Frequently Asked Questions (FAQs)

The Disease

What is malaria?

Malaria is a serious and sometimes fatal disease caused by a parasite that commonly infects a certain type of mosquito which feeds on humans. People who get malaria are typically very sick with high fevers, shaking chills, and flu-like illness. Four kinds of malaria parasites infect humans: *Plasmodium falciparum, P. vivax, P. ovale*, and *P. malariae.* In addition, *P. knowlesi*, a type of malaria that naturally infects macaques in Southeast Asia, also infects humans, causing malaria that is transmitted from animal to human ("zoonotic" malaria). *P. falciparum* is the type of malaria that is most likely to result in severe infections and if not promptly treated, may lead to death. Although malaria can be a deadly disease, illness and death from malaria can usually be prevented.

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About 2,000 cases of malaria are diagnosed in the United States each year. The vast majority of cases in the United States are in travelers and immigrants returning from parts of the world where malaria transmission occurs, including sub-Saharan Africa and South Asia.

Globally, the World Health Organization estimates that in 2020, 241 million clinical cases of malaria occurred, and 627,000 people died of malaria, most of them children in Africa. Because malaria causes so much illness and death, the disease is a great drain on many national economies. Since many countries with malaria are already among the poorer nations, the disease maintains a vicious cycle of disease and poverty.

How People Get Malaria (Transmission)

How is malaria transmitted?

Usually, people get malaria by being bitten by an infective female *Anopheles* mosquito. Only *Anopheles* mosquitoes can transmit malaria and they must have been infected through a previous blood meal taken from an infected person. When a mosquito bites an infected person, a small amount of blood is taken in which contains microscopic malaria parasites. About 1 week later, when the mosquito takes its next blood meal, these parasites mix with the mosquito's saliva and are injected into the person being bitten.

Because the malaria parasite is found in red blood cells of an infected person, malaria can also be transmitted through blood transfusion, organ transplant, or the shared use of needles or syringes contaminated with blood. Malaria may also be transmitted from a mother to her unborn infant before or during delivery ("congenital" malaria).

Is malaria a contagious disease?

No. Malaria is not spread from person to person like a cold or the flu, and it cannot be sexually transmitted. You cannot get malaria from casual contact with malaria-infected people, such as sitting next to someone who has malaria.

Who Is at Risk

Who is at risk for malaria?

Anyone can get malaria. Most cases occur in people who live in countries with malaria transmission. People from countries with no malaria can become infected when they travel to countries with malaria or through a blood transfusion (although this is very rare). Also, an infected mother can transmit malaria to her infant before or during delivery.

Who is most at risk of getting very sick and dying from malaria?

Plasmodium falciparum is the type of malaria that most often causes severe and life-threatening malaria; this parasite is very common in many countries in Africa south of the Sahara desert. People who are heavily exposed to the bites of mosquitoes infected with *P. falciparum* are most at risk of dying from malaria. People who have little or no immunity to malaria, such as young children and pregnant women or travelers coming from areas with no malaria, are more likely to become very sick and die. Poor people living in rural areas who lack access to health care are at greater risk for this disease. As a result of all these factors, an estimated 90% of deaths due to malaria occur in Africa south of the Sahara; most of these deaths occur in children under 5 years of age.

Symptoms and Diagnosis

What are the signs and symptoms of malaria?

Symptoms of malaria include fever and flu-like illness, including shaking chills, headache, muscle aches, and tiredness. Nausea, vomiting, and diarrhea may also occur. Malaria may cause anemia and jaundice (yellow coloring of the skin and eyes) because of the loss of red blood cells. If not promptly treated, the infection can become severe and may cause kidney failure, seizures, mental confusion, coma, and death.

How soon will a person feel sick after being bitten by an infected mosquito?

For most people, symptoms begin 10 days to after infection, although a person may feel ill as early as 7 days or as late as 1 year later. Two kinds of malaria, *P. vivax* and *P. ovale*, can occur again (relapsing malaria). In *P. vivax* and *P. ovale* infections, some parasites can remain dormant in the liver for several months up to about 4 years after a person is bitten by an infected mosquito. When these parasites come out of hibernation and begin invading red blood cells (“relapse”), the person will become sick.

How do I know if I have malaria for sure?

Most people, at the beginning of the disease, have fever, sweats, chills, headaches, malaise, muscles aches, nausea, and vomiting. Malaria can very rapidly become a severe and life-threatening disease. The surest way for you and your health-care provider to know whether you have malaria is to have a diagnostic test where a drop of your blood is examined under the microscope for the presence of malaria parasites. If you are sick and there is any suspicion of malaria (for example, if you have recently traveled in a country where malaria transmission occurs), the test should be performed without delay.

Preventing Malaria During Travel

I will be traveling outside the United States to an area with malaria. How do I find out what is the best drug to take to prevent malaria?

CDC has a list of all the places in the world where malaria transmission occurs and the malaria drugs that are recommended for prevention in each place.

Many effective antimalarial drugs are available. Your health-care provider and you will decide on the best drug for you, if any, based on your travel plans, medical history, age, drug allergies, pregnancy status, and other factors.

To allow enough time for some of the drugs to become effective and for a pharmacy to prepare any special doses of medicine (especially doses for children and infants), you may need to visit your health-care provider 4-6 weeks before travel. Other malaria medicines only need to be started the day before travel and so last-minute travelers can still benefit from a visit to their health-care provider before traveling.

What is known about the long-term effects of drugs that are commonly used to prevent malaria?

The drugs used to prevent malaria have been shown to be safe and well-tolerated for long term use.

I was born in a country where malaria is present and had malaria as a child, and then moved to the United States many years ago. Do I need to worry about getting malaria when I return home to visit my friends and relatives?

Yes. Anyone who goes to a country where malaria transmission occurs should take precautions against contracting malaria. During the time that you have spent in the United States, you have lost any malaria immunity that you might have had while living in your native country. Without frequent exposure to malaria parasites, your immune system has lost its ability to fight malaria. You are now as much at risk as someone who was born in the United States (a “nonimmune” person). Please consult with your health-care provider or a travel clinic about precautions to take against malaria (preventive drugs and protection against mosquito bites) and against other diseases.

Is it safe to buy my malaria drugs in the country where I will be traveling?

Buying medications abroad has its risks. The drugs could be of poor quality because of the way they are produced. The drugs could contain contaminants or they could be counterfeit drugs and therefore may not provide you the protection you need against malaria. In addition, some medications that are sold overseas are not used anymore in the United States or were never sold here. These drugs may not be safe or their safety has never been evaluated.

It would be best to purchase all the medications that you need before you leave the United States. As a precaution, note the name of the medication(s) and the name of the manufacturer(s). That way, in case of accidental loss, you can replace the drug(s) abroad at a reliable vendor.

Isn’t there a malaria vaccine? And if not, why?

Attempts at producing an effective malaria vaccine and vaccine clinical trials are ongoing. The malaria parasite is a complex organism with a complicated life cycle. The parasite has the ability to evade your immune system by constantly changing its surface, so developing a vaccine against these varying surfaces is very difficult. In addition, scientists do not yet totally understand the complex immune responses that protect humans against malaria. However, many scientists all over the world are working on developing an effective vaccine. Because other methods of fighting malaria, including drugs, insecticides, and insecticide-treated bed nets, have not succeeded in eliminating the disease, the search for a vaccine is considered to be one of the most important research projects in public health.

Malaria and Infants and Children

Should infants and children be given antimalarial drugs?

Yes, but not all types of malaria drugs. Children of any age can get malaria and any child traveling to an area where malaria transmission occurs should use the recommended prevention measures, which often include an antimalarial drug. However, some antimalarial drugs are not suitable for children. Doses are based on the child’s weight.

Pregnancy, Preconception, and Breastfeeding

I live in the United States, am 4 months pregnant, and want to take a 2-week trip to a country where malaria transmission occurs. Is it safe to do so?

CDC advises women who are pregnant or likely to become pregnant not to travel to areas where malaria transmission occurs, if possible. Malaria in pregnant women can be more severe than in women who are not pregnant. Malaria can increase the risk for serious pregnancy problems, including prematurity, miscarriage, and stillbirth. If travel to a malarious area cannot be postponed, use of an effective chemoprophylaxis regimen is essential. However, no preventive drugs are completely effective. Please consider these risks (and other health risks as well) and discuss them with your health-care provider.

I plan to become pregnant after I return from an area where malaria transmission occurs. How long does it take it take for antimalarial drugs to clear the body?

Because there is no evidence that chloroquine and mefloquine are associated with congenital defects when used for preventing malaria (prophylaxis), CDC does not recommend that women planning pregnancy need to wait a specific period of time after their use before becoming pregnant. However, if women or their health-care providers wish to decrease the

amount of antimalarial drug in the body before conception, the below table provides information on the half-lives of selected antimalarial drugs. After two, four, and six half-lives, approximately 25%, 6%, and 2% of the drug remain in the body.

Half-lives of selected antimalarial drugs

Drug	Half life
Atovaquone	2–3 days
Chloroquine	6–60 days
Doxycycline	12–24 hours
Mefloquine	2–3 weeks
Primaquine	4–7 hours
Proguanil	14–21 hours
Tafenoquine	2 weeks

Is it considered safe for me to breastfeed while taking an antimalarial drug?

There are limited data available about the safety of antimalarial drugs while breastfeeding. However, the amount of antimalarial drug transferred from the nursing mother to her infant is not thought to be harmful to the infant. Very small amounts of the antimalarial drugs chloroquine and mefloquine are excreted in the breast milk of women who are breastfeeding. Although there is limited information about the use of doxycycline in breastfeeding women, most experts consider it unlikely to cause any harm.

No information is available on the amount of primaquine or tafenoquine that enters human breast milk. The mother and infant should be tested for G6PD deficiency before primaquine is given to a woman who is breastfeeding. Because there is no information on the use of tafenoquine in infants, tafenoquine is not recommended during breastfeeding.

It is not known whether atovaquone, which is a component of the antimalarial drug Malarone, is excreted in human milk. Proguanil, the other component of Malarone, is excreted in human milk in small quantities.

Note:

Because there is little information available on the safety of atovaquone/proguanil to prevent malaria in infants weighing less than 5 kg (11 lbs), CDC does not currently recommend it for the prevention of malaria in women breastfeeding infants weighing less than 5 kg.

If I am taking an antimalarial drug and breast-feeding, will my baby be protected from malaria because of the medication transferred in my breast milk?

No. Based on experience with other antimalarial drugs, the quantity of drug transferred in breast milk is not likely to be enough to provide protection against malaria for the infant.

Other Preventive Measures

I am a U.S. citizen and am now living in an area where malaria is a problem. How can I prevent myself and my family from getting sick?

You and your family can most effectively prevent malaria by taking all three of these important measures:

- Taking antimalarial medication to kill the parasites and prevent becoming ill
- Keeping mosquitoes from biting you, especially at night
- Sleeping under insecticide-treated bed nets, using insect repellent, and wearing long-sleeved clothing if out of doors at night.

After Returning from an Area That Has Malaria

How long after returning from an area with malaria could I develop malaria?

Any traveler who becomes ill with a fever or flu-like illness while traveling, and up to 1 year after returning home, should immediately seek professional medical care. You should tell your health-care provider that you have been traveling in an area

where malaria transmission occurs and ask to be tested for malaria infection.

Can I give blood if I have been in a country where there is malaria?

It depends on what areas of that country you visited, how long ago you were there, and whether you ever had malaria. People who used to live in countries where malaria transmission occurs cannot donate blood for 3 years. People diagnosed with malaria cannot donate blood for 3 years after treatment, during which time they must have remained free of symptoms of malaria.

Blood banks follow strict guidelines for accepting or deferring donors who have been in malaria-endemic areas. They do this to avoid collecting blood for transfusions from an infected donor. In the United States during the period 1963-2012, there were 97 cases reported to CDC where people acquired malaria through a transfusion. Because of these control measures, transfusion-transmitted malaria is very rare in the United States and occurs at a rate of less than 1 per million units of blood transfused.

Treating Malaria

When should malaria be treated?

The disease should be treated early in its course, before it becomes serious and life-threatening. Several good antimalarial drugs are available, and should be taken early on. The most important step is to go see a doctor if you are sick and are presently in, or have recently been in, an area with malaria, so that the disease is diagnosed and treated right away.

What is the treatment for malaria?

Malaria can be cured with prescription drugs. The type of drugs and length of treatment depend on the type of malaria, where the person was infected, their age, whether they are pregnant, and how sick they are at the start of treatment.

For health-care providers treating malaria, please see the CDC Guidelines for Treatment of Malaria in the US.

When is malaria self-treatment recommended?

Very rarely. Travelers who are taking effective malaria preventive drugs but who will be traveling for an extended period of time or who will be at higher risk of developing a malaria infection may decide, in consultation with their health-care provider, to take along malaria treatment medication (referred to as a reliable supply) in case they develop malaria while traveling. If the traveler develops symptoms of malaria, they should immediately seek medical attention so that they can be examined and diagnosed appropriately. If they are diagnosed with malaria, they will then already have with them a reliable supply of an effective malaria treatment medicine to take. Malaria self-treatment should begin right away if fever, chills, or other influenza-like illness symptoms occur and if professional medical care is not available within 24 hours. Self-treatment of a possible malarial infection is only a temporary measure and immediate medical care is important. Appropriate options for a reliable supply of malaria treatment medicines are atovaquone/proguanil or artemether/lumefantrine.

If I get malaria, will I have it for the rest of my life?

No, not necessarily. Malaria can be treated. If the right drugs are used, people who have malaria can be cured and all the malaria parasites can be cleared from their body. However, the disease can continue if it is not treated or if it is treated with the wrong drug. Some drugs are not effective because the parasite is resistant to them. Some people with malaria may be treated with the right drug, but at the wrong dose or for too short a period of time.

Two types (species) of parasites, *Plasmodium vivax* and *P. ovale*, have liver stages and can remain in the body for years without causing sickness. If not treated, these liver stages may reactivate and cause malaria attacks (“relapses”) after months or years without symptoms. People diagnosed with *P. vivax* or *P. ovale* are often given a second drug to help prevent these relapses. Another type of malaria, *P. malariae*, if not treated, has been known to stay in the blood of some people for several decades.

However, in general, if you are correctly treated for malaria, the parasites are eliminated and you are no longer infected with malaria.

Where Malaria Occurs

Where does malaria occur?

Malaria typically is found in warmer regions of the world — in tropical and subtropical countries. Higher temperatures allow the *Anopheles* mosquito to thrive. Malaria parasites, which grow and develop inside the mosquito, need warmth to complete their growth before they are mature enough to be transmitted to humans.

Malaria occurs in more than 100 countries and territories. About half of the world's population is at risk. Large areas of Africa and South Asia and parts of Central and South America, the Caribbean, Southeast Asia, the Middle East, and Oceania are considered areas where malaria transmission occurs.

Yet malaria does not occur in all warm climates. For example, malaria has been eliminated in some countries with warm climates, while a few other countries have no malaria because *Anopheles* mosquitoes are not found there.

Why is malaria so common in Africa?

In Africa south of the Sahara, the principal malaria mosquito, *Anopheles gambiae*, transmits malaria very efficiently. The type of malaria parasite most often found, *Plasmodium falciparum*, causes severe, potentially fatal disease. Lack of resources and political instability can prevent the building of solid malaria control programs. In addition, malaria parasites are increasingly resistant to antimalarial drugs, presenting one more barrier to malaria control on that continent.

In some countries, malaria is said to exist in "rural" areas. How would one know if an area is rural vs urban?

What constitutes a rural area can vary by country. In general, urbanization can be said to involve both population size and economic development of an area in which there is concentrated commercial activity, such as manufacturing, the sale of goods and services, and transportation. Rural areas tend to have less commercial activity, less population density, more green space, and agriculture may be a main feature.

Eradication and Elimination

Wasn't malaria eradicated years ago?

No. Eradication means that no more malaria exists in the world. Malaria has been **eliminated** from many developed countries with temperate climates. However, the disease remains a major health problem in many developing countries, in tropical and subtropical parts of the world.

An eradication campaign was started in the 1950s, but it failed globally because of problems including the resistance of mosquitoes to insecticides used to kill them, the resistance of malaria parasites to drugs used to treat them, and administrative issues. In addition, the eradication campaign never involved most of Africa, where malaria is the most common.

What is CDC doing to help stop malaria?

In the United States, CDC is involved in the following activities:

- Epidemiologic surveillance
- Investigations of outbreaks of locally transmitted malaria and of other occurrences (e.g., transfusion-transmitted malaria)
- Determination of country-specific risk of malaria in US residents traveling abroad
- Advice to international travelers
- Consultations with clinicians
- Advice to blood collection centers
- Diagnostic assistance
- Investigations of medications to prevent malaria
- Develop and update guidelines for malaria prevention and treatment.

CDC's international activities include the following:

- Work with the U.S. Agency for International Development (USAID) in the planning and implementation of the President's Malaria Initiative (PMI), a $3 billion initiative to rapidly increase malaria control interventions in 24 African countries and focus countries in the Greater Mekong Subregion in Asia.

- Conduct research in malaria-endemic countries to improve understanding of best practices for prevention and treatment of malaria.
- Provide technical assistance to the national malaria control program and local disease prevention and control partners (e.g., the reproductive health program responsible for maternal health) to strengthen malaria control activities.
- Work with key Roll Back Malaria (RBM) partners (e.g., World Health Organization, the United Nations' Children's Fund (UNICEF), the World Bank, and the U.S. Agency for International Development) on malaria control programs.

CDC currently has staff posted at UNICEF, the Global Health Group (University of California at San Francisco), the U.S. Agency for International Development, , and the World Health Organization, as well as in 21 malaria-endemic countries. Their work spans the spectrum of policy development, program guidance and support, scientific research, and monitoring and evaluation of progress toward RBM and PMI goals.

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