

Patient information from the BMJ Group

Malaria prevention

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Malaria prevention

Malaria is a dangerous disease that is common in many parts of the world. If you are in one of those areas, you can get malaria from just one mosquito bite. It can make you very ill, or even kill you. But there are things you can do to avoid mosquito bites, and good treatments are available to protect against the disease.

We've brought together the best research about malaria and weighed up the evidence about how to prevent it. You can use our information to talk to your doctor and decide which treatments are best for you.

What is malaria?

Malaria is a dangerous disease caused by a parasite (an organism that lives on another creature). This parasite lives in mosquitoes in parts of Asia, Africa, and South America. You can catch it if you are bitten by an infected mosquito. The parasite can then invade and destroy the red cells in your blood.

The malaria parasite is small and is only one cell. It's called plasmodium. There are four different kinds of plasmodium that cause malaria. They are called: ^[1]

- *Plasmodium falciparum*
- *Plasmodium vivax*
- *Plasmodium ovale*
- *Plasmodium malariae*.

Plasmodium falciparum causes the most severe sort of malaria.

Malaria prevention



You can get malaria if you are bitten by a mosquito carrying the infection.

You can get malaria if you are bitten by a mosquito that is infected with any of the plasmodium parasites.^[2] Some people are more likely than others to be bitten:^[3] ^[4]

- Large people are bitten more often than small people
- Adults are bitten more often than children
- Women get more mosquito bites than men.

Some mosquitoes, especially in Africa, like to bite around your ankles. Most bite in the evening and at night.^[5] But some will bite during the day if they are very hungry.^[6]

Malaria can give you symptoms similar to the flu (influenza). The most common symptom is a fever.^[7] ^[8] The most severe sort of malaria can cause your organs to stop working and your blood to stop circulating properly. This could kill you. But good treatments are available. People rarely die from malaria in countries like the UK, where good medical treatment is available.^[9]

Malaria is common in parts of Asia, Africa, and South America where the temperature is between 25°C (77°F) and 30°C (86°F) and the weather is humid.^[10] You don't usually find malaria where the temperature is below 16°C (61°F) or above 36°C (97°F), or at altitudes higher than 3,000 metres (10,000 feet).^[11] Mosquitoes mostly breed in small pools of fresh water exposed to sunlight.^[12]

Your chances of getting malaria depend on where you go, how long you stay there, and what you do.

- If you spend more than three weeks in an area where malaria is common, you have twice the chance of getting malaria than if you stayed for a shorter time.^[13]

Malaria prevention

- If you go as an independent traveller, you are nine times more likely to get malaria than if you go on a package tour. ^[14]
- You are much more likely to get malaria in Africa than in Asia or South America. ^[15]
^[16]

What are the symptoms of malaria?

If you get malaria, you may feel as though you've got flu. The most common symptom is fever (a high temperature). If you don't get treated quickly, you may get delirious and have fits. You may first get symptoms months after you were infected.

The time between getting infected with the parasite and the first symptoms varies a lot. It might take only a week, or it might take as long as 18 months. But you will probably get symptoms within three months.

You should see a doctor if you get a feverish illness after travelling to a malaria area, especially if you were there less than three months ago.

The symptoms of malaria vary. They depend on what sort of malaria parasite is infecting you. ^[17] But you will probably get a spiking fever. This means your temperature suddenly goes up for a few hours. Then it falls again for several hours. This may happen every few hours.

You may also have one or more of these symptoms: ^[18] ^[19]

- Chills, when you suddenly feel cold and shivery
- Headache
- Muscles aching and feeling weak
- Vomiting
- Diarrhoea
- Cough
- Pain in your abdomen.

If you don't get treatment, malaria can make you delirious. This means you get confused and over-excited. If you have the more severe types of malaria you might have fits or fall into a coma.

Malaria prevention

You are more likely to get malaria and have more serious symptoms if you are pregnant. You may have a **miscarriage**.^[20] Doctors advise women who are pregnant not to travel to places where there is malaria.

Your doctor can diagnose malaria by putting a small drop of your blood onto a strip of test paper. The doctor will also send a sample of your blood to a laboratory to be examined under a microscope. This will show whether you have malaria and, if you do, what type you have.

How common is malaria?

Malaria is common in many parts of the world.

About 1 in 20 people in the world get malaria. It causes about 1 million deaths each year.^[21]

Nearly all of the people who die from malaria live in areas where malaria is common.^[21]

About 25,000 travellers get malaria each year.^[22] At least 150 of them die from the disease. Malaria is becoming more widespread. More than 100 countries now have malaria.^[23]

You are more likely to get malaria if you are pregnant. If you do, you are more likely to be seriously ill and you could have a **miscarriage**.^[24]

What treatments work for preventing malaria?

The best way to prevent malaria is to avoid being bitten by mosquitoes.

There are lots of things you can do to reduce your risk of getting bitten. You should also take drugs to protect you from malaria. But no treatment can protect you completely.

If you get a **fever** and symptoms similar to the flu after visiting Asia, Africa, or South America, then you should see a doctor at once.

Key messages about preventing malaria

- You can avoid mosquito bites by sleeping inside a mosquito net at night, wearing clothes that protect you from bites, and putting insect repellent on your skin.
- Anti-malaria drugs can also help to protect you. You will need to start taking anti-malaria drugs before you travel.
- You should see a doctor or nurse before travelling to a country where malaria is common. The type of drug you need depends on where you are going.
- It is important to keep taking the anti-malaria drugs after you return from your trip, because a malaria parasite in your blood could still be growing.

Malaria prevention

- Herbal remedies or homeopathic remedies are not recommended for preventing malaria. There's no reason why they should work, and there's no research showing they help people avoid the disease. ^[30]
- If you're pregnant you should avoid travelling to places where there is malaria. You are more at risk of severe malaria and could have a miscarriage.

Which treatments work best?

We've looked at the best research and given a rating for each treatment according to how well it works. We've ranked treatments for adults, pregnant women, and children separately because the risks of each treatment are different depending how old you are and if you are pregnant.

- [Treatments to prevent malaria in adults \(except for women who are pregnant\)](#)
- [Treatments to prevent malaria in children](#)
- [Treatments to prevent malaria in pregnant women](#)

The drugs you need when travelling to a country where malaria is common may change over time. This is because some types of malaria become resistant to some drugs. This means the drug no longer protects you against the disease. Even if you have been to a country before, you need to check which drug to take next time you go.

Treatment Group 1

Treatments to prevent malaria in adults (except for women who are pregnant)

Treatments that are likely to work

- [Nets treated with insecticide](#)
- [Clothes treated with insecticide](#)
- [Insect repellents for your skin](#)
- [Atovaquone plus proguanil](#)
- [Chloroquine](#)
- [Doxycycline](#)

Malaria prevention

Treatments that work, but whose harms may outweigh benefits

- [Chloroquine plus proguanil](#)
- [Mefloquine](#)

Treatments that need further study

- [Insecticide sprays](#)
- [Air conditioning and electric fans](#)
- [Full-length clothing](#)
- [Mosquito coils and vaporising mats](#)
- [Smoke](#)

Treatments that are unlikely to work

- [Buzzer devices](#)
- [Vitamin supplements](#)
- [Body oils](#)

Treatment Group 2

Treatments to prevent malaria in children

Treatments that are likely to work

- [Nets treated with insecticide to prevent malaria in children](#)
- [Anti-malaria drugs for children](#)

Treatments that work, but whose harms may outweigh benefits

- [Insect repellents containing DEET \(diethyltoluamide\) to prevent malaria in children](#)

Treatment Group 3

Treatments to prevent malaria in pregnant women

Pregnant women are advised not to travel to places where there is malaria. You're more likely to get malaria if you are pregnant, and you're likely to have more serious problems (complications) if you do get malaria.

But if it's essential for you to travel to an area where malaria is a risk, anti-malaria drugs can help you avoid the disease.

Treatments that are likely to work

- [Anti-malaria drugs for pregnant women](#)
- [Clothes treated with insecticide to prevent malaria in pregnant women](#)
- [Nets treated with insecticide to prevent malaria in pregnant women](#)

Treatments that work, but whose harms may outweigh benefits

- [Insect repellents to prevent malaria in pregnant women](#)

What will happen to me?

Most travellers get ill from malaria only after they get back home. You should recover completely if you are treated without delay. But there is a risk of dying from malaria if you don't get the right treatment.

It usually takes 10 to 14 days for malaria to develop once a mosquito bite has passed the parasite onto you.^[25] But some types of malaria can take much longer to develop. Malaria caused by the *Plasmodium malariae* parasite takes about 28 days. Some types take six months to 18 months before you get any symptoms.^[26]

If you have been to a country where malaria is common, you should suspect malaria if you get a feverish illness. If this happens, you should go to your doctor straight away.

- About 9 in 10 people first get symptoms of malaria when they are back home.^[27]
- More than 1 in 3 people get symptoms of malaria at least two months after their return.^[28]
- Almost 9 in 10 people recover completely if they are generally healthy and their malaria is diagnosed and treated straight away.^[29]
- Malaria may be more serious for older travellers.

Malaria prevention

Malaria caused by the *Plasmodium falciparum* parasite is the most likely to cause serious problems (complications) and death. This happens because the parasite damages your red blood cells . This means:

- Important organs like the kidneys stop working
- Your blood circulation system stops working.

You might get convulsions (seizures) and then fall into a coma and die.

Complications and death from malaria usually happen only if you don't get the right treatment or if treatment isn't started soon enough. ^[29] Your malaria shouldn't come back if you are treated properly the first time.

Treatments:

Nets treated with insecticide

In this section

Sleeping inside a mosquito net that has been sprayed or dipped in an insecticide (a substance that kills insects) will help to keep mosquitoes away and reduce your risk of getting malaria. Nets or gauze covering windows and doors can also help to keep mosquitoes away.

You can buy mosquito nets in camping shops.

A summary of the research (known as a systematic review) found that people were less likely to catch malaria if they used nets. ^[31] They were also less likely to die from malaria.

The studies looked at thousands of people living in countries where malaria is common. The nets were treated with a type of insecticide called permethrin. Some research suggests that mosquitoes are not affected by permethrin in the way that they used to be. Using a net treated with another type of insecticide, such as one called carbosulfan, may work better. ^[32]

There hasn't been any research to say if sleeping in insecticide-treated nets could be harmful.

Clothes treated with insecticide

In this section

Wearing clothes that have been sprayed with an insecticide that kills mosquitoes will probably protect you from malaria.

Malaria prevention

You can buy sprays that contain the insecticide permethrin in camping shops. You should spray your outer clothes, including your hat and socks. The spray might make you itch or make your skin sore.

One good-quality study (known as a **randomised controlled trial**) showed that soldiers wearing uniforms treated with permethrin were less likely to get malaria.^[33] Two other studies found that people were less likely to get one of the more serious types of malaria if their clothes, bedsheets, or both were treated with permethrin.^[34] ^[35]

Insect repellents for your skin

In this section

There isn't much evidence that putting insect repellents on your skin will stop mosquitoes biting you. But doctors agree that repellents containing DEET (diethyltoluamide) protect you from getting bitten. And they recommend using a repellent that includes DEET if you're travelling to an area where there is malaria.^[36] Picaridin is another repellent that you can use. But this is quite new and there hasn't been enough good research to say whether or not it works.

One study found that using a soap containing DEET worked well against malaria.^[37]

DEET can cause some side effects. People who use DEET for a long time may get confused and irritable. They may also have difficulty sleeping.^[38] And some people get a skin irritation or rash.^[39]

Another repellent is lemon eucalyptus oil. But we don't know how well it works.

Atovaquone plus proguanil

In this section

Different anti-malaria medicines are recommended for different areas. You need to check with a doctor or nurse which medicine works best for the country you are visiting. You may not be able to get an NHS prescription for anti-malaria drugs. You may need to pay for a private prescription. Your doctor or nurse can tell you how much this will cost.

Atovaquone and proguanil are drugs that can be used to prevent malaria. This combination probably works as well as most other medicines and may be less likely to cause side effects.

The brand name for this treatment is Malarone. You'll need a prescription from a doctor. It comes as tablets that combine the two medicines.

You'll need to take atovaquone plus proguanil once a day. You should start taking it one or two days before you arrive in a malaria area, every day during your stay, then for seven days after you leave.^[40]

Malaria prevention

One summary of the research and four good-quality studies ([randomised controlled trials](#)) show you're unlikely to get malaria if you take atovaquone with proguanil. ^[41] ^[42] ^[43] ^[44] ^[45] The studies found that taking atovaquone plus proguanil works as well as taking two other drugs together called [chloroquine and proguanil](#) (brand names Avloclor and Paludrine).

You may get side effects. But these are usually mild. ^[42] You could get these side effects with any of the anti-malaria medicines: ^[44]

- An upset stomach
- Diarrhoea
- Backache
- Stomach ache
- Mouth [ulcers](#)
- Dizziness.

You may also get a headache, strange dreams, and disturbed sleep. But this is less likely if you take atovaquone with proguanil than if you take another anti-malaria medicine called [mefloquine](#) (Lariam).

A review of the research concluded that atovaquone with proguanil, or a drug called [doxycycline](#) , were the least likely of the malaria drugs to cause side effects. ^[41]

Women should avoid getting pregnant for two weeks after stopping atovaquone with proguanil. You should use contraception while taking the medicine. ^[46]

Chloroquine

In this section

Different anti-malaria medicines are recommended for different areas. You need to check with a doctor or nurse which medicine works best for the country you are visiting. You may not be able to get an NHS prescription for anti-malaria drugs. You may need to pay for a private prescription. Your doctor or nurse can tell you how much this will cost.

Chloroquine has been used for a long time to protect people from malaria. But it no longer works in some countries. That's because, in most parts of the world, the parasite that causes the most dangerous sort of malaria has become resistant to chloroquine. That means the drug can't kill the parasite any more. But where resistance is low, doctors agree that chloroquine works well to prevent malaria. ^[47]

Malaria prevention

The brand name for chloroquine is Avloclor. It comes as tablets. Some people who take chloroquine have difficulty sleeping, get a skin rash, or have problems with their eyesight. ^[48] Serious side effects are rare if you take the recommended dose.

You take chloroquine once a week, starting the week before you arrive in a place where malaria is common. Keep taking it during your stay, then take it for four weeks after you leave.

Doxycycline

In this section

Different anti-malaria medicines are recommended for different areas. You need to check with a doctor or nurse which medicine works best for the country you are visiting. You may not be able to get an NHS prescription for anti-malaria drugs. You may need to pay for a private prescription. Your doctor or nurse can tell you how much this will cost.

Doxycycline will probably protect you against malaria in countries where other malaria medicines don't work. ^[49] ^[50] But most studies of this drug have looked at soldiers. So we don't know for certain how well doxycycline works for tourists and business travellers.

You'll need a prescription from a doctor.

Doxycycline can cause side effects. In a study of soldiers who took doxycycline for four months: ^[49]

- About 1 in 4 got an upset stomach
- About 1 in 4 got skin problems
- About 1 in 4 got a cough
- About 1 in 4 got a headache.

Some women travellers (1 in 10) get vaginal irritation (vaginitis) while taking doxycycline. ^[51] And up to a half of travellers get an allergic skin reaction to the sun while taking doxycycline. ^[52]

But another study found that fewer people got side effects from doxycycline than from [mefloquine](#) (Lariam) and [chloroquine \(Avloclor\) taken with proguanil \(Paludrine\)](#). ^[49] A review of the research concluded that doxycycline and the combination [atavoquone with proguanil](#) were the least likely of the malaria drugs to cause problems with side effects. ^[41]

Malaria prevention

You need to take doxycycline every day. You should start taking it one week before you arrive in a malaria area, all through your stay, and then for four weeks after you leave. ^[40]

Women are advised not to get pregnant until one week after stopping doxycycline. You should use contraception while you are taking it. ^[46]

Chloroquine plus proguanil

In this section

Different anti-malaria medicines are recommended for different areas. You need to check with a doctor or nurse which medicine works best for the country you are visiting. You may not be able to get an NHS prescription for anti-malaria drugs. You may need to pay for a private prescription. Your doctor or nurse can tell you how much this will cost.

Taking both chloroquine tablets and proguanil tablets may work as well as other medicines to prevent malaria. But you could get more side effects from these drugs.

The brand name for chloroquine is Avloclor and the brand name for proguanil is Paludrine. You can buy both of these medicines from a pharmacy. You don't need a prescription.

You take your first dose of chloroquine one week before you arrive in a malaria area. You then take it once a week during your stay, and for four weeks after you leave. Proguanil is taken once a day. You need to start taking it one week before you arrive, then take it during your stay, and for four weeks after you leave.

Up to 3 in 100 people who take chloroquine and proguanil together get nausea, diarrhoea, or dizziness. ^[53] You also have a higher than normal chance of getting mouth ulcers. ^[54] In studies, people who took chloroquine and proguanil were more likely to get side effects than those who took other drugs. ^[55] ^[41]

Mefloquine

In this section

Different anti-malaria medicines are recommended for different areas. You need to check with a doctor or nurse which medicine works best for the country you are visiting. You may not be able to get an NHS prescription for anti-malaria drugs. You may need to pay for a private prescription. Your doctor or nurse can tell you how much this will cost.

The brand name for mefloquine is Lariam. You need a prescription from a doctor for this medicine.

Mefloquine works very well to prevent malaria. ^[56] In some studies it seemed to protect people completely. ^[56] ^[43] But at least 1 in 5 people who take mefloquine complain of strange or vivid dreams, mood changes, disturbed sleep, or difficulty concentrating. ^[57]

Malaria prevention

One man in one study said he felt suicidal after taking mefloquine with a large amount of alcohol.^[58]

Side effects of all sorts seem more common with mefloquine than with other drugs for malaria.^[41]

Other common side effects include:^[43] ^[59]

- Sleep problems (these happened to about 13 in 100 people)
- Depression (4 in 100 people)
- Dizziness or vertigo (10 in 100 people)
- Headaches (7 in 100 people)
- Sight problems (3 in 100 people)
- Skin irritation or rash (30 in 100 people).

You should not take mefloquine if you have epilepsy or a mental health problem, or if you have needed treatment for depression or anxiety.^[40] ^[60] If you have heart problems, especially an irregular heartbeat, make sure you tell your doctor.

A big review of research has looked at the reasons why people might get these side effects from mefloquine.^[58] It found that the drug might react with other drugs, such as the contraceptive pill, and with alcohol. Mefloquine could be safer if you avoid drinking alcohol, don't get dehydrated, and avoid taking the contraceptive pill or recreational drugs.

Women get more side effects than men.^[61] But older people may get fewer side effects.^[62]

Because of the risks of getting serious side effects, you should start taking mefloquine two-and-a-half weeks before you travel to a malaria area. This will give you time to switch to another drug if you do get side effects.

Mefloquine should be taken once a week. You need to take it for four weeks after you leave the malaria area.

Women are advised not to get pregnant while taking mefloquine. You should use contraception while you are taking mefloquine, and for three months after the last dose.^[46]

Insecticide sprays

In this section

Malaria prevention

There hasn't been enough research to say if spraying insecticide indoors to kill mosquitoes can help prevent malaria. Doctors don't usually recommend it.

A large survey of 90,000 tourists from Europe returning from East Africa found that those who had sprayed insecticide in their room weren't any less likely to get malaria.^[39] But two small studies of people living in malaria areas showed that people were less likely to get the disease if they sprayed inside their houses with insecticide.^[63] ^[64] We don't know if these sprays can be harmful.

Air conditioning and electric fans

In this section

We don't know whether using air conditioning or electric fans keeps mosquitoes away.

One large survey of about 90,000 tourists from Europe who had been to East Africa found that people who had slept in an air-conditioned room were less likely to get malaria.^[64]

A study in Pakistan found that electric ceiling fans run at high speed reduced the numbers of some types of mosquitoes, but not the kind that pass on malaria.^[65]

Buzzer devices

In this section

You can buy electric mosquito repellents that claim to keep mosquitoes away. They're small electronic devices that make a high-pitched sound. However, the research shows that they probably don't work.

Ten small studies looked at whether electronic buzzers reduced the numbers of mosquitoes landing on people's skin. But the results showed they made no difference.^[66]

Full-length clothing

In this section

Wearing long clothes that cover you up will probably stop you getting bitten by mosquitoes. But there hasn't been much research on how well this works.

A large survey of tourists returning from Africa found that people who wore long-sleeved shirts and trousers during their stay were less likely to get malaria.^[39] A smaller study also found that people who wore clothes that covered their arms and legs in the evening or at night were less likely to get malaria.^[67]

Malaria prevention

It may be better to wear light rather than dark clothing because insects prefer landing on dark surfaces.^[39] ^[68] And remember that you can avoid mosquitoes by not going outdoors in the evening and at night. Mosquitoes are more likely to bite after dark.

Mosquito coils and vaporising mats

In this section

People often burn coils containing insecticide to keep mosquitoes away. You can also buy electric devices that release insecticide from mats or tablets. But we don't know how well they work at keeping mosquitoes away.

Three studies showed that you're just as likely to get malaria whether or not you use a coil.^[69] ^[70] ^[71] Some people found the smoke from the coils irritated their eyes and noses. We don't know if breathing in the insecticides from the coils or vaporising mats could be harmful.

These coils and devices should not be used indoors, because of the unknown risks.

Smoke

In this section

Smoke may repel mosquitoes during the evening, but there hasn't been enough research to say how well this works.

One poor-quality study in a village in Papua New Guinea found that smoke keeps mosquitoes away.^[72] But the smoke could cause problems with your eyes and your breathing.

Body oils

In this section

Some people put baby oil or other types of natural oils on their skin because they think it will protect them from insect bites. It's thought that the oil traps insects so they can't bite.^[73] But there's no good evidence from the research that putting baby oil, or any other type of oil, on your skin will protect you from mosquito bites or malaria.^[74]

Vitamin supplements

In this section

Some people think that taking supplements of vitamin B helps to prevent mosquito bites. But the evidence suggests they don't work.^[75] ^[76]

Nets treated with insecticide to prevent malaria in children

In this section

Sleeping inside a mosquito net that has been sprayed or dipped in an insecticide will keep mosquitoes away and help stop your child getting malaria. Nets or gauze covering windows and doors can also keep mosquitoes away. You can buy mosquito nets in camping shops.

A summary of the research (a **systematic review**) found that children were less likely to get malaria, and less likely to die from malaria, if they used nets. The studies looked at thousands of people living in countries where malaria is common. About five deaths were prevented for every 1,000 children sleeping in mosquito nets. ^[31]

The nets were treated with a type of insecticide called permethrin. There hasn't been any research to say if sleeping in nets treated with insecticide could be harmful.

Anti-malaria drugs for children

In this section

Different anti-malaria medicines are recommended for different areas. You need to check with a doctor or nurse which medicine works best for the country you are visiting. You may not be able to get an NHS prescription for anti-malaria drugs. You may need to pay for a private prescription. Your doctor or nurse can tell you how much this will cost.

Low doses of anti-malaria drugs can protect children from malaria. Most anti-malaria medicines seem to be safe for children, except for doxycycline. Doxycycline should not be used by children younger than 12 years. It could damage their bones or teeth. ^[77]

Many years of experience with chloroquine have shown that this drug works well if it's used in an area where the parasite hasn't become resistant to it. ^[47] But we need more research to know for certain which anti-malaria drugs are best for children.

We found one study (a **randomised controlled trial**) that showed that both atovaquone with proguanil (Malarone) and chloroquine with proguanil (Avloclor and Paludrine) prevent malaria in children. ^[78] But about 1 in 3 children who took these medicines had mild side effects, such as diarrhoea, stomach ache, vomiting, nausea, or mouth ulcers.

Children seem to get fewer side effects from mefloquine (Lariam) than adults do. ^[58]

You can get chloroquine as a liquid, which may be easier for your child to take. Mefloquine and proguanil are tablets. But you could crush them and put them in your child's food to make them easier to swallow.

Atovaquone with proguanil comes as a tablet at one quarter of the adult dose. Your doctor will tell you how many tablets your child should take each day. This will depend on how much your child weighs.

Insect repellents containing DEET (diethyltoluamide) to prevent malaria in children

In this section

Insect repellents may protect your child from mosquito bites, but there's a risk of serious side effects if you put products containing DEET on their skin.

A few children under 8 years old got nervous system damage after using insect repellents with DEET on their skin for a long time. ^[79] ^[80]

Lower concentrations of DEET (below 10 percent) may be more suitable for children. If your child is likely to suck or lick his or her fingers or thumbs, it may be best not to apply DEET to his or her hands.

Lemon eucalyptus oil is another repellent. We don't know how well it works.

Anti-malaria drugs for pregnant women

In this section

Different anti-malaria medicines are recommended for different areas. You need to check with a doctor or nurse which medicine works best for the country you are visiting. You may not be able to get an NHS prescription for anti-malaria drugs. You may need to pay for a private prescription. Your doctor or nurse can tell you how much this will cost.

One summary of the research (a **systematic review**) showed that taking anti-malaria drugs protects pregnant women from malaria. ^[81] Their babies were just as likely to be born healthy as those whose mothers didn't take the medicine.

Doctors agree that the drug chloroquine is safe to take during pregnancy and can help protect against malaria in areas where the parasite hasn't become resistant to it. ^[47] If you travel to an area where malaria is resistant to chloroquine, mefloquine is recommended. ^[82]

But there hasn't been much research on whether taking anti-malaria drugs when you're pregnant could harm you or your baby. Here's what we know:

- A study of 350 pregnant women in Thailand found that women who took mefloquine tablets (Lariam) were more likely to feel dizzy. But there was no harm to their child. ^[83]
- Doxycycline may damage your baby's bones or teeth if you take it while you're pregnant or breastfeeding. ^[68] You shouldn't take this drug if you are pregnant.

Clothes treated with insecticide to prevent malaria in pregnant women

In this section

You could spray your outer clothes and socks with a spray containing an insecticide, such as permethrin. We know this reduces the risk of malaria in women who aren't pregnant and in men. So it's likely to protect women who are pregnant against malaria. But we don't know if wearing clothes which have been sprayed with insecticide is harmful for women who are pregnant.

Nets treated with insecticide to prevent malaria in pregnant women

In this section

Although there is no good research to show that using a net that has been treated with insecticide protects pregnant women against malaria, we know that these types of nets can help reduce the risk of malaria in women who aren't pregnant, men, and children. So it's highly likely that they will do the same thing for pregnant women.

Insect repellents to prevent malaria in pregnant women

In this section

There hasn't been enough research to say how well insect repellents protect pregnant women against malaria. We also don't know how safe it is to use repellents containing DEET (diethyltoluamide) if you are pregnant.

One good-quality study of almost 900 pregnant women showed there were no more health problems in the women or their babies after using DEET repellents.^[84] But we found one report of a baby being born with abnormalities after a mother used DEET every day during her pregnancy.^[85]

Pericaridin and lemon eucalyptus oil are two other repellents. But we don't know whether they work or are safe for pregnant women.

Further informations:

Glossary:

fever

If you have a fever, your body temperature is above 37 degrees Celsius (98.6 degrees Fahrenheit). With a fever you often get other symptoms, such as shivering, headache or sweating. A fever is usually caused by an infection.

miscarriage

A miscarriage is when something happens before the 28th week of pregnancy that means the fetus does not survive.

red blood cells

Malaria prevention

Red blood cells are the part of your blood that makes it red. Their main job is to carry oxygen from your heart and lungs to the tissues of your body. Once these cells unload oxygen, they pick up carbon dioxide. They take carbon dioxide back to your lungs so it can be breathed out of your body.

kidney

Your kidneys are organs that filter your blood to make urine. You have two kidneys, on either side of your body. They are underneath your ribcage, near your back.

seizure

A seizure (or fit) is when there is too much electrical activity in your brain, which results in muscle twitching and other symptoms.

systematic reviews

A systematic review is a thorough look through published research on a particular topic. Only studies that have been carried out to a high standard are included. A systematic review may or may not include a meta-analysis, which is when the results from individual studies are put together.

randomised controlled trials

Randomised controlled trials are medical studies designed to test whether a treatment works. Patients are split into groups. One group is given the treatment being tested (for example, an antidepressant drug) while another group (called the comparison or control group) is given an alternative treatment. This could be a different type of drug or a dummy treatment (a placebo). Researchers then compare the effects of the different treatments.

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ulcer

An ulcer is an open sore. Ulcers can happen in many parts of your body, such as in your stomach, and the skin of your legs, mouth, or genitals.

allergy

If you have an allergy to something (such as pollen or a medicine), your body always overreacts to it. The reaction happens because your immune system (your body's system for fighting infection) is too sensitive to it.

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