



Main Office
 529 East Home Road
 Springfield, OH 45503

Phone: (937) 390-5600
Fax: (937) 390-5625
Email: health@ccchd.com

Clark County Combined Health District- Health Message
West Nile Virus and Malaria
 July 10, 2023

Recent mosquito samples taken by sanitarians from the Clark County Combined Health District (CCCHD) have tested positive for West Nile Virus (WNV.) The sample was taken at the end of June on the west end of Springfield and is the first WNV-positive sample collected in 2023. The most recent case of WNV in Clark County occurred in 2021.

This WNV update and the recent discovery of locally transmitted malaria in Florida and Texas (see attachment) highlight the need for effective mosquito bite prevention and understanding the signs and symptoms of disease. Individuals should take reasonable precautions to avoid mosquito bites and eliminate potential mosquito breeding sites near or surrounding their homes.

	West Nile Virus	Malaria
Symptoms	<p>Most people who become infected with WNV do not have any symptoms. About one in five people who become infected develop a fever with other symptoms such as headache, body aches, joint pains, vomiting, diarrhea, or rash. WNV can lead to severe fever, encephalitis, or meningitis.</p>	<p>The first symptoms of malaria (most often fever, chills, sweats, headaches, muscle pains, nausea, and vomiting) are often not specific and are also found in other diseases (such as influenza and other common viral infections). In severe malaria (caused by <i>P. falciparum</i>), clinical findings (confusion, coma, neurologic focal signs, severe anemia, respiratory difficulties) are more striking and may increase the suspicion index for malaria.</p>
Clinical Criteria	<p>A clinically compatible case of arboviral disease is defined as follows:</p> <ul style="list-style-type: none"> • Neuroinvasive disease: <ul style="list-style-type: none"> • Meningitis, encephalitis, acute flaccid paralysis, or other acute signs of central or peripheral neurologic dysfunction, as documented by a physician, and absence of a more likely clinical explanation. • Other clinically compatible symptoms of arbovirus disease include: headache, myalgia, rash, arthralgia, vertigo, vomiting, paresis and/or nuchal rigidity. • Non-neuroinvasive disease: <ul style="list-style-type: none"> • Fever (chills) as reported by the patient or healthcare provider. • Absence of neuroinvasive disease, and absence of a more likely clinical explanation. • Other clinically compatible symptoms of arbovirus disease include: headache, myalgia, rash, arthralgia, vertigo, vomiting, paresis and/or nuchal rigidity. 	<p>Patients diagnosed with malaria are generally categorized as having either uncomplicated or severe malaria:</p> <ul style="list-style-type: none"> • Severe malaria <ul style="list-style-type: none"> • Patients who have one or more of the following clinical criteria—impaired consciousness/coma, severe anemia, acute kidney injury, acute respiratory distress syndrome, circulatory collapse/shock, disseminated intravascular coagulation, acidosis, jaundice and/or percent parasitemia of $\geq 5\%$ are considered to have manifestations of severe disease and should be treated aggressively with intravenous antimalarial therapy. • Uncomplicated malaria <ul style="list-style-type: none"> • Patients diagnosed with uncomplicated malaria can be effectively treated with oral antimalarials.



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	West Nile Virus	Malaria
Period of Communicability	Humans are dead-end hosts for the virus (i.e., they do not circulate sufficient numbers of the virus in the blood stream to infect a mosquito). The disease cannot be spread from person to person	Mosquitoes can be infected as long as infective gametocytes are present in the blood of patients. This varies with Plasmodium species and response to therapy, ranging from 1-3 years.
Incubation Period	2 to 14 days, usually 2 to 6 days. In immunocompromised persons, the incubation can be as long as 21 days.	12-30 days depending on species of malaria.
Laboratory Criteria for Diagnosis	<ul style="list-style-type: none"> Isolation of virus from, or demonstration of specific viral antigen or nucleic acid in, tissue, blood, cerebrospinal fluid (CSF) or other body fluid or Four-fold or greater change in virus-specific quantitative antibody titers in paired sera or Virus-specific immunoglobulin M (IgM) antibodies in serum with confirmatory virus-specific neutralizing antibodies in the same or a later specimen or Virus-specific IgM antibodies in CSF or serum. 	<ul style="list-style-type: none"> Detection of circulating malaria-specific antigens using rapid diagnostic test (RDT) or Detection of species-specific parasite DNA in a sample of peripheral blood using a Polymerase Chain Reaction (PCR) test or Detection of malaria parasites in thick or thin peripheral blood films, determining the species by morphologic criteria and calculating the percentage of red blood cells infected by asexual malaria parasites (parasitemia).
Recommendations for Providers	Consider West Nile Virus in the differential diagnoses for patients presenting with mosquito exposure and appropriate symptoms.	Consider 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 (Texas or Florida)
Local Disease Incidence	Approximately 3-13 cases are reported per year in Ohio for WNV. The yearly rate of WNV in Clark County is 1.3 cases per 100,000 people.	Approximately 30-45 malaria cases occur per year in Ohio, almost all have been internationally acquired. The last case of malaria in Clark County was one case in 2006.

Here are some tips to avoid mosquito bites:

- If you are outdoors between dusk and dawn, when mosquitoes are most active, wear long pants, a long-sleeved shirt, shoes and socks.
- Wear light-colored clothing, which is less attractive to mosquitoes.
- Wear permethrin treated clothing to repel and kill mosquitoes.
- Use an EPA-registered mosquito repellent and follow the label directions for usage.
- Install or repair screens on windows and doors to keep mosquitoes out of your home.

Here are some tips to eliminate mosquito breeding sites around your home:

- Eliminate standing water.



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- Empty or remove all types of water-holding containers, such as buckets, barrels, tires, unused flowerpots and bird baths. Even a small amount of water in a small lid can be enough to breed mosquitoes.
- Make sure all roof gutters are clean and draining properly.
- Keep children's wading pools empty and placed on their sides when not being used.
- Change water in pet dishes regularly.

Resources:

- Learn more about mosquitoes and WNV on the ODH website at <https://www.odh.ohio.gov/wnv>
- Learn more about malaria on the ODH website at <https://www.odh.ohio.gov>
- For more information about interpreting arboviral lab results, case definition and classification, see the Ohio Infectious Disease Control Manual at ODH West Nile Virus IDCM

If you are receiving this health alert via fax, please visit the CCCHD website to view a digital copy with clickable links. Alternatively, you may visit the following URLs for information:

- <https://www.odh.ohio.gov/wnv>
- <https://odh.ohio.gov/wps/portal/gov/odh/know-our-programs/infectious-disease-control-manual/section3/section-3-wnv>

Please see the attached memo from the Centers for Disease Control regarding locally acquired malaria in the United States.

Attachments:

- **CDC-HAN-494 Locally Acquired Malaria Cases Identified in the United States**

If you are receiving this health message via fax, please visit the CCCHD website (<https://ccchd.com/for-healthcare-providers/>) or follow the QR code below to view a digital copy with clickable links. If you wish to receive health alerts electronically in the future, please contact hlecaptain@ccchd.com.

Message Details

Date: 7/10/2023

Time Sensitivity: Not Urgent

To: Medical offices, Urgent Cares, Clinics, Hospitals, Laboratories and ICPs

Target Audience: Physicians, PA, NP, Nurses, Medical Staff, ICP staff, and Laboratorians

Relevance to Public Health: High Concern



This is an official **CDC HEALTH ADVISORY**

Distributed via the CDC Health Alert Network
June 26, 2023, 5:00 PM ET
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.