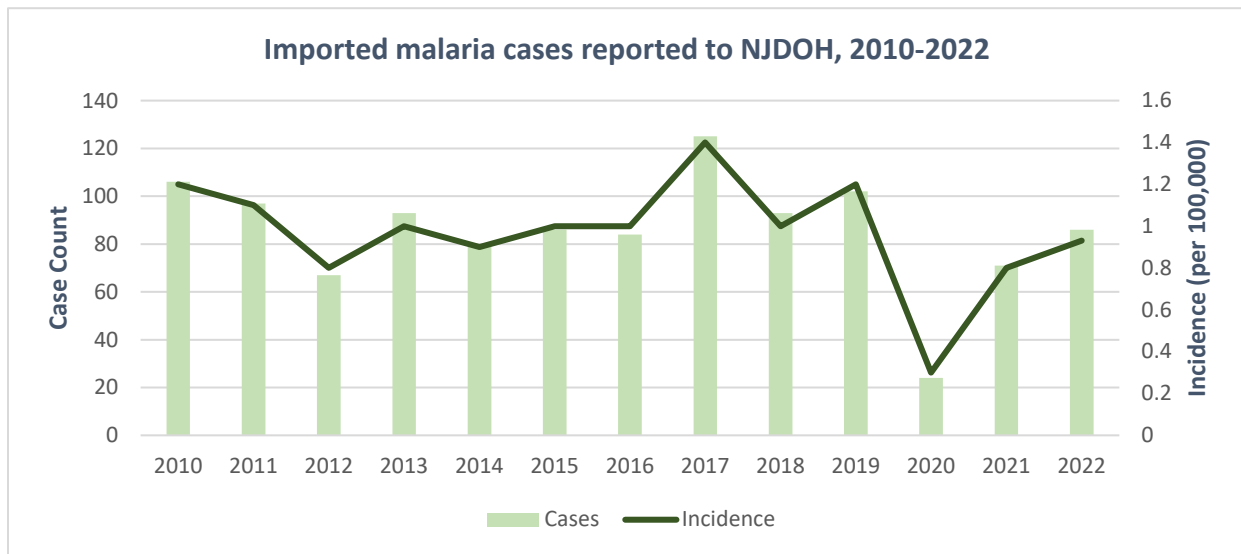
- Treatment of uncomplicated malaria: https://www.cdc.gov/malaria/diagnosis_treatment/treatment.html
- CDC’s algorithm for diagnosis and management of malaria: https://www.cdc.gov/malaria/resources/pdf/Malaria_Management_Algorithm.pdf
- Malaria treatment table: https://www.cdc.gov/malaria/resources/pdf/Malaria_Treatment_Table.pdf

Contact Information:

- Communicable Disease Service Vector-borne Disease Team, CDSVectorTeam@doh.nj.gov
- The Communicable Disease Service at (609) 826-4872 during business hours

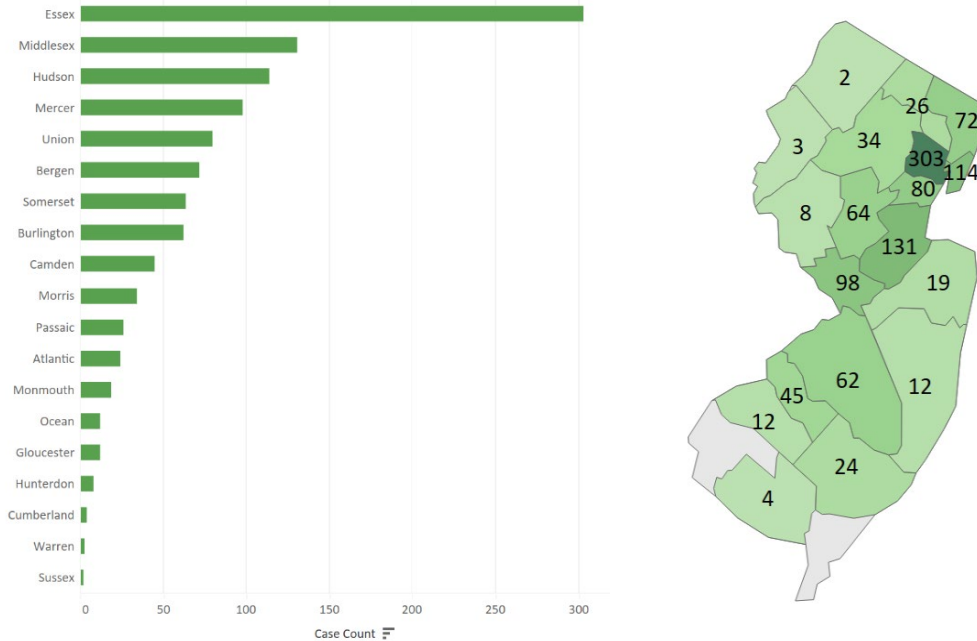
Travel-associated malaria cases and trends in New Jersey residents

Between 2010-2022, an average of 86 imported malaria cases were reported to NJDOH annually, meaning individuals were exposed to malaria in a country where malaria is endemic. Cases dropped significantly in 2020 owing to the COVID-19 pandemic and travel restrictions.



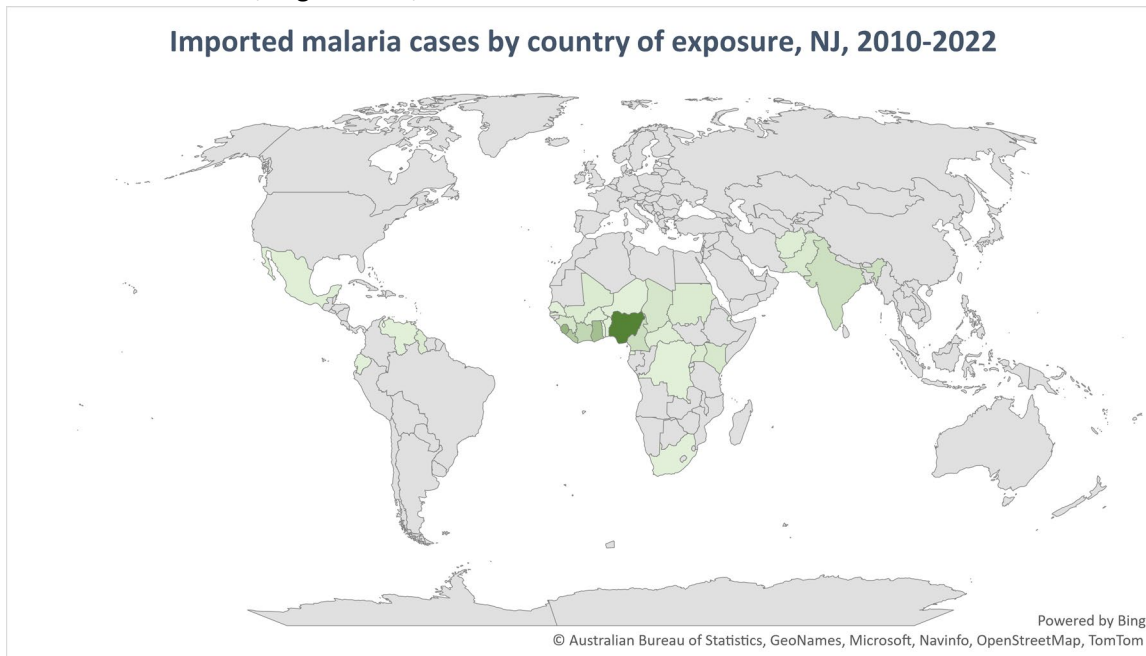
Since 2010, there have been malaria cases reported in New Jersey for all counties except for Salem and Cape May. Most cases are reported in central and northeastern New Jersey counties, with Essex having the highest number of reported cases. It is important to note, however, that international visitors are reported as New Jersey cases and are included in the county where they are staying.

New Jersey Malaria Cases by County, 2010-2022



Among reported cases from 2010-2022, travel from 31 countries was documented, either in persons who relocated to or visited the U.S. or N.J. residents who traveled to those locations. Most imported cases were associated with travel to Africa, with the highest number having been to Nigeria, Sierra Leone, Ghana, Liberia, and Cote D'ivoire. The predominant *Plasmodium* parasite in these countries is *P. falciparum*, although *P. malariae*, *P. ovale*, or *P. vivax* are rarely detected. These countries have documented chloroquine resistance to *P. falciparum*. Imported cases from Asia were most-often associated with India, Afghanistan, and Pakistan.

Imported malaria cases by country of exposure, NJ, 2010-2022



Refer to the CDC Malaria Information and Prophylaxis page for a list of malaria species and drug resistance status by country: (https://www.cdc.gov/malaria/travelers/country_table/a.html)

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CDCHAN-00494

Locally Acquired Malaria Cases Identified in the United States

Summary

The Centers for Disease Control and Prevention (CDC) is issuing this Health Alert Network (HAN) Health Advisory to share information and notify clinicians, public health authorities, and the public about—

- 1) Identification of locally acquired malaria cases (*P. vivax*) in two U.S. states ([Florida](#) [4] and [Texas](#) [1]) within the last 2 months,
- 2) Concern for a potential rise in imported malaria cases associated with increased international travel in summer 2023, and
- 3) Need to plan for rapid access to IV artesunate, which is the first-line treatment for severe malaria in the United States.

Background

CDC is collaborating with two U.S. state health departments with ongoing investigations of locally acquired mosquito-transmitted *Plasmodium vivax* malaria cases. There is no evidence to suggest the cases in the two states (Florida and Texas) are related. In [Florida](#), four cases within close geographic proximity have been identified, and active surveillance for additional cases is ongoing. Mosquito surveillance and control measures have been implemented in the affected area. In [Texas](#), one case has been identified, and surveillance for additional cases, as well as mosquito surveillance and control, are ongoing. All patients have received treatment and are improving. Locally acquired mosquito-borne malaria has not occurred in the United States since 2003 when eight cases of locally acquired *P. vivax* malaria were identified in Palm Beach County, FL (1). Despite these cases, the risk of locally acquired malaria remains extremely low in the United States. However, *Anopheles* mosquito vectors, found throughout many regions of the country, are capable of transmitting malaria if they feed on a malaria-infected person (2). The risk is higher in areas where local climatic conditions allow the *Anopheles* mosquito to survive during most of or the entire year and where travelers from malaria-endemic areas are found. In addition to routinely considering malaria as a cause of febrile illness among patients with a history of international travel to [areas where malaria is transmitted](#), clinicians should consider a malaria diagnosis in any person with a fever of unknown origin regardless of their travel history. Clinicians practicing in areas of the United States where locally acquired malaria cases have occurred should follow guidance from their state and local health departments. Prompt diagnosis and treatment of people with malaria can prevent progression to severe disease or death and limit ongoing transmission to local *Anopheles* mosquitos. Individuals can take [steps to prevent mosquito bites](#) and [control mosquitos at home](#) to prevent malaria and other mosquito-borne illnesses.

[Malaria](#) is a serious and potentially fatal disease transmitted through the bite of an infective female anopheline mosquito. Though rare, malaria can also be transmitted congenitally from mother to fetus or to the neonate at birth, through blood transfusion or organ transplantation, or through unsafe needle-sharing practices. Malaria is caused by any of five species of protozoan parasite of the genus *Plasmodium*: *P. falciparum*, *P. vivax*, *P. malariae*, *P. ovale*, and *P. knowlesi*. Worldwide, more than 240 million cases of malaria occur each year (95% in Africa). Almost all cases of malaria in the United States are imported and occur in people traveling from [countries with malaria transmission](#), many from sub-Saharan Africa and South Asia. Before the COVID-19 pandemic, approximately 2,000 cases of mostly travel-related malaria were diagnosed in the United States each year; approximately 300 people experienced severe disease (most *P. falciparum*), and 5 to 10 people with malaria died yearly (3). Most imported cases of malaria in

the United States are diagnosed during summer and early fall. In 2023, CDC expects summer international travel among U.S. residents will be increasing to pre-COVID-19 pandemic levels (4).

Clinical manifestations of malaria are non-specific and include fever, chills, headache, myalgias, and fatigue. Nausea, vomiting, and diarrhea may also occur. For most people, symptoms begin 10 days to 4 weeks after infection, although a person may feel ill as early as 7 days or as late as 1 year after infection. If not treated promptly, malaria may progress to severe disease, a life-threatening stage, in which mental status changes, seizures, renal failure, acute respiratory distress syndrome, and coma may occur. Malaria in pregnant people is associated with high risks of both maternal and perinatal morbidity and mortality. *P. falciparum* and *P. knowlesi* infections can cause rapidly progressive severe illness or death, while the other species, including *P. vivax*, are less likely to cause severe disease. Laboratory abnormalities can include anemia, thrombocytopenia, hyperbilirubinemia, and elevated transaminases, varying from normal or mildly altered in uncomplicated disease to very abnormal in severe disease. *P. vivax* and *P. ovale* can remain dormant in the liver and such infections require additional treatment; failure to treat the dormant hepatic stages may result in chronic infection, causing relapsing episodes. Relapses may occur after months or even years without symptoms.

Malaria is a medical emergency and [should be treated accordingly](#). Patients suspected of having malaria should be urgently evaluated in a facility that is able to provide rapid diagnosis and treatment, within 24 hours of presentation. Order microscopic examination of thin and thick blood smears, and a rapid diagnostic test (RDT) if available, to diagnose malaria as soon as possible. Artemether-lumefantrine (Coartem[®]) is the preferred option, if readily available, for the initial treatment of uncomplicated *P. falciparum* or unknown species of malaria acquired in areas of chloroquine resistance. Atovaquone-proguanil (Malarone[®]) is another recommended option. *P. vivax* infections acquired from regions other than Papua New Guinea or Indonesia should initially be treated with chloroquine (or hydroxychloroquine). IV artesunate is the only drug available for treating severe malaria in the United States. Artesunate for Injection[™], manufactured by Amivas, is approved by the U.S. Food and Drug Administration (FDA) and is commercially available. Hospitals should have a plan for rapidly diagnosing and treating malaria within 24 hours of presentation. Additional information on diagnosing and treating malaria, including details of treating the dormant liver stages, is available on the [CDC website](#).

Recommendations for Clinicians

- Consider the diagnosis of malaria in any person with a fever of unknown origin, regardless of international travel history, particularly if they have been to the areas with recent locally acquired malaria.
- Routinely obtain a travel history and consider malaria in a symptomatic person who traveled to an [area with malaria](#) in the weeks to months preceding symptom onset.
- Treatment recommendations for malaria vary by species and severity. Please refer to [CDC's Malaria Diagnosis and Treatment Guidelines for U.S. Clinicians](#) for specific detailed instructions.
 - Malaria is a medical emergency. If not diagnosed and treated promptly, illness may progress to severe disease, a life-threatening stage, where mental status changes, seizures, renal failure, acute respiratory distress syndrome, and coma may occur. An algorithm for diagnosis and treatment of malaria is available [here](#).
 - Patients suspected of having malaria should be urgently evaluated in a facility, such as an emergency department, able to provide rapid diagnosis and treatment, within 24 hours of presentation.
 - Order microscopic examination of thin and thick blood smears, and a rapid diagnostic test (RDT) if available, to diagnose malaria as soon as possible.
 - “BinaxNOW[™],” a malaria RDT, is approved for use in the United States. RDTs are less sensitive than microscopy and cannot confirm each specific species of the malaria parasite or the parasite density.
 - Therefore, microscopy should also be obtained in conjunction with an RDT as soon as possible.
 - If blood smears or RDT are positive and species determination is not available, antimalarial treatment effective against chloroquine-resistant *P. falciparum* must be initiated immediately.

- Artemether-lumefantrine (Coartem[®]) is the preferred option, if readily available, for the initial treatment of uncomplicated *P. falciparum* or unknown species of malaria acquired in areas of chloroquine resistance. Atovaquone-proguanil (Malarone[®]) is another recommended option. *P. vivax* infections acquired from regions other than Papua New Guinea or Indonesia should initially be treated with chloroquine (or hydroxychloroquine).
- IV artesunate is the first-line drug for treatment of severe malaria in the United States. Artesunate for Injection[™] is approved by the FDA for treating severe malaria and is commercially available. More information on how to acquire IV artesunate in the United States can be found [here](#).
- Species determination is important because *P. vivax* and *P. ovale* can remain dormant in the liver and require additional antirelapse treatment; failure to treat the dormant hepatic parasites may result in chronic infection with relapsing episodes. Relapses may occur after months or even years without symptoms.
- After an urgent infectious disease consultation, if there are still questions about diagnosing and treating malaria, CDC malaria clinicians are on call 24/7 to provide advice to healthcare providers, further information can be found [here](#).
- Suspected or confirmed locally acquired malaria is a public health emergency and should be reported immediately to your state, territorial, local, or tribal [health department](#). Imported (or travel-associated malaria) is also reportable in all states through routine reporting methods.
- Discuss travel plans with patients; prescribe a CDC-recommended [malaria chemoprophylaxis](#) regimen and discuss [mosquito bite prevention](#) for those traveling to an international [area with malaria](#); encourage patients to adhere to the regimen before, during, and after travel. Malaria chemoprophylaxis is not needed domestically at this time.

Recommendations for Hospitals and Laboratories

- Have malaria diagnostic tests available (blood smear or [BinaxNow[™] rapid diagnostic test \[RDT\]](#) followed by blood smear) and ensure that qualified personnel who can perform and interpret these tests are always available.
 - If malaria blood smear or RDT results are not readily available, patients in whom malaria is suspected should be referred to a higher level of care for prompt evaluation for malaria.
 - Bench aids for blood smear preparation, staining, diagnosis, and calculating the percent parasitemia are available [here](#).
- Stock IV artesunate (Artesunate for Injection[™]) or have a plan in place for emergency procurement.
 - More information on how to acquire IV artesunate in the United States can be found [here](#).
- Stock artemether-lumefantrine (Coartem[®]), the first-line drug in the United States for most cases of uncomplicated *P. falciparum* or unknown malaria species. Atovaquone-proguanil (Malarone[®]) is another recommended option.

Recommendations for Public Health Officials

- Public health officials who are concerned about potential cases of locally acquired malaria should contact CDC's Malaria Branch (malaria@cdc.gov; 770-488-7788) during regular business hours or CDC's Emergency Operations Center (eocreport@cdc.gov; 770-488-7100) outside of regular business hours for assistance with recommendations and testing.
- Consider the following strategies for rapid identification, prevention, and control:
 - How you can support clinicians to identify hospitals that can rapidly diagnose and treat malaria.
 - Outreach to communities to provide education on the importance of precautions for malaria and other diseases before traveling internationally to an area where malaria occurs.
 - Provide education to communities to prevent mosquito borne illness including breeding site reduction strategies.
- In areas of higher risk for local malaria transmission or with higher numbers of cases of imported malaria consider

- Assessing capacity of hospitals and laboratories to rapidly diagnose and treat malaria. This should include the ability to rapidly acquire and provide treatment (See Recommendations for Hospitals and Laboratories.)
- Coordination with mosquito control programs to enhance mosquito surveillance.

Recommendations for the Public

- Take steps to [prevent mosquito bites](#) and [control mosquitos at home](#) to protect yourself from any mosquito-borne illness.
- Before you travel, [learn](#) about the health risks and precautions for malaria and other diseases for your destination.
- If you are traveling internationally to an area [where malaria occurs](#), talk to your healthcare provider about medicines to prevent you from getting malaria.
- If you have traveled to an area where malaria occurs and develop fever, chills, headache, body aches, and fatigue, seek medical care and tell your healthcare provider that you have traveled.

For More Information

Malaria Prevention, Diagnosis, and Treatment

- [CDC Treatment of Malaria: Guidelines for Clinicians \(United States\)](#)
- [CDC - DPDx - Diagnostic Procedures](#)
- [Malaria | CDC Yellow Book 2024](#)
- [CDC Malaria Information and Prophylaxis, by Country](#)
- [CDC - Parasites - Continuing Education - Malaria 101 for the Healthcare Provider](#)
- [CDC - Malaria - Travelers - Risk Assessment](#)

Mosquito-Borne Disease Prevention

- [Prevent Mosquito Bites | Mosquitoes | CDC](#)

References

1. CDC. [Local Transmission of Plasmodium vivax Malaria --- Palm Beach County, Florida, 2003](#). MMWR. 2003 Sep 26; 52(38):908-911.
2. Dye-Braumuller KC, Kanyangarara M. [Malaria in the USA: How Vulnerable Are We to Future Outbreaks?](#) Curr Trop Med Rep. 2021; 8(1):43-51.
3. Mace KE, Lucchi NW, Tan KR. [Malaria Surveillance — United States, 2018](#). MMWR Surveill Summ 2022 Sep 2; 71(No. SS-8):1–29.
4. Schultz JS, Mace KE, Tan KR. [Return to Travel in the Coronavirus Disease 2019 Pandemic Recovery Period and Implications for Imported Malaria: Reinforcing Prevention, Early Diagnosis, and Appropriate Treatment of Malaria](#). Clin Infect Dis. 2023 Apr 1; 76(7):1161-1163.

The Centers for Disease Control and Prevention (CDC) protects people's health and safety by preventing and controlling diseases and injuries; enhances health decisions by providing credible information on critical health issues; and promotes healthy living through strong partnerships with local, national, and international organizations.

Categories of Health Alert Network messages

Health Alert	Conveys the highest level of importance about a public health incident.
Health Advisory	Provides important information about a public health incident.
Health Update	Provides updated information about a public health incident.