

Health and Safety

Malaria Identification and Protection



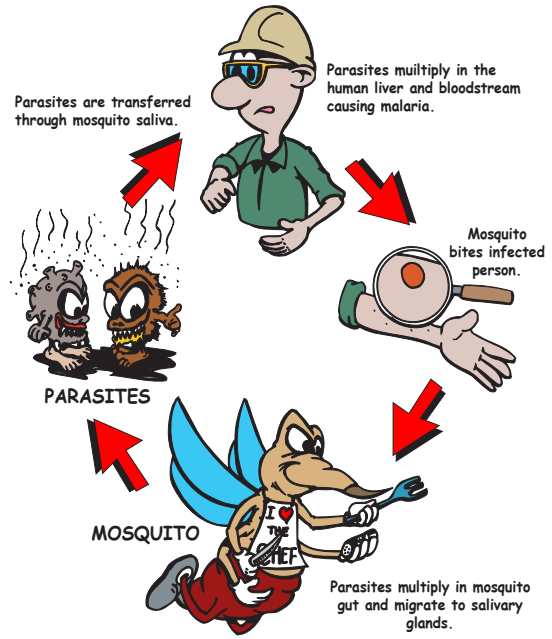
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1. Malaria Infection Process

Malaria is a disease that is caused by a parasite called *Plasmodium*. The *Plasmodium* parasites are spread from person to person through the bites of infected mosquitoes.

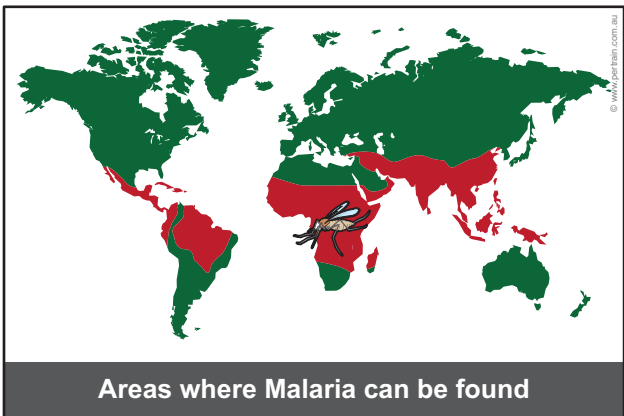
When you have been bitten by an infected mosquito, the *Plasmodium* parasites travel to your liver where they grow and multiply and then infect your red blood cells.



NOTE

There are 250 million malaria cases and nearly one million deaths per year from malaria. (World Health Organization Statistics).

Malaria is generally more common in areas with a tropical climate.



1.1. Plasmodium Parasites

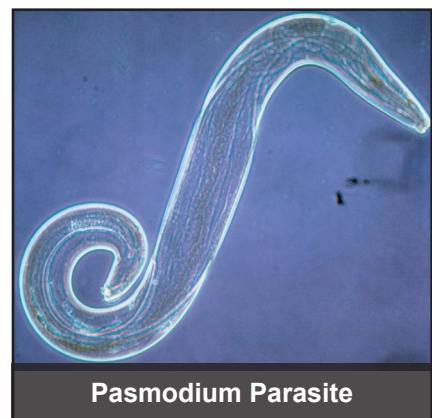
Parasites are organisms that live in or on a host and benefit by deriving nutrients at the host's expense. There are four types of *Plasmodium* parasites that cause malaria.

- *Plasmodium falciparum*: widespread and if left untreated can lead to cerebral malaria, shock, liver and kidney failure, coma and death. In cerebral malaria, the infected red cells obstruct the blood vessels in the brain.
- *Plasmodium vivax* and *Plasmodium ovale*: if left untreated, can remain in the liver without causing sickness for years, or recur at irregular times for months or years.
- *Plasmodium malariae*: if left untreated, can recur several decades after exposure.



NOTE

Vivax, *ovale* and *malariae* *Plasmodium* parasites are not usually life-threatening, but can pose a serious risk to the very young or old.



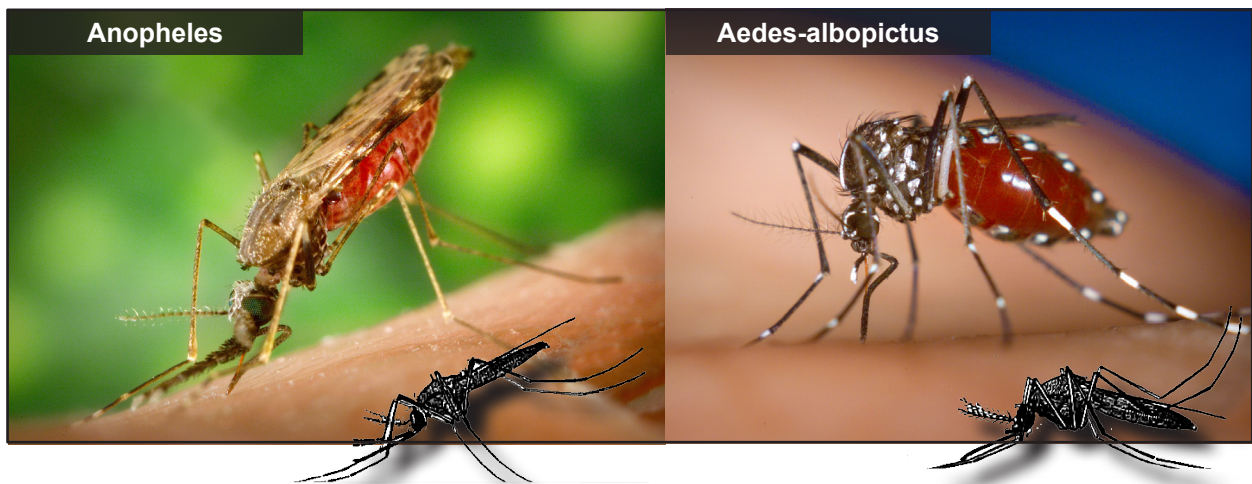
Plasmodium Parasite

1.2. Anopheles Mosquitoes

It is only the female Anopheles mosquitoes that transmit malaria. Males only live for a week and only feed on nectar and other sources of sugar. While females also feed on sugar sources for energy, they usually require a blood meal for the development of eggs.

After obtaining a blood meal, the female rests for two to three days while the blood is digested and eggs are developed. Once the eggs are developed, the female lays them and resumes host seeking. If the female feeds on a host suffering from malaria, the parasite develops within the female's gut, then travels to her salivary glands ready to be injected into the next host.

Anopheles mosquitoes can be identified by the position they adopt when biting and resting. They make very little noise compared to other mosquitoes when flying.



NOTE

Anopheles mosquitoes usually bite between dusk and dawn (around 6 pm to 6 am).

1.3. Transmission of Malaria

In endemic regions, where transmission is high, people are continuously infected so they may gradually develop immunity to the disease. Malaria cannot move from person to person, except:

- from a mother to her foetus during pregnancy
- via a blood transfusion using infected blood.

1.4. How Plasmodium Parasites Make You Sick

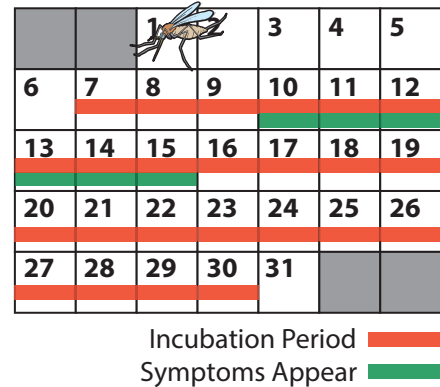
Once in the blood stream, the parasites travel from the bite site to the liver where they grow and multiply. After seven days, the parasites leave the liver and enter the red blood cells where they continue to grow and multiply. When the parasites mature, the red blood cell ruptures, freeing the parasites to attack and enter other red blood cells.



The symptoms of malaria are caused by the toxins that are released when the red blood cells burst. A toxin is a poisonous substance produced within cells.

1.5. Incubation Period

The incubation period (the time between being bitten and the start of symptoms) ranges from 7 to 30 days. Most often however symptoms appear 10 to 15 days after being bitten. Some parasites can remain dormant in the liver from several months to years after a person has been infected.

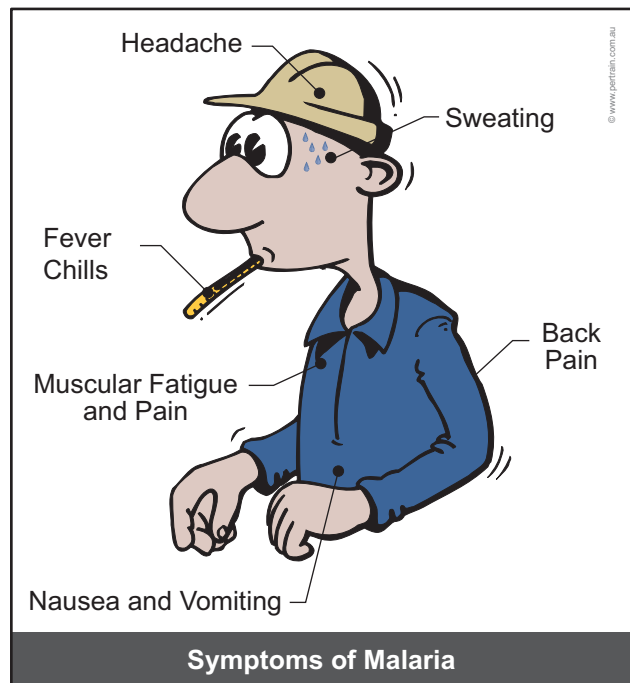


2. Symptoms and Treatment of Malaria

2.1. Clinical Symptoms

Malaria can cause a wide variety of symptoms that range from very mild to severe.

- fever and flu like illness that may come and go
- headache
- backache
- joint aches and pain
- muscle aches
- tiredness
- nausea and vomiting
- diarrhoea.



NOTE

Not all of the above symptoms need to be present. Malaria should be suspected if you have any of the symptoms, even if they are mild, seek medical help immediately.

Because of the loss of red blood cells, anemia and jaundice (yellow colouring of skin and eyes) can occur.

Classical malaria attacks sometimes occur, though they are not present in every patient. Attacks last about 6 to 10 hours and repeat every two to three days. They start with feeling cold and shivering. A high fever, headache, and sometimes vomiting follow. The attack ends with sweating and a return to normal body temperature. The patient is left fatigued.



2.2. Diagnosing Malaria

Malaria is diagnosed by the clinical symptoms and microscopic examination of the blood.

A Rapid Diagnostic Testing (RDT) kit is used to examine a pin prick of blood to detect parasite-specific antigens (proteins).

The test does not require a laboratory and takes about 1 – 15 minutes to perform.



2.3. Treating Malaria

Malaria is treated with antimalarial medications, such as chloroquine, mefloquine, atovaquone-proguanil, primaquine and artemisinin derivatives. Treatment should start as soon as possible. Severe or potentially severe cases require hospitalization. Mild cases can be treated as outpatients.



NOTE

Some types of malaria can recur if treatment has not been fully successful in eradicating the parasite. To ensure all parasites are killed, follow ALL advice given by your doctor and the instructions prescribed on medication labels.



3. Preventing Malaria




3.1. Personal Protection

You cannot be vaccinated against malaria, but you can protect yourself by adopting the points in the following tables.

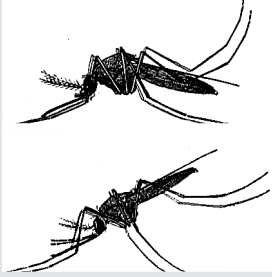


Clothing

- Cover as much of your skin as possible by wearing long pants, a long sleeve shirt, shoes and socks.
- Wear light coloured clothes.
- Wear insecticide-treated clothing if working on night shift.
- Insecticides are available as soaks and sprays and usually last through several washings.



<p>Insect Repellent</p> <ul style="list-style-type: none"> • Apply insect repellent that contains at least 20% DEET to exposed skin. • The higher the concentration of active ingredient in an insect repellent, the longer it lasts on your skin. • Reapply after swimming or excessive sweating. • Read directions provided on labels. • Be aware that allergic reaction can occur in some people. 	
<p>Medication</p> <ul style="list-style-type: none"> • Consult with a travel doctor well in advance of travelling to an area where malaria is prevalent as anti-malarial medication must be started before entering the area. • Take anti-malaria tablets as directed by the doctor and/or as prescribed on the label. • Medication can cause side-effects so trial the drug well before your trip to check that you have no adverse reactions. • Medication must be continued on your return (7 to 28 days depending on the type of medication) to ensure the treatment of parasites still emerging from the liver. • The type of malaria medication prescribed will depend on how soon you will be travelling, the duration of your travel, the destination, your physical condition and personal preferences. 	
<p>Sleeping Quarters</p> <ul style="list-style-type: none"> • Ensure window and door screens are undamaged and fit snugly to frame. • Sleep under insecticide-treated mosquito nets. • If sleeping outdoors, treat bedding and clothing with insecticide. • Use 'knock down' aerosol sprays to kill mosquitoes inside buildings. • Air conditioning also helps to keep mosquitoes away. 	

3.2. General Protection Methods

<p>Mosquito identification program</p> <ul style="list-style-type: none">• provides detailed information about the number and types of mosquito in the area.	
<p>Breeding site monitoring program</p> <ul style="list-style-type: none">• regular monitoring provides information for preparing control and eradication treatments.	
<p>Drainage program</p> <ul style="list-style-type: none">• prevents stagnant water build up.	

3.3. Removing Mosquito Breeding Habitat

Anopheles mosquitoes like to breed in:

- salty, brackish and stagnant water
- blocked drains
- puddles and wheel ruts
- empty containers.
- pig wallows
- swamps
- canoes



NOTE

Take every opportunity to minimise the possibility for mosquitoes to breed. Empty water capture areas and vessels that provide the mosquito with a place to breed.



3.4. Chemical Treatments

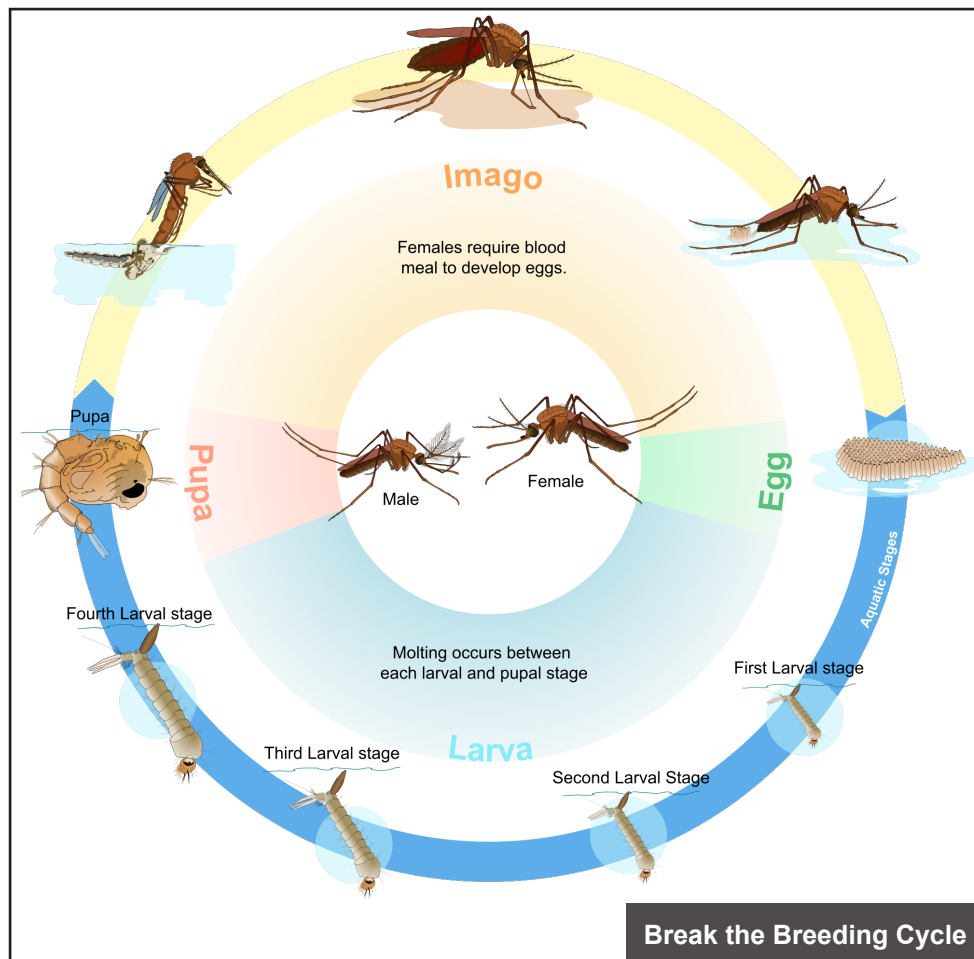
Larvicide chemicals: chemicals applied directly to stagnant water to control mosquito larvae.

Adulticide chemicals: chemicals used in fogging and spraying to control adult mosquitoes. Fogging is used during high risk times to reduce the number of mosquitoes around the site.

Indoor Residual Spraying: process of spraying the inside of dwellings with an insecticide to kill and deter mosquitoes. Bed nets are also sprayed with insecticide.



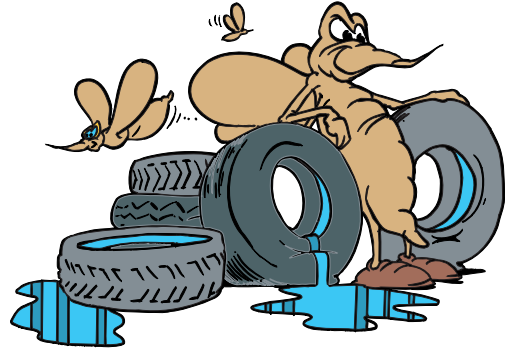
Larvicide Spraying



4. Summary

Malaria is preventable disease, however world-wide over two million people die from malaria each year. Take personal responsibility to protect yourself and others from this disease.

- ✓ Wear protective clothing and insecticides.
- ✓ Don't let water stagnate in containers such as empty bottles, cans, old tyres.
- ✓ Take anti-malarial tablets.
- ✓ If you have cold or flu symptoms, seek site medical treatment quickly.
- ✓ Follow site guidelines for the prevention of malaria.



5. Quiz

Complete the following quiz by circling the correct answer. Discuss the answers with your supervisor or trainer.

Quiz Questions - Malaria	
Question 1.	<p>Malaria is caused by a:</p> <ul style="list-style-type: none"> a) Virus b) Parasite c) Fungus d) Germ
Question 2.	<p>Can malaria kill you?</p> <p>Yes / No</p>
Question 3.	<p>All types of mosquito can spread malaria?</p> <p>True / False</p>
Question 4.	<p>What times pose the highest risk of being bitten by Anopheles mosquitoes?</p> <ul style="list-style-type: none"> a) When working outside in the sun b) During winter c) Between dusk and dawn d) July to December
Question 5.	<p>Can you get malaria if you have a blood transfusion using infected blood?</p> <p>Yes / No</p>
Question 6.	<p>What organ in the human body does the parasite infect first?</p> <ul style="list-style-type: none"> a) Brain b) Liver c) Heart d) Lungs
Question 7.	<p>Which of the following are symptoms of malaria? (Circle ALL that apply)</p> <ul style="list-style-type: none"> a) Fever and flu like illness that may come and go b) Headache and/or muscle aches c) Yellow colouring of skin and eyes e) Nausea and vomiting e) Diarrhoea f) None of the above

Quiz Questions - Malaria	
Question 8.	<p>How can a case of suspected malaria be confirmed?</p> <p>a) If others in the area have malaria then you will also have it b) Symptoms only c) Symptoms and a blood test</p>
Question 9.	<p>If you have malaria, and do not follow ALL instructions given by your doctor, all parasites may not be killed and you may get sick again?</p> <p>True / False</p>
Question 10.	<p>Malaria is treated with medications such as chloroquine and mefloquine.</p> <p>True / False</p>
Question 11.	<p>The best way for you to protect yourself against malaria is to not get bitten by mosquitoes and to take anti-malaria tablets?</p> <p>True / False</p>
Question 12.	<p>Anopheles mosquitoes like to breed in:</p> <p>a) Fresh running water b) Damp soil c) Humid conditions d) Stagnant water</p>
Question 13.	<p>How can YOU interrupt the mosquito breeding cycle?</p> <p>a) Do not get bitten by mosquitoes b) Use knock-down insect sprays c) Remove breeding habitats d) All of the above</p>
Question 14.	<p>How can organisations interrupt the mosquito breeding cycle?</p> <p>a) Spray larvicide chemicals onto stagnant water to kill mosquito larvae b) Use fogging and spraying to control adult mosquitoes c) Spray inside dwellings to kill and deter mosquitoes d) Put insect screens on windows and doors e) Supply treated bed nets f) All of the above</p>
Question 15.	<p>When working outdoors during a night shift, what precautions can you take to minimise the risk of getting malaria.</p> <p>a) Wear long pants, long sleeves, shoes and socks b) Use insect repellent c) Take anti-malarial medication d) All of the above</p>

