

Malaria

Malaria is an infection of the red blood cells that can cause sudden fever. Untreated, infection can progress rapidly and become life threatening.

It is a parasitic disease transmitted to humans by the bites of infected *Anopheles* mosquitoes. There are five types of parasites that cause malaria:

1. *Plasmodium falciparum*
2. *P. vivax*
3. *P. malariae*
4. *P. ovale*
5. *P. knowlesi*

The first two are the most common.

Malaria can kill by destruction of red blood cells (anaemia) and by altering the function of vital organs such as the brain (cerebral malaria), lungs or kidneys.

Primarily, malaria is an infection of the red blood cells, causing recurring fever of sudden onset. Malaria caused by *P. falciparum* is life threatening and can cause multiple organ damage, coma and death.

How it is spread

Malaria is spread by female *Anopheles* mosquitoes. The parasite enters the body in mosquito saliva when a person is bitten by an infected mosquito.

The parasite first infects the liver where it begins to multiply. After some days, the resulting parasites are released into the blood stream to infect the red blood cells, where they continue to multiply, eventually bursting the red blood cells and further infecting others. If they reach high numbers they may cause severe disease or even death.

Some of the parasites in the red blood cells develop into the sexual stages (gametocytes). If an *Anopheles* mosquito bites a malaria-infected person and ingests gametocytes the parasite can infect the mosquito and multiply in its salivary glands. The developmental period of the parasite in a mosquito is generally 5 to 10 days.

Where it is found

Malaria is found throughout the tropical and subtropical regions of the world. Areas of high transmission are found predominantly in most areas of sub-Saharan Africa and rural areas in the Western Pacific (Papua New

Guinea, Solomon Islands and Vanuatu), south and south-east Asia (e.g. India, Pakistan, and Indonesia) and South America (e.g. Brazil).

The last case of locally acquired malaria in the Northern Territory was in 1962 and Australia was declared free of malaria by the World Health Organisation (WHO) in 1981. However, a number of species of *Anopheles* mosquitoes exist in the NT and the malaria parasite could be re-introduced into endemic *Anopheles* mosquitoes if infected travellers from overseas are bitten here.

The disease could become established anywhere in the Top End, down to a latitude of 19 degrees which is just north of Tennant Creek.

Symptoms

Symptoms appear about 9 to 14 days after a bite from an infected mosquito, and coincide with the rupture of the red blood cells. Symptoms are often delayed in people who have lived in malarious areas and who may have developed some immunity.

Typically malaria produces fever, rigors (shakes), sweating, headache, vomiting and other flu-like symptoms. Sometimes there is a 2 or 3 day period of reduced symptoms before a recurrence on the third or fourth day. Untreated, infection can progress rapidly and become life threatening.

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Malaria relapse

Plasmodium vivax and *P. ovale* can remain dormant in the liver for months or years before producing the disease.

With *P. falciparum*, the disease can reoccur after apparent recovery, due to either inadequate treatment or infection with a drug resistant strain. In rare instances *Plasmodium malariae* can persist at low levels in the peripheral blood of a human for decades.

Plasmodium knowlesi produces acute illness but does not cause relapse.

Diagnosis

Malaria is diagnosed by a blood test. The blood is examined under a microscope looking for malaria parasites inside the red blood cells. All travellers from malarious areas who become ill or develop a fever should be tested for malaria.

Treatment

All cases of *P. falciparum* malaria in the NT are admitted to hospital because this form of malaria can rapidly become life threatening.

Cases of malaria other than *P. falciparum* can sometimes be treated at home if the house is adequately screened and if the patient agrees to stay indoors between dusk and dawn. This is to avoid any risk of transmission of the parasite to the local *Anopheles* mosquitoes.

Treatment must be given in consultation with specialist physicians.

Before travelling overseas

Check whether the countries to which you are travelling are affected by malaria by contacting your GP, Travel Health Clinic or going to WHO International Travel and Health website or the Centers for Disease Control and Prevention website.

If you are travelling to an affected country you may need preventative medication (prophylaxis). Contact your GP or Travel Clinic to organise anti-malarial medication for your trip. Some medication must be started 1 week prior to entry to the affected area.

How to protect yourself from mosquito bites

While travelling in malarious areas there are measures which should be taken to reduce the risk of mosquito bites:

- avoid being outdoors between dusk and dawn to avoid mosquito bites, particularly in poorly lit areas, rural areas, or the outskirts of large towns
- if accommodation is not well screened, sleep inside mosquito netting. Use insecticide treated bed nets and clothing in high risk areas
- avoid scents on the body, e.g. perfume, deodorants, and sweat, since these can attract mosquitoes
- use protective clothing in outdoor situations including covering feet, legs and arms - loose, light coloured clothing is best
- use personal repellents containing DEET, picaridin or PMD (oil of lemon Eucalyptus) on areas of exposed skin in combination with protective clothing
- use electric repellent devices using insecticide treated pads in indoor or enclosed areas
- use mosquito coils, canister pulse release repellent devices or gas operated repellent devices using insecticide treated pads for patio and veranda or relatively sheltered or low wind outdoor situations.

For more information on protection measures see [Personal protection from mosquitoes](#).

If you return from a malarious area and develop symptoms

If you develop symptoms of malaria within 2 years of visiting a malarious area contact your GP or hospital emergency department immediately for an urgent medical assessment.

Remember to inform the medical officer of where you have travelled as this will help determine your risk of malaria and the type of treatment required.

If you have malaria, the people you have travelled overseas with (particularly to high risk areas such as Africa, PNG, and parts of Indonesia) should also be tested.

Contact

For more information contact your nearest [Centre for Disease Control](#).

Location	Phone
Darwin (Top End Region)	(08) 8922 8044 1800 008 002
Katherine (Big Rivers Region)	(08) 8973 9049
Tennant Creek (Central Australia Region)	(08) 8962 4259
Alice Springs (Central Australia Region)	(08) 8951 7540
Nhulunbuy (East Arnhem Region)	(08) 8987 0357

For more information on mosquitoes and malaria contact the [Medical Entomology Unit of the Centre for Disease Control](#).