



# Mosquito Bites

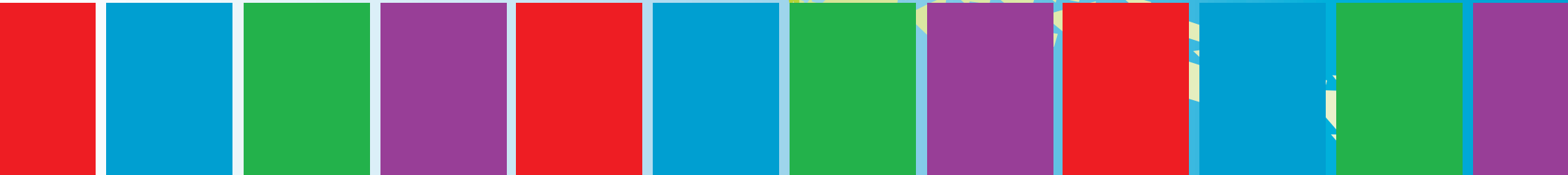
## Small bites, big threat



Resource for Primary School Teachers

WORLD HEALTH DAY

WORLD MALARIA DAY



# Introduction for teachers

Malaria is a public health problem in over 100 countries worldwide affecting about 40% of the world's population. The potentially life-threatening disease is caused by parasites that are transmitted to people through the bites of infected mosquitoes. According to the World Health Organization (WHO), malaria caused an estimated 627,000 deaths in 2012. Over 90% of deaths from malaria occur among children living in Sub-Saharan Africa where it is estimated that a child dies every minute from this disease.

Apart from causing a deplorable number of deaths annually, malaria has further-reaching consequences. For those who don't die from the disease, its protracted and debilitating effects render them unable to work, function or care for their families often for weeks at a time. In financial terms, the economic burden of malaria in Africa alone is an estimated US\$12 billion (€8.7 billion) annually, a huge amount for a preventable and curable disease, in a continent already struggling with so many other challenges. Malaria and poverty are intimately connected with the high burden of malaria being a major contributing factor in keeping poorer countries poor.

To mark *World Health Day* (7th April) and *World Malaria Day* (25th April), GOAL has developed *Mosquito Bites*, a resource for use in primary schools. *Mosquito Bites* is primarily targeted at pupils in middle and senior primary school classes. It includes pages for pupil use, as well as numerous lesson suggestions and links to other resources that are freely available online.

We hope that you will use this resource with your class and help to make a difference by getting involved. By raising awareness or fundraising, your school can play a part in combatting malaria.

## NOTE ON USING THIS RESOURCE

Pages designed for pupil use are indicated by the mosquito symbol. These can be either photocopied and distributed or displayed on an interactive whiteboard/projector screen.



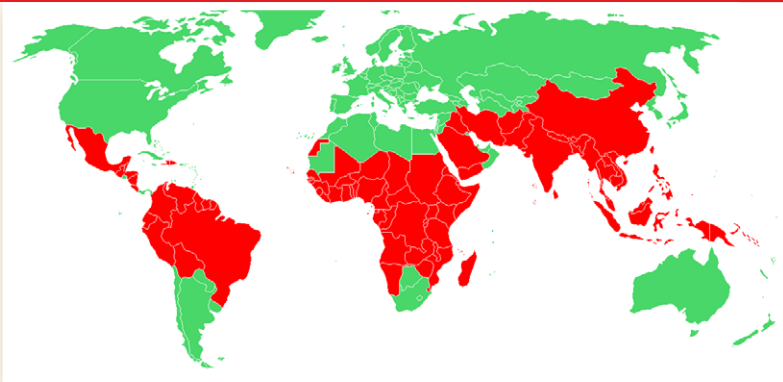
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# Malaria



World map showing countries with a malaria risk

- Malaria risk
- No malaria



Children who have been displaced by fighting, like these children in South Sudan, have an increased risk of getting malaria

## What is malaria?

Malaria is a serious, potentially deadly, disease. It is spread by mosquitoes who have been infected by a parasite. When one of those mosquitoes bites a person, the parasite gets into the person's blood and makes them very sick.

### DID YOU KNOW?

The word 'malaria' comes from the Italian words 'malus aria', meaning bad or evil air. Before it was discovered that mosquitoes spread malaria, people believed that the disease was caused by foul air in marshy areas. While this was not correct, marshy areas and stagnant water are breeding grounds for malaria so the people were not so wrong after all!

In many parts of the world, for example in Europe and North America, malaria is under control or eradicated. However, malaria is still a real problem, particularly in many countries in Sub-Saharan Africa. The World Health Organization (WHO) estimates that there were 207 million cases of malaria in 2012 and an estimated 627,000 deaths. 90% of all malaria deaths occur in Sub-Saharan Africa.

Children are particularly at risk. In Sub-Saharan Africa, it is estimated that one child dies every minute from malaria. Adults who have grown up in areas where malaria is a problem may have developed some resistance to malaria. This is because they have been exposed to it and survived many infections in childhood. While they can still get malaria they are less at risk of dying from the infection compared to children. Unfortunately, children haven't yet built up some resistance to malaria infection and not all children who get the disease survive it. Other high risk groups include pregnant women and their unborn children, refugees and travellers.





## How does malaria affect people?

### How does a human become infected with malaria?

There are many different types of mosquitoes but only the female *Anopheles* mosquito can spread the malaria parasite called *Plasmodium*. A mosquito first becomes infected with malaria from biting an infected human. When that mosquito bites a human, it passes on the parasite. Female mosquitoes don't bite humans because they are greedy. It is a matter of survival; they need the blood to help them grow

### DID YOU KNOW?

While there are mosquitoes in Ireland, they don't carry malaria as it is too cold here. Even in countries that are warm enough, such as Mediterranean countries, malaria has been eradicated. The governments of these countries set up mosquito eradication programmes to break the cycle of transmission. Italy and Greece are two examples of countries where malaria was eradicated.



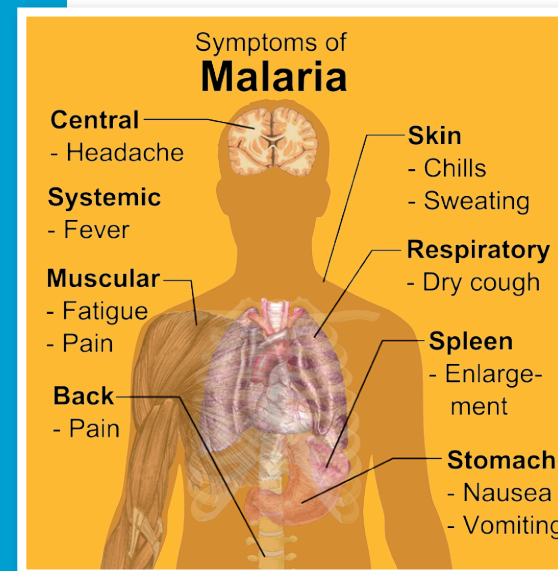
Mosquito biting a human



## Symptoms

Although tiny in size, mosquitoes can pack a punch. Symptoms of malaria usually appear seven to 18 days following a bite from an infected mosquito. The first symptoms are usually flu-like and include fevers, headaches, sweats, chills and vomiting. Other symptoms of malaria can include muscle pains, diarrhoea and a general feeling of being unwell.

If not treated, malaria can quickly become life-threatening. Infection with one type of malaria, can be very serious if not treated quickly. This type of malaria is called *Cerebral malaria* and affects the brain. Young children and travellers who have had no previous exposure to malaria are particularly at risk from this. This is the type of malaria that can even kill.



Symptoms of malaria



Children are particularly at risk of getting malaria



## Why is malaria so serious?

Malaria is a significant health and development issue facing millions of people.

- Malaria is both a cause and consequence of poverty. Poor people are most affected by malaria as they tend to live in rural, malaria-prone areas in homes that offer little protection from mosquitoes. Poor people are also less likely to have the resources to reduce the risks of malaria (such as mosquito nets) and the access to health services to get prompt treatment.
- Being infected with malaria during pregnancy often causes babies to be born with a low birth weight. This can cause problems for growth and development and can lead to child deaths. Being infected with malaria can also cause serious risks to the pregnant mother and her baby.
- Malaria is one of the biggest causes of child deaths in Africa with one child dying every minute from the disease. It is especially serious in remote rural areas where people have little access to health care services.
- Malaria causes an increase in spending for households. Costs include transport to the medical centre, buying medical supplies, taking time off work (loss of income) and absence from school. Often families simply cannot afford these expenses.
- People who survive malaria are often left unable to work, function or care for their families for several weeks.
- Malaria is also expensive for governments. Costs include providing health care services and lost income through people being out of work.



A woman at a GOAL health centre in South Sudan



# What can be done about malaria?



## Prevention

As the old saying goes, “prevention is better than cure”. Despite being a major killer, particularly in Africa, malaria is a preventable and treatable disease. Malaria can be prevented in many different ways, including by:

- Using repellent sprays to get rid of mosquito breeding sites in homes
- Using bed nets treated with insecticide or, if not available, nets with a small enough mesh to stop mosquitoes getting through
- Putting screens in windows and doors to stop mosquitoes entering
- Informing people about malaria danger signs and malaria prevention and advising them to access treatment early if they suspect malaria
- Reducing the breeding grounds for mosquitoes, e.g. clearing swamps, keeping water containers covered
- In places where malaria is a threat year round, pregnant women and even children can be given tablets to treat malaria. This is done to eradicate any early infection in particularly vulnerable groups

## DID YOU KNOW?

Mosquitoes breed in water. Different species, including those that spread malaria, have different choices of breeding site. For example some mosquitoes prefer small puddles while others prefer flowing streams. By monitoring and controlling mosquito breeding sites it is possible to reduce the risk of malaria in an area.



## Treatment

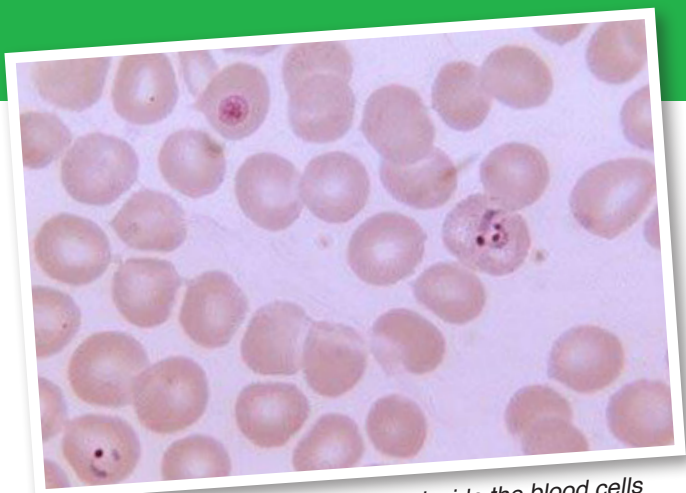
When treating malaria, the main aim is to eradicate the parasite from the patient's blood. This will help to stop the malaria from becoming more serious and life-threatening. In order to be treated, first patients need to be



Mosquito nets  
Source: WHO



House with covered windows



Blood sample with malaria parasite inside the blood cells  
Source: CDC



The artemisia annua tree is used to make Artesunate-based treatments for malaria



Women and children waiting at a health centre in South Sudan

diagnosed. The diagnosis is made by doing a blood test. Once diagnosed with malaria, patients can be given anti-malarial medication.

The WHO now recommend Artesunate-based treatments for malaria treatment in most countries. This drug, which originally came from a tree, is effective. However, some resistance to this medication is slowly emerging as a problem. This is a huge concern as once people become resistant to this drug there is no new drug available to treat malaria. Scientists are working to try to find a vaccine for malaria that can be used safely in Sub-Saharan Africa. If they succeed in developing a safe and effective vaccine, malaria might well become a disease of the past.

### DID YOU KNOW?

For centuries the only widely known cure for malaria was quinine, which comes from the bark of the cinchona tree of Peru and Ecuador. Nowadays there are other types of anti-malarial medication however there is a huge problem with resistance to these drugs. The *Plasmodium* parasite is very clever and changes its cell structure so that over time it becomes immune to the drug that is trying to kill it!

### Questions

1. How do people get malaria?
2. How does malaria affect people's health?
3. In what ways are poor people in the world more at risk of getting malaria?
4. Explain three ways that malaria can be prevented.





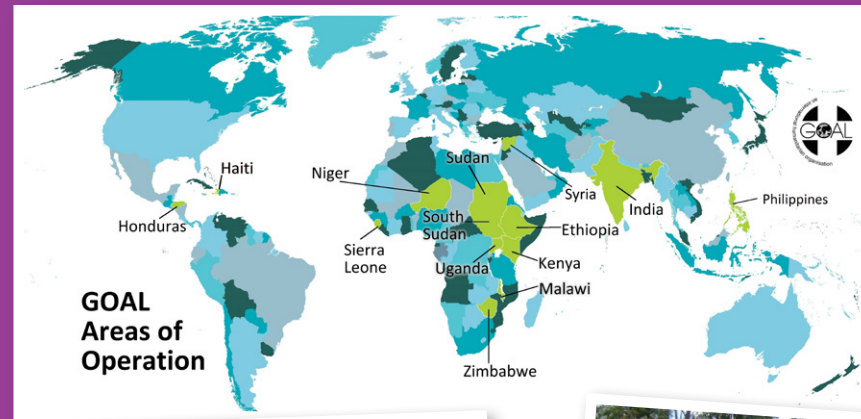
# GOAL's work with malaria



GOAL is an international humanitarian organisation working in 14\* countries around the world. GOAL works with the poorest of the poor and helps people to access the basic needs and rights of life including food, water, shelter, healthcare and education.

The risk of malaria varies from country to country. In South Sudan, malaria is a risk year round. Such countries are considered *malaria endemic*. In these places, the temperature always remains high and the malaria breeding cycle is not interrupted. This results in a very high rate of malaria. In other places where GOAL works, such as the highlands of Ethiopia, it can get cold. This means that the malaria breeding cycle is interrupted at certain times of the year. While malaria is still a risk in these areas it is not a risk the whole year round so rates of infection are lower overall and will change with the season.

\*Correct at time of publication (March 2014)



Traditional birth attendants working to protect pregnant women from malaria in Sudan



GOAL malaria educators at work in Ethiopia



Children in Sudan learn about malaria at a World Malaria Day event run by GOAL



Women and children with a health worker at a GOAL health centre in Sudan



GOAL worker taking a blood sample to test for malaria



# Case study: Nawal and Samir's story of malaria



Nawal Abdulla Elnour lives in a village outside Kutum town in North Darfur, Sudan. Nawal and her husband have eight children. Nawal looks after the children, cooks the food, cares for their chickens and fetches water from the water pump that is half an hour away from their home. Nawal's husband works out in the fields to earn money for his family.

One day, their young son Samir became sick. He had a high fever, had stopped eating and was crying constantly. Nawal was worried about Samir and wanted to bring him to the clinic. Her husband suggested giving Samir "Ardeab", a local treatment, instead. Nawal had heard that Ardeab wasn't safe and felt that her son needed to see the health worker.

There was a local clinic nearby. Nawal had gone to the clinic before for minor ailments and injuries. However, Nawal knew that the health worker at the local clinic wasn't qualified. It was a two hour journey to the GOAL-run clinic in Kutum town with no public transport. Nawal still needed to cook the family meal, collect water (collecting water alone would take two hours) and look after her other children so she decided to make the shorter journey to the local clinic. There the health worker didn't examine Samir; he just gave Nawal some tablets and told her to give them to her son.

Samir's fever continued to worsen. His breathing had become very fast and he was drowsy. Nawal became very concerned. She spoke to her husband who allowed her to go to the clinic in the town with their son the next morning. He gave her some money from their savings, so she could pay for a lift. He was worried about his son and felt guilty that he didn't act sooner.

Early the next day Nawal took Samir to the GOAL-run clinic in Kutum town. On arrival, the qualified health worker immediately checked Samir's temperature and breathing rate. Both were very high. He straightaway gave Samir medicine to help bring down the temperature. He tested for malaria by pricking Samir's finger and taking a tiny amount of blood. The result showed that Samir was infected with malaria.

The health worker gave Nawal proper treatment tablets which are the approved medicines for malaria. The health worker then advised Nawal on how to give the tablets and check Samir. He also gave her some medicine for fever to take home and advised her to give Samir plenty to drink and eat. This is very important when you are sick.

Nawal was very concerned that her baby might die. The health worker reassured her that the medication would make her baby get better. He gently reminded Nawal that if her child got a fever again she should not wait but should bring the child immediately to the GOAL clinic.



*Nawal's baby having a malaria test done by a GOAL health worker*





GOAL-run clinic in Kutum town

Finally the health worker explained to Nawal how she can prevent her children from getting malaria. They should sleep under a mosquito net and try to avoid being bitten by mosquitoes. Nawal returned home and explained to her husband what the health worker had said. He was also relieved that his son had been treated and he told Nawal the next time the baby was sick they would not delay going to the proper clinic.

Nawal gave her baby some milk and then started to give him the medication. Over the next few days Samir's condition got better and soon he was back to normal. Nawal and her husband both realised that they had been very lucky.

Nawal remembered the simple but very important information the health worker gave her at the GOAL-run clinic. Now she advises other mothers on what to do if their child gets sick or has a fever. This is a positive outcome for Nawal, her family and her community but not all children in Sudan are so lucky.

## Questions

1. What were Samir's symptoms?
2. What problems did Nawal face in getting health care for her child?
3. How did the health worker in the GOAL-run clinic treat Samir?
4. How did Nawal use her experience with her son to support other mothers in her community?
5. Is there anything the health workers in the GOAL-run clinic could do to help parents in Nawal's village be better able to prevent, recognise and tackle malaria?





# Lesson suggestions and activities



## NOTE

These lesson suggestions and activities are aimed at a middle or senior primary school class and are suggestions only.

## Lesson plan

**Subject:** Geography

**Strand:** Human environments

**Strand Unit:** Trade and development issues

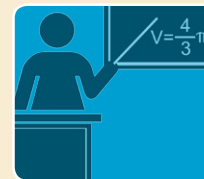
### Learning objectives:

The child should be enabled to:

- Define the following terms: malaria, mosquito, parasite, transmission, eradicate, insecticide, diagnosis, resistance
- Explain how malaria is transmitted and how it affects people
- Illustrate how malaria is a development issue linked to poverty
- Describe the work GOAL does involving malaria in Sub-Saharan Africa
- Develop a plan of action for helping to combat malaria, either through raising awareness of malaria or fundraising and donating money

### Introduction ideas:

- **KWL chart:** use a KWL chart to brainstorm and identify what the children already know about malaria and the work of GOAL. Then identify and fill in what they want to know. Can the children relate to malaria? Have they, or someone known to them, had malaria or been to a country where malaria is a threat? Have they heard anyone speak about malaria, e.g. an aid worker?
- **Introductory video:** to introduce the topic of malaria, show the children a video clip - <http://malaria.novartis.com/newsroom/childrens-corner/index.shtml> is an animated video aimed at 5 – 12 year olds. It explains how people in Africa can be infected by malaria and the effect this has on their lives.
- **Pre-teach vocabulary:** the children will encounter several words that may be new to them such as malaria, mosquito, parasite, transmission, eradicate, insecticide, diagnosis, resistance. To ensure that the children are familiar with these and can explain what they mean, get them to look the words up in their dictionaries and write down their meanings. Check that children can define the terms in their own words.



FOR TEACHERS

### Development ideas:

- **Glitter game:** get the children thinking about how malaria is transmitted by playing a game with glitter. Before you begin, secretly select one child and sprinkle their hands with glitter. Then divide the class into two groups. Instruct one group to remove their shoes, they are the mosquitoes. The group with shoes are humans. Give the class one minute to shake hands with each other. After that minute, ask them to look at their hands. Who has glitter? Use this game to explain how malaria is transmitted by getting them to imagine that the glitter is the parasite. Emphasise that only one mosquito had the glitter/parasite at the start of the game.
- **Read the resource:** read and discuss the pupil pages of this resource. Ensure children understand what malaria is and can explain how it is transmitted and how it affects people.
- **Mapping the problem:** distribute blank world maps to the children. Ask them to colour in the parts of the world where malaria is a problem. In a different colour, get the children to identify the countries where GOAL works. What do they notice? How might this impact the work of GOAL?
- **Write:** get the children to write an informational text (e.g. a report, a fact file, a newspaper article) about malaria or an aspect of malaria, e.g. how it affects children, how it is a development issue, etc. They may need to carry out some additional research in order to complete this.

### Conclusion ideas:

- **KWL chart:** return to the KWL chart from the beginning of the lesson. What have the children learned about malaria and the work of GOAL?
- **Action plan:** as a class, discuss how you can make a difference and help to combat malaria. How can you create awareness and/or raise funds? Here are some suggestions:
  - \* Design and create a display about malaria for your school or local area
  - \* Create an art installation or display that relates to the theme of malaria. For example, pipe cleaners could be used to make mosquitoes <http://inm.larryhollon.com/wp-content/uploads/2011/02/PipeCleaner-Mosquito-Instructions.pdf>
  - \* Develop brochures or mini-booklets on malaria for display in the school library
  - \* Prepare a presentation for the younger classes that teaches them about malaria and the work that GOAL does
  - \* Create bookmarks to raise awareness of malaria and sell these to raise funds for mosquito nets
  - \* Hold a spelling bee competition to raise funds for mosquito nets – include the new words from this lesson!
  - \* Hold a GOAL Sports Challenge in your school – kick balls into the back of the net to raise money for mosquito nets!

**The opportunities are endless!**



# Get involved!

We need your help to combat malaria!

You can help to make a difference by:

## 1. Raising awareness

With your class, decide on an appropriate activity that you can do to raise awareness of malaria. Then, take a picture of that activity and send it into [schools@goal.ie](mailto:schools@goal.ie). We will upload the pictures received from schools onto our website to help create even greater awareness of malaria.

N.B: Please ensure appropriate permissions have been sought from participants prior to sending pictures to GOAL.

## 2. Raising funds

Just €10 can help GOAL provide a family with mosquito nets. Can your class help to raise funds?

For an A- Z of creative fundraising suggestions visit [http://www.goal.ie/Organise\\_your\\_event\\_for\\_GOAL/465](http://www.goal.ie/Organise_your_event_for_GOAL/465) Donate the proceeds to GOAL, or visit the GOAL shop online at <http://gifts.goal.ie/> to buy mosquito nets for just €10. Be sure to send an email to [schools@goal.ie](mailto:schools@goal.ie) to let us know about your fundraiser.

### For more information on malaria visit:

#### WHO:

<http://www.who.int/topics/malaria/en/>

[http://www.who.int/features/factfiles/malaria/malaria\\_facts/en/index4.html](http://www.who.int/features/factfiles/malaria/malaria_facts/en/index4.html)

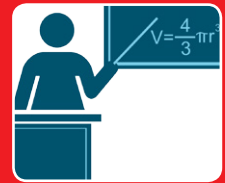
#### CDC:

<http://www.cdc.gov/Malaria/>

#### Roll Back Malaria:

<http://www.rollbackmalaria.org/endemiccountries.html>

Sources: WHO World Malaria Report, WHO Factsheet on Malaria, Centre for Disease Control and Prevention (CDC)



FOR TEACHERS



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