

THE MANAGER

MANAGEMENT STRATEGIES FOR IMPROVING HEALTH SERVICES

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Case

A Malaria Task Force Works to Improve Supply and Demand for Appropriate Antimalarials

Addressing Barriers in Malaria Control through Pharmaceutical and Commodity Management

Editors' Note

MALARIA IS A SERIOUS, sometimes fatal disease caused by a parasite that is spread to humans through the bite of infected mosquitoes. For more than 50 years, chloroquine, an inexpensive and widely available medicine, has been used to cure malaria. Today, however, the world is faced with a resurgence of malaria, fueled in part by the spread of strains of the parasite that are resistant to chloroquine and other antimalarial medicines.

Malaria is a problem in every region of the developing world. The problem is greatest in Africa, where over 80 percent of malaria cases and deaths occur. The disease affects all ages and economic groups with a devastating impact on pregnant women and children less than five years of age. In 1992, the Global Ministerial Conference on Malaria released a world declaration in Amsterdam stressing, "the urgent need for commitment to malaria control by all governments, all health and development workers and the world community. . . ." The Conference went on to say, "We have learnt that the key to success [for malaria control] is to apply the right strategies in the right place at the right time, and to apply the appropriate strategies on a sustained basis." The 2000 Summit on Roll Back Malaria reiterated commitment to malaria control through an ambitious five-year strategy to improve treatment and prevention.

THIS ISSUE OF *THE MANAGER* focuses on both the barriers that impede the control of malaria and promising strategies for addressing them through pharmaceutical and commodity management. Policymakers and health managers can apply some of these strategies to ensure a supply of effective antimalarial medicines and promote their correct use. They can use other strategies to promote the wide distribution of insecticide-treated nets and insecticides for re-treating these nets. ■

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Subscriptions to *The Manager* are \$15 per year in North America, Western Europe, Japan, and Australia; in all other areas the publication is distributed free of charge. Postmaster: Send address changes to: 165 Allandale Road, Boston, MA 02130-3400 USA.

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The Manager (ISSN 1060-9172) is published quarterly by Management Sciences for Health with support from USAID. This publication does not represent official statements of policy by MSH, USAID, or the Bill & Melinda Gates Foundation. © Copyright 2003 Management Sciences for Health. All rights reserved.

Recommended citation: Management Sciences for Health. "Addressing Barriers in Malaria Control through Pharmaceutical and Commodity Management" *The Manager* (Boston), vol. 12, no. 1 (2003): pp. 1–24.

MSH Publications
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This issue was published with support from the US Agency for International Development through the Rational Pharmaceutical Management Plus (RPM Plus) Program under cooperative agreement HRN-A-00-00-00016-00. Additional support was provided by the Bill & Melinda Gates Foundation through the MSH Strategies for Enhancing Access to Medicines (SEAM) Program.



Promoting Effective Antimalarial Strategies While Ensuring Good Pharmaceutical and Commodity Management

Between 300 million and 500 million new cases of malaria occur every year, resulting in 1.5 to 1.7 million deaths annually. Those most vulnerable to malarial infection include children less than five years of age (particularly in Africa), pregnant women, and individuals with little or no natural resistance to malaria (nonimmune persons). In some areas, malaria is the leading cause of death of children under five. Complications from infection include anemia and increased susceptibility to other diseases.

Malaria represents a major public health challenge, particularly in many of the poorest countries. Well over three-quarters of the malaria cases and deaths occur in Africa. The disease also inflicts severe economic loss on societies in the form of lost school days, low economic productivity, and long-term disability from severe illness. In some areas, as much as 25 percent of annual household income is spent on malaria-related costs.

The total cost of malaria in sub-Saharan Africa has been estimated to be US\$12 billion per year with 40 percent of public health expenditures in high-burden countries going to malaria control and management. In some areas, gross domestic productivity is estimated to be 32 percent lower than it would be if malaria had been eradicated from Africa by 1960.

The magnitude of malaria's effects prompted renewed global commitment to eradicating the disease. The 1992 Global Ministerial Conference on Malaria in Amsterdam, attended by representatives from 102 countries, released the World Declaration on the Control of Malaria, which urges early diagnosis of malaria, prompt treatment, and sustainable preventive measures.

At the 2000 Summit on Roll Back Malaria in Abuja, Nigeria, African heads of state reaffirmed this commitment and called for "strengthened health systems to ensure that by the year 2005, at least 60 percent of those suffering from malaria will have prompt access to correct, affordable treatment and those at risk of malaria, particularly pregnant women and children under five years of age, will benefit from the most suitable combination of personal and community measures such as insecticide-treated mosquito nets and other materials to prevent infection and suffering."

Today, one of the biggest challenges in controlling malaria is combating drug resistance. Increasingly, one of the parasites that cause malaria (*Plasmodium falciparum*) is becoming resistant to chloroquine, the most widely used malaria treatment since the 1940s. The most common replacement for chloroquine in Africa, sulfadoxine-pyrimethamine (SP), is also rapidly losing effectiveness against this parasite. Continued use of ineffective pharmaceuticals not only contributes to the spread of drug resistance but also causes a disturbing increase in malaria-related morbidity and mortality. A shift to effective first-line treatment could prevent a substantial percentage of the deaths each year from malaria. Halting the spread of drug-resistant malaria needs to be a global priority, and resources must be focused on those areas of the world where the burden from the disease is greatest.

This issue of *The Manager* was written to support the goals of the Global Malaria Control Strategy. It outlines the current barriers to malaria control and offers policymakers and health managers at the district and provincial levels some ways to promote widespread access to safe, effective, high-quality, affordable antimalarial medicines and insecticide-treated nets for populations at risk, while developing systems for rational pharmaceutical use. It stresses that rational pharmaceutical use must be promoted to preserve the useful therapeutic life of effective antimalarial medicines and to reduce morbidity and mortality due to ineffective management of the disease.

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Understanding Malaria and Malaria Control Efforts

Malaria is an infection caused by parasites of the genus *Plasmodium*. Human malaria is caused by four species: *P. falciparum*, *P. vivax*, *P. malariae*, and *P. ovale*. The first two species have the widest distribution, with *P. falciparum* causing the most serious illness and the majority of deaths associated with malaria, particularly in Africa. *P. vivax* is the most prevalent species in Asia.

TRANSMISSION OF MALARIA

Malaria is normally transmitted through the bite of an infected female mosquito of the genus *Anopheles*. The female mosquitoes acquire the parasite when they feed on the blood of an individual infected with malaria, mainly between dusk and dawn. Malaria can also be transmitted through the transfusion of infected blood to a nonimmune individual.

EFFORTS TO CONTROL MALARIA

In the 1880s, one of the *Plasmodium* parasites was first identified in red blood cells, and mosquitoes were subsequently identified as the vector for this parasite. Early malaria control efforts focused on avoiding and killing mosquitoes. Later developments occurred in:

- 1955—environmental interventions were initiated aimed at eradicating mosquitoes with dichlor-diphenyl-trichloroethane (DDT) and synthetic insecticides.
- 1970s—as eradication efforts failed, particularly in Africa, new strategies focused on controlling malaria as part of primary health care, including promoting widespread use of chloroquine to prevent malaria.
- 1980s—failures of the malaria control efforts resulted in malaria ceasing to be a priority.
- 1990s to present—the World Health Organization (WHO) has fostered efforts to stimulate global malaria control through the Amsterdam conference's adoption of a global strategy for malaria and the establishment of the Roll Back Malaria partnership. Interest in attempts to develop a malaria vaccine is also growing.

Source: Technical Notes on Malaria Control, Malaria Consortium, www.malariaconsortium.org/Mcsumm.html

Why Does Malaria Continue to Spread?

With worldwide focus on malaria over decades, why does this disease continue to spread? Malaria disproportionately affects populations with few resources and vulnerable groups, such as pregnant women and young children. Its spread will continue until effective interventions are widely used and access to health services and preventive measures increases. The development of a vaccine to prevent malaria would greatly reduce the burden of this disease, but until researchers develop one, health services must rely on antimalarial medicines and insecticide-treated nets.

If you are a district or provincial health manager, you need to review local or regional surveillance data, if available, to answer questions about critical environmental factors that may be fueling malaria's spread in your geographic area:

- What are the patterns of drug resistance in your geographic area?
- What other infections are present that will influence the regional effects of malaria?
- What are the local patterns of malaria transmission and the risks to pregnant women and children?

Identifying Patterns of Drug Resistance

Researchers have found drug resistance in *P. vivax* (chloroquine resistance) and to a greater extent in *P. falciparum*. In fact, *P. falciparum* has been found resistant to almost all the antimalarials. Surveillance systems can help you determine if such drug resistance exists in your area.

Drug resistance for malaria was defined by WHO in 1973 as “the ability of a parasite strain to survive and/or multiply despite the administration and absorption of a medicine given in doses equal to or higher than those usually recommended but within tolerance of the subject.” Resistance to a medicine usually occurs as a result of changes in the gene structure of a parasite so that its sensitivity to the medicine is reduced. When a medicine is used to treat malaria, the parasite with the altered genes survives while other parasites die. This surviving parasite can continue to reproduce and be spread to other people.

When health care providers underdose patients or patients do not adhere to treatment regimens, they contribute to the spread of resistant parasites in the population.

Recognizing Other Infections That Influence the Severity of Malaria

Malaria interacts with other infections to increase general morbidity in infected people. A major cause of anemia in pregnant women and children, malaria destroys red blood cells or worsens anemia caused by malnutrition and other parasites. Individuals with HIV infection are at increased risk of developing malaria, and more severe malaria, probably because of their compromised immunity. HIV-infected pregnant women who are also infected with placental malaria are more likely to transmit the HIV virus to their fetus. Your population is more at risk if such infections are present in your area.

Understanding Patterns of Malaria Transmission and Risks to Pregnant Women and Young Children

There are two types of malaria transmission, endemic and epidemic, usually occurring in different areas of a country or group of countries. Both types of transmission pose significant risks to pregnant women.

Areas of **endemic transmission** are considered high- or stable-transmission areas. Endemic transmission occurs year-round, and most adult women who live in these areas have developed some degree of immunity. When they become pregnant, they may have “silent” attacks of malaria, without experiencing the common symptoms. Despite the lack of overt symptoms, pregnant women in endemic areas are at high risk of severe anemia and often have longstanding placental malaria. These conditions can lead to anemic and low-birth-weight babies, with increased risk of infant mortality.

Areas of **epidemic transmission** are viewed as low-transmission areas, where malaria occurs during certain seasons of the year. In these areas, adult women have generally not developed any immunity. When they become pregnant, they are two to three times more likely to get clinical malaria than nonpregnant women living in the same region. Clinical malaria marks the point at which infection with malaria turns into a disease with symptoms. The symptoms make it

more likely that pregnant women will seek help or be diagnosed during prenatal visits. If untreated, their infection can result in severe anemia, miscarriage, premature delivery, stillbirth, or even maternal death.

Regardless of the type of transmission, malaria in children under five causes fever and anemia and increases their susceptibility to other diseases.

Recognizing Barriers to Malaria Control Efforts

While geographic areas may have different local patterns of drug resistance and of infections, all health managers face many of the same barriers in treating and preventing malaria. After looking at disease surveillance data for your area, you need to recognize local barriers to pharmaceutical and commodity management. Barriers reduce your ability to provide infected individuals with the prompt, effective treatment necessary to reduce death and illness from malaria. *For example, low-income people frequently lack access to effective health services and therapy, thus hindering their treatment, and their referral if their infection is severe.* Other barriers you may face include:

- unnecessary treatment of adults;
- limited availability and high cost of diagnostic tests;
- rising costs of antimalarial treatment;
- substandard or poor-quality pharmaceuticals;
- inadequate regulatory systems to control the quality of antimalarial medicines;
- difficulties in changing first-line pharmaceutical therapies;
- populations' over-reliance on sources of ineffective medicines;
- providers' noncompliance with pharmaceutical guidelines and dosages;
- patients' nonadherence to medical advice and instructions;
- limited availability and cost of insecticide-treated nets.

Unnecessary Treatment of Adults

Where the diagnosis of malaria depends primarily on the clinical skills of the providers, as it does in most parts of Africa, providers often diagnose malaria in adults who do not have malaria. This results in widespread overtreatment and extra costs for the health care system. It can contribute to increased resistance if treated adults are exposed to the malaria parasite when they have subtherapeutic or ineffective medicines in their systems.

Standard criteria exist for the clinical diagnosis of malaria, but they are not highly accurate because other diseases commonly cause fevers in the populations at risk for malaria. Given the difficulty of diagnosis, as reliable medicines become more expensive, providers will need to improve their diagnostic skills or weigh the effects of not treating an infected individual against the costs of treating a noninfected individual. Where malaria is common in children under five years of age, particularly in high transmission areas in Africa, treating children is never a problem. There, it is generally considered prudent to treat fever in all children under five as malaria in order to prevent death.

Limited Availability and High Cost of Diagnostic Tests

In areas with low transmission of malaria, biological tests can improve diagnosis. However, in areas of high or stable transmission, among semi-immune, nonpregnant adults, tests are not very useful because these populations normally carry malaria parasites in their blood without the appearance of symptoms. Basic microscopy can differentiate species of malaria parasites and estimate the density levels of these parasites, but health care facilities in countries with few resources often lack the necessary materials, equipment, and trained personnel to perform these tests. In addition, the absence of parasites in blood drawn for testing does not necessarily mean that infection is absent. Specialized dipsticks are highly effective in identifying *P. falciparum* in Southeast Asia, but they are not useful for detecting treatment failures or other malaria parasites. These dipsticks are expensive and significantly drive up the cost of treatment. As a result, in areas of

high transmission, clinical diagnosis is often used. Efforts to bring down the cost of diagnostic tests could help decrease unnecessary treatment.

Rising Costs of Antimalarial Treatment

Because of drug resistance, the limited possibilities for affordable treatment alternatives for malaria may soon be depleted. If this happens, communities may need to rely on newer, alternative pharmaceutical treatments. Currently, the most promising of these are the artemisinin combinations. However, treatment with these is 20 to 400 times more expensive than with the older medicines and would be out of reach for most households at risk. National pharmaceutical committees may find it difficult to select a replacement therapy because the newer replacement pharmaceuticals may not have chloroquine's "useful therapeutic life" of 50 years, and national treatment policies may need to be changed more often.

Substandard or Poor-Quality Pharmaceuticals

A significant percentage of antimalarial pharmaceuticals are ineffective against the disease either because of developed resistance or because they have low levels of active ingredients. The quality of antimalarial pharmaceuticals on the market varies widely. *For example, a 2001 assessment of access to essential medicines prepared for the MSH/CPM Strategies for Enhancing Access to Medicines (SEAM) Program indicated that the active ingredient in sulfadoxine-pyrimethamine (SP) tablets in one African country varied from 28 to 108 percent of the stated dose amount. Only five out of 11 generic products tested conformed to the labels, and none met the required criteria for disintegration.* Other studies have shown that high percentages of pharmaceuticals on the market lack all the active ingredients they claim to contain. *For example, in Asia where artemisinin combinations are expensive, increasing numbers of counterfeit antimalarials are being introduced in packages that mimic an existing brand yet contain no active ingredient.*

Inadequate Regulatory Systems to Control Pharmaceutical Quality

If your country's regulatory system for controlling pharmaceutical quality is inadequate, it will contribute to irrational prescribing and use of pharmaceuticals, distribution of poor-quality products, and intensified drug resistance. Reasons for differences in the quality of pharmaceuticals include gaps in regulatory capacity, lack of implementation of guidelines for generic pharmaceuticals, little or no quality control over imported products, lack of skilled workers to provide inspections, and financial incentives to sell inexpensively produced low-quality pharmaceuticals for large profits. Only 20 percent of WHO's 191 member states have a well developed pharmaceutical regulation system, and another 50 percent have regulatory systems at varying levels of development (Kapp 2002). To improve the quality of pharmaceuticals requires testing for quality prior to pharmaceutical registration, an effective post-marketing surveillance system, and controls at country borders. Inspections are necessary to enforce quality standards.

Difficulties in Changing First-Line Pharmaceuticals

If the pharmaceuticals specified for your region are ineffective because of drug resistance, efforts may be underway to change first-line pharmaceuticals. Making this change requires changing entrenched practices of providers by influencing the decisions of many sectors and stakeholders. Influencing the decision makers is not easy. Despite resistance to chloroquine in most of Africa, the WHO Regional Office for Africa indicates that only four of the 17 countries with a malaria-in-pregnancy policy are actually implementing it. Opposition to desired changes is largely the result of past success. Chloroquine has been used for more than 50 years, is widely available and relatively safe, and has few side effects. Any new policy addressing the use of antimalarial pharmaceuticals needs to include long-term objectives to ensure safe, effective, high-quality pharmaceuticals while also being sensitive to emerging strains of resistant parasites.

Populations' Over-Reliance on Sources of Ineffective Medicines

Rather than seeing a health care provider when symptoms of malaria occur, many individuals (between 12 and 89 percent in sub-Saharan Africa [McCombie 1996]) treat themselves with ineffective medicines from private drugstores or the black market. If these medicines do not seem to work, individuals may eventually visit a provider in the formal sector, but often after their condition has deteriorated. Practical access to affordable, essential antimalarial pharmaceuticals should be available not only through the public sector but also through formal and informal private-sector outlets where people go for treatment. To ensure appropriate dispensing of essential pharmaceuticals will require different strategies tailored to outlets' and providers' situations.

Providers' Noncompliance with Pharmaceutical Guidelines and Dosages

Even if health care facilities and private outlets have a reliable supply of high-quality antimalarial pharmaceuticals and patients obtain treatment early in their illness, effective treatment depends on provider compliance with up-to-date treatment guidelines.

Providers' perceptions of specific treatments influence their compliance with treatment guidelines. In the private sector, providers often dispense small quantities of pharmaceuticals because they believe that many patients are not able to afford a full treatment and think of this as the simplest solution. Providers may not consistently educate patients about the correct way to take the treatment and the importance of completing a full course of treatment. This is partly because many providers dispensing pharmaceuticals neither know enough about the illness and recommended treatment, nor are closely monitored.

In the public sector, many providers have no way of staying current about new developments in guidelines and treatment policies. Poor salaries and competition

from private providers may sap their motivation to seek information and provide good service. Excessive patient loads may prevent them from spending enough time with each patient.

Patients' Nonadherence to Medical Advice and Instructions

Patient adherence can be defined as the degree to which patients follow medical advice and take medicines as directed. For malaria treatment to be effective, patients must understand their role in treating their disease and be willing and able to carry out instructions for correct use. Many barriers can keep patients from taking their antimalarial medicines correctly:

- insufficient information about the severity and potential consequences of the disease;
- inability to afford effective medicine or complete doses of a medicine;
- lack of understanding of instructions and discomfort about asking questions;
- confusion about the number of daily doses needed;
- inability to take the doses as required for various reasons, including the frequency of doses or unpleasant side-effects of the medicines;
- lack of understanding about how quickly or slowly the medicine begins to work;
- lack of understanding about the length of time needed to complete treatment;
- discontinuation of medication when symptoms disappear, due to a lack of understanding of the importance of completing treatment;
- confusion caused by varied pharmaceutical packaging and by variations in a medicine's taste, color, tablet size, or dosage volume.

Improving Patient Adherence: What a Provider Can Do

The provider must first have accurate, up-to-date information to give to patients from the country's current standard treatment guidelines. The provider must gain patients' trust and persuade them that treatment is worthwhile. To improve patients' adherence, providers need to:

- be sympathetic and reassuring;
- discuss the disease, symptoms, and treatment in a culturally appropriate way;
- ask nonjudgmental questions to understand each patient's perspective on malaria, its causes and effects, and why adherence might be difficult;
- carefully explain the medicine's possible side-effects and why it is important to continue with the treatment despite any side-effects;
- discuss with each patient his or her concerns in taking the medicine;
- explain the number of doses, when to take them, and for how long;
- include instructions, in writing or pictures, on taking the medicine;
- arrange subsidies to cover the costs of low-income patients, especially those from vulnerable groups.

Limited Availability and Cost of Insecticide-Treated Nets

Insecticide-treated nets are very effective in preventing malaria, yet currently require some public support before they become commercially sustainable. Their cost, though low, still remains beyond the reach of the most vulnerable populations. A recent Roll Back Malaria analysis estimated that a net with a useful life of about five years is US\$3.50, while the cost of treating the net once is an additional US\$0.50. The nets need to be retreated every six to 12 months in order to stay effective, and while untreated nets are available in many regions, the insecticide for treating the nets is not yet widely available. Sustaining continual retreatment will remain a challenge until it becomes a local custom. For ways to overcome this barrier, please see "Supporting the Distribution of Insecticide-Treated Nets and Insecticides" on pages 11–12.

Laying the Groundwork for Stronger Malaria Control

Though the barriers to malaria control are numerous, you and other health managers can address them through a number of very effective preventive and curative measures. First, you need to lay the groundwork that will help to ensure the success of these measures by:

- establishing up-to-date standard treatment and prevention guidelines;
- working toward intersectoral collaboration;
- linking public communication and patient incentives to supply strategies;
- considering possible interventions in the context of the pharmaceutical and commodity management cycle.

Establishing Up-to-Date Standard Treatment and Prevention Guidelines

As a manager, you should establish standard treatment and prevention guidelines at the provincial or local level to promote the rational use of effective antimalarial treatment and treated nets. First, familiarize yourself with your country's national guidelines for treating and preventing malaria. Make sure they are up to date and responsive to the situation of your province or area, based on your review of local disease surveillance data and drug resistance data. Check the date on the guidelines and see if they include a discussion about whether they were developed to address rising levels of drug resistance. National guidelines need to be continually updated as the malaria parasites develop resistance to commonly used medicines. If you work at the provincial or local level, you can alert the national level if treatment failures to particular pharmaceuticals increase, so that the appropriate authorities can modify the guidelines.

Any changes to the national guidelines need to be distributed widely throughout the public and private sectors and among NGOs. Some versions of the guidelines need to be adapted for use by nonphysicians at health care facilities. Your distribution strategy should address the fact that, in some areas, the private sector has rarely had new guidelines, so personnel in that sector are either unaware that the guidelines exist or are only aware of older national guidelines that may no longer be in effect.

You can also advocate for updated provincial or local guidelines if they are out of date. These will need to be in line with the national guidelines and based on local disease patterns. It is important that the local guidelines complement guidelines for other programs, such as those for the integrated management of childhood illnesses (IMCI) and for reproductive health. Once the local guidelines are current, you can oversee their distribution in your area and make them available at all health care facilities.

Working toward Intersectoral Collaboration

Throughout the world, antimalarial treatment is frequently offered through formal and informal outlets in the private sector as well as through the public sector

and nongovernmental organizations (NGOs). People using public-sector clinics may be referred to shops that sell insecticide-treated nets. It is therefore critical that you collaborate with managers of other sectors to ensure that effective treatment and prevention measures are delivered appropriately. If you are a district or provincial manager, you can take the following steps to encourage a coordinated approach:

- train and support providers, dispensers, and shopkeepers in all three sectors;
- investigate franchising and accreditation of drug shops;
- develop collaborative interventions;
- offer incentives to providers.

Train and support health care providers, dispensers, and shopkeepers. Once the guidelines are widely distributed, you need to ensure they are implemented in all sectors. To do this requires training public, private, and NGO providers and dispensers who provide antimalarial medications, including traditional healers, public health physicians, and national malaria control program managers. Also consider organizing training in preventive measures for shopkeepers who are willing to stock mosquito nets and for community health workers who can help treat the nets with insecticide.

Once these groups have been trained, you will need to provide management support for them, their helpers, and other staff. You should set up or strengthen systems for communication, supplies, supervision, monitoring, and evaluation. Communicate with private dispensers and other organizations working on malaria control to disseminate new information, assist in problem solving, and speak on behalf of your program. Provide direction and motivate your own staff to carry out their antimalarial tasks well. Allocate your resources effectively, negotiate agreements with your staff and partners, and implement changes to keep your program focused and current.

Investigate franchising and accreditation of drug shops. To ensure the quality of drug shops, you can investigate national or regional approaches for establishing accredited drug-dispensing outlets. Accredited approaches for dispensing pharmaceuticals foster the de-

velopment of alternative suppliers for public, private, and church mission health care services. Working with pharmacy boards, these accredited outlets help to assure the quality and affordability of pharmaceuticals dispensed. Whether part of a franchise or independent, such outlets need to be monitored through a combination of government accreditation (with the threat of losing their license to sell pharmaceuticals if their quality declines) and community oversight through local government and community institutions.

Develop collaborative interventions. Partnerships between various sectors of the Ministry of Health greatly improve the quality of services. *For example, you may want to investigate a partnership between your malaria control program and the reproductive health department in the Ministry of Health to improve implementation of your interventions to control malaria during pregnancy.*

Offer incentives for providers. Well thought-out incentives can motivate providers to prescribe appropriately. You may want to consider instituting monetary bonuses for accurately providing the most current

treatment and care, or travel vouchers to cover the cost to providers of traveling for community outreach.

Linking Public Communication and Patient Incentives to Supply Strategies

To create demand for appropriate medications and treated nets, you will need to establish systems through which you can communicate with communities about the policies you are implementing and the rationale behind these policies. Your contact should take into account current patterns of communication between providers and consumers and their various perceptions about treatments and services for malaria and other diseases.

Incentives can encourage patients to responsibly take the medicines you promote or to purchase treated nets. You may want to use travel vouchers that cover patients' transportation costs to a clinic to encourage timely treatment.

The following box provides an example of an intervention in Kenya designed to communicate appropriate treatment information to both providers and patients.

Working Solutions—Kenya

VENDOR-TO-VENDOR TRAINING AND PUBLIC INFORMATION EXCHANGE

The African Medical & Research Foundation (AMREF) in Kenya developed a district-wide strategy to improve malaria treatment practices in the Bungoma district. The strategy included having vendors train other vendors and distribute simple job aids produced by the foundation.

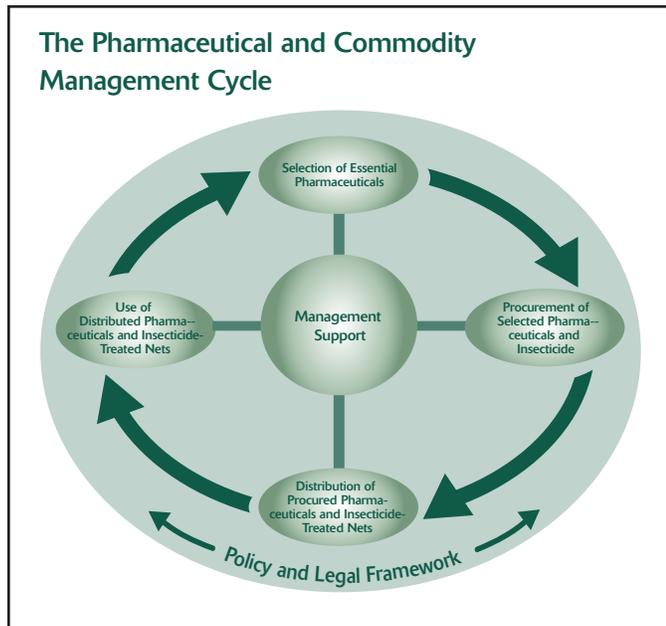
At the same time, the foundation initiated a neighbor-to-neighbor information exchange system where five persons in each community receive information on the appropriate treatment for malaria and relay

this information to at least five others, who then pass the information on to another five, and so on.

This two-pronged intervention has improved the rates of appropriate prescription to over 50 percent, compared to 21 percent in outlets not participating in the intervention. The program still needs to strengthen the public/private partnership, maintain retailers' motivation, address the unregulated market for antimalarial pharmaceuticals, and secure sufficient long-term funding.

Considering Strategies within the Pharmaceutical and Commodity Management Cycle

As you design prevention and treatment strategies for your malaria control program, it will be helpful for you to view your strategies within the context of good management for antimalarial pharmaceuticals and commodities such as insecticide-treated nets. The pharmaceutical and commodity management cycle provides a useful, systematic approach to the management of these supplies.



The pharmaceutical and commodity management cycle can help you think about the distribution and use of antimalarial products and the procurement of these, if that is a responsibility of your province. For more information on the pharmaceutical and commodity management cycle, please refer to Management Sciences for Health and the World Health Organization, *Managing Drug Supply*, second edition, 1997.

Advancing Preventive Measures to Protect against Malaria

Spraying to reduce mosquito populations has tended not to be cost-effective except in places where mosquitoes have permanent breeding places or tend to rest in houses. However, there are two highly effective preventive measures you should advance:

- insecticide-treated nets that keep mosquitoes from biting people as they sleep;
- intermittent preventive therapy that protects pregnant women from malaria.

Supporting the Distribution of Insecticide-Treated Nets and Insecticides

Insecticide-treated nets, commonly used around beds, help protect both the population at large and the high-risk groups (pregnant women and young children). Treated nets are one of the most effective, low-cost interventions you can promote. They decrease the risk of malaria by keeping malaria-infected mosquitoes from physically contacting people, and, unlike untreated nets, can repel or kill the mosquitoes. When used appropriately, the treated nets decrease the risk of death in children under five by 20 percent and reduce cases of malaria by 50 percent.

Net treatment. The nets need to be initially treated and then re-treated every six months to a year depending on how often they are washed. You can include net treatment, installation, and periodic retreatment as one of the tasks of community health workers.

Financing and collaboration for local distribution. One of the Abuja summit goals is to ensure that 60 percent of pregnant women and of children less than five years of age in Africa have a treated net by the year 2005. To achieve this coverage, you can increase the access of low-income and high-risk groups to low-cost, treated nets through public-private collaboration. To make certain that nets are provided in an equitable way to those most in need, you may want to:

- **Provide vouchers.** Health care providers can give vouchers to patients to purchase the nets and insecticide from retail stores in the private sector at a discounted price. The vouchers need to be designed so they can only be redeemed for these nets and treatment kits, and the private sector needs to offer both the nets and kits in the same geographic areas as the voucher programs. Vouchers foster the sustainable distribution of the nets, because health care facilities avoid the costs of stocking the nets and do not compete with private vendors.

- **Sell nets at a subsidized price.** Your health care facilities can sell treated nets to patients or exempt patients from charges for these supplies. Since public-sector distribution is more difficult to sustain than private-sector distribution, any distribution through public clinics or NGOs should be limited to the most vulnerable patients, such as impoverished pregnant women, who might not normally purchase the nets from stores.
- **streamline the registration process for appropriate insecticides** so that insecticides that are chemically safe for use in homes and effective against mosquitoes are available;
- **provide information, education, communication (IEC), and appropriate advertising** for treated nets and create demand for the insecticide for treating nets, as 10 to 30 million untreated nets exist in Africa.

In China and Vietnam, people buy their nets from vendors, while the government offers free insecticide treatment for the nets because it has been harder to stimulate public demand for and commercial supply of this insecticide.

Positive business environment. To ensure widespread availability of treated nets, your region needs a business environment that favors private-sector involvement in selling the nets and insecticides. Roll Back Malaria suggests that at the national level, governments take three steps to expand the distribution of these supplies in the private sector:

- **develop a favorable fiscal and regulatory environment** by removing tax and tariff barriers to reduce the cost of the materials used in manufacturing the nets and ultimately the consumer price;

If you are a provincial or district manager, you can promote local demand for treated nets by encouraging social marketing strategies in your area. You can also encourage cooperatives that sew and sell treated nets.

Long-lasting insecticidal nets. Long-lasting nets may overcome some difficulties in re-treating the nets. Long-lasting nets retain an effective amount of insecticide over time because the fibers used in manufacturing the netting have insecticide incorporated in them rather having the insecticide applied after the nets are made. If you encourage supply and demand for such nets, recognize that they are more expensive and that the people who use these nets will still need the same information as users of other treated nets: the effects of different soaps on the insecticide, how to return the insecticide to full strength after washing, and the useful life of nets under home conditions.

Working Solutions—Africa

PROVIDING INSECTICIDE-TREATED NETS TO HIGH-RISK GROUPS

Tanzania will soon implement a system in maternal and child health clinics to provide vouchers for high-risk groups to redeem with retailers for insecticide-treated nets. The retailers will, in turn, be able to redeem the vouchers through banks. Through this approach, the government is expecting to stimulate the private sector's distribution of the treated nets and increase their use in rural areas without placing an administrative burden on health care staff. Potential problems with this initiative include fraud (vouchers are highly valued items), retailers' refusal to accept the vouchers, and lack of cooperation from banks.

The Uganda ministry of health is proposing a similar scheme. Pregnant women visiting public and private prenatal clinics and parents or caretakers of children under five receiving services through the Expanded Programme on Immunizations (EPI) will receive vouchers that they can exchange for subsidized treated nets at retail outlets. Coupons redeemable for only one brand of treated net are being tested in four districts.

The Ghana ministry of health is distributing treated nets to families as part of its EPI services. Caretakers will receive training in the treatment and retreatment of nets with appropriate insecticides.

Protecting Pregnant Women through Preventive Treatment

As a district or provincial manager, one of your highest priorities is to protect pregnant women from malaria. In addition to making sure these women have treated nets, you need to partner with family planning and reproductive health programs to offer treatment through prenatal services. In this way, you can quickly expand

malaria control for pregnant women wherever large numbers of women attend prenatal clinics at least once during their pregnancy, such as happens in many African countries. If your area has endemic (year-round) transmission, women may not show symptoms, so you will want prenatal clinics to offer Intermittent Preventive Treatment (IPT).

Intermittent Preventive Treatment for Pregnant Women

The health care facilities that offer prenatal and reproductive health services in areas of endemic transmission should offer Intermittent Preventive Treatment (IPT) for pregnant women. IPT clears malaria parasites from the blood of pregnant women so their babies can be born healthier.

WHAT IS IPT?	IPT provides for full curative treatment doses of an effective antimalarial at predefined intervals during pregnancy, beginning in the second trimester after the first noted movement of the fetus (quickening).
HOW OFTEN?	WHO advises that all pregnant women in areas of endemic transmission receive the recommended antimalarial pharmaceutical at the first prenatal visit after quickening and at each regularly scheduled visit after that, for a minimum of two IPT doses. Since the prenatal schedule recommended by WHO requires three visits in the second and third trimesters, the ideal schedule would result in three doses of the recommended antimalarial.
WITH WHAT MEDICINE?	A single-dose antimalarial pharmaceutical is the preferred medicine for IPT because it improves adherence by allowing the treatment to be directly observed. The currently recommended pharmaceutical is sulfadoxine-pyrimethamine (SP) (500mg/25mg); a single dose is three tablets. Extensive research has shown that IPT using SP significantly reduces placental malaria, low birthweight in infants, and severe maternal anemia. Due to increasing resistance to SP, particularly in East Africa, however, studies are underway to identify medicines that could replace SP for the IPT strategy.

Source: WHO/AFRO, *Strategic Framework for Malaria Control during Pregnancy in the Africa Region*, 2002.

Strengthening Treatment for Malaria

Controlling malaria through treatment means providing prompt access to effective treatment, preventing progression to severe disease, and dealing effectively with malaria during emergencies and outbreaks. Your approach needs to combine a strategy and a pharmaceutical, for example, reaching agreement with the Expanded Programme on Immunizations to use an artesunate/sulfadoxine/pyrimethamine combination pharmaceutical for children under five. To strengthen treatment for malaria, you need improve the diagnosis

and referral of severe cases, making sure that second-line medicines are available at referral centers for severe cases. Other strategies you may want to consider include:

- procuring effective pharmaceuticals;
- making appropriately packaged products available;
- integrating malaria control with child survival services;
- improving home-based treatment;
- advocating for national policies that support effective pharmaceuticals.

Procuring Effective Pharmaceuticals

Good pharmaceutical procurement involves purchasing pharmaceuticals in ways that contribute to their availability and quality, promote effective treatment, and preserve scarce resources by controlling costs. If your program procures antimalarial pharmaceuticals at the provincial level, then based on your up-to-date standard treatment guidelines, you should:

- procure the most cost-effective antimalarial pharmaceuticals in the right quantities;
- select reliable suppliers of high-quality products;
- ensure timely delivery;

- achieve the lowest possible cost for all pharmaceuticals.

If the malarial parasite in your area is resistant to chloroquine, your malaria guidelines may require that you procure an alternative therapy. While this can be expensive, several initiatives are underway to develop low-cost therapies. Converting to a more effective pharmaceutical can reduce malaria mortality and morbidity, as well as improve the quality of care and help reduce health care costs from return visits and inpatient admissions. For more information on how to procure effective pharmaceuticals, see *Managing Drug Supply*, second edition, 1997.

Staying Ahead of Resistance with Combination Therapies

SUCCESS OF CTS

In many regions, monotherapy, or the use of a single antimalarial pharmaceutical, is still widely used to treat malaria. Yet experts believe that increasing resistance to antimalarial medicines can be slowed by the use of a combination of two or more pharmaceuticals at the same time. Combination therapies (CTs) using artemisinin-based pharmaceuticals, also known as ACTs, have been successfully used in Southeast Asia, especially in border areas with frequent migration, where multidrug resistance tends to flourish. This approach has improved the success rate of treatment and appears to have slowed the development of resistance while reducing malaria's transmission.

CURRENT RESEARCH

It is still unclear whether a combination is less effective if it includes one pharmaceutical to which a malaria parasite is resistant. Several studies in Africa are evaluating the effectiveness of ACTs there and assessing which combination should be used. To address the urgency of malaria in their countries, some African governments have already adopted ACTs without waiting for the studies' results. *For example, Zambia has decided to use a combination of artemether/lumefantrine; Zanzibar is using artemether/amodiaquine; and Burundi and the KwaZulu-Natal province in South Africa, are using an artesunate/sulfadoxine/pyrimethamine combination.*

ISSUES IN INTRODUCING CTS

In order for CTs to reduce resistance in a region, all monotherapy pharmaceuticals must be replaced with CTs in both the private and public sectors. Poor prescribing practices and nonadherence to guidelines in either sector could pose challenges to the effectiveness of CTs. Introducing CTs also requires changes in national pharmaceutical policy and strategies for their implementation. Some countries are choosing to move to other treatments while they try to sort out all the issues that policymakers need to consider:

- challenges in marketing the new combinations;
- the increased cost of ACTs;
- equity issues and delivery issues arising because most CTs are currently available only as separate pharmaceuticals with shorter shelf lives;
- changes in both provider and user behavior to ensure availability and rational use of the combinations;
- the possibility of replacing the clinical diagnosis of malaria with a more definitive biological diagnosis based on laboratory tests so that ACTs are not prescribed unnecessarily.

Making Appropriately Packaged Products Available

To make it easier for providers and patients to effectively use antimalarial treatments, you can support making available prepackaged products that meet your country's and your area's most effective treatment regi-

men. With their premeasured doses of daily medicines, blister packs are easy for providers to prescribe and for patients to use with proper instruction. These packs also make tampering with the medicines difficult to conceal.

Working Solutions—Cambodia

INTRODUCING PREPACKAGED FIRST-LINE TREATMENTS IN THE PUBLIC AND PRIVATE SECTORS

In Cambodia during the mid- to late 1990s, patients in areas of endemic transmission obtained malaria treatment in their communities, most often from private providers. Inappropriate medicines and dosages were common, and fake or substandard pharmaceuticals were widely available from pharmacies and other vendors. As a result, in 1999 the Cambodian National Malaria Center implemented an approach with three components to improve early diagnosis and use of effective antimalarial medicines:

- conventional public-sector channels to train and use a network of village malaria workers in the most remote, inaccessible, highly endemic areas;
- social marketing using IEC techniques to inform and persuade consumers and to advertise the availability of effective first-line pharmaceuticals through the private sector;
- program efforts to improve clinical diagnostic skills and provide a prepackaged combination therapy

(artesunate/mefloquine) in the public sector as the first-line pharmaceutical for *P. falciparum*.

To facilitate distribution of an effective first-line therapy in the private sector, its strategy also called for an equivalent artesunate/mefloquine combination therapy in that sector. With the support of WHO and the European Union and using research in the private sector, the National Malaria Center offered an attractive brand of combination therapy that could be easily promoted through social marketing. It was named Malarine, because tests found the name to be universally liked and remembered.

To encourage rational use, the public-sector product was repackaged in blister packs, sealed to discourage tampering, and distributed only to specific community providers who were trained to dispense them correctly. This approach is being scaled up for countrywide use, although distributing the products to remote areas, particularly along the Cambodia-Thailand border, will remain a challenge.

Integrating Malaria Control with Child Survival Services

For young children, it is important to combine malaria control with child survival services, such as the integrated management of childhood illness (IMCI) strategy. Child survival strategies generally incorporate case

management and prevention to improve the health and well being of children under five by focusing on treating major childhood illnesses, including malaria, pneumonia, diarrhea, and malnutrition. The IMCI strategy has three national components that can be adapted for use in malaria programs:

- improve case management skills of health-care staff by developing and adapting local guidelines, training health care providers, and training community health workers in problem-solving in the community;
- improve the overall health system by making pharmaceuticals and supplies more available, strengthening the quality and organization of services in both public and private health care facilities, reinforcing referral services, and ensuring equitable access to health care;
- improve family and community health practices by strengthening community participation, encouraging families to respond appropriately to their children's illnesses, promoting good nutrition among children, and creating safe environments for them.

You will need to consider what combination of child survival components and preventive measures, such as treated nets in the home, will be appropriate for children in your area.

Improving Home-Based Treatment

Home-based management of fever assumed to be caused by malaria has recently been identified as a key strategy for achieving the Roll Back Malaria targets. To improve home-based care for malaria in a sustainable way, you must identify the current problems in home treatment in your region, develop strategies to address the problems, and integrate the strategies within a package of existing interventions, such as child survival programs.

Studies in Ghana, for example, uncovered one problem: 22 percent of caregivers took appropriate action for malarial illness in children within 24 hours, but only 15 percent of those using medicines gave a correct dose at the correct time. One of the contributing factors was that mothers relied on chloroquine syrup to treat fever in children under five and measured the dose incorrectly with a variety of devices or had difficulty with the syrup's instructions. One group of caregivers was subsequently given prepackaged tablets to see if the situation improved. Of this group, 91 percent adhered to the recommended antimalarial dosage, compared to 42 percent of another group given syrup.

Based on the problems in home treatment that you identify in your area, you may want to consider one or several of the following strategies:

- make available prepackaged tablets of the recommended antimalarial medicine, color-coded for different age groups;
- attach pictorial and written labels with clear instructions to the medicine containers that patients receive;
- distribute medicines free or at low cost through trained distributors or community health workers who can instruct caregivers;
- use trained mother coordinators to administer treatment and inform caregivers.

Advocating for National Policies That Support Effective Pharmaceuticals

If your country has unsafe, ineffective, low-quality pharmaceuticals, then you need to advocate for national policies for sampling and testing the anti-malarial products that are entering the country or manufactured in-country. Some countries already have developed their own regulatory bodies, employing trained pharmaceutical inspectors to ensure that registered products meet national quality standards. These inspectors need training and supervision to effectively monitor pharmaceutical manufacturing plants, so they can make sure that the plants comply with good manufacturing practices and that pharmaceutical products on the market meet specifications for quality.

For example, Tanzania has designed a tiered product testing program to assess the quality of imported and locally manufactured pharmaceuticals. This includes testing locally manufactured products for quality prior to their registration, and testing for all imported products at their port of entry.

You can also advocate for drug resistance monitoring as part of the national malaria strategy and for training and resources for scientists and researchers in your country, so that they can participate fully in new malaria research.

Using Resources to Plan for Malaria Control

Knowledge about available strategies and resources and tools for collecting information can help you plan realistic activities at your program level that will help support global activities for malaria control. It is es-

pecially important to link your planning for malaria control to your country's national planning and budgeting for the health sector. To help you plan to meet your region's treatment and prevention needs, you may want to consider the following global strategies, international resources, and tools for collecting data for malaria control.

Global Strategies and Resources for Malaria Control

THE GLOBAL MALARIA CONTROL STRATEGY

Developed by WHO with countries where malaria is endemic, this strategy has shaped the malaria control measures in most countries. The strategy has four elements that have been incorporated into Roll Back Malaria:

- provide early diagnosis and prompt treatment for malaria;
- plan and implement sustainable preventive measures, including mosquito control;
- prevent, detect early, and contain malaria epidemics;
- strengthen local capacities in basic and applied research for malaria.

ROLL BACK MALARIA (RBM)

The RBM partnership was established in 1998 by WHO, the United Nations Children's Fund, the United Nations Development Programme, and the World Bank as a global partnership to encourage collaboration to ensure prompt, effective treatment of malaria. Its goal is to decrease malaria-related mortality by at least 50 percent by the year 2010. Intermediate goals include:

- at least 60 percent of people with malaria will have access to and correctly use affordable and appropriate treatment within 24 hours of the onset of symptoms;
- at least 60 percent of people at risk of malaria, particularly children under five and pregnant women, will benefit from protective measures such as insecticide-treated mosquito nets and other accessible, affordable interventions;
- at least 60 percent of pregnant women at risk of malaria, especially those in their first pregnancies, will have access to intermittent preventive treatment.

Web site: www.who.int/rbm

THE GLOBAL FUND FOR AIDS, TB, AND MALARIA (GFATM)

The GFATM is a public-private partnership that attracts, manages, and disburses resources to reduce infections, illness, and death caused by HIV/AIDS, TB, and malaria. The fund provides grants to public, private or nongovernmental programs. Since 2001, the fund has received US\$4.7 billion for financing activities through 2008. Countries in Africa, the Middle East, Asia, and Latin America have been awarded funds for their proposals, which they are using to purchase medicines and commodities essential for controlling malaria.

Web site: www.theglobalfund.org

THE BILL & MELINDA GATES FOUNDATION

The Gates Foundation funds malaria research for improving mosquito control, developing new drugs that target resistant strains of malaria parasites, and developing an effective vaccine against malaria. To date the foundation has awarded grants of US\$125 million in support of these activities.

Web site: www.gatesfoundation.org

THE ROCKEFELLER FOUNDATION

The Rockefeller Foundation provides grants for the improvement of health equity, some of which relate to malaria control.

Web site: www.rockfound.org

BILATERAL DEVELOPMENT PARTNERS

Sources of bilateral funds that affect malaria control include the United States Agency for International Development (USAID) (www.usaid.gov), the United Kingdom Department for International Development (DFID) (www.dfid.gov), and Belgian Cooperation (www.dgci.be).

THE MALARIA ACTION COALITION (MAC)

Through the support of USAID, this coalition provides technical assistance with other RBM partners to African countries to meet two of the Abuja Summit targets for malaria control:

- 60 percent of patients, particularly children under five, receive prompt, effective malaria treatment;
- 60 percent of pregnant women have access to intermittent preventive treatment.

The coalition is made up of four technical partners with different areas of expertise:

- the RPM Plus Program of MSH/CPM (www.msh.org/projects/rpmpplus)—pharmaceutical management, rational pharmaceutical use, and private-sector collaboration;
- the Maternal and Neonatal Health Project (MNH) of JHPIEGO (www.mnh.jhpiego.org)—interventions and training in prenatal care;
- the US Centers for Disease Control and Prevention (CDC) (www.cdc.gov)—epidemiology of malaria and monitoring drug resistance;
- WHO (www.who.int)—promotion of rational antimalarial policies in Africa.

Applying Tools to Support Planning for Malaria Control

The following field-tested tools can help you to identify needs in pharmaceutical and commodity management that you will want to address in your annual plans. They are available from the Center for Pharmaceutical Management, 4301 North Fairfax Drive, Suite 400 Arlington, VA 22203-1627, USA. E-mail: cpm@msh.org

The Pharmaceutical Management for Malaria Tool.

You can use this manual to assess the availability of antimalarial medicines and patterns of use of these medicines in drug retail shops and in public-sector health care facilities in your area. Your assessment can serve as a basis for strengthening the supply of and demand for antimalarial medicines to overcome such problems as stockouts.

The Community Pharmaceutical Management for Malaria Assessment Tool. Focused on how consumers seek care in the public and private sectors and use antimalarial medicines, this tool can help you address factors related to:

- choice of medicines by consumers and providers;
- decisions about the quantities of a pharmaceutical to buy;
- where the medicines are purchased or otherwise obtained;
- how the medicines are prescribed, dispensed, and ultimately used by patients.

The Child-Health Assessment Tool. Covering the major childhood illnesses, this tool is designed for use with other malaria assessment tools. Both the *Community Pharmaceutical Management for Malaria Assessment Tool* and the *Child-Health Assessment Tool* can give district-level staff, NGOs, and ministries of health in-depth information on problems such as the irrational use of antimalarial medicines. Program managers can then use a second guide to target interventions that promote local availability and appropriate use of medicines.

An additional assessment tool can help support the introduction of interventions for IPT and inform training, communication, and behavior change interventions at different organizational levels. This tool includes guides for focus group discussions with pregnant women; guides for interviewing recently delivered women, patients entering or exiting from health care facilities, community health workers, and provid-

ers; and guides for observing interactions between patients and providers or dispensers. It also includes information on handling patient-provider encounters in the prenatal clinics and checklists for supplies.

Taking Charge to Improve Malaria Control

While the barriers to malaria control may seem daunting, there are very effective preventive and treatment strategies you can implement. You will need to design and implement strategies that:

- address drug resistance where it exists, such as by converting first-line antimalarial pharmaceuticals from chloroquine to prepackaged combination therapies;
- prevent and treat malaria in pregnant women and children under five years of age, such as through insecticide-treated nets, IPT, and better treatment of fever in the home;
- achieve the rational use of antimalarial medicines through collaboration among the public and private sectors and NGOs and related IEC of caregivers and users.

In this era of evolving drug resistance, you need to be prepared to continuously monitor first-line treatments for malaria and recommend timely revisions in standard treatment guidelines. All countries must be open to revising their recommendations and strengthening their systems to implement new antimalarial policies rapidly, even in the most remote areas.

adherence to treatment	Appropriate behavior of patients that includes taking medicine in the correct dose, at the correct time, and for the correct duration of time as prescribed by providers.
antimalarial medicines	Pharmaceuticals used for the treatment of malaria, which, when used at frequent, regular, less-than-therapeutic doses, serve as prophylaxis. Sulfadoxine-pyrimethamine and artemisinin compounds are examples of antimalarial medicines.
clinical diagnosis	A disease diagnosis based on signs and symptoms in the patient rather than on laboratory tests.
combination therapy	Two or more pharmaceuticals with different biochemical targets that are used together. Combination therapy may help slow drug resistance.
drug resistance	The ability of a microorganism, such as a malaria parasite, to survive when exposed to a pharmaceutical. Resistance arises from changes in the genetic make-up of the microorganism and is passed on to subsequent generations when it enhances the microorganism's chance of survival. <i>For example, due to chloroquine resistance, a malaria patient may not respond to treatment with chloroquine at all, may show a slight improvement in symptoms but still remain unwell, or may initially respond, then suffer a relapse within a week of treatment.</i>
endemic (stable transmission) regions	Areas where specified infections occur year round. Children over five years of age and adults living in malaria-endemic communities tend to have some immunity to malaria. Severe cases of malaria are therefore limited to children under five and to adults who relocate to the area.
epidemic (unstable transmission) regions	Areas where specified infections occur seasonally. People living in malaria epidemic areas generally have little or no immunity to malaria, and therefore illness occurs in both adults and children.
first-line medicines or treatment	Medicines prescribed for initial therapy of the patient. If first-line medicines fail to successfully treat the infection, providers prescribe second-line medicines according to government guidelines.
ineffective medicines or treatment	Medicines that do not achieve the treatment results that are indicated or expected. Ineffective medicines may be of poor quality and not contain the ingredients listed, may contain the incorrect dosage, or may have become ineffective over time because of increased resistance by the infecting agent.
insecticide-treated net	A chemically treated net that repels mosquitoes and shortens their life spans. The effectiveness of the physical barrier of a net used for sleeping is increased when treated with a biodegradable pyrethroid insecticide.
intermittent preventive treatment (IPT)	A full treatment dose of an antimalarial, provided at regular intervals of at least a month to prevent the patient from developing malaria. Currently the antimalarial being recommended for IPT in pregnant women is sulfadoxine-pyrimethamine (SP).

laboratory diagnosis	A disease diagnosis based on laboratory testing of physical samples of blood. Direct microscopic examination of parasites on stained blood films is the current standard for diagnosing malaria. Less commonly used approaches use a parasite antigen and genetic detection methods.
malaria parasites	Four species of the one-celled protozoal parasite called <i>Plasmodium</i> (<i>P. falciparum</i> , <i>P. malariae</i> , <i>P. ovale</i> , and <i>P. vivax</i>) are human blood parasites. Of the four species, <i>P. falciparum</i> causes the most severe illness and death. These parasites are transmitted by the bite of an infected female mosquito of the genus <i>Anopheles</i> .
monotherapy	A single pharmaceutical used as a stand-alone treatment.
nonimmune	Having no constant exposure, and therefore, no immunity, to the disease. Nonimmune people visiting endemic countries are at higher risk for contracting a severe or fatal case of malaria.
provider compliance	A health care provider's adherence to standard treatment guidelines for a disease.
quality control of pharmaceuticals	Testing of pharmaceutical samples against specific standards of quality.
rational use of medicines	Prescribing, dispensing, and use of medicines appropriate to patients' clinical needs in doses that meet individual requirements, for an adequate period of time, and at the lowest cost to patients and their community.
semi-immune	Having partial immunity to a disease through natural exposure. Many people who live in malaria-endemic areas develop semi-immunity from previous infections. Semi-immune people who are re-infected with malaria have less severe symptoms or are asymptomatic.
standard treatment guidelines	Recommended treatment practices for a diagnosed illness, specifying the diagnostic requirements, pharmaceutical combinations, and duration of treatment.

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Reviewers' Corner

A forum for discussing concepts and techniques presented in this issue

On the importance of treatment guidelines...

One reviewer notes, "In many countries, treatment guidelines have not been updated to reflect the problem of drug resistance. Appropriateness of treatment guidelines precedes provider compliance. The cost of drugs other than chloroquine and sulfadoxine-pyrimethamine probably is a factor in that ministries are reluctant to designate as standard therapy the drugs that the government cannot afford to purchase."

On the financial motivation of some private providers...

Another reviewer warns, "It is important to address the potential motivation for overprescribing or overdispensing, which may be increased profit."

On the difficulties of implementing policy changes and strategies...

One reviewer stresses, "Between the formation and adoption of new policies on the one hand, and their implementation on the other, implementation tends to be much more problematic."

Another reviewer notes, "In countries where the Roll Back Malaria initiative has not spread, it is not due to lack of advocacy. They have simply not been able to roll out its implementation."



Checklist for Addressing Barriers in Malaria Control through Pharmaceutical and Commodity Management

- Review disease and drug surveillance data from your geographic area, and answer these important questions:
 - What are the patterns of drug resistance in your geographic area?
 - What other infections are present that influence the regional effects of malaria?
 - What are the local patterns of malaria transmission and the risks to pregnant women and to children?
- Assess the barriers in your region that reduce the effectiveness of malaria control, such as inaccuracy of diagnosis, cost and ineffectiveness of locally available medicines, nonadherence to medical guidelines, and limited availability of insecticide-treated nets.
- Lay the groundwork for stronger malaria control by establishing up-to-date standard treatment and prevention, and encourage collaboration among the public and private sectors and NGOs.
- Use the pharmaceutical and commodity management cycle to help plan strategies that promote the procurement, distribution, and use of preventive products and antimalarial treatments, especially for pregnant women and young children. Where medicines are ineffective, also advocate for national policies for registration, inspection, research, and surveillance to influence the selection of pharmaceuticals.
- Use global resources and assessment tools as you plan your strategies to control malaria.
- Depending on your local situation, consider effective measures, such as:
 - insecticide-treated nets;
 - intermittent preventive treatment for pregnant women;
 - combination therapies;
 - premeasured doses of daily medicines;
 - the integration of malaria control with child survival services;
 - improvements in home-based treatment;
 - improvements in the diagnosis and referral of severe cases.
- Strengthen local and regional surveillance of the malaria parasites' response to antimalarial medicines so that you can revise local standard treatment guidelines and rapidly implement new strategies to control malaria.

THE MANAGER

The Manager is designed to help managers develop and support the delivery of high-quality health services. The editors welcome any comments, queries, or requests for subscriptions.

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CASE STUDY FOR TRAINING AND GROUP DISCUSSION

A Malaria Task Force Works to Improve Supply and Demand for Appropriate Antimalarials

Scenario

THREE YEARS AGO, rising resistance to chloroquine and other monotherapy pharmaceuticals for managing malaria led the government of Nyasumu to change the national treatment policy from these therapies to a combination therapy for malaria. For initial treatment of uncomplicated *P. falciparum* malaria, the new treatment guidelines recommended artesunate and sulfadoxine-pyrimethamine. If that treatment failed, they recommended quinine. The government distributed the guidelines to public-sector health facilities throughout Nyasumu and provided training in applying them to half of all public-sector providers.

The Malaria Control Program (MCP) recently learned that malarial morbidity and mortality patterns in the country have changed very little in the past three years. A study revealed that 80% of malaria patients first seek care in the private sector, and 90% of them purchase their antimalarials from private pharmacies and drug shops. The study also found that 75% of providers in both the public and private sectors do not follow the national standard treatment guidelines, and only 10% of patients correctly complete the recommended combination therapy.

A Malaria Task Force met to discuss the study's findings and determine what to do to improve supply and demand for appropriate antimalarials. Task force members include MCP staff, the Director of Health

Services, the directors of the maternal and child health and malaria programs, research scientists, international development agencies, and representatives from the pharmacy board, the pharmaceutical manufacturers' association, and the medical association.

"Since clients are seeking treatment outside the public-sector, I found it disturbing that many private providers don't even know that new guidelines exist!" commented Dr. Muyaa, a scientist on the task force. "The MCP needs to disseminate them more widely and provide incentives to encourage providers to follow them. People will pay more attention if they are rewarded for following them."

"It isn't just providers who need to know about the guidelines," noted Mrs. Kamau, another scientist. "Pharmacies and private laboratories are involved in malaria control, also. The data show that most people buy antimalarials from private pharmacies and informal drug shops. The incidence of drug-resistant malaria will rise if the MCP doesn't take steps to inform the public about the need to go to a trained provider and adhere to the recommended treatment. These data on low adherence are alarming. I think we should ban the sale of antimalarials through private pharmacies and in particular the informal drug shops."

"We do not want to recommend such a drastic step," said Dr. Wambui, the task force leader, quickly cutting off protests from the pharmaceutical repre-

sentatives. “It may make sense to review the licensing requirements for prescribing or dispensing antimalarials, instead. Let’s encourage the MCP to involve the private sector in deliberations on this topic. A strong-arm approach could backfire, I believe. Besides, we need to be partners with the private sector, not adversaries.” Her pharmaceutical colleagues nodded in agreement and sat back again.

“The study showed that younger providers, right out of medical school, tended to be aware of the guidelines and follow them closely,” said Mr. Kiyonga, an MCP staff member. “This tells me that dissemination efforts in medical schools were successful. We should recommend that the MCP continue to provide printed copies of the guidelines for free to medical schools and other provider training programs.”

“It wasn’t just the training they received in class,” said Miss Ethuro, the communications member of the task force. “Younger providers also visited the MCP Web site to learn about upcoming events, keep up with news and data, and download reports. Let’s make sure we commend the MCP on their Web site and highlight its effectiveness in getting out the message.”

“Good point,” noted Dr. Wambui, “but I was disappointed that no outreach or training was done with traditional healers. They could be useful frontline collaborators in the fight against malaria—just as they are for some other health programs where they are part of the education and referral systems. Let’s recommend that the MCP research other health programs to find out what they have done to train and utilize traditional healers as well as informal drug shops.”

“The training curriculum needs to be evaluated,” suggested Dr. Kiplagat, the medical association representative. “If half of public-sector providers received training in the guidelines but only slightly more than 25% followed them, the training program may need to be revised.”

“Providers and patients can’t follow the guidelines if the recommended medicines are neither in stock

at the health center nor available through private pharmacies,” said the Director of Health Services. “Problems may exist with the pharmaceutical and commodity management system.”

“The MCP supervisory system may also be a contributing factor,” said Dr. Wambui. “Let’s recommend further study of the supply system, training program, and supervisory system.”

“It’s possible that the antimalarial packaging is problematic,” suggested a pharmaceutical representative. “Perhaps packaging the combination medicines together in blister packs would help patients to adhere to the recommended treatment.”

“Let’s also investigate those new rapid diagnostic tests,” said Mr. Kiyonga. “The private providers are already using them. If the public-sector providers start using them, they would no longer have to wait for results of laboratory tests.”

“That is worth exploring,” said Dr. Wambui. “You have raised some excellent ideas. Let’s stop the discussion here for today and decide on our next steps.”

Discussion Questions

1. Who are the stakeholders in the Nyasumu malaria control efforts, and what are their roles? What other stakeholders could the Malaria Control Program consider involving?
2. What barriers to malaria control are identified in the case? What do the Malaria Task Force members suggest as underlying causes of different problems? Based on the issue and experience, what other problems might exist?
3. What interventions have been implemented so far? What interventions have Task Force members suggested in the case? Based on the issue and experience, what other interventions would you recommend considering?

QUESTION 1 Who are the stakeholders in the Nyasumu malaria control efforts, and what are their roles? What other stakeholders could the Malaria Control Program consider involving?

The stakeholders in the Nyasumu malaria control efforts and their possible roles include:

- **Malaria Control Program**—coordinates public- and cross-sector efforts, encourages collaboration among sectors, trains providers, publishes and disseminates guidelines, provides information to the general public, and maintains a Web site with current information for providers and others
- **national government**—develops malaria control policy and treatment guidelines
- **Malaria Task Force**—plays an advisory role to the government’s Malaria Control Program and is comprised of MCP staff, the Director of Health Services, directors of the maternal and child health and malaria programs, research scientists, international development agencies, and representatives of the pharmacy board, the pharmaceutical manufacturers’ association, and the medical association
- **public health facilities**—quantify pharmaceutical needs and ensure a supply of necessary pharmaceuticals, ensure that providers follow treatment guidelines
- **medical schools**—train medical students in the new treatment guidelines
- **researchers**—carry out research and analysis to assist the government in developing policy and revising treatment guidelines
- **medical associations**—help disseminate new guidelines, encourage collaboration between the public and private sectors, provide or be a conduit for provider training
- **pharmacy board**—participate in licensing and other policy-level discussions
- **pharmaceutical manufacturers**—manufacture needed antimalarials, follow quality guidelines, bid on government contracts for antimalarials
- **informal drug shops**—sell antimalarials; if they know recommended guidelines, follow them; refer patients to public- or private-sector providers

- **laboratories**—analyze samples so providers can determine the type of parasite causing a patient’s malaria and prescribe appropriately
- **patients**—purchase antimalarials prescribed by their provider and complete recommended treatment
- **donors**—provide funding and/or technical assistance for research, policy development, infrastructure, pharmaceutical and commodity management systems, training, purchase of antimalarials, etc.

Additional stakeholders not mentioned in the case could include representatives from health insurance organizations, major employers, development programs with education and training components, schools of public health, traditional healers, and local nongovernmental organizations (NGOs).

QUESTION 2 What barriers to malaria control are identified in the case? What do the Malaria Task Force members suggest as underlying causes of different problems? Based on the issue and experience, what other problems might exist?

The basic problem in this case is that patterns in malaria morbidity and mortality have changed very little in the country, despite new standard treatment guidelines for malaria recommending an effective combination therapy. Identified barriers include the fact that most providers (in both the public and private sectors) do not follow the recommended treatment guidelines and providers in the private sector do not know about the guidelines. The majority of patients do not adhere to their recommended treatment. As a result, the incidence of drug-resistant malaria is likely to increase.

Possible causes underlying these barriers include:

- Providers in the private sector are unaware of the guidelines; no training or dissemination efforts have been carried out to reach them;
- No efforts have been initiated to involve pharmacies, private laboratories, traditional healers, or informal drug shops in malaria control efforts;
- There have been no efforts to educate the general public about the current treatment guidelines (for first-line treatment of uncomplicated *P. falciparum* malaria, use artesunate and sulfadoxine-pyrimethamine; for second-line treatment, use quinine) and adhering to the recommended treatment;

- The training carried out with public-sector providers does not seem to have had much of an impact on their treatment practices;
- Supplies of recommended first-line and second-line pharmaceuticals may be inadequate;
- A supervisory system does not exist that ensures providers' compliance with the guidelines;
- The antimalarial packaging may be problematic.

The task force may want to learn more by asking:

- How well are the guidelines being distributed? Are they easy for providers to access when needed? Are they written clearly and easy to refer to?
- Do private-sector providers have access to laboratory services? Are they making their diagnoses of malaria on the basis of clinical symptoms alone?
- Does the government provide any oversight of private-sector providers?
- Are the medicines too expensive for patients to purchase in the recommended quantities?
- Are dispensers in the drug shops licensed? If not, are they regulated? Are their activities monitored?
- Do public-sector providers have access to computers so they can visit the MCP Web site?

QUESTION 3 What interventions have been implemented so far? What interventions have Task Force members suggested in the case? Based on the issue and experience, what other interventions would you recommend considering?

Interventions they have implemented to date include:

- changing the national treatment policy to the use of combination therapy for malaria;
- distributing the new treatment guidelines to public-sector health facilities;
- conducting research in order to find out why malarial morbidity and mortality patterns have not improved despite the new policy and guidelines;
- using the new guidelines in medical school programs;
- creating a Malaria Control Program Web site containing the guidelines, information about upcoming events, news, data, and downloadable reports;

- training about 50% of all public-sector providers in the new guidelines (so far).

Task Force members suggest interventions such as disseminating the guidelines more widely and providing incentives to encourage providers to follow the guidelines. They also suggest reviewing licensing requirements for prescribing or dispensing antimalarials and involving the private sector in licensing or regulation deliberations. They want to see outreach to traditional healers and drug shops. They suggest investigating the use of rapid diagnostic tests; evaluating the training program; and studying the pharmaceutical and commodity management system, training program, supervisory system, and packaging of antimalarials. Other interventions could include:

- accrediting drug shops that have been trained in the guidelines;
- communicating the new guidelines to the general public, using radio, television, posters, etc.;
- improving the supervisory and monitoring system to ensure that providers follow the guidelines;
- reviewing and improving the pharmaceutical and commodity management system to ensure antimalarials are consistently available in public-sector facilities;
- providing vouchers or other incentives to help ensure that patients purchase the recommended medicines and adhere to treatment;
- distributing medicines at low cost to indigent caregivers through trained community health workers;
- complementing treatment with preventive measures: supporting insecticide-treated nets and providing intermittent preventive treatment in prenatal clinics.

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