

Biological Hazards

Malaria

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What is malaria?

Malaria is a serious and sometimes life-threatening disease caused by parasites that spread to humans through bites of certain types of mosquitos. It is not caused by a virus or a bacterium. While malaria is preventable and curable, it can be severe or fatal if it is not diagnosed and treated.

How is malaria transmitted?

Malaria is not directly transmitted from person to person, like a cold or flu. It spreads to people through the bite of a specific type of mosquito called *Anopheles* mosquito, which carries parasites. It is the only type of mosquito that spreads malaria. When an infected female mosquito bites a person, it injects the parasite into the bloodstream. If a different, uninfected mosquito bites this sick person, it picks up the parasite, and when it bites someone else, it transfers the parasite to them, potentially starting a new infection.

It is also important to note that because the malaria parasite targets red blood cells, it can also spread through blood transfusion and contaminated needles.

Where does malaria occur?

Malaria is very rare in Canada, although the *Anopheles* mosquito is present.

Malaria is found in tropical regions such as Africa, Central America, South America, and Southern Asia, with warm temperatures and high humidity. The infection is transmitted in areas where *Anopheles* mosquitoes can survive and multiply and where malaria parasites can complete their growth cycles.

In 2023, 9 locally acquired malaria cases were reported in the United States of America. The Centers for Disease Control and Prevention (CDC) states that “Most malaria cases diagnosed in the United States are imported, usually by persons who travel to countries where malaria is endemic (regularly occurring). However, locally acquired mosquito-transmitted malaria cases can occur, as *Anopheles* mosquito vectors exist throughout the United States.”

Who is at risk?

Vulnerable groups and those with compromised immune systems are at a greater risk of severe infection. These groups include:

- Infants
 - Children under 5 years
 - Pregnant women
 - Travellers or migrants from regions where malaria is common
 - People who have existing medical conditions or are immunocompromised.
 - Workers who come into contact with blood or other body fluids of malaria-infected patients (for example, healthcare and laboratory workers)
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What are the signs and symptoms of malaria infection?

The symptoms of malaria can appear between 7 to 10 days after a bite from an infected mosquito, although some people feel symptoms as early as 7 days or as long as 1 year later.

Symptoms can vary but often include:

- Fever (most common)
 - Headaches
 - Chills and sweats
 - Extreme fatigue
 - Nausea and vomiting
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Depending on the type of malaria parasite, severe cases can lead to complications, including:

- Impaired consciousness,
- Severe anemia,
- Respiratory distress,
- Organ failure,
- Convulsions,
- Abnormal bleeding or
- Neurobiological abnormalities.

How do I know if I have a malaria infection?

Malaria is diagnosed through a blood test that detects the malaria parasites. Although rapid diagnostic tests (RDTs) can be used for fast results, microscopic examination of the blood is considered the most reliable method.

In addition to reviewing your medical history and recent travels, your healthcare provider will conduct a physical exam and order blood tests. These blood tests detect the presence of malarial parasites and can help your healthcare provider determine the most appropriate treatment.

How is malaria treated?

Malaria is primarily treated with antimalarial drugs. However, the type of treatment depends on different factors, including:

- Type of malaria parasite: Different types of malaria parasites can cause the disease, and the treatment can differ based on the specific parasite.
- The severity of the disease: Mild malaria cases can often be treated with oral medications, and early detection and treatment can lead to a full recovery. On the other hand, severe cases of malaria can be life-threatening, requiring hospitalization and treatment via intravenous (IV) medications.
- Individual's age and health: Treatment may vary for pregnant women, children, the elderly, and those with existing health issues requiring certain medications or dosages.

What types of occupations are associated with a higher risk of exposure to malaria?

The risk of malaria transmission depends on the geographic location and the type of occupation. Occupations that involve prolonged outdoor activities, especially in tropical areas where *Anopheles* mosquitoes are most active or in regions where malaria is prevalent, are at the highest risk.

Other occupations that may have a higher risk of exposure to malaria include:

Healthcare: Healthcare workers (e.g., nurses, physicians, clinical staff, and medical laboratorians) who are working in or travelling to regions where malaria is prevalent. The infection can spread through contact with blood, bodily fluids, respiratory secretions, or contaminated needles. The risks can vary depending on the healthcare worker's duties and geographic location.

Agriculture and Forestry: Those working outdoors in forests or rural crop fields in malaria-affected regions are at a higher risk of infection due to their proximity to stagnant water reservoirs, which can be breeding sites for mosquitoes.

Mining: Some studies have also found increased transmission of malaria in mining sites, especially in tropical forested regions where mining activities create habitats that attract *Anopheles* mosquitoes.

Military: Military service workers may also have a higher risk as they are often deployed for missions in countries or remote regions where malaria might be prevalent.

Research scientists: Scientists who conduct field research and travel to communities where malaria is prevalent may also be at risk.

How can I prevent myself from getting malaria?

Anti-Malarial Medications

When planning a trip to a malaria-prone region, it is important to consult a travel healthcare provider well in advance for guidance on medications and protective measures. The type of medication required is determined by several factors, including your travel destination, medical history, and the time left before your trip.

Consult the Government of Canada's [Travel Advice and Advisories](#) website to find out if your destination has any health risks, and visit a travel health clinic at least 6 weeks before you travel.

Protection against mosquitos

The best way to protect against malaria is by preventing mosquito bites. The CDC recommends the following protective measures:

- Mosquito bites often happen between dusk and dawn. When you are outside, use insect repellent on all exposed skin. The most effective repellants contain the ingredient DEET (N, N-diethyl-meta-toluamide). However, it is important to use the right concentration of DEET (at least 20%–30%), depending on age.
- Choose light-coloured clothing, a long-sleeved shirt, long pants, and socks.
- Treat clothing with an insect repellent

Workplace measures

In addition to the prevention measures mentioned above, workers who are at higher risk for malaria exposure can be protected through several measures:

- **Hazard identification and risk assessment:** workplaces in or near malaria-affected areas or those that admit patients with malaria should conduct a risk assessment to determine the risk of malaria exposure among workers.
- **Education and training:** workers should be educated about malaria, its risks, its transmission, symptoms, and prevention measures.
- **Safe work practices and procedures:** high-risk workplaces (e.g., healthcare settings) should implement standard infection prevention and control procedures to avoid the rare but possible transmission of malaria. For example, in healthcare settings, preventive measures may include safe work procedures for the administration of injections, handling of medical instruments and blood testing devices, and use and disposal of personal protective clothing such as gloves.
- **Health monitoring and reporting:** workplaces should have a system or process to report symptoms and unsafe work practices.

Where can I get more information about malaria?

For more information about malaria, its causes, symptoms, surveillance, and recommendations for prevention and treatment, visit the [Health Canada](#) and [Public Health Agency of Canada](#) websites.

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