

**The Africa Malaria
Report 2003**



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Acronyms and abbreviations

ACT	artemisinin-based combination therapy
ANC	antenatal clinic
AQ	amodiaquine
AS	artemisinin
CFR	case-fatality rate
CQ	chloroquine
DHS	demographic and health surveys
DSS	demographic surveillance systems
ETF	early treatment failure
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
HBM	home-based management of fever
HIPC	highly indebted resource-poor countries
HIS	health information system
HIV/AIDS	human immunodeficiency virus/acquired immunodeficiency syndrome
IMCI	Integrated Management of Childhood Illness
INDEPTH	International Network of field sites with continuous Demographic Evaluation of Populations and their Health in developing countries
IPT	intermittent preventive treatment
IRS	indoor residual spraying
ITN	insecticide-treated net
LBW	low birth weight
LCF	late clinical failure
LLIN	long-lasting insecticidal net
LPF	late parasitological failure
MARA	Mapping Malaria Risk In Africa
MEWS	malaria early warning systems
MICS	multiple indicator cluster surveys
MoH	Ministry of Health
n.a.	not applicable
NGO	nongovernmental organization
NMCP	national malaria control programme
PRSC	poverty reduction support credits

PRSP	poverty reduction strategy paper
PTD	preterm delivery
RBM	Roll Back Malaria
SAMC	Southern Africa Malaria Control Programme
SGA	small for gestational age
SP	sulfadoxine–pyrimethamine
SWAPs	sector-wide approaches
TB	tuberculosis
UNICEF	United Nations Children's Fund
VAT	value-added tax
WHO	World Health Organization

- Where space is limited in some figures and tables, the following abbreviations have been used for country names:

CAR	Central African Republic
DRC	Democratic Republic of the Congo
Tanzania	United Republic of Tanzania

Foreword

In October 1998, together with the President of the World Bank and the Administrator of the United Nations Development Programme, we launched Roll Back Malaria as a catalyst for a renewed global commitment to tackle a disease that has been ignored by the world for far too long – a single disease that puts a brake on development, particularly in Africa.

This report from UNICEF and WHO suggests that, in 2003, malaria remains the single biggest cause of death of young children in Africa and one of the most important threats to the health of pregnant women and their newborns. However, there are clear signs that the movement to Roll Back Malaria is having an impact. The combined strategies suggested in 1998 for reducing the burden of malaria (insecticide-treated nets, prompt access to treatment, and prevention of malaria in pregnancy) are now widely accepted; their application on a large scale throughout Africa is under way.

Although coverage of individual interventions, such as insecticide-treated nets, is still far too low, the good news is that there is a clear trend towards increasing coverage, and other encouraging moves – a change in government taxation policies on nets and netting materials, for example,

and the development of Africa-based industrial production of nets – that will help sustain this trend.

Parasite resistance to previously effective low-cost drugs is an enormous and growing problem, but governments are now fully engaged in this challenge, monitoring the development of resistance and energetically pursuing the most promising options for more effective treatment.

The financial resources for fighting malaria are increasing. The establishment of the Global Fund to Fight AIDS, Tuberculosis and Malaria is providing significant new grants to help countries accelerate implementation of their plans to Roll Back Malaria. In addition, funds made available to improve health under debt-relief initiatives are being used to finance malaria interventions in some countries.

Our two organizations remain firmly committed to working together, with our other partners and with Africa, to achieve the ambitious goals for Roll Back Malaria set in Abuja on 25 April 2000 and agreed to by African heads of state. We intend that this report should be the first of a regular series, tracking progress towards achievement of these goals and of the Millennium Development Goal for malaria.



Carol Bellamy
Executive Director
United Nations Children's Fund



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Director-General
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Executive summary

This report – the first of its kind – takes stock of the malaria situation and of continuing efforts to tackle the disease in Africa; it is based on a review of the best information available to WHO and UNICEF, from sample surveys and routine reports, at the end of 2002.

Malaria continues to be a major impediment to health in Africa south of the Sahara, where it frequently takes its greatest toll on very young children and pregnant women. Because malaria is such a common disease and well known to the people it affects most, and because many of those who become sick with malaria do not visit health care facilities, assessing the size of the problem, and how it is changing over time, is an enormous challenge.

New analyses confirm that malaria is a principal cause of at least one-fifth of all young child deaths in Africa. The latest available data on outpatient visits and on hospital admissions and deaths due to malaria confirm that this disease makes substantial demands on Africa's fragile health infrastructure. In endemic countries, as many as one-third of all clinic visits and at least a quarter of all hospital admissions are for malaria. In some countries, these data suggest that illness due to malaria has increased over the past decade; in others, the size of the problem has remained constant. No country in Africa south of the Sahara for which data are available shows a substantial decline.

Additional information on trends in malaria mortality is available for an increasing number of countries with "demographic surveillance systems". These sources indicate that the number of children dying of malaria rose substantially in eastern and southern Africa during the first half of the past decade compared with the 1980s. In west Africa over the same period there was little change in the overall malaria mortality rate in children.

In summary, the burden of sickness and death due to malaria remained high in Africa south of the Sahara during the 1990s and increased in most countries in the eastern and southern part of the continent. Monitoring systems cannot yet reliably track changes in

indicators of the burden of malaria, particularly malaria mortality, on a yearly basis.

The high burden of malaria in Africa, and the increasing burden in some parts of the continent during the 1990s, is not an indication that the intensified efforts to control the disease over the past few years have had no impact. The full impact on malaria sickness and death of the recent efforts to accelerate malaria control described in this report will be measurable only some years after high coverage of interventions is achieved. It is possible that the start of intensified control efforts coincided with increasing malaria mortality, meaning that – without them – the situation might have been substantially worse than is now reported. The strengthening of malaria surveillance and monitoring needs to be given priority in parallel with efforts to control malaria.

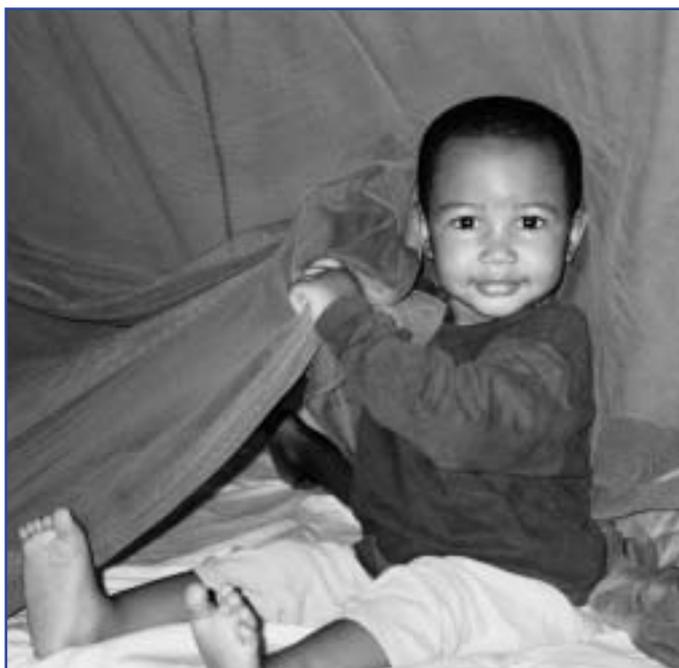
The 2000 Summit on Roll Back Malaria, held in Abuja, endorsed a "shortlist" of relatively inexpensive malaria control interventions already available and known to be effective. Partners in the Roll Back Malaria effort, which include governments of malaria-endemic countries, donor governments, international organizations, the private sector, and civil society bodies, have supported the introduction of these interventions.



Picture: WHO/RBM

The 2000 Abuja Summit established control priorities and goals.

Picture: WHO AFRO



Insecticide-treated nets are highly effective in reducing malaria mortality in young children.

Insecticide-treated nets (ITNs) are a low-cost and highly effective way of reducing the incidence of malaria in people who sleep under them, and they have been conclusively shown in a series of trials to substantially reduce child mortality in malaria-endemic areas of Africa. By preventing malaria, ITNs reduce the need for treatment and the pressure on health services, which is particularly important in view of the increase in drug-resistant falciparum malaria parasites. Although accurate data from the 1980s are not generally available for comparison, it is certain that there are now more children sleeping under nets and a greater use of ITNs in Africa than ever before. Recent survey data showed that approximately 15% of young children slept under a net, but that only about 2% used nets that were treated with insecticide. Untreated nets provide some protection against malaria, but their full protective benefits can be realized only if they are regularly retreated with insecticide.

The price of nets has fallen substantially as a result of greater demand, increased competition between producers, and reductions in taxes and tariffs and other obstacles to trade that many African countries instituted after the Abuja Summit. In many countries, both nets and the

insecticide to treat them can now be purchased in small shops and markets and even on street corners; only a few years ago they would have been available only in a few specialist shops in capital cities. At least five large factories in Africa are now producing nets. Almost all malaria-endemic African countries now have active programmes under way to encourage ITN use, and most of these support a variety of different mechanisms to increase net coverage. Nevertheless, the commercial price of nets and insecticide – though falling – still puts this life-saving technology beyond the reach of the poorest income groups of the population. Major efforts are now being made in at least five African countries to provide subsidized ITNs to the most vulnerable groups – young children and pregnant women. New technological developments promise nets that will retain insecticidal activity for many years, and novel ways of encouraging regular net treatment with insecticide should make it possible to increase the proportion of nets that are effectively treated.

Treated nets and other means of reducing mosquito bites will not totally prevent malaria. People who become ill with the disease need prompt and effective treatment to prevent the development of severe manifestations and death. Since the 1980s, parasite resistance to chloroquine, the most commonly available antimalarial drug, has emerged as a major challenge. In most countries in eastern, central, and southern Africa, chloroquine has lost its clinical effectiveness as a malaria treatment. A similar evolution is taking place, though some years later, in west Africa, and there is indirect, but compelling, evidence that this is giving rise to increasing mortality. Unfortunately, resistance to the most common replacement drug, sulfadoxine–pyrimethamine, has also emerged, especially in eastern and southern Africa.

Over the past few years, 13 countries in Africa have changed their national policies to require the use of more effective antimalarial treatments. Where current monotherapies are failing, WHO recommends artemisinin-based combination therapy (ACT), which is highly efficacious and promises to delay the emergence of resistance. So far however, its use is constrained by high costs and limited operational experience in Africa. To date, four African countries have adopted ACTs as first-line treatment.

Improved management of malaria cases may be undertaken as part of a general strengthening of public health services, for example as part of the strategy for Integrated Management of Childhood Illness (IMCI). However, in many malaria-endemic countries the first treatment for malaria is often purchased from a shop. Data from representative sample surveys indicate that almost half of all children under 5 years of age with fever are treated with an antimalarial drug. Although this is encouraging, some of these treatments may have been with failing drugs or been given too late or in the wrong dosage. Recent studies indicate that home treatment, supported by public information and pre-packaging (as an aid, to ensure that patients take the full treatment course at the right time), can help to reduce malaria mortality in children. Many countries now concentrate on making effective malaria treatment available close to the home, through support to community initiatives and engagement of drug sellers and the pharmaceutical industry. Realizing the full potential of effective treatment as a tool for reducing mortality will require a systems approach, ensuring that effective drugs are affordable (which will often require subsidization) and that they are supported by appropriate education of formal and informal providers as well as mothers, and by quality assurance and regulation.

The impact of malaria on pregnant women and their newborns can be substantially reduced by the recently recommended use of "intermittent preventive treatment" (IPT). This strategy provides at least two treatment doses of an effective antimalarial at routine antenatal clinics to all pregnant women living in areas at risk of endemic falciparum malaria in Africa (irrespective of whether they are actually infected with malaria or not). About two-thirds of pregnant women in Africa south of the Sahara attend clinics for antenatal care, and incorporating IPT for malaria into their routine care should be straightforward. Now an integral part of the "Making Pregnancy Safer" strategy, IPT has been adopted as policy by six countries to replace chemoprophylaxis; most other countries in the region are reviewing their policies in the light of the new recommendation. The beneficial effects of IPT will probably be additive to the proven benefits of ITN use by pregnant women. A comprehensive approach



Picture: WHO/MAL

Pre-packaged antimalarial drugs can increase compliance and facilitate home treatment.

to the prevention and management of malaria during pregnancy therefore calls for a combination of IPT, support for ITN use, and prompt access to effective treatment. Five countries in eastern and southern Africa have recently formed a coalition to reduce the impact of malaria in pregnancy through this combined approach.

Areas on the northern and southern fringes of the malaria-endemic belt of Africa, as well as highland areas in many countries, are at



Picture: WHO/RBM/L Taylor

Young children are at the greatest risk of malaria in Africa.

Picture: WHO/TDR



Prevention of malaria during pregnancy results in healthier mothers and infants.

risk of epidemic malaria. Unlike the endemic disease, epidemic malaria typically affects people of all ages and can have high case-fatality. Roll Back Malaria has been supporting efforts to improve the early recognition of, and effective and timely response to, malaria epidemics. Indoor residual spraying can play an important role in malaria vector control, especially in the control of epidemics. Malaria early warning systems have been established in southern Africa to improve outbreak detection and response and are being developed in other epidemic-prone parts of Africa. Fifteen epidemic-prone countries have developed a preparedness plan of action; data on the timeliness and effectiveness of epidemic response in these countries are presented in this report.

Tackling malaria effectively requires substantial resources. At the Abuja Summit it was estimated that at least US\$ 1 billion is needed from a combination of increased domestic spending and international assistance; the report provides information on resource flows. Since the launch of Roll Back Malaria in 1998, international spending on malaria has more than doubled to approximately US\$ 200 million per year. Further untapped resources for malaria control may become available through debt relief initiatives. Government spending on all health care is low in most African countries – typically less than US\$ 15 per person per

year – and the costs of malaria control are high: artemisinin-based combination drugs to treat resistant malaria are likely to cost US\$ 1–3 per treatment for the drug alone, and ITNs cost around US\$ 5. Most of the costs of preventing and treating malaria in Africa today are in fact borne by people themselves. For example, people buy nets, insecticide sprays, and coils, and spend a considerable amount of money on malaria treatment, which may contribute to poverty. Increasing the efficiency of domestic “out of pocket” spending is a priority, and this can be achieved through government support for the most effective interventions and the appropriate regulation to ensure that only safe, effective malaria interventions are sold and that the public is fully informed about their use and effectiveness.

The recently established Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) is a major new source of grant funding for tackling malaria in Africa. Twenty-five countries and one multi-country group have submitted successful proposals to the GFATM. Almost all of these proposals build on the national malaria control plans developed by these countries with the support of the Roll Back Malaria Partnership during the period 1999–2001. The countries have been awarded a total of US\$ 256 million for an initial two years to scale up malaria control activities. Depending on success, it is expected that additional funds will be made available for a total period of five years.

Introduction

This report has been drafted in response to a seemingly very simple question: "What do we know about malaria in Africa today?" In the past, the answer to this question would have been, "It depends on whom you ask."

Although most experts would have agreed on the fundamental facts, including the relative importance of the disease, its geographical distribution, and the key strategies for prevention and treatment, opinions would have begun to diverge at the next level of detail – dictated by personal experience in the absence of routinely collected and authoritative information on the global malaria situation.

Accurate statistics on malaria in Africa have been difficult to collect and report because of the enormity of the disease problem, the weakness of health information systems, and the fact that treatment of most malaria cases, as well as many deaths from the disease, occurs outside the formal health system. Following the period of international indifference to malaria, there was also little international agreement on what information was needed for monitoring malaria control and how it should be collected. This situation is changing, and there is now a strong consensus on priority indicators and the best way of collecting representative information.

During the 1950s and 1960s, the malaria eradication campaign successfully eliminated or controlled the disease in countries with temperate climates and in some countries where malaria transmission was low or moderate. However, the emergence of drug and insecticide resistance, coupled with concerns about the feasibility and sustainability of tackling malaria in areas with weak infrastructure and high transmission, brought an end to the eradication era, as well as to the bulk of international funding for malaria control and investment in malaria research. Despite international indifference in subsequent years, progress continued to be made in understanding the problem of malaria and strategies for its control. By the early 1990s the international community began to appreciate that the malaria burden was unacceptably high and worsening,

particularly in Africa, and that real reductions in malaria mortality and morbidity were possible with existing but under-used tools and strategies.

In 1992, malaria control was re-established as a global health priority by a Conference of Ministers of Health held in Amsterdam. Scientific interest in the disease and its control, political commitment to reducing the burden of malaria, and the financial resources for malaria research and control began to increase rapidly. The project for Accelerated Implementation of Malaria Control (1997–1998) represented an unprecedented contribution to the fight against malaria in Africa south of the Sahara, in terms of both technical support and funds. The funding provided for the project over the two years was estimated to have been more than 12 times the contributions made by WHO during the previous decade.

By the year 2000 a sequence of critical milestones had been achieved and an ambitious global commitment had been realized:

- 1991–1998: malaria control expertise and capacity were expanded and strengthened, particularly in Africa, especially through the project for Accelerated Implementation of Malaria Control (1997–1998);
- 1997: new research collaborations, notably the Multilateral Initiative on Malaria (<http://mim.nih.gov/>), were formed.
- 1998: the Roll Back Malaria Partnership (www.rbm.who.int/) was launched and consensus on the core technical strategies for tackling malaria established.
- 2000: the United Nations declared 2001–2010 the Decade to Roll Back Malaria in developing countries, particularly in Africa (United Nations General Assembly, Resolution 55/284).
- 2000: malaria figured prominently in the United Nations' Millennium Development Goals (General Assembly official records: 27th Special Session: Supplement 3. Document A/S-27/19/Rev.1).

- 2000: African heads of state met in a historic summit in Abuja, Nigeria, to express their personal commitment to tackling malaria and to establish targets for implementing the technical strategies to Roll Back Malaria.
- 2001: resources for controlling malaria were significantly boosted with the establishment of the Global Fund to Fight AIDS, Tuberculosis and Malaria.

With the renewed international commitment to fighting malaria, the need for regular and reliable information on the global malaria situation is greater than it has ever been. The general indifference of the past has given way to an urgent demand for information that can be used to define and analyse the malaria situation and measure progress towards the goals established by the international community and by national control programmes. The World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) are committed to meeting this demand.

This report is an initial effort to collect, analyse, and present information on the malaria situation. The report focuses on Africa

and specifically on those African countries with the highest burden of the disease. These countries bear more than 90% of the global malaria burden. Emphasis is also given to the technical strategies for malaria control established by the Roll Back Malaria Partnership and the targets set at the Abuja Summit. In addition, with due regard to the importance of understanding the resource requirements of malaria control, a chapter on resource mobilization and financing is included.

The data contained in this report have been drawn from a variety of sources in order to provide the most complete picture of the malaria situation in Africa. The UNICEF Multiple Indicator Cluster Surveys and the and Health Surveys, in particular, are national surveys that represent a major advance in collection of baseline data to provide benchmarks against which progress can be measured. It is fully expected that the recent consensus on core data needs, well coordinated efforts to collect data, and progress in solving methodological and other data collection problems will together fulfil the new demands for malaria information.

The goal of Roll Back Malaria is to halve the burden of malaria by 2010. The following targets for specific intervention strategies were established at the Abuja Malaria Summit, April 2000

RBM strategy

Prompt access to effective treatment

Abuja target (by 2005)

- 60% of those suffering with malaria should have access to and be able to use correct, affordable, and appropriate treatment within 24 hours of the onset of symptoms

Insecticide-treated nets (ITNs)

- 60% of those at risk for malaria, particularly children under 5 years of age and pregnant women, will benefit from a suitable combination of personal and community protective measures, such as ITNs

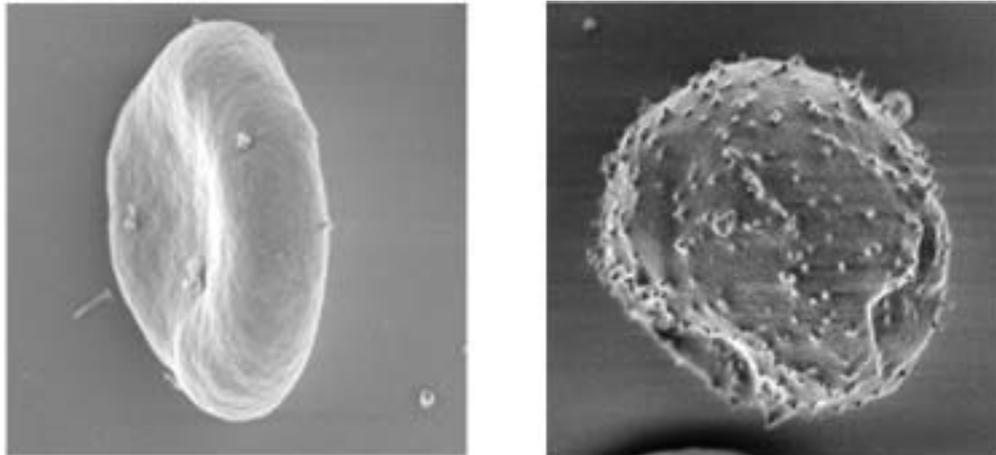
Prevention and control of malaria in pregnant women

- 60% of pregnant women at risk of malaria will be covered with suitable combinations of personal and community protective measures, such as ITNs
- 60% of pregnant women at risk of malaria will have access to intermittent preventive treatment^a

Malaria epidemic and emergency response

- 60% of epidemics are detected within 2 weeks of onset
- 60% of epidemics are responded to within 2 weeks of detection

a: The original Abuja declaration included the recommendation for chemoprophylaxis as well, but present WHO and RBM policy strongly recommends IPT – and not chemoprophylaxis – for prevention of malaria during pregnancy.



On the left is a normal, healthy, red blood cell with a smooth surface. The flexible and deformable disc shape allows it to flow easily through narrow blood capillaries.

On the right is a similar red blood cell infected for one day with *Plasmodium falciparum* parasites. It has many knob-like protrusions. The cell's rapid transformation to a more rigid spherical shape impedes flow through narrow blood capillaries. Additionally the protrusions act like Velcro, causing the infected blood cell to bind to specific receptors such as those on the lining of blood vessels. These adhesions in the brain and the placenta are part of the cause of cerebral and placental malaria.

■ Picture from scanning electron microscope: Lirong Shi, Michael Delannoy, David Sullivan, Johns Hopkins Bloomberg School of Public Health, Malaria Research Institute.

1. The burden of malaria in Africa

About 90% of all malaria deaths in the world today occur in Africa south of the Sahara. This is because the majority of infections in Africa are caused by *Plasmodium falciparum*, the most dangerous of the four human malaria parasites. It is also because the most effective malaria vector – the mosquito *Anopheles gambiae* – is the most widespread in Africa and the most difficult to control. An estimated one million people in Africa die from malaria each year and most of these are children under 5 years old (1).

Malaria affects the lives of almost all people living in the area of Africa defined by the southern fringes of the Sahara Desert in the north, and a latitude of about 28° in the south. Most people at risk of the disease live in areas of relatively stable malaria transmission – infection is common and occurs with sufficient frequency that some level of immunity develops. A smaller proportion of people live in areas where risk of malaria is more seasonal and less predictable, because of either altitude or rainfall patterns. People living in the peripheral areas north or south of the main endemic area (Figure 1.1) or bordering highland areas are vulnerable to highly seasonal transmission and to malaria epidemics.

In areas of stable malaria transmission, very young children and pregnant women are the population groups at highest risk for malaria morbidity and mortality. Most children experience their first malaria infections during the first year or two of life, when they have not yet acquired adequate clinical immunity – which makes these early years particularly dangerous. Ninety percent of all malaria deaths in Africa occur in young children. Adult women in areas of stable transmission have a high level of immunity, but this is impaired especially in the first pregnancy, with the result that risk of infection increases.

Malaria has been well controlled or eliminated in the five northernmost African countries, Algeria, Egypt, Libyan Arab

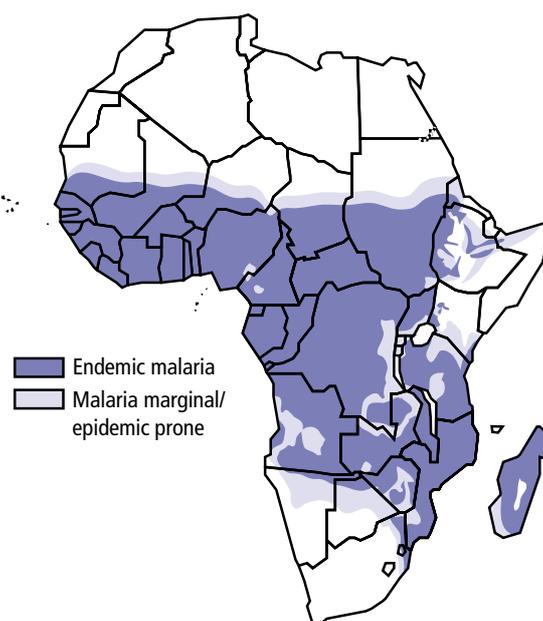
Jamahiriya, Morocco, and Tunisia. In these countries the disease was caused predominantly by *Plasmodium vivax* and transmitted by mosquitoes that were much easier to control than those in Africa south of the Sahara. Surveillance efforts continue in most of these countries in order to prevent both a reintroduction of malaria parasites to local mosquito populations, and the introduction of other mosquito species that could transmit malaria more efficiently (a particular risk in southern Egypt). The malaria situation in these countries is not considered further in this report.

Malaria is endemic in some of the offshore islands to the west of mainland Africa – Sao Tome and Principe and São Tiago Island of Cape Verde. In the east, malaria is endemic in Madagascar, in the Comoro islands (both the Islamic Federal Republic of the Comoros and the French Territorial Collectivity of Mayotte),

Roll Back Malaria target

The global target of Roll Back Malaria is to halve malaria-associated morbidity and mortality by 2010 compared with levels in year 2000.

Distribution of endemic malaria



Source: reference 2

Figure 1.1

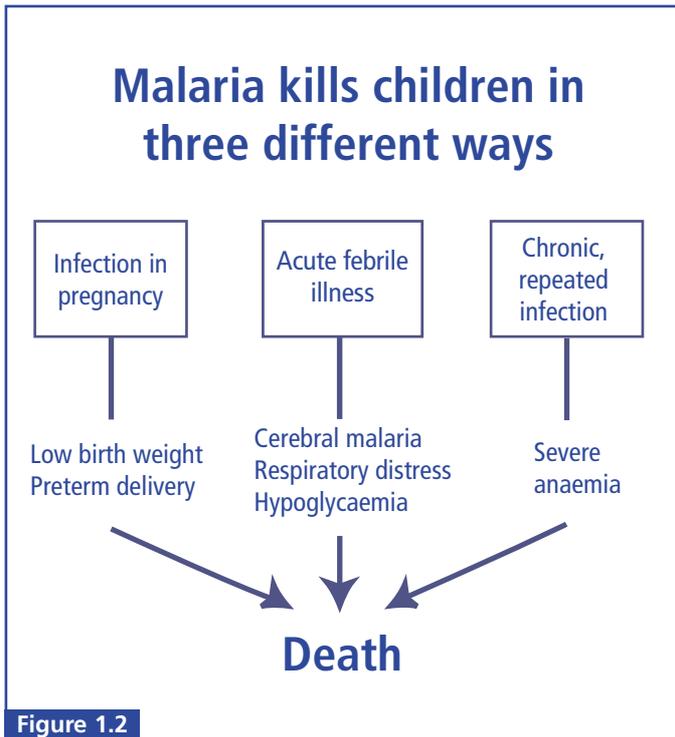
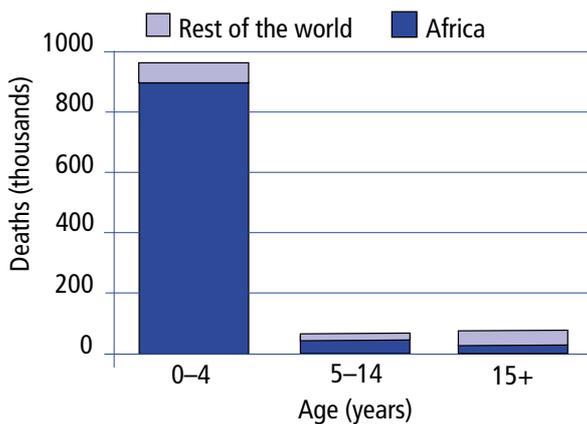


Figure 1.2

Most of the malaria burden is from deaths in young children



Although adults also become infected with malaria, the illness is usually less severe thanks to their acquired immunity. Infections in young children are serious and may kill if not treated promptly.

Source: WHO Global Burden of Disease project, estimates for 2000, reference 17

Figure 1.3

and on Pemba and Zanzibar, but has been eliminated from the island of Reunion. In Mauritius, malaria has been well controlled since the 1950s, but occasional outbreaks of vivax malaria occur, the last in association with a cyclone in 1982. Since that year there has been a steady decrease in cases and risk is now extremely low. Seychelles has been free of malaria since 1930, and malaria vectors are believed to no longer exist there.

1.1

Burden of malaria on health in Africa

Mortality

There are three principal ways in which malaria can contribute to death in young children (Figure 1.2). First, an overwhelming acute infection, which frequently presents as seizures or coma (cerebral malaria), may kill a child directly and quickly. Second, repeated malaria infections contribute to the development of severe anaemia, which substantially increases the risk of death. Third, low birth weight – frequently the consequence of malaria infection in pregnant women – is the major risk factor for death in the first month of life (3). In addition, repeated malaria infections make young children more susceptible to other common childhood illnesses, such as diarrhoea and respiratory infections, and thus contribute indirectly to mortality (4).

The consensus view of recent studies and reviews is that malaria causes at least 20% of all deaths in children under 5 years of age in Africa (Figures 1.3 and 1.4). Although respiratory disease caused by a variety of infectious agents results in a similar proportion of deaths, *P. falciparum* is the most important single infectious agent causing death among young children.

Morbidity and long-term disability

Children who survive malaria may suffer long-term consequences of the infection. Repeated episodes of fever and illness reduce appetite and restrict play, social interaction, and educational opportunities, thereby contributing to poor development. An estimated 2% of children who recover

from malaria infections affecting the brain (cerebral malaria) suffer from learning impairments and disabilities due to brain damage, including epilepsy and spasticity (5).

1.2

Burden of malaria on African health systems

In all malaria-endemic countries in Africa, 25–40% (average 30%) of all outpatient clinic visits are for malaria (with most diagnosis made clinically). In these same countries, between 20% and 50% of all hospital admissions are a consequence of malaria (see country profiles for details). With high case-fatality rates due to late presentation, inadequate management, and unavailability or stock-outs of effective drugs, malaria is also a major contributor to deaths among hospital inpatients (Figure 1.5).

This high burden may in fact be partly a result of misdiagnoses, since many facilities lack laboratory capacity and it is often difficult clinically to distinguish malaria from other infectious diseases. Nonetheless, malaria is responsible for a high proportion of public health expenditure on curative treatment, and substantial reductions in malaria incidence would free up available health resources and facilities and health workers' time, to tackle other health problems.

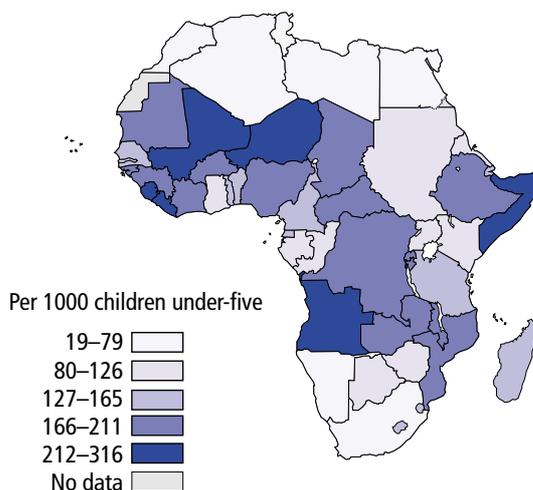
1.3

Burden of malaria on the poor

Poor people are at increased risk both of becoming infected with malaria and of becoming infected more frequently. Child mortality rates are known to be higher in poorer households and malaria is responsible for a substantial proportion of these deaths. In a demographic surveillance system in rural areas of the United Republic of Tanzania, under-5 mortality following acute fever (much of which would be expected to be due to malaria) was 39% higher in the poorest socioeconomic group than in the richest (6).

A survey in Zambia also found a substantially higher prevalence of malaria infection among the poorest population

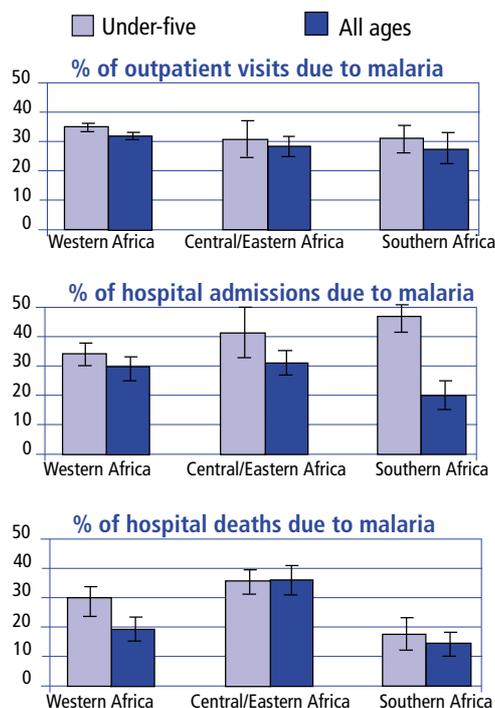
Under-five all cause mortality



Source: UNICEF, State of the World's Children, 2003

Figure 1.4

Malaria burden on health facilities



Source: AFRO routine Health Information System data. Averages 1998–2001. Error bars give the standard errors.

Figure 1.5

Parasite prevalence is higher in poor children

The prevalence of malaria infection was higher in under-fives from poorer families in 10 districts surveyed in Zambia.

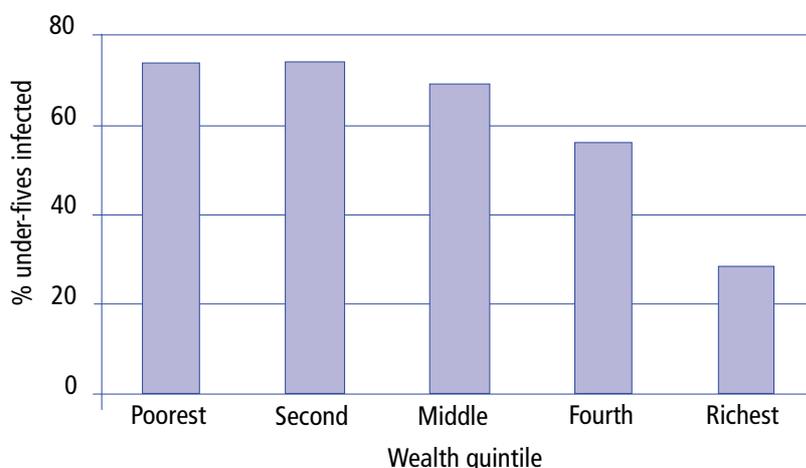


Figure 1.6

Source: reference 7

groups (7) (Figure 1.6). Poor families live in dwellings that offer little protection against mosquitoes and are less able to afford insecticide-treated nets. Poor people are also less likely to be able to pay either for effective malaria treatment or for transportation to a health facility capable of treating the disease.

Both direct and indirect costs associated with a malaria episode represent a substantial burden on the poorer households. A study in northern Ghana found that, while the cost of malaria care was just 1% of the income of the rich, it was 34% of the income of poor households (8).

1.4

Recent trends in the burden of malaria

Routine case detection and reporting

Data from health facilities are potentially useful for monitoring time trends in the number of malaria cases and deaths but have severe limitations (Figure 1.7). In Africa, most cases of malaria are diagnosed on the basis of clinical symptoms and treatment is presumptive, rather than based on laboratory confirmation. Moreover, malaria parasitaemia is common among clinic attendees in many endemic areas, so that a positive laboratory result does not necessarily mean that the patient is ill with malaria. The main clinical symptoms of malaria – fever and general

weakness – are nonspecific and may well be due to other common infections.

Reporting from facilities to districts and from districts to the ministry of health varies in its completeness and timeliness from country to country and often does not include nongovernment facilities. Thus, routine reports of the number of malaria cases and deaths have limited value for comparisons of the malaria burden between countries. Demographic and health surveys (DHS) and other sources (9) indicate that less than 40% of malaria morbidity and mortality is seen in formal health facilities – a small fraction of the total burden. However, routinely collected data are often the only information available over a prolonged period and over a wide geographical area. While these data are of use for local programme planning, major investment in improving both the quality of health information systems and access to health services would be required before their utility for monitoring changes in malaria disease trends could be assessed.

At present, the most reliable data available on trends in malaria deaths in children under 5 years of age is obtained from demographic surveillance systems (DSS), which measure deaths and possible causes prospectively over time in populations of known size and composition. The number of DSS sites is increasing: 24 sites in 13 African countries are collaborating under the INDEPTH network (International Network of field sites with continuous Demographic Evaluation of

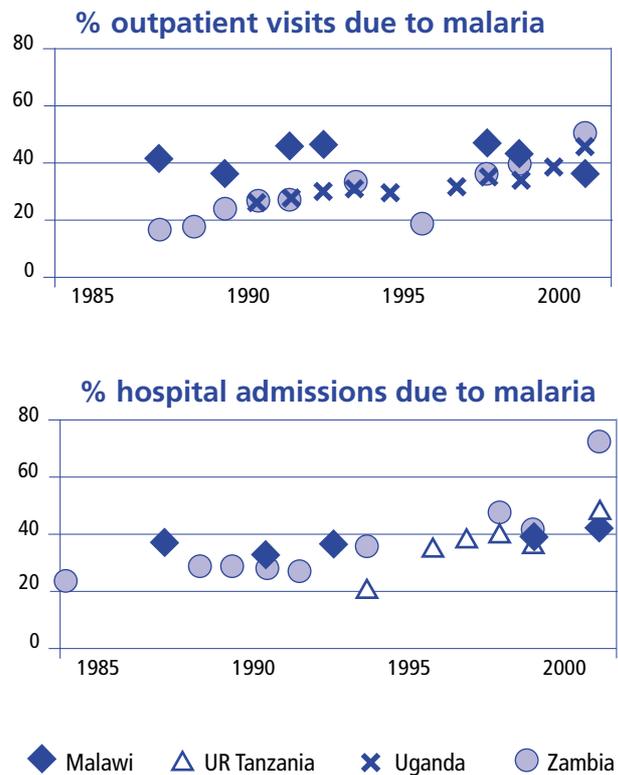
Populations and Their Health) (10). Most of these sites are in eastern and southern Africa; there are a few sites in the west of the continent but none in central Africa.

Recently, data from 1982–1998 were analysed across 28 DSS sites, adjusting for the specificity and sensitivity of verbal autopsies that were used to attribute deaths to malaria (11). Malaria mortality in under-5s almost doubled in eastern and southern Africa over the period 1990–1998 compared with 1982–1989. It is known that the prevalence of malaria infections caused by chloroquine-resistant parasites increased substantially from the late 1980s in these same areas (Figure 1.8). Thus, although the methodology cannot prove cause and effect, it is very likely that some of this increase in child mortality was related to some extent to the spread of chloroquine-resistant malaria. In west Africa the mortality rate remained the same; here too, however, malaria became proportionally more important (11). Analysis of mortality data being collected from INDEPTH using standardized verbal autopsy questionnaires since 2000 should soon provide further insight into more recent disease trends.

Throughout Africa south of the Sahara, the decrease in all-cause under-5 mortality that was apparent during the 1970s and 1980s levelled off in the 1990s (Figure 1.9), perhaps partially as a result of increased malaria mortality. Some of the important factors that may have contributed to the increasing malaria burden in these African settings include:

- drug resistance (12)

Trends in outpatient visits and hospital admissions for malaria

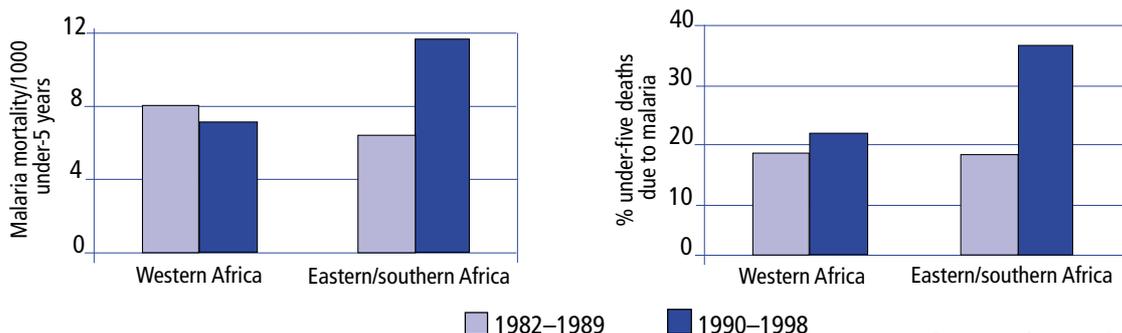


Source: Routine health information system data, AFRO, for under-fives

Figure 1.7

Malaria mortality in DSS sites

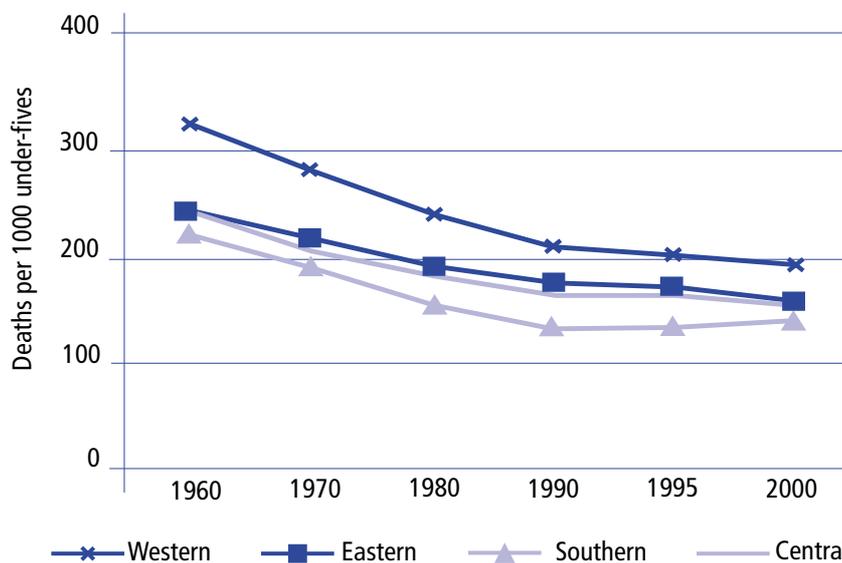
Estimates for average prevalences of *Plasmodium falciparum* of 63% in western Africa and 39% in eastern and southern Africa, adjusted for variations in the sensitivity and specificity of verbal autopsy.



Source: reference 11

Figure 1.8

Trends in all-cause, under-five mortality in Africa



Source: DHS

Figure 1.9

- more frequent exposure of non-immune populations
- emergence of HIV/AIDS (13, 14)
- climate and environmental change (15)
- breakdown of control programmes (16).

of drug effectiveness. Coverage levels approaching the Abuja target of 60% will probably be required before the full effect of ITNs and effective treatment on child health will become apparent.

1.5

Future prospects

From the time trends shown, it appears that RBM is acting against a background of increasing malaria burden. With the typical 2–3-year delay in national-level data becoming available, it is still too early to evaluate the extent to which RBM has achieved a levelling-off or reversal of the rising trend in the malaria burden. The very low level of coverage with ITNs and untreated nets documented in 2000 and 2001 falls far below the coverage levels in the ITN trials that demonstrated substantial health benefits. It should therefore come as no surprise that significant reductions in child mortality have yet to be observed. The impact of treatment coverage levels is more difficult to estimate, given both a lack of information on promptness and dosage, and varying levels

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2. Insecticide-treated nets

Abuja target

In April 2000, African heads of state participating in the Abuja Summit agreed that at least 60% of those at risk for malaria, particularly children under 5 years of age and pregnant women, are to benefit from the most suitable combination of personal and community protective measures such as ITNs by 2005 (4).

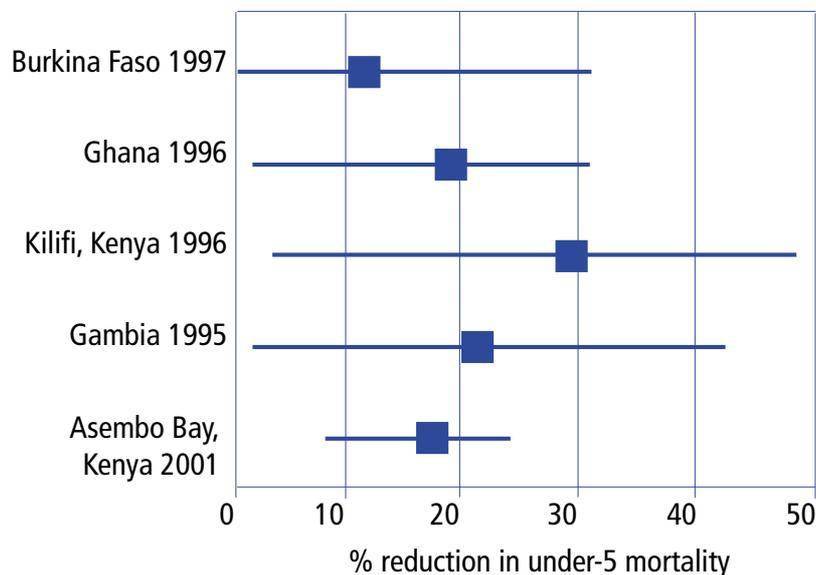
Before the development of insecticide-treated nets (ITNs) as a new technology in the mid-1980s, people in many countries were already using nets, mainly to protect themselves against biting insects and for cultural reasons (1–3). It was only recently appreciated that a net treated with insecticide offers much greater protection against malaria: not only does the net act as a barrier to prevent mosquitoes biting, but also the insecticide repels, inhibits, or kills any mosquitoes attracted to feed. Thus ITNs provide protection both to individuals sleeping under them and to other community members. The effect is so significant that use of ITNs is considered to be one of the most effective prevention measures for malaria.

2.1 Evidence

Randomized controlled trials in African settings of different transmission intensities have shown that ITNs can reduce the number of under-5 deaths by around one-fifth (5), saving about 6 lives for every 1000 children aged 1–59 months protected each year (Figure 2.1). The incidence of clinical episodes of *Plasmodium falciparum* infection is reduced by 50% on average. When used by pregnant women, ITNs are also efficacious in reducing maternal anaemia, placental infection, and low birth weight (6).

This may even be an underestimate of the

ITNs reduce under-5 mortality



Randomized controlled trials showed an overall under-5 mortality reduction of 17% in communities provided with ITNs compared with communities not provided with ITNs. The impact was similar across a range of malaria endemicities. Impact derives not only from a reduction in malaria deaths, but also from reductions in child deaths due to other causes that are associated with, or exacerbated by, malaria, such as acute respiratory infection, low birth weight, and malnutrition.

Source: reference 5, 24

Figure 2.1

efficacy of ITNs because the impact of reduced mosquito burden extends to households and communities without nets, which reduces the apparent difference between study areas with nets and study areas without nets. The protection afforded to non-users in the vicinity is difficult to quantify, but it appears to extend over several hundred metres. From observed reductions in parasite prevalences, it has recently been estimated that, in the long term, widespread use of ITNs – if regularly retreated – will massively reduce malaria transmission (7), but this effect will become fully apparent only after the usual 2-year duration of a trial.

The ITN trials achieved their impact with close to 100% of households possessing nets and 50–75% of under-5s sleeping under them, a level of use similar to the Abuja target of 60%. Where lower coverage and use rates are achieved, the impact on mortality will be less.

Subsequent programmes have demonstrated the effectiveness of ITNs under field conditions. In a large-scale social marketing programme in two rural districts in the south of the United Republic of Tanzania with high perennial malaria transmission, ITN coverage of infants rose from less than 10% at baseline to more than 50% 3 years later. ITN use was associated with a 27% increase in survival of children aged 1 month to 4 years and a 63% reduction of anaemia in this same age group (evaluated by case-control design) (8).

In the Gambia, the National Impregnated Bednet Programme achieved an 83% net treatment rate and reported 77% of under-5s and 78% of women of childbearing age sleeping under ITNs (9). Overall under-5 mortality fell by 25%, and case-control studies suggested that there were 59% fewer episodes of uncomplicated malaria in ITN users (10, 11).

2.2

Progress: ITN strategy plans

Eighteen of the 40 malaria-endemic countries in Africa with country strategy plans for rolling back malaria have developed strategic plans which include increasing access to ITNs. Twenty-five African countries have

successfully applied for funding in the second round of Global Fund applications.

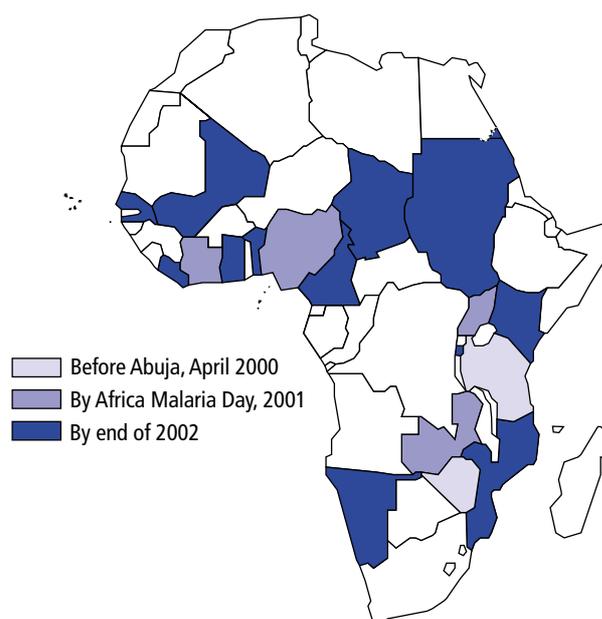
2.3

Progress: taxes and tariffs

The cost of ITNs is a barrier to their widespread use. As one element in reducing prices, the Abuja Declaration committed governments to “reduce or waive taxes and tariffs for nets and materials, insecticides, antimalarial drugs and other recommended goods and services that are needed for malaria control strategies”. Eighteen countries have now reduced or eliminated taxes and tariffs (Figure 2.2). Time-limited changes in tax or tariff regimes can be introduced through informal agreements between health and finance ministries, but more permanent arrangements normally require national legislation.

Most countries apply the “Harmonized Commodity Description and Coding System” to classify products introduced by the World Customs Office (12). Under this system, each product is assigned a six-digit code for the purposes of levying tariffs and collecting trade statistics. Nets are currently classified as textiles and customs offices can be reluctant

Reduction of taxes and tariffs



Source: RBM data from countries, 2003

Figure 2.2

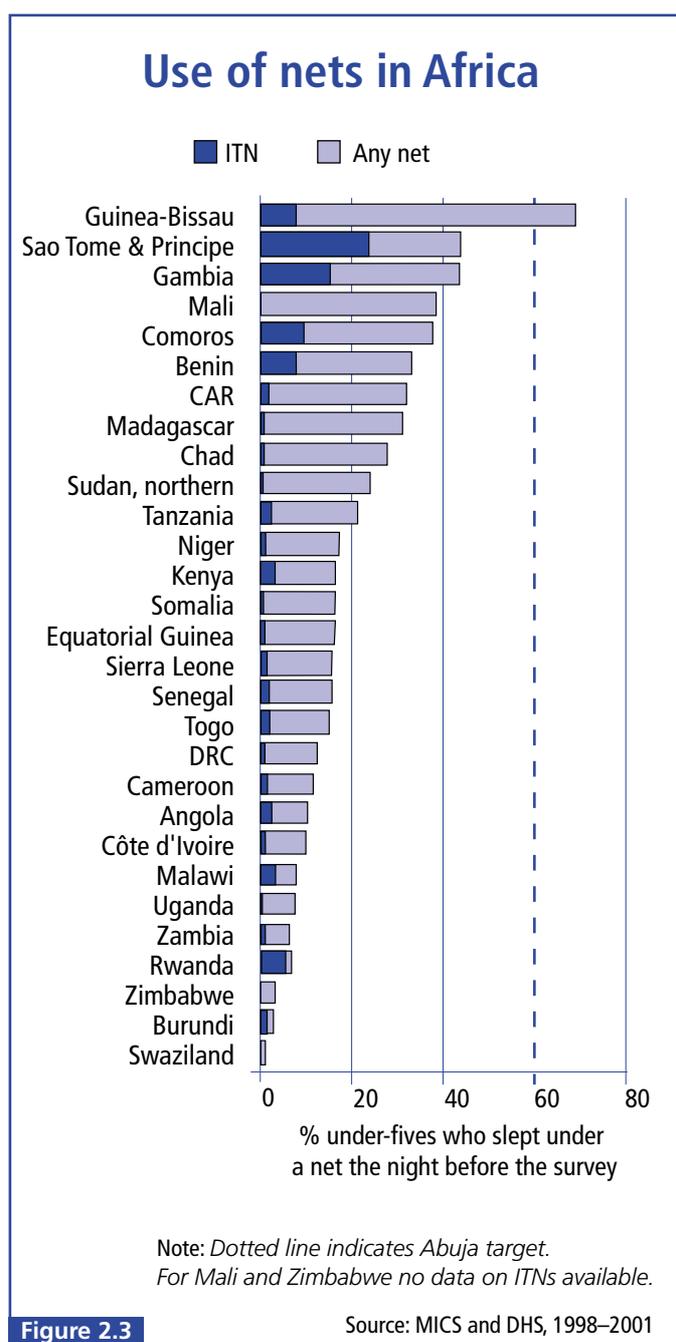


Figure 2.3

to give exemption for the whole range of products covered by the code. Some countries also subscribe to regional agreements on tariffs and taxation rates, which can influence the adoption of policy change. For example, the West African Economic and Monetary Union requires all of its eight member states to adhere to the Common External Tariff Resolution, which stipulates fixed rates for import duty of 20% and for value-added tax (VAT) of 18%. Clearly, changes in national policy would be greatly facilitated by changes to international agreements.

2.4

Progress: long-lasting insecticidal nets

In response to low re-treatment rates of conventional insecticide-treated nets, especially in Africa, WHO prompted industry to develop long-lasting insecticidal nets (LLINs) – ready-to-use, factory-pretreated nets that require no further treatment during their expected lifespan of 4–5 years. This technology obviates the need for re-treatment (unlike conventional ITNs, LLINs resist washing) and reduces both human exposure (at any given time, most of the insecticide is hidden and not bioavailable) and the risk of environmental contamination.

Using the most recent fibre technologies, LLINs are regarded as a major breakthrough in malaria prevention. One LLIN is already commercially available and is recommended by WHO. At a current price of around US\$ 5 per net, LLINs are already more cost-effective than conventionally treated nets. Efforts are being made to scale up production capacity to meet demand, which is already high. The RBM partnership is facilitating technology transfer and stimulating local production of LLINs in Africa (13).

2.5

Progress: coverage

In nine countries surveyed between 1997 and 2001, a median 13% of households possess one or more nets (range 1.1–54%). A median 1.3% (range 0.2–4.9%) of households surveyed in three countries own at least one ITN (14). The proportion of under-5s sleeping under nets is also low – about 15% across 28 countries surveyed. Even fewer children (less than 2%) sleep under ITNs. Only two countries, the Gambia and Sao Tome and Principe, reported ITN use rates of more than 10% (Figure 2.3).

While current rates of coverage are generally low, the availability and use of nets have increased appreciably over the past 10 years, particularly in countries where nets were not normally used. In the United Republic of Tanzania, for example, nets were rare in the 1980s, especially in rural areas, but ownership has increased to 63% in towns

and to 29% in rural areas (14). Such trends are encouraging and highlight the progress that is being made.

2.6

Challenges: increasing coverage

Most African households in malaria risk areas do not possess any net, whether treated with insecticide or not. To achieve adequate coverage most countries will require many more nets; to cover all Africans at risk (16), an estimated total of 260 million nets would be needed.

Increasing ITN availability will require large-scale expansion of supply and distribution. Barriers to increasing the supply and distribution of nets and insecticides include taxes and tariffs, regulatory issues, and inadequate distribution systems. Barriers to increasing the demand for nets and insecticides relate to the price, to their affordability for households, and to promotion and marketing.

There is also scope to increase the use of ITNs by providing insecticide treatment for any untreated nets already in houses. Based on the comparative coverage with untreated and treated nets, this could double the percentage of households with ITNs.

Low insecticide re-treatment rates are another challenge. Insecticide for net treatment is still an unfamiliar commodity in Africa. Moreover, people's motivation for using nets is often to reduce mosquito nuisance, not to repel or kill malaria-transmitting mosquitoes. The increasing availability of attractive branded formulations in Africa should stimulate demand for insecticides, and the development of LLINs is another potential solution to the problem of low re-treatment rates.

2.7

Challenges: overcoming disparities in net coverage

A major barrier to net ownership is poverty. The most common reason cited for not possessing a net is lack of money: the price of a net represents a large proportion of the income of a poor household.

Eritrea's national impregnation campaign

The current estimate of the number of nets in use in Eritrea is 533 200, with some 226 000 having been procured and distributed in 2002. Net treatment rate increased from 20% in 2000 to 58.5% in 2002. Most households in endemic areas of Eritrea possess two nets (17).

2.8

Scaling up

Net possession and use have to increase considerably if the gap between the number of under-5s who would benefit from a net and those who currently sleep under one is to be reduced. The challenge is to find the balance between covering the costs of increasing ITN coverage and stimulating the growth of commercial markets, while ensuring that the poorest and most vulnerable are protected (23).

In most malaria-endemic African countries the public sector does not have the financial or logistic capacity to extend net use to the scale required. Most countries spend only US\$ 4 per capita a year on health – the equivalent of the average cost of an untreated net. The Abuja target for expanding ITN use in Africa will therefore require synergy between public and private sector activities.

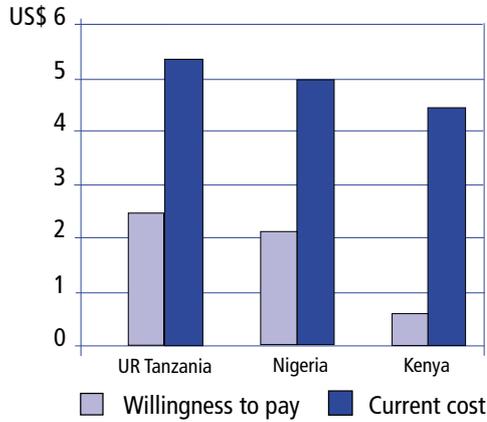
In providing an enabling environment for scaling-up actions, governments need to focus on the following priorities:

- Creating demand for ITNs through health information channels and mass media.
- Providing sustained subsidies targeted to the most vulnerable groups, preferably through a system that uses public channels (e.g. at antenatal clinics) for delivery of

ITN coverage in Zambia

A community programme in rural Zambia achieved net coverage of more than 60% of individuals at risk. With support from UNICEF, ITNs have been sold since 1995 by the provincial community-based malaria control programme. In a survey, a third of the population reported sleeping under a net the previous night, more than 80% had re-treated their nets at least once, and pregnant women and under-5s were given priority for net use. The incidence of malaria was significantly lower among net users than non-users (18).

Households are willing to pay for nets

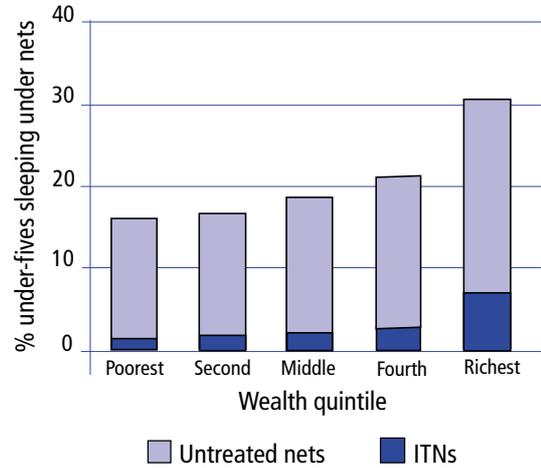


Studies in Kenya, Nigeria and the United Republic of Tanzania indicate that household members are willing to pay for ITNs, but typically less than the current cost. One approach to reducing inequities is social marketing – subsidizing, to some extent, the cost of ITNs on sale. In the United Republic of Tanzania, a social marketing project that started in 1998 increased coverage while reducing socioeconomic inequities.

Source: references 19, 20 and 21

Figure 2.4

Net ownership and use is lowest in poor households

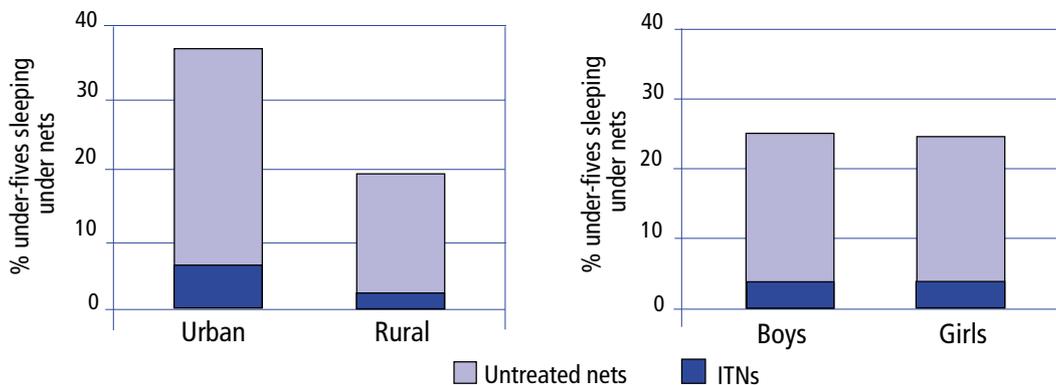


Poor households are less likely to have ITNs or any net. The disparity contrasts with a probably higher burden of malaria in poorer households, who live in houses and areas that typically allow for more exposure to mosquitoes, and who are less able to afford treatment once infection has occurred.

Source: MICS, 1998–2001, average across 22 countries

Figure 2.5

Children in rural households are less likely to use nets



In rural areas, fewer children under-5 sleep under a net than in urban areas, even though malaria is often more prevalent in rural areas. The magnitude of the urban–rural difference was larger for ITNs than for any net. Pooled over all surveys, the ratio of urban to rural coverage was 1.8 for any net and 2.8 for ITN. From these same surveys, use of any nets or ITNs is similar in boys and girls.

Source: MICS and DHS, 1998–2001, average across 22 countries

Figures 2.6 and 2.7

subsidies but commercial distribution channels for delivery of the goods.

- Stimulating and facilitating the development of commercial markets, through tax and tariff reduction and by streamlining the regulation of new insecticide products. Competition between manufacturers and distributors must be promoted to ensure that nets are available to the general population at the lowest possible price.

- Monitoring insecticide resistance.

- Possibly, market priming (i.e. the temporary procurement and distribution of ITNs, aimed at strengthening commercial distribution channels) in areas where the demand for nets is too low for manufacturers to make an economical return.

To overcome the challenge of low re-treatment rates, there should be a stronger role for subsidy of insecticide distribution through publicly funded channels. This is the system followed in the world's largest and longest-sustained ITN programmes, namely those in China and Viet Nam (23).

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3. Prompt and effective treatment

Prompt and effective treatment of malaria is a critical element of malaria control (1). In Africa south of the Sahara, where most malaria is due to *Plasmodium falciparum* and potentially fatal, early and effective treatment could save many lives. It is vital that sufferers, especially children aged under 5 years, start treatment within 24 hours of the onset of symptoms, to prevent progression – often rapid – to severe malaria and death (2).

A strong health system would provide for reliable diagnosis as the basis for optimal treatment. However, in most malaria-endemic areas, access to curative and diagnostic services is limited and drugs are purchased through the private, informal sector (3, 4). Moreover, diagnosis is complicated by the lack of a specific clinical presentation, frequent occurrence of several diseases simultaneously, and – in areas of intense transmission – asymptomatic malaria infections. In high-transmission malaria-endemic areas, WHO therefore recommends that, as part of the strategy of Integrated Management of Childhood Illnesses (IMCI), all under-5s with fever be presumptively treated with antimalarials (5). Community-level interventions to strengthen home management of children with fever are gaining importance as part of efforts to improve access to prompt treatment, particularly in isolated rural areas.

3.1 Evidence

The global consensus that access to prompt, effective treatment should be a key element of the RBM strategy is based on the widespread recognition that untreated falciparum malaria contributes both directly and indirectly to the death of non-immune individuals, sometimes within hours of the onset of symptoms (2). Prompt, effective treatment of malaria and appropriate management of clinical complications will be life-saving.

Uncontrolled studies in Madagascar (7) and the United Republic of Tanzania (8) revealed significant reductions in mortality when

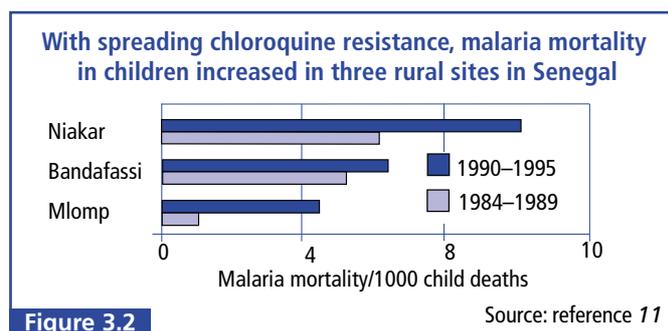
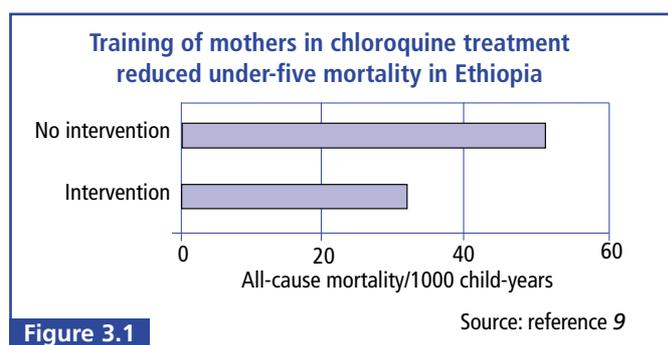
research teams provided prompt access to antimalarial treatment. However, these studies took place in circumstances where the obstacles to access that characterize most health systems in endemic countries had been eliminated.

Randomized, controlled trials of treatment of febrile illness with reduction of mortality as the end-point are fraught with methodological and ethical problems and have produced conflicting results. In a widely quoted community-randomized trial in an area of low, seasonal malaria transmission in Ethiopia, under-5 mortality was reduced by 40% as a result of teaching mothers to provide prompt chloroquine treatment for fevers at home (9) (Figure 3.1). However, a general improvement in child care may have contributed to this high level of impact.

Other indirect evidence attributed the low malaria-specific mortality in Brazzaville to the widespread use of chloroquine as self-treatment (10). Conversely, an increase in child mortality following the spread of chloroquine resistance was observed at a demographic surveillance site in rural Senegal (11) (Figure 3.2). Demographic and Health Surveys documented a 15% reduction in infant and

Abuja target

In April 2000, African heads of state participating in the Abuja Summit agreed that by the year 2005 at least 60% of those suffering from malaria should have prompt access to and be able to use correct, affordable, and appropriate treatment within 24 hours of the onset of symptoms (6).



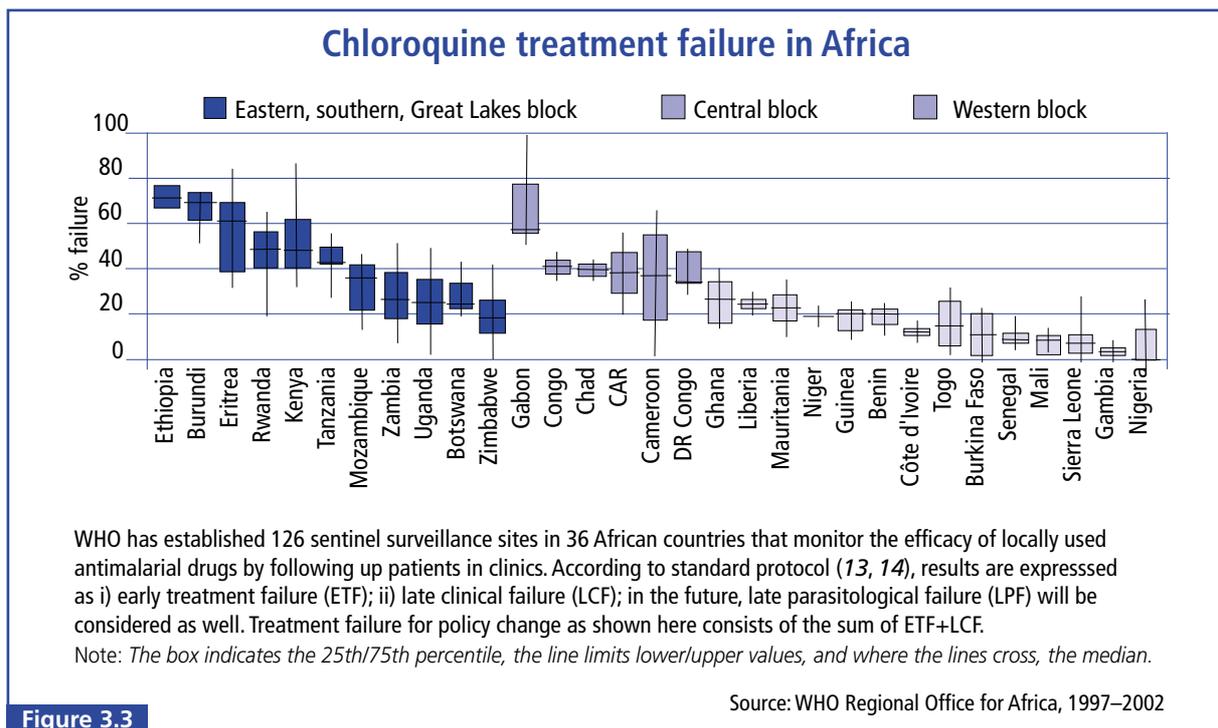


Figure 3.3

child mortality in Malawi during the 1990s at a time of increasing or stable rates of infant and child mortality in Kenya, Rwanda, Uganda, the United Republic of Tanzania, Zambia and Zimbabwe. The exceptional mortality reduction in Malawi is likely to be due partly to the 1993 change in drug policy from chloroquine to sulfadoxine-pyrimethamine (SP).

3.2

Drug resistance

Antimalarial drug resistance has become one of the greatest challenges in malaria treatment. Chloroquine, the cheapest and most widely available antimalarial drug, has lost its clinical effectiveness in most parts of Africa (Figure 3.3). Resistance of *Plasmodium falciparum* to the most affordable alternative drugs, notably SP, is also an emerging problem in eastern and southern Africa (Figure 3.4).

Several newly developed drugs could replace those that are no longer effective. In particular, artemisinin-based combination therapies (ACTs) have enormous potential in malaria therapy. The combination of multiple drugs enhances clinical efficacy and may delay the development of resistance of parasites (12). However, these drugs are not yet widely available and not always affordable.

3.3

Progress: drug policies

Drug resistance has led many countries in eastern, southern and central Africa to revise their treatment guidelines (Figure 3.5).

The varying levels of drug resistance within countries make the changing of national policies difficult. In addition to clinical

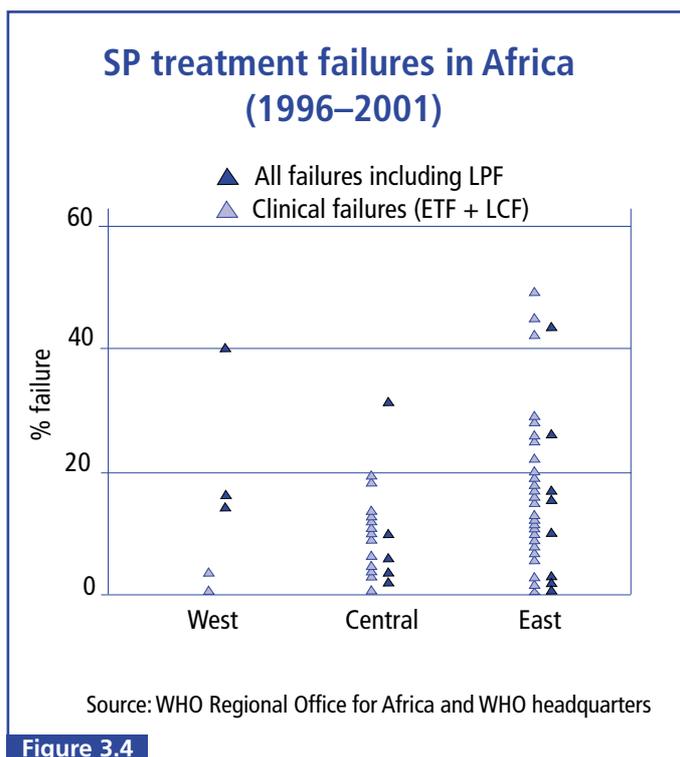


Figure 3.4

Drugs nationally recommended for first-line treatment of uncomplicated malaria, January 2003

Non-ACT: CQ+SP or AQ+SP combination.
 ACT: artemisinin (AS)+AQ, AS+SP, or Coartem.
 In Cameroon, amodiaquine is recommended.

Countries that changed first-line policy from CQ to SP: Malawi (1993), Kenya (1996), Botswana (1997), DRC and Tanzania (2001).

Selected provinces in South Africa where change to ACTs has been fully implemented: Coartem in KawZulu-Natal, and artesunate+SP in Mpumalanga (2001).

Countries that have adopted ACTs but have yet to implement this policy fully: Tanzania (Zanzibar) (2001), Zambia (2001), Burundi (2002).

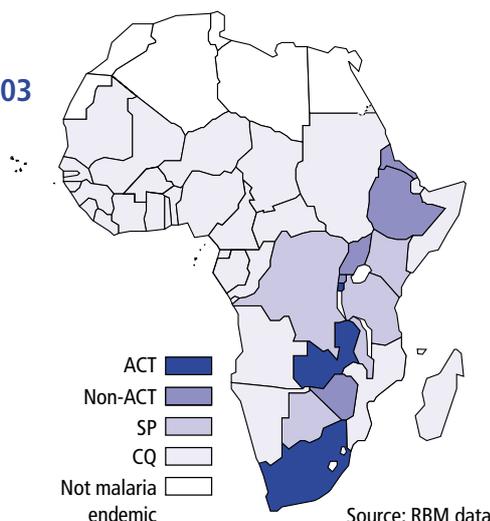


Figure 3.5

efficacy and safety, factors such as adherence to treatment regimens, cost, and drug management issues must be taken into account in deciding on a policy revision. Implementing a policy change is an expensive venture that requires significant injection of funds both to finance the change process and for procurement of the required medications.

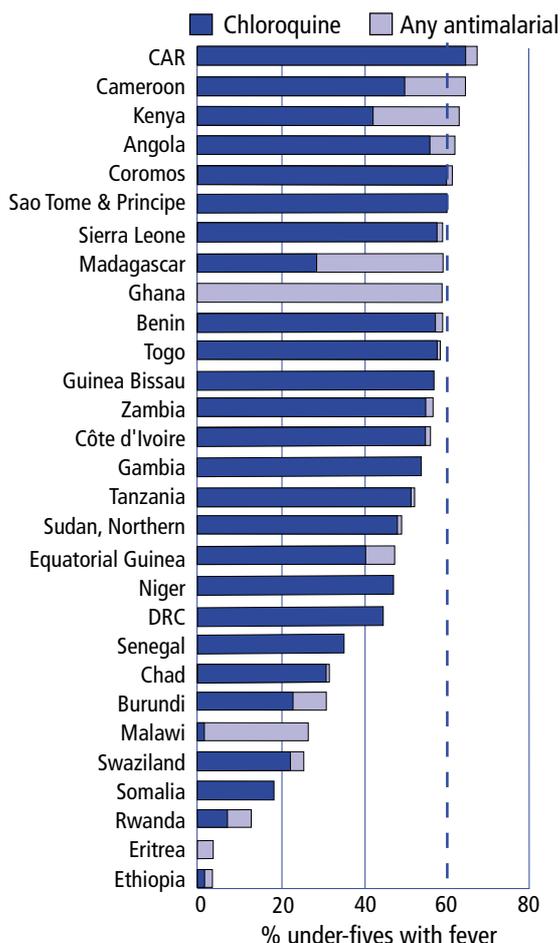
On average, a period of 18 months has been needed from consensus to complete implementation of policy in most African countries. Factors accounting for this delay included obtaining political and financial support, training of health care providers, and sensitization of the general population, which is crucial for successful implementation of the policy decision.

3.4

Progress: treatment coverage

Recent national household surveys in 28 African countries have shown that an average of 42% of children under 5 years with fever were treated with an antimalarial (Figure 3.6). However, more than 80% of these reported treatments were with chloroquine, so the coverage with effective treatment is likely to have been much lower. In addition, many treatments may not have been within 24 hours of onset of symptoms, and dosages may have been inadequate (15–17). These coverage estimates therefore represent an upper limit of the coverage with prompt, effective treatment, and the true value is probably much lower.

Almost half of febrile under-fives are treated with antimalarials. Most treatments involve chloroquine against which resistance is increasing.



These data do not indicate source of treatment, i.e. formal or informal private sector.

Note: Dotted line indicates Abuja target. No chloroquine data available for Ghana (DHS, 1998) and Eritrea (preliminary data DHS, 2002).

Figure 3.6

Source: MICS and DHS, 1998–2002

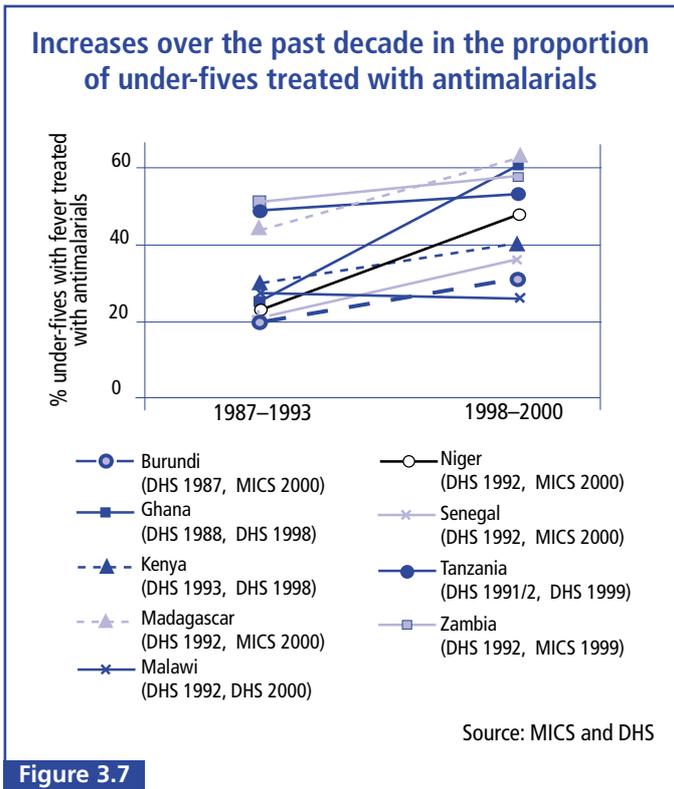


Figure 3.7

In nine countries where a number of national surveys have been conducted over the past 15 years, there has been an increasing trend towards use of antimalarials for treatment of febrile under-5s (Figure 3.7). These national surveys provide further proof that use of antimalarials is widespread and common. The apparent increasing responsiveness of caretakers of young children in accessing antimalarial treatment highlights

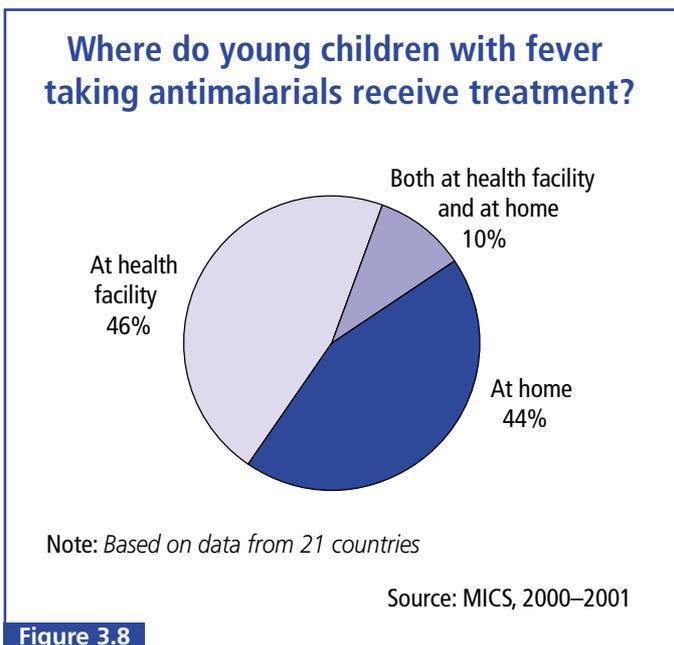


Figure 3.8

the opportunity for achieving further improvements in their access to more effective antimalarials and their compliance with treatment regimens.

3.5

Challenges: increasing coverage

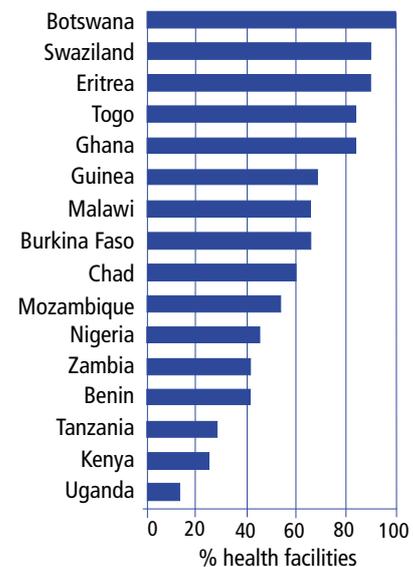
At least half of the population in the poorest parts of Africa lacks access to essential drugs, including antimalarials (18), for reasons that include inadequate financing, poor health care delivery systems, and weak drug regulation (19).

Use of health facilities and suboptimal treatment at home

Data from MICS in 21 countries indicate that about 46% of febrile children who received antimalarial treatment were treated at a health facility, 44% at home, and 10% both at home and at a health facility (Figure 3.8). There is considerable variation between countries. In Burundi, Gambia, and Guinea Bissau, children treated with antimalarials were at least four times as likely to be treated in a health facility as at home, whereas children in Cameroon,

Antimalarial drug stock-outs are a common reason for not using health facilities

% of health facilities with no stock-out of nationally recommended antimalarial drugs continuously for 1 week during the past 3 months.



Source: RBM Baseline Surveys 2000–2001

Figure 3.9

Chad, and Niger were at least three times as likely to be treated at home.

Distance to the health facility, inadequate drug stocks, and lack of money to pay for services are the most common reasons for not using public health facilities (Figure 3.9). The cost of antimalarial treatment imposes a significant burden on households in many affected areas. In the United Republic of Tanzania, for example, the cost of treatment has been shown to be by far the largest component of household expenditures on malaria (20), exceeding that on preventive measures such as ITNs. Only in five countries (Botswana, Djibouti, Namibia, South Africa, and Swaziland) is treatment free of charge.

A study of treatment of childhood malaria in Zambia found that, in most cases, drugs were bought at pharmacies or local shops. The "informal private sector" is thus a main source of antimalarial drugs (21). However, these treatments are often inconsistent with national treatment guidelines: they may include counterfeit drugs, drugs of poor quality, and incorrect dosing and irrational prescription practices (22, 23).

3.6

Challenges: disparities in use

National MICS have shown that children from poorer households are less likely than others to receive antimalarial treatment. In addition, although coverage is equally high for boys and girls, it is somewhat lower in rural areas, where the malaria burden is higher, than in urban areas (Figures 3.10, 3.11, and 3.12).

Household wealth also affects the quality of antimalarial drugs administered. A community study in Ghana, for example, suggests that leftover drugs were used more often by the poor (82%) than by the less poor (53%) to treat fever episodes. Drug purchases without prescriptions were also more common, and visits to health clinics less frequent, among the poor (24).

The seriousness of high fever will prompt the majority of caretakers to seek treatment for life-threatening illness in young children. For most surveyed populations, however, the distribution of prompt effective treatment among communities remains unknown and requires further investigation.

Antimalarial treatment is lower for children living in poorer households

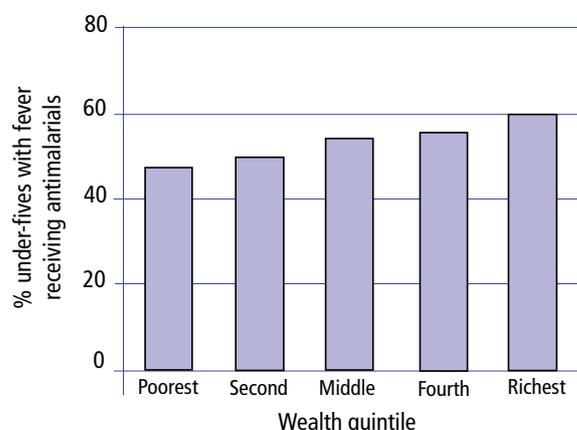


Figure 3.10

Source: MICS, 2000–2001

Boys and girls with fever are equally likely to receive antimalarial drugs

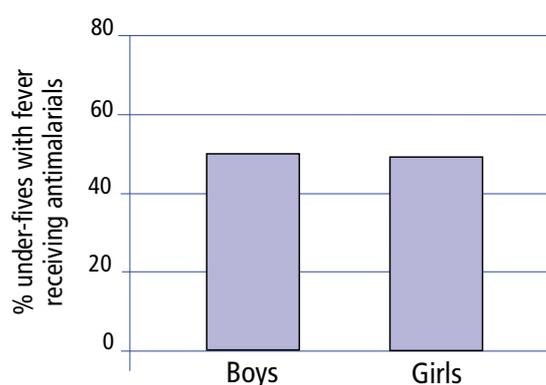


Figure 3.11

Source: MICS and DHS, 1998–2001

Despite a higher malarial burden, children in rural areas are less likely to receive antimalarial drugs when they have fever

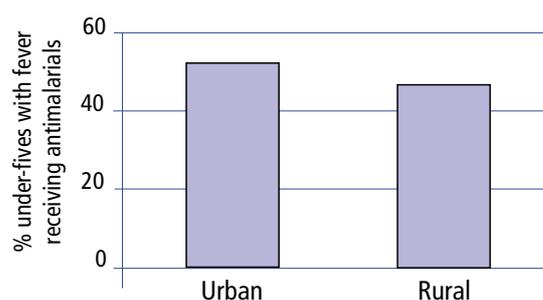


Figure 3.12

Source: MICS and DHS, 1998–2001

Cost-effectiveness versus affordability

Cost-effectiveness analyses indicate that antimalarial treatment is generally highly cost-effective, even in the most resource-poor countries (25). In practice, however, the costs of treating malaria patients with the most effective antimalarials may well not be affordable for communities or households in countries with widespread resistance to commonly available, inexpensive drugs.

Average cost of a full course of adult outpatient treatment:

Chloroquine	US\$ 0.13
SP	US\$ 0.14
Amodiaquine	US\$ 0.20
Artemisinin-based combinations	US\$ 1–3

3.7

Scaling up

The achievement of the Abuja target of 60% coverage with prompt and effective antimalarial treatment will require more effective methods to improve delivery and compliance with recommended regimens. Measures will include full integration of malaria treatment into national health

systems, improving access to effective drugs for treatment as close to the home as possible, and engaging the private sector (26). However, currently allocated financial resources for health care in most of the low-income malaria-endemic countries will not be sufficient to respond to malaria treatment needs (25).

Although financial support for antimalarial treatment is increasing, this has not kept pace with the costs incurred by the need to begin replacing with newer drugs (including ACTs) those that are no longer effective because of parasite resistance. African governments and the global community are asked to address urgently the need to allocate substantial resources for the delivery of more effective treatment regimens to those most at risk of malaria.

Additional strategies, such as cost containment by pooled procurement, negotiation of more favourable prices, removal of charges, tariffs and taxes, and the introduction of subsidies, are key to improving the affordability of newer and more expensive treatment regimens and to the widespread availability of these treatment to at-risk populations in Africa.

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Home-based management of fever

Home-based management of fever (HBMF) is a promising strategy for improving the coverage of prompt effective treatment. Community health workers and mothers of young children are trained in the recognition of symptoms and the benefits of prompt antimalarial treatment. Prepackaged kits of full-course treatments, with appropriate drawn and written instructions, allow mothers to treat children as soon as fever is detected. Programmes have been launched in Ghana, Nigeria, and Uganda in June 2002.

Uganda has gone to scale with the HBMF approach in more than 10 districts and is rapidly expanding coverage. The impact of HBMF is being evaluated in three districts; interim results suggest that, among children under 5 years, the number of outpatient malaria cases has declined since programme implementation.

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4. Malaria during pregnancy

Abuja target

In the Abuja Declaration African heads of states agreed to achieve by 2005:

- at least 60% coverage of pregnant women at risk of malaria with the most suitable combination of personal and community protective measures
- at least 60% of all pregnant women at risk of malaria, especially those in their first pregnancies, shall have access to intermittent preventive treatment (1).

Malaria infection during pregnancy is a major public health problem in tropical and subtropical regions throughout the world. In most endemic areas of Africa, pregnant women are the main adult risk group for malaria. The main burden of malaria infection during pregnancy results from infection with *Plasmodium falciparum*. The impact of the other three human malaria parasites (*P. vivax*, *P. malariae*, and *P. ovale*) is less clear. Every year at least 30 million women in malarious areas of Africa become pregnant; most of these women live in areas of relatively stable malaria transmission.

The symptoms and complications of malaria during pregnancy differ with the intensity of malaria transmission and thus with the level of immunity acquired by the pregnant woman (2). Since malaria transmission intensity may vary within the same country from areas of relatively stable transmission to areas of unstable or epidemic transmission, the clinical picture of malaria infection during pregnancy may likewise range from asymptomatic to severe, life-threatening illness.

In areas of epidemic or low (unstable) malaria transmission, adult women have not acquired any significant level of immunity and usually become ill when infected with *P. falciparum*. For pregnant women in these areas the risk of developing severe malaria is 2–3 times higher than that for non-pregnant women living in the same area. Maternal

death may result either directly from severe malaria or indirectly from malaria-related severe anaemia. In addition, malaria may result in a range of adverse pregnancy outcomes, including low birth weight, spontaneous abortion, and neonatal death (Figure 4.1).

In areas of high and moderate (stable) malaria transmission, most adult women have developed sufficient immunity that, even during pregnancy, *P. falciparum* infection does not usually result in fever or other clinical symptoms. In these areas, the principal impact of malaria infection is malaria-related anaemia in the mother and the presence of parasites in the placenta. The resulting impairment of fetal nutrition contributes to low birth weight and is a leading cause of poorer infant survival and development (Figure 4.1). In areas of Africa with stable malaria transmission,

Strategic framework for malaria control during pregnancy in WHO Africa Region

To reach the Abuja Summit goal^a, a three-pronged approach is recommended:

- Intermittent preventive treatment
- Insecticide-treated nets
- Effective case management of malarial illness.

a: The original Abuja declaration also recommended chemoprophylaxis, but present WHO and RBM policy strongly recommends IPT – and not chemoprophylaxis – for prevention of malaria during pregnancy.

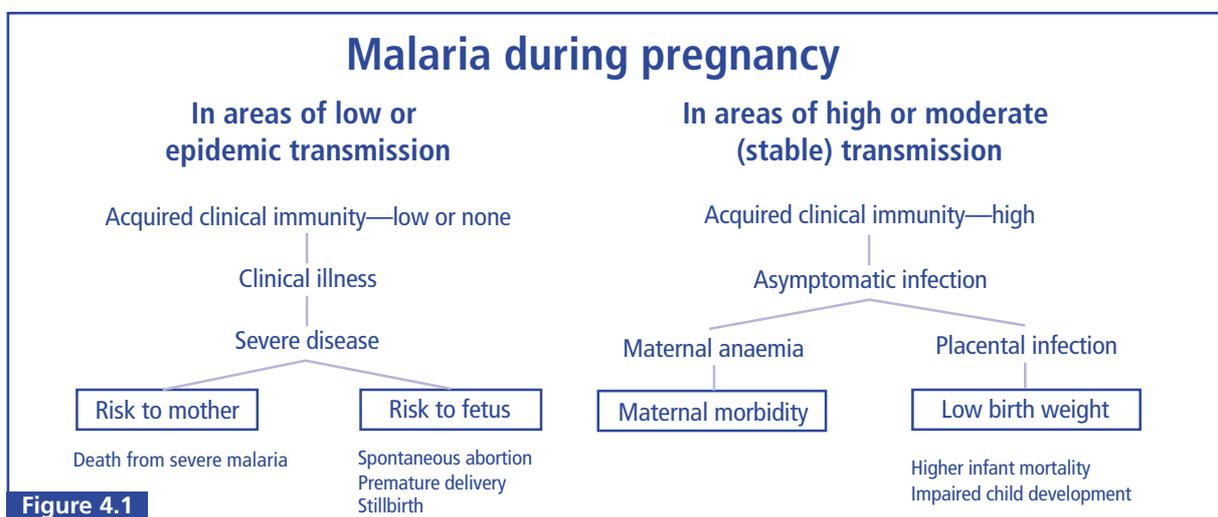


Figure 4.1

P. falciparum infection during pregnancy is estimated to cause an estimated 75 000 to 200 000 infant deaths each year (3).

Despite the toll that malaria exacts on pregnant women and their infants, this was – until recently – a relatively neglected problem, with less than 5% of pregnant women having access to effective interventions. During the past decade, however, potentially more effective strategies for prevention and control of malaria in pregnancy have been developed and shown to have a remarkable impact on the health of mothers and infants.

4.1

Evidence

Intermittent preventive treatment (IPT)

For many years WHO recommended that pregnant women in malaria endemic areas should receive an initial antimalarial treatment dose on their first contact with antenatal services, followed by weekly chemoprophylaxis (given at less than therapeutic dose) with an effective and safe antimalarial drug (4). In most countries in Africa, chloroquine (CQ) has been the drug of choice. However, the emergence and spread of CQ-resistant *falciparum* malaria, poor patient compliance with multiple doses, and a high incidence of CQ-induced pruritus have limited the effectiveness and hence the implementation of this policy.

In 2000, the WHO Expert Committee on Malaria recommended that intermittent treatment with an effective, preferably one-dose, antimalarial drug, should be made available as a routine part of antenatal care to women in their first and second pregnancies in highly endemic areas (5). At present, sulfadoxine–pyrimethamine (SP) – given at a therapeutic dose – is the single-dose antimalarial with the best overall effectiveness for prevention of malaria in pregnancy in areas with high transmission, and low resistance to SP. Other antimalarials are being evaluated for potential use in IPT.

Studies in Kenya (6,7) and Malawi (8) have shown that IPT with at least two treatment doses of SP is highly effective in reducing the proportion of women with anaemia and placental malaria infection at delivery. The benefits of IPT for both maternal and infant health have been seen in a range of different malaria transmission settings (Figures 4.2–4.4).

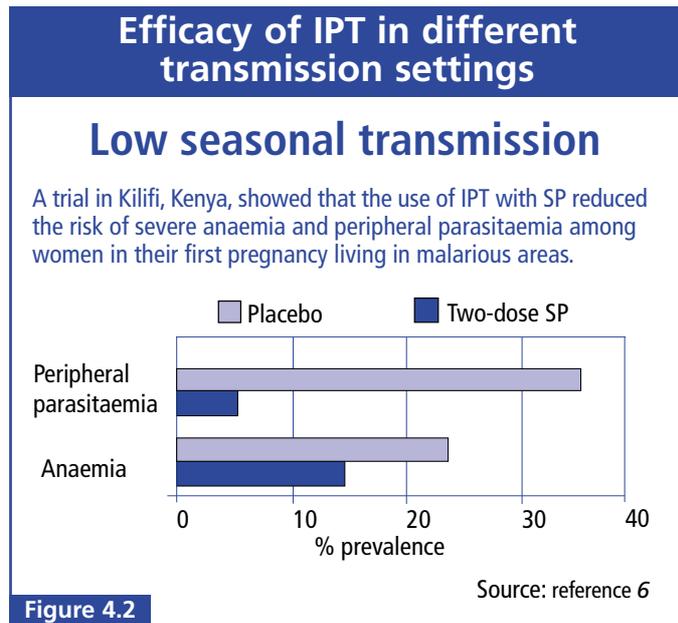


Figure 4.2

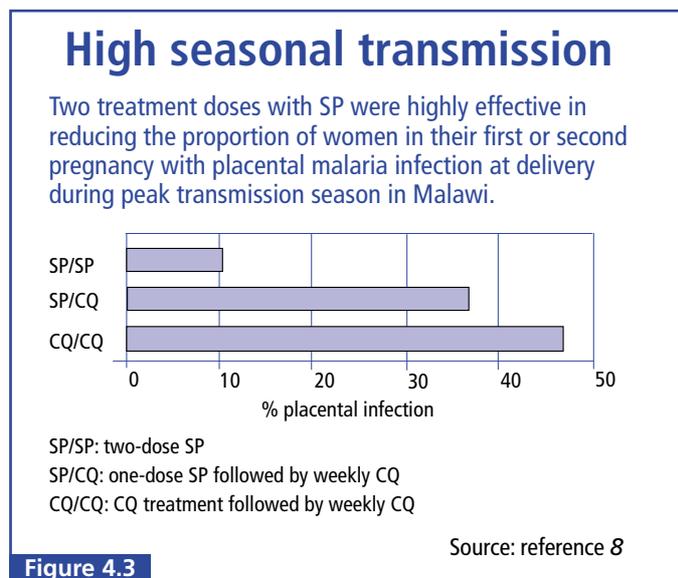


Figure 4.3

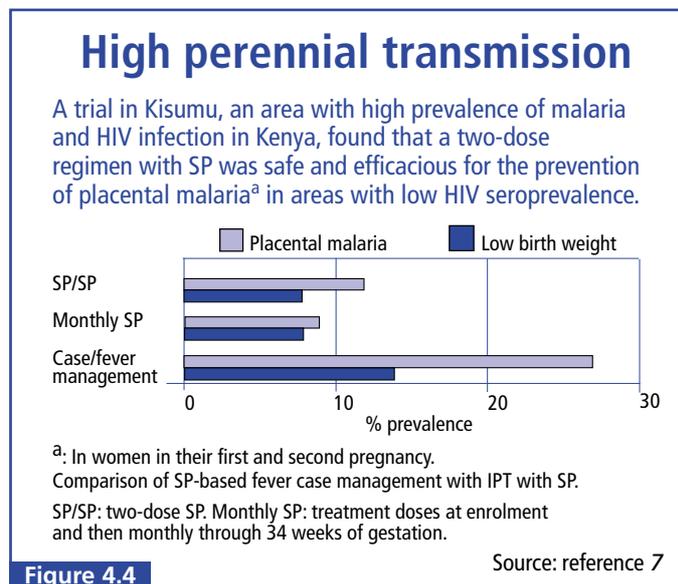


Figure 4.4

ITN use among women in their first four pregnancies reduced LBW and premature birth by 25%

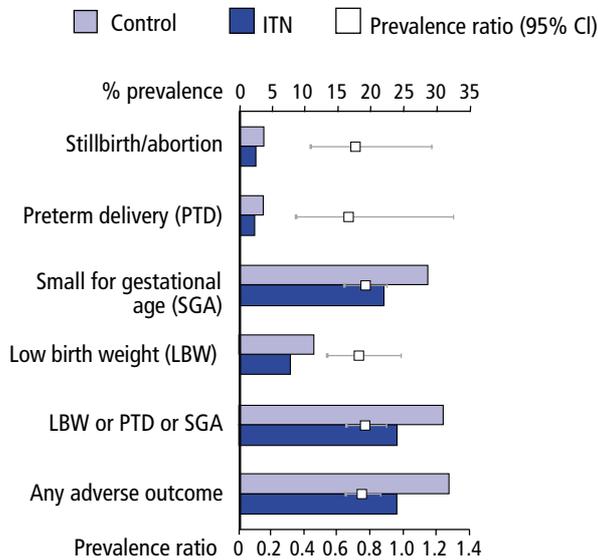


Figure 4.5

Source: reference 11

Insecticide-treated nets

If used during pregnancy in areas of stable malaria transmission, ITNs reduce the overall risk of morbidity and mortality among pregnant women and their infants. A trial in the Gambia found that, during the rainy season in villages where ITNs were used, the prevalence of malaria infection among pregnant women was lower and fewer babies were classified as premature (9). Further evidence comes from a recent study in a highly malarious area of Kenya. During the first four pregnancies, women who were protected by ITNs at night gave birth to 25% fewer premature or small-for-gestational-age babies than women who did not sleep under ITNs (10) (Figure 4.5).

Case management of malaria illness

Malaria in pregnant women requires immediate treatment, focusing on complete cure of the infection. Each country in malaria-endemic areas of Africa needs a policy that guides effective management of malaria in pregnant women. Collaboration between malaria control programme and reproductive health programme staff can facilitate the development of systematic management protocols and drug supply strategies (11).

Cost-effectiveness

Weekly CQ chemoprophylaxis was compared with two-dose IPT using SP in primigravidae in an area of moderate to high malaria transmission: IPT-SP proved to be more cost-effective than CQ chemoprophylaxis, largely because of lower costs and higher compliance with SP (12). In a further cost-effectiveness analysis, three different SP regimens were compared with febrile case management using SP for a hypothetical cohort of 10 000 pregnant women in Kenya. The results suggested that the two-dose SP regimen (when the costs only of antenatal care are considered and at HIV seroprevalence below 10%) would be the least expensive strategy for preventing low birth weight (13).

ITN use by children has been shown to be cost-effective in several settings (14,15). The substantial benefit of ITNs in reducing the burden of malaria during pregnancy makes it likely that the cost-effectiveness of ITN use by pregnant women will be of similar attractiveness to that for children.

Most women in Africa south of the Sahara attend an antenatal clinic at least once

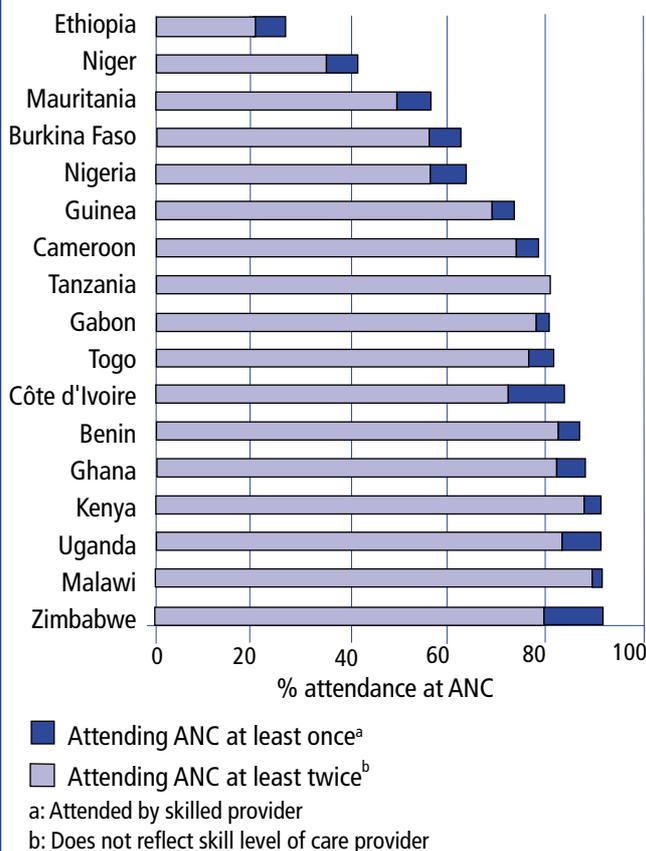


Figure 4.6

Source: DHS, 1998–2001

4.2

Progress

Antenatal care

WHO recommends that IPT be administered to pregnant women during routine visits to antenatal clinics. As recent surveys confirm, at least two-thirds of pregnant women in most countries do have access to, and use, antenatal care, and most of them attend antenatal clinics at least twice (Figure 4.6). The high level of antenatal care coverage and use provides a unique opportunity to deliver prevention packages to pregnant women in the Africa region.

Prevention with IPT and ITNs

Coverage of pregnant women with IPT and ITNs is a fundamental part of prevention of malaria during pregnancy. Although there are examples of successful delivery of IPT and ITNs through antenatal clinics, large-scale programmes to deliver these prevention tools to pregnant women are only now being developed. Thus, data on IPT and ITN coverage are limited at present.

Surveys conducted on a national scale indicate that net use among women of reproductive age (15–49 years) – an indication of use by pregnant women – remains very low. Among pregnant women, coverage with any net (treated or untreated) was less than 10% in three of the four countries for which recent data were available. Coverage with ITNs in these three countries was even lower, at 3% or less (Figure 4.7). As countries accelerate efforts to control malaria during pregnancy, ITN coverage is expected to increase.

4.3

Challenges

Bottlenecks

Timely antenatal clinic attendance is key for delivering the prevention package to pregnant women. Some 40% of pregnant African women present for the first time to antenatal clinics in the second trimester of pregnancy, and about 25% come for the first time in the third trimester (16) (Figure 4.8). This means that at least the first dose of IPT could be given in time to most pregnant women. The ITN part of the prevention package delivered during the first antenatal

Use of ITNs by pregnant women is a fundamental part of the Strategic Framework for Africa

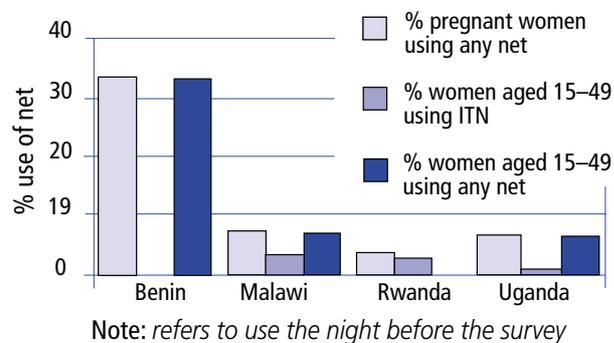
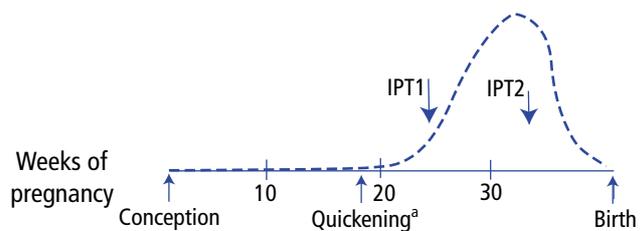


Figure 4.7

Source: DHS, 2000–2001

Timing of intermittent preventive treatment



a: Quickening is the first noted movement of the fetus

When do pregnant women attend antenatal clinics?

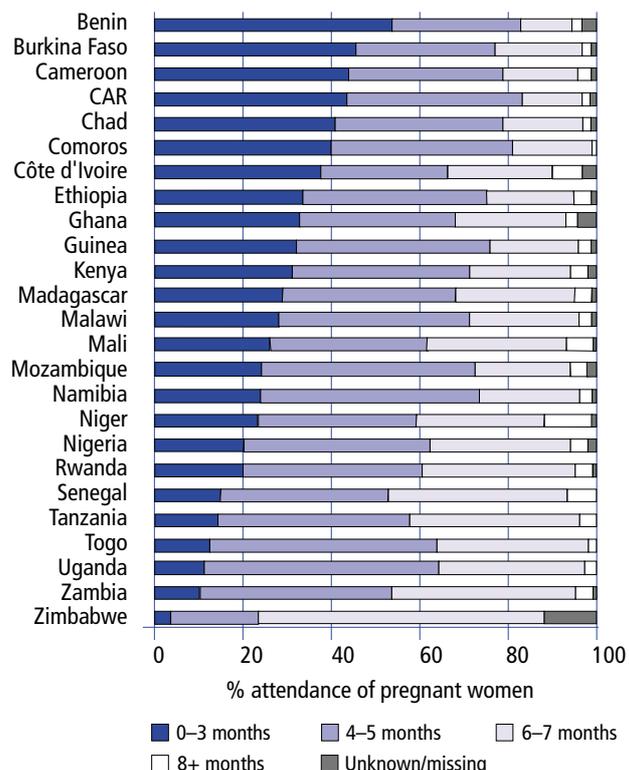
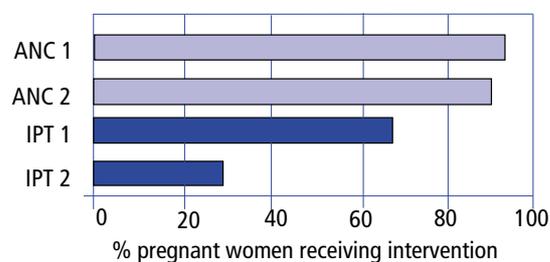


Figure 4.8

Source: reference 16

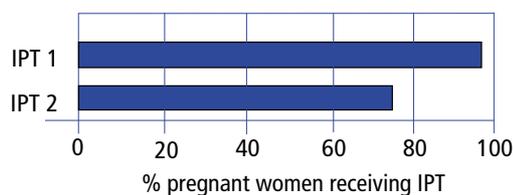
Malawi demonstrates the feasibility of achieving high coverage with two doses of SP

In 2000, less than half of pregnant women attending ANC received the full course of IPT



ANC 1 and 2: Proportion of women attending ANC at least once or twice

Follow-up surveys in the Blantyre district in late 2002 indicate high coverage with two doses of SP

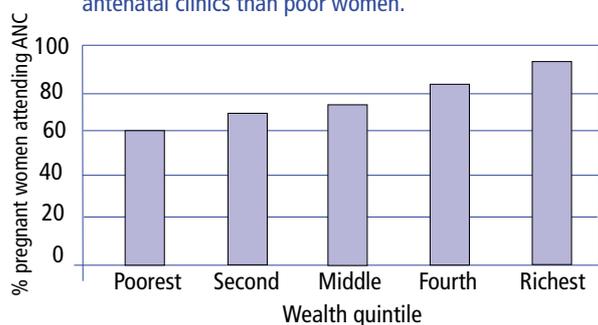


Sources: DHS 2000 and Malawi Ministry of Health, 2003

Figure 4.9

Does household wealth affect antenatal care?

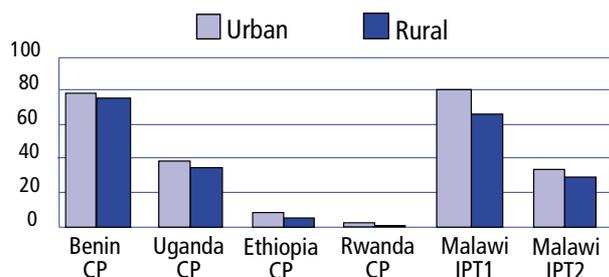
Across 22 countries in Africa south of the Sahara, rich women were about 1.5 times more likely to attend antenatal clinics than poor women.



Source: reference 16

Figure 4.10

Coverage with chemoprophylaxis/IPT in pregnant women is lower in rural areas



Note: CP= chemoprophylaxis

Source: DHS, 1999–2001

Figure 4.11

clinic visit would provide additional protection for the mother during the remainder of the time of pregnancy and into the post-partum period, as well as protection for the newborn through at least the first year of life.

Overcoming challenges

High coverage with antenatal care, i.e. a minimum of two visits to an antenatal clinic, does not necessarily translate into full coverage with IPT. However, a multidisciplinary team in the Blantyre district in Malawi (population about 950 000, with approximately 35 000 births annually) focused from mid-2001 through 2002 on resolving barriers to complete coverage with IPT. Improved education about the benefit of IPT and modified recommendations for the scheduled antenatal clinic visits after quickening resulted in a rapid increase to 75% coverage, with two doses of SP in pregnant women (Figure 4.9).

Disparities

A striking determinant of attendance at antenatal clinics is household wealth. According to a recent study, poor women are less likely to use antenatal services than are women from the richest households (16) (Figure 4.10). In seven African countries south of the Sahara for which recent data are available, the percentage of rich women attending antenatal clinics was at least twice that of poor women. The same study indicated that antenatal care coverage was significantly higher in urban than in rural areas.

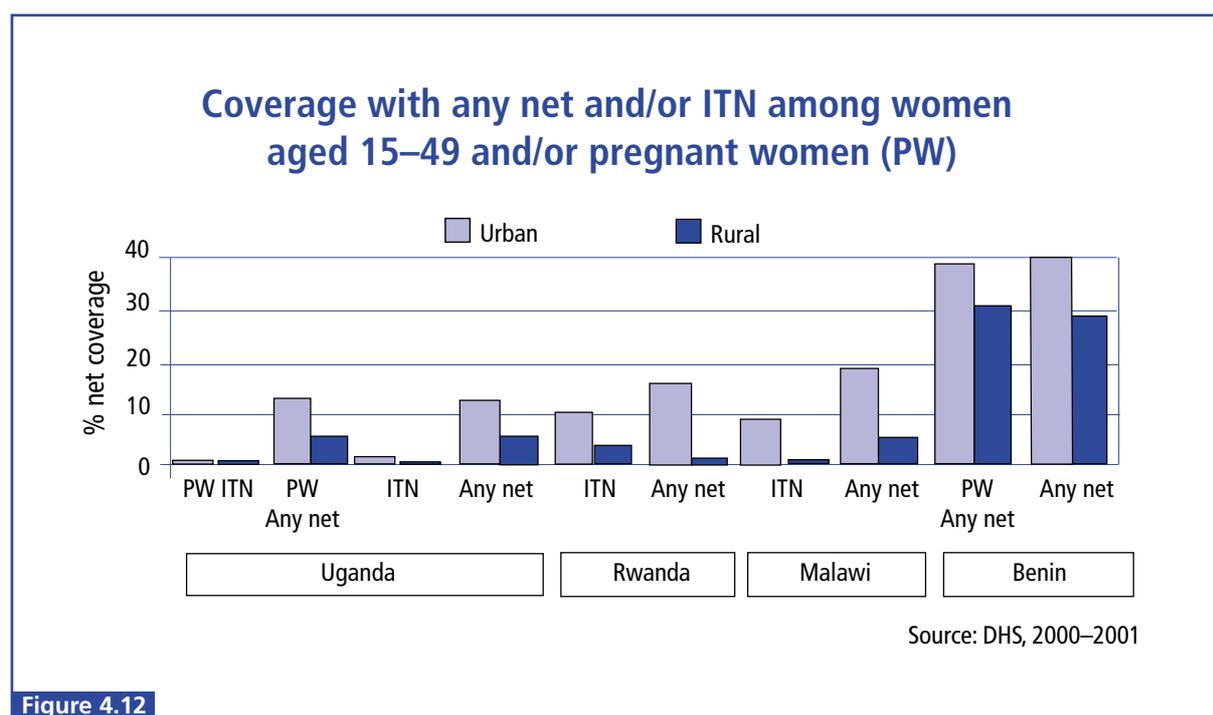


Figure 4.12

Nationally representative surveys confirm similar difference in coverage of pregnant women with chemoprophylaxis, IPT, or nets (Figures 4.11 and 4.12). Women living in rural areas were less likely to receive chemoprophylaxis or, in Malawi, IPT with SP.

4.4

Opportunities

At present, strategies to ensure safe pregnancy in malaria-endemic areas are planned with a focus initially on strengthening malaria preventive services and correct case management for pregnant women attending antenatal care. A number of opportunities will facilitate the accelerated implementation of malaria control during pregnancy:

- High levels of coverage with antenatal care visits make a clinic-based approach feasible
- Partnerships have been established between RBM and programmes such as Making Pregnancy Safer and national reproductive health services committed to strengthening entry-level antenatal clinic services
- The Strategic Framework for Malaria Control During Pregnancy in the WHO Africa Region (2) has been developed

Policy summary: Best practices for malaria control during pregnancies

- Effective case management of malaria illness for all women of reproductive age in malarious areas must be ensured.
- The policy for malaria control during pregnancy should emphasize a preventive package of intermittent preventive treatment (IPT) and insecticide-treated nets (ITNs), particularly in areas of stable transmission.
- All pregnant women should receive at least 2 doses of IPT after quickening, during routinely scheduled antenatal clinic visits as recommended by WHO.
- Programmes should seek the highest possible coverage of pregnant women with these interventions – at least 60% (Abuja RBM goals) and preferably higher – and document this accomplishment. Given current high rates of antenatal clinic attendance in most African countries south of the Sahara, this should be achievable.

Source: adapted from reference 2

Making Pregnancy Safer: access to essential care for pregnant women and their newborns

In support of the Safe Motherhood Initiative, the WHO Making Pregnancy Safer focuses on effective evidence-based interventions that target the major causes of maternal and newborn morbidity and mortality. Making Pregnancy Safer aims to strengthen health systems and to identify actions at community level needed to ensure access to essential care for pregnant women and their newborns.

Skilled attendance at delivery and provision of an appropriate and effective continuum of antenatal and perinatal care are particularly important in this initiative.

The evidence-based interventions of Making Pregnancy Safer focus on six areas:

- Technical and policy support
- Advocacy
- Partnership building
- Development of norms and tools
- Research and dissemination
- Monitoring and evaluation



Picture: WHO/TDR

- Several countries are in the process of updating policies that are consistent with new evidence and with WHO recommendations for prevention and control of malaria during pregnancy

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Commitment to accelerating prevention and control of malaria during pregnancy

Countries are developing national policies on the prevention of malaria in pregnancy according to WHO recommendations and have started to document experiences from control efforts.

In March 2002, a technical meeting on malaria prevention and control during pregnancy was held in Malawi where reproductive health and malaria staff from five countries, Kenya, Malawi, Uganda, the United Republic of Tanzania, and Zambia, came together to discuss a coordinated approach to accelerating prevention and control of malaria in pregnancy. The participants and RBM partners have agreed to forge the East and Southern Africa Coalition for malaria prevention and control during pregnancy, MIPESA. The coalition was inaugurated in June 2002.

This coalition is a unique concerted effort in which national reproductive health programmes, Making Pregnancy Safer and malaria control programmes are coming together

- to support inter-country programme collaboration in accelerating prevention and control of malaria in pregnancy
- to provide a forum of information exchange between and among countries, partners and involved institutions
- to strengthen models for programme collaboration between national reproductive health, Making Pregnancy Safer and Malaria Control Programmes for quality evidence-based antenatal care
- to develop mechanisms that facilitate consultation among member programmes
- to support documentation of best practices
- to develop a collaborative monitoring and evaluation system
- to develop collaborative approaches to information, education and communication that improve knowledge of antenatal care providers and pregnant women
- to facilitate the development of a sub-regional operational research agenda and conduct of key research protocols.

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5. Response to epidemics and complex emergencies

Abuja target

The target of Roll Back Malaria in the Abuja Declaration is that 60% of epidemics are detected within 2 weeks of onset and 60% of epidemics are responded to within 2 weeks of detection (3).

Some 110 million Africans live in areas at risk for epidemic malaria (Figure 5.1). The increasing frequency of epidemics in both low-risk areas and areas of moderate transmission make imperative the institution of special responses to epidemics, in addition to regular malaria control activities. The impact of epidemics can be greatly reduced by timely detection or, ideally, prediction and prevention. Timely response may include the deployment of additional drug stocks, use of different drugs, and vector control.

5.1 Magnitude of the problem

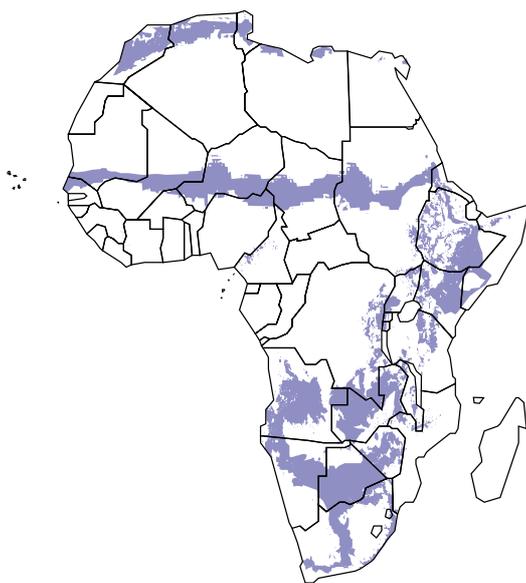
Devastating malaria epidemics have recently been reported from Botswana, Mozambique, South Africa, Swaziland and Zimbabwe (Figure 5.2) and have been attributed mainly

to heavy rainfall following a drought. Epidemics also affected several Sahelian countries in the 1990s.

In East Africa and the Great Lakes region, Burundi, Ethiopia, Kenya, Uganda, and the United Republic of Tanzania, are subject to frequent and recurrent malaria epidemics that often affect large numbers of people (Table 5.1). Anomalies of rainfall and/or temperature are thought to be the most important causes of the epidemics here.

Although the extent of suffering caused by malaria epidemics is not adequately documented, it is generally believed that morbidity, mortality, and the overall economic impact of these epidemics are enormous. For example, the number of deaths during the malaria epidemic that hit Ethiopia in 1958

Areas at risk of epidemic malaria



Source: reference 15

Figure 5.1

What is a malaria epidemic?

A sharp increase in malaria incidence among populations in whom the disease is infrequent, or an increase in clinical malaria in areas of moderate transmission constitutes an epidemic.

Malaria epidemics occur principally in areas of low transmission, where no single age group in the population is immune. The introduction of malaria, particularly if exacerbated by changes in rainfall and temperature, can trigger explosive epidemics that affect both adults and children (1). However, epidemics can also occur in areas of higher transmission as a result of the abandonment of control programmes, immigration of non-immune people, and reduced access to treatment.

Historic examples of severe epidemics

Place, year	Population exposed	Episodes	Deaths	Causes
Madagascar highlands, 1987–1988 (1)	2.5 million	Over 200 000 each year; at peak, 27% of outpatient attendances	15 000–30 000 each year	Abandonment of IRS and shortage of antimalarials
Ethiopia highlands/Dumbia plain, 1958 (1)	8–10 million	3 million	Over 150 000 (case fatality rate >5%)	High rainfall and temperature
Ethiopia, Dec. 1997–Feb. 1998 (1)	45 million	>1 million	3271 officially reported	High rainfall and temperature
NE Burundi, Oct-2000–May 2001 (9)		2 million during 6 months – a 4-fold increase in confirmed cases (10)	1287 reported, true number estimated to be 10–15x higher.	Abandonment of control (in relation to complex emergency), chloroquine resistance and expanded rice cultivation.

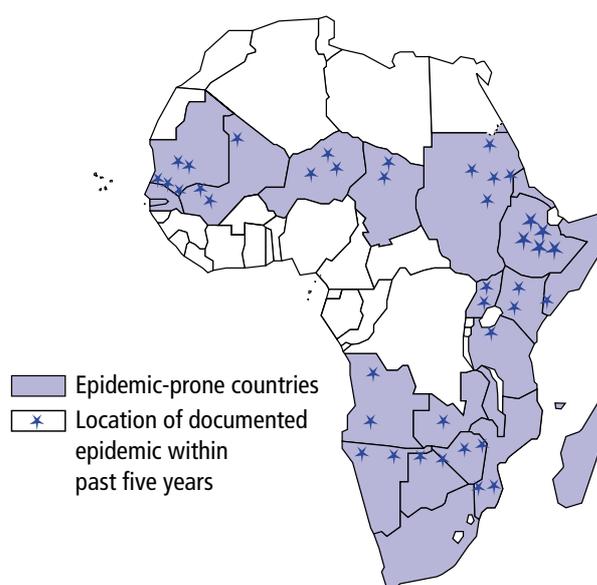
Table 5.1

was estimated at more than 150 000 out of 3 million clinical cases (a case-fatality rate of 5%) (1). Adults account for a relatively large proportion of epidemic cases and deaths.

On the basis of the following assumptions (4) it is estimated that there are 110 000 deaths from epidemics each year:

- 110 million Africans are at epidemic risk
- Epidemics occur on average every 5 years (cyclical) (5)
- Assuming 0.5 malaria episodes per person during epidemics:
 - 0.1 episodes per person at risk per year
 - 11 million malaria episodes in epidemics each year
- Up to 5% of malaria episodes are severe, with case-fatality rate for severe episodes in epidemics possibly up to 20%:
 - possible 110 000 malaria deaths from epidemics each year.

Malaria epidemics in Africa 1997–2002



Source: RBM data

Figure 5.2

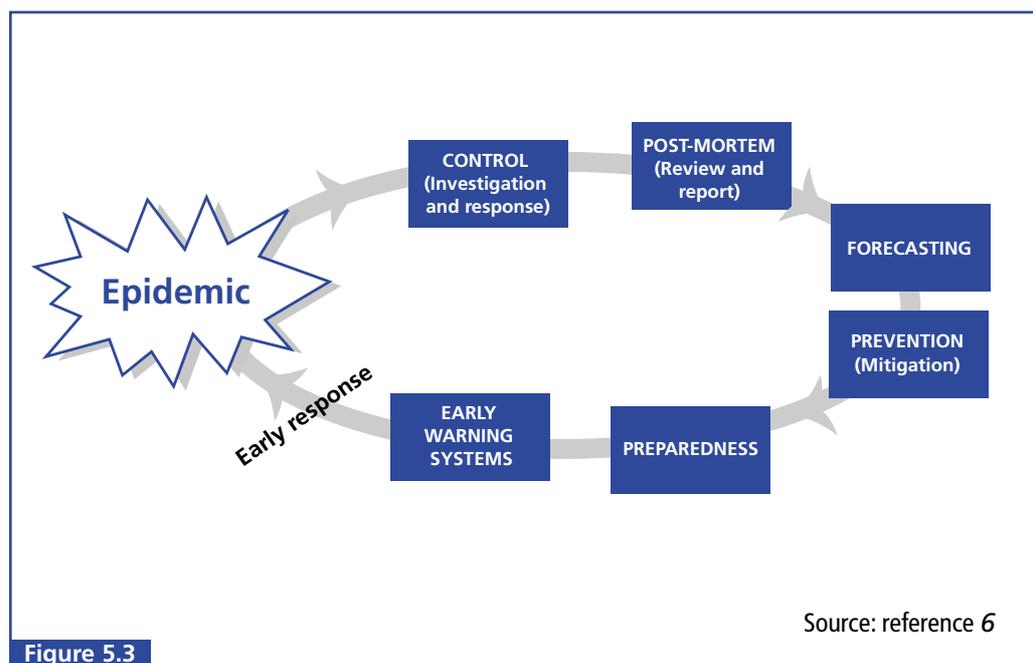


Figure 5.3

Source: reference 6

5.2 Prevention and control of epidemics

The main functions of a malaria control programme in combating epidemics are illustrated in Figure 5.3 and described in greater detail in several WHO documents (7).

The burden of an epidemic will be much less if the number of cases is contained by early detection and rapid response (7) (Figure 5.4).

Antimalarial treatment during epidemics

It may be necessary to formulate drug policies for treatment during epidemics, because malaria epidemics usually involve non-immune patients who have lower spontaneous parasite clearance than partially immune patients from endemic areas. It is essential that treatments selected for use in these situations are highly effective. The trend is toward artemisinin-based combinations (ACT) which have the added advantage of reducing gametocyte carriage. Some countries, e.g. Burundi, Ethiopia, and Mozambique, have already adopted special drug policies for epidemics.

5.3 Progress and challenges

Identification of risk areas

Table 5.2 shows 15 of the 25 African countries which have identified their areas of

risk and have prepared plans to respond to epidemics.

Actual detection and response

It is difficult to say with certainty whether countries are close to the Abuja target of 60% adequate detection and response. Evaluation is hampered by the diverse nature of epidemics and associated definition issues.

In evaluations of control programmes, timely detection has been found to be a bigger challenge than adequate and timely response once an epidemic has been identified (7). (Table 5.3) However, there is indication that response, especially with measures like indoor residual spraying, is often too slow (more than 2 weeks after detection of the epidemic) as well.

Integrated Disease Surveillance

A recently initiated programme on Integrated Disease Surveillance and Response, promoted by WHO/AFRO, is helping epidemiologists to select and use accurate indicators – initially on a monthly basis. In defined epidemic-prone districts, the second step is to collect weekly malaria morbidity and mortality data in order to detect any unusual increase occurring within 2 weeks and to take immediate action. This programme has considerable potential for rapidly improving the capacity for early detection of epidemics of malaria and other diseases; its implementation is making good progress across the continent (Table 5.4).

Malaria Early Warning Systems

Malaria Early Warning Systems (MEWS) are intended to facilitate the timely responses that will prevent and contain epidemics. MEWS comprise forecasting, early warning, and early detection. Forecasting usually refers to seasonal climate forecasts; early warning refers to the monitoring of meteorological conditions such as rainfall and temperature; and early detection is based on routine clinical surveillance.

RBM has supported the development of a simple tool to monitor epidemic risks in marginal transmission areas based on anomalies in rainfall and temperature, i.e. rainfall in excess of or less than the expected amount, as identified from satellite observations. The predictions point to epidemics that might occur around 6 weeks after the detected meteorological change. The risks are displayed on maps which are updated every 10 days and can be freely accessed via the RBM web site or at <http://edcsnw4.cr.usgs.gov/adds/>.

MEWS are generally performing well in southern Africa, and studies have started in Ethiopia, Kenya, Uganda, the United Republic of Tanzania, and Sudan. Decision-tree models are being constructed and validated. Work remains to be done to better involve staff from meteorological services in joint ventures with ministries of health to regularly compile and evaluate data and disseminate warnings to communities.

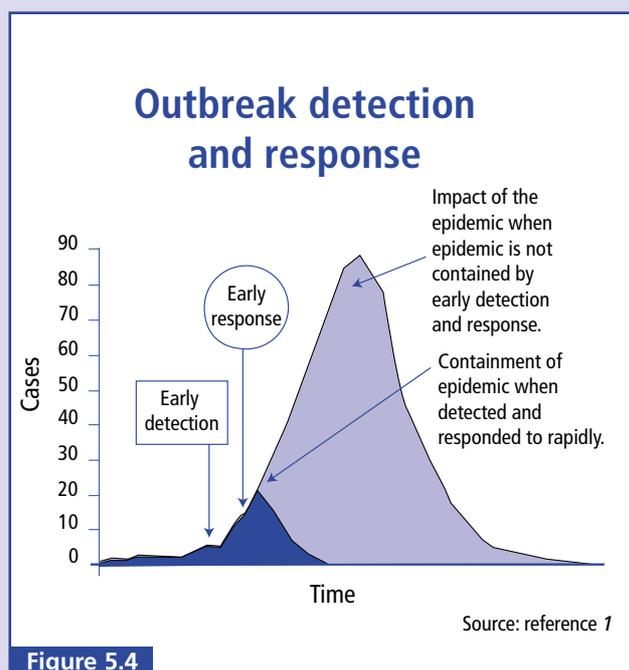


Figure 5.4

Country with epidemic risk and preparedness plan of action

Risk areas

Angola	All risk areas
Botswana	All risk areas
Burundi	Highlands
Ethiopia	Highlands
Kenya	Highlands
Mozambique	All risk areas
Namibia	All risk areas
Rwanda	Highlands
Senegal	Close to Senegal river
South Africa	All risk areas
Swaziland	All risk areas
Sudan	Sahelian areas
Uganda	Highlands
Zambia	Highlands
Zimbabwe	Highlands

Sources: references 6, 12, 13

Table 5.2

	Epidemics identified 1998–2000	Percentage detected within 2 weeks	Percentage responded to within 2 weeks of detection	Source
Angola	3	0	0	SAMC
Botswana	2	100	100	SAMC
Malawi	–	–	–	SAMC
Mozambique	3	67	67	SAMC
Namibia	3	0	33	SAMC
South Africa	4	100	100	SAMC
Swaziland	2	100	100	SAMC
Tanzania	–	–	–	SAMC
Zambia	–	–	–	SAMC
Zimbabwe	3	33	67	SAMC
Eritrea	4 (districts)	75	100	RBM baseline survey
Ethiopia	102	55	100	RBM baseline survey
Uganda	?	0	100	RBM baseline survey

Note: SAMC – reference 7

Table 5.3

Status of Integrated Disease Surveillance implementation, 2002

Guidelines adapted	Botswana, Eritrea, Ethiopia, Ghana, Kenya, Malawi, Mali, Nigeria, Swaziland, Tanzania, Zambia.
Guideline adaptation initiated	Burkina Faso, Cameroon, Chad, Congo, DRC, Equatorial Guinea, Gabon, Gambia, Guinea-Conakry, Mozambique, Namibia, Rwanda, Seychelles, Uganda, Zimbabwe.
Plan of action completed	Lesotho, Madagascar.
Assessment completed	Benin, CAR, Mozambique,

Table 5.4

Complex emergencies

A large proportion of malaria deaths in Africa occur among populations affected by conflicts. Population displacement, malnutrition, and breakdown of health systems characterize these conflicts, making victims highly vulnerable to disease. Given the large numbers of cases occurring within short periods of time, and the consequent heavy burden on the health system, malaria epidemics in complex emergencies might be considered as "man-made epidemics".

International organizations are the main providers of relief assistance – in the first instance, emergency shelters, clean water, and food – to displaced populations, then basic health care.

A main requirement in complex emergencies is coordination of the activities of different NGOs to streamline the technical approaches for malaria-specific interventions (cost-effective drugs, ITNs, and residual spraying) and to ensure that existing resources are used cost-effectively, within a context of basic health care.

Epidemic control in southern Africa

Systematic epidemic control is standardized to the greatest extent in southern Africa, where it is being coordinated under the Southern African Malaria Control programme (SAMC). Since 1998, a regional approach to reducing the impact of malaria epidemics includes strategic planning, forecasting, prevention, preparedness and early warning to facilitate an improved early response (6, 14).

Several SAMC countries use residual house spraying and distribution of ITNs for epidemic prevention, and most use residual house spraying as early response to reduce epidemic impact.

Capacity for detection – southern Africa

Country	Forecasting	Weekly surveillance epidemic-prone districts	Evaluation short-term weather	Epidemic plan	Manual guidelines	Epidemic control committee	Contingency (drug) stocks	Epidemic funds
Angola	No	No	No	Yes	No	No	Yes	No
Botswana	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Malawi	No	No	No	No	No	No	No	No
Mozambique	Yes	Yes	No	Yes	No	No	No	Yes
Namibia	Yes	Yes	No	Yes	Yes	Yes	No	Yes
South Africa	No	Yes	No	Yes	Yes	Yes	No	No
Swaziland	Yes	Yes	Yes	Yes	No	Yes	Yes	No
Tanzania	No	No	No	No	Yes	No	No	No
Zambia	No	No	No	Yes	No	No	No	No
Zimbabwe	Yes	Yes	No	Yes	No	No	No	Yes

Table 5.5

Other activities supported by WHO and other RBM partners include:

- producing and distributing an emergencies handbook;
- operational research into emergency management, including suitable drug regimens;
- increasing capacity on the ground, including training;
- stimulating the development of tools, such as insecticide-impregnated sheet shelters and blankets.

5.4

Strategies for the future

A key challenge for district and national health managers is to improve the use of data routinely generated at the peripheral level, using Integrated Disease Surveillance where appropriate. In areas affected by

epidemics related to anomalies in seasonal rainfall and temperature, joint MoH/meteorological services teams should be set up to promote the use of local epidemic predictions. Similar coordination mechanisms may need to be established among appropriate government services in areas that are affected by epidemics linked to, for instance, migration or agricultural practices.

Control options are as important as prediction and early detection; they must be well defined and agreed upon in advance by the MoH and partners of malaria control programmes as part of a preparedness plan of action allowing for rapid and cost-effective deployment. Treatment options may need to include new and more effective drugs or drug combinations (such as ACT) to be supplied free of charge to all malaria patients in the early stage of an epidemic. As regards efficient vector control approaches, the controversy surrounding the choice of insecticides for IRS needs to be resolved. Logistic support capacity should be

strengthened in countries considering the use of IRS for early response or prevention. In epidemic-prone areas, all strategies to increase the coverage with ITNs to a level that reduces transmission are relevant to epidemic prevention.

Broad agreement on the choice of efficient prevention and control options will contribute to securing funds from RBM partners in advance of the epidemic season, particularly for the establishment of essential emergency stocks. In this context, collaboration in epidemic risk assessment and response with other epidemic-prone countries by managing subregional/cross-border surveillance systems and emergency stocks is vital. The participation of NGOs in national and international partnerships is particularly important, because these groups can rapidly deploy assistance at field level.

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Epidemic detection in Kenya

Early warning based on district-level rainfall estimates had high potential for detecting two epidemics in summer 2002 in four highland districts in south-west Kenya. The district-specific warnings could have given 4 weeks' notice of possible emergency conditions, as identified in a retrospective analysis.

The rainfall estimates are freely available and their use requires minimal training and technical facilities. In this setting, seasonal forecasts proved to be less specific and less accurate. Early detection based on surveillance of outpatient cases provided sentinel information too late, because the reporting – although fairly complete – was monthly (weekly reporting under Integrated Disease Surveillance was not yet active at this time) (8).

6. Resource mobilization and financing

Since the inception of Roll Back Malaria in 1998, and particularly since the Abuja Summit in 2000, malaria prevention and control have once again become domestic and international priorities. International spending for malaria has increased at least twofold since 1998, and this does not even include the complementary financing of a range of primary health care services (such as reproductive health and IMCI) that also have an impact on malaria (1).

In 2002, approximately US\$ 200 million was earmarked for malaria control worldwide, compared with an estimated US\$ 60 million in 1998. Of the total in 2002, about US\$ 70–80 million can be attributed to domestic commitments (1). Through the work of national and international RBM partners, the renewed importance of malaria is reflected in the development of country strategic plans, the recognition of malaria control actions as a global public good, and the prioritization of malaria in development initiatives such as the Highly Indebted Poor Countries initiative and the Millennium Development Goals.

6.1

Resources required to roll back malaria

A broad resource base is essential to reduce the burden of malaria in Africa. Critical resources include financial and human resources, institutional know-how, political commitment, and community support. These resources are located in a diverse set of institutions including governments, nongovernmental organizations, the international community, the private sector, and civil society.

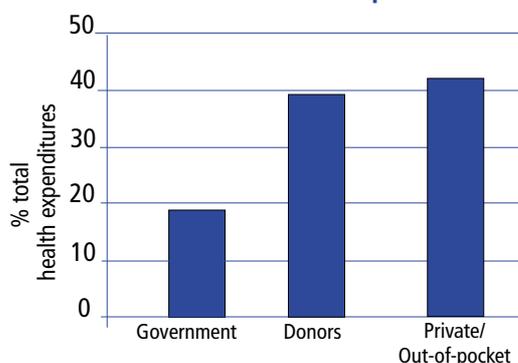
Harnessing and coordinating these resources require the development of consensus among potential partners and the formation of effective working relationships. The establishment of partnerships working toward a common goal is an integral part of the strategy to Roll Back Malaria.

The Abuja Declaration in 2000 (2) called for the allocation of new resources – at least US\$ 1 billion per year – from African countries and their development partners. Although more resources are available for malaria control today than 3 years ago, a significantly greater investment is needed to support those fighting malaria on the ground. In 2000 and 2001, African heads of state pledged to allocate the resources required for sustained implementation of planned Roll Back Malaria actions, including significant increases to country health budgets. However, in order for additional investments to have an impact on malaria,

Malaria control is financed through mainly three channels

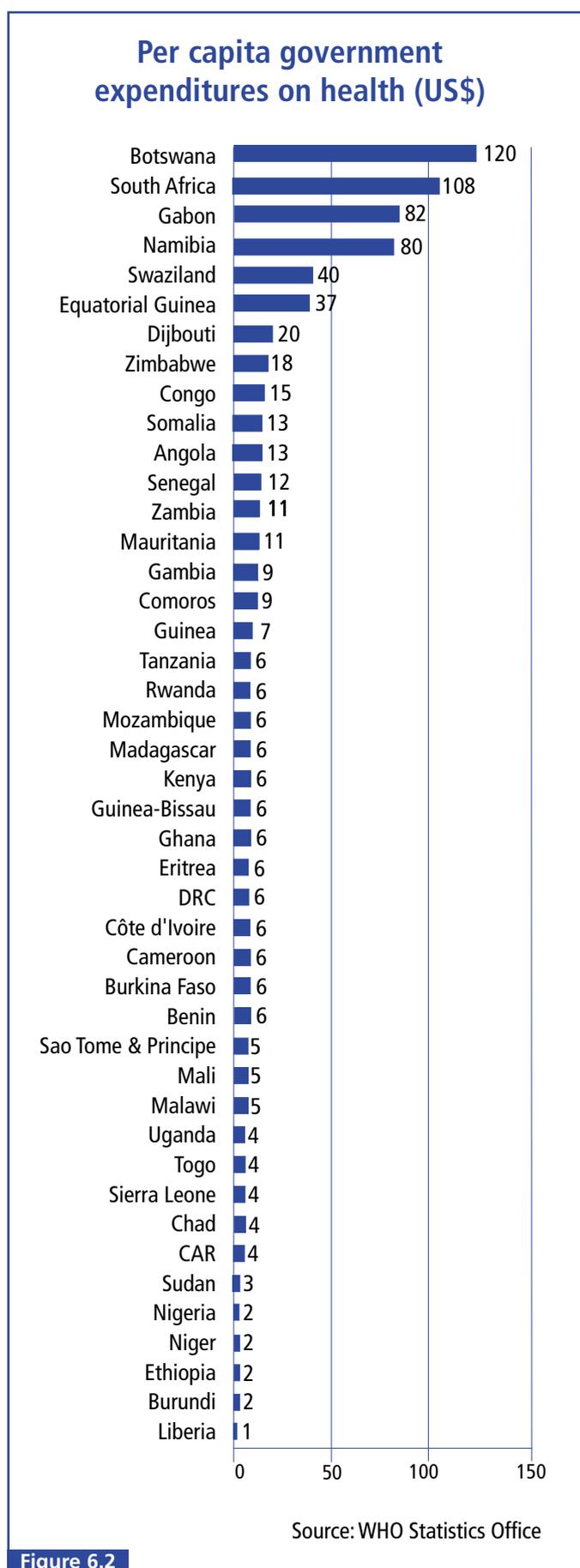
Private – primarily household – expenditures, combined with donor support, make up the bulk of health and malaria control financing in Africa south of the Sahara. The available data suggest that expenditure on health care and malaria control by African governments is low. Successful efforts to reduce the financial burden of malaria on African families must concentrate on reducing out-of-pocket expenditures on malaria commodities, such as drugs, while making these expenditures more efficient, for instance, through improving the quality of drugs and encouraging correct drug use. Governments are highly dependent on external support for health, and increased governmental health expenditures would enable greater support for malaria control.

Contribution of different sources in African health expenditure



Source: World Health Report 2002 Statistical Annex 5

Figure 6.1



countries must have mechanisms by which resources can be translated into effective programmes that reach those most in need. This requires functioning health systems that allocate appropriate resources to malaria programmes for recurrent costs and essential commodities (such as antimalarial drugs), administrative systems that ensure timeliness, regularity and accountability in the flow of funds, infrastructure and supplies for delivering services, a skilled and motivated work force, and sufficient organizational capacity to manage the system. In addition, an enabling environment is required to stimulate private sector growth to provide commodities for malaria prevention and treatment, such as insecticide-treated nets and antimalarial drugs.

Rationalization of taxes and tariffs on drugs and nets, for example, has already contributed to this environment in some countries. While private sector growth is stimulated, governments will have an increased responsibility to implement sufficient regulatory controls to ensure the safety, quality, and effectiveness of malaria control commodities.

6.2

Domestic resources

It is not possible to ascertain accurately the amount of government resources supporting malaria control. Malaria control today is financed through a range of complementary programmes that all have an impact on malaria. Public health activities such as IMCI, reproductive health programmes, and other primary health care services will all have direct positive impacts on malaria but are not recorded as expenditures attributed to malaria control programmes. In addition, many malaria costs are covered by general budgets for health facility staff or drugs. In countries with a heavy malaria burden, the disease may account for as much as 25–40% of outpatient visits and up to 50% of inpatient admissions, generating costs that may amount to as much as 40% of public health expenditure. Figure 6.2 illustrates the expenditures on health in 44 African countries.

Continued fiscal shortfalls faced by those working on malaria suggest that, despite progress, government resource allocations for malaria are still insufficient. Governments in

The prioritization of malaria control in debt relief: A reflection of renewed importance

The Heavily Indebted Poor Countries (HIPC) Initiative is the first international response to provide comprehensive debt relief to the world's poorest, most heavily indebted countries. The 26 countries that entered the HIPC programme, of which most are in Africa south of the Sahara, are saving an average US\$ 1.3 billion per year compared with debt payments in 1998. Resources freed from debt are being used to support country-driven poverty reduction strategies – in the form of Poverty Reduction Strategy Papers (PRSPs), which are developed by national governments in consultation with civil society.

As of January 2003, PRSPs (and Interim PRSPs) in every country in Africa south of the Sahara note malaria as a significant contributor to poverty and stress the importance of malaria control in their approaches to sustainable development. The prioritization of malaria in these documents will have tangible implications for financing malaria control. For instance, as of 2002, all World Bank activities in countries that have prepared poverty reduction strategies must respond to the priorities detailed in the PRSP. In addition, the Bank has developed Poverty Reduction Support Credits (PRSCs) to directly support implementation of a country's poverty reduction strategy. Although the process is still relatively new, these resources have already been made available for malaria control in some countries, such as Cameroon.

African countries generally support public sector salaries without providing resources for the other recurrent expenditures, such as antimalarial drugs, needed to deliver services. In addition, although the "cost" of achieving the scale of action required may be significant, human resources are required for expenditures to have an impact on reducing the burden of malaria. In many African countries today, however, shortages of trained personnel impede malaria control more than the lack of financial resources.

Most people in Africa south of the Sahara pay out-of-pocket for malaria control

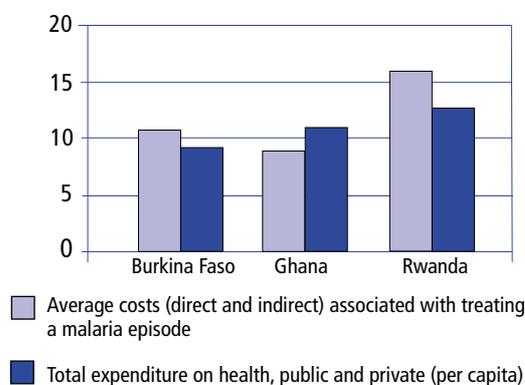
Overwhelmingly, people in Africa south of the Sahara pay for malaria prevention and treatment through out-of-pocket expenditure. The lack of government resources for malaria prevention and treatment contributes to shifting the burden of expenditure to households. Evidence suggests that most of this expenditure is on pharmaceuticals, the costs of which will further rise with the introduction of new antimalarials made necessary by increasing resistance to current drugs. Measures should be taken to reduce the costs of these drugs, for instance through targeted subsidies. It is important to note, however, that high out-of-pocket expenditure indicates a willingness to pay for malaria treatment, which may have positive implications for the sustainability of malaria control financing.

Inevitably the poorest households will spend a greater proportion of their income on

The cost of malaria control is high

The average direct and indirect costs (opportunity cost of time, for instance) of malaria can exceed per capita total spending on health, highlighting the importance of increased government health expenditures to mitigate the health and economic impact of malaria.

Average costs of malaria treatment (US\$)



Original data source: references 4, 9, 10

Figure 6.3

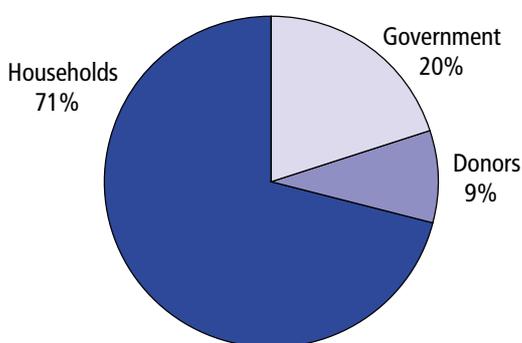
Government expenditures on health are low

Health expenditure in Africa is generally less than US\$ 15 per person per year – and less than US\$ 5 per year in several countries. Some of the variation between countries can be attributed to their relative wealth but there is also a considerable range in the percentage of government expenditure allocated to health –from 3.0% to 16%. In 2001, the year after the summit on malaria, leaders of African countries assembled once again in Abuja, Nigeria, and pledged to earmark 15% of their national budgets to health spending. Fulfilling this pledge would no doubt have a significant impact on the financial resources available for malaria.

Households are spending the most for malaria

In the United Republic of Tanzania, more than 70% of total expenses for malaria control come from households and are spent in the private sector. A similar financial burden is felt by households across Africa south of the Sahara, suggesting a need for improved targeting of interventions – particularly preventive interventions – at the household level. In addition, better understanding of domestic expenditure flows could lead to improvements in the distribution of resources for malaria control.

Total malaria expenditures by source in the United Republic of Tanzania, fiscal year 1998

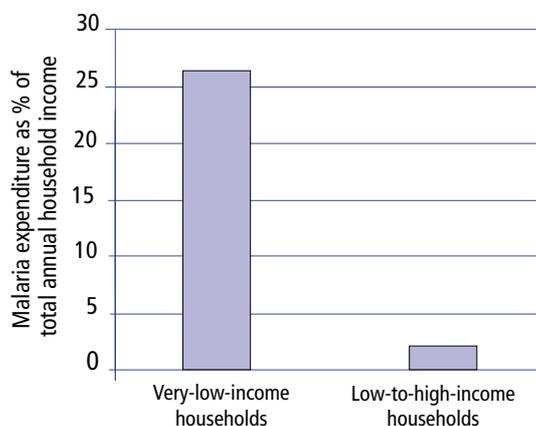


Source: reference 5

Figure 6.4

The financial burden of malaria is greatest on the poor

A study from Malawi demonstrated that both poor and less poor households spent approximately US\$ 19 for malaria treatment annually. This represents a relatively greater burden on poorer households. Strategies must be devised to reduce costs for the poor while maximizing the health impact of expenditures.



Source: reference 6

Figure 6.5

malaria prevention and treatment. Strategies to mitigate the financial burden of malaria – particularly on the poorest households, least likely to afford the necessary expenditures – should be combined with appropriate communication and behaviour change activities both to reduce the costs of malaria-related commodities and to support appropriate use of those commodities.

Household spending should be directed toward the most effective interventions

Although household spending on malaria control is very high, it is not necessarily efficient. Most purchasing of malaria control commodities occurs in the private sector – through local markets and drug vendors, for instance – with the result that individuals receive little guidance and may purchase and use poor-quality, inappropriate, or incomplete interventions. Significant expenditures on mosquito coils and insecticide aerosol sprays have been reported, but while these commodities reduce nuisance mosquitoes there is little evidence that their use reduces the burden of malaria. Drug vendors may provide little guidance on treatment choice and usually will not encourage the completion of a full course of treatment, contributing to the development of parasite resistance.

Communication programmes designed to bring about behaviour change will play an essential role in guiding consumers towards the purchase of malaria control interventions of demonstrated effectiveness in reducing malaria transmission, such as insecticide-treated materials and antimalarials to which resistance is less common. There is evidence that preventive spending directed at ITNs may reduce the annual cost per case of all-cause clinic visits by sick children from US\$ 49 to US\$ 38 (3), suggesting a significant cost saving in addition to the reduction in pain and suffering from disease.

Planning for impact

Several countries are well advanced in forming coalitions between partners that are working towards an agreed plan of action. The process differs from one country to another but some common themes are evident. The process usually starts with a situation analysis of the state of health sector development, as well as of the epidemiology of malaria. The analysis also identifies the resources available to roll back malaria, including the diverse range of

stakeholders already involved in malaria control. Formal partnerships are created and a statement of intent issued, indicating what will be achieved in 5 years, and how. Resources are mobilized from partners and systems are set up to monitor achievements in rolling back malaria. Forty African countries have drawn up National Strategic Plans, and at least 25 countries are ready to implement. Many of these plans have served as the basis for successful proposals to the Global Fund to Fight AIDS, Tuberculosis and Malaria – and some are already receiving funds from this source to support implementation of the plans (Table 6.1).

Partnerships with industry are increasing resources for malaria

The business community is increasingly playing a role in the Roll Back Malaria partnership and providing vital resources and expertise to support malaria control programmes. Partnerships have been forged with the drug industry, companies with major investments in malaria-endemic countries whose workers are at risk from malaria, and manufacturers of nets and insecticides. In addition, companies have provided funds for training and collaborating with young scientists and medical officers to allow them to gain valuable experience in the field.

Understanding resource flows to improve effectiveness of expenditures

Financial resources are only one part of resource mobilization. African countries and the international community need to place greater emphasis on understanding the flow of resources to actual malaria prevention and control activities. Expenditure analyses that track spending on malaria can elucidate the pathways that allow financing for malaria to overcome administrative bottlenecks and support essential services and commodities required for achieving impact.

Efforts to roll back malaria in Ethiopia, for instance, have been hampered by inefficiencies in the flow of scarce resources to malaria prevention and control activities. Total expenditure for malaria control is approximately US\$ 10.25 million, or only US\$ 0.35 per person at risk, but even these limited resources could have a greater impact on malaria control if they were reaching those most in need.

Through a recent malaria expenditure

RBM policy planning and implementation

	Situation analysis	Coordination mechanism	National strategic plan	Costed plan	Implementation plan	Monitoring & evaluation plan
Angola		✓	✓	✓	✓	✓
Benin	✓	✓	✓	✓	✓	✓
Botswana	✓	✓	✓	✓	✓	✓
Burkina Faso	✓	✓	✓	✓	✓	✓
Burundi						
Cameroon	✓	✓	✓	✓	✓	✓
CAR	✓	✓	✓	✓		✓
Chad	✓					
Comoros			✓	✓		✓
Congo			✓	✓		✓
Côte d'Ivoire	✓	✓	✓	✓	✓	✓
DRC	✓	✓	✓	✓	✓	✓
Djibouti	✓	✓	✓			
Equatorial Guinea	✓	✓	✓	✓	✓	✓
Egypt	✓	✓	✓	✓	✓	
Eritrea	✓	✓	✓	✓	✓	✓
Ethiopia	✓	✓	✓	✓	✓	✓
Gabon						
Gambia	✓	✓	✓	✓	✓	✓
Ghana	✓	✓	✓	✓	✓	✓
Guinea	✓	✓	✓			✓
Guinea-Bissau	✓		✓	✓		✓
Kenya	✓	✓	✓	✓	✓	✓
Liberia		✓	✓	✓	✓	✓
Madagascar	✓	✓	✓	✓	✓	✓
Malawi	✓	✓	✓	✓	✓	✓
Mali	✓	✓	✓	✓	✓	✓
Mauritania	✓	✓	✓	✓	✓	✓
Mozambique	✓	✓	✓	✓	✓	✓
Namibia	✓	✓	✓	✓	✓	✓
Niger	✓	✓	✓	✓		✓
Nigeria	✓	✓	✓	✓	✓	✓
Rwanda						
Sao Tome and Principe		✓	✓	✓		✓
Senegal	✓	✓	✓	✓	✓	✓
Sierra Leone	✓					
Somalia	✓	✓	✓	✓	✓	
South Africa	✓	✓	✓	✓	✓	✓
Sudan	✓	✓	✓	✓	✓	✓
Swaziland	✓	✓	✓	✓	✓	✓
Tanzania	✓	✓	✓	✓	✓	✓
Togo	✓	✓	✓			✓
Uganda	✓	✓	✓	✓	✓	✓
Zambia	✓	✓	✓	✓	✓	✓
Zimbabwe	✓	✓	✓	✓	✓	✓

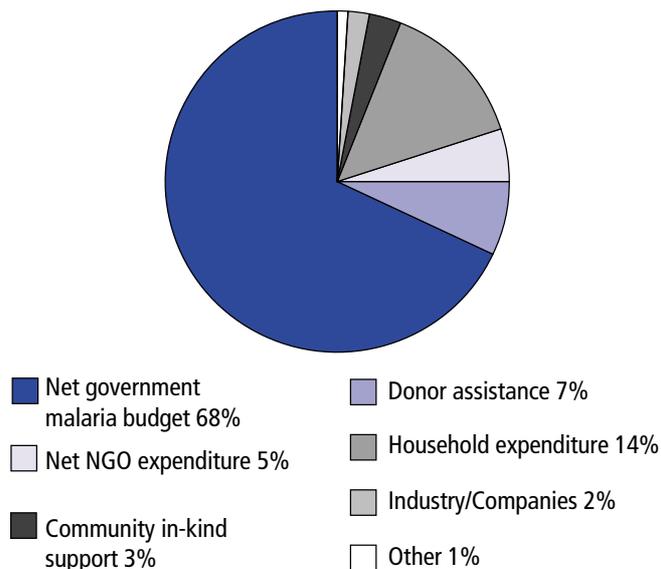
Table 6.1

Source: RBM data

Expenditure for malaria can be attributed to many different sources

Understanding resource flows to malaria control and the essential interventions that are part of it is important to improving efficiency and utilizing both existing and new resources.

Ethiopia: Malaria expenditure by source
(Total: US\$ 10.25 million)



Source: reference 8

Figure 6.6

review in Ethiopia, commissioned by Roll Back Malaria, it is clear that different parts of the malaria control programme are competing for the same scarce resources, leaving little room for transportation, antimalarials, and other recurrent operational costs. For example, public facility-based pharmacies, where patients can obtain drugs free of charge, are often out of stock of essential drugs, forcing patients to purchase drugs at private facilities (7). In addition, the allocation of funds across the different levels of the health sector that have contact with malaria patients may not be proportional to need.

Ethiopia has recently decentralized the delivery of health services and has not yet established sustainable management and financial structures within all levels of the health sector. However, the bottlenecks that impede effective resource flows for malaria have now been identified and malaria control is back on the government agenda. With increases in management and

implementation capacity, Ethiopia will be able to use effectively the approximately US\$ 38 million in new financing from the Global Fund to Fight AIDS, Tuberculosis, and Malaria. Further organizational and institutional strengthening, accompanied by political commitment and increased international support, will assist Ethiopia to use new and existing resources to better support effective malaria control measures.

Similar reviews of resource flows to malaria control should be undertaken in other countries in Africa south of the Sahara to make better use of existing resources and improve targeting of new resources, so that the impact of both domestic and donor resources can be maximized.

6.3

International resources

Despite the increased level of international financing, the amount of money available in most countries to control malaria is still inadequate. In some cases, the necessary additional resources can be made available internally through greater government allocations for increased preventive and control activities. If this alone is insufficient, government spending needs to be supported by increased international funding.

Although continued financial support from the international community for malaria control is essential, it is equally important for the international community to support countries in developing implementation capacity. For instance, donors should work with countries and the private sector to devise and implement innovative financing schemes – the use of targeting mechanisms, such as vouchers for ITNs for instance – to improve financial flows to malaria control on the ground.

A health sector-wide approach for malaria support in the United Republic of Tanzania: a reduction in malaria will be a mark of success

The World Bank-funded Health Sector Development Programme Project in the United Republic of Tanzania broadly supports the first phase of the Health Sector Reform Programme of the country's government. Although project financing is not specifically designated as "malaria" financing, the

Countries and donors still need to increase spending for malaria

Recent estimates of what is financially necessary for malaria control with available tools suggest an approximate US\$ 0.6–0.9 (2002 US\$) per capita by 2007 and 2015, respectively, a significant increase from current levels of financing.



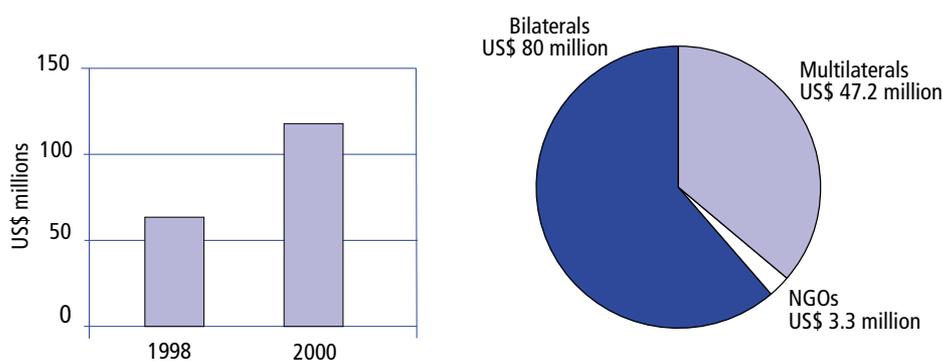
Note: Chart refers to malaria control in Africa south of the Sahara

Figure 6.7

Source: reference 1

International financing earmarked for malaria has more than doubled

International expenditures on malaria increased from US\$ 60 million in 1998 to US\$ 120 million in 2002. Including spending for reproductive health, IMCI, and primary health care, all of which have an impact on malaria, raises the total amount to significantly more than US\$ 120 million. The figure (right) shows estimated earmarked expenditures on malaria worldwide by bilaterals, multilaterals and NGOs.



Source: reference 1

Figures 6.8 and 6.9

The Global Fund: A new resource to fight malaria

Commitments from the Global Fund to Fight AIDS, Tuberculosis and Malaria have significantly increased the financial resources for malaria control in Africa. Over the next 2 years, the Global Fund is expected to disburse US\$ 256 million for malaria control activities in 25 African countries. The challenge now is for countries to develop the capacity to spend the money efficiently and for the international community to support Africa in that effort.

Africa: Global Fund component approvals as of January 2003

Country	Total commitment over two years (US\$)
Benin	2 389 185
Burkina Faso	7 144 703
Burundi	13 792 126
Comoros	1 534 631
Eritrea	2 617 633
Ethiopia	37 915 012
Ghana	4 596 111
Guinea	6 893 509
Kenya	10 526 880
Madagascar	2 023 424
Malawi	20 872 000
Mali	2 023 424
Mauritania	824 125
Mozambique	12 273 573
Namibia	3 719 354
Nigeria	17 828 808
Senegal	4 285 714
Somalia	8 890 497
Sudan (North)	14 237 853
Sudan (South)	12 855 490
Swaziland	978 000
Tanzania	11 959 076
Tanzania (Zanzibar)	781 220
Uganda	23 211 300
Zambia	17 892 000
Zimbabwe	6 716 250
Multicountry Africa ^a	7 424 815
Total	256 206 713

^a: Lubombo Spatial Development Initiative Area

Source: The Global Fund Secretariat, January 2003

Table 6.2

project's objectives have profound implications for resource mobilization for malaria. A target of reducing the malaria inpatient case-fatality rate for children under 5 from 12.8% (1997) to 8% (2011) has been included as a key indicator of success, and the government has successfully allocated approximately US\$ 10 million for malaria in 2003 (Figure 6.10).

The potential flexibility and country ownership of sector-wide approaches (SWAPs) have dramatically changed the resource envelope for malaria in a number of African countries. As of February 2003, at least eight countries in Africa south of the Sahara have prioritized malaria through SWAPs. With detailed district-level planning and coordination with sectoral funding cycles and planning meetings, additional resources for malaria prevention and control can be made available while the health sector as a whole is strengthened.

6.4

Next steps for financing malaria control in Africa

Countries have demonstrated commitment to RBM by driving the Country Strategic Planning process. International expenditure directly financing malaria has risen dramatically, and additional support for malaria through sectoral financing schemes can be mobilized as required. In addition, the Global Fund for AIDS, Tuberculosis and Malaria is an exciting new source for significant direct support for malaria control.

Countries should improve domestic health sector investment and management, including improved integration of malaria control activities into health sector development efforts.

Policies that provide a greater resource base for health in general and malaria in particular must be pursued, including policies that promote equity of access to goods and services and facilitate the delivery of quality services at low cost through the private commercial sector. Public sector linkages with the private sector and NGOs, through contracting out of services for instance, would allow countries to expand significantly the resource envelope for malaria activities.

Communications for behaviour change must coincide with resource mobilization activities to improve the efficiency of household spending on malaria prevention and control

A significant portion of the financial burden from malaria falls on households. Though measures must be taken to mitigate the financial impact on the poorest who are unable to afford such high levels of out-of-pocket expenditure, the prominent role of households in malaria control marks an opportunity as well. If, for instance, household expenditures were made only on appropriate and effective malaria prevention and treatment commodities, current spending could make a significant impact on the malaria burden. Behaviour change communications combined with innovative financing mechanisms would make the most of existing household expenditures.

The international community must assist countries and partners in spending increased resources for malaria effectively and demonstrating their impact

Donors should work with governments to improve management and organizational capacity for monitoring and evaluating resource flows, both human and financial. Existing resources do not always flow to

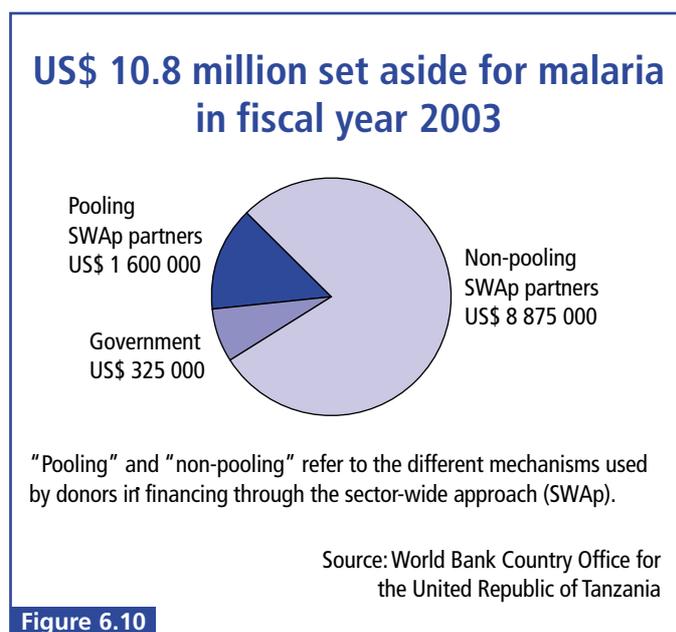
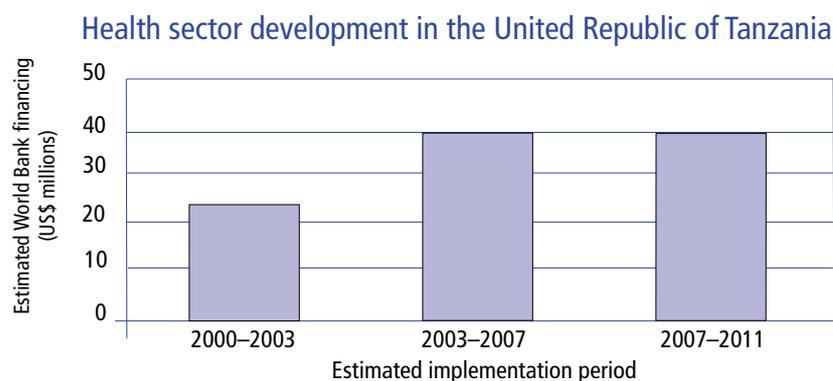


Figure 6.10

those who need them most. It is essential that governments respond by prioritizing malaria within their own health sector budgets to maximize the disbursement of domestic and international resources to prevent and control malaria. At the same time, the international community must assist countries in the efficient and effective spending of available resources for malaria, such as those mobilized through health sector development programmes and the

Malaria control is a priority in health sector development



Despite the lack of explicit earmarking, a significant portion of the funding for World Bank financing of health sector development in Tanzania will support malaria control, either for direct malaria activities at national or district level, infrastructure and vehicles for health services, or through improved supplies of pharmaceuticals. Should the need arise, the Tanzanian government could request that additional malaria-specific inputs be financed from this source of funds.

Source: World Bank Country Office for the United Republic of Tanzania

Figure 6.11

Global Fund. Public health success stories, such as the Onchocerciasis Control Programme and the polio eradication campaign, have depended on the combination of country commitment and international support translating into impact on the ground. There is good reason to believe that similar progress can be achieved in malaria. As recent increases in malaria financing demonstrate, the international community stands ready to support countries in their malaria control efforts, and should readily increase expenditures with further progress in countries.

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Notes on data sources

Data on the progress in coverage with RBM interventions and on the burden of malaria at population level in Africa are increasing. This report drew information mainly from the following sources, which are described here with a focus on their quality, reliability, representativeness, and potential for future RBM monitoring.

Demographic and Health Surveys

Demographic and Health Surveys (DHS) are nationally representative household surveys that focus on reproductive and child health. They are organized by Macro International, Calverton, MD, USA and sponsored by the United States Agency for International Development (USAID) (1). Data are freely available on the Internet, at <http://www.measuredhs.com/>, approximately 1 year after completion of the fieldwork. Typically, DHS consist of interviews with between 4000 and 12000 women aged 15–49 years living in households that are sampled in a multiple-stage cluster design. Between 1990 and 2002, 10 African countries have had 1 DHS, 17 have had 2, and 4 have had 3 or more. The average interval between two DHS is 5–6 years. The questionnaire addresses, inter alia, household living conditions and assets, and child health through birth histories. Because questionnaire are standardized and structured and change little between surveys, DHS outcomes are comparable between countries and over time.

Malaria-relevant indicators include the reported treatment and care (whether antimalarials were given and facilities attended) to under-5s who had fever in the 2 weeks preceding the survey. Since 1998, some DHS have used specific questions on malaria prevention and treatment, including the type of antimalarial drugs given, timing and dosage, possession of mosquito nets and their use for under-5s and pregnant women, and the use of by pregnant women. Since 2001, most of these questions have been grouped in a standard malaria module, now to be used in all surveys conducted in malarious countries. The interpretation of DHS malaria modules must take into account that these surveys are (for logistical

reasons) mostly conducted in the dry, least malarious season.

DHS are additionally a primary source of information on under-5 all-cause mortality rates, obtained by the direct estimation technique, i.e. from birth histories. Recent DHS also measure the prevalence of anaemia by haemoglobin measurement in children under 5 and (pregnant) women; in future this may prove to be a very useful indicator of malaria burden and a proxy for malaria-related mortality.

Multiple Indicator Cluster Surveys

Between 1999 and 2001, Multiple Indicator Cluster Surveys (MICS) were conducted in 67 countries around the world with support from UNICEF. MICS are nationally representative and sampled through a two-stage cluster design, with an average sample size of around 6000 households. A household questionnaire covers living conditions and household assets, allowing the data to be stratified by such factors as place of residence, education of the mother, and wealth quintile of the household.

For 24 countries in Africa, the survey included a malaria module with questions related to the prevalence of fever in the previous 2 weeks, type of treatment received and place of treatment, as well as use of any nets and of insecticide-treated nets by children under 5. Relevant data were also collected on indicators such as all-cause mortality among children under 5 and coverage of antenatal care. Survey results and questionnaires are freely available on the Internet at <http://childinfo.org/>. As DHS most MICS were conducted outside of the peak malaria season.

The next round of MICS is planned for 2004–2005 and these will again include questions on malaria prevention and treatment, and possibly additional questions on household availability of nets, dosage and timing of antimalarial treatment, and IPT among pregnant women.

Demographic Surveillance Sites

Demographic surveillance sites (DSS) monitor births, deaths, and health in geographically

defined populations, continuously over time. They measure mortality due to specific causes, including malaria, by using verbal autopsies – interviews with surviving relatives on the symptoms that preceded death. Of all DSS sites, 29 from 16 African countries collaborate under the RBM-supported INDEPTH network (International Network of field sites with continuous Demographic Evaluation of Populations and Their Health in developing countries). Further information on the INDEPTH network is available at <http://www.indepth-network.net/>. INDEPTH aims to strengthen technical and research capacity, and to promote the use of standardized methodological tools (such as verbal autopsy questionnaires) and the application of information to policy and practice (3).

Although coverage is limited to about 0.2% (1.3/650 million) of the African population (3, 4), DSS are practically the only source of information on malaria-attributed mortality at a population level. Also, their prospective nature means that DSS-based estimates of all-cause under-5 mortality are typically more precise and more up-to-date than those from the retrospective DHS or MICS. Nevertheless, there are concerns about the representativeness. Large-scale phase III and phase IV community health intervention trials are often carried out at DSS (5, 6); if successful, the tested interventions are implemented on a large scale thereafter. Coverage with interventions, including ITNs, may therefore be higher than in the surrounding population, and the disease burden – in general or of the specific targeted disease – consequently lower.

RBM baseline surveys

In 2000 and 2001, 17 countries in Africa south of the Sahara conducted surveys to determine their baseline situations with respect to rolling back malaria. The surveys included a facility component and a community (household) component. Default questionnaires were adapted for local use, and outcomes vary in comparability between countries. Most countries followed the sampling guideline, which specified that three or four districts of different malaria endemicity were to be chosen. In each district, the highest-level health facility (usually a hospital), two health centres and three clinics were randomly selected; for each sampled facility, the nearest and the farthest

communities in its catchment area were sampled, bringing the total to around 15 facilities, 30 communities, and 1000 households. Outcomes are not nationally representative but provide indications of disease status of malaria and control implementation in the districts most affected by malaria and most targeted by the national malaria control programme (NMCP).

The household component addresses net possession and use and treatment-seeking for fever. For some core RBM indicators (drug stock-outs, correct clinical management of malaria patients, and availability of diagnostic services), the health facility component of the RBM baseline surveys the main or only current source of data. When coverage estimates from the RBM baseline surveys are compared with national estimates from DHS or MICS, the baseline surveys typically give higher rates, as expected from their focus on targeted areas of the NMCP.

Routine Health Information Systems

Routine Health Information Systems (HIS) are the source of national data on malaria cases and deaths seen in health facilities. In principle, these data are national, but in practice not all facilities and districts report. The numbers of cases and deaths reported are therefore less than the actual clinical burden. More importantly, the clinical burden represents only a fraction of the total burden in the population, since most malaria patients either do not seek treatment or are treated outside the formal health sector (7). To add to the uncertainty, case loads are based largely on clinical, rather than parasitological diagnosis. To reduce the consequent bias, this report focuses not on absolute numbers of recorded malaria cases and deaths, but on the proportion of the burden of recorded events (outpatient clinic visits, hospital admissions, deaths in hospitals) accounted for by malaria.

Table 1. Data availability by source, for indicators used in this report, as of February 2003

	DHS	MICS	RBM baseline surveys, component:			DSS	Routine HIS
			community	health facility	NMCP		
Burden / Impact							
All-cause under-5 mortality (in population)	✓	✓				✓	
Malaria-attributed mortality (in population)						✓	
Malaria as % of outpatient visits							✓
Malaria as % of hospital admissions							✓
Malaria as % of hospital deaths							✓
ITNs							
Household possession of nets/ITNs	✓		✓				
% of under-5s sleeping under net/ITN	✓	✓	✓				
Antimalarial treatment							
% of febrile under-5s treated with antimalarial	✓	✓					
% of clinical cases correctly managed				✓			
Drug stock-outs in clinics				✓			
Malaria control in pregnancy							
% of pregnant women attending ANC	✓	✓					
% of pregnant women taking IPT	✓						
% of pregnant women sleeping under net/ITN	✓						
Epidemic response					✓		✓
Data quality							
Nationwide	Yes	Yes	No	No	n.a.	No	Yes
Sample size (households)	8000	6000	1000	15 (facilities)		15 000	n.a.

Table 2. Sources of data for monitoring malaria burden and control

Source	Type, interval, countries	Data availability and (dis-)advantages		
		General	Morbidity	Mortality
Demographic and Health Surveys (DHS)	Population-based, large, representative at national/provincial but not district level; increasing subset of developing countries, expensive, every 5–8 years. Data available on Internet within 1 year of end of fieldwork	Retrospective (recall bias) can be adjusted for co-collected socioeconomic and general health variables	Under-5s and (pregnant) women, mainly reported fevers i.e. non-specific.	All-cause under-5 mortality
Multiple Indicator Cluster Survey (MICS)	Population-based, large, representative at national/provincial but not district level; increasing number of developing countries, every 5 years. Main tables available on Internet within 1 year of end of fieldwork.	Retrospective, can be adjusted for co-collected socioeconomic general health variables	Reported fevers in under-5s i.e. non-specific	All-cause under-5 mortality
Demographic Surveillance Sites (DSS)	Community-based, longitudinal, small and non-representative sentinel populations, long reporting delay	Continuous	Variable	Verbal autopsy on deaths, particularly for under-5s
Routine HIS (clinic-based)	Clinic-based, generally least functional in countries most affected by malaria (south of the Sahara).	Continuous, limited to subgroup of clinic attendees, which is – especially for children – a small, selected and variable fraction.	Clinical and/or parasitological diagnosis, all ages aggregated and/or under-5s separately.	Parasitologically confirmed diagnosis, all ages and/or under-5s separately

^a: As of April 2003, the DHS malaria module, has been conducted in Benin (2001), Eritrea (2002), Malawi (2000), Mauritania (2000/01), Rwanda (2000), Uganda (2000/01), Zambia (2001–2002) and ongoing in Kenya (2003), Mali (2003), and Nigeria (2003).

Country profile overview

General indicators

■ Population: estimates are based on United Nations Population Division (2000 revision estimates), available online at: <http://www.un.org/popin/>.

■ Population growth rate: expressed as percent per year, is based on estimates published annually in the World Health Report, available online at: <http://www.who.int/whr/2002/en/>.

■ Infant mortality rate: expressed as number of infants per 1000 dying before first birthday. See:

- UNICEF, State of the world's children 2003, available online at <http://www.unicef.org/sowc03/>
- Hill K. al. Trends in child mortality in the developing world: 1960 to 1996, available online at: <http://childinfo.org/cmr/revis/kh98meth.html>.

■ Under-5 mortality rate: expressed as number of under-5s per 1000 dying before fifth birthday. See:

- UNICEF, State of the World's Children 2003, available online at <http://www.unicef.org/sowc03/>
- Hill K et al. Trends in child mortality in the developing world: 1960 to 1996, available online at: <http://childinfo.org/cmr/revis/kh98meth.html>.

■ Crude birth rate: the number of births per year per 1000 population; further information is available at <http://unstats.un.org/unsd/>.

■ Population at risk: expressed as percentage of population living where the climate is suitable for malaria transmission. Estimates from Mapping Malaria Risk in Africa (MARA) (see <http://www.mara.org.za/>) derived from a theoretical model of the distribution of endemic and epidemic malaria based on climate conditions (long-term mean rainfall and temperature) suitable for malaria transmission. Classification of risk as endemic, epidemic or overall is based on (8,9).

Malaria morbidity and mortality

■ Hospital deaths due to malaria: the percentage of recorded inpatient deaths that are attributed to malaria; derived from Ministry of Health reports where data are available.

■ Malaria admissions: the percentage of recorded health facility admissions that are attributed to malaria; derived from Ministry of Health reports where data are available.

■ Malaria outpatient attendance: the percentage of recorded outpatient visits to health facilities that are attributed to malaria; derived from Ministry of Health reports where data are available.

■ Outpatient malaria cases per 1000 persons: the total number of outpatient malaria cases among all age groups reported in a country in a year, expressed per 1000 total population per year; total population is based on the United Nations Population Division estimates for the same year as the case reporting.

■ Inpatient malaria cases per 1000 persons: the total number of inpatient malaria cases (i.e. hospital admissions) among all age groups reported in a country in a year, expressed per 1000 total population; total population is based on the United Nations Population Division estimates for the same year as the case reporting.

Nets and insecticide-treated nets (ITNs)

■ Households with mosquito nets (or ITNs): the percentage of households that possess one or more nets, treated or not (or one or more ITNs). Estimates are derived from nationally representative household surveys, such as MICS or DHS.

■ Under-5s using mosquito nets (or ITNs): the percentage of children under 5 years old who slept under nets (or ITNs) the night before the survey. Estimates are derived from nationally representative household surveys such as MICS or DHS.

Antimalarial treatment

■ Under-5s receiving any antimalarial: the percentage of children under 5 years old,

with reported fever in the previous 2 weeks, who received any antimalarial for the fever. Estimates are derived from nationally representative household surveys such as MICS or DHS.

■ Under-5s receiving chloroquine: the percentage of children under 5 years old, with reported fever in the previous 2 weeks, who received chloroquine for the fever. Estimates are derived from nationally representative household surveys such as MICS or DHS.

■ Under-5s receiving antimalaria within 24 hours: the percentage of children under 5 years old, with reported fever in the previous 2 weeks, who received any antimalarial for the fever within 24 hours of onset of the fever symptoms. Estimates are derived from nationally representative household surveys such as MICS or DHS.

Attending health facility

■ Under-5s receiving any antimalarial: the percentage of children under 5 years old, with reported fever in the previous 2 weeks, who were taken to a health facility and received any antimalarial for the fever. Estimates are derived from nationally representative household surveys such as MICS or DHS.

■ Under-5s receiving chloroquine: the percentage of children under 5 years old, with reported fever in the previous 2 weeks, who were taken to a health facility and received chloroquine for the fever. Estimates are derived from nationally representative household surveys such as MICS or DHS.

Malaria in pregnancy

■ Pregnant women receiving antenatal care at least once: the percentage of women with a live birth during the 3 years preceding the survey who received antenatal care during the pregnancy by a skilled attendant. Skilled attendant is defined as a doctor, trained nurse, or midwife; traditional birth attendants are not included in this analysis. For women with multiple pregnancies during the previous 3 years, only the most recent pregnancy is considered (DHS; for MICS the interval under consideration is the past 1 year). Estimates are derived from nationally representative household surveys such as MICS or DHS.

■ Pregnant women attending antenatal care at least twice: the percentage of women with

a live birth during the 3 years preceding the survey who reported at least two visits for antenatal care. This does not reflect the skill level of the care provider. For women with multiple pregnancies during the past 3 years, only the most recent pregnancy is considered. Estimates are derived from nationally representative household surveys such as MICS or DHS.

■ Pregnant women receiving Intermittent Preventive Treatment (IPT) at least once/twice: the percentage of women reportedly pregnant at the time of the survey who used sulfadoxine-pyrimethamine (SP) for malaria prevention during the pregnancy. The number of data points collected for this indicator so far is limited, because IPT has only recently been adopted nationally and internationally. Estimates are derived from nationally representative household surveys such as MICS or DHS.

■ Pregnant women using nets/ITNs: the percentage of women reportedly pregnant at the time of the survey who slept under a net/ITN the night before the survey. Estimates are derived from nationally representative household surveys such as MICS or DHS.

Antimalarial treatment policy

Information on the current official antimalarial treatment policy. Date adopted reflects the date of recent policy change on the type of antimalarial drugs used for treatment. Treatment regimens are given, where information is available, for uncomplicated malaria (differentiated further as "probable" and parasitologically confirmed malaria), treatment failure, severe malaria, and prevention during pregnancy.

Taxes and tariffs on insecticide-treated nets (ITNs)

Information on import tariffs and Value-Added Tax (VAT) on ITNs is based on currently available information. Data are available only from countries where a change of policy has been made. Date reflects the last year of known update or available information. If the change occurred before the April 2001 Abuja Summit, date is specified as "before Abuja".

Proportional rank for selected indicators

Information on selected indicators expressed as the country's proportional rank among all countries in Africa south of the Sahara for which information is currently available.

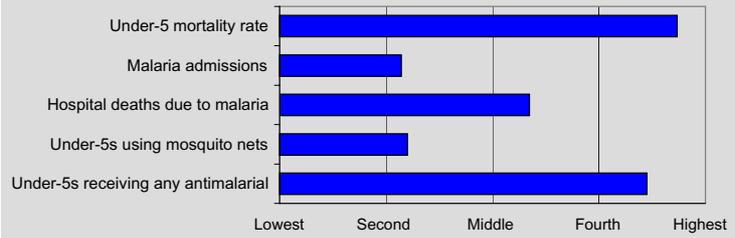
References

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2. *End-decade multiple indicator cluster survey manual*. New York, United Nations Children's Fund, 2000 (available at <http://www.childinfo.org/index2.htm>).
3. *Population and health in developing countries. Vol. I. Population, health and survival at INDEPTH sites*. Ottawa, International Development Research Centre, 2002.
4. Snow RW et al. Estimating mortality, morbidity and disability due to malaria among Africa's non-pregnant population. *Bulletin of the World Health Organization*, 1999, 77(8):624–640.
5. Byass P et al. The role of demographic surveillance systems (DSS) in assessing the health of communities: an example from rural Ethiopia. *Public Health*, 2002, 116(3):145–150.
6. Adult Morbidity & Mortality Project - Phase 1 (AMMP-1). The policy implications of adult morbidity and mortality end of phase 1 report. 1997:
7. McCombie SC. Treatment seeking for malaria: a review of recent research. *Social Science and Medicine*, 1996, 43(6):933–945.
8. Snow RW et al. A preliminary continental risk map for malaria mortality among African children. *Parasitology Today*, 1999, 15:99–104.
9. Craig MH et al. A climate-based distribution model of malaria transmission in sub-Saharan Africa. *Parasitology Today*, 1999, 15:105–111.

Angola

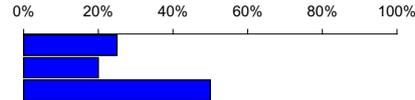
General indicators	Source	2001
Population (thousands)	UNPOP	13527
Population growth rate (%)	UNPOP	3.2
Infant mortality rate (per 1000)	UNICEF	154
Under-5 mortality rate (per 1000)	UNICEF	260
Crude birth rate (per 1000)	UNPOP	51.3
Pop. at endemic (epidemic) risk (%)	MARA ¹	90 (8)

Proportional rank for select indicators



Malaria morbidity and mortality

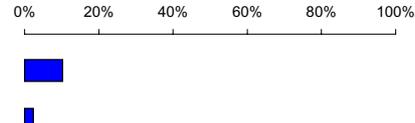
Hospital deaths due to malaria	25
Malaria admissions	20
Malaria outpatient attendance	50
Outpatient malaria cases (per 1000)	94
Inpatient malaria cases (per 1000)	62



Source	1998	1999	2000	2001
MoH	25			
MoH		20		
MoH		50		
MoH	94	62	105	66

Mosquito nets and ITNs

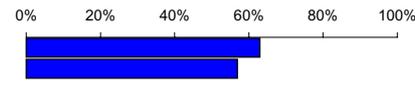
Households with mosquito nets	
Under-5s using mosquito nets	10
Households with ITNs	
Under-5s using ITNs	2



Source	1998	1999	2000	2001
MICS				10
MICS				2

Antimalarial treatment

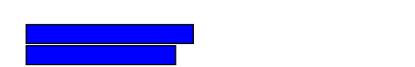
Under-5s receiving any antimalarial	63
Under-5s receiving chloroquine	57
Under-5s receiving any antimalarial <24 h	



Source	1998	1999	2000	2001
MICS				63
MICS				57

Attending health facility

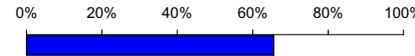
Under-5s receiving any antimalarial	45
Under-5s receiving chloroquine	40



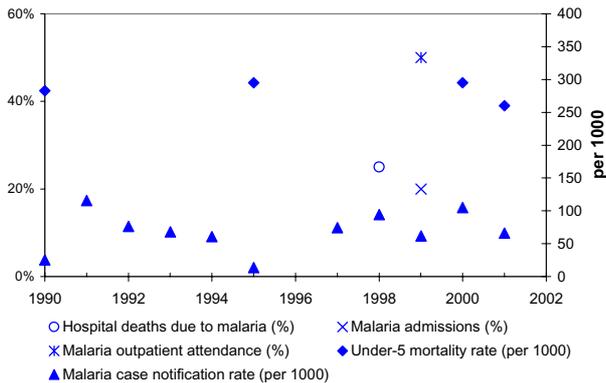
Source	1998	1999	2000	2001
MICS				45
MICS				40

Malaria in pregnancy

PW receiving ANC at least once	
PW attending ANC at least twice	
PW receiving IPT at least once	
PW receiving IPT at least twice	
PW using mosquito nets	
PW using ITNs	



Source	1998	1999	2000	2001
MICS				66



Antimalarial treatment policy

Date adopted:	---	
Uncomplicated	Probable	CQ 25 mg/kg
	Confirmed	CQ 25 mg/kg
Treatment failure		SP
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

	Date
Import tariff - nets	
VAT - nets	

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

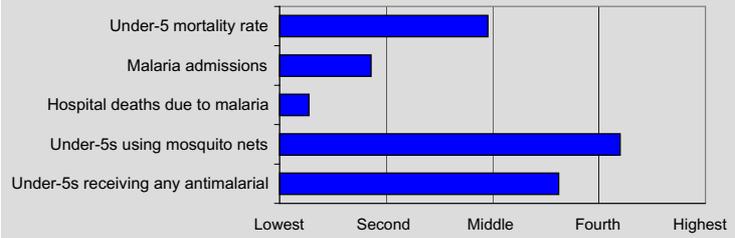
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Benin

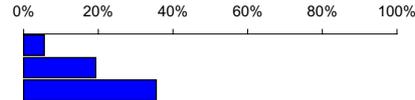
General indicators	Source	2001
Population (thousands)	UNPOP	6446
Population growth rate (%)	UNPOP	3.0
Infant mortality rate (per 1000)	UNICEF	94
Under-5 mortality rate (per 1000)	UNICEF	158
Crude birth rate (per 1000)	UNPOP	42.0
Pop. at endemic (epidemic) risk (%)	MARA ¹	100 (0)

Proportional rank for select indicators



Malaria morbidity and mortality

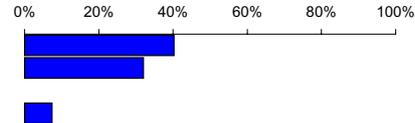
Hospital deaths due to malaria	15
Malaria admissions	26
Malaria outpatient attendance	35
Outpatient malaria cases (per 1000)	115
Inpatient malaria cases (per 1000)	2



Source	1998	1999	2000	2001
MoH	15		6	
MoH	26		19	
MoH	35	36	36	
MoH	115		85	
MoH				2

Mosquito nets and ITNs

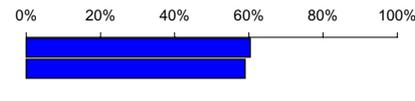
Households with mosquito nets	40
Under-5s using mosquito nets	32
Households with ITNs	
Under-5s using ITNs	7



Source	1998	1999	2000	2001
DHS				40
DHS				32
DHS				7

Antimalarial treatment

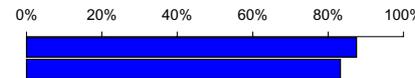
Under-5s receiving any antimalarial	60
Under-5s receiving chloroquine	59
Under-5s receiving any antimalarial <24 h	



Source	1998	1999	2000	2001
DHS				60
DHS				59

Attending health facility

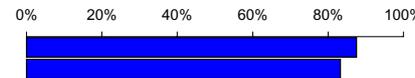
Under-5s receiving any antimalarial	88
Under-5s receiving chloroquine	83



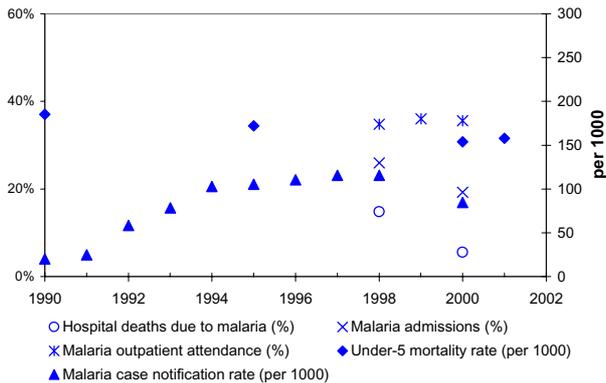
Source	1998	1999	2000	2001
DHS				88
DHS				83

Malaria in pregnancy

PW receiving ANC at least once	88
PW attending ANC at least twice	83
PW receiving IPT at least once	
PW receiving IPT at least twice	
PW using mosquito nets	
PW using ITNs	



Source	1998	1999	2000	2001
DHS				88
DHS				83



Antimalarial treatment policy

Date adopted:	---	
Uncomplicated	Probable	CQ 25 mg/kg
	Confirmed	CQ 25 mg/kg
Treatment failure		SP
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

		Date
Import tariff - nets	18%	2000
VAT - nets	18%	2000

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

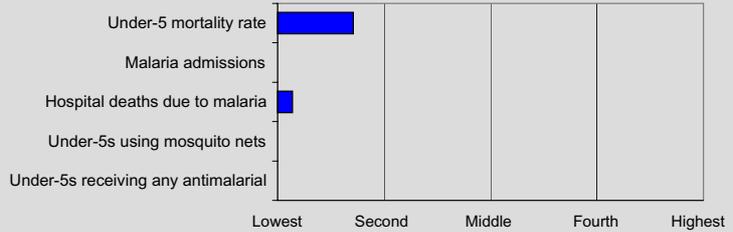
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Botswana

General indicators	Source	2001
Population (thousands)	UNPOP	1554
Population growth rate (%)	UNPOP	2.0
Infant mortality rate (per 1000)	UNICEF	80
Under-5 mortality rate (per 1000)	UNICEF	110
Crude birth rate (per 1000)	UNPOP	30.6
Pop. at risk (%)	MARA ¹	32

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria
Malaria admissions
Malaria outpatient attendance



Source	1998	1999	2000	2001
MoH	2			

Outpatient malaria cases (per 1000)
Inpatient malaria cases (per 1000)

Source	1998	1999	2000	2001
MoH	44	44	46	28

Mosquito nets and ITNs

Households with mosquito nets
Under-5s using mosquito nets
Households with ITNs
Under-5s using ITNs



Source	1998	1999	2000	2001

Antimalarial treatment

Under-5s receiving any antimalarial
Under-5s receiving chloroquine
Under-5s receiving any antimalarial <24 h



Source	1998	1999	2000	2001

Attending health facility

Under-5s receiving any antimalarial
Under-5s receiving chloroquine



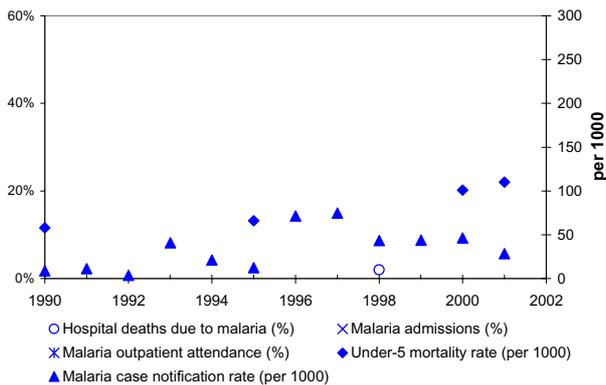
Source	1998	1999	2000	2001
MICS			97	

Malaria in pregnancy

PW receiving ANC at least once
PW attending ANC at least twice
PW receiving IPT at least once
PW receiving IPT at least twice
PW using mosquito nets
PW using ITNs



Source	1998	1999	2000	2001
MICS			97	



Antimalarial treatment policy

	Date adopted:	1997
Uncomplicated	Probable	SP
	Confirmed	SP
Treatment failure		Quinine 3 times a day, 7 days
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	SP - IPT

Taxes and tariffs on insecticide-treated nets

	Date
Import tariff - nets	
VAT - nets	

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

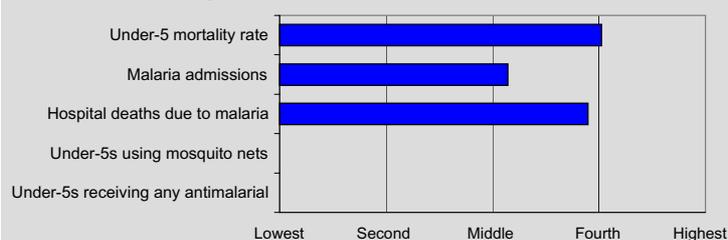
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Burkina Faso

General indicators	Source	2001
Population (thousands)	UNPOP	11856
Population growth rate (%)	UNPOP	2.5
Infant mortality rate (per 1000)	UNICEF	104
Under-5 mortality rate (per 1000)	UNICEF	197
Crude birth rate (per 1000)	UNPOP	46.8
Pop. at endemic (epidemic) risk (%)	MARA ¹	100 (0)

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria	30%
Malaria admissions	25%
Malaria outpatient attendance	30%

Source	1998	1999	2000	2001
MoH	33	31		
MoH	26	27		
MoH	30	31		

Outpatient malaria cases (per 1000)	81	78	6
Inpatient malaria cases (per 1000)	3	3	

Source	1998	1999	2000	2001
MoH	81	78	6	
MoH	3	3		

Mosquito nets and ITNs

Households with mosquito nets	0%
Under-5s using mosquito nets	0%
Households with ITNs	0%
Under-5s using ITNs	0%

Source	1998	1999	2000	2001

Antimalarial treatment

Under-5s receiving any antimalarial	0%
Under-5s receiving chloroquine	0%
Under-5s receiving any antimalarial <24 h	0%

Source	1998	1999	2000	2001

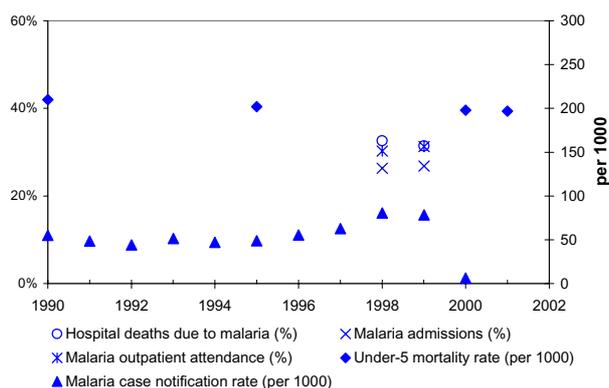
Attending health facility

Under-5s receiving any antimalarial	0%
Under-5s receiving chloroquine	0%

Malaria in pregnancy

PW receiving ANC at least once	60%
PW attending ANC at least twice	50%
PW receiving IPT at least once	0%
PW receiving IPT at least twice	0%
PW using mosquito nets	0%
PW using ITNs	0%

Source	1998	1999	2000	2001
DHS		63		
DHS		56		



Antimalarial treatment policy

Date adopted:	---	
Uncomplicated	Probable	CQ 25 mg/kg
	Confirmed	CQ 25 mg/kg
Treatment failure		SP
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

		Date
Import tariff - nets	18%	2000
VAT - nets	18%	2000

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

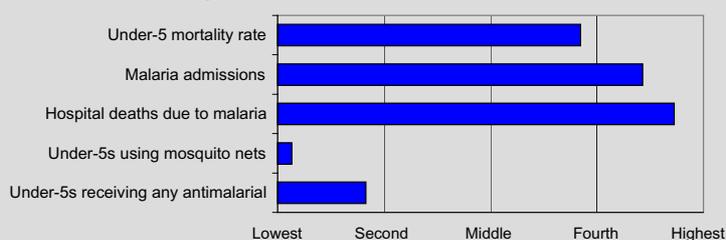
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Burundi

General indicators	Source	2001
Population (thousands)	UNPOP	6502
Population growth rate (%)	UNPOP	1.2
Infant mortality rate (per 1000)	UNICEF	114
Under-5 mortality rate (per 1000)	UNICEF	190
Crude birth rate (per 1000)	UNPOP	43.5
Pop. at endemic (epidemic) risk (%)	MARA ¹	68 (17)

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria	47
Malaria admissions	51
Malaria outpatient attendance	

0% 20% 40% 60% 80% 100%



Source 1998 1999 2000 2001

Outpatient malaria cases (per 1000)	283	287	481	435
Inpatient malaria cases (per 1000)				

MoH 283 287 481 435

Mosquito nets and ITNs

Households with mosquito nets	
Under-5s using mosquito nets	3
Households with ITNs	
Under-5s using ITNs	1

0% 20% 40% 60% 80% 100%

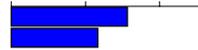


Source 1998 1999 2000 2001

Antimalarial treatment

Under-5s receiving any antimalarial	31
Under-5s receiving chloroquine	23
Under-5s receiving any antimalarial <24 h	

0% 20% 40% 60% 80% 100%

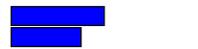


Source 1998 1999 2000 2001

Attending health facility

Under-5s receiving any antimalarial	25
Under-5s receiving chloroquine	19

0% 20% 40% 60% 80% 100%



Source 1998 1999 2000 2001

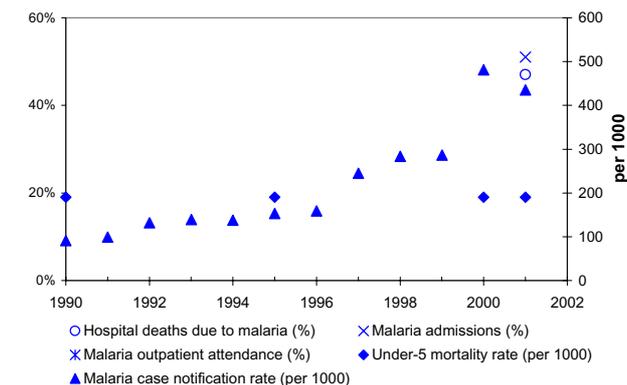
Malaria in pregnancy

PW receiving ANC at least once	
PW attending ANC at least twice	
PW receiving IPT at least once	
PW receiving IPT at least twice	
PW using mosquito nets	
PW using ITNs	78

0% 20% 40% 60% 80% 100%



Source 1998 1999 2000 2001



Antimalarial treatment policy

Date adopted: 2002

Uncomplicated	Probable	SP (AS+AQ)
	Confirmed	SP (AS+AQ)
Treatment failure		Quinine 3 times a day, 7 days
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	SP - IPT

Taxes and tariffs on insecticide-treated nets

		Date
Import tariff - nets	21%	2002
VAT - nets	21%	2002

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

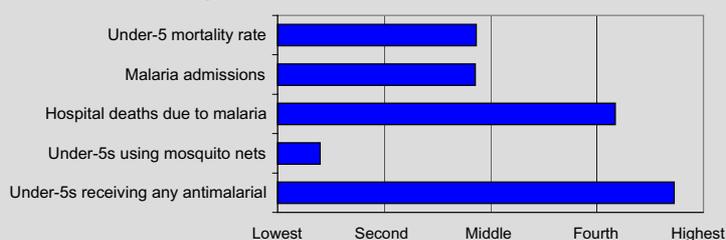
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Cameroon

General indicators	Source	2001
Population (thousands)	UNPOP	15203
Population growth rate (%)	UNPOP	2.4
Infant mortality rate (per 1000)	UNICEF	96
Under-5 mortality rate (per 1000)	UNICEF	155
Crude birth rate (per 1000)	UNPOP	36.3
Pop. at endemic (epidemic) risk (%)	MARA ¹	94 (4)

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria
Malaria admissions
Malaria outpatient attendance

0% 20% 40% 60% 80% 100%



Source 1998 1999 2000 2001

MoH			35	
MoH			23	

Outpatient malaria cases (per 1000)
Inpatient malaria cases (per 1000)

Mosquito nets and ITNs

Households with mosquito nets
Under-5s using mosquito nets
Households with ITNs
Under-5s using ITNs

0% 20% 40% 60% 80% 100%



Source 1998 1999 2000 2001

MICS				11
MICS				1

Antimalarial treatment

Under-5s receiving any antimalarial
Under-5s receiving chloroquine
Under-5s receiving any antimalarial <24 h

0% 20% 40% 60% 80% 100%



Source 1998 1999 2000 2001

MICS				66
MICS				48

Attending health facility

Under-5s receiving any antimalarial
Under-5s receiving chloroquine

0% 20% 40% 60% 80% 100%



Source 1998 1999 2000 2001

MICS				24
MICS				14

Malaria in pregnancy

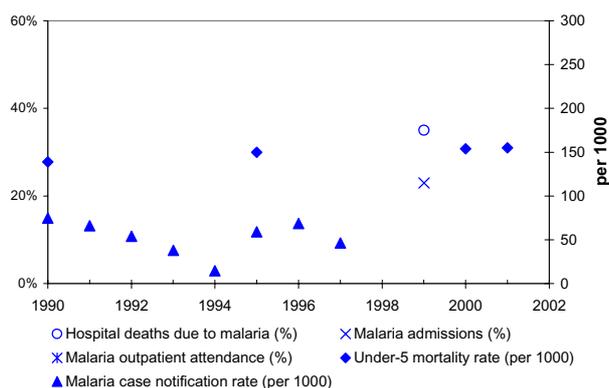
PW receiving ANC at least once
PW attending ANC at least twice
PW receiving IPT at least once
PW receiving IPT at least twice
PW using mosquito nets
PW using ITNs

0% 20% 40% 60% 80% 100%



Source 1998 1999 2000 2001

MICS				75
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Antimalarial treatment policy

Date adopted:	---	
Uncomplicated	Probable	AQ
	Confirmed	AQ
Treatment failure		SP
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

		Date
Import tariff - nets	21%	2000
VAT - nets	21%	2000

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

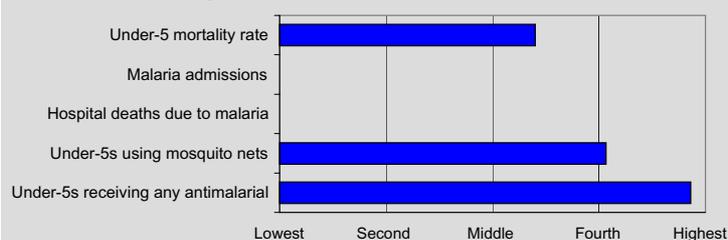
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Central African Republic

General indicators	Source	2001
Population (thousands)	UNPOP	3782
Population growth rate (%)	UNPOP	2.3
Infant mortality rate (per 1000)	UNICEF	115
Under-5 mortality rate (per 1000)	UNICEF	180
Crude birth rate (per 1000)	UNPOP	37.5
Pop. at endemic (epidemic) risk (%)	MARA ¹	100 (0)

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria
Malaria admissions
Malaria outpatient attendance

Outpatient malaria cases (per 1000)
Inpatient malaria cases (per 1000)

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

Mosquito nets and ITNs

Households with mosquito nets
Under-5s using mosquito nets
Households with ITNs
Under-5s using ITNs

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

Antimalarial treatment

Under-5s receiving any antimalarial
Under-5s receiving chloroquine
Under-5s receiving any antimalarial <24 h

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

Attending health facility

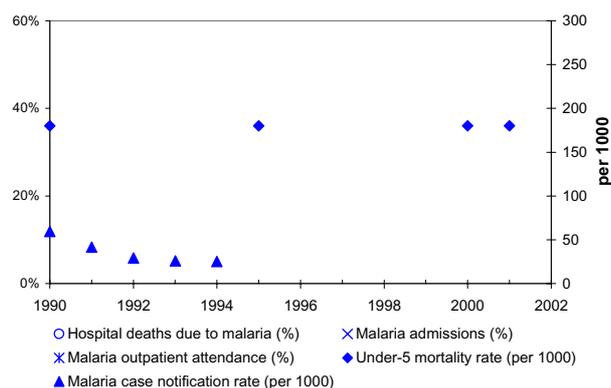
Under-5s receiving any antimalarial
Under-5s receiving chloroquine

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

Malaria in pregnancy

PW receiving ANC at least once
PW attending ANC at least twice
PW receiving IPT at least once
PW receiving IPT at least twice
PW using mosquito nets
PW using ITNs



Antimalarial treatment policy

	Date adopted:	
Uncomplicated	Probable	CQ 25 mg/kg
	Confirmed	CQ 25 mg/kg
Treatment failure		SP
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

		Date
Import tariff - nets	21%	2000
VAT - nets	21%	2000

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

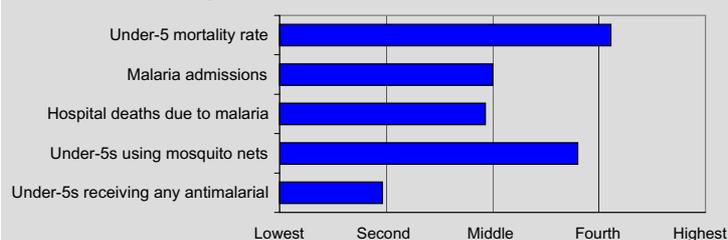
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Chad

General indicators	Source	2001
Population (thousands)	UNPOP	8135
Population growth rate (%)	UNPOP	3.1
Infant mortality rate (per 1000)	UNICEF	117
Under-5 mortality rate (per 1000)	UNICEF	200
Crude birth rate (per 1000)	UNPOP	48.5
Pop. at endemic (epidemic) risk (%)	MARA ¹	96 (4)

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria	23
Malaria admissions	26
Malaria outpatient attendance	22
Outpatient malaria cases (per 1000)	53
Inpatient malaria cases (per 1000)	2
	47

0% 20% 40% 60% 80% 100%

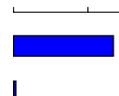


Source	1998	1999	2000	2001
MoH			23	
MoH			26	
MoH			22	
MoH	53	2	47	

Mosquito nets and ITNs

Households with mosquito nets	
Under-5s using mosquito nets	27
Households with ITNs	
Under-5s using ITNs	1

0% 20% 40% 60% 80% 100%



Source	1998	1999	2000	2001
MICS			27	
MICS			1	

Antimalarial treatment

Under-5s receiving any antimalarial	32
Under-5s receiving chloroquine	31
Under-5s receiving any antimalarial <24 h	

0% 20% 40% 60% 80% 100%



Source	1998	1999	2000	2001
MICS			32	
MICS			31	

Attending health facility

Under-5s receiving any antimalarial	12
Under-5s receiving chloroquine	12

0% 20% 40% 60% 80% 100%



Source	1998	1999	2000	2001
MICS			12	
MICS			12	

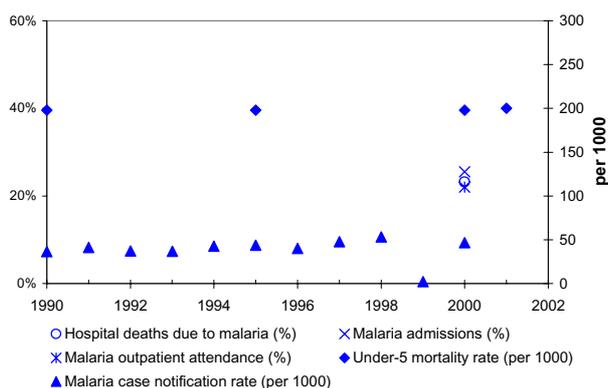
Malaria in pregnancy

PW receiving ANC at least once	
PW attending ANC at least twice	
PW receiving IPT at least once	
PW receiving IPT at least twice	
PW using mosquito nets	42
PW using ITNs	

0% 20% 40% 60% 80% 100%



Source	1998	1999	2000	2001
MICS			42	



Antimalarial treatment policy

Date adopted:	---	
Uncomplicated	Probable	CQ 25 mg/kg
	Confirmed	CQ 25 mg/kg
Treatment failure		SP
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

	Date
Import tariff - nets	
VAT - nets	

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

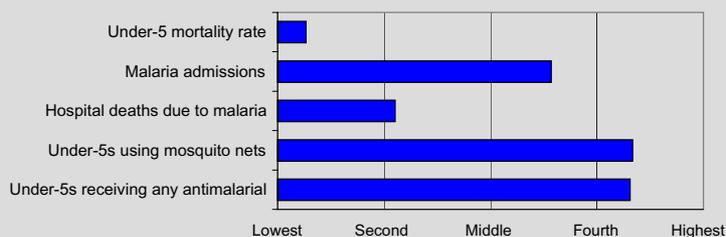
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Comoros

General indicators	Source	2001
Population (thousands)	UNPOP	727
Population growth rate (%)	UNPOP	3.0
Infant mortality rate (per 1000)	UNICEF	59
Under-5 mortality rate (per 1000)	UNICEF	79
Crude birth rate (per 1000)	UNPOP	37.7
Pop. at endemic (epidemic) risk (%)	MARA ¹	

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria	15%
Malaria admissions	35%
Malaria outpatient attendance	35%
Outpatient malaria cases (per 1000)	6
Inpatient malaria cases (per 1000)	2

0% 20% 40% 60% 80% 100%

Source	1998	1999	2000	2001
MoH		58	12	
MoH		37	34	
MoH		52	31	
MoH	6	14	14	
MoH	2	3	6	

Mosquito nets and ITNs

Households with mosquito nets	35%
Under-5s using mosquito nets	35%
Households with ITNs	10%
Under-5s using ITNs	10%

0% 20% 40% 60% 80% 100%

Source	1998	1999	2000	2001
MICS			36	
MICS			9	

Antimalarial treatment

Under-5s receiving any antimalarial	60%
Under-5s receiving chloroquine	60%
Under-5s receiving any antimalarial <24 h	60%

0% 20% 40% 60% 80% 100%

Source	1998	1999	2000	2001
MICS			63	
MICS			62	

Attending health facility

Under-5s receiving any antimalarial	40%
Under-5s receiving chloroquine	40%

0% 20% 40% 60% 80% 100%

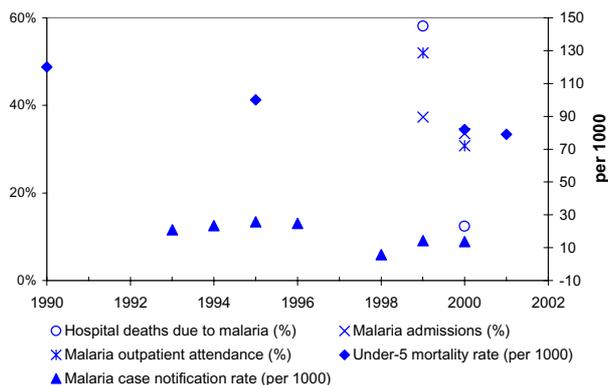
Source	1998	1999	2000	2001
MICS			41	
MICS			40	

Malaria in pregnancy

PW receiving ANC at least once	75%
PW attending ANC at least twice	75%
PW receiving IPT at least once	75%
PW receiving IPT at least twice	75%
PW using mosquito nets	75%
PW using ITNs	75%

0% 20% 40% 60% 80% 100%

Source	1998	1999	2000	2001
MICS			74	



Antimalarial treatment policy

Date adopted:	---	
Uncomplicated	Probable	CQ 25 mg/kg
	Confirmed	CQ 25 mg/kg
Treatment failure		SP
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

	Date
Import tariff - nets	
VAT - nets	

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

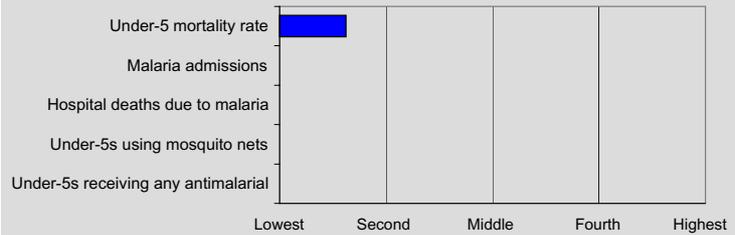
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Congo

General indicators	Source	2001
Population (thousands)	UNPOP	3110
Population growth rate (%)	UNPOP	3.1
Infant mortality rate (per 1000)	UNICEF	81
Under-5 mortality rate (per 1000)	UNICEF	108
Crude birth rate (per 1000)	UNPOP	44.2
Pop. at endemic (epidemic) risk (%)	MARA ¹	100 (0)

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria
Malaria admissions
Malaria outpatient attendance

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

Outpatient malaria cases (per 1000)
Inpatient malaria cases (per 1000)

MoH 18
MoH 38
MoH 21

Mosquito nets and ITNs

Households with mosquito nets
Under-5s using mosquito nets
Households with ITNs
Under-5s using ITNs

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

Antimalarial treatment

Under-5s receiving any antimalarial
Under-5s receiving chloroquine
Under-5s receiving any antimalarial <24 h

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

Attending health facility

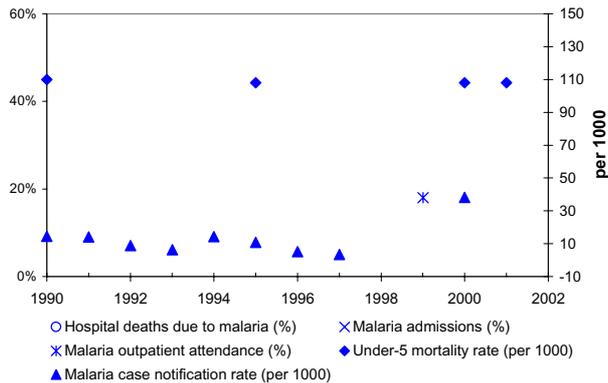
Under-5s receiving any antimalarial
Under-5s receiving chloroquine

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

Malaria in pregnancy

PW receiving ANC at least once
PW attending ANC at least twice
PW receiving IPT at least once
PW receiving IPT at least twice
PW using mosquito nets
PW using ITNs



Antimalarial treatment policy

	Date adopted:	
Uncomplicated	Probable	CQ 25 mg/kg
	Confirmed	CQ 25 mg/kg
Treatment failure		SP
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

	Date
Import tariff - nets	
VAT - nets	

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

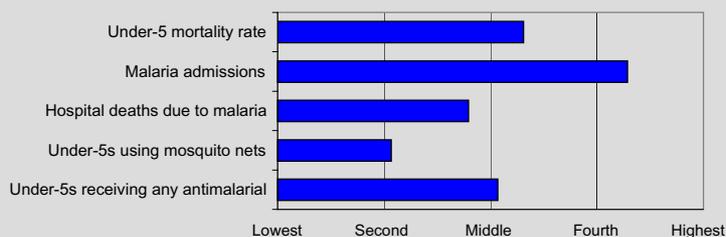
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Côte d'Ivoire

General indicators	Source	2001
Population (thousands)	UNPOP	16349
Population growth rate (%)	UNPOP	2.3
Infant mortality rate (per 1000)	UNICEF	102
Under-5 mortality rate (per 1000)	UNICEF	175
Crude birth rate (per 1000)	UNPOP	35.3
Pop. at endemic (epidemic) risk (%)	MARA ¹	100 (0)

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria	20%
Malaria admissions	45%
Malaria outpatient attendance	35%
Outpatient malaria cases (per 1000)	93
Inpatient malaria cases (per 1000)	28

0% 20% 40% 60% 80% 100%

Source	1998	1999	2000	2001
MoH			10	20
MoH			21	49
MoH			24	38
MoH			93	24
MoH			28	2

Mosquito nets and ITNs

Households with mosquito nets	10%
Under-5s using mosquito nets	10%
Households with ITNs	1%
Under-5s using ITNs	1%

0% 20% 40% 60% 80% 100%

Source	1998	1999	2000	2001
MICS			10	
MICS			1	

Antimalarial treatment

Under-5s receiving any antimalarial	58%
Under-5s receiving chloroquine	56%
Under-5s receiving any antimalarial <24 h	

0% 20% 40% 60% 80% 100%

Source	1998	1999	2000	2001
MICS			58	
MICS			56	

Attending health facility

Under-5s receiving any antimalarial	27%
Under-5s receiving chloroquine	26%

0% 20% 40% 60% 80% 100%

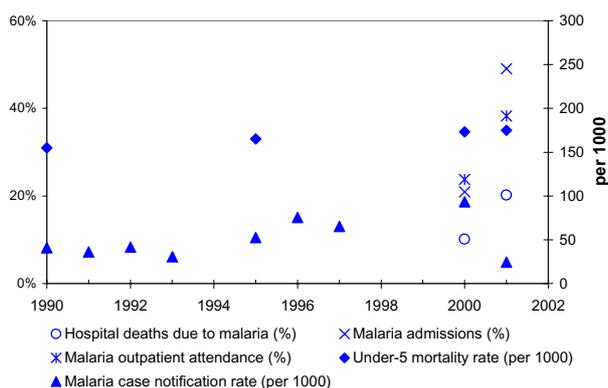
Source	1998	1999	2000	2001
MICS			27	
MICS			26	

Malaria in pregnancy

PW receiving ANC at least once	84%
PW attending ANC at least twice	88%
PW receiving IPT at least once	
PW receiving IPT at least twice	
PW using mosquito nets	
PW using ITNs	

0% 20% 40% 60% 80% 100%

Source	1998	1999	2000	2001
MICS		84	88	
DHS		73		



Antimalarial treatment policy

Date adopted:	---	
Uncomplicated	Probable	CQ 25 mg/kg
	Confirmed	CQ 25 mg/kg
Treatment failure		SP
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

		Date
Import tariff - nets	21%	2001
VAT - nets	0%	2001

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

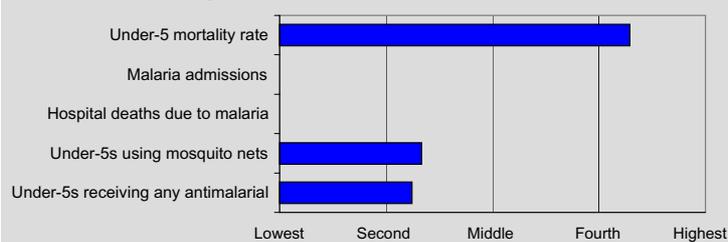
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Democratic Republic of Congo

General indicators	Source	2001
Population (thousands)	UNPOP	52522
Population growth rate (%)	UNPOP	3.2
Infant mortality rate (per 1000)	UNICEF	129
Under-5 mortality rate (per 1000)	UNICEF	205
Crude birth rate (per 1000)	UNPOP	48
Pop. at endemic (epidemic) risk (%)	MARA ¹	92 (3)

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria
Malaria admissions
Malaria outpatient attendance

0% 20% 40% 60% 80% 100%

Outpatient malaria cases (per 1000)
Inpatient malaria cases (per 1000)

Source 1998 1999 2000 2001

MoH		28		
MoH	3	30		
MoH			14	

Mosquito nets and ITNs

Households with mosquito nets
Under-5s using mosquito nets
Households with ITNs
Under-5s using ITNs

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

MICS			12	
MICS				1

Antimalarial treatment

Under-5s receiving any antimalarial
Under-5s receiving chloroquine
Under-5s receiving any antimalarial <24 h

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

MICS			45	
MICS			45	

Attending health facility

Under-5s receiving any antimalarial
Under-5s receiving chloroquine

0% 20% 40% 60% 80% 100%

MICS			24	
MICS			18	

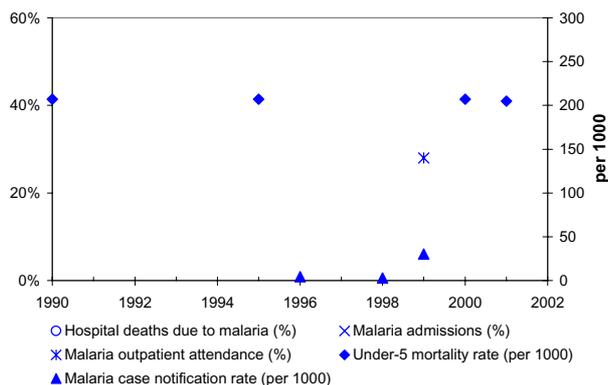
Malaria in pregnancy

PW receiving ANC at least once
PW attending ANC at least twice
PW receiving IPT at least once
PW receiving IPT at least twice
PW using mosquito nets
PW using ITNs

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

MICS			68	
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Antimalarial treatment policy

Date adopted:	---	
Uncomplicated	Probable	SP
	Confirmed	SP
Treatment failure	Quinine 3 times a day, 7 days	
Severe malaria	Quinine 3 times a day, 7 days	
Pregnancy	Prevention	SP - IPT

Taxes and tariffs on insecticide-treated nets

	Date
Import tariff - nets	
VAT - nets	

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

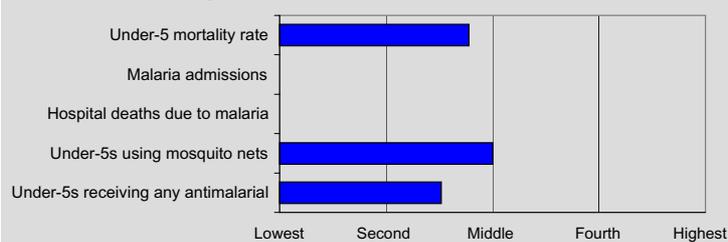
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Equatorial Guinea

General indicators	Source	2001
Population (thousands)	UNPOP	470
Population growth rate (%)	UNPOP	2.7
Infant mortality rate (per 1000)	UNICEF	101
Under-5 mortality rate (per 1000)	UNICEF	153
Crude birth rate (per 1000)	UNPOP	43.2
Pop. at endemic (epidemic) risk (%)	MARA ¹	98 (1)

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria
Malaria admissions
Malaria outpatient attendance

Outpatient malaria cases (per 1000)
Inpatient malaria cases (per 1000)

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

Mosquito nets and ITNs

Households with mosquito nets
Under-5s using mosquito nets
Households with ITNs
Under-5s using ITNs

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

Antimalarial treatment

Under-5s receiving any antimalarial
Under-5s receiving chloroquine
Under-5s receiving any antimalarial <24 h

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

Attending health facility

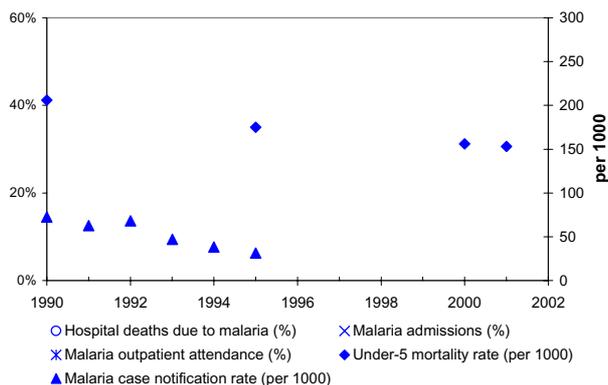
Under-5s receiving any antimalarial
Under-5s receiving chloroquine

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

Malaria in pregnancy

PW receiving ANC at least once
PW attending ANC at least twice
PW receiving IPT at least once
PW receiving IPT at least twice
PW using mosquito nets
PW using ITNs



Antimalarial treatment policy

	Date adopted:	
Uncomplicated	Probable	CQ 25 mg/kg
	Confirmed	CQ 25 mg/kg
Treatment failure		SP
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

	Date
Import tariff - nets	
VAT - nets	

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

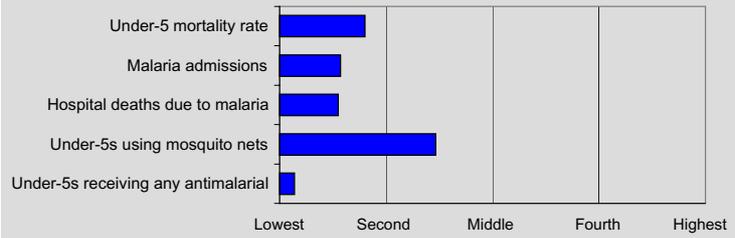
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Eritrea

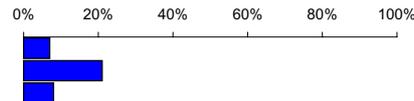
General indicators	Source	2001
Population (thousands)	UNPOP	3816
Population growth rate (%)	UNPOP	2.0
Infant mortality rate (per 1000)	UNICEF	72
Under-5 mortality rate (per 1000)	UNICEF	111
Crude birth rate (per 1000)	UNPOP	38.5
Pop. at endemic (epidemic) risk (%)	MARA ¹	92 (7)

Proportional rank for select indicators



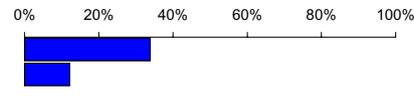
Malaria morbidity and mortality

Indicator	Source	1999	2000	2001	2002
Hospital deaths due to malaria	MoH	13	6	7	4
Malaria admissions	MoH	26	17	21	12
Malaria outpatient attendance	MoH	11	9	8	5
Outpatient malaria cases (per 1000)	MoH	40	33	34	20
Inpatient malaria cases (per 1000)	MoH	4	2	3	2



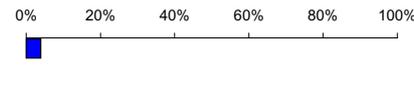
Mosquito nets and ITNs

Indicator	Source	1999	2000	2001	2002
Households with mosquito nets	DHS ²				34
Under-5s using mosquito nets	DHS ²				12
Households with ITNs					
Under-5s using ITNs	DHS ²				4



Antimalarial treatment

Indicator	Source	1999	2000	2001	2002
Under-5s receiving any antimalarial	DHS ²				4
Under-5s receiving chloroquine					
Under-5s receiving any antimalarial <24 h					

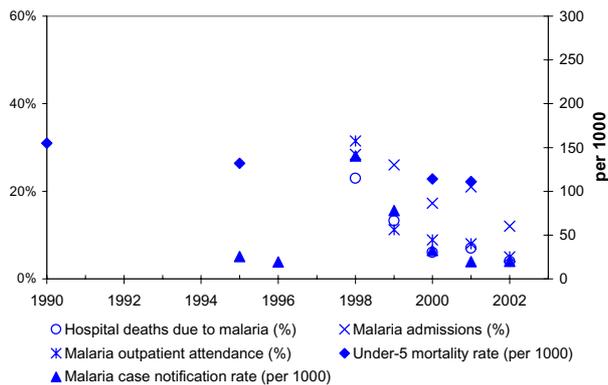
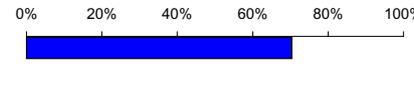


Attending health facility

Indicator	Source	1999	2000	2001	2002
Under-5s receiving any antimalarial					
Under-5s receiving chloroquine					

Malaria in pregnancy

Indicator	Source	1999	2000	2001	2002
PW receiving ANC at least once	DHS ²				70
PW attending ANC at least twice					
PW receiving IPT at least once					
PW receiving IPT at least twice					
PW using mosquito nets	DHS ²				7
PW using ITNs	DHS ²				3



Antimalarial treatment policy

Date adopted:		2002
Uncomplicated	Probable	CQ 25 mg/kg + SP
	Confirmed	CQ 25 mg/kg + SP
Treatment failure		Quinine 3 times a day, 7 days
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ + Proguanil weekly

Taxes and tariffs on insecticide-treated nets

Indicator	Date
Import tariff - nets	
VAT - nets	

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview. Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

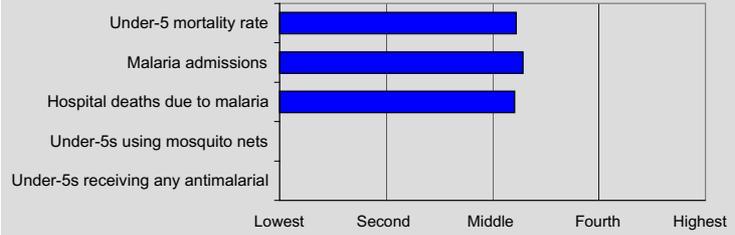
¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

² DHS data for 2002 is preliminary

Ethiopia

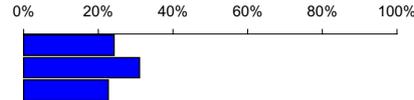
General indicators	Source	2001
Population (thousands)	UNPOP	64459
Population growth rate (%)	UNPOP	2.8
Infant mortality rate (per 1000)	UNICEF	116
Under-5 mortality rate (per 1000)	UNICEF	172
Crude birth rate (per 1000)	UNPOP	43.8
Pop. at endemic (epidemic) risk (%)	MARA ¹	40 (24)

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria	24	24
Malaria admissions	20	31
Malaria outpatient attendance	25	23

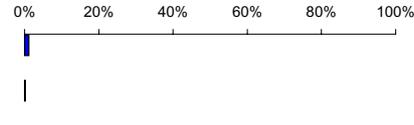


Outpatient malaria cases (per 1000)
Inpatient malaria cases (per 1000)

Source	1998	1999	2000	2001
MoH		24		24
MoH		20		31
MoH		25		23
MoH	10	11	6	

Mosquito nets and ITNs

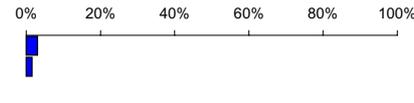
Households with mosquito nets				
Under-5s using mosquito nets				
Households with ITNs				
Under-5s using ITNs				



Source	1998	1999	2000	2001
DHS			1	
DHS			0	

Antimalarial treatment

Under-5s receiving any antimalarial				
Under-5s receiving chloroquine				
Under-5s receiving any antimalarial <24 h				



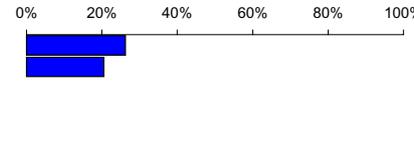
Source	1998	1999	2000	2001
DHS			3	
DHS			2	

Attending health facility

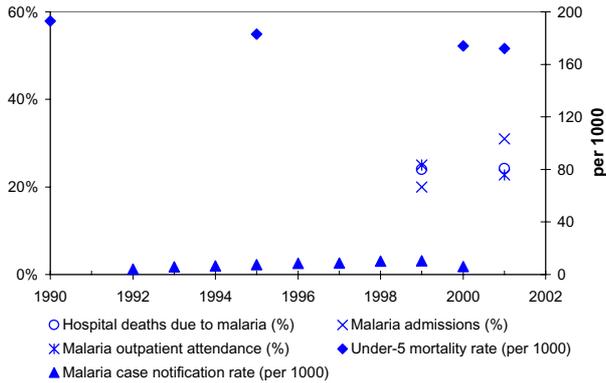
Under-5s receiving any antimalarial				
Under-5s receiving chloroquine				

Malaria in pregnancy

PW receiving ANC at least once				
PW attending ANC at least twice				
PW receiving IPT at least once				
PW receiving IPT at least twice				
PW using mosquito nets				
PW using ITNs				



Source	1998	1999	2000	2001
DHS			26	
DHS			21	



Antimalarial treatment policy

	Date adopted:	1998
Uncomplicated	Probable	CQ 25 mg/kg + SP
	Confirmed	CQ 25 mg/kg + SP
Treatment failure		Quinine 3 times a day, 7 days
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	

Taxes and tariffs on insecticide-treated nets

	Date
Import tariff - nets	
VAT - nets	

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

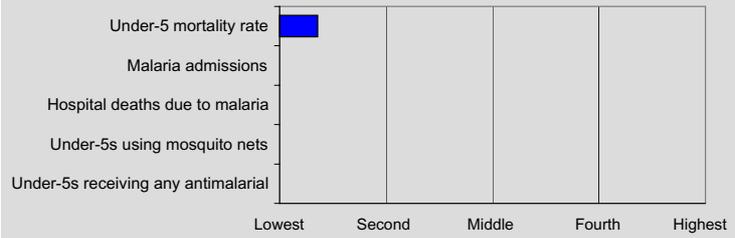
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Gabon

General indicators	Source	2001
Population (thousands)	UNPOP	1262
Population growth rate (%)	UNPOP	2.7
Infant mortality rate (per 1000)	UNICEF	60
Under-5 mortality rate (per 1000)	UNICEF	90
Crude birth rate (per 1000)	UNPOP	37.6
Pop. at endemic (epidemic) risk (%)	MARA ¹	97 (0)

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria
Malaria admissions
Malaria outpatient attendance

Outpatient malaria cases (per 1000)
Inpatient malaria cases (per 1000)

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

MoH 23

Mosquito nets and ITNs

Households with mosquito nets
Under-5s using mosquito nets
Households with ITNs
Under-5s using ITNs

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

Antimalarial treatment

Under-5s receiving any antimalarial
Under-5s receiving chloroquine
Under-5s receiving any antimalarial <24 h

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

Attending health facility

Under-5s receiving any antimalarial
Under-5s receiving chloroquine

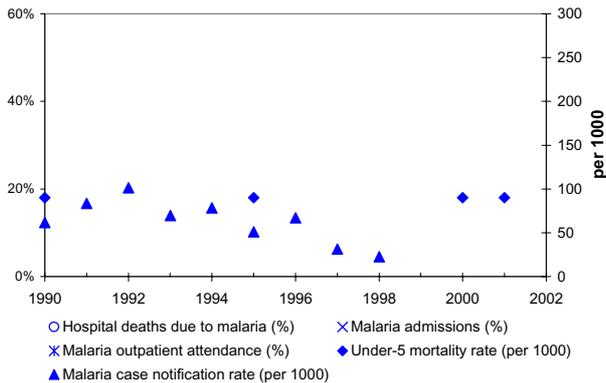
Malaria in pregnancy

PW receiving ANC at least once
PW attending ANC at least twice
PW receiving IPT at least once
PW receiving IPT at least twice
PW using mosquito nets
PW using ITNs

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

DHS 81
DHS 78



Antimalarial treatment policy

	Date adopted:	
Uncomplicated	Probable	CQ 25 mg/kg
	Confirmed	CQ 25 mg/kg
Treatment failure		SP
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

	Date
Import tariff - nets	
VAT - nets	

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

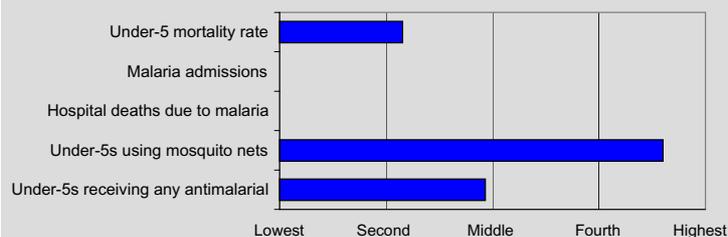
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Gambia

General indicators	Source	2001
Population (thousands)	UNPOP	1337
Population growth rate (%)	UNPOP	3.3
Infant mortality rate (per 1000)	UNICEF	91
Under-5 mortality rate (per 1000)	UNICEF	126
Crude birth rate (per 1000)	UNPOP	37.2
Pop. at endemic (epidemic) risk (%)	MARA ¹	100 (0)

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria
Malaria admissions
Malaria outpatient attendance

Outpatient malaria cases (per 1000)
Inpatient malaria cases (per 1000)

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

MoH 184 101

Mosquito nets and ITNs

Households with mosquito nets
Under-5s using mosquito nets
Households with ITNs
Under-5s using ITNs

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

MICS 42

MICS 15

Antimalarial treatment

Under-5s receiving any antimalarial
Under-5s receiving chloroquine
Under-5s receiving any antimalarial <24 h

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

MICS 55

MICS 55

Attending health facility

Under-5s receiving any antimalarial
Under-5s receiving chloroquine

0% 20% 40% 60% 80% 100%

MICS 48

MICS 48

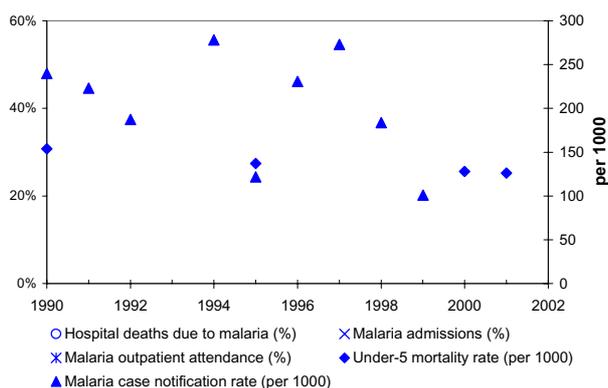
Malaria in pregnancy

PW receiving ANC at least once
PW attending ANC at least twice
PW receiving IPT at least once
PW receiving IPT at least twice
PW using mosquito nets
PW using ITNs

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

MICS 91



Antimalarial treatment policy

Date adopted: ---

Uncomplicated	Probable	CQ 25 mg/kg
	Confirmed	CQ 25 mg/kg
Treatment failure		SP
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

Import tariff - nets
VAT - nets

Date

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

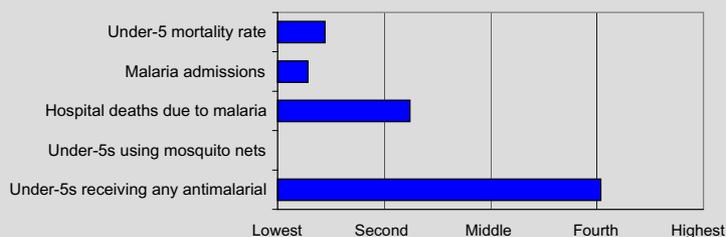
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Ghana

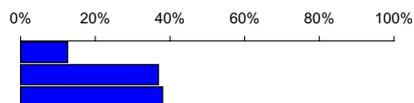
General indicators	Source	2001
Population (thousands)	UNPOP	19734
Population growth rate (%)	UNPOP	2.4
Infant mortality rate (per 1000)	UNICEF	57
Under-5 mortality rate (per 1000)	UNICEF	100
Crude birth rate (per 1000)	UNPOP	32.6
Pop. at endemic (epidemic) risk (%)	MARA ¹	100 (0)

Proportional rank for select indicators



Malaria morbidity and mortality

Indicator	Source	1998	1999	2000	2001
Hospital deaths due to malaria	MoH	14	12	12	13
Malaria admissions	MoH	13	11	11	37
Malaria outpatient attendance	MoH	41	38	38	38
Outpatient malaria cases (per 1000)	MoH	94	153	148	171
Inpatient malaria cases (per 1000)	MoH	3	4	6	4



Mosquito nets and ITNs

Indicator	Source	1998	1999	2000	2001
Households with mosquito nets					
Under-5s using mosquito nets					
Households with ITNs					
Under-5s using ITNs					



Antimalarial treatment

Indicator	Source	1998	1999	2000	2001
Under-5s receiving any antimalarial	DHS	61			
Under-5s receiving chloroquine					
Under-5s receiving any antimalarial <24 h					

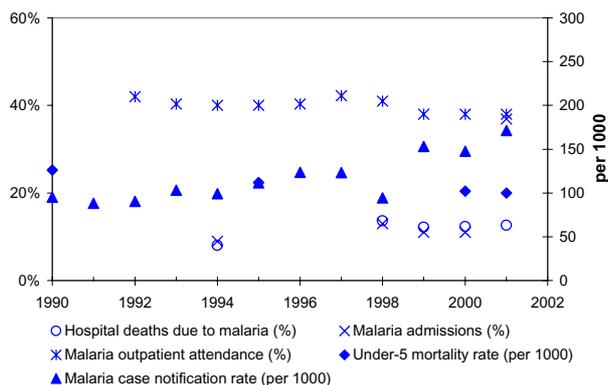


Attending health facility

Indicator	Source	1998	1999	2000	2001
Under-5s receiving any antimalarial					
Under-5s receiving chloroquine					

Malaria in pregnancy

Indicator	Source	1998	1999	2000	2001
PW receiving ANC at least once	DHS	89			
PW attending ANC at least twice	DHS	83			
PW receiving IPT at least once					
PW receiving IPT at least twice					
PW using mosquito nets					
PW using ITNs					



Antimalarial treatment policy

	Date adopted:	
Uncomplicated	Probable	CQ 25 mg/kg
	Confirmed	CQ 25 mg/kg
Treatment failure		SP
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

Indicator	Value	Date
Import tariff - nets	13%	2001
VAT - nets		

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

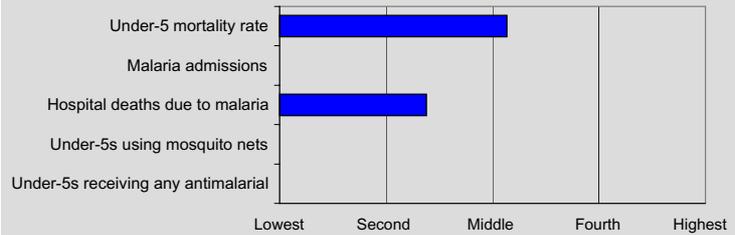
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

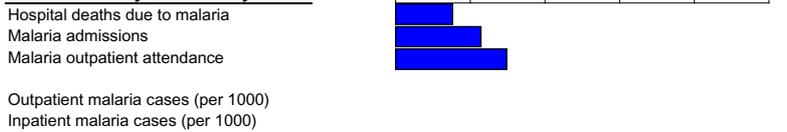
Guinea

General indicators	Source	2001
Population (thousands)	UNPOP	8274
Population growth rate (%)	UNPOP	2.7
Infant mortality rate (per 1000)	UNICEF	109
Under-5 mortality rate (per 1000)	UNICEF	169
Crude birth rate (per 1000)	UNPOP	43.4
Pop. at endemic (epidemic) risk (%)	MARA ¹	100 (<1)

Proportional rank for select indicators



Malaria morbidity and mortality



Source	1998	1999	2000	2001
MoH	1	1	26	15
MoH	23	23	23	
MoH	27	27	33	30
MoH	104	65	109	
MoH			2	

Mosquito nets and ITNs



Source	1998	1999	2000	2001
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Antimalarial treatment



Source	1998	1999	2000	2001
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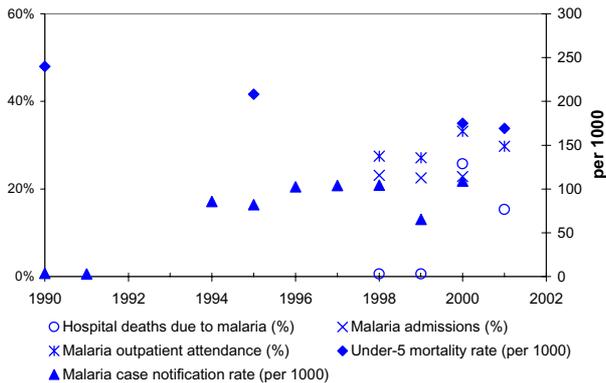
Attending health facility



Malaria in pregnancy



Source	1998	1999	2000	2001
DHS		74		
DHS		69		



Antimalarial treatment policy

	Date adopted:	---
Uncomplicated	Probable	CQ 25 mg/kg
	Confirmed	CQ 25 mg/kg
Treatment failure		SP
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

		Date
Import tariff - nets	21%	2000
VAT - nets	21%	2000

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

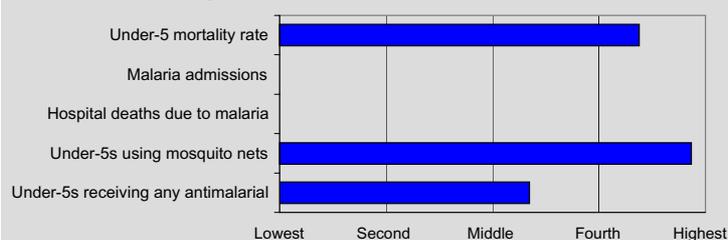
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Guinea-Bissau

General indicators	Source	2001
Population (thousands)	UNPOP	1227
Population growth rate (%)	UNPOP	2.4
Infant mortality rate (per 1000)	UNICEF	130
Under-5 mortality rate (per 1000)	UNICEF	211
Crude birth rate (per 1000)	UNPOP	44.6
Pop. at endemic (epidemic) risk (%)	MARA ¹	100 (0)

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria
Malaria admissions
Malaria outpatient attendance

Outpatient malaria cases (per 1000)
Inpatient malaria cases (per 1000)

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

MoH 2 168

Mosquito nets and ITNs

Households with mosquito nets
Under-5s using mosquito nets
Households with ITNs
Under-5s using ITNs

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

MICS 67

MICS 7

Antimalarial treatment

Under-5s receiving any antimalarial
Under-5s receiving chloroquine
Under-5s receiving any antimalarial <24 h

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

MICS 58

MICS 58

Attending health facility

Under-5s receiving any antimalarial
Under-5s receiving chloroquine

0% 20% 40% 60% 80% 100%

MICS 48

MICS 48

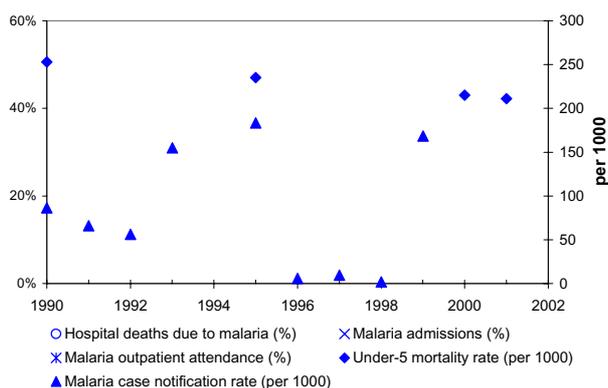
Malaria in pregnancy

PW receiving ANC at least once
PW attending ANC at least twice
PW receiving IPT at least once
PW receiving IPT at least twice
PW using mosquito nets
PW using ITNs

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

MICS 62



Antimalarial treatment policy

Date adopted: ---

Uncomplicated	Probable	CQ 25 mg/kg
	Confirmed	CQ 25 mg/kg
Treatment failure		SP
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

	Date
Import tariff - nets	
VAT - nets	

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

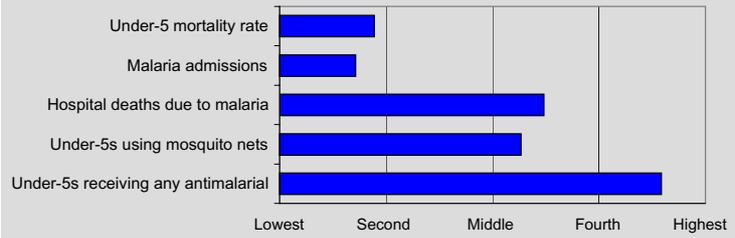
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Kenya

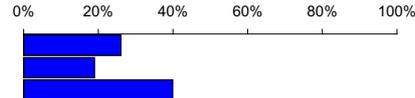
General indicators	Source	2001
Population (thousands)	UNPOP	31293
Population growth rate (%)	UNPOP	2.5
Infant mortality rate (per 1000)	UNICEF	78
Under-5 mortality rate (per 1000)	UNICEF	122
Crude birth rate (per 1000)	UNPOP	34.1
Pop. at endemic (epidemic) risk (%)	MARA ¹	53 (24)

Proportional rank for select indicators



Malaria morbidity and mortality

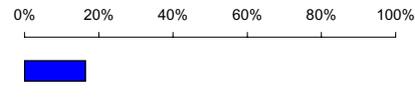
Hospital deaths due to malaria	26
Malaria admissions	19
Malaria outpatient attendance	40
Outpatient malaria cases (per 1000)	10
Inpatient malaria cases (per 1000)	5



Source	1998	1999	2000	2001
MoH		26		
MoH		19		
MoH		40		
MoH		10		5
MoH				1

Mosquito nets and ITNs

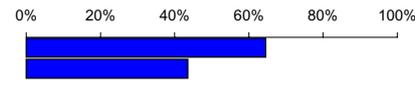
Households with mosquito nets	16
Under-5s using mosquito nets	16
Households with ITNs	3
Under-5s using ITNs	3



Source	1998	1999	2000	2001
MICS			16	
MICS			3	

Antimalarial treatment

Under-5s receiving any antimalarial	65
Under-5s receiving chloroquine	44
Under-5s receiving any antimalarial <24 h	



Source	1998	1999	2000	2001
MICS			65	
MICS			44	

Attending health facility

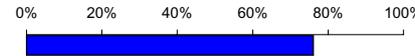
Under-5s receiving any antimalarial	42
Under-5s receiving chloroquine	25



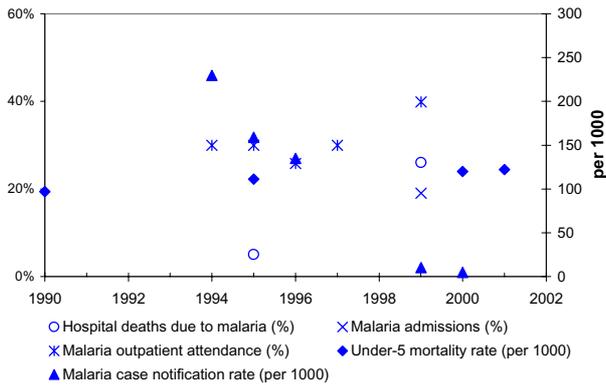
Source	1998	1999	2000	2001
MICS			42	
MICS			25	

Malaria in pregnancy

PW receiving ANC at least once	76
PW attending ANC at least twice	
PW receiving IPT at least once	
PW receiving IPT at least twice	
PW using mosquito nets	
PW using ITNs	



Source	1998	1999	2000	2001
MICS			76	



Antimalarial treatment policy

Date adopted:	1998
Uncomplicated	Probable SP
Treatment failure	Confirmed AQ
Severe malaria	Quinine 3 times a day, 7 days
Pregnancy	Prevention SP - IPT

Taxes and tariffs on insecticide-treated nets

	Date
Import tariff - nets	18%
VAT - nets	2001

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

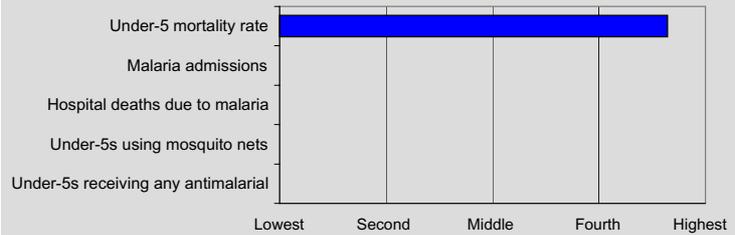
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Liberia

General indicators	Source	2001
Population (thousands)	UNPOP	3108
Population growth rate (%)	UNPOP	4.0
Infant mortality rate (per 1000)	UNICEF	157
Under-5 mortality rate (per 1000)	UNICEF	235
Crude birth rate (per 1000)	UNPOP	55.5
Pop. at endemic (epidemic) risk (%)	MARA ¹	100 (0)

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria
Malaria admissions
Malaria outpatient attendance

Outpatient malaria cases (per 1000)
Inpatient malaria cases (per 1000)

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

MoH 311

Mosquito nets and ITNs

Households with mosquito nets
Under-5s using mosquito nets
Households with ITNs
Under-5s using ITNs

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

Antimalarial treatment

Under-5s receiving any antimalarial
Under-5s receiving chloroquine
Under-5s receiving any antimalarial <24 h

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

Attending health facility

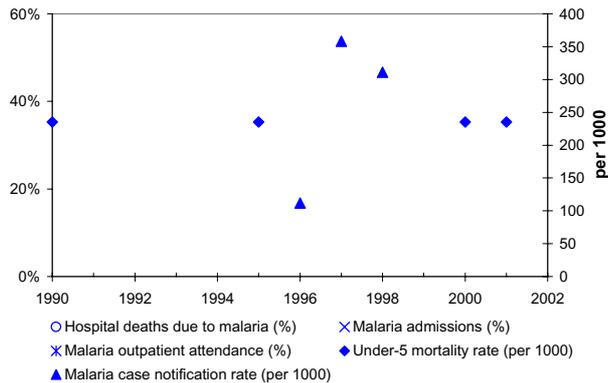
Under-5s receiving any antimalarial
Under-5s receiving chloroquine

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

Malaria in pregnancy

PW receiving ANC at least once
PW attending ANC at least twice
PW receiving IPT at least once
PW receiving IPT at least twice
PW using mosquito nets
PW using ITNs



Antimalarial treatment policy

	Date adopted:	
Uncomplicated	Probable	CQ 25 mg/kg
	Confirmed	CQ 25 mg/kg
Treatment failure		SP
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

	Date
Import tariff - nets	
VAT - nets	

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

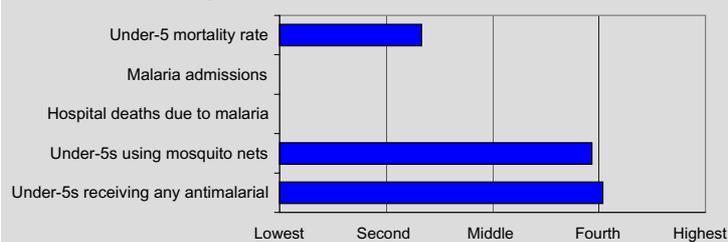
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Madagascar

General indicators	Source	2001
Population (thousands)	UNPOP	16437
Population growth rate (%)	UNPOP	2.9
Infant mortality rate (per 1000)	UNICEF	84
Under-5 mortality rate (per 1000)	UNICEF	136
Crude birth rate (per 1000)	UNPOP	41.5
Pop. at endemic (epidemic) risk (%)	MARA ¹	89 (7)

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria
Malaria admissions
Malaria outpatient attendance

Outpatient malaria cases (per 1000)
Inpatient malaria cases (per 1000)

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

Mosquito nets and ITNs

Households with mosquito nets
Under-5s using mosquito nets
Households with ITNs
Under-5s using ITNs

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

Antimalarial treatment

Under-5s receiving any antimalarial
Under-5s receiving chloroquine
Under-5s receiving any antimalarial <24 h

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

Attending health facility

Under-5s receiving any antimalarial
Under-5s receiving chloroquine

0% 20% 40% 60% 80% 100%

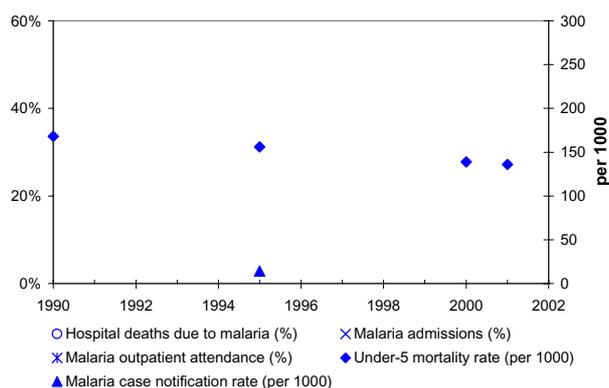
Source 1998 1999 2000 2001

Malaria in pregnancy

PW receiving ANC at least once
PW attending ANC at least twice
PW receiving IPT at least once
PW receiving IPT at least twice
PW using mosquito nets
PW using ITNs

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001



Antimalarial treatment policy

	Date adopted:	
Uncomplicated	Probable	CQ 25 mg/kg
	Confirmed	CQ 25 mg/kg
Treatment failure		SP
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

	Date
Import tariff - nets	
VAT - nets	

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.
Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

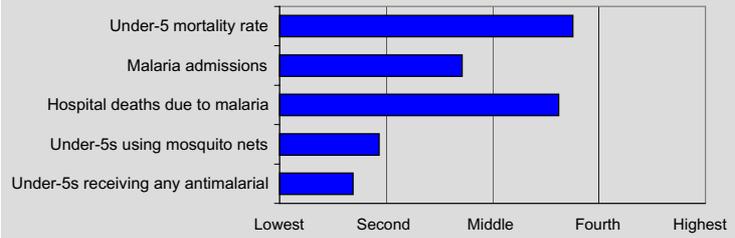
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Malawi

General indicators	Source	2001
Population (thousands)	UNPOP	11572
Population growth rate (%)	UNPOP	1.8
Infant mortality rate (per 1000)	UNICEF	114
Under-5 mortality rate (per 1000)	UNICEF	183
Crude birth rate (per 1000)	UNPOP	44.9
Pop. at endemic (epidemic) risk (%)	MARA ¹	97 (3)

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria	28
Malaria admissions	22
Malaria outpatient attendance	26
Outpatient malaria cases (per 1000)	259
Inpatient malaria cases (per 1000)	3

0% 20% 40% 60% 80% 100%



Source	1998	1999	2000	2001
MoH	19			28
MoH				22
MoH	50	40		26

Mosquito nets and ITNs

Households with mosquito nets	13
Under-5s using mosquito nets	8
Households with ITNs	5
Under-5s using ITNs	3

0% 20% 40% 60% 80% 100%



Source	1998	1999	2000	2001
DHS				13
DHS				8
DHS				5
DHS				3

Antimalarial treatment

Under-5s receiving any antimalarial	27
Under-5s receiving chloroquine	1
Under-5s receiving any antimalarial <24 h	22

0% 20% 40% 60% 80% 100%



Source	1998	1999	2000	2001
DHS				27
DHS				1
DHS				22

Attending health facility

Under-5s receiving any antimalarial	
Under-5s receiving chloroquine	

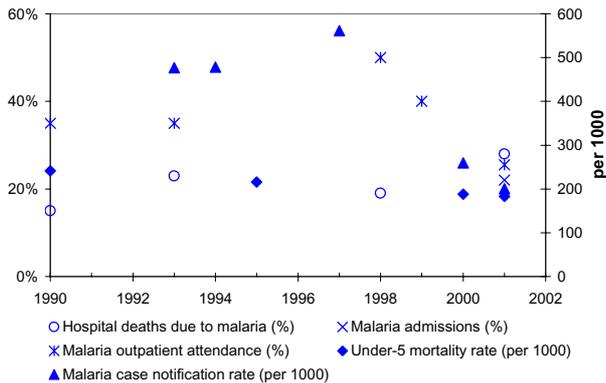
Malaria in pregnancy

PW receiving ANC at least once	92
PW attending ANC at least twice	90
PW receiving IPT at least once	68
PW receiving IPT at least twice	29
PW using mosquito nets	
PW using ITNs	7

0% 20% 40% 60% 80% 100%



Source	1998	1999	2000	2001
DHS				92
DHS				90
DHS				68
DHS				29
DHS				7



Antimalarial treatment policy

	Date adopted:	1993
Uncomplicated	Probable	SP
	Confirmed	SP
Treatment failure		Quinine 3 times a day, 7 days
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	SP - IPT

Taxes and tariffs on insecticide-treated nets

		Date
Import tariff - nets	20%	2001
VAT - nets	20%	2001

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Mali

General indicators	Source	2001
Population (thousands)	UNPOP	11677
Population growth rate (%)	UNPOP	2.6
Infant mortality rate (per 1000)	UNICEF	141
Under-5 mortality rate (per 1000)	UNICEF	231
Crude birth rate (per 1000)	UNPOP	49.6
Pop. at endemic (epidemic) risk (%)	MARA ¹	99 (1)

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria	30%
Malaria admissions	40%
Malaria outpatient attendance	35%
Outpatient malaria cases (per 1000)	11%
Inpatient malaria cases (per 1000)	2%

Source	1998	1999	2000	2001
MoH		42	40	30
MoH		42	46	38
MoH	33	40	36	32

Mosquito nets and ITNs

Households with mosquito nets	54%
Under-5s using mosquito nets	37%
Households with ITNs	
Under-5s using ITNs	

Source	1998	1999	2000	2001
DHS				54
DHS				37

Antimalarial treatment

Under-5s receiving any antimalarial	38%
Under-5s receiving chloroquine	
Under-5s receiving any antimalarial <24 h	

Source	1998	1999	2000	2001
DHS				38

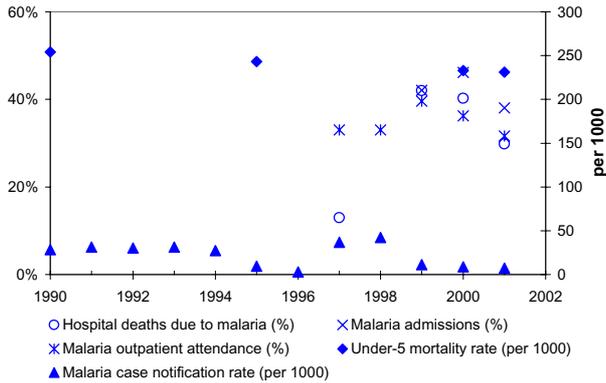
Attending health facility

Under-5s receiving any antimalarial	
Under-5s receiving chloroquine	

Malaria in pregnancy

PW receiving ANC at least once	57%
PW attending ANC at least twice	47%
PW receiving IPT at least once	
PW receiving IPT at least twice	
PW using mosquito nets	
PW using ITNs	

Source	1998	1999	2000	2001
DHS				57
DHS				47



Antimalarial treatment policy

Date adopted:	---	
Uncomplicated	Probable	CQ 25 mg/kg
	Confirmed	CQ 25 mg/kg
Treatment failure		SP
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

		Date
Import tariff - nets	18%	2000
VAT - nets	18%	2000

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

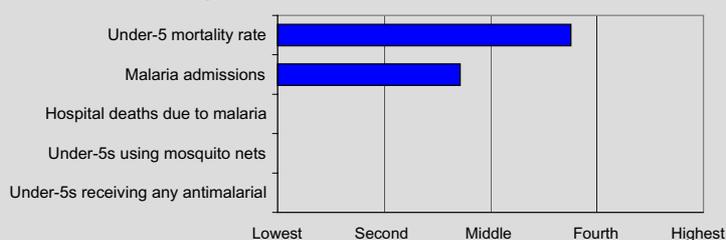
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Mauritania

General indicators	Source	2001
Population (thousands)	UNPOP	2747
Population growth rate (%)	UNPOP	3.0
Infant mortality rate (per 1000)	UNICEF	120
Under-5 mortality rate (per 1000)	UNICEF	183
Crude birth rate (per 1000)	UNPOP	43.7
Pop. at endemic (epidemic) risk (%)	MARA ¹	65 (35)

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria
Malaria admissions
Malaria outpatient attendance

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

Outpatient malaria cases (per 1000)
Inpatient malaria cases (per 1000)

MoH				22
MoH	70	115	97	
MoH			7	4

Mosquito nets and ITNs

Households with mosquito nets
Under-5s using mosquito nets
Households with ITNs
Under-5s using ITNs

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

Antimalarial treatment

Under-5s receiving any antimalarial
Under-5s receiving chloroquine
Under-5s receiving any antimalarial <24 h

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

Attending health facility

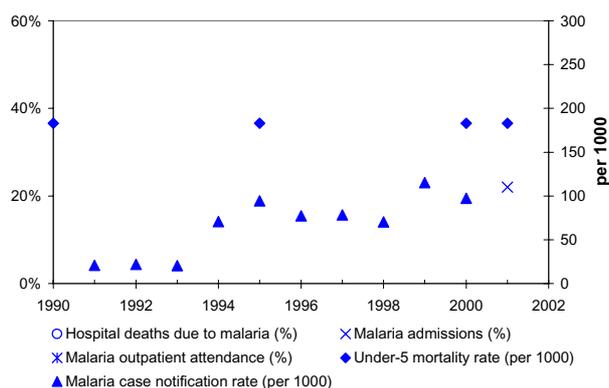
Under-5s receiving any antimalarial
Under-5s receiving chloroquine

Malaria in pregnancy

PW receiving ANC at least once
PW attending ANC at least twice
PW receiving IPT at least once
PW receiving IPT at least twice
PW using mosquito nets
PW using ITNs

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001



Antimalarial treatment policy

Date adopted:	---	
Uncomplicated	Probable	CQ 25 mg/kg
	Confirmed	CQ 25 mg/kg
Treatment failure		SP
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

		Date
Import tariff - nets	18%	2000
VAT - nets	18%	2000

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

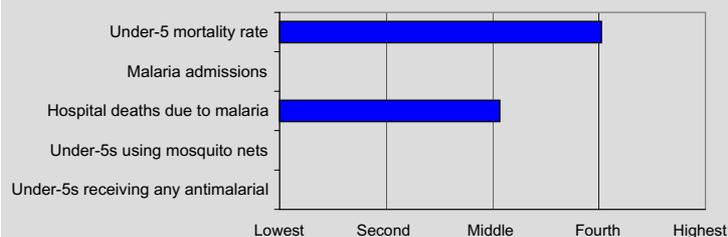
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Mozambique

General indicators	Source	2001
Population (thousands)	UNPOP	18644
Population growth rate (%)	UNPOP	2.9
Infant mortality rate (per 1000)	UNICEF	125
Under-5 mortality rate (per 1000)	UNICEF	197
Crude birth rate (per 1000)	UNPOP	41.7
Pop. at endemic (epidemic) risk (%)	MARA ¹	100 (<1)

Proportional rank for select indicators



Malaria morbidity and mortality

Indicator	Source	1998	1999	2000	2001
Hospital deaths due to malaria	MoH	24			
Malaria admissions	MoH	28	48	44	
Malaria outpatient attendance	MoH	11	130	179	198

0% 20% 40% 60% 80% 100%



Source	1998	1999	2000	2001
MoH	24			
MoH	28	48	44	
MoH	11	130	179	198

Mosquito nets and ITNs

Indicator	Source	1998	1999	2000	2001
Households with mosquito nets					
Under-5s using mosquito nets					
Households with ITNs					
Under-5s using ITNs					

0% 20% 40% 60% 80% 100%



Source 1998 1999 2000 2001

Antimalarial treatment

Indicator	Source	1998	1999	2000	2001
Under-5s receiving any antimalarial					
Under-5s receiving chloroquine					
Under-5s receiving any antimalarial <24 h					

0% 20% 40% 60% 80% 100%

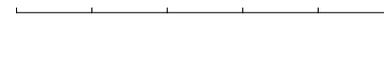


Source 1998 1999 2000 2001

Attending health facility

Indicator	Source	1998	1999	2000	2001
Under-5s receiving any antimalarial					
Under-5s receiving chloroquine					

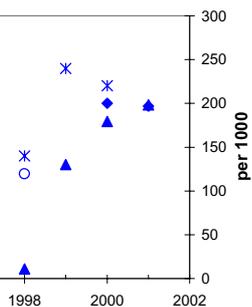
0% 20% 40% 60% 80% 100%



Source 1998 1999 2000 2001

Malaria in pregnancy

Indicator	Source	1998	1999	2000	2001
PW receiving ANC at least once					
PW attending ANC at least twice					
PW receiving IPT at least once					
PW receiving IPT at least twice					
PW using mosquito nets					
PW using ITNs					



○ Hospital deaths due to malaria (%) × Malaria admissions (%)
 × Malaria outpatient attendance (%) ◆ Under-5 mortality rate (per 1000)
 ▲ Malaria case notification rate (per 1000)

Antimalarial treatment policy

	Date adopted:	2002
Uncomplicated	Probable	CQ 25 mg/kg
	Confirmed	CQ 25 mg/kg
Treatment failure		SP
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

Indicator	Date
Import tariff - nets	
VAT - nets	

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.
 Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

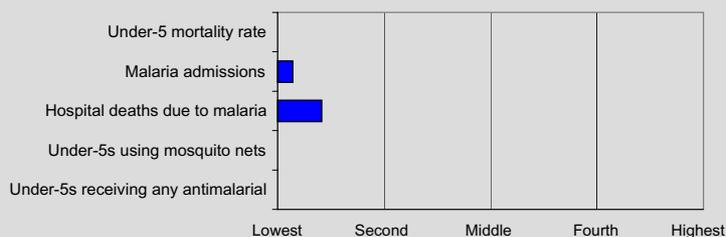
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Namibia

General indicators	Source	2001
Population (thousands)	UNPOP	1788
Population growth rate (%)	UNPOP	2.3
Infant mortality rate (per 1000)	UNICEF	55
Under-5 mortality rate (per 1000)	UNICEF	67
Crude birth rate (per 1000)	UNPOP	34.5
Pop. at risk (%)	MARA ¹	41

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria	0%
Malaria admissions	~10%
Malaria outpatient attendance	~20%
Outpatient malaria cases (per 1000)	~173
Inpatient malaria cases (per 1000)	~27

0% 20% 40% 60% 80% 100%

Source	1998	1999	2000	2001
MoH	2	6		
MoH		6		
MoH		17		
MoH	173	27	15	

Mosquito nets and ITNs

Households with mosquito nets	0%
Under-5s using mosquito nets	0%
Households with ITNs	0%
Under-5s using ITNs	0%

0% 20% 40% 60% 80% 100%

Source	1998	1999	2000	2001
--------	------	------	------	------

Antimalarial treatment

Under-5s receiving any antimalarial	0%
Under-5s receiving chloroquine	0%
Under-5s receiving any antimalarial <24 h	0%

0% 20% 40% 60% 80% 100%

Source	1998	1999	2000	2001
--------	------	------	------	------

Attending health facility

Under-5s receiving any antimalarial	0%
Under-5s receiving chloroquine	0%

0% 20% 40% 60% 80% 100%

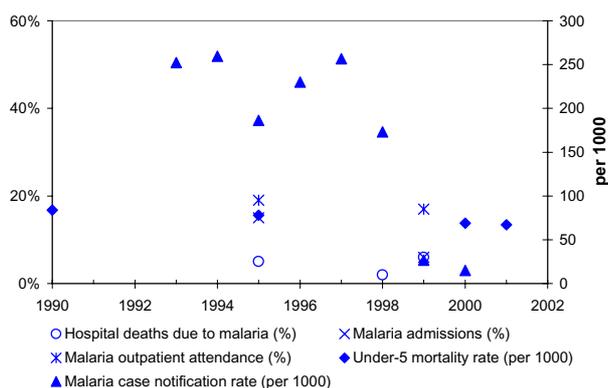
Source	1998	1999	2000	2001
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Malaria in pregnancy

PW receiving ANC at least once	0%
PW attending ANC at least twice	0%
PW receiving IPT at least once	0%
PW receiving IPT at least twice	0%
PW using mosquito nets	0%
PW using ITNs	0%

0% 20% 40% 60% 80% 100%

Source	1998	1999	2000	2001
--------	------	------	------	------



Antimalarial treatment policy

	Date adopted:	---
Uncomplicated	Probable	CQ 25 mg/kg
	Confirmed	CQ 25 mg/kg
Treatment failure		SP
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

	Date
Import tariff - nets	
VAT - nets	

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

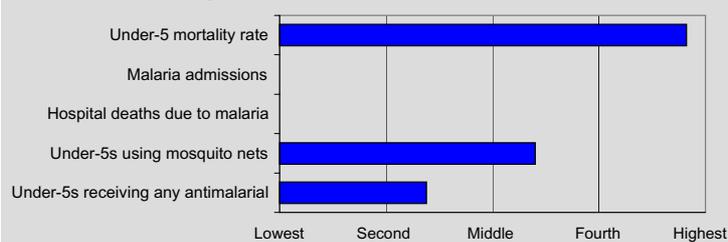
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Niger

General indicators	Source	2001
Population (thousands)	UNPOP	11227
Population growth rate (%)	UNPOP	3.5
Infant mortality rate (per 1000)	UNICEF	156
Under-5 mortality rate (per 1000)	UNICEF	265
Crude birth rate (per 1000)	UNPOP	55.2
Pop. at endemic (epidemic) risk (%)	MARA ¹	97 (3)

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria
Malaria admissions
Malaria outpatient attendance

Outpatient malaria cases (per 1000)
Inpatient malaria cases (per 1000)

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

MoH 18

Mosquito nets and ITNs

Households with mosquito nets
Under-5s using mosquito nets
Households with ITNs
Under-5s using ITNs

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

MICS 17

MICS 1

Antimalarial treatment

Under-5s receiving any antimalarial
Under-5s receiving chloroquine
Under-5s receiving any antimalarial <24 h

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

MICS 48

MICS 48

Attending health facility

Under-5s receiving any antimalarial
Under-5s receiving chloroquine

0% 20% 40% 60% 80% 100%

MICS 14

MICS 14

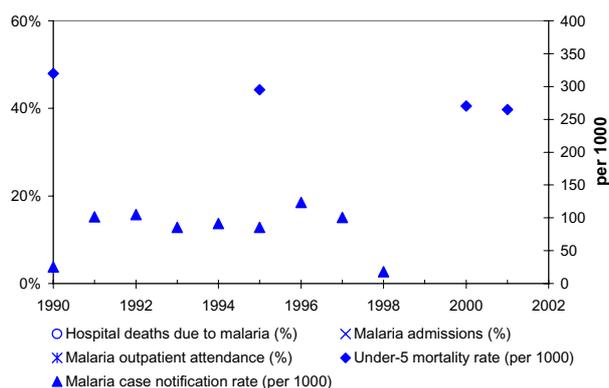
Malaria in pregnancy

PW receiving ANC at least once
PW attending ANC at least twice
PW receiving IPT at least once
PW receiving IPT at least twice
PW using mosquito nets
PW using ITNs

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

MICS 41



Antimalarial treatment policy

	Date adopted:	
Uncomplicated	Probable	CQ 25 mg/kg
	Confirmed	CQ 25 mg/kg
Treatment failure		SP
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

		Date
Import tariff - nets	18%	2000
VAT - nets	18%	2000

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

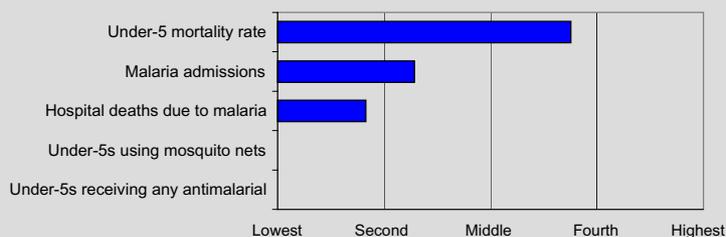
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Nigeria

General indicators	Source	2001
Population (thousands)	UNPOP	116929
Population growth rate (%)	UNPOP	2.8
Infant mortality rate (per 1000)	UNICEF	110
Under-5 mortality rate (per 1000)	UNICEF	183
Crude birth rate (per 1000)	UNPOP	39.5
Pop. at endemic (epidemic) risk (%)	MARA ¹	100 (0)

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria	10%
Malaria admissions	20%
Malaria outpatient attendance	30%
Outpatient malaria cases (per 1000)	2
Inpatient malaria cases (per 1000)	2

0% 20% 40% 60% 80% 100%

Source	1998	1999	2000	2001
MoH	10	7	7	
MoH	18	24	9	20
MoH	25	22	19	27
MoH	2			

Mosquito nets and ITNs

Households with mosquito nets	0%
Under-5s using mosquito nets	0%
Households with ITNs	0%
Under-5s using ITNs	0%

0% 20% 40% 60% 80% 100%

Source	1998	1999	2000	2001

Antimalarial treatment

Under-5s receiving any antimalarial	0%
Under-5s receiving chloroquine	0%
Under-5s receiving any antimalarial <24 h	0%

0% 20% 40% 60% 80% 100%

Source	1998	1999	2000	2001

Attending health facility

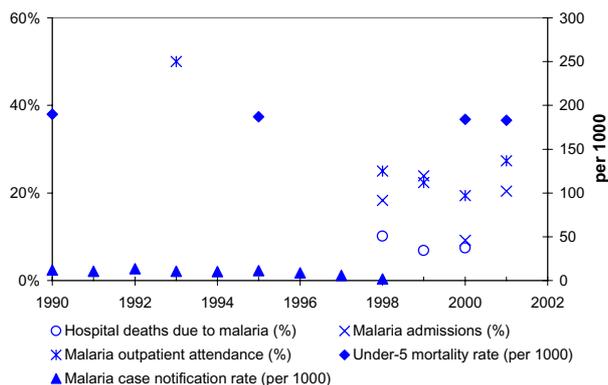
Under-5s receiving any antimalarial	0%
Under-5s receiving chloroquine	0%

Malaria in pregnancy

PW receiving ANC at least once	60%
PW attending ANC at least twice	30%
PW receiving IPT at least once	0%
PW receiving IPT at least twice	0%
PW using mosquito nets	0%
PW using ITNs	0%

0% 20% 40% 60% 80% 100%

Source	1998	1999	2000	2001
DHS		64		
DHS		35		



Antimalarial treatment policy

Date adopted:	---	
Uncomplicated	Probable	CQ 25 mg/kg
	Confirmed	CQ 25 mg/kg
Treatment failure		SP
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

		Date
Import tariff - nets	5%	2001
VAT - nets	5%	2001

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

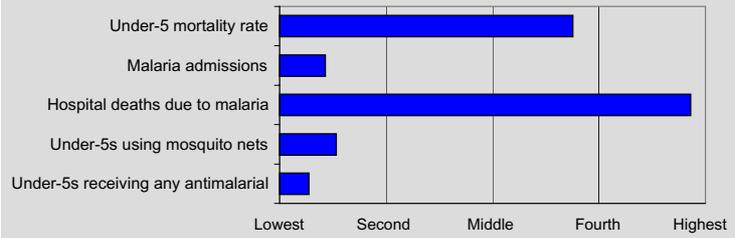
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Rwanda

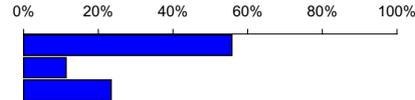
General indicators	Source	2001
Population (thousands)	UNPOP	7949
Population growth rate (%)	UNPOP	2.1
Infant mortality rate (per 1000)	UNICEF	96
Under-5 mortality rate (per 1000)	UNICEF	183
Crude birth rate (per 1000)	UNPOP	42.1
Pop. at endemic (epidemic) risk (%)	MARA ¹	53 (14)

Proportional rank for select indicators



Malaria morbidity and mortality

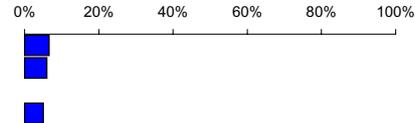
Hospital deaths due to malaria	58
Malaria admissions	21
Malaria outpatient attendance	34
Outpatient malaria cases (per 1000)	221
Inpatient malaria cases (per 1000)	8



Source	1998	1999	2000	2001
MoH	58	56	56	
MoH	21	15	11	
MoH	34	25	23	
MoH	221	142	110	
MoH	8	4	3	

Mosquito nets and ITNs

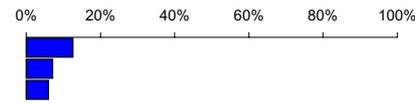
Households with mosquito nets	7
Under-5s using mosquito nets	6
Households with ITNs	
Under-5s using ITNs	5



Source	1998	1999	2000	2001
DHS				7
MICS				6
MICS				5

Antimalarial treatment

Under-5s receiving any antimalarial	13
Under-5s receiving chloroquine	7
Under-5s receiving any antimalarial <24 h	6



Source	1998	1999	2000	2001
MICS				13
MICS				7
DHS				6

Attending health facility

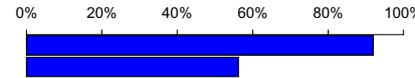
Under-5s receiving any antimalarial	8
Under-5s receiving chloroquine	4



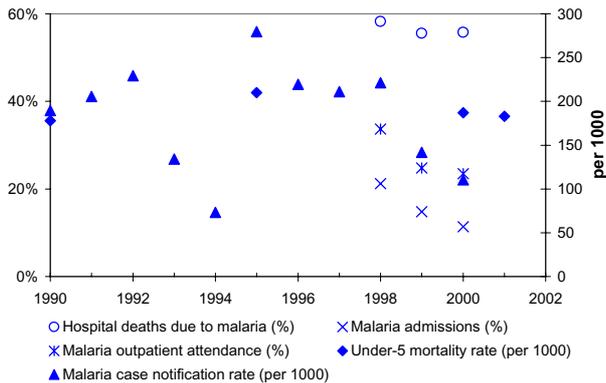
Source	1998	1999	2000	2001
MICS				8
MICS				4

Malaria in pregnancy

PW receiving ANC at least once	92
PW attending ANC at least twice	56
PW receiving IPT at least once	
PW receiving IPT at least twice	
PW using mosquito nets	
PW using ITNs	



Source	1998	1999	2000	2001
DHS				92
DHS				56



Antimalarial treatment policy

Date adopted: 2000

Uncomplicated	Probable	AQ + SP
	Confirmed	AQ + SP
Treatment failure		Quinine 3 times a day, 7 days
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

Import tariff - nets	Date
VAT - nets	

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

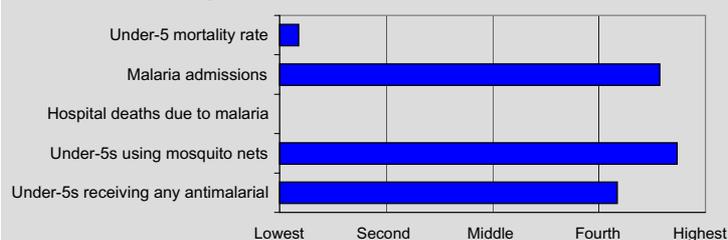
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Sao Tome and Principe

General indicators	Source	2001
Population (thousands)	UNPOP	140
Population growth rate (%)	UNPOP	1.8
Infant mortality rate (per 1000)	UNICEF	57
Under-5 mortality rate (per 1000)	UNICEF	71
Crude birth rate (per 1000)	UNPOP	
Pop. at endemic (epidemic) risk (%)	MARA ¹	0 (0)

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria	60%
Malaria admissions	55%
Malaria outpatient attendance	55%
Outpatient malaria cases (per 1000)	330
Inpatient malaria cases (per 1000)	61

Source	1998	1999	2000	2001
MoH	46	70		
MoH	56			
MoH	55			
MoH	330		314	
MoH	61			

Mosquito nets and ITNs

Households with mosquito nets	40%
Under-5s using mosquito nets	43%
Households with ITNs	20%
Under-5s using ITNs	23%

Source	1998	1999	2000	2001
MICS			43	
MICS			23	

Antimalarial treatment

Under-5s receiving any antimalarial	61%
Under-5s receiving chloroquine	61%
Under-5s receiving any antimalarial <24 h	

Source	1998	1999	2000	2001
MICS			61	
MICS			61	

Attending health facility

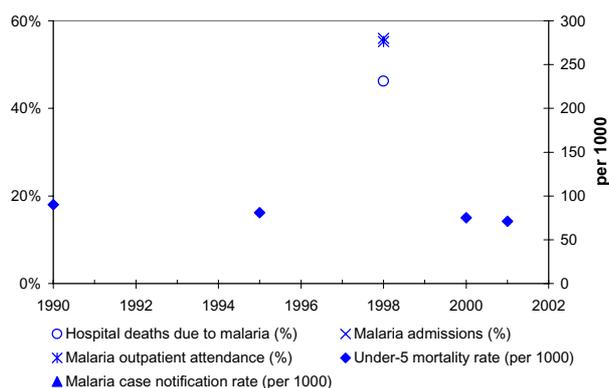
Under-5s receiving any antimalarial	58%
Under-5s receiving chloroquine	46%

Source	1998	1999	2000	2001
MICS			58	
MICS			46	

Malaria in pregnancy

PW receiving ANC at least once	91%
PW attending ANC at least twice	
PW receiving IPT at least once	
PW receiving IPT at least twice	
PW using mosquito nets	
PW using ITNs	

Source	1998	1999	2000	2001
MICS			91	



Antimalarial treatment policy

Date adopted:	---	
Uncomplicated	Probable	CQ 25 mg/kg
	Confirmed	CQ 25 mg/kg
Treatment failure		SP
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

Import tariff - nets	Date
VAT - nets	

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

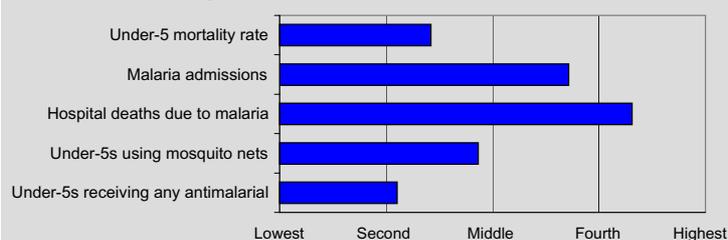
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Senegal

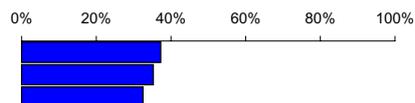
General indicators	Source	2001
Population (thousands)	UNPOP	9662
Population growth rate (%)	UNPOP	2.5
Infant mortality rate (per 1000)	UNICEF	79
Under-5 mortality rate (per 1000)	UNICEF	138
Crude birth rate (per 1000)	UNPOP	37.6
Pop. at endemic (epidemic) risk (%)	MARA ¹	100 (0)

Proportional rank for select indicators



Malaria morbidity and mortality

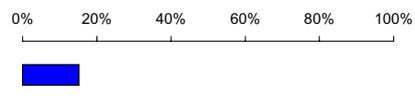
Hospital deaths due to malaria	34	34	37
Malaria admissions	31	31	35
Malaria outpatient attendance	30	32	32
Outpatient malaria cases (per 1000)	106	125	119
Inpatient malaria cases (per 1000)	2	4	3



Source	1998	1999	2000	2001
MoH	34	34	37	
MoH	31	31	35	
MoH	30	32	32	
MoH	106	125	119	
MoH	2	4	3	

Mosquito nets and ITNs

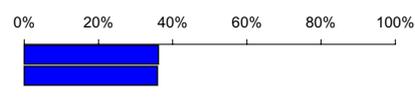
Households with mosquito nets				
Under-5s using mosquito nets			15	
Households with ITNs				
Under-5s using ITNs				2



Source	1998	1999	2000	2001
MICS			15	
MICS				2

Antimalarial treatment

Under-5s receiving any antimalarial	36			
Under-5s receiving chloroquine	36			
Under-5s receiving any antimalarial <24 h				



Source	1998	1999	2000	2001
MICS			36	
MICS			36	

Attending health facility

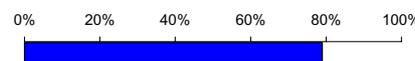
Under-5s receiving any antimalarial	23			
Under-5s receiving chloroquine	20			



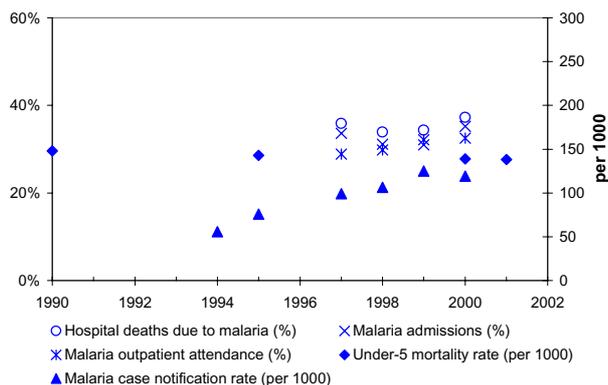
Source	1998	1999	2000	2001
MICS			23	
MICS			20	

Malaria in pregnancy

PW receiving ANC at least once				79
PW attending ANC at least twice				
PW receiving IPT at least once				
PW receiving IPT at least twice				
PW using mosquito nets				
PW using ITNs				



Source	1998	1999	2000	2001
MICS				79



Antimalarial treatment policy

Date adopted:	---	
Uncomplicated	Probable	CQ 25 mg/kg
	Confirmed	CQ 25 mg/kg
Treatment failure		SP
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

		Date
Import tariff - nets	21%	2000
VAT - nets	21%	2000

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

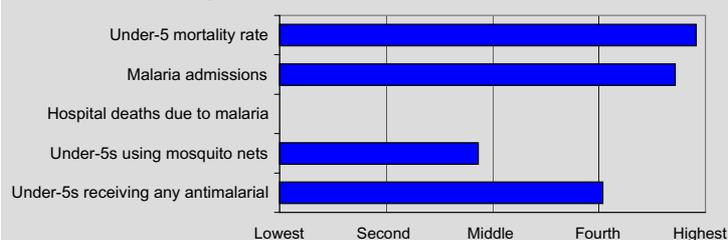
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Sierra Leone

General indicators	Source	2001
Population (thousands)	UNPOP	4587
Population growth rate (%)	UNPOP	1.1
Infant mortality rate (per 1000)	UNICEF	182
Under-5 mortality rate (per 1000)	UNICEF	316
Crude birth rate (per 1000)	UNPOP	49.1
Pop. at endemic (epidemic) risk (%)	MARA ¹	100 (0)

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria	20%
Malaria admissions	60%
Malaria outpatient attendance	36%
Outpatient malaria cases (per 1000)	60
Inpatient malaria cases (per 1000)	96

0% 20% 40% 60% 80% 100%

Source	1998	1999	2000	2001
MoH		20		
MoH		60		
MoH		36		
MoH	60	96		

Mosquito nets and ITNs

Households with mosquito nets	15%
Under-5s using mosquito nets	15%
Households with ITNs	2%
Under-5s using ITNs	2%

0% 20% 40% 60% 80% 100%

Source	1998	1999	2000	2001
MICS			15	
MICS			2	

Antimalarial treatment

Under-5s receiving any antimalarial	61%
Under-5s receiving chloroquine	60%
Under-5s receiving any antimalarial <24 h	

0% 20% 40% 60% 80% 100%

Source	1998	1999	2000	2001
MICS			61	
MICS			60	

Attending health facility

Under-5s receiving any antimalarial	36%
Under-5s receiving chloroquine	36%

0% 20% 40% 60% 80% 100%

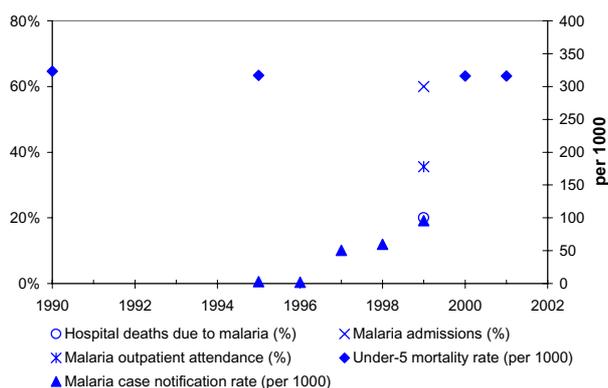
Source	1998	1999	2000	2001
MICS			36	
MICS			36	

Malaria in pregnancy

PW receiving ANC at least once	68%
PW attending ANC at least twice	
PW receiving IPT at least once	
PW receiving IPT at least twice	
PW using mosquito nets	
PW using ITNs	

0% 20% 40% 60% 80% 100%

Source	1998	1999	2000	2001
MICS			68	



Antimalarial treatment policy

Date adopted:	---	
Uncomplicated	Probable	CQ 25 mg/kg
	Confirmed	CQ 25 mg/kg
Treatment failure		SP
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

		Date
Import tariff - nets	20%	2001
VAT - nets	20%	2001

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

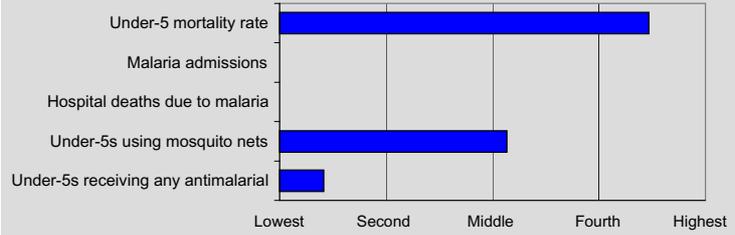
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Somalia

General indicators	Source	2001
Population (thousands)	UNPOP	9157
Population growth rate (%)	UNPOP	2.4
Infant mortality rate (per 1000)	UNICEF	133
Under-5 mortality rate (per 1000)	UNICEF	225
Crude birth rate (per 1000)	UNPOP	51.8
Pop. at endemic (epidemic) risk (%)	MARA ¹	20 (79)

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria
Malaria admissions
Malaria outpatient attendance

Outpatient malaria cases (per 1000)
Inpatient malaria cases (per 1000)

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

MoH 1 1

Mosquito nets and ITNs

Households with mosquito nets
Under-5s using mosquito nets
Households with ITNs
Under-5s using ITNs

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

MICS 16

MICS 0

Antimalarial treatment

Under-5s receiving any antimalarial
Under-5s receiving chloroquine
Under-5s receiving any antimalarial <24 h

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

MICS 19

MICS 19

Attending health facility

Under-5s receiving any antimalarial
Under-5s receiving chloroquine

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

MICS 32

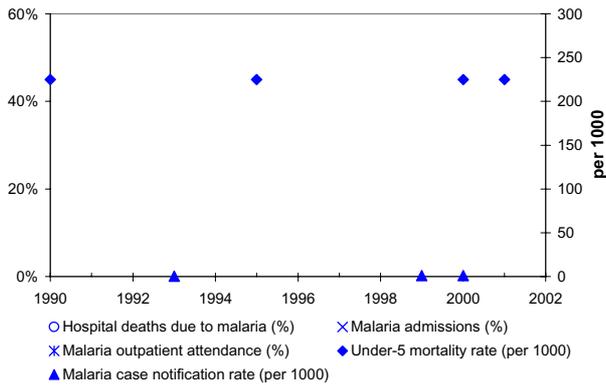
Malaria in pregnancy

PW receiving ANC at least once
PW attending ANC at least twice
PW receiving IPT at least once
PW receiving IPT at least twice
PW using mosquito nets
PW using ITNs

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

MICS 32



Antimalarial treatment policy

Date adopted: ----

Uncomplicated Probable
Confirmed
Treatment failure
Severe malaria
Pregnancy Prevention

Taxes and tariffs on insecticide-treated nets

Import tariff - nets
VAT - nets

Date

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

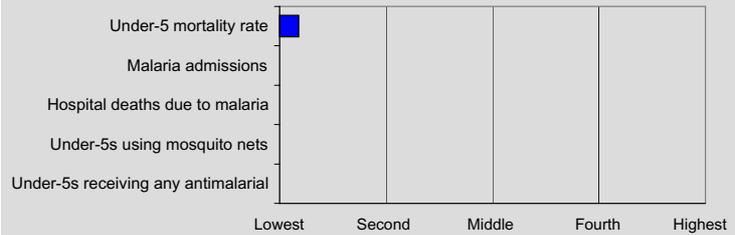
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

South Africa

General indicators	Source	2001
Population (thousands)	UNPOP	43792
Population growth rate (%)	UNPOP	1.7
Infant mortality rate (per 1000)	UNICEF	56
Under-5 mortality rate (per 1000)	UNICEF	71
Crude birth rate (per 1000)	UNPOP	24.6
Pop. at risk (%)	MARA ¹	20

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria
Malaria admissions
Malaria outpatient attendance

Outpatient malaria cases (per 1000)
Inpatient malaria cases (per 1000)

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

MoH 0.2

MoH 1 1 1 1

Mosquito nets and ITNs

Households with mosquito nets
Under-5s using mosquito nets
Households with ITNs
Under-5s using ITNs

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

Antimalarial treatment

Under-5s receiving any antimalarial
Under-5s receiving chloroquine
Under-5s receiving any antimalarial <24 h

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

Attending health facility

Under-5s receiving any antimalarial
Under-5s receiving chloroquine

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

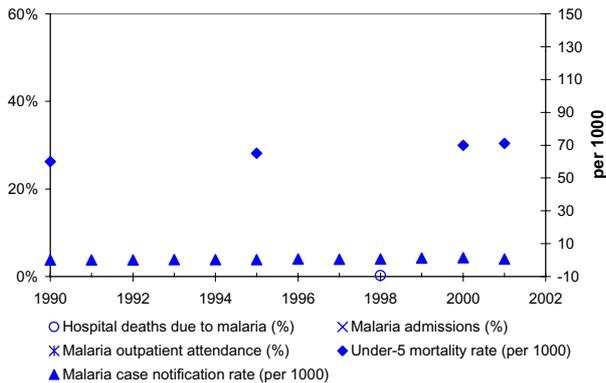
Malaria in pregnancy

PW receiving ANC at least once
PW attending ANC at least twice
PW receiving IPT at least once
PW receiving IPT at least twice
PW using mosquito nets
PW using ITNs

0% 20% 40% 60% 80% 100%

Source 1998 1999 2000 2001

DHS 94



Antimalarial treatment policy

Date adopted: 2000

Uncomplicated	Probable	Coartem (Kwazulu Natal); SP
	Confirmed	Coartem (Kwazulu Natal); SP
Treatment failure		Quinine 3 times a day, 7 days
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ + PG

Taxes and tariffs on insecticide-treated nets

Import tariff - nets
VAT - nets

Date

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

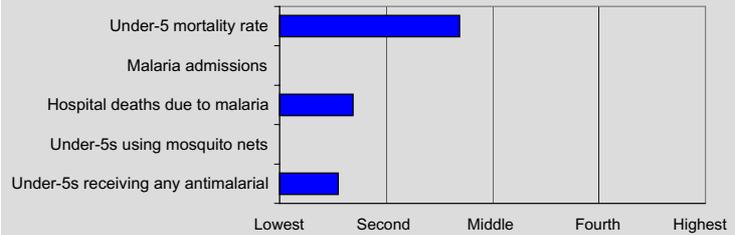
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Swaziland

General indicators	Source	2001
Population (thousands)	UNPOP	938
Population growth rate (%)	UNPOP	1.8
Infant mortality rate (per 1000)	UNICEF	106
Under-5 mortality rate (per 1000)	UNICEF	149
Crude birth rate (per 1000)	UNPOP	33.4
Pop. at risk (%)	MARA ¹	77

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria	0%
Malaria admissions	~5%
Malaria outpatient attendance	~2%
Outpatient malaria cases (per 1000)	~5%
Inpatient malaria cases (per 1000)	~5%

Source	1998	1999	2000	2001
MoH	2		5	
MoH			6	6
MoH	3		2	2
MoH	5	3	28	5

Mosquito nets and ITNs

Households with mosquito nets	0%
Under-5s using mosquito nets	0%
Households with ITNs	0%
Under-5s using ITNs	0%

Source	1998	1999	2000	2001
MICS			0	
MICS			0	

Antimalarial treatment

Under-5s receiving any antimalarial	~25%
Under-5s receiving chloroquine	~20%
Under-5s receiving any antimalarial <24 h	~20%

Source	1998	1999	2000	2001
MICS			26	
MICS			22	

Attending health facility

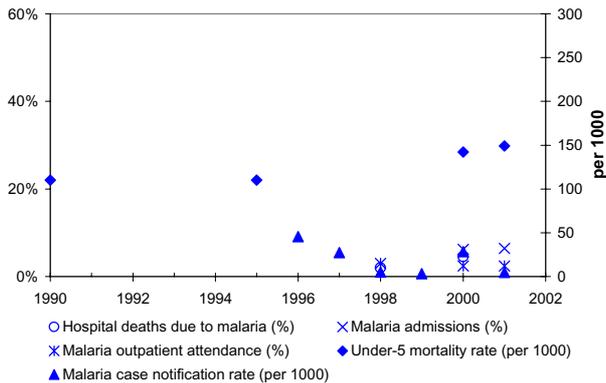
Under-5s receiving any antimalarial	~15%
Under-5s receiving chloroquine	~10%

Source	1998	1999	2000	2001
MICS			12	
MICS			9	

Malaria in pregnancy

PW receiving ANC at least once	~85%
PW attending ANC at least twice	~85%
PW receiving IPT at least once	~85%
PW receiving IPT at least twice	~85%
PW using mosquito nets	~85%
PW using ITNs	~85%

Source	1998	1999	2000	2001
MICS			87	



Antimalarial treatment policy

Date adopted:	---	
Uncomplicated	Probable	CQ 25 mg/kg
	Confirmed	CQ 25 mg/kg
Treatment failure		SP
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

	Date
Import tariff - nets	
VAT - nets	

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

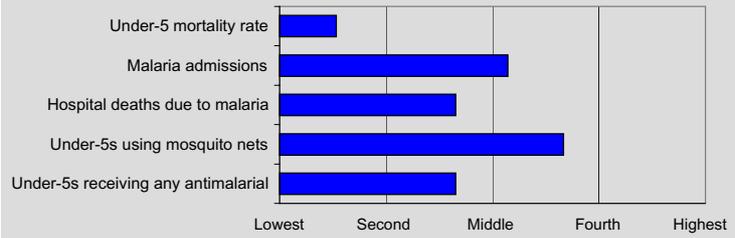
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Sudan

General indicators	Source	2001
Population (thousands)	UNPOP	31809
Population growth rate (%)	UNPOP	2.3
Infant mortality rate (per 1000)	UNICEF	65
Under-5 mortality rate (per 1000)	UNICEF	107
Crude birth rate (per 1000)	UNPOP	33.6
Pop. at endemic (epidemic) risk (%)	MARA ¹	74 (25)

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria	20%
Malaria admissions	25%
Malaria outpatient attendance	20%
Outpatient malaria cases (per 1000)	138
Inpatient malaria cases (per 1000)	4

Source	1998	1999	2000	2001
MoH	20	22	20	16
MoH	32	31	32	26
MoH	25	17	21	20
MoH	138	139	139	124
MoH	4	5	3	4

Mosquito nets and ITNs

Households with mosquito nets	20%
Under-5s using mosquito nets	20%
Households with ITNs	0%
Under-5s using ITNs	0%

Source	1998	1999	2000	2001
MICS ²			23	
MICS ²			0	

Antimalarial treatment

Under-5s receiving any antimalarial	50%
Under-5s receiving chloroquine	49%
Under-5s receiving any antimalarial <24 h	0%

Source	1998	1999	2000	2001
MICS ²			50	
MICS ²			49	

Attending health facility

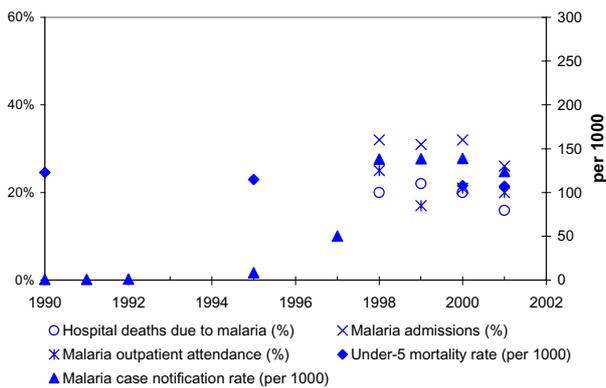
Under-5s receiving any antimalarial	33%
Under-5s receiving chloroquine	32%

Source	1998	1999	2000	2001
MICS ²			33	
MICS ²			32	

Malaria in pregnancy

PW receiving ANC at least once	0%
PW attending ANC at least twice	0%
PW receiving IPT at least once	0%
PW receiving IPT at least twice	0%
PW using mosquito nets	0%
PW using ITNs	0%

Source	1998	1999	2000	2001
MICS ²				



Antimalarial treatment policy

Date adopted: 2000

Uncomplicated	Probable	CQ 25 mg/kg
	Confirmed	CQ 25 mg/kg
Treatment failure		SP, MQ or Q
Severe malaria		Q or ART
Pregnancy	Prevention	

Taxes and tariffs on insecticide-treated nets

Import tariff - nets
VAT - nets

Date

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview. Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

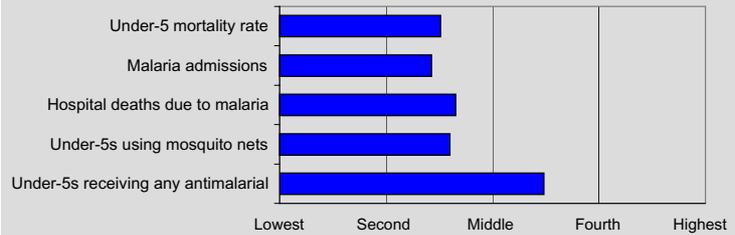
¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

² MICS values represent Northern Sudan

Togo

General indicators	Source	2001
Population (thousands)	UNPOP	4657
Population growth rate (%)	UNPOP	2.8
Infant mortality rate (per 1000)	UNICEF	79
Under-5 mortality rate (per 1000)	UNICEF	141
Crude birth rate (per 1000)	UNPOP	38.7
Pop. at endemic (epidemic) risk (%)	MARA ¹	100 (0)

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria	20%
Malaria admissions	25%
Malaria outpatient attendance	40%
Outpatient malaria cases (per 1000)	87
Inpatient malaria cases (per 1000)	2

0% 20% 40% 60% 80% 100%

Source	1998	1999	2000	2001
MoH	23	27	19	20
MoH	26	24	19	22
MoH	39	38	39	39
MoH	87	94	88	93
MoH	2	3	3	3

Mosquito nets and ITNs

Households with mosquito nets	20%
Under-5s using mosquito nets	15%
Households with ITNs	2%
Under-5s using ITNs	2%

0% 20% 40% 60% 80% 100%

Source	1998	1999	2000	2001
MICS			15	
MICS			2	

Antimalarial treatment

Under-5s receiving any antimalarial	60%
Under-5s receiving chloroquine	59%
Under-5s receiving any antimalarial <24 h	

0% 20% 40% 60% 80% 100%

Source	1998	1999	2000	2001
MICS			60	
MICS			59	

Attending health facility

Under-5s receiving any antimalarial	21%
Under-5s receiving chloroquine	21%

0% 20% 40% 60% 80% 100%

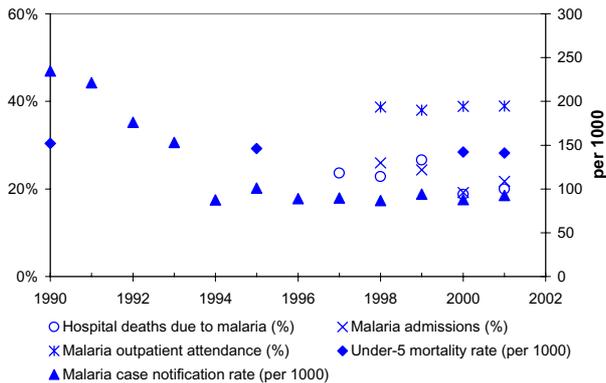
Source	1998	1999	2000	2001
MICS			21	
MICS			21	

Malaria in pregnancy

PW receiving ANC at least once	73%
PW attending ANC at least twice	
PW receiving IPT at least once	
PW receiving IPT at least twice	
PW using mosquito nets	
PW using ITNs	

0% 20% 40% 60% 80% 100%

Source	1998	1999	2000	2001
MICS			73	



Antimalarial treatment policy

Date adopted:	---	
Uncomplicated	Probable	CQ 25 mg/kg
	Confirmed	CQ 25 mg/kg
Treatment failure		SP
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

		Date
Import tariff - nets	18%	2000
VAT - nets	18%	2000

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

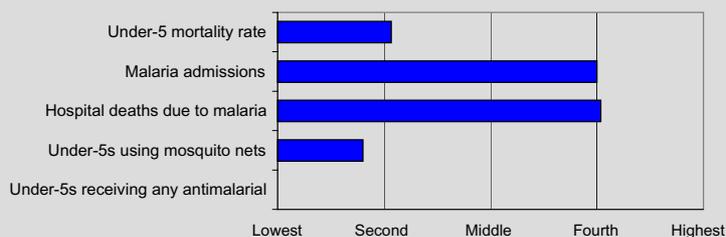
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Uganda

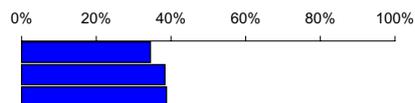
General indicators	Source	2001
Population (thousands)	UNPOP	24023
Population growth rate (%)	UNPOP	3.0
Infant mortality rate (per 1000)	UNICEF	79
Under-5 mortality rate (per 1000)	UNICEF	124
Crude birth rate (per 1000)	UNPOP	50.6
Pop. at endemic (epidemic) risk (%)	MARA ¹	90 (3)

Proportional rank for select indicators



Malaria morbidity and mortality

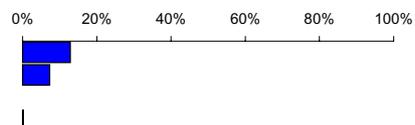
Hospital deaths due to malaria	35
Malaria admissions	38
Malaria outpatient attendance	39
Outpatient malaria cases (per 1000)	150
Inpatient malaria cases (per 1000)	0.1



Source	1998	1999	2000	2001
MoH	23	16		35
MoH		20	38	38
MoH	33	31	37	39
MoH	90	136	150	
MoH			0.1	

Mosquito nets and ITNs

Households with mosquito nets	13
Under-5s using mosquito nets	7
Households with ITNs	
Under-5s using ITNs	0



Source	1998	1999	2000	2001
DHS				13
DHS				7
DHS				0

Antimalarial treatment

Under-5s receiving any antimalarial	
Under-5s receiving chloroquine	
Under-5s receiving any antimalarial <24 h	



Source	1998	1999	2000	2001

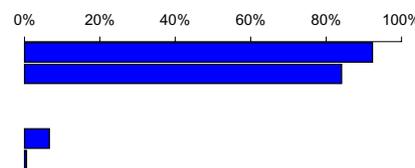
Attending health facility

Under-5s receiving any antimalarial	
Under-5s receiving chloroquine	

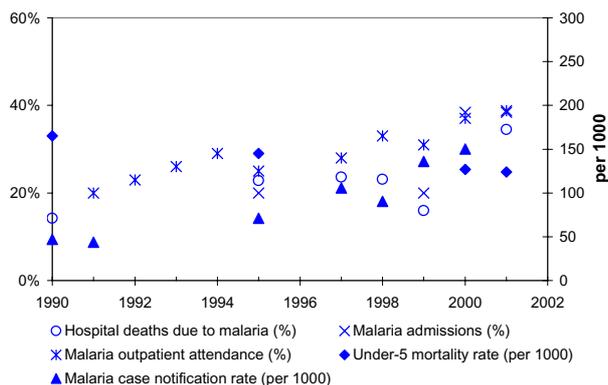


Malaria in pregnancy

PW receiving ANC at least once	92
PW attending ANC at least twice	84
PW receiving IPT at least once	
PW receiving IPT at least twice	
PW using mosquito nets	7
PW using ITNs	1



Source	1998	1999	2000	2001
DHS				92
DHS				84
DHS				7
DHS				1



Antimalarial treatment policy

	Date adopted:	2000
Uncomplicated	Probable	CQ 25 mg/kg + SP
	Confirmed	CQ 25 mg/kg + SP
Treatment failure		Quinine 3 times a day, 7 days
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly

Taxes and tariffs on insecticide-treated nets

	Date
Import tariff - nets	
VAT - nets	0% 2000

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

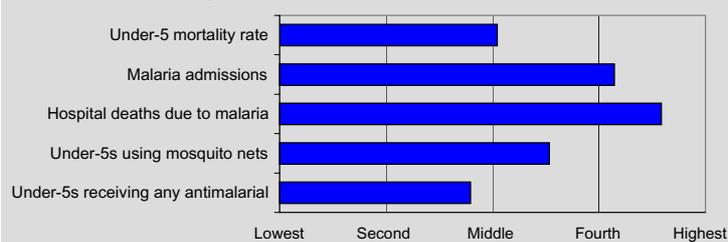
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

United Republic of Tanzania

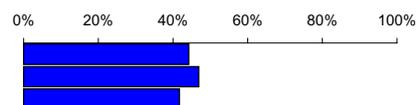
General indicators	Source	2001
Population (thousands)	UNPOP	35965
Population growth rate (%)	UNPOP	2.9
Infant mortality rate (per 1000)	UNICEF	104
Under-5 mortality rate (per 1000)	UNICEF	165
Crude birth rate (per 1000)	UNPOP	37.9
Pop. at endemic (epidemic) risk (%)	MARA ¹	93 (3)

Proportional rank for select indicators



Malaria morbidity and mortality

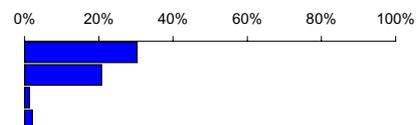
Hospital deaths due to malaria	44
Malaria admissions	47
Malaria outpatient attendance	42
Outpatient malaria cases (per 1000)	912
Inpatient malaria cases (per 1000)	12



Source	1998	1999	2000	2001
MoH	22			44
MoH	39	35		47
MoH	33	40		42
MoH	912	12		

Mosquito nets and ITNs

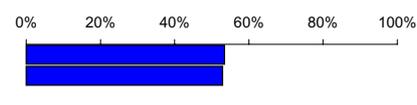
Households with mosquito nets	30
Under-5s using mosquito nets	21
Households with ITNs	1
Under-5s using ITNs	2



Source	1998	1999	2000	2001
DHS		30		
DHS		21		
DHS		1		
DHS		2		

Antimalarial treatment

Under-5s receiving any antimalarial	53
Under-5s receiving chloroquine	53
Under-5s receiving any antimalarial <24 h	



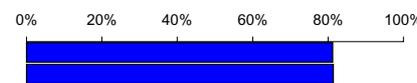
Source	1998	1999	2000	2001
DHS		53		
DHS		53		

Attending health facility

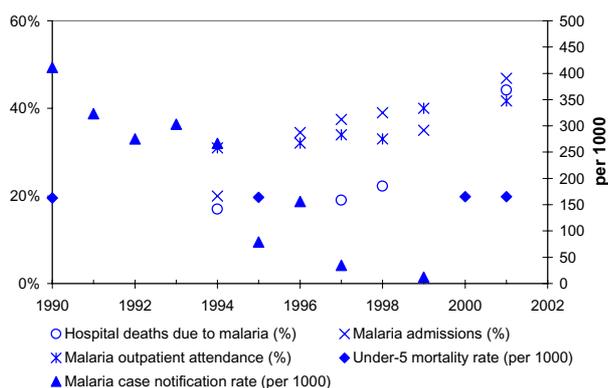
Under-5s receiving any antimalarial	
Under-5s receiving chloroquine	

Malaria in pregnancy

PW receiving ANC at least once	81
PW attending ANC at least twice	81
PW receiving IPT at least once	
PW receiving IPT at least twice	
PW using mosquito nets	
PW using ITNs	



Source	1998	1999	2000	2001
DHS		81		
DHS		81		



Antimalarial treatment policy

Date adopted:	1999
Uncomplicated	Probable SP
Treatment failure	Confirmed AQ
Severe malaria	Quinine 3 times a day, 7 days
Pregnancy	Prevention SP - IPT

Taxes and tariffs on insecticide-treated nets

		Date
Import tariff - nets	0%	Before Abuja
VAT - nets	0%	Before Abuja

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

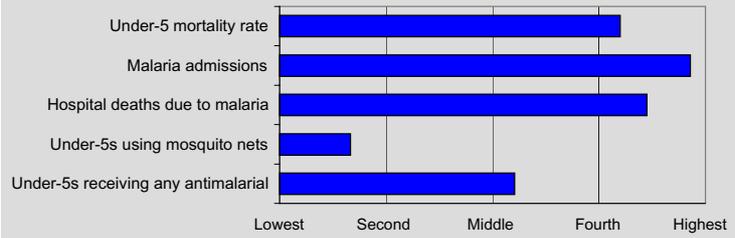
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Zambia

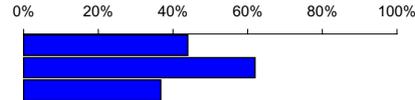
General indicators	Source	2001
Population (thousands)	UNPOP	10649
Population growth rate (%)	UNPOP	2.5
Infant mortality rate (per 1000)	UNICEF	112
Under-5 mortality rate (per 1000)	UNICEF	202
Crude birth rate (per 1000)	UNPOP	41.5
Pop. at endemic (epidemic) risk (%)	MARA ¹	96 (3)

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria	44
Malaria admissions	62
Malaria outpatient attendance	37

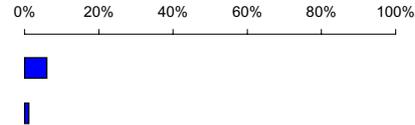


Source	1998	1999	2000	2001
MoH	19	22		44
MoH	27	35		62
MoH	32	35		37
MoH	342	268	342	204
MoH			24	15

Outpatient malaria cases (per 1000)
Inpatient malaria cases (per 1000)

Mosquito nets and ITNs

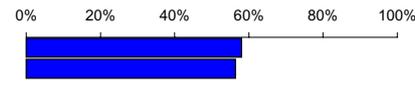
Households with mosquito nets	
Under-5s using mosquito nets	6
Households with ITNs	
Under-5s using ITNs	1



Source	1998	1999	2000	2001
MICS		6		
MICS		1		

Antimalarial treatment

Under-5s receiving any antimalarial	58
Under-5s receiving chloroquine	56
Under-5s receiving any antimalarial <24 h	



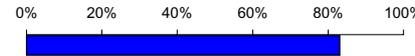
Source	1998	1999	2000	2001
MICS		58		
MICS		56		

Attending health facility

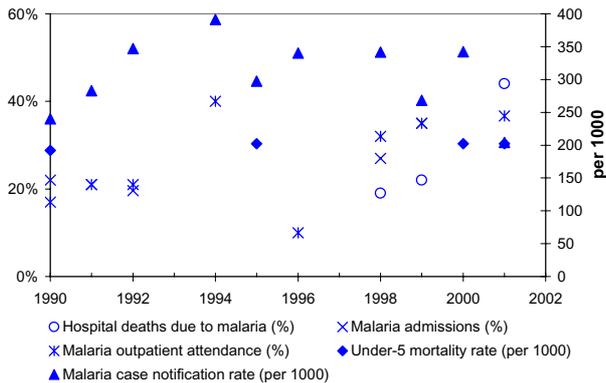
Under-5s receiving any antimalarial	
Under-5s receiving chloroquine	

Malaria in pregnancy

PW receiving ANC at least once	
PW attending ANC at least twice	
PW receiving IPT at least once	
PW receiving IPT at least twice	
PW using mosquito nets	
PW using ITNs	



Source	1998	1999	2000	2001
MICS		83		



Antimalarial treatment policy

Date adopted:	2002	
Uncomplicated	Probable	Coartem
	Confirmed	Coartem
Treatment failure		Quinine
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	CQ weekly (SP-IPT)**

Taxes and tariffs on insecticide-treated nets

		Date
Import tariff - nets	18%	2001
VAT - nets	0%	2001

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

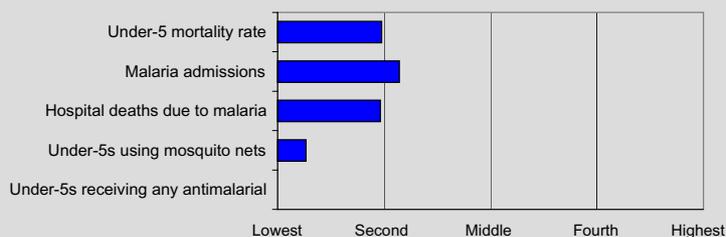
Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.

Zimbabwe

General indicators	Source	2001
Population (thousands)	UNPOP	12852
Population growth rate (%)	UNPOP	2.0
Infant mortality rate (per 1000)	UNICEF	76
Under-5 mortality rate (per 1000)	UNICEF	123
Crude birth rate (per 1000)	UNPOP	35.1
Pop. at risk (%)	MARA ¹	84

Proportional rank for select indicators



Malaria morbidity and mortality

Hospital deaths due to malaria	10%
Malaria admissions	15%
Malaria outpatient attendance	12%
Outpatient malaria cases (per 1000)	141
Inpatient malaria cases (per 1000)	96

0% 20% 40% 60% 80% 100%

Source	1998	1999	2000	2001
MoH	8			
MoH	15		20	
MoH	12		15	
MoH	141	96	121	
MoH			1	

Mosquito nets and ITNs

Households with mosquito nets	10%
Under-5s using mosquito nets	3%
Households with ITNs	
Under-5s using ITNs	

0% 20% 40% 60% 80% 100%

Source	1998	1999	2000	2001
DHS		10		
DHS		3		

Antimalarial treatment

Under-5s receiving any antimalarial	
Under-5s receiving chloroquine	
Under-5s receiving any antimalarial <24 h	

0% 20% 40% 60% 80% 100%

Source	1998	1999	2000	2001

Attending health facility

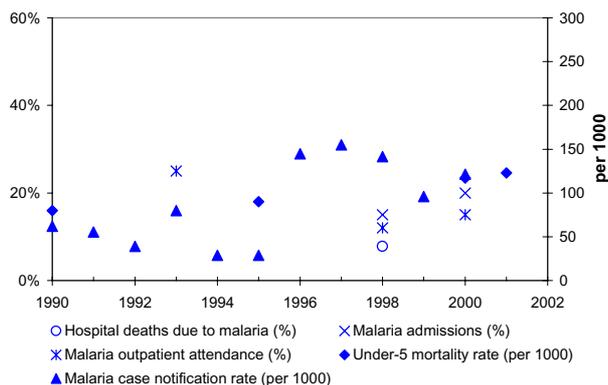
Under-5s receiving any antimalarial	
Under-5s receiving chloroquine	

Malaria in pregnancy

PW receiving ANC at least once	93%
PW attending ANC at least twice	80%
PW receiving IPT at least once	
PW receiving IPT at least twice	
PW using mosquito nets	
PW using ITNs	

0% 20% 40% 60% 80% 100%

Source	1998	1999	2000	2001
DHS		93		
DHS		80		



Antimalarial treatment policy

	Date adopted:	2001
Uncomplicated	Probable	CQ + SP
	Confirmed	CQ + SP
Treatment failure		Quinine 3 times a day, 7 days
Severe malaria		Quinine 3 times a day, 7 days
Pregnancy	Prevention	Maloprim weekly

Taxes and tariffs on insecticide-treated nets

		Date
Import tariff - nets	10%	Before Abuja
VAT - nets	20%	Before Abuja

Notes

For an explanation of indicators, ranks, and other information, see the Country Profile Overview.

Sources listed reflect most recent value.

Case notification rate is based on number of reported outpatient cases.

Nationally representative surveys (MICS and DHS) are used for reporting intervention coverage estimates for 1) mosquito net and ITN possession and use and 2) antimalarial treatment.

¹ Population at risk is determined from modelling retrospective climate data and population projections. Percentage of population at risk does not vary by year.