



How to detect, treat and prevent malaria

**A guide for ASHA and other community volunteers
in districts with a high burden of malaria**

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What Is This Book About?

This book will teach you how malaria is caused and how it is spread. It will teach you how to detect malaria in a person who has fever and how to treat different types of malaria. It will teach you how to stop mosquitoes from spreading malaria.

Once you learn how to do this, you will be able to help people in your village understand how to tackle malaria and become free from malaria.

About Malaria

WHAT IS CAUSE OF MALARIA?

Malaria is caused by an organism called Plasmodium. This organism is so small that it cannot be seen with the naked eye, but it can be seen with a microscope.

The Plasmodium organism is found in the blood of persons having malaria.

In India, there are two main types of the malaria organism:

- The name of the less dangerous type is Plasmodium vivax.
- The name of the more dangerous type is Plasmodium falciparum.

The malaria caused by Plasmodium falciparum can lead to dangerous consequences, such as brain fever and death. That is why we fear falciparum malaria.

In this book, we will learn how to detect and treat both kinds of malaria.

HOW IS MALARIA SPREAD FROM PERSON TO PERSON?

Mosquitoes spread malaria from person to person. When a mosquito bites a person who has malaria, the Plasmodium organism gets into the stomach of the mosquito. It grows inside the mosquito. After some days, when the mosquito bites another person, the organism enters the blood of that person from the affected mosquito. About two weeks after the bite, this person gets fever and other symptoms of malaria. In this way, mosquitoes spread malaria from person to person. If there are no mosquitoes, malaria would not spread like this.

There are many different kinds of mosquitoes, just as there are different kinds of cows. Different kinds of mosquitoes spread different diseases. The name of the mosquito that spreads malaria is Anopheles. Anopheles mosquitoes bite us in the night, when we sleep. The mosquitoes that bite us during the day are usually not Anopheles, and cannot give us malaria. But they can give us other diseases such as dengue or chickungunya or elephantiasis.

If you closely observe a mosquito sitting on a wall, you can tell whether it is Anopheles. The Anopheles mosquito sits with a straight back, at a slant, as shown in the picture. Most other common mosquitoes sit with a hunched back.

Malaria is caused by a tiny organism and it is transmitted by mosquito bites.

WHO ARE THE PEOPLE MORE LIKELY TO BE AFFECTED BY MALARIA?

Any person can get any kind of malaria, at any age. It is usually more common after the rains, when there are water collections where mosquitoes can breed in large numbers. The dangerous form, or falciparum malaria, is usually more common among people who live close to forests, because the Anopheles mosquitoes living in forests are particularly suited for transmitting falciparum malaria.

When pregnant women get malaria, it can be dangerous for the unborn child and for the woman herself. When young children get malaria, they are more likely than adults to become dangerously ill. So, it is important to act immediately when any person has fever, particularly pregnant women and young children.

People belonging to the poorer and less educated families and communities are more likely to get malaria, or die from malaria, because they are least likely to be able to protect themselves from mosquitoes, or to seek proper treatment upon getting malaria. They are also the least likely to learn about malaria from the radio or TV or newspapers. So, it is important that such families and communities are always given more of your attention.

Detecting And Treating Malaria

HOW WOULD YOU SUSPECT THAT A PERSON MAY HAVE MALARIA?

A person having malaria almost always has fever. Usually, the person gets sudden high fever and chills. The fever may come every day or every other day. Usually there is headache and body ache also. There may be vomiting.

But any of these symptoms can be caused by diseases other than malaria. Common causes of fever other than malaria are common cold, sore throat, pneumonia, infected ear, infected wound, abscess, urinary infection, etc. So, it is difficult to say from symptoms alone whether someone has malaria.

HOW WOULD YOU KNOW WITH CERTAINTY WHETHER A PATIENT HAS MALARIA?

That is why it is necessary to do a blood test on any person who has fever. A blood test can say with certainty whether a person has malaria or not. Without doing a blood test, even a doctor cannot say with certainty whether a person has malaria.

BLOOD TESTS TO DETECT MALARIA

There are two kinds of blood tests for detecting malaria:

1. Slide test:
A few drops of blood are taken from a finger and spread on a glass slide. The glass slide is then examined by a trained laboratory technician under a microscope. If the technician sees Plasmodium organisms in the smears, the slide test is reported positive.

If the slide is made by a health worker at home in the village, it has to be sent to the laboratory, and it may take several days for the report to get back to the patient. This method has the advantage that it can detect both types of malaria.
2. Rapid Diagnosis Test (RDT):
One drop of blood is taken from a finger and immediately placed on a test strip. A few drops of a solution are added, and a few minutes later, a red line appears on the strip. If two red lines appear, the test is positive for falciparum malaria.

At present, this test can detect only falciparum malaria, the dangerous form. Later, similar tests will be available to detect the less dangerous form of vivax malaria as well. The advantage of this method is that it is easy to learn, there is no need for a laboratory, and it takes only 15 minutes to get the result.

The Rapid Test (RDT) is thus very useful for detecting the dangerous form of malaria early and saving lives. It is expensive, but is supplied by the Government of India free of cost.

WHICH OF THE TWO BLOOD TESTS FOR MALARIA WILL YOU USE?

Those of you who live very close to the laboratory will need to do only the slide test, because it will be possible for you to get the test result from the laboratory on the same day or, at the most, the next day.

Those of you who live far from the laboratory should do both the tests, RDT and slide, from a single finger prick. You will be able to first read the RDT result within 15 minutes.

- If the RDT is positive, you know that the person has falciparum malaria. You should give treatment for falciparum malaria. You need not send the slide to the laboratory.
- If the RDT is negative, you know the person does not have falciparum malaria, but you do not know whether the person has the less dangerous form, vivax malaria, or not. Hence, you should send the slide to the laboratory and wait for the result. You can wait, because you know that the person does not have the dangerous form of malaria.

The health workers from the PHC will tell you whether you should do both tests, or only the slide test.

HOW TO DO THE BLOOD TESTS FOR MALARIA

To do the blood test, first you draw blood from a finger prick. Then, you first do the RDT, and then the slide test. Let us learn how to do this, step by step.

1. Drawing blood from a finger-prick

What you require to draw blood:

1. Spirit swab
2. Cotton
3. Lancet

How to draw blood from a finger-prick:

1. Clean the ring or middle finger (either of the two fingers next to the little finger) of the left hand of the patient with the spirit swab.
2. Select the part of the finger tip a little away from the center (this area becomes red if gently pressed) but not too close to the nail on the side.
3. This part of the finger should be pricked with a lancet, using one quick, firm movement.

4. Gently wipe the tip of the finger with cotton, and then allow the blood to flow out on its own.
5. If blood does not come out freely, then gently press the tip of the finger.

As described later, it is important for your safety and for the safety of the patient, that you do not touch the sharp tip of the lancet or directly touch the blood with your bare fingers.

2. Doing a Rapid Diagnosis Test (RDT)

What you require for doing a Rapid Test:

To do a Rapid Diagnosis Test (RDT), you need a Rapid Diagnosis Test Kit (RDK). This kit will be regularly supplied to you by the government through the nearest Primary Health Center. The kit contains the following materials:

1. Spirit swabs - one swab for one patient
2. Lancets - one lancet for one patient
3. Small glass tube (capillary tube) - one for each patient
4. Test strips - one strip for one patient
5. One multiple-well plastic plate - common for all tests
6. Test tube – one test tube for one patient
7. Buffer solution or reagent solution - a special liquid for doing the test, in a dropper bottle, common for all tests

How to do a Rapid Test: (follow the instructions, looking at the pictures)

1. Check that the test kit is within its expiry date. If not, do not use it.
2. Place your waste box close by.
3. Open a foil pouch and check that the powder inside it is still blue. If not, discard the test and use another test.
4. Remove the test strip and the small glass tube or loop from the foil pouch and place them on a clean dry surface.
5. Take out the bottle containing the liquid and the dropper.
6. Place a new test tube in the multiple-well plate.
7. After drawing blood from a finger as described, touch the tip of the small glass tube to the blood drop on the finger and let a small amount of blood come up in the tube or the loop.
8. Touch the tube or the loop to the test strip just below the arrow mark to place the blood there. If there is a paper where *Plasmodium falciparum* is written, remove it and place the blood on the strip in the place that was covered by the paper.
9. Put the used small glass tube in waste box.
10. Using the dropper, place 4 drops of liquid from the bottle into the new test tube that you had placed in the multiple-well plate.
11. Place the test strip containing blood in this test tube with the arrow pointing down, with the tip of the strip dipped in the liquid.

12. Wait for about 15 minutes. During this time, you can prepare the blood smear on a slide.
13. Observe the test strip after 15 minutes. You will find one of the following situations:
 - a. No red line appears on the test strip: This means that the test strip is not working. Discard it and repeat the test carefully with a new test strip, starting with the first step.
 - b. A single red line appears: This means that the patient does not have falciparum malaria. You need to send a slide to the laboratory to check if the patient may have the less dangerous form, vivax malaria.
 - c. Two red lines appear: This means that the patient has falciparum malaria. Treat the patient for falciparum malaria, as described later. There is no need to send the blood slide to the laboratory.
14. After the test has been read, put the test strip and test tube into the waste box, along with all used swabs and the used lancet.

Since the RDK may come from different companies at different times, there may be small differences in the contents and in the manner in which the test is done. The PHC staff will help you if there is a difference between the contents and the procedure described here and the kit you receive.

3. Making a Blood Smear

What you require to make a blood smear:

1. Glass slides
2. Pencil
3. Form M1L

How to make a blood smear on a slide: (follow the instructions, looking at the pictures)

1. Take a clean glass slide free from scratches and stains. Keep another clean slide ready, to spread the blood.
2. After drawing blood from a finger as described earlier, hold the slide above the pricked finger, and touch the lower surface of the slide to the drop of blood on the finger. Some blood will stick to the slide.
3. Touch the slide to the drop of blood three times, away from the center of the slide, as shown in the picture.
4. With the corner edge of another slide spread the blood on the slide into a circle to make a thick smear. The thickness should be just enough to be able to see printed words through the smear.
5. Touch the slide to the drop of blood one more time, near the middle of the slide, as shown in the picture.
6. Bring the edge of the other slide to just touch this drop of blood, as shown in the picture. Wait until the blood spreads along the whole edge.

7. Holding the second slide at an angle as shown in the picture, with its edge just touching the blood under it. Push this slide forward with a steady, quick movement, to spread the blood to a thin smear, as shown in the picture.
8. Wait until the thin smear is dry. Then, with the pencil, write the patient number on the thin smear. The patient number is the same number that you have given the patient on your Form M1.
9. Place the slide on a flat surface, facing upwards, and leave it there until the thick smear is dry. Make sure that flies and other insects do not sit on the smear.
10. By the time the smear dries, the RDT result will be ready. If RDT is negative, fill out M2.
11. If the RDT is positive, discard the slide.
12. Dispatch the slide to the laboratory along with M2 as instructed during your training. Do not wrap the slides in M2. The laboratory will examine the slide and send you the report as discussed during your training.

HOW TO STORE THE RDK

The RDK should be stored in a cool, dry place inside the house and should not be exposed to sunlight. It can be stored in a refrigerator, but not in the freezer.

The RDT may not give you correct results if it is exposed to sunlight or if it becomes wet. Therefore, it is very important to store the RDK carefully.

HOW TO SAFELY DISPOSE OF MATERIALS USED FOR BLOOD TESTS

All the materials used in doing blood tests are unsafe for people to handle. Blood from patients can contain organisms that can cause disease. So, any materials that have been contaminated by blood, such as swabs, lancets, used and discarded slides, test strips and test tubes should be handled with care. They should be collected in a waste box having a lid. The box should be kept firmly closed and should be stored in a place out of reach of children. When the box is full, it should be buried in a deep hole in the ground away from wells and other sources of water. Or, the box can be given to the MPHWH for disposal.

HOW TO PROTECT THE PATIENT AND YOURSELF WHILE DOING THE BLOOD TESTS

If your hands are dirty when you do the blood test, dirt from your hands may contaminate the blood of the patient and cause harm to the patient. Hence, it is important that you take precautions while you do the test:

- Wash your hands thoroughly with soap and water before you draw blood. You will be taught how to wash your hands properly during your training.
- Always use a fresh lancet for each test. Do not reuse lancets.

- Do not touch the sharp tip of the lancet before or during the process of drawing blood. If the lancet gets accidentally contaminated before it can be used, discard the lancet and use another.
- After the blood has been taken for the tests, place a clean cotton swab on the prick site and ask the patient to apply firm pressure on the swab for a few minutes.

To protect yourself from the patient's blood, take the following precautions:

- Do not touch the blood with your bare fingers at any time. Handle the lancet, swabs, slides and RDT test strips with care.
- Take care to ensure that you do not prick yourself accidentally with a used lancet.
- After the blood test are over, again wash your hands thoroughly with soap and water. This is the best way to prevent any harm to yourself from the patient's blood.
- Dispose of all used materials in the waste box as described earlier, and handle the waste box carefully.

HOW TO TREAT PATIENTS WHO HAVE MALARIA DETECTED BY A BLOOD TEST

All fever cases diagnosed as malaria by either RDT or microscopy should be promptly given effective treatment. The medicine chosen will depend upon whether the patient has vivax malaria or falciparum malaria according to the blood test. The medicines are available in the drug kit given to you during your malaria training. MPHWS will supply you regularly with these medicines, so that you do not run out of stock. If at some period, you use more than usual of these medicines, then contact the MPHWS as soon as possible, and ask for more medicines.

Treatment of falciparum malaria

You will know if the patient has falciparum malaria or not when you do the RDT, or when you receive the report of the slide test from the laboratory. If the RDT is positive or if the laboratory report tells you that the patient has falciparum malaria, you should immediately treat the patient for falciparum malaria with three drugs, as follows:

Artesunate (AS) and Sulphadoxine-Pyrimethamine (SP) tablets taken together can cure falciparum malaria by killing the malaria organisms in the body. AS tablets should be given for three days, and SP for one day, as shown in the dosage chart. All tablets for a day should be taken together, swallowed with water.

In addition, Primaquine (PQ Large) tablets should be given on the first day. Primaquine prevents falciparum malaria from spreading to others. Primaquine tablets should be taken after a meal, not on an empty stomach. Children less than one year old and pregnant women should not be given Primaquine.

Pregnant women having falciparum malaria require different medicines, not AS and SP. So, they cannot be treated by you. Also, falciparum malaria in pregnancy can be dangerous for the woman and for the unborn child. Therefore, all pregnant women who are RDT positive should be asked to go to the nearest PHC or hospital immediately, without delay.

Dosage Chart for Treatment of falciparum Malaria					
Age	Day 1			Day 2	Day 3
	AS tablet	SP tablet	PQ large tablet	AS tablet	AS tablet
Less than 1 yr	½	¼	0	½	½
1-4 years	1	1	1	1	1
5-8 years	2	1 ½	2	2	2
9-14 years	3	2	4	3	3
15 yrs or more	4	3	6	4	4
Pregnancy	Do not treat. Refer to hospital				

(Tablet PQ big is Primaquine, 7.5 mg, given only to patients of Falciparum malaria)

Treatment of vivax malaria

You will know if the patient has vivax malaria or not when you receive the report for the slide you sent to the laboratory. If the report tells you that the patient has vivax malaria, you should contact the patient and treat for vivax malaria with two drugs, as follows:

Chloroquine (CQ) is effective in killing the malaria organisms in the blood and immediately curing vivax malaria. CQ is given daily over 3 days, as showing in the dosage chart. All tablets for a day should be taken together. They should be swallowed with water.

However, in some cases, some vivax malaria organisms are hidden deep inside the body, and are not killed by CQ. These organisms may come out in the blood stream after a few weeks or months, and again cause malaria. So, it is important to give another medicine that can kill such hidden organisms. Primaquine is a medicine which is effective in killing such organisms. Primaquine (PQ small) tablets should be given daily for 14 days, as shown in the dosage chart. All tablets for a day should be taken together. They should be swallowed with water.

CQ and Primaquine tablets to be taken on a single day can be taken together or separately.

Primaquine can cause harm to unborn children in the womb and to children younger than one year. So, Primaquine should not be given to pregnant women, as shown in the dosage chart.

Dosage Chart for Treatment of vivax Malaria							
Age	Day 1		Day 2		Day 3		Days 4 to 14
	CQ tablet	PQ small tablet	CQ tablet	PQ small tablet	CQ tablet	PQ small tablet	PQ small tablet
Less than 1 yr	½	0	½	0	¼	0	0
1-4 years	1	1	1	1	½	1	1
5-8 years	2	2	2	2	1	2	2
9-14 years	3	4	3	4	1½	4	4
15 yrs or more	4	6	4	6	2	6	6
Pregnancy	4	0	4	0	2	0	0

(Tablet **PQ small** is Primaquine, 2.5 mg, given only to patients of Vivax malaria)

Both, CQ and Primaquine should be taken after food, never on an empty stomach, because they sometimes cause pain and vomiting when taken on an empty stomach.

Treatment of both types of malaria together

Sometimes, the laboratory report on the slide test may tell you that the patient has both types of malaria, vivax and falciparum. In this case, the patient should be treated with three drugs, AS, SP and Primaquine (PQ small), as shown in the dosage chart. Pregnant women having both types together should not be treated but should be sent to the hospital immediately.

Dosage Chart for Treatment of vivax and falciparum Malaria, together								
Age	Day 1			Day 2		Day 3		Days 4-14
	AS tablet	SP tablet	PQ small tablet	AS tablet	PQ small tablet	AS tablet	PQ small tablet	PQ small tablet
Less than 1 yr	½	¼	0	½	0	½	0	0
1-4 years	1	1	1	1	1	1	1	1
5-8 years	2	1 ½	2	2	2	2	2	2
9-14 years	3	2	4	3	4	3	4	4
15 yrs or more	4	3	6	4	6	4	6	6
Pregnancy	Do not treat. Refer to hospital							

WHAT DIET SHOULD BE GIVEN TO A PATIENT HAVING MALARIA?

Patients of malaria tend to become weak very quickly. So, it is important that they eat food as often as they can. They may eat any food that they are able to eat – there are no diet restrictions. Patients with high fever may not feel hungry at all, so it is important to bring down fever in such cases, and make them feel more comfortable and hungry.

HOW TO BRING DOWN FEVER

Fever is considered good for a patient, because it helps fight the disease. However, when fever is very high, it becomes very distressing for the patient and the family. There are simple ways of bringing down fever of almost any cause, including the fever of malaria.

1. Use of paracetamol

You will be given paracetamol tablets as part of your kit. When given in adequate doses, paracetamol can bring down fever from any cause within half an hour. However, paracetamol does not cure the disease that is causing the fever. So, its effect does not last long. The fever remains low for about 4-6 hours, and then the fever can rise again.

Paracetamol can be safely given at any age and even during pregnancy, in the dose shown in the dosage chart. In this dose, it can be given 3-4 times a day if needed. If the fever is not very high, and the patient is able to tolerate the fever, there is no need to give paracetamol.

Dosage Chart for Paracetamol tablets	
Less than 1 yr	$\frac{1}{4}$
1-4 years	$\frac{1}{2}$
5-8 years	$\frac{3}{4}$
9-14 years	1
15 yrs or more	1 or 2

2. Use of plain water sponging

When a patient has high fever, the whole body becomes hot, from inside and outside. One simple way of reducing the heat in the body is to apply water to the body. This is just like pouring water on a hot vessel to make it cool down. With a towel, plain water can be applied to the whole body, including the arms and legs, the chest and abdomen, front and back. This is the fastest way to bring down fever. It is not useful to just apply a wet towel on the forehead alone – when the whole body is hot, you must sponge the whole body to quickly bring down the fever.

This method is particularly useful when the fever is very high and paracetamol may take long to bring it down. In such cases, first give a dose of paracetamol as shown in the dosage chart, and then start sponging. By the time the sponging has brought down the fever, the paracetamol will also take effect.

WHAT TO DO IF A PERSON WITH FEVER HAS BOTH MALARIA TESTS NEGATIVE

When you find that RDT is negative, you will send the blood slide to the laboratory and wait for the report. In the meanwhile, if you have been trained to give treatment for other

illnesses, you may do so. You can certainly give paracetamol to give the patient relief from high fever, as described earlier. If the patient appears to be very sick, but RDT negative, it is best to send the patient to the nearest hospital.

If the laboratory report on the blood test is also negative, you must inform the patient that she or he does not have malaria, and that there must be some other cause of fever. The patient may seek further guidance from the subcenter or the PHC.

HOW TO KNOW IF A PATIENT HAS SEVERE MALARIA

Sometimes, malaria can become severe. Usually, it is falciparum malaria that becomes severe. A patient of severe malaria can die if not treated in a hospital. So, it is important that you should learn how to recognize if a patient has severe malaria, and help such a patient to reach the PHC or nearest hospital immediately.

Severe malaria affects the brain, or kidneys, or other organs inside the body. When such vital organs are affected, the patient is in danger of dying. You can know if the patient has such severe disease if the patient has any of the following symptoms:

- The patient is abnormally drowsy. It is difficult or impossible to wake up the patient.
- The patient has convulsions (fits).
- The patient is so weak that she or he is unable to even sit up.
- The patient has stopped passing urine since more than half a day. Even when the patient tries to pass urine, very little urine comes out.
- The patient passes black or red coloured urine.
- The patient has such severe vomiting, that she or he cannot retain the medicines swallowed.

To know whether a patient has severe malaria, you must ask questions and observe the patient carefully. If a relative comes to you and says that the patient is unable to walk to your house for a blood test, it is important to ask and find out why. If the patient appears to be very sick, you must go to the patient's home and see her or him.

WHAT TO DO IF A PATIENT HAS SEVERE MALARIA

1. Make arrangements to take the patient to the hospital immediately

All patients with symptoms of severe malaria must be immediately taken to the PHC or nearest hospital, without any delay. During your training, you will be told which hospitals near your village are equipped to treat severe malaria. It is important to take or send the patient only to these hospitals. If the patient is taken to a hospital where facilities are not available for treating such a patient, there will be needless delay, and the patient may die because proper treatment was not given in time.

Some poor families may not have the money required to hire a vehicle to take the patient to the hospital. You should be aware that now, there are funds available with the ANM at the sub-centre and with the village panchayat for paying for the transport of severely ill patients of any disease from poor families. You should help such families get in touch with the ANM or with appropriate members of the village panchayat to avail of these funds.

2. Do RDT while arrangements for transport are being made

While arrangements are being made to take the patient to the hospital, it is important to do RDT. This will tell you with certainty whether the patient has the dangerous form of malaria, falciparum. You should send the RDT test strip with the patient to the hospital, so that the doctor can see the result, and save time required for doing tests in the hospital.

3. Give one dose of AS and SP if the patient is conscious and can swallow

If you have done RDT on such a patient, and it is positive, try and give the first dose of AS and SP tablets, as you would give any patient who is RDT positive. If the patient is able to swallow and retain the tablets, it may save a life. If the patient is unconscious, or difficult to wake up, do not give any medicines.

MAKE SURE THAT THE PATIENT REACHES THE HOSPITAL WITHIN TWO HOURS OF DEVELOPING SYMPTOMS OF SEVERE MALARIA.

HOW WOULD YOU SUSPECT THAT THERE IS AN OUTBREAK OF MALARIA IN YOUR VILLAGE?

Sometimes, malaria occurs in outbreaks, affecting large numbers of people at a time. During such outbreaks, severe malaria and deaths from malaria are also common. If an outbreak is detected early, steps can be taken to minimize the spread of malaria, and to save lives. Therefore, it is important to detect an outbreak early.

After your training, as you start testing and treating patients with fever, and keeping a record of such patients, you will know what is the usual number of patients of fever in your village every day or every week. If you suddenly get many more patients of fever than you expect, it is cause for alarm.

WHAT WILL YOU DO WHEN THERE IS AN OUTBREAK OF FEVER CASES IN YOUR VILLAGE?

1. Inform PHC staff immediately:

You must immediately inform the MPHW (M or F) or any PHC staff immediately, without delay, that there is an outbreak of fever cases in your village. Use a telephone or send someone by the fastest available means to the PHC with this information.

2. Conduct RDT on all fever cases and treat if positive:

Until someone from the PHC arrives in the village, you should conduct RDT and take blood slides from every case of fever, as you would normally do. If any patient has a positive RDT, treat for falciparum malaria as you would normally do.

3. Follow up regularly with the PHC until someone arrives:

Until someone from the PHC arrives in the village, keep following up with the PHC, and make sure that the staff is aware that no one has yet arrived.

4. Assist PHC staff in containing the outbreak:

Once the PHC staff arrive, they will take many steps to contain the outbreak. You can assist the PHC staff in this work.

Preventing Mosquitoes From Spreading Malaria

As we learnt earlier, malaria is spread from person to person by the bite of the Anopheles mosquito. If we can get rid of the Anopheles mosquitoes, or if we can prevent them from biting people, it is possible to prevent people from suffering from malaria.

WHAT YOU CAN DO TO GET RID OF ANOPHELES MOSQUITOES FROM YOUR VILLAGE

If you know where Anopheles mosquitoes come from, and what they need to do to survive and to propagate, you will understand how you can get rid of them.

Where Anopheles mosquitoes come from:

Like all other kinds of mosquitoes, Anopheles mosquitoes also breed in water. Other kinds of mosquitoes breed in stagnant, dirty water, but Anopheles breeds only in clean, fresh water. That is why malaria is more common after the rains, when there are lots of collections of fresh water in the village and in the fields for Anopheles mosquito to breed.

The female Anopheles mosquito lays hundreds of eggs at a time in clean, fresh water. The eggs of the Anopheles mosquito are so small that we do not normally see them in water.

After a few days, the eggs hatch, and each egg releases one tiny larva. At this stage, the larva are very small, and may be difficult to see. But they are very hungry creatures, and they feed on whatever food they can find in the water. As they feed, they grow quickly and are seen as snake-like creatures swimming near the water surface, small enough to be picked up on a finger-tip.

After a few days of growing like this, the larva becomes round like a ball, and becomes very quiet. This is called a pupa.

About a day after becoming a pupa, an adult mosquito is born, and it immediately opens its wings and flies away, leaving behind an empty pupa shell.

It takes about one week for an egg to transform into an adult mosquito.

What you can do to prevent breeding of Anopheles mosquitoes:

Mosquitoes can only breed in any collection of fresh water which is undisturbed for at least one whole week. If you can drain all water collections within a week, mosquitoes can simply not breed at all.

Some of this is easy to do – once a week, just turn over all the pots and pans in your backyard, fill up hoof-marks with mud, check all the tanks and tyres to see if there is water collected, keep water stores in the house closed.

However, it is not possible to drain water collected in the fields or on the edges of ponds. The PHC staff can help you learn what can be done to prevent breeding in such places. For instance, there are some varieties of fish which like to eat mosquito larva. These fish are available at the PHC. You can also breed them in small tanks in your village. Releasing a few such fish in wells and ponds or large ditches filled with water, and sometimes in even the fields, can control mosquito breeding.

WHAT YOU CAN DO TO PREVENT MOSQUITOES FROM SPREADING MALARIA:

If you know what mosquitoes require to do to survive, you will understand how you can prevent them from spreading malaria.

What Anopheles mosquitoes need to do to survive:

Male mosquitoes are vegetarian. They live on juices of plants and leaves. They do not bite people or animals.

Female mosquitoes are the ones that bite people and animals. Usually, if there are enough animals available, such as cattle, mosquitoes do not seek humans to bite. Cattle do not get malaria when bitten by mosquitoes, but people do. The female mosquito requires a blood meal particularly before laying eggs.

Anopheles mosquitoes bite during the evenings or during the night, rather than during the day. Their bite does not hurt much, so when they bite us during sleep, we may not realize that we have been bitten. Female mosquitoes have a very good sense of smell, and can smell humans and animals. That is why they are able to seek out people to bite at night.

During the day, Anopheles mosquitoes rest on walls in dark corners of house or in the bushes and plants. Once it starts getting dark, they become active and set out looking for a blood meal.

The mosquitoes that bite us during the day are usually not Anopheles, and so their bites cannot cause malaria.

Ways of keeping Anopheles mosquitoes away from us:

Thus, if we can keep the female Anopheles mosquitoes out of the house, and prevent them from biting people, they will not be able to spread malaria. There are mainly two methods of doing this: the use of insecticide-treated bed nets and the use of insecticide spray on the walls of the rooms where we live and sleep.

1. Use of insecticide-impregnated bed nets:

Bed-nets (also called mosquito nets) are not very effective when they are not **impregnated** with insecticide, because mosquitoes can still get in through holes or gaps. When the net is **impregnated** with insecticide, the mosquito is either repelled, and does not enter the net, or is killed by the insecticide. Therefore, insecticide-treated nets are very effective. In areas where there is a lot of malaria, everyone should sleep under an insecticide-treated bed net.

There are two types of insecticide **impregnated** bed-nets:

Ordinary bed-nets, which can be impregnated with insecticide (ITN):

Any bed-net, whatever it is made from can be **impregnated** with an insecticide. Once **impregnated**, the effect of the insecticide lasts about six months. So, these nets have to be re- **impregnated** with insecticide every six months.

The PHC staff has the correct insecticide and is trained in the **impregnation** of such nets with it. If there are such nets in use in your village, the staff will come to your village every six months to **impregnate** the nets. When they come for this work, you can help them by informing people, collecting the nets and assisting the PHC staff in **impregnating** the nets with insecticide. Once you get trained in doing this, you can also do the **impregnation** yourself.

In some areas, the government has supplied such nets free of cost to families.

Factory-treated mosquito nets (LLIN):

Now, a special type of mosquito net is available which is treated with insecticide in the factory itself. Since the fibres from which the net is made are themselves treated with the insecticide, the insecticide does not get washed away easily. Such nets retain the insecticide, until they are washed about 25 or 30 times. Provided people do not wash the nets too often, they can be used for 3-5 years without the need to **impregnate** them.

Such long-lasting nets are more expensive than ordinary nets and are not yet commonly available in the market. The government plans to supply such nets free of cost to villages in areas where malaria is very common.

The correct use of bed nets:

It is possible for a village to be free of malaria by using LLINs or **impregnated** bed nets correctly:

- All families and individuals in the village should sleep under **such** nets.
- Since malaria can spread during any time of the year, the nets must be used all round the year, every night.

- There should be enough numbers of nets to cover all the people in the village. Thus, each family should have as many nets as are needed for the number of people in the family.
- Those most likely to suffer from malaria and its ill-effects should use these nets without fail – pregnant women, young children, the poor families.
- Each family should learn how to put up the mosquito net, whether they are sleeping outdoors or indoors. You will be taught how to hang up a net during training, and you can teach this to the people in your village.
- If impregnated bed-nets are used, they must be re-treated every six months, without fail. They should not be washed between treatments, except just before they are impregnated.
- If LLIN is used, it must be washed sparingly. Its expiry date must be noted, and it must be replaced or retreated before this date.

2. Use indoor insecticide spray

Since mosquitoes often rest on walls inside the house during the day, it is possible to kill them or drive them away by spraying insecticide on the inner walls of the house. You have seen teams of men coming to your village with tanks of insecticide and spraying your houses. They do this to prevent the spread of malaria.

There are different insecticides used for this purpose. The commonest is DDT. Usually, it is necessary to spray twice a year.

The correct use of insecticide spray:

- All the inner walls of all rooms of the house must be sprayed.
- All rooms should be sprayed, except those used for food storage. Cattle sheds also should not be sprayed.
- After spraying, the walls must not be washed, or plastered or painted. It is best that the washing or plastering or painting is done just before the spraying is done.

The PHC staff will tell you the dates on which the teams will come to your village for spraying. You must inform the people in your village about these dates in advance, so that they make sure that they are present at home when the teams come. Some people do not like to have spraymen enter their house or to take their food stuffs outside, while the spraying takes place. You should explain to people how it is important for their own health that all rooms are sprayed.

PRECAUTIONS TO BE TAKEN WHEN USING INSECTICIDES

Insecticides can be dangerous to people. Therefore, it is very important that full care is taken not to harm people when using insecticides for malaria control.

The smell that comes after **impregnating** a bed net or after spraying the wall can be irritating, but does not harm the health of people. Similarly, touching an insecticide impregnated net or a sprayed wall is not harmful.

The PHC staff and the spray teams are trained in the safe use of insecticides and the safe disposal of excess insecticide. Only such trained persons should handle insecticides, not others in the village.

In general, the following precautions must be observed:

- Insecticides must not be handled with bare hands. Gloves must be used.
- Insecticides must not be eaten, drunk or inhaled. If this happens by accident, consult the PHC doctor immediately.
- Children should never be allowed to come close to insecticides, or to touch them or play with them. If this happens by accident, consult the PHC doctor immediately.
- After use of insecticide, the persons using it should thoroughly bathe or wash all exposed parts of the body with soap and water.
- Cleaning and washing after use of insecticide must be done in such a manner that the used water does not contaminate sources of drinking water. Thus, it should be done far away from streams, ponds and wells.
- Empty or partly used insecticide containers and packets should not be left lying around. They should be disposed of correctly by the PHC staff or spray teams.
- In case of accidental poisoning, the affected person should be immediately taken to the hospital along with the container of the insecticide, so that the doctor can be shown which insecticide caused the poisoning.

Recording and Reporting

After receiving training for contributing to malaria control, you will be able to maintain simple records of the patients seen by you. You will also be able to keep count of the drugs and supplies you receive.

You will be given printed forms for maintaining records. Patient case records and a count of the medicines and supplies you receive will be maintained in Form M1. When you send a slide to the laboratory, you will use Form M2.

We will now learn how to use these forms.

Use of Form M1

Whenever you see a patient having fever, you should record details of the patient in Form M1.

Which cases should be recorded in this form?

All new cases of fever coming to ASHA are recorded in M1:
Both, positive and negatively tested cases should be recorded.
Even if the patient is not tested for any reason, the details of the patient should be recorded in M1. Even those cases where the patient does not belong to her village, but may only be a visitor, should be recorded in M1.

Any patient with fever suspected to be suffering whom malaria are to be entered in M1.

A fresh M1 form should be used each month. Thus, in a single M1 form, the name of same patient cannot appear more than once.

How many cases are to be recorded in each M1 form?

Each M1 form is meant for recording patients of fever seen in one reporting month. All fever cases seen in a reporting month are thus recorded in one M1 form. If there are more patients of fever in a given month than can fit in one M1 form, another M1 sheet is used and attached to the first one. In this case, each sheet is numbered.

When a new month starts, patients are recorded in a new M1 form.

Filling of the M1 form:

When starting to use a fresh form at the beginning of the month, first fill out the name of the Village, your name (Name of ASHA or other Provider), your code (Provider code, as given to you) and the name of the reporting month, and the top of the form.

If you know the names of the subcenter and PHC, and whether your village is a designated RDT village, you can fill out these details also, otherwise the MPHWP will fill these out for you later.

Once these details are filled out, you can start filling details of cases of fever seen by you.

When a patient of fever comes to you, you will fill out the columns in the following manner:

Column 1: Patient number: Write the serial number of the patient. Each month, the number of the patients will begin with 1. Therefore, the first patient of the month will always be assigned number 1 in the first column.

Column 2: Name of Village: Write the name of the village to which the patient belongs.

Column 3: Village Code: Write the code of your village given to you by the MPHWP or PHC. When a patient comes from some other village, record this as 991/ 992.

Column 4: Name of the Patient: This is the name by which the patient is known in the village, and it may include the name of the patient's father or husband, and the family name or surname. In some states, it may be necessary to include the name of the grandfather or father-in-law.

Column 5: Name of Head of family: This is the name of the person by whom the family is known in the village.

Columns 6: This shows whether the collection has been through active or passive case detection. In your case it will be always passive, therefore put a single P and slash the rest of the column.

Columns 7: Age, and Days, Months or Years: Write the age in completed months or years:

- If the patient is less than one month old, write the number of completed days in the column and put a D along side. (such situations will be very rare)
- If the patient is more than one month old but less than one year old, write the number of completed months and put an M
- If the patient is more than one year old, write the number of completed years.

Column 8: Sex: Write "M" or "F" (or local language equivalent).

Columns 9, 10: SC and ST: If the family belongs to SC or ST groups, write "Y" in either of these two columns.

Column 11: Duration of fever: Write the number of completed days since the patient first had fever during this illnesses. For example if the patient has had fever since day before yesterday, write “2” in this column.

Column 12: Date of RDT/ BSC: All patients of fever should have a blood test as soon as possible. This may be only a slide test, or an RDT as well as a slide test. Record the date on which you performed the test. Usually, this is the date on which the patient first came to you. Record the date, month and year, for example, “23.09.08” or “23.09.2008”.

Column 13: RDT Positive: If you have performed an RDT, and it is positive, put a tick (√) in red; if negative, put a dash (-). If you have not performed an RDT, put a cross “X” in this column.

Column 14: Slide No. In case RDT is negative or the village is not supplied with RDTs, slide is sent to the lab. This slide is to be coded. Each provider collecting slides begins slide numbers fresh at the beginning of each year which are continued over months up to December. Eg the first slide collected in the year will be numbered 1. This slide number is followed by provider code/ village code/ subcentre code.

Column 15: Date of sending slide to laboratory: If RDT has been done and is negative, or if only a slide has been taken, write the date on which you dispatched the slide to the lab in this column. For each slide sent to the lab, you will need to fill out one Form M2. All slides which need to be sent to lab on one day should be entered into one M2

Column 16: Date of receiving report: If you have sent a slide to the laboratory, you will receive the report within a day or two. Write the date on which you receive the report of the slide test of the patient back from the lab. Once you get the result, you can inform the patient about the result and provide treatment accordingly.

Column 17 and 18: Pv and Pf: The report of the slide examination that you receive from the lab should be entered in these columns. If it is positive for P vivax (Pv), is positive, put a tick (√) in red; if negative, put a dash (-) in column 17 (Pv), if positive for P falciparum (Pf), is positive, put a tick (√) in red; if negative, put a dash (-) in column 18 (Pf).

Column 19: Pregnant: If either RDT done by you is positive, or the report of the slide that you get from the laboratory in positive for Pf, the patient must be given ACT. However, pregnant women cannot be given ACT. So, ask all female patients over the age of 15 years whether they are pregnant. If pregnant, put a tick (√) in this column. All pregnant patients who are RDT positive or Pf positive on slide test must be referred to the MPHWH or the PHC for receiving treatment.

Column 20: Date of starting treatment: When a patient has tested positive for malaria, he or she should be treated with malaria medicines, according to whether the patient is

positive for Pv or Pf, and according to the age and pregnancy status. You should administer the first dose of the medicines in your presence, after explaining to the patient the diagnosis and the dosage of the medicines. In this column, write the date on which the first dose of medicines was taken by the patient.

Columns 21, 22,23, 24,25,26,27: Combi-blisters, CQ, PQ large, PQ small, AS, SP: You will administer the medicines according to the test result and according to the age of the patient, referring to the dosage chart in the manual. In these columns, you will write the total number of tablets of each type given to the patient. For example, when you are given ACT to an adult who is RDT positive, you will give one full blister pack, and write the Number of Blister Pack/ Packs given. PQ large is Primaquine 7.5 mg, given only to patients of falciparum malaria. PQ small is Primaquine 2.5 mg, given only to patients of vivax malaria.

Column 28: Severe malaria. If the patient exhibits signs of severe malaria, as per the training given to you and as described in your malaria reference booklet, write “Y” in this column. Such patients should be given the first dose of ACT, and urgently sent to the nearest big hospital which is equipped to treat such patients, as discussed during your training.

Column 29: Date of referral: Write the date on which the patient was sent to the hospital. This could be because the patient was having severe malaria, or because the patient was Pf positive and pregnant.

Column 30: Date of death: In case a diagnosed patient of fever dies, write the date of death in this column. Such a case should have RDT or microscopy confirmation of diagnosis.

Column 31: Verified by (signature): Do not write anything in this column. This is for your supervisor to fill in.

Reporting at the end of the reporting fortnight.

1. Fill in the stock position:

Whenever you receive medicines or supplies from the MPH or from the PHC, enter the number of tablets or other numbers received in the relevant columns in the row “Received during the month” under “Stock position” at the bottom of form M1.

At the end of the month, count the number of tables of each type remaining with you and enter these numbers in the relevant columns in the row “In stock at end of the month”.

2. Answer three questions:

At the end of the month, answer “Y” or “N” to the three questions at the bottom of Form M1:

- **Did you report an outbreak of fever during the month?** During the reporting month, if you noticed an unusually high number of fever cases during the month and informed the MPH or ANM or PHC, circle “Y” here.

- **During the month, did it happen that you could not do the RDT on any patient because you did not have RDK?** If this happened anytime during the reporting month, circle “Y” here.
- **During the month, did it happen that you could not give ACT to any patient who tested positive because you did not have ACT in stock?** If this happened anytime during the reporting month, circle “Y” here.

3. Submit Form M1:

Once you have completed M1 you should submit M1 to the ANM or MPHWS at the earliest possible, the 21st of the month for the first fortnight and 7th of the following month for the following fortnight. This is the only report you need to submit. Keep one copy of M1 retained.

Use of Form M2

This form accompanies every blood slide send to the lab. Every blood slide will have its own form.

Column 1: Slide number. Copy from Column 14 of M1. The same number will be written on the slide, along with your provider code.

Column 2: Name of patient: Copy from Column 4 of M1.

Column 3: Age: Copy from Column 7 of M1.

Column 4: Sex: Copy from Column 8 of M1.

Column 5: Duration of fever: Duration of fever in days until the day the slide was dispatched. This should be same as Column 11 of M1.

Column 6: Active/ Passive: Filled from Column 6 of M1

Column 7: Slide sent date: Copy from Column 15 of M1.

Columns 8, 9,10,11: These will be filled up by the laboratory. When you receive the report, pay particular attention to column 11, which tells you if you made any mistakes in making the slide. You will know about the Quality of the smear made by you Poor/Satisfactory/Good.

Column 12: Result received date: Write the date on which you received the report from the lab. This should be the same as Column 16 of M1.

Roles and Responsibilities of ASHA / village level volunteer provider in the malaria control program

The ASHA or equivalent community volunteers trained to support the malaria control program in districts with high burden of falciparum malaria are expected to undertake the following roles and responsibilities:

A. Early Diagnosis and Complete, Effective Treatment

- Examine all fever cases presenting to her / him as per training provided, and conduct RDT and / or collect blood smears as instructed.
- Treat non-pregnant RDT positive cases as per training provided
- Dispatch blood slides of RDT negative cases to the laboratory, as per arrangement made by the local PHC, accompanied by appropriate record.
- Receive and interpret blood slide reports from the lab
- Treat blood smear positive cases as per training provided.
- Observe all safety precautions in conducting blood tests and treating cases as per training provided.
- Identify warning signs of severe malaria and to assist timely referral of such cases with adequate pre-referral care as per training provided. Help arrange for funds for such transportation of patients from NRHM pools when necessary.
- Advise and assist immediate referral of pregnant women with fever to nearest appropriate institution after conducting RDT and / or collecting blood slide as per training provided.
- Identify any unusual increase in the number of fever cases in the community and to provide prompt information of fever outbreak to the MPW, BMO and DMO/ DVBD/CO/ Nodal Officer-IDSP, as per training provided.

B. Preventing mosquitoes from spreading malaria (reducing mosquito bites)

- Assist MPH of the village area in ensuring adequate mobilization of the community for acceptance of IRS before the rounds.
- To assist the MPH in distribution and impregnation of mosquito nets

C. Behaviour Change Communication

- Advise positive cases about the proper treatment, danger signs and prevention of malaria.
- Provide information to the community about signs & symptoms of malaria, its treatment, prevention and vector control.
- Participate in all the village level activities planned for the Anti-malaria month.

D. Recording & Reporting

- Maintain the record of fever cases in the M1 form and submit the form to the designated MPH in a timely manner, as per arrangements made by the local PHC.
- Ask for replenishment of stocks of RDT, slides, lancets, medicines, etc., so that stocks sufficient for at least month remain with her / him at any time.

