

Practical Pharmacy

For Developing Countries

FOREWORD FROM THE FIRST EDITOR OF PRACTICAL PHARMACY

During the 1990's I worked for 3 years in a district hospital in Tanzania as a pharmacist. I found that many health workers were responsible for managing drug supplies, even though they had little training or information to help them. It was this experience that led to the formation of the newsletter that we called 'Practical Pharmacy'. Subjects covered included drug storage, dispensing, rational prescribing and the use of drugs in pregnancy, to name a few.

Between 1996 and 2000, fifteen issues of *Practical Pharmacy* were produced, and circulation reached over 4000. An evaluation confirmed the need for this type of information. Unfortunately it was not possible to continue publishing the newsletter, so it is a very welcome development that *Practical Pharmacy* is to be revived as an electronic document, and its original format and content up-dated for the needs that prevail today.

Georgina Stock

INTRODUCTION

Six years have passed since the last edition of *Practical Pharmacy*. However, the needs it addressed still exist. Many health workers in developing countries still have no specific training in pharmacy and have no information to help them in their day to day work. They need tools and resources to help them manage medicine supplies, to prescribe medicines appropriately and to help their patients understand how to use medicines appropriately.

The World Health Organization (WHO) estimates that nearly a third of the world's population lacks access to most of the basic essential medicines. In the poorest parts of Africa and Asia, this figure climbs to one half. There are many reasons why people do not get the medicines they need. One of these reasons is the irrational, or inappropriate, use of medicines. More than half of all medicines are prescribed, dispensed or sold inappropriately, and half of all patients fail to take them correctly. The over-use, under-use or misuse of medicines results in wastage of scarce resources, especially in developing countries. In addition, using medicines improperly increases the risk of people falling sick and dying of illness, as well as resistance of disease-causing microbes to available treatments.

Therefore, after discussing with one of *Practical Pharmacy's* founding members, Health Action International (HAI) Africa, the Mission for Essential Drugs and Supplies (MEDS), the Ecumenical Pharmaceutical Network (EPN) and the Sustainable Healthcare Foundation (SHEF) have partnered together to revive the quarterly publication. Since the newsletter was first published, the Information Age has taken off, even in the developing world. For this reason, as well as for reasons of cost, the newsletter will primarily be distributed electronically, via the Internet (email and the World Wide Web). *Practical Pharmacy* will continue to be available for free.

As with the original editions, readers are free to circulate the newsletter in whatever way they see best – by email or in hard copy. Users may also include the information in their own publications and training material. We would only request that they reference *Practical Pharmacy* as the source of their information and tell us when they are using the information in this way.

The first editions of *Practical Pharmacy* laid a solid foundation, beginning from basic essential skills for medicine management in a health centre setting (storing medicines, stock control, etc) and moving on to patient-centred topics (rational prescribing, medicines in pregnancy and the elderly, etc). This new issue is taking up from where the last issue stopped: on the topic of malaria. The older issues of the newsletter have also been updated and will be reissued separately so that the vital information they contain will not be lost.

Over the next few months, we will cover the following topics:

- HIV and AIDS: HIV treatment, adherence to ARVs
- Tuberculosis: treatment, multi-drug resistant TB
- Rational use of medicines in the community
- Infection control

We hope you will benefit from *Practical Pharmacy* and we look forward to hearing your feedback.

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MALARIA

Malaria is an infection caused by parasites. It is passed from person to person by mosquitoes. The World Health Organization (WHO) estimates that one million people in Africa die of malaria every year. In tropical countries, health workers will often encounter people at risk of, and ill with, malaria.

WHO in 2006 has published new treatment guidelines (see the article below). These guidelines recommend what have been proven to be the most effective and safe antimalarial medicines. The following sections contain information from these new malaria guidelines.

MALARIA AND HIV & AIDS

In much of the developing world, places where HIV is common also have high levels of malaria. Therefore, people living with HIV are often at risk of malaria. Scientists are beginning to find that there may be significant effects (interactions) if a person has HIV or AIDS and malaria at the same time.

In places where both malaria and HIV are common, health workers need to take note of the following facts when dealing with their patients:

- If somebody has HIV or AIDS, just a fever is not enough proof that he or she has malaria. Give a malaria test to confirm the diagnosis so that another cause of fever is not missed.

- If somebody with HIV or AIDS also has malaria, the number of HIV viruses (viral load) in their blood increases significantly. If a patient of yours is in such a situation, tell them that it is easier for them to pass on HIV while they have malaria.
- Pregnant women who have both malaria and HIV or AIDS have a higher chance of being anaemic. There is also a higher chance that their babies will grow more slowly while in the womb, and might be born too early. Therefore, if an HIV positive woman lives in an area where malaria is common, to help prevent her getting malaria, offer her either:
 - at least three doses (1 dose = 3 tablets) of sulfadoxine-pyrimethamine (SP) at intervals of at least 4 weeks
 - or**
 - daily doses of cotrimoxazole, which helps prevent infections, including malaria.
- If a pregnant woman with HIV is found to have malaria, find out whether she is receiving cotrimoxazole (sulfamethoxazole-trimethoprim) to prevent other opportunistic infections. If she is, then give her malaria medicines that do not contain sulfa, such as quinine or artemether-lumefantrine (recommended in the 2nd and 3rd trimesters). Examples of medicines which do contain sulfa are: sulfalene and sulfadoxine.



QUICK TIP:

Take extra care if a person living with HIV or AIDS also has malaria.

Practical Pharmacy aims to ensure the safe and rational use of medicines world-wide by increasing knowledge and understanding of medicine management and supply and improving work practices. It has been written for individual health workers who may have no specific pharmacy qualifications and as a resource for training activities.

To receive Practical Pharmacy by email, send an email to practicalpharmacy@gmail.com

NEW WHO GUIDELINES ON TREATMENT OF MALARIA

This year, the World Health Organization (WHO) released new and comprehensive treatment guidelines for malaria. At 266 pages, it is a big document, with a lot of highly technical information. It will help guide national programs and policies but can also be a useful resource for a health worker who is interested in learning more about all aspects of the treatment of malaria. It is available on the Internet (<http://www.who.int/malaria/docs/TreatmentGuidelines2006.pdf>) but needs a fast Internet connection to be downloaded.

What the Guidelines say about Artemisinin Combination Therapies (ACT)

The parasite that causes malaria has the potential to develop resistance against the medicines used to treat it.

Therefore, WHO recommends that appropriate, effective **combination therapies** (more than one medicine at the same time) be used to for treatment. Combination therapy means using at least two medicines which attack the malaria parasite in completely different ways.

Doing this makes it harder for the parasite to become resistant to the medicines in the combination.

Artemisinin and its derivatives (such as artesunate, artemether, artemotil, dihydroartemisinin) kill the malaria parasites quickly so that people can recover quickly. WHO recommends that artemisinin be part of the combination therapy, together with another antimalarial appropriate for the region's resistance patterns, such as amodiaquine, lumefantrine, mefloquin, or others.



QUICK TIP:

Combination therapy makes it harder for the malaria parasite to become resistant.

USING MALARIA MEDICINES PROPERLY

There are a number of reasons why malaria medicines should be used correctly:

- Malaria medicines work by killing the parasite that causes the illness. However, the parasite can develop resistance over time if the medicines are not used appropriately. This means that the medicines would lose their effectiveness.
- It is dangerous not to use malaria medicines properly: the patient can become more ill or even die.
- It can be expensive to use medicines incorrectly. If the person does not recover from malaria, they might have to use a more costly line of treatment or be hospitalized.

Problems Experienced in Treating Malaria

It should be noted that some of these mistakes are made by the patient and others by the health worker:

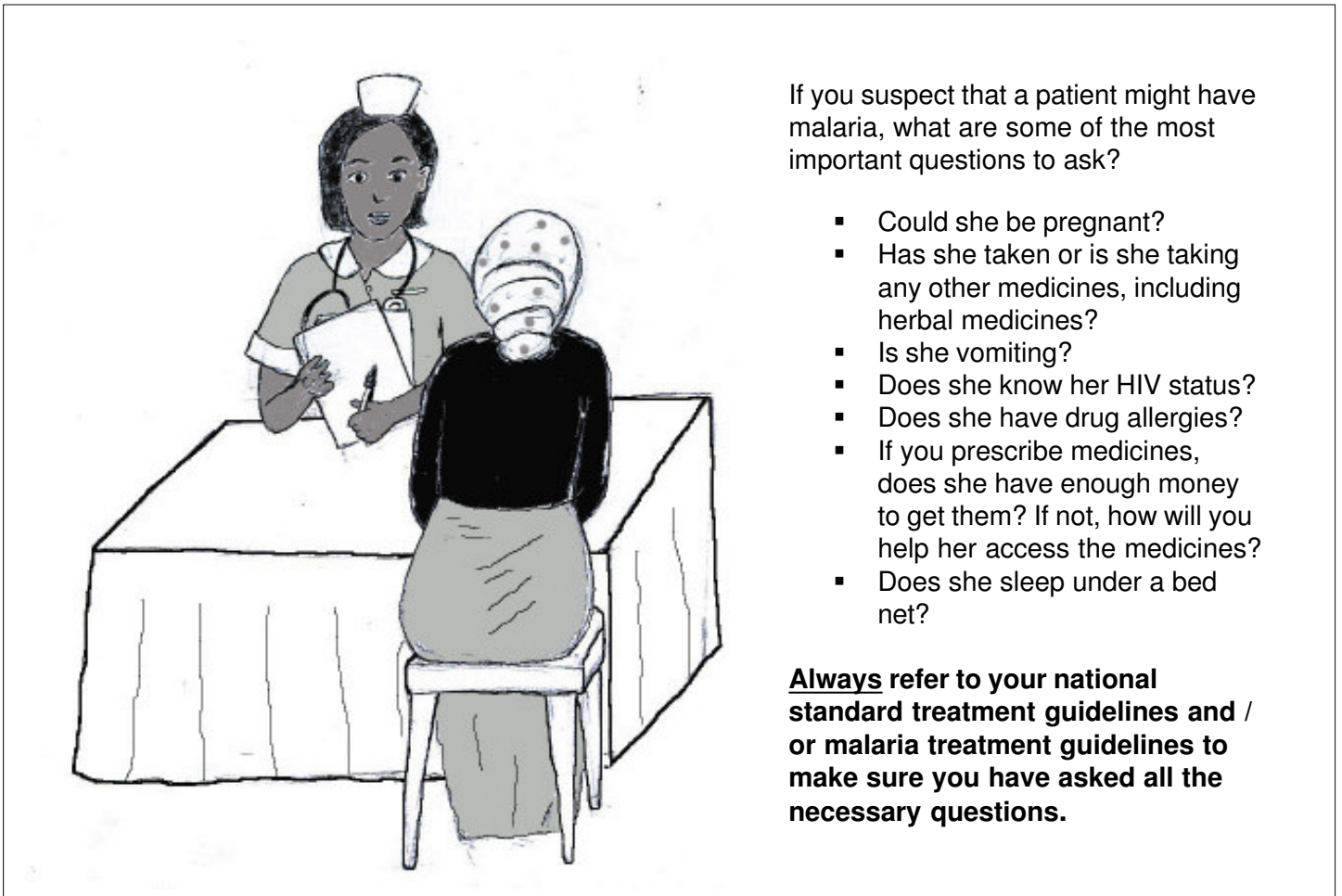
- The patient visits a traditional healer for treatment. While traditional herbs may help to relieve some of the symptoms of the sickness, people usually need the recommended malaria medicines to completely rid their bodies of the malaria parasite.

- The patient may buy medicine for malaria in a nearby shop and not be given the correct dose.
- At the health facility, the person could be misdiagnosed and treated for something else instead of the malaria that they actually have.
- The health worker may not prescribe the correct dose and length of treatment needed.
- The health worker may not find out whether the person has taken other malaria medicines before their visit to the clinic / hospital.
- The health facility does not have the medicines needed to treat malaria.
- The health worker does not explain how the person should take their medicines or what to do if they do not get better.
- The person does not take the full dose of medicines due to side effects, lack of understanding of the dangers of not finishing the medicines, or lack of money to buy all the medicines they need.



QUICK TIP:

Make sure you know all the relevant information before you give a patient malaria medicine.



If you suspect that a patient might have malaria, what are some of the most important questions to ask?

- Could she be pregnant?
- Has she taken or is she taking any other medicines, including herbal medicines?
- Is she vomiting?
- Does she know her HIV status?
- Does she have drug allergies?
- If you prescribe medicines, does she have enough money to get them? If not, how will you help her access the medicines?
- Does she sleep under a bed net?

Always refer to your national standard treatment guidelines and / or malaria treatment guidelines to make sure you have asked all the necessary questions.

SIGNS, SYMPTOMS AND DIAGNOSTIC METHODS OF MALARIA

When someone has **uncomplicated malaria** they may have any one, or a combination, of: fever, chills, sweating, muscle and joint pain, abdominal (“stomach”) pain, diarrhoea, nausea, vomiting, loss of appetite. When someone has **severe malaria** this is dangerous and life-threatening, and they may have any one, or a combination, of: difficulty sitting up or standing, decreased consciousness (ranging from drowsiness to a coma), difficulty breathing, seizures (convulsions), abnormal bleeding and various other features needing laboratory testing to confirm.

Rapid Diagnostic Tests (RDTs)

Rapid diagnostic tests use finger-prick blood samples to detect malaria parasites. They are simple to use and their results are easy to understand by any cadre of health worker, private health providers, and even volunteers who may all be quickly trained in their use and interpretation.

RDTs are widely available for sale, but are relatively expensive and thus may be unaffordable to many. Government support is needed to make them available and accessible. They feature prominently in many free, donor-funded malaria programs in various countries, such as those supported by Global Funds.

Advantages of RDTs	Disadvantages of RDTs
<ul style="list-style-type: none"> ✓ Results are available immediately ✓ simple to train staff to use them ✓ clients gain confidence that they will get a proper diagnosis 	<ul style="list-style-type: none"> * Some RDTs cannot differentiate between the malaria parasite and other causes of parasitaemia, or between new malaria infections and recently treated ones. This could cause some confusion. * RDTs can lose their sensitivity in places where it is very hot and humid

REFERENCE CHART FOR ANTIMALARIALS

On the next page is a table of medicines recommended in the newly-published World Health Organization Malaria Treatment Guidelines. However, please note that your country should have its own Malaria Treatment Guidelines, which you must refer to and follow.

REFERENCE CHART FOR ANTIMALARIALS

MEDICINE	FORMULATION	DOSE FOR TREATMENT OF MALARIA	SPECIAL ADVICE TO THE PATIENT	MOST COMMON ADVERSE EFFECTS	COMMENTS AND PRACTICAL ISSUES
Artesunate	<p>Tablet 50mg 200mg</p> <p>Injection 60mg/mL</p> <p>Rectal suppository 100mg 400mg</p>	<p>Uncomplicated malaria: Adult and child over 6 months: 4mg/kg daily for 3 days (see ACT charts below)</p> <p>Severe malaria: IM: 2.4mg/kg load, then 1.2mg/kg at 12 hrs and 24hrs, then 1.2mg/kg daily for 6 days</p> <p>IV: 2.4mg/kg load, then 1.2mg/kg daily until patient can tolerate tablets</p> <p>Pre-referral: rectal admin of 10mg/kg, with a second dose after 24hrs if no IM / IV therapy accessible</p>	<p>These medicines should only be used in combination. Never use these medicines alone – a second antimalarial must be used</p> <p>If all or part of a dose is vomited within one hour of giving, the same amount should be given again immediately</p>	<p>The artemisinins are normally well tolerated, but they may all cause: headaches, nausea, vomiting, abdominal pain, dizziness, ringing in the ears, decreased white blood cells, increased liver enzymes, lack of appetite</p>	<p>Artemisinins should not be used on their own -- they should only be used in combination with another effective antimalarial (see ACT charts below)</p> <p>Since small amounts are used for the IM / IV doses for children, it is best to use the smallest syringe (such as a 1mL syringe) in order to ensure accurate measuring and dosing</p>
Artemether	<p>Injection 80mg/mL 40mg/mL</p> <p>Capsule 40mg</p> <p>Tablet 50mg</p>	<p>Adult and child over 6 months: IM load 3.2mg/kg, then 1.6mg/kg daily until patient can use tablets, to complete a 7 day course</p>			
Amodiaquine	<p>Tablet base (as HCl) 153mg 200mg</p>	<p><i>doses in terms of the base</i></p> <p>Adult and child over 20kg: 7.5mg/kg twice daily for 1 day, then 5mg/kg twice daily for 2 days (total dose 35mg/kg over 3 days)</p> <p>As combination with artesunate: 10mg/kg daily for 3</p>	<p>Teach the patient to recognize signs of blood disorders and liver problems (fever, sore throat, rash, ulcers, bruising, bleeding, weight loss, abdominal pain, nausea, vomiting)</p>	<p>Blood disorders, hepatitis, nausea, abdominal pain, vomiting</p>	<p>If all or part of a dose is vomited within one hour of giving, the same amount should be given again immediately</p>

		days together with artesunate 4mg/kg daily for 3 days (see ACT chart below)			
Chloroquine	<i>Chloroquine base as PO₄ or SO₄</i> Tablet 100mg 150mg Syrup 50mg/5mL Injection 40mg/mL	<i>doses in terms of the base</i> <u>Adult and child, by mouth (tablets or syrup):</u> 10mg/kg load, then 5mg/kg at 6 – 8 hrs later, then 5mg/kg daily for 2 days (total dose 25mg/kg over 3 days) <u>Severe malaria:</u> IV infusion (slowly, over at least 8 hours): 10mg/kg as initial dose, then 2 further infusions of 5mg/kg at 8 hour intervals (but give CQ as tablets as soon as the patient is able to take by mouth – for the total dose of 25mg/kg over 3 days) IM: 2.5mg/kg every 4 hrs or 3.5mg/kg every 6 hrs until total dose 25mg/kg completed	Take oral CQ after meals to help prevent nausea and vomiting If all or part of a dose is vomited within one hour of giving, the same amount should be given again immediately	Headache, nausea, vomiting, abdominal pain, convulsions, visual problems, rash, itching	Resistance is increasing in many African countries, meaning CQ is very often no longer an effective treatment for malaria
Quinine	<i>various salts</i> Injection (hydrochloride, dihydrochloride, sulfate) 300mg salt / mL Tablet (sulphate, bisulfate, hydrochloride, dihydrochloride) 300mg 200mg	<u>Severe malaria:</u> tablets: 10mg/kg (up to 600mg) three times a day (as every 8 hours) for 3, 7, or 10 days IV (adult): by slow infusion (over 4 hours) 20mg/kg load then 10mg/kg every 8 hours IV (children): by slow infusion	If all or party of a dose is vomited within one hour, the same amount must be given again immediately	ringing in the ears, headache, blurred vision, altered vision, nausea, diarrhoea, hot skin, rash, confusion, decreased blood sugar, blood disorders, effects on the heart	When given IV, quinine should only be given as a slow infusion Omit the loading dose if the patient has received quinine in the last 24hr or has received mefloquine in the last 7 days If a patient has

	<p><i>For practical purposes, one 300mg sulfate tab = one 300mg dihydrochloride tab = one and a half 300mg bisulphate tabs.</i></p> <p><i>One 300mg bisulphate tab = one 200mg sulphate tab.</i></p>	<p>20mg/kg load then 10mg/kg every 12 hours</p> <p>IM (if IV infusion not possible): 15mg/kg load then 10mg/kg every 8 hours until the person can take medicines by mouth</p>			<p>liver failure, the dose should be reduced by 25%</p> <p>Because hypoglycaemia (low blood sugar) is a potential side effect, especially in pregnant women, always provide glucose</p> <p>Quinine must be diluted before IM injection (maximum concentration 60 mg/mL)</p>
Mefloquine	Tablet 250mg	<p>15mg/kg (maximum 1000mg) as a single dose</p> <p>With artesunate as combination therapy: 25mg/kg given as a single or split dose on 2nd or 3rd day of artesunate (see ACT chart below)</p>	<p>Avoid in 1st trimester pregnancy</p> <p>If all or part of a dose is vomited within one hour of giving, the same amount should be given again immediately</p>	<p>Nausea, vomiting, abdominal pain, diarrhea – dose related and self-limiting</p>	<p>Do not give to infants weighing less than 5kg</p> <p>Avoid in people with a history of mental illness</p>
Sulfadoxine / pyrimethamine	Tablet S 500mg / P 25mg	<p>Adult: 3 tablets as single dose</p> <p>Child: single dose as per weight band: 5-10kg: ½ tab 11-20kg: 1 tab 21-30kg: 1.5 tab 31-45kg: 2 tabs</p> <p>In combination with artesunate: see ACT chart below</p>	<p>If all or part of a dose is vomited within one hour of giving, the same amount should be given again immediately</p>	<p>Rash, itchiness, nausea, vomiting</p>	<p>Resistance increasing in many African countries, meaning that SP is often no longer an effective treatment for malaria</p>

Dosing schedule for artesunate + mefloquine

Age	Dose in mg (number of tablets)					
	Artesunate (50mg)			Mefloquine (250mg)		
	Day 1	Day 2	Day 3	Day 1	Day 2	Day 3
5 – 11 months	25 (1/2)	25	25	-	125 (1/2)	-
≥1 – 6yrs	50 (1)	50	50	-	250 (1)	-
≥7 – 13yrs	100 (2)	100	100	-	500 (2)	250 (1)
>13yrs	200 (4)	200	200	-	1000 (4)	500 (2)

Dosing schedule for artemether-lumefantrine

Body weight (kg)	Approximate corresponding age (years)	Number of tablets at approximate timing of dosing					
		0h	8h after 1 st dose	24h after 1 st dose	36h after 1 st dose	48h after 1 st dose	60h after 1 st dose
5 – 14	< 3	1	1	1	1	1	1
15 – 24	≥3 – 8	2	2	2	2	2	2
25 – 34	≥9 – 14	3	3	3	3	3	3
> 34	> 14	4	4	4	4	4	4

Dosing schedule for artesunate + amodiaquine

Age	Dose in mg (number of tablets)					
	Artesunate (50mg)			Amodiaquine (153mg)		
	Day 1	Day 2	Day 3	Day 1	Day 2	Day 3
5 – 11 months	25 (1/2)	25	25	76 (1/2)	76	76
≥1 – 6yrs	50 (1)	50	50	153 (1)	153	153
≥7 – 13yrs	100 (2)	100	100	306 (2)	306	306
>13yrs	200 (4)	200	200	612 (4)	612	612

Dosing schedule for artesunate + SP

Age	Dose in mg (number of tablets)					
	Artesunate (50mg)			SP (500/25)		
	Day 1	Day 2	Day 3	Day 1	Day 2	Day 3
5 – 11 months	25 (1/2)	25	25	250/12.5 (1/2)	-	-
≥1 – 6yrs	50 (1)	50	50	500/25 (1)	-	-
≥7 – 13yrs	100 (2)	100	100	1000/50 (2)	-	-
>13yrs	200 (4)	200	200	1500/75 (3)	-	-

Dosing schedule for quinine tablets

Quinine 200mg salt		Quinine 300mg salt	
Body weight (kg)	Number of tablets	Body weight (kg)	Number of tablets
to 12	½	to 18	½
13 - 22	1	19 – 33	1
23 - 32	1 ½	34 – 48	1 ½
33 - 42	2	49 – 63	2
43 - 52	2 ½	64 – 78	2
53 - 62	3	79 – 92	2

Dosing chart for quinine IV (always IV infusion, never IV injection)

	Adult:	Child:
Loading Dose	20mg/kg in 500mL 5% dextrose or normal saline over 4 hours (max 1200mg)	20mg/kg in 15mL/kg 5% dextrose or normal saline over 4 hours
Maintenance Dose (until patient can take medicines by mouth)	10mg/kg in 500mL over 4 hours (max 600mg) every 8 hours	10mg/kg in 10mL/kg fluid over 4 hours every 12 hours

Sources for reference chart and tables: WHO guidelines 2006; WHO Model Formulary 2004; Ghana, Kenya, South Africa National Malaria Treatment Guidelines

AN EXAMPLE OF MALARIA NATIONAL TREATMENT GUIDELINES

Standard Treatment Guidelines, or National Treatment Guidelines, are used to guide (a) procurement and (b) health workers in providing the most effective treatment for the disease in a specific country setting. Below are examples of Malaria Guidelines from three countries, as an example for readers.

Country	First line regimen for uncomplicated malaria	Reference
Ghana	Artesunate + amodiaquine	www.moh-ghana.org
Kenya	Artemether / lumefantrine	www.kmis.org
South Africa	Artemether / lumefantrine	http://www.doh.gov.za/docs/factsheets/guidelines/malaria/treatment/index.html

PREVENTION OF MALARIA

There is a saying that "Prevention is better than cure." It is much better to prevent malaria in the first place. You can tell patients to do the following things in order to reduce the chances of getting malaria:



long-lasting treated kind, it will have to be re-dipped in insecticide to keep it effective at

- Sleep under an insecticide-treated mosquito net. Recently, special **long-lasting** treated nets have been invented. These keep their insecticide protection for four to five years, which means that users do not have to regularly re-treat the net. If the net is not the new

keeping mosquitoes away.

- Wear long sleeves and long skirts or trousers when outside at dusk or early in the morning. You may put insect repellent on exposed skin.
- Avoid allowing puddles of water in the area around the house. Mosquitoes lay their eggs in stagnant water.
- Teach the community about how malaria is spread and how they can avoid catching it.

Pregnant women, children under 5 and visitors to the area are most at risk of getting malaria.

They should be given prophylaxis – medicines to lower the risk of their getting sick, even if they are bitten by mosquitoes that carry malaria.



Send us your comments and questions!

We are very interested in hearing from our readers. Send questions, ideas and comments about the newsletter and we will make every effort to answer them. Send your questions to practicalpharmacy@gmail.com

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