ROLL BACK MALARIA

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World Malaria Day 2010: Africa Update

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ROLL BACK MALARIA

World Malaria Day 2010: Africa Update

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The majority of the malaria burden and its effect on child survival occur in sub-Saharan Africa. This report therefore focuses on the African region; other reports from the RBM Partnership Secretariat and RBM Partners will address the burden of malaria outside of Africa. The data provided in this report were assembled from December 2009 through February 2010 (inclusive). Due to the constant updating of intervention coverage information by countries and agencies, some numbers in this report may have changed during this time interval; not all numbers are adjusted to a single date. Such changes are generally minor and do not, at the time of publication, affect the overall picture of malaria intervention coverage and observed or estimated impact. Monetary amounts are listed in US dollars.

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KEY POINTS

- Achieving and sustaining malaria control is central to meeting many of the Millennium Development Goals in the most affected countries. One of the eight goals specifically relates to malaria, AIDS, and other infectious diseases. And other goals, specifically those related to child mortality and maternal health, will be difficult to reach in endemic countries without substantially reducing the malaria burden.
- Global funding toward malaria control has increased significantly in recent years, rising from $0.3 billion in 2003 to nearly $1.7 billion in 2009 due largely to contributions from the Global Fund to Fight AIDS, Tuberculosis and Malaria, along with more recent commitments from the World Bank, the US President's Malaria Initiative, and the Bill & Melinda Gates Foundation, among others.[1] However, this external assistance in malaria funding still falls far short of the estimated $6 billion needed in 2010 alone for global implementation of malaria control interventions.[2]
- Data presented here show significant progress in scaling up coverage with key malaria control interventions. Major increases in funding and attention toward malaria have helped accelerate efforts to deliver critical interventions by reducing bottlenecks in the production, procurement, and delivery of key commodities. Countries have also been quicker to adopt more effective—but also more expensive—strategies, such as the use of artemisinin-based combination therapies and diagnostics to better target treatment.
- Most endemic African countries have developed national plans for achieving the universal coverage targets by the deadline of end-2010, including monthly distribution plans for insecticide-treated nets. And Roll Back Malaria partners are stepping up support to ensure that local capacity to deliver the services and adequate data to monitor these goals have been achieved.
- These efforts are already demonstrating a clear impact on the lives of people at risk of malaria in many countries and areas. More evidence of positive impact will become available as additional countries scale up their programmes and document results.

CHAPTER I

THE FIGHT AGAINST MALARIA

On this World Malaria Day 2010, malaria-endemic countries are focused on reaching the target of universal coverage with key malaria control interventions by the end of this year.[3] Progress toward the Roll Back Malaria (RBM) 2010 universal coverage targets and the Millennium Development Goals[4] will go a long way toward saving child lives and reducing the morbidity associated with malaria worldwide (Box 1).

Box 1: International malaria control goals and targets

Roll Back Malaria Partnership goals

- Achieve universal coverage for all populations at risk of malaria using locally appropriate interventions for prevention and case management by 2010.
- By 2010, halve the 2000 malaria burden and by 2015, reduce the number of cases by three quarters and the number of preventable deaths to near zero.
- Eliminate malaria in 8 to 10 countries by 2015 and afterwards in all countries that are currently in the pre-elimination phase. In the long-term, eradicate malaria worldwide by reducing the global incidence to zero through progressive elimination in countries.

Millennium Development Goals (MDGs)

Malaria control can contribute importantly to achievement of several of the MDGs. Most directly, it will contribute to MDG 4 (child survival) and MDG 6 (malaria reduction):

- MDG 4 target: By 2015 reduce by two thirds the mortality rate among children under five
  - Indicator 4.1: Under-five mortality rate
  - Indicator 4.2: Infant mortality rate
- MDG 6 target: By 2015 have halted and begun to reverse the incidence of malaria and other major diseases
  - Indicator 6.6: Incidence and death rates associated with malaria
  - Indicator 6.7: Proportion of children under five sleeping under insecticide-treated nets
  - Indicator 6.8: Proportion of children under five with fever treated with appropriate antimalarial medicines.

Additionally, malaria control can be expected to contribute substantively to achievement of MDG 1 (poverty reduction), MDG 5 (improve maternal health), and MDG 8 (develop a global partnership for development). Because malaria is a disease of poverty, its control will help reduce the gap between the poorest and least-poor households. Malaria directly affects women of reproductive age and is an important cause of maternal morbidity; placental malaria infection contributes both to premature delivery and low birth weight, which are major contributors to early child mortality. Finally, a comprehensive malaria control programme should contribute importantly to the development of open, predictable, non-discriminatory financial systems supporting public health broadly in all malaria-endemic countries.

Source: Roll Back Malaria Partnership, *Global Malaria Action Plan* 2008;[2] UN Statistics Division, MDG Indicators website 2009.[4]

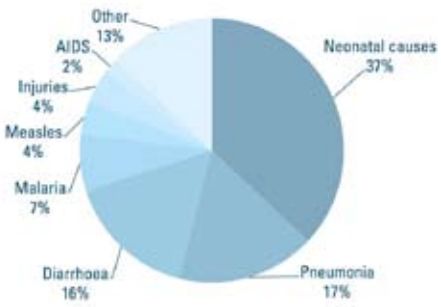
The burden of malaria is described in Figures 1.1 and 1.2 in terms of geographical distribution as well as in terms of its relationship to other causes of child mortality.

Figure 1.1.

Global and African distribution of all deaths among children under five, by cause

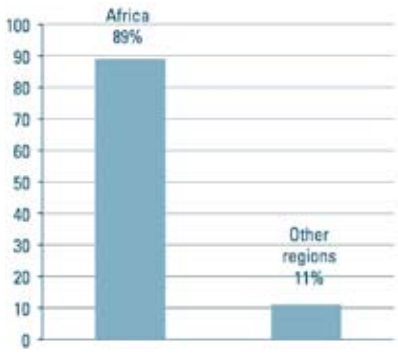
The World Health Organization estimates that approximately 250 million malaria episodes occurred in 2008 leading to approximately 850 000 deaths.

Malaria accounts for 7% of global deaths in children.



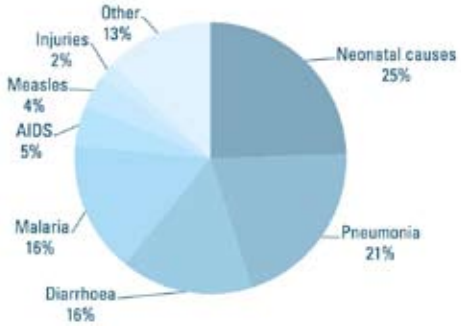
Global cause of death among children under five, 2008

The majority of these deaths occur in Africa.



Global distribution of malaria deaths among children under five, 2008

Approximately 1 in every 6 child deaths (16%) in Africa is due to malaria.



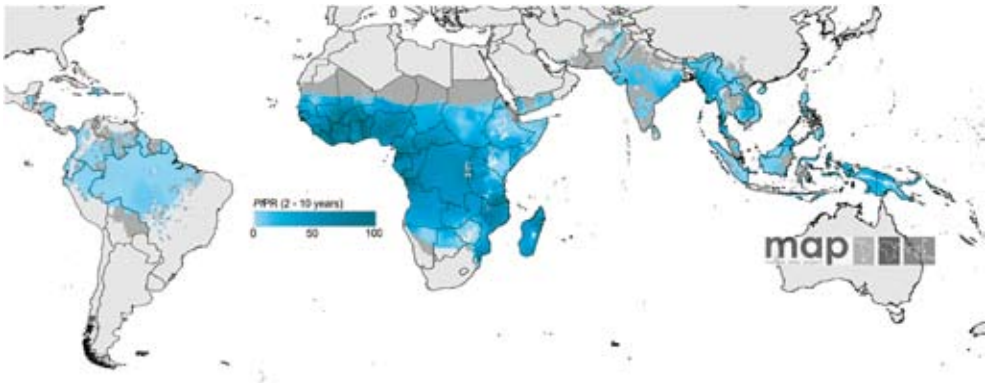
Cause of death among children under five in Africa, 2008

Source: WHO, *World Malaria Report 2009*;[5] and WHO, *The global burden of disease: 2004 update*.[6]

Figure 1.2.

Plasmodium falciparum malaria global endemicity

This figure shows the intensity of the Plasmodium falciparum *parasite prevalence rates (PPR) in children aged 2–10.*



Source: Malaria Atlas Project.[7]

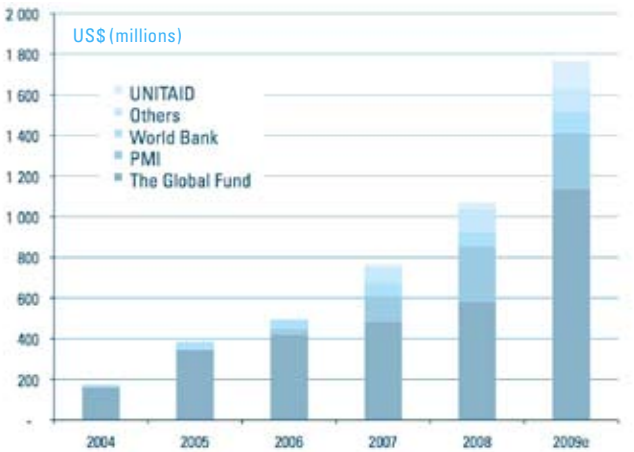
Note: The light colour shows low intensity and the darker colour shows the highest intensity of malaria transmission (grey = no malaria transmission). The dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties.

During the last six years, there has been substantial global commitment to control malaria; this is particularly noticeable in the progress in global financing for malaria control (Figure 1.3). This financing has fuelled global production of key intervention commodities, country procurement, and distribution of these life-saving interventions.

Figure 1.3.

Global malaria funding from external sources between 2004 and 2009 (estimated) including the GFATM, US-PMI, the World Bank, UNITAID, and other donors

Annual donor support for malaria control has increased dramatically (approximately 10-fold) between 2004 and 2009. Although the majority of this financing comes to countries via the GFATM, the breadth of donor contributions, including the multi-donor support of the GFATM, is both encouraging and critical to malaria control success.



Source: Adapted from *Malaria funding & resource utilization*, Roll Back Malaria Progress & Impact Series, March 2010.[1]

Note: Information for 2009 is incomplete and presented here as "2009e" indicating an estimated amount based on available data.

Box 2: Interventions to control malaria

The malaria community has a number of highly effective interventions available for broad use in malaria-endemic settings. Controlling malaria is based on both preventing the infection and on prompt effective treatment of the infection and illness when it does occur. Effective prevention is a priority as this both limits disease and significantly reduces the need for treatment. However, particularly in Africa, the intensity of transmission has been such that in many settings people were getting bitten by an infected mosquito nearly every night. That would mean that preventive measures would need to accomplish a 100-fold reduction in transmission intensity to bring the frequency to one infective bite every three to four months. Fortunately, available prevention tools are capable of such transmission reduction and much progress is being made, even in malaria-intense settings.

Prevention requires addressing the habits of mosquitoes and their interaction with humans. The female mosquito needs a blood meal to provide protein and energy to lay her eggs, and she seeks this blood meal regularly, typically taking a blood meal every three days. When she is able to bite a human, she fills her abdomen with blood and, because she then becomes many times her usual body weight, she needs to fly to a nearby resting place to digest her meal before moving on. Anophelene mosquitoes particularly like vertical surfaces in a warm, dark, humid, protected setting—such as a wall or curtain inside the house. Once her blood meal is digested, she will seek a nearby body of water suitable for laying her eggs. Once she has taken a blood meal with parasites, the parasites must develop over about ten days in the mosquito to a new stage before the mosquito can infect another human. If prevention measures can shorten her lifespan such that she does not survive the ten days, then she will not infect anyone. In summary, because malaria mosquitoes in Africa bite indoors at night, and rest indoors after feeding, vector control with mosquito nets and indoor residual spraying is highly effective.

Prevention

Insecticide-treated mosquito nets (ITNs): Most ITNs are now long-lasting insecticide-treated nets (LLINs). One of the most effective ways to prevent malaria transmission is sleeping under an ITN. When a mosquito tries to bite a person sleeping under the net, it lands on the net and comes into contact with the insecticide and dies soon thereafter. Scientifically controlled trials of ITNs in settings with variations in transmission risk (from low to very high risk) have shown great benefit in mosquito killing, marked transmission reduction, and markedly improved child survival. And when a large proportion of the population is using ITNs, they have been shown to have a protective effect for non-users in the community who live near the households with nets, probably because the extensive killing of female mosquitoes is such that few live long enough to transmit malaria. Critical issues for the efficacy and effectiveness of ITNs are that they have an effective insecticide on their surface and that they are used regularly. Current recommendations for malaria-endemic settings are that all people should regularly sleep under an ITN. In households where there are still inadequate numbers of ITNs, young children and pregnant women should be prioritized to sleep under the ITN, but it is most critical that *someone* in the house sleep under the ITN each night.

Indoor residual spraying (IRS): IRS involves applying a long-lasting insecticide to the inside walls of houses and other structures where people sleep to kill mosquitoes when they rest on the walls. IRS is a highly effective malaria prevention method in settings where it is epidemiologically and logistically appropriate. That is, IRS must be applied prior to the transmission season (either annually or twice a year if there are continuous or multiple seasons of transmission) and is carried out by a trained cadre of workers who move through a community spraying all appropriate structures. This is easiest if houses

are close together as is found in urban or peri-urban settings. As a means of limiting the spread of insecticide-resistant mosquitoes, IRS programmes may rotate use of different insecticides with the different spray cycles.

Intermittent preventive treatment during pregnancy (IPTp): Together with regular use of LLINs, IPTp is key to preventing malaria in pregnant women in malaria-endemic settings. The treatment consists of at least two doses of an effective antimalarial drug during the second and third trimesters of pregnancy. The intervention is highly effective in reducing the proportion of women with anaemia, placental malaria, and babies delivered prematurely and with low birth weight. Currently, sulfadoxine-pyrimethamine (SP) is considered a safe and appropriate drug for IPTp in malaria-endemic settings.

Treatment

Prompt and effective malaria treatment: Prompt treatment—preferably within 24 hours of fever onset—with an effective antimalarial agent is necessary to prevent life-threatening complications. Artemisinin-based combination therapy (ACT) is widely recommended for *Plasmodium falciparum,* whereas chloroquine remains highly effective for most cases of *Plasmodium vivax*. This intervention raises several challenges. First, many malaria cases do not present promptly and many infected people may seek care outside of formal health structures. This means that programmes must examine opportunities to identify and treat malaria cases in the variety of places where they present. Second, many countries have viewed fever in children as equivalent to malaria, but as malaria prevention capacity improves and malaria infection rates decrease, this may no longer be the case. Thus, malaria diagnosis with microscopy or rapid diagnostic tests (RDTs) is necessary in order to know who has a malaria infection and needs an antimalarial, who does not have malaria and needs an alternative treatment, and where the malaria infections are occurring in the communities and the nation. Finally, the efficacy of the drug is critical; malaria parasites have long had the ability to develop resistance to antimalarial drugs, posing a threat to intervention effectiveness. Programmes must use diagnostics to limit and focus drug use to those in need, and they must monitor the efficacy of their drugs over time to ensure that they are using the most effective drugs available.

Emerging interventions

Surveillance, case-finding, infection-finding, and transmission-containment: As countries make progress in malaria prevention and control, they may be able to markedly reduce malaria transmission such that fewer and fewer malaria cases exist. In that context, active identification of the remaining malaria infections (not just cases, but also asymptomatic infections) will likely be an effective and required means of further containing malaria transmission. This approach was used effectively during the World Health Organization's 1955 Malaria Eradication Programme efforts and is relevant to countries progressing toward malaria elimination. But a plan for implementing these emerging interventions should be developed early in order to be fully in place when needed.

Although other malaria interventions exist, they are not widely recommended for national programme adoption. For example, mosquito repellants used by individuals may reduce the frequency of mosquito bites, but this is largely seen as an intervention to be taken up by the individual. Application of larvicidal chemicals in mosquito breeding sites can be effective in reducing the emergence of new mosquitoes; however, the required frequent application, associated human and financial costs, and the challenges of reaching the many, many mosquito breeding sites means that this approach may be relevant only in a few, specific settings.

MALARIA PREVENTION: ACHIEVING HIGH INTERVENTION COVERAGE

In parallel with the growth in financial resources for malaria control, there has been a rapid increase in production, procurement, and distribution of malaria intervention commodities, particularly ITNs, IRS, and antimalarial medications (with an increasing reliance on ACT). Here we describe progress with malaria prevention coverage and use.

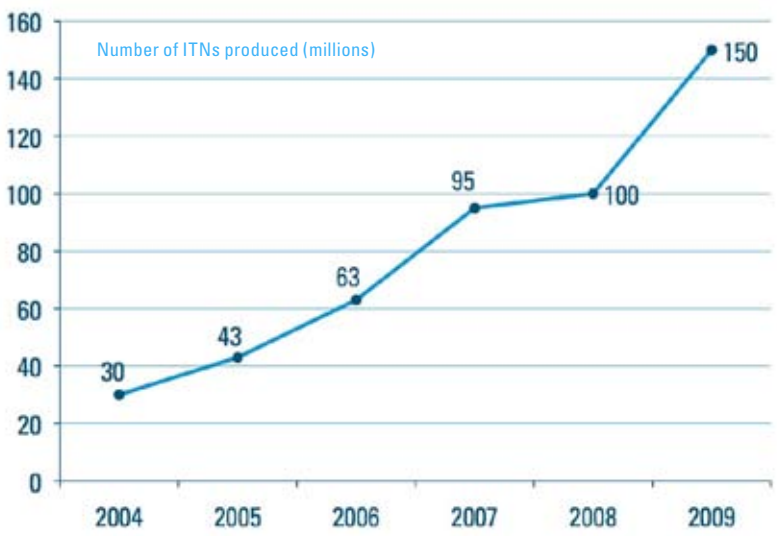
Insecticide-treated nets

- Regular use of insecticide-treated mosquito nets (ITNs) has been shown to reduce all-cause child mortality by around 20%[8] with more recent evidence suggesting that even greater reductions are possible.
- Global production of ITNs has increased 5-fold since 2004, rising from 30 million to 150 million in 2009 (Figure 2.1).
- UNICEF—the largest global procurer of ITNs—purchased more than 40 times more nets in 2009 than in 2000. From 2000 through 2009, UNICEF purchased a total of 141 million nets for malaria-endemic countries (Figure 2.2).
- Countries with more recent data show larger proportions of households owning at least one ITN (Figures 2.3 and 2.4).
- African children, who are among the most vulnerable to malaria illness and death, were using nets in 2009 in far greater proportions than in 2000. All 26 countries with trend data have shown major increases in ITN use since this time, although scale-up in most countries started more recently (around 2005). Averaging across these 26 African countries, use of ITNs by children rose from 2% in 2000 to 22% in 2008. (These countries represent 71% of the under-five population in Africa.) Twenty of the 26 African countries with trend data have documented at least a 5-fold increase in coverage during this time, with 11 of these countries achieving at least a 10-fold gain (Figure 2.5).
- Achieving the universal coverage targets will also require equitable distribution of ITNs to households. Recent data show that while some countries have achieved remarkable equity in ITN ownership among rural and urban households, as well as among the poorest and richest households, many other countries have not done so. Equity in coverage is largely due to widespread, free net distribution campaigns that target areas of intense malaria transmission (Figure 2.6).
- Of the nearly 350 million ITNs needed to achieve universal coverage, nearly 200 million were delivered to African countries by manufacturers during 2007–2009 and are available for use.
- Based on these estimates, endemic African countries have received enough nets to cover more than half of their at-risk populations. Much additional support is required, however, to achieve the universal coverage targets (Figure 2.7).

Figure 2.1.

Global production of insecticide-treated mosquito nets (ITNs), 2004–2009

An estimated 150 million ITNs were produced in 2009 alone, up from just 30 million in 2004.

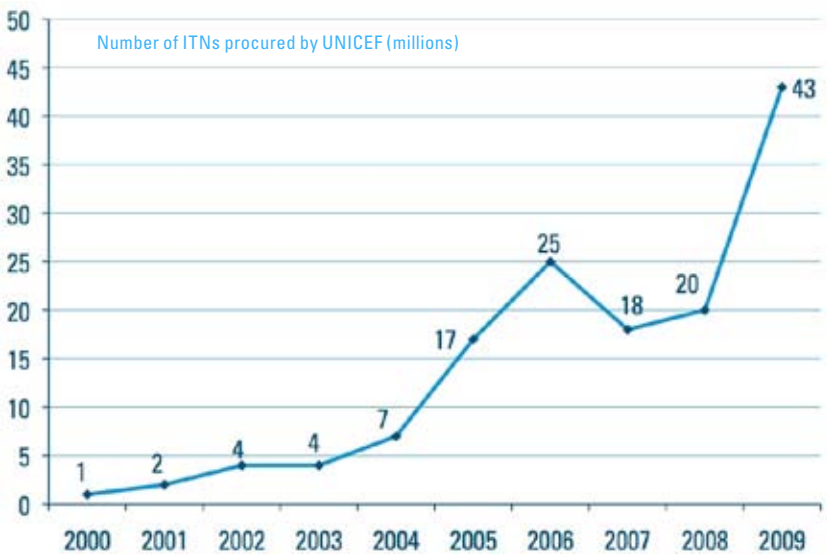


Source: UNICEF Supply Division 2010[9] based on estimates from ITN manufacturers; data for 2007–2009 are based on estimated production capacity.

Figure 2.2.

Number of insecticide-treated mosquito nets (ITNs) procured by UNICEF, 2000–2009

UNICEF, the largest global ITN procurer, purchased 141 million ITNs from 2000–2009.



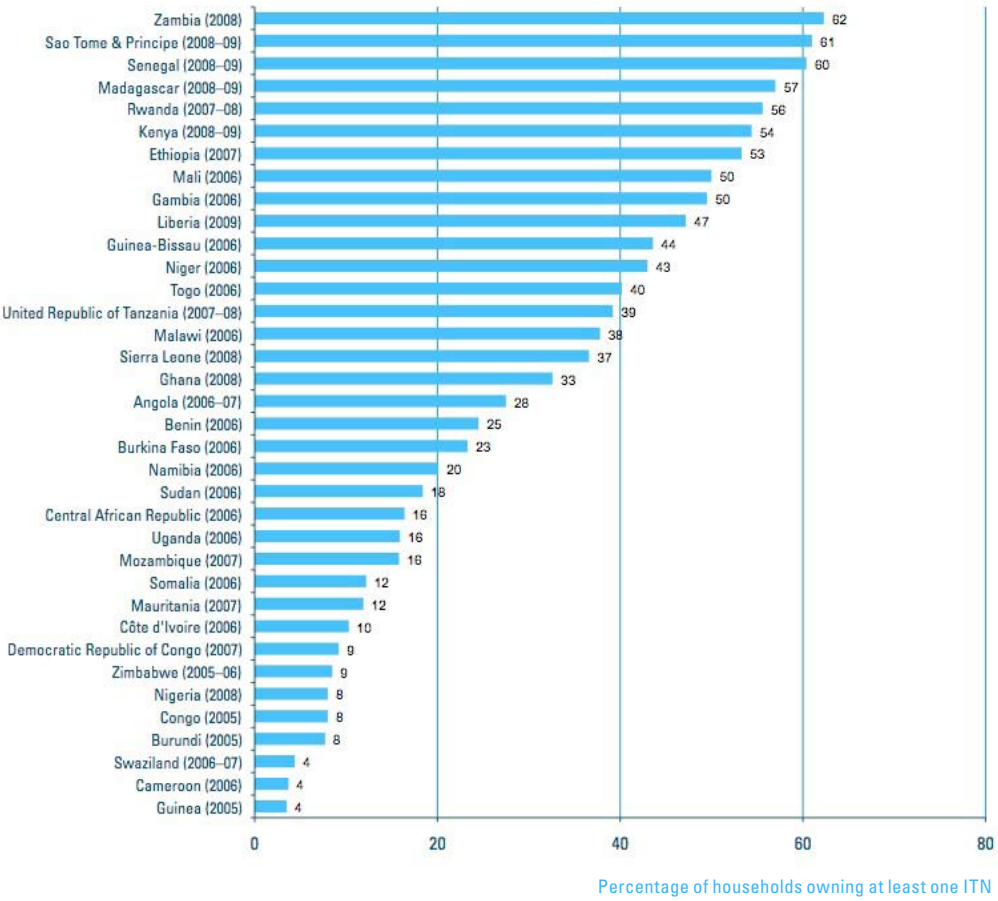
Source: UNICEF Supply Division 2010.[9]

Note: Data are for ITNs treated by the user or long-lasting ITNs. Since 2004, data refer mostly to long-lasting ITNs.

Figure 2.3.

Proportion of households owning at least one insecticide-treated mosquito net (ITN), African region, 2005–2009

There remains high variability in ITN coverage across the African continent (from about 4% to more than 60%) but some countries have done very well in recent years in scaling up home ownership of ITNs.

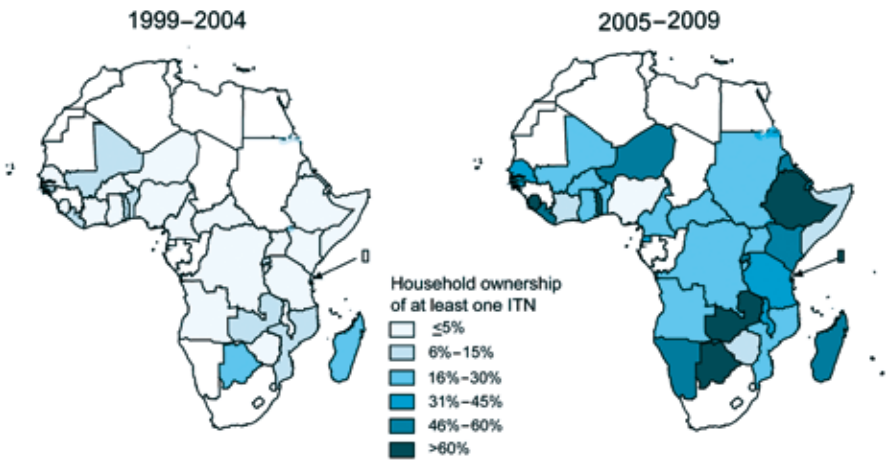


Source: UNICEF global malaria databases 2010.[10]

Figure 2.4.

Progress in households owning at least one insecticide-treated mosquito net (ITN) in malaria-endemic African countries

Country progress in net coverage has been rapid and recent. High coverage rates in 2005–2009 are a dramatic change from rates in 1999–2004.

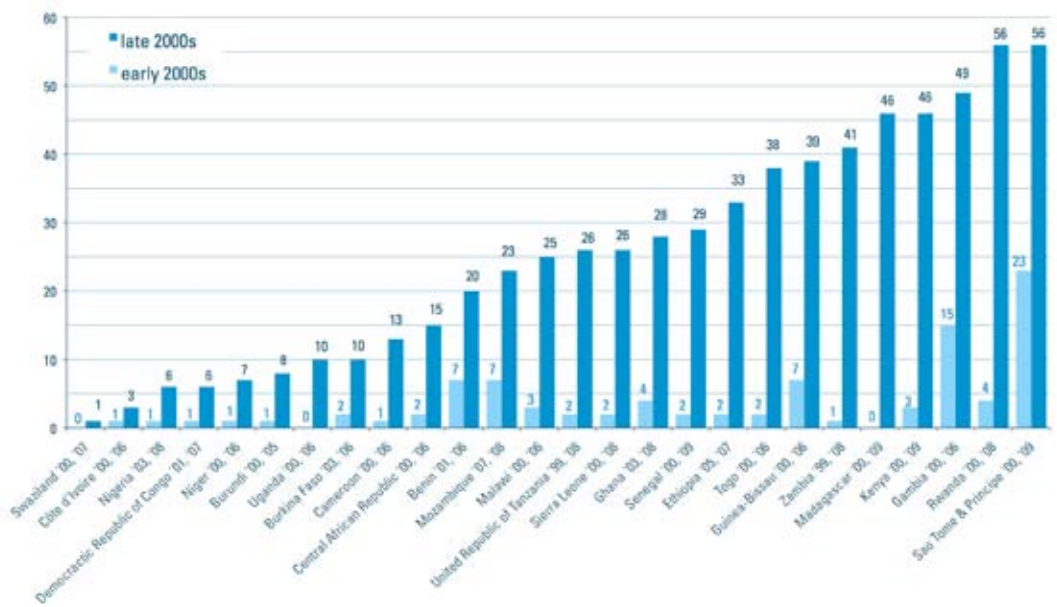


Source: Demographic and Health Surveys (DHS),[11] Multiple Indicator Cluster Surveys (MICS),[12] Malaria Indicator Surveys (MIS),[13] and other national surveys with data available as of January 2010.

Figure 2.5.

Proportion of children under five years of age sleeping under an insecticide-treated mosquito net (ITN), all African countries with two or more comparable data points

Major increases (by as much as 40-fold) were achieved in ITN use among children across African countries.



Source: UNICEF global malaria databases 2010.[10]

Note: Dates of national surveys (Demographic and Health Surveys [DHS],[11] Multiple Indicator Cluster Surveys [MICS],[12] or Malaria Indicator Surveys [MIS][13]) are indicated next to the country.

Figure 2.6.

Proportion of households owning at least one insecticide-treated mosquito net (ITN), by residence and wealth index quintiles, African region, 2006–2008

Some African countries have achieved remarkable equity in ITN coverage; this is largely due to widespread, free national distribution campaigns and emphasis on reaching poor and rural populations.

Country	Household ITN ownership		
	Urban	Rural	Ratio (Urban/ Rural)
Gambia (MICS06)	13	38	**0.3**
Namibia (DHS06)	10	29	**0.4**
Swaziland (DHS06–07)	3	5	**0.6**
Ethiopia (MIS07)	40	56	**0.7**
Guinea-Bissau (MICS06)	35	49	**0.7**
Senegal (MIS08–09)	50	70	**0.7**
Ghana (DHS08)	27	38	**0.7**
Mauritania (MICS07)	10	13	**0.8**
Liberia (MIS09)	42	52	**0.8**
Niger (DHS06)	37	44	**0.8**
Togo (MICS06)	37	42	**0.9**
Zambia (MIS08)	59	64	**0.9**
Sierra Leone (DHS08)	37	37	**1.0**
Kenya (DHS08–09)	56	54	**1.0**
Madagascar (DHS08–09)	60	56	**1.1**
Cameroon (MICS06)	4	4	**1.1**
Mali (DHS06)	54	48	**1.1**
Angola (MIS06–07)	29	26	**1.1**
Nigeria (DHS08)	9	8	**1.1**
Mozambique (MIS07)	17	15	**1.1**
Côte d'Ivoire (MICS06)	11	10	**1.2**
Rwanda (DHS07–08)	65	54	**1.2**
Benin (DHS06)	29	21	**1.4**
Zimbabwe (DHS05–06)	11	7	**1.5**
Malawi (MICS06)	55	35	**1.6**
Somalia (MICS06)	16	10	**1.7**
Sao Tome & Principe (MICS06)	44	25	**1.7**
Democratic Republic of Congo (DHS07)	12	7	**1.7**
United Republic of Tanzania (MIS07–8)	59	33	**1.8**
Uganda (DHS06)	26	14	**1.9**
Central African Republic (MICS06)	26	11	**2.3**
Burkina Faso (MICS06)	45	15	**3.0**

Favouring poorest or rural households

Equitable

Favouring richest or urban households

Country	Household ITN ownership		
	Poorest	Richest	Ratio (Richest/ Poorest)
Gambia (MICS06)	45	9	**0.2**
Namibia (DHS06)	28	8	**0.3**
Senegal (MIS08–09)	67	42	**0.6**
Swaziland (DHS06–07)	7	5	**0.6**
Guinea-Bissau (MICS06)	45	33	**0.7**
Ethiopia (MIS07)	57	43	**0.8**
Liberia (MIS09)	48	38	**0.8**
Ghana (DHS08)	36	31	**0.9**
Madagascar (DHS08–09)	65	56	**0.9**
Cameroon (MICS06)	5	4	**0.9**
Mauritania (MICS07)	12	11	**0.9**
Niger (DHS06)	44	42	**0.9**
Zambia (MIS08)	63	65	**1.0**
Togo (MICS06)	39	42	**1.1**
Mali (DHS06)	52	57	**1.1**
Angola (MIS06–07)	26	31	**1.2**
Sierra Leone (DHS08)	30	38	**1.3**
Mozambique (MIS07)	14	20	**1.4**
Rwanda (DHS07–08)	39	66	**1.7**
Uganda (DHS06)	15	25	**1.7**
Côte d'Ivoire (MICS06)	7	14	**1.9**
Sao Tome & Principe (MICS06)	22	53	**2.4**
Malawi (MICS06)	23	57	**2.5**
Sudan (ONS06)	9	23	**2.6**
Zimbabwe (DHS05–06)	5	15	**2.8**
Nigeria (DHS08)	4	11	**2.8**
Somalia (MICS06)	6	16	**3.0**
United Republic of Tanzania (MIS07–08)	22	67	**3.0**
Benin (DHS06)	11	39	**3.5**
Democratic Republic of Congo (DHS07)	3	16	**4.8**
Central African Republic (MICS06)	7	33	**5.0**
Burkina Faso (MICS06)	8	52	**6.2**

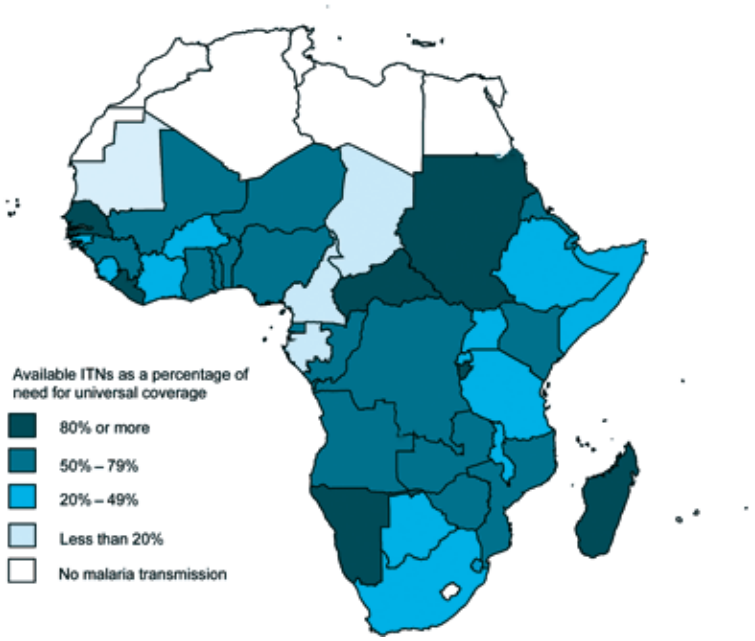
Source: UNICEF global malaria databases 2010;[10] adapted from Steketee RW and Eisele TP.[14]

Note: Dates of national surveys (Demographic and Health Surveys [DHS],[11] Multiple Indicator Cluster Surveys [MICS],[12] or Malaria Indicator Surveys [MIS][13]) are indicated next to the country; ONS = other national survey.

Figure 2.7.

Available long-lasting insecticide-treated mosquito nets (ITNs) as a percentage of nets needed to achieve universal coverage

By the end of 2009, many countries in the African region had received enough nets to cover more than half of the at-risk population; only seven countries had received enough nets to reach 80% coverage of households.



Source: Milliner J. Net Mapping Project.[15]

Note: Data are as of the end of 2009. The number of nets needed to achieve universal coverage is based on information provided by countries in the RBM Country Roadmaps.[16] Available long-lasting ITNs include cumulative deliveries from 2007 through 2009 and the subtraction of worn-out nets. The Net Mapping Project is a project of the Alliance for Malaria Prevention, a workstream of the Roll Back Malaria Partnership Harmonization Working Group.

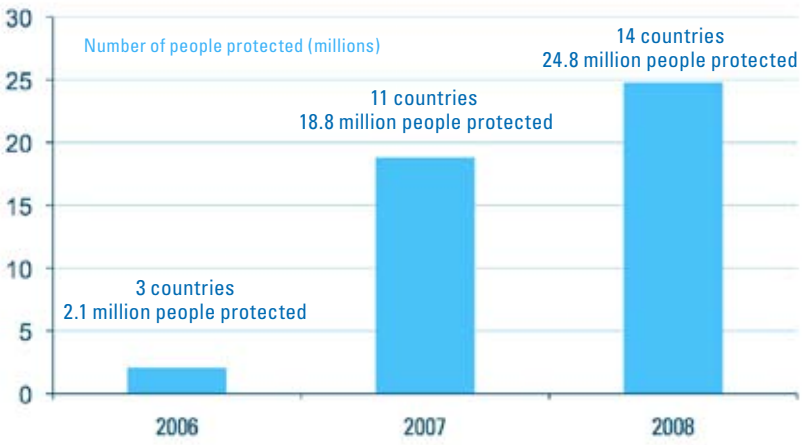
Indoor residual spraying

- Indoor residual spraying (IRS) is an effective prevention method where epidemiologically and logistically appropriate.
- National programme records provide the most useful data for monitoring spray coverage because this intervention is often targeted to sub-national areas.
- Results from the US President's Malaria Initiative (US-PMI), which supports National Malaria Control Programme IRS activities in its focus countries, indicate that in 2008 alone, nearly 25 million people were protected as a result of these efforts (Figure 2.8).

Figure 2.8.

Number of people living in households sprayed through an indoor residual spraying (IRS) campaign in 14 countries supported by US-PMI

Nearly 25 million people were protected by IRS in 14 African countries in 2008 alone through the US-PMI.



Source: US-PMI, Third Annual Report 2009, USAID.[17]

Notes: "People protected" refers to the number of people living in households sprayed through an IRS campaign supported by the US-PMI in 14 countries. IRS operations typically involve successive rounds of spraying in the same geographical area. To avoid counting the same people twice, only one round is counted within any given year. Countries include: Angola, Benin, Ethiopia, Ghana, Kenya, Madagascar, Malawi, Mali, Mozambique, Rwanda, Senegal, Uganda, United Republic of Tanzania (including Zanzibar), and Zambia.

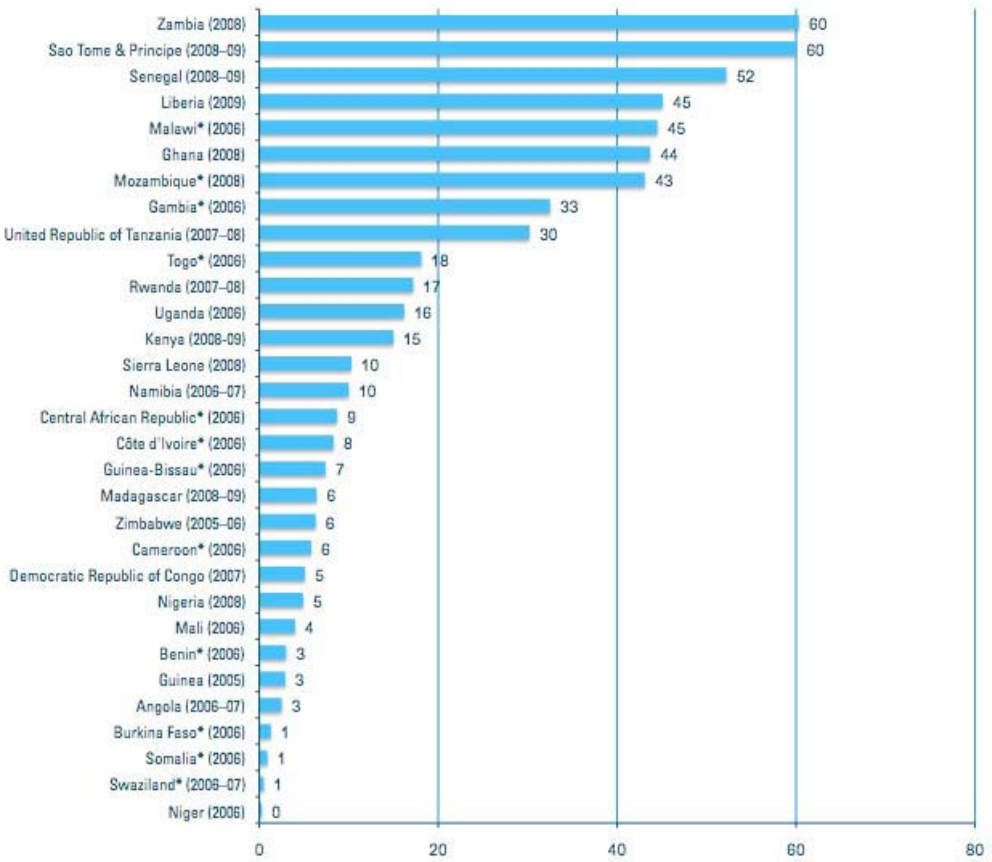
Malaria prevention during pregnancy

- Together with regular insecticide-treated net use, intermittent preventive treatment during pregnancy (IPTp) is critical for preventing malaria among pregnant women in endemic areas. The treatment consists of at least two doses of sulfadoxine-pyrimethamine (SP) received during the second and third trimesters of pregnancy.
- Most countries have only recently adopted and implemented IPTp for pregnant women during routine antenatal care visits. Countries that implemented this intervention earlier and have recent survey data—such such as Zambia, Sao Tome & Principe, and Senegal—show higher coverage levels (Figure 2.9).
- ITN use by pregnant women varies substantially between countries and tends to be similar to use rates among young children (Figure 2.10). Major progress has occurred in ITN use among pregnant women in the limited number of African countries with comparable trend data (Figure 2.11). Despite this progress, ITN use among pregnant women is still too low in most countries.

Figure 2.9.

Proportion of women ages 15–49 who received intermittent preventive treatment during pregnancy (IPTp) before their last live birth, African region, 2005–2009

IPTp coverage is highly variable between African countries and is still too low in many countries.



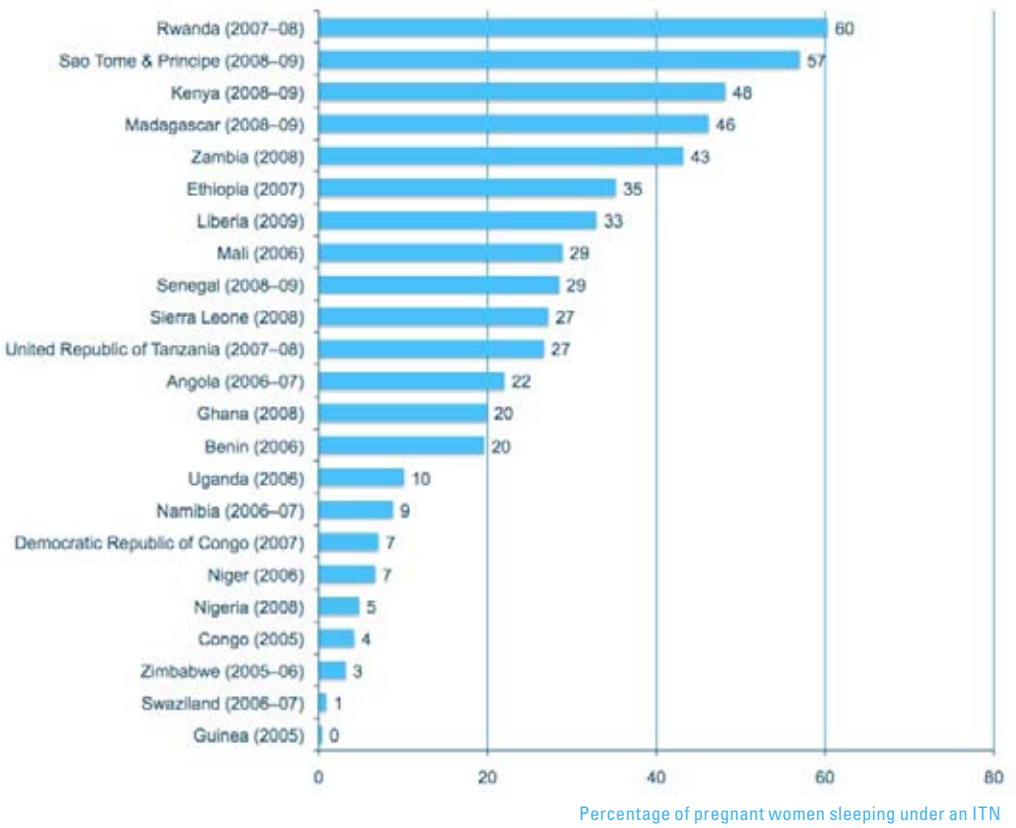
Source: UNICEF global malaria databases 2010.[10]

Note: Intermittent preventive treatment is defined as receiving two or more doses of sulfadoxine-pyrimethamine (SP) during an antenatal care visit; in some country surveys the site of treatment (e.g. "during antenatal care visit") is not specified and these countries are marked with an "*". Dates of national surveys (Demographic and Health Surveys [DHS],[11] Multiple Indicator Cluster Surveys [MICS],[12] or Malaria Indicator Surveys [MIS][13]) are indicated next to the country.

Figure 2.10.

Proportion of pregnant women sleeping under an insecticide-treated mosquito net (ITN), African region, 2005–2009

Despite progress in some countries, ITN use among pregnant women is still far below targets in most African countries.



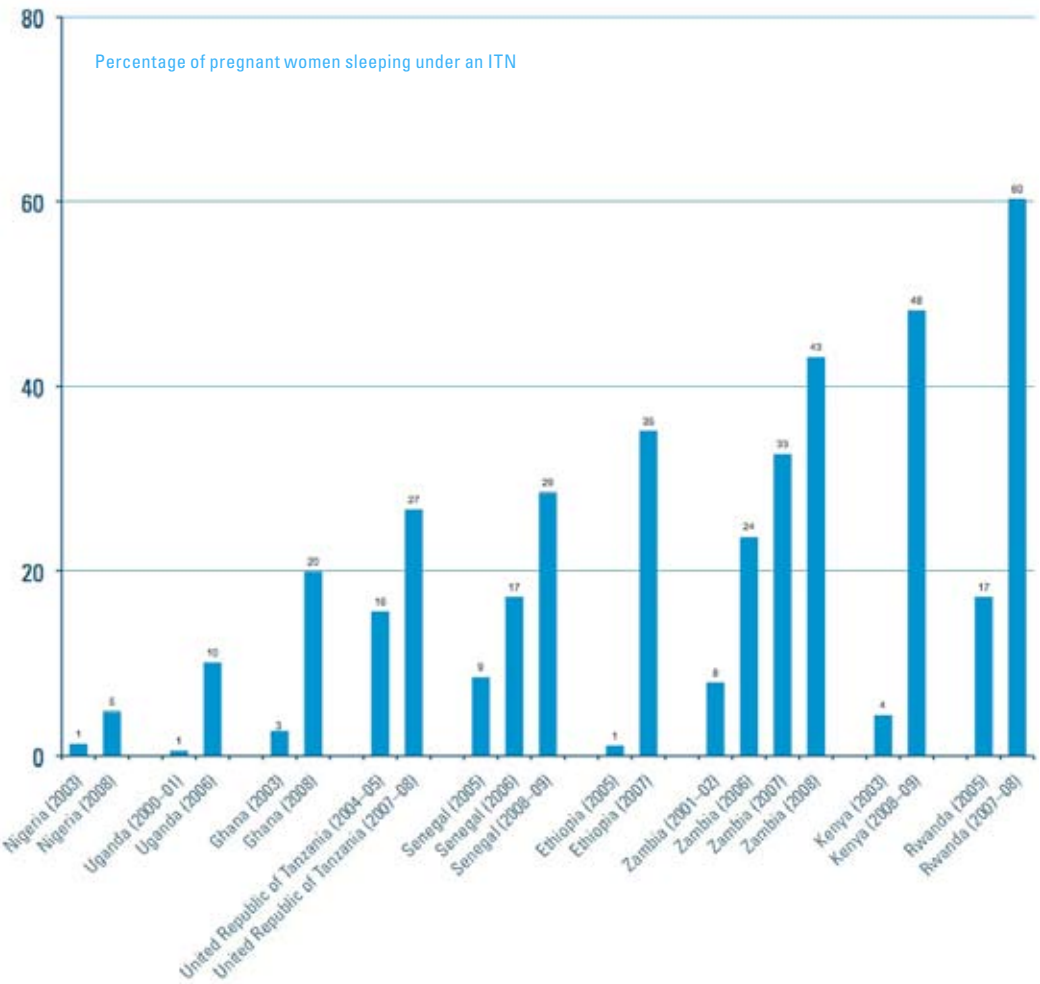
Source: UNICEF global malaria databases 2010.[10]

Note: Dates of national surveys (Demographic and Health Surveys [DHS],[11] Multiple Indicator Cluster Surveys [MICS],[12] or Malaria Indicator Surveys [MIS][13]) are indicated next to the country.

Figure 2.11.

Proportion of pregnant women sleeping under an insecticide-treated mosquito net (ITN), all African countries with two or more comparable data points

Limited data show major progress in ITN use among pregnant women in African countries.



Source: UNICEF global malaria databases 2010.[10]

Note: Dates of national surveys (Demographic and Health Surveys [DHS],[11] Multiple Indicator Cluster Surveys [MICS],[12] or Malaria Indicator Surveys [MIS][13]) are indicated next to the country.

MALARIA TREATMENT: ATTAINING HIGH COVERAGE AND USE

WHO guidelines for malaria treatment[18] provide specific guidance for malaria diagnosis and treatment; here we provide updates on several aspects of intervention coverage and identify some of the evolving features as countries begin to expand the use of diagnostics to better target their malaria treatment and to better understand the evolving burden of malaria.

Diagnostics

- Systematic implementation of diagnostics will support the more rational use of antimalarial medicines, and is a critical aspect of treatment programmes. Overuse of expensive antimalarial medicines, notably artemisinin-based combination therapy (ACT), could place a financial burden on health systems, hasten antimalarial drug resistance with devastating consequences for global malaria control, and prevent other causes of fever from being appropriately treated.
- The use of microscopes to examine blood smears in laboratories is considered the best method for diagnosing malaria but requires equipment and expertise that is often lacking in many health facilities in malaria-endemic countries. In recent years, rapid diagnostic tests (RDTs) have been developed and refined for use by health workers without access to adequate microscopy.
- Many countries are now greatly expanding the use of diagnostics to better target treatment to only those febrile patients with a positive diagnosis, along with activities to strengthen health systems to perform these tests. Survey data to monitor the use of diagnostics, however, are largely unavailable. Questions on the use of diagnostics for malaria testing have been developed for inclusion in household surveys, and new information will become increasingly available in the coming years.

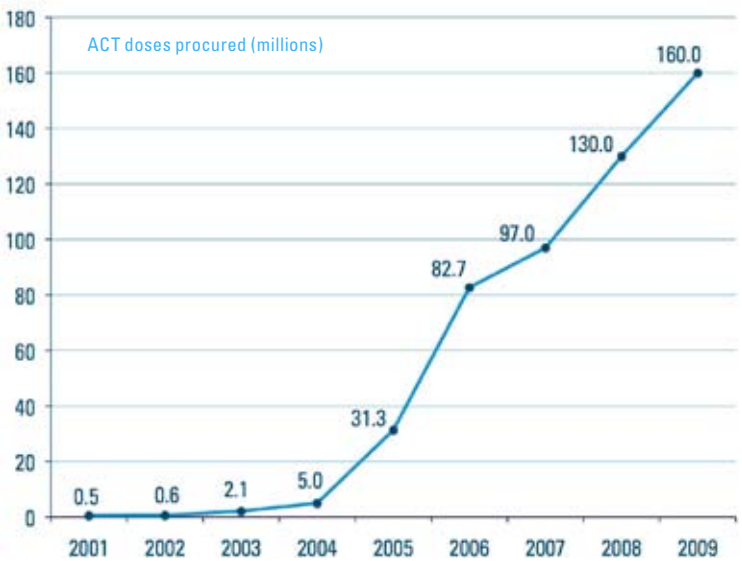
Antimalarial treatment

- Prompt and effective treatment is critical for preventing life-threatening complications from malaria. In recent years, the African region has gone through a major period of transition in terms of malaria treatment activities, which has laid the groundwork to increase access to appropriate treatment for more children in need.
- Since around 2003, countries have rapidly shifted their national drug policies to promote ACT, which is a more efficacious—but also a more expensive—treatment course. At the same time, global procurement of these medicines has risen sharply since around 2005 (Figure 3.1).
- The proportion of children receiving antimalarial treatment is moderately high across Africa, although many febrile children are still being treated at home and with less effective medicines (Figures 3.2, 3.3, and 3.4).
- Based on these efforts, it is expected that African countries that have recently invested in expanding ACT coverage will show major improvements in providing prompt and effective treatment in their next round of surveys. However, interpreting trends in treatment coverage is challenging and will become more difficult in areas with substantial declines in the number of malaria cases and where diagnostic use is widespread (see Box 3).

Figure 3.1.

Number of doses of artemisinin-based combination therapy (ACT) procured worldwide, 2001–2009

There has been a recent and rapid rise in ACT procurement since 2004.

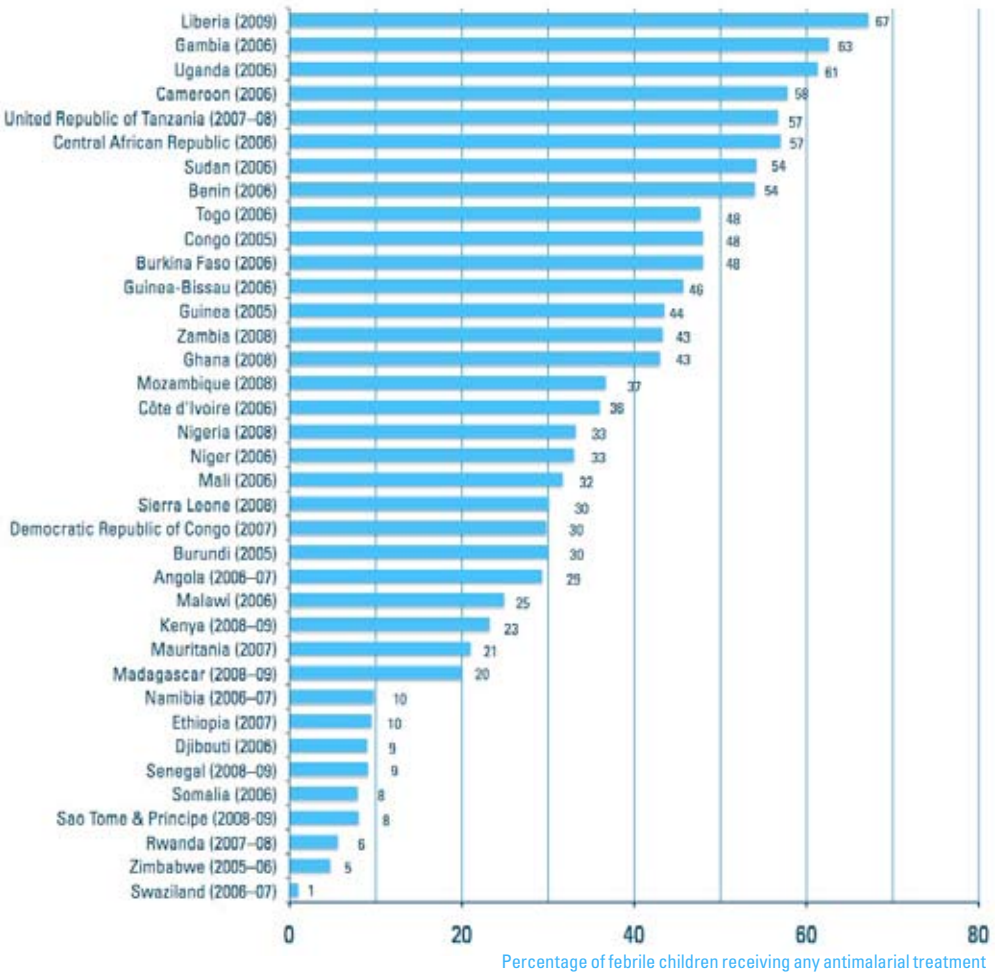


Source: WHO Global Malaria Programme, 2010.

Figure 3.2.

Proportion of febrile children under five years of age receiving any antimalarial treatment, African region, 2005–2009

A widely varying proportion of children are receiving antimalarial treatment for their febrile illness. This variation is due to several factors. In some countries (especially those with very low coverage rates, at the bottom of the graph), the wide use of diagnostics serves to limit treatment to only those with documented malaria infection; in other countries, all febrile children are meant to be treated but only some access health services to receive proper medication.



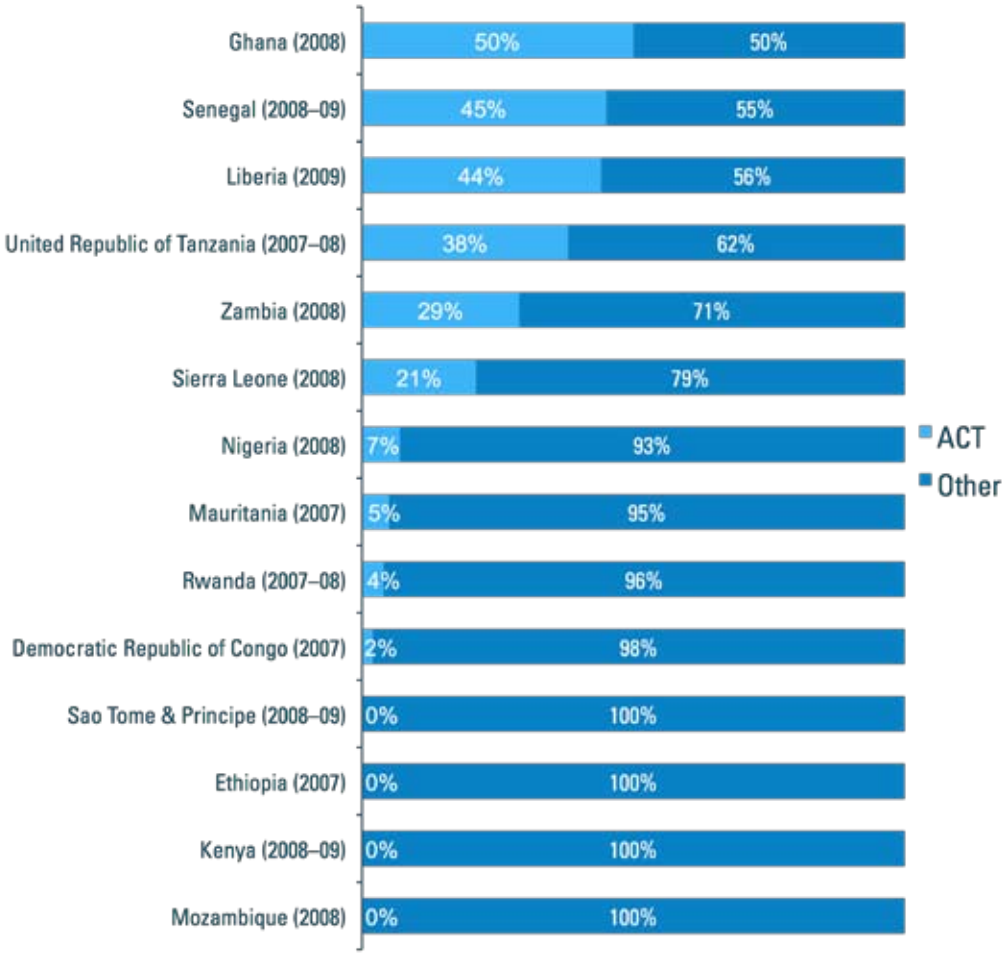
Source: UNICEF global malaria databases 2010.[10]

Note: Dates of national surveys (Demographic and Health Surveys [DHS],[11] Multiple Indicator Cluster Surveys [MICS],[12] or Malaria Indicator Surveys [MIS][13]) are indicated next to the country.

Figure 3.3.

Among all children who received an antimalarial drug, the proportion of children receiving artemisinin-based combination therapy (ACT), African region, 2005–2009

By 2008, most African countries had adopted a malaria treatment policy of ACT use as the first-line drug. However, in surveys since 2007, only a relatively low proportion of children treated for malaria were actually receiving an ACT. Although practice is changing, chloroquine, sulfadoxine-pyrimethamine (SP), and other drugs are still commonly used for malaria treatment.



Source: UNICEF global malaria databases 2010.[10]

Note: Dates of national surveys (Demographic and Health Surveys [DHS],[11] Multiple Indicator Cluster Surveys [MICS],[12] or Malaria Indicator Surveys [MIS][13]) are indicated next to the country.

Figure 3.4.

Proportion of febrile children under five years of age receiving any antimalarial drug, by location where the drug was obtained, 24 African countries, 2000–2006

Many African children with fever taking antimalarial medicines are treated with drugs obtained at home; less than 60% are treated in a health facility. Thus, as countries try to improve malaria treatment and assure that the recommended first-line treatment is received, they must improve treatment practices both in health facilities and in homes.

Source: UNICEF global malaria databases 2010[10] based on latest available data from Multiple Indicator Cluster Surveys (MICS; Rounds 2 and 3)[12] conducted in 24 African countries between 2000 and 2006.

Box 3: Interpreting trends in malaria treatment

Interpreting trends in malaria treatment data from population-based household surveys is difficult, particularly where scaling up prevention measures has substantially lowered the number of malaria cases and where diagnostics are increasingly available.

In areas of high malaria transmission, WHO recently updated its recommendations to strongly encourage parasitological diagnosis in children under five years of age who present with febrile illness. Some countries are already moving away from presumptive malaria treatment by scaling up the use of diagnostics through microscopy at health facilities and rapid diagnostic tests at peripheral levels of the health system. However, household surveys currently collect treatment data for children who experienced fever (not diagnostically confirmed malaria) at some point in the two weeks before the survey. In areas that are scaling up the use of diagnostics, measuring treatment rates among all febrile children will become less useful for monitoring the success of programmes that are targeted toward treating only confirmed cases. In addition, comparisons of historical survey data reflecting presumptive treatment with newer data based on laboratory-confirmed malaria would inevitably show a downward trend in treatment coverage among all febrile children. This issue becomes more critical as countries scale up preventive measures, resulting in even fewer febrile cases due to malaria.

Trends in the use of artemisinin-based combination therapy (ACT) compared to chloroquine, sulfadoxine-pyrimethamine, or other antimalarials have also evolved as individual countries have changed national treatment policies, particularly between 2003–2007. As a consequence, surveys completed prior to 2008 must consider the use patterns of ACT in the context of the timing of the national policy changes. For example, if a survey was done in 2006 when chloroquine or sulfadoxine-pyrimethamine was the recommended first-line treatment, then one should not expect to observe much ACT use. Of note, recent surveys from ACT Watch in eight countries have documented the variation seen within and between countries in diagnostics and antimalarial drug use.[19]

The Roll Back Malaria Partnership Monitoring and Evaluation Reference Group is currently reviewing this treatment indicator in light of the major scale-up of malaria control activities across Africa and has recommended collecting data on diagnostics use in the next round of surveys to help interpret trends.

Source: UNICEF, RBM, GFATM. *Malaria and children: Progress in intervention coverage*. 2009.[20]


SEPTRIN & FANSIDAR
(ALL SULPHUR DRUGS)
NO ANTIBIOTIC IN +VE
MALARIA AND NON
3. MAKE SURE THE PT
COMPLIES WITH Rx.
4. COUNSEL THE PT ON
THE DANGERS OF STI'S
5. PROVIDE
CONDOMS.

ENSURING IMPACT AGAINST MALARIA

Walking through the empty paediatric ward of the Mnazi Mmoja Hospital (pictured opposite), Zanzibar's malaria director Dr Abdullah Ali described the scene three years ago: three children in each bed, with many more sleeping on the floor. "The whole situation has changed completely," he said.[21]

Scaling up control programmes—impact on the malaria burden

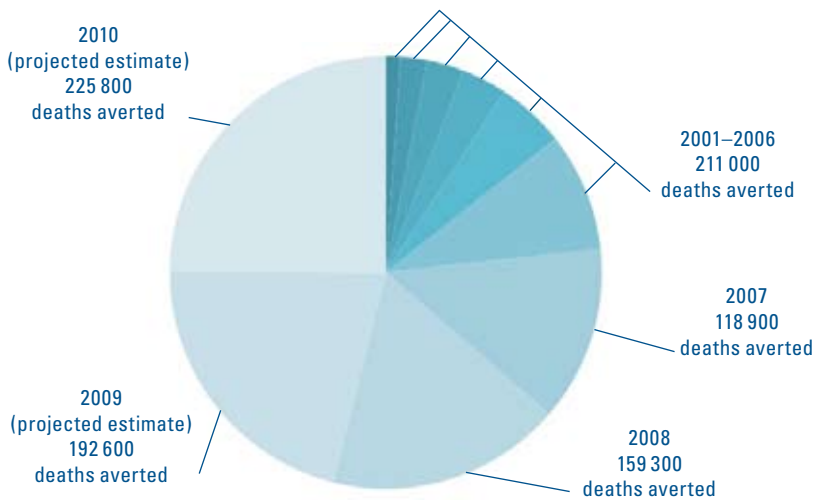
- Information on the impact of malaria control is coming from an increasing number of sources showing national and local progress. The photo opposite shows one impressive result from Zanzibar, where a paediatric ward in a local hospital is essentially empty of the many malaria patients who were once so common.[21]
- Mathematical modelling can provide crude estimates of the mortality impact of malaria control programmes, and may be used alongside other data sources to provide an overall indication of changes in the malaria mortality burden. This model, known as the Lives Saved Tool or LiST model, links coverage of key child survival interventions (including for malaria) with empirical evidence of the effect of these interventions on preventing deaths in children under five years of age.[22] The model's predictions also take into account current demographic projections and country-specific cause of death profiles for these children.
- Based on available estimates for ITN coverage alone in 35 malaria-endemic African countries that account for more than 95% of malaria-associated child deaths in Africa, we estimated the number of lives saved with current ITN coverage and estimated additional lives saved if the countries achieved universal (100%) coverage with ITNs. Between 2000–2010, we estimated that there would have been more than 10 million deaths during this span due to malaria in children under five years of age if there were no ITN coverage. With current ITN coverage estimates over the 11 years in these countries, we estimate that ITNs saved 908 000 lives or 8.8% of malaria deaths; see Figure 4.1. In 2010 alone, with projected ITN coverage from household surveys, we estimate that more than 20% of child malaria deaths will be prevented. And, if all of these countries can successfully scale up to 100% ITN coverage, we estimate that 55% of malaria deaths will be prevented in 2010. These estimates are consistent with reaching the target of halving malaria mortality, but they require a great deal of work to achieve the necessary ITN coverage to accomplish this task.

- Information from other data sources further substantiates the model's predictions. By early 2010, nine African countries or areas had published an in-depth analysis of the health improvements linked to scale-up of malaria control programmes based on data from health facilities, household surveys, and other sources. These countries/areas include: Bioko Island (Equatorial Guinea), Ethiopia, Eritrea, Gambia, Ghana, Rwanda, Sao Tome and Principe, Zambia, and Zanzibar (United Republic of Tanzania). Figure 4.2 provides a summary of these results.

Figure 4.1.

Predicted number of malaria deaths averted in children under five years of age due to changes in insecticide-treated net (ITN) coverage during 2000–2010 based on modeled estimates, 35 African countries*

An estimated 908 000 malaria deaths have been averted through ITN coverage between 2000–2010, with three quarters of the deaths averted since 2006.



* Countries included Angola, Benin, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Ethiopia, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Somalia, Sudan, Togo, Uganda, United Republic of Tanzania, Zambia, and Zimbabwe. Malaria-endemic countries not included because of limited information were Botswana, Cape Verde, Comoros, Eritrea, Equitorial Guinea, Gabon, Namibia, South Africa, and Swaziland.

Source: Data were abstracted from national surveys (Demographic and Health Surveys [DHS],[11] Multiple Indicator Cluster Surveys [MICS],[12] or Malaria Indicator Surveys [MIS][13]). All included countries had at least one nationally-representative household survey between 2004 and 2008. From years 2004–2008, adjusted cumulative net procurement data from manufacturers were used to develop the rate of household ITN ownership change in each country; estimates from the manufacturers' data were applied to countries without direct survey data for individual years between 2004–2008. Coverage was assumed to increase linearly to 2004 from the earliest survey date prior to 2004; where no survey existed, ITN coverage was assumed to be 0% in 2000. The rates of ITN coverage increases from 2004–2008 were used to estimate coverage for 2009 and 2010. Estimates of efficacy of ITNs in the Lives Saved Tool are available in reference 22.

Figure 4.2.

African countries or regions with recent documented health improvements linked to malaria control scale-up

An increasing number of African countries have scaled up malaria interventions and have observed marked reductions (30–95%) in morbidity and mortality indicators.

Countries/regions		Zanzibar	Sao Tome & Principe	Bioko Island (Equatorial Guinea)	Rwanda	Ethiopia	Eritrea	Gambia	Ghana	Zambia
Time period		2000–02 vs 2005	2000–03 vs 2007	Pre-2003 vs post-2004	2001–06 vs 2007	2001–05 vs 2007	1999–2004	1999–2007	1999–2003 vs 2004-08	2001–02, 2006, 2007, 2008
Morbidity	Outpatient malaria visits in children under 5	↓73%	↓93%		↓58%	↓85%	↓83%			↓33%
	Fever			↓56%						
	Hospital malaria admissions in children under 5	↓75%	↓88%		↓55%	↓73%		↓53%		↓55%
	Blood transfusions	↓95%						↓>90%		
	Parasite prevalence in children under 5	↓97%	↓93%	↓57%		<1% in all age groups				↓54%
	Child anaemia prevalence (Hb<8gm/dl)	↓87%		↓87%		No change		Mean Hb ↑1.2gm/dl		↓69%
	Splenomegaly		↓99%							
Mortality	Malaria-specific mortality (not all microscopy confirmed)	↓71%	↓95%		↓67%			From 29 deaths/yr to 1 death/yr (across 3 hospitals)		↓66%
	All-cause mortality									
	Under-5	↓52%		↓64%	↓33%				↓28%	↓29%
	Infant (0–11mos)	↓33%			↓28%				↓22%	↓26%
	Child (1–4yrs)	↓71%			↓41%				↓38%	↓36%
	Case fatality		No change					↓92%		
Comments		Introduced IRS; ACTs in 2004, ITNs in 2006 all to high coverage rates	IRS + ITNs + IPTp + case man. started in mid-2003 and nationally in late 2004	IRS + ACTs started in 2004; ITNs added in 2007	ITN and ACT scaled up in late 2006	Scaled up ITN distribution in all malarious areas in 2006-2007	ITN scale up during interval; strong correlation between ITN coverage and morbidity	Scale up of malaria prevention and treatment since 2003	Scaled up ITN coverage with emphasis on rural areas	Scaled up ITNs, IRS, IPTp, and case management

Source: Impact of national malaria control scale-up programmes in Africa were abstracted from several reports and articles.[23-25]

LOOKING FORWARD

As countries look forward in 2010 to their efforts to achieve universal coverage, there is much work to be done. The existing resource base from within national budgets and from external donor assistance is essentially known (see Figure 1.3); and the work to procure and deliver the needed malaria prevention and treatment commodities remains. There are also considerable opportunities to evaluate progress; in anticipation of the work ahead, many countries have scheduled national surveys and are strengthening local health information systems to be able to report on progress.

Examples of progress are described below. Nigeria, for instance, plans to distribute around 60 million nets by the end of 2010 in an unprecedented distribution effort to support their achievement of the universal coverage goal (Box 4). The United Republic of Tanzania is working with public and private organizations to prevent stockouts of key malaria commodities (Box 5). And many countries have planned national surveys from late 2009 through early 2011 to assess their progress in malaria control (Figure 5.1). Finally, growing interest in achieving agreed-upon targets can be seen among African heads of state via the African Leaders Malaria Alliance (ALMA)[26] and through other key partnerships such as United Against Malaria (UAM)[27] and attention through the 2010 World Cup football games.

Figure 5.1.

Surveys planned for 2009–2010 to monitor the targets for achieving universal malaria intervention coverage

Nationally representative household surveys are scheduled to occur in approximately 26 countries in the sub-Saharan African region, 2009–2010.

Note: Planned standard national population-based surveys that assess malaria information include the Demographic and Health Surveys (DHS),[11] Multiple Indicator Cluster Survey (MICS),[12] and Malaria Indicator Survey (MIS).[13]

Box 4: Nigeria moves closer to universal coverage with insecticide-treated nets

Nigeria is the most populous country in Africa, and bears one of the greatest malaria burdens of any country in the world. More than 150 million Nigerians—the entire population of the country—live in areas of intense malaria transmission. An estimated one in every five child deaths is due to malaria, accounting for more than 200 000 deaths among Nigerian children under age five every year.

Until recently, global funding and attention toward the problem of malaria in Nigeria was severely lacking, and consequently, little progress was made in expanding coverage of key interventions. For example, household ownership of insecticide-treated nets was just 2% in 2003, and rose only slightly to 8% in 2008. But since 2008, there has been a renewed focus on tackling malaria in this populous country—and a major push by the Nigerian government and its partners to achieve the RBM target of universal coverage with key malaria control interventions by the end of 2010.

Funding for some 60 million insecticide-treated nets has already been secured through the Global Fund to Fight AIDS, Tuberculosis and Malaria; the US President's Malaria Initiative; and the World Bank, among others. An estimated 70 million nets are needed to achieve universal coverage in Nigeria, and the government is working to obtain funds for these additional nets. In addition, a month-by-month distribution strategy has been established to plan the delivery of these nets across the country's 36 states. This largest-ever in-country net distribution effort is being supported through community partnerships, including with the religious sector; Muslim and Christian leaders are working closely together to help meet the universal coverage target.

Source: WHO, *The global burden of disease: 2004 update*;[6] UNICEF, *State of the World's Children 2009*,[28] UN Secretary-General's Special Envoy for Malaria, *Tracking progress toward ending malaria deaths in Africa*.[29]

Box 5: The United Republic of Tanzania and "SMS for Life"—a pilot project to eliminate antimalarial stock-outs

An innovative public-private initiative between the RBM Partnership, Novartis, Vodafone, and IBM has been formed to help eliminate stock-outs of essential antimalarial medicines in health facilities. This effort brings together mobile phones, SMS technologies, and mapping software to track the supply of antimalarial drugs in health facilities, and to help manage deliveries to replenish these supplies. This system enables the timely tracking and management of antimalarial supplies even in the most remote areas of malaria-endemic countries.

How does the system work? Key focal points at all health facilities receive weekly, automated text messages that prompt them to check antimalarial drug supplies and respond with information on current stock levels via text message linked to a central database system. This alert then prompts the delivery of new drug supplies to the health facility in order to prevent stock-outs from occurring. A main advantage of this programme is that SMS services are inexpensive, widely available, and commonly used—and therefore require limited training of health workers before participating in the programme.

In 2009, this five-month pilot project began in the United Republic of Tanzania covering three districts (135 villages) with over one million people. In the first few weeks of this programme, all 47 health facilities in one district had full stocks of the antimalarial medicines needed to treat patients—a major improvement from the frequent stock-outs occurring in about half of the facilities prior to its implementation. Similar progress has been seen in the other pilot districts as well. Based on this early evidence, the United Republic of Tanzania is expanding the programme to additional districts, and other countries have shown interest in implementing a similar programme. Indeed, if successful, this pilot programme could have far-reaching implications for strengthening supply-chain management systems for other essential medicines and commodities.

Source: "SMS for Life"—Improving medicine access through innovation.[30]

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ANNEX: STATISTICAL TABLE

Key malaria control indicators

Countries	Percentage of households with at least one insecticide-treated mosquito net (2006-2009*)		Percentage of children under age five sleeping under an insecticide-treated mosquito net** (2006-2009*)		Percentage of children under age five with fever receiving antimalarial medicines *** (2006-2009*)		Source
Angola	28		18		29		MIS 2006–07
Azerbaijan	-		1	x	1	x	MICS 2000
Benin	25		20		54		DHS 2006
Burkina Faso	23		10		48		MICS 2006
Burundi	8	x	8	x	30	x	MICS 2005
Cambodia	5	x	4	x	0	x	DHS 2005
Cameroon	4		13		58		MICS 2006
Central African Republic	16		15		57		MICS 2006
Chad	-		1	x	53	x	MICS 2000 / DHS 2004
Colombia	3	x	-		-		DHS 2000
Comoros	-		9	x	63	x	MICS 2000
Congo	8	x	6	x	48	x	DHS 2005
Côte d'Ivoire	10		3		36		MICS 2006
Democratic Republic of the Congo	9		6		30		DHS 2007
Djibouti	-		1		10		MICS 2006
Equatorial Guinea	-		1	x	49	x	MICS 2000
Eritrea	-		4	x	4	x	DHS 2002
Ethiopia	53		33		10		MIS 2007
Gambia	50		49		63		MICS 2006
Ghana	33		28		43		DHS 2008
Guatemala	-		1	x	-		MICS 1999
Guinea	4	x	1	x	44	x	DHS 2005
Guinea-Bissau	44		39		46		MICS 2006
Haiti	-		-		5		DHS 2005–06
Honduras	-		-		1		DHS 2005–06
India	-		-		8		DHS 2005–06
Indonesia	3		3		1		DHS 2007
Iraq	-		0	x	1	x	MICS 2000
Kenya	54		46		23		DHS 2008–09 (preliminary report)
Lao People's Democratic Republic	45		41		8		MICS 2006
Liberia	47		26		67		MIS 2009
Madagascar	57		46		20		DHS 2008–09 (preliminary report)
Malawi	38		25		25		MICS 2006
Mali	50		27		32		DHS 2006
Mauritania	12		2	x	21		MICS 2007 / Other national survey 2003–04
Mozambique	16		23		37		MIS 2007 / MICS 2008
Namibia	20		11		10		DHS 2006–07
Nepal	-		-		0		DHS 2006
Nicaragua	-		-		2	x	DHS 2001
Niger	43		7		33		DHS 2006
Nigeria	8		6		33		DHS 2008
Pakistan	0		-		3		DHS 2006–07
Philippines	-		-		0	x	DHS 2003
Rwanda	56		56		6		DHS 2007–08
Sao Tome and Principe	61		56		8		DHS 2008–09
Senegal	60		29		9		MIS 2008–09
Sierra Leone	37		26		30		DHS 2008
Solomon Islands	-		-		19		DHS 2008
Somalia	12		11		8		MICS 2006
Sri Lanka	5		3		0		DHS 2006–07
Sudan	18		28		54		SHHS 2006
Suriname	-		3	x	-		MICS 2000
Swaziland	4		1		1		DHS 2006–07
Tajikistan	2	x	1	x	2	x	MICS 2005
Timor-Leste	-		8	x	47	x	MICS 2002
Togo	40		38		48		MICS 2006
Uganda	16		10		61		DHS 2006
United Republic of Tanzania	39		26		57		THMIS 2007–08
Viet Nam	19		13	x	3		MICS 2006 / AIS 2005
Zambia	62		41		43		MIS 2008
Zimbabwe	9		3		5		DHS 2005–06
SUMMARY INDICATORS							
AFRICA	27		20		34		
Sub-Saharan Africa	27		20		34		
East and Southern Africa	40		29		29		
West and Central Africa	17		11		36		
Middle East and North Africa	-		-		-		
ASIA	-		-		6		
South Asia	-		-		7		
East Asia and Pacific	-		-		-		
LATIN AMERICA AND CARIBBEAN	-		-		-		
WORLD	-		-		-		
Industrialized countries	-		-		-		
Developing countries	-		-		17		
Least developed countries	34		23		32		

\- Data not available.

x Data refer to years or period other than those specified in the column heading, differ from standard definition, or refer to only part of a country. Such data are not included in the calculation of regional and global averages.

* Data refer to the most recent year available during the period specified in the column heading.

** Data are for the night before the survey.

*** Estimate refers to any antimalarial medicine.

Source: Demographic and Health Surveys (DHS), Multiple Indicator Cluster Surveys (MICS), Malaria Indicator Surveys (MIS), Tanzania HIV/AIDS and Malaria Indicator Survey (THMIS), and Sudan Household Health Survey (SHHS).

ABBREVIATIONS

ACT	*Artemisinin-based combination therapy*
ALMA	*African Leaders Malaria Alliance*
DHS	*Demographic and Health Survey*
GFATM	*Global Fund to Fight AIDS, Tuberculosis and Malaria*
GMP	*Global Malaria Programme*
IRS	*Indoor residual spraying*
IPT	*Intermittent preventive treatment*
IPTp	*Intermittent preventive treatment for pregnant women*
ITN	*Insecticide-treated mosquito net*
LLIN	*Long-lasting insecticide-treated net*
MDGs	*Millennium Development Goals*
MICS	*Multiple Indicator Cluster Survey*
MIS	*Malaria Indicator Survey*
NMCP	*National Malaria Control Programme*
PPR	*Parasite prevalence rate*
RBM	*Roll Back Malaria*
RDT	*Rapid diagnostic test*
SP	*Sulfadoxine-pyrimethamine*
UAM	*United Against Malaria*
UNICEF	*United Nations Children's Fund*
UNITAID	*United Nations-affiliated organization contributing to scaling up access to treatment for HIV, malaria, and tuberculosis*
USAID	*United States Agency for International Development*
US-PMI	*United States President's Malaria Initiative*
WHO	*World Health Organization*

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