

Report to the Boards of Health

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Mid-Michigan District Health Department, Wednesday, October 25, 2023
Central Michigan District Health Department, Wednesday, October 25, 2023
District Health Department 10, Friday, October 27, 2023

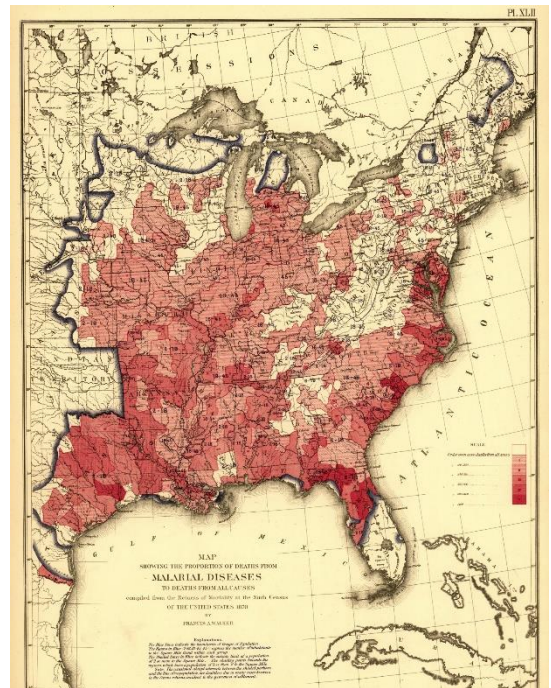


Malaria in the US

In the United States, malaria is typically diagnosed in people returning from travel to areas where malaria is endemic. So far this year there have been 10 cases of locally acquired malaria reported in four states: one case each in Arkansas, Maryland, and Texas, and seven in Florida. Prior to 2023, the last locally acquired cases of malaria in the U.S. occurred in 2003 when eight cases occurred in Palm Beach County, Florida. In the United States, outbreaks of locally transmitted malaria have been small and isolated. The mosquitoes capable of carrying malaria are still in the U.S., so there is always the potential risk for the disease to re-establish itself.

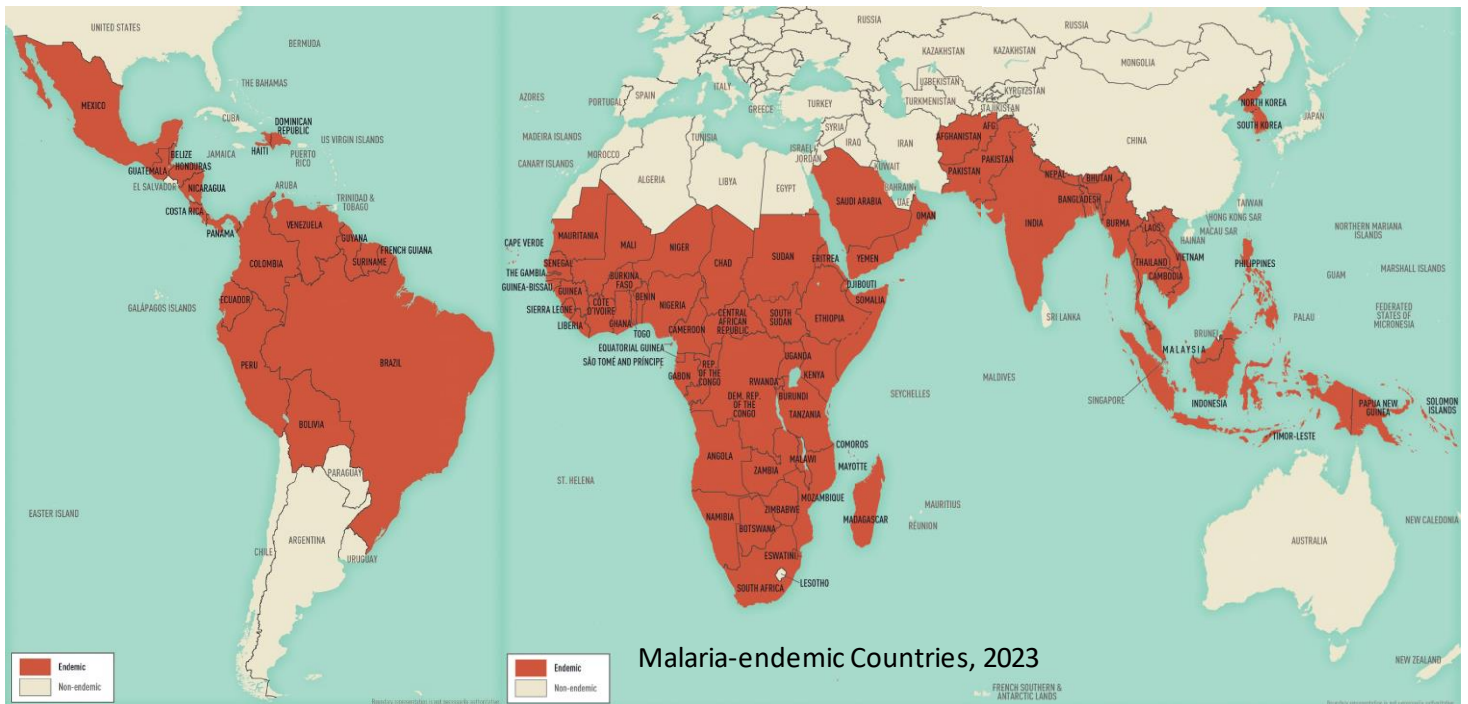
Malaria has been a major source of illness and death since at least 3200 B.C. There was no record of malaria in the Americas prior to their exploration by Europeans, and it is felt that malaria was most likely brought to the New World with explorers, conquerors, and colonists. The importation of malaria continued at an even larger scale during the trade of African slaves. Malaria is mentioned in many historic writings and has shaped history. It likely contributed to the fall of Rome, helped the colonists win the final battles of the Revolutionary War, and had major effects on the Civil War, World War I, and World War II. Over time, malaria has had and continues to have its greatest effects on Africa.

It was discovered that malaria was caused by a parasite in the 1880s and the role of mosquitos in spreading malaria was discovered in the late 1800s to early 1900s. These discoveries allowed for more focused improvements in sanitation and prevention. In 1942, the Malaria Control in War Areas (MCWA) program was established in the United States to control malaria around the military bases in the southern U.S. In 1946, this program led to the creation of the Communicable Disease Center, or CDC, as it was known at that time. The focus of the CDC then was mainly the control and elimination of malaria in the United States. The National Malaria Eradication Program started July 1, 1947. The main efforts were DDT application to the inside of homes in rural areas or to entire counties where malaria had recently been reported. Over the span of two years, over 4.5 million houses were sprayed. By 1951, malaria was considered eliminated from the US.



[Proportion of deaths from malaria to deaths of all causes – US Census 1870](#)

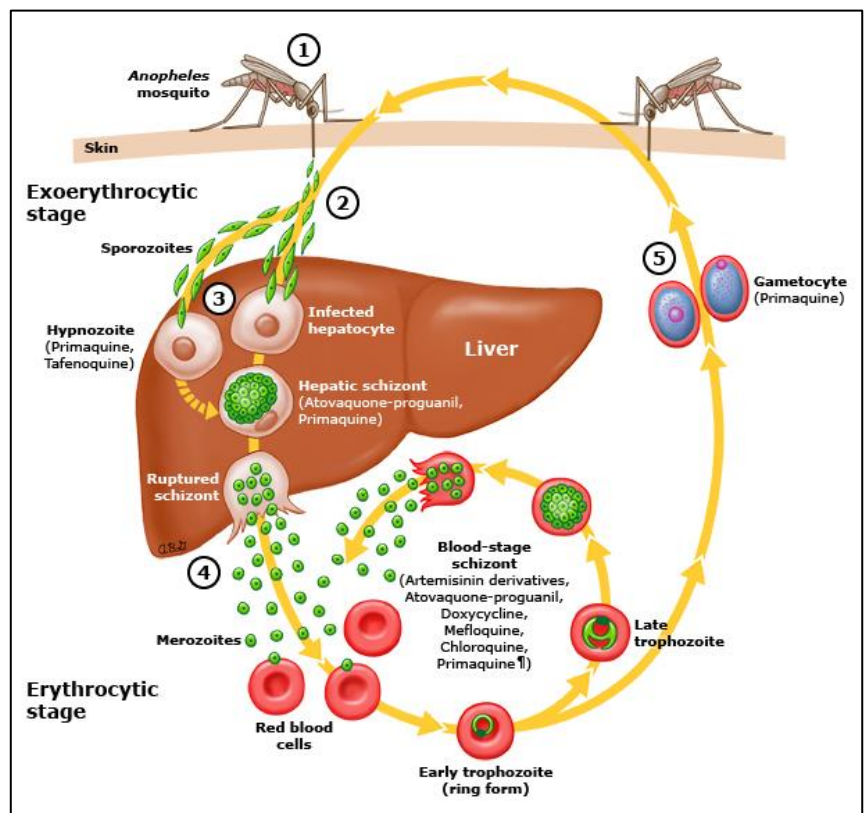
More than 90 countries in the world continue to be affected by malaria. In 2020, 241 million cases and 627,000 deaths from malaria were reported. More than 95% of cases of malaria occur in Africa, with Nigeria the most effected. Southeast Asian and Eastern Mediterranean regions each have 2% of cases, and the American and Western Pacific regions have the remaining cases. There are typically about 2,000 cases of malaria diagnosed in the United States each year in people that have returned from travel within the prior three months. The majority (95%) of these travelers diagnosed with malaria did not take malaria prophylaxis properly and 25% did not take any prophylaxis.



Malaria is caused by one of several parasites in the genus *Plasmodium*. There are several different species of *Plasmodium*, and the illness varies depending on the species causing the infection. *Plasmodium falciparum* is the most common species in the world. Malaria is spread by mosquitos. It does not spread directly from person to person, by close contact, or sexual contact.

The parasite goes through different phases of its life cycle in humans and in mosquitos. The phases in humans happen mainly in the liver and the red blood cells. Symptoms may start from one week to one year after infection and may include fever that typically comes on rapidly and at intervals, chills, sweating, headache, muscle and bone aches, tiredness, nausea, vomiting, abdominal pain, diarrhea, and loss of appetite. Malaria damages red blood cells and can cause anemia, and the effort to clear out the damaged red blood cells can cause the spleen to become enlarged. The cycles through the liver can cause liver damage, and all this together can start to damage the kidneys. Severe malaria happens when there is serious organ and blood damage. This can lead to death. Malaria can recur, either because treatment failed or from reinfection.

Malaria can be diagnosed by looking at the blood under a microscope. There are also



rapid tests for malaria if microscopes are not available. There are tests available to determine what species of parasite is causing malaria, and to check for drug resistance.

The treatment for malaria varies based on the species causing malaria, what area the malaria likely came from which can determine the chance of drug resistance, the age of the infected person, if they are pregnant or breastfeeding, and how sick they are. Guidelines for clinicians is available [here](#).

To control malaria transmission in an area, there needs to be effective access to antimalarial medication, mosquito protection, area control of mosquitos, and more research into the control malaria. There are currently many countries that lack the infrastructure needed to achieve the needed steps for malaria control.



Rings of *P. falciparum* in a thin blood smear
<https://www.cdc.gov/dpdx/malaria/index.html>

Before traveling, see what vaccines and medications are recommended for your destination at <https://wwwnc.cdc.gov/travel/destinations/list>. If malaria prophylaxis is recommended, talk with your healthcare provider about getting a prescription or getting a referral to a travel clinic. More guidance for malaria and travelers is available [here](#). Because malaria can be transmitted by infected blood, you should not donate blood for 3 months after you return from an area with malaria. For those that lived in an area where malaria is present, donation should be deferred for 3 years after coming to the United States.

Efforts have been underway for over 60 years to develop a vaccine that will work against malaria. There have recently been two new malaria vaccines approved and recommended by the World Health Organization (WHO) for children in Sub-Sahara Africa and other regions with high transmission, the RTS,S/AS01 (Mosquirix™) vaccine and R21/Matrix-M™.

The RTS,S/AS01 (Mosquirix™) vaccine consists of a recombinant protein that targets an antigen in the surface of the *P. falciparum* sporozoite, fused with the hepatitis B surface antigen as a carrier, along with an adjuvant to help boost immunity. The vaccine efficacy of preventing clinical illness among children between the ages of 5 months and 17 months who received three doses plus a booster from birth to the age of 20 months was 36% to 44%. Follow up of children that received only three doses had no remaining efficacy by age 4 years. Additional follow-up for those who received the four-dose vaccine schedule is pending.

The R21/Matrix-M™ vaccine is like RTS,S/AS01 but has had part of the protein in the antigen taken out, which is believed will improve the immune response to the antigen. It is also fused to the hepatitis B antigen and uses an adjuvant, but one that is easier to manufacture so the vaccine should be less costly. The vaccine efficacy of preventing clinical illness in children between the ages of 5 months and 17 months more than 6 months after receiving three doses of vaccine was 74% to 77%. The efficacy data beyond 6 months are limited at this time. It is difficult to compare vaccine efficacy between R21 and RTS,S vaccines.

Recommendations:

1. Before traveling, see what vaccines and medications are recommended for your destination at <https://wwwnc.cdc.gov/travel/destinations/list>. If malaria prophylaxis is recommended, talk with your healthcare provider about getting a prescription or getting a referral to a travel clinic.
2. Whether traveling or at home, use [insect repellent](#) to prevent mosquito and tick-borne diseases.
3. Follow the U.S. efforts in combating malaria at the U.S. President's Malaria Initiative, started in 2005 <https://www.pmi.gov/about-us/>.

Sources

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