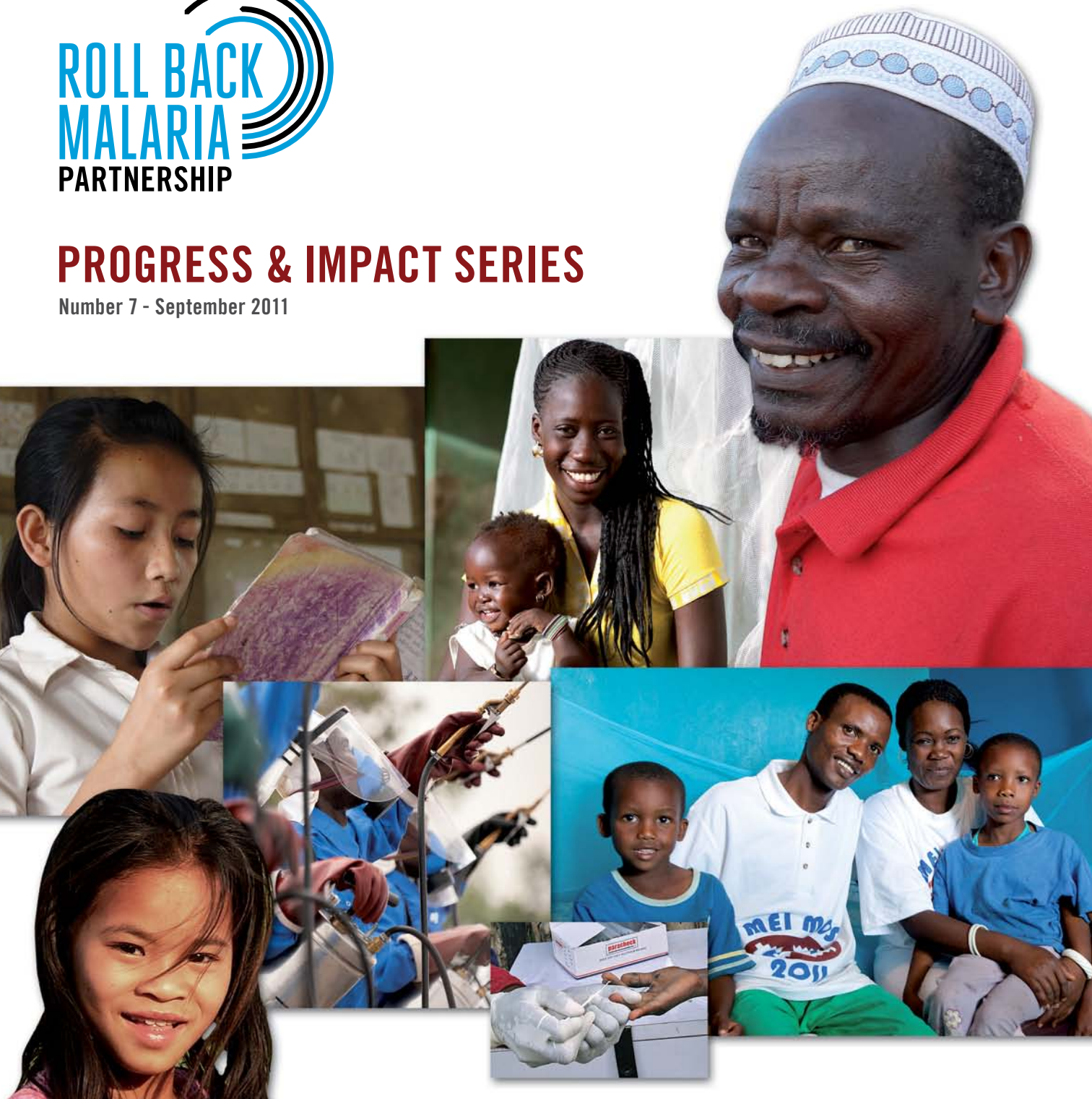
ROLL BACK MALARIA PARTNERSHIP

PROGRESS & IMPACT SERIES

Number 7 - September 2011



A Decade of Partnership and Results

World Health Organization | unicef | THE WORLD BANK | UNDP

The Global Fund To Fight AIDS, Tuberculosis and Malaria | PATH | Tulane University | CDC | USAID | President's Malaria Initiative

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The Roll Back Malaria Partnership was launched in 1998 by WHO, UNICEF, UNDP and the World Bank. It is the global framework for implementing coordinated action against malaria. The Partnership comprises more than 500 partners, including malaria endemic countries, their bilateral and multilateral development partners, the private sector, nongovernmental and community-based organizations, foundations, and research and academic institutions.

www.rollbackmalaria.org

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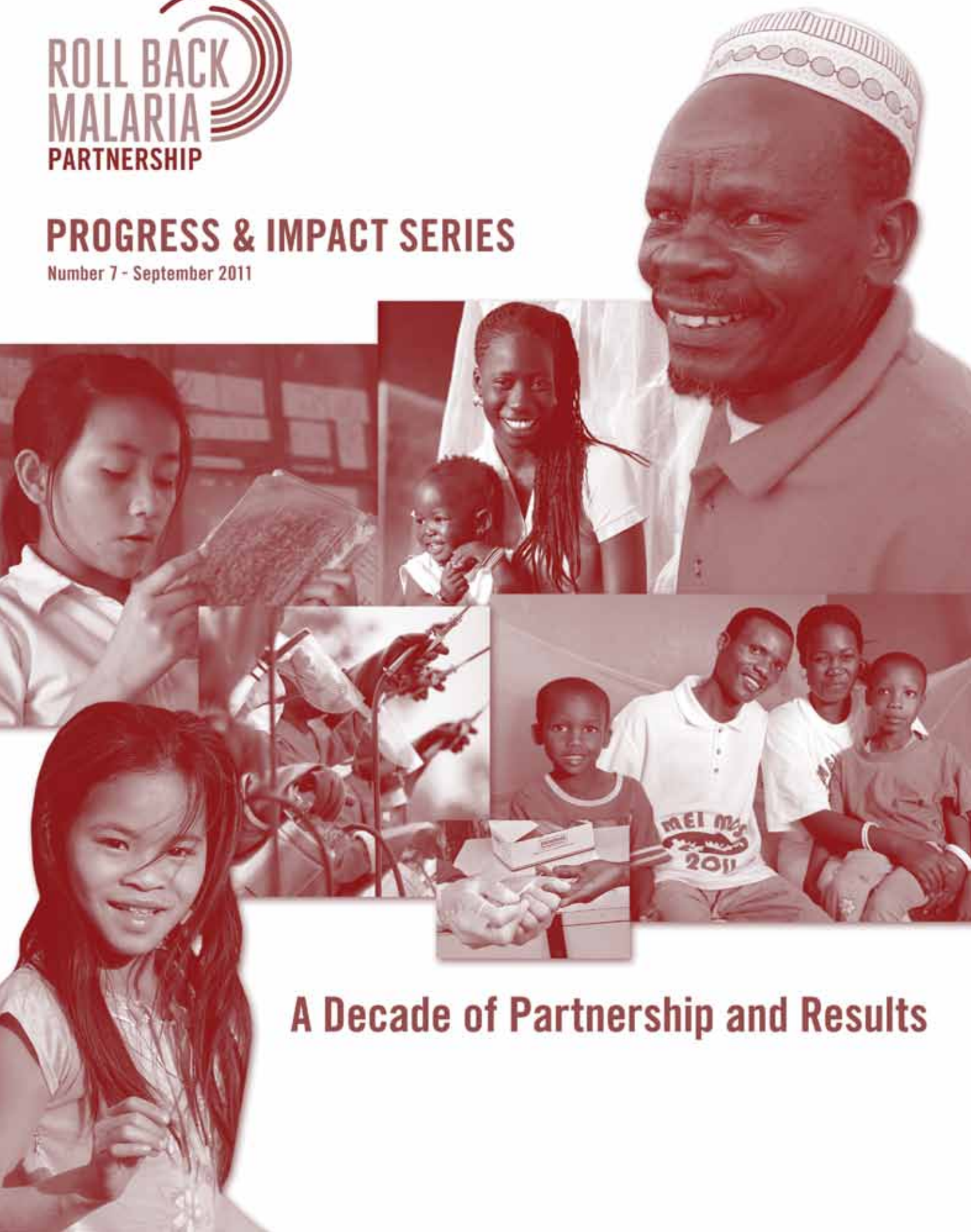

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CONTENTS

CONTENTS

ABBREVIATIONS

ACT	artemisinin-based combination therapy
ALMA	African Leaders' Malaria Alliance
DAC	Development Assistance Committee
DDT	dichloro-diphenyl-trichloroethane
DFID	Department for International Development (United Kingdom)
DHS	Demographic and Health Survey
GLOBAL FUND	Global Fund to Fight AIDS, Tuberculosis and Malaria
GMAP	Global Malaria Action Plan
GMEP	Global Malaria Eradication Programme
GMP	Global Malaria Programme
HSS	health systems strengthening
HWG	Harmonization Working Group
IDA	International Development Association
IPTp	intermittent preventive treatment during pregnancy
IRS	indoor residual spraying
ITN	insecticide-treated mosquito net
IVCC	Innovative Vector Control Consortium
LiST	Lives Saved Tool
LLIN	long-lasting insecticide-treated mosquito net
MACEPA	Malaria Control and Evaluation Partnership in Africa
MalERA	Malaria Eradication Research Agenda
MDG	Millennium Development Goal
MICS	Multiple Indicator Cluster Survey
MIS	Malaria Indicator Survey
ODA	official development assistance
OECD	Organisation for Economic Co-operation and Development
RBM	Roll Back Malaria
RDT	rapid diagnostic test
TRP	Technical Review Panel
UN	United Nations
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
US-PMI	United States President's Malaria Initiative
WHO	World Health Organization

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FOREWORD

The "UN Decade to Roll Back Malaria" was proclaimed soon after all UN Member States made a commitment to tackle the disease in their landmark 2001 General Assembly resolution. This report documents the remarkable progress that has been made—the lives saved; the resources freed up to fight other illnesses; the children able to stay in school, workers able to stay on their jobs and women able to deliver healthy babies.

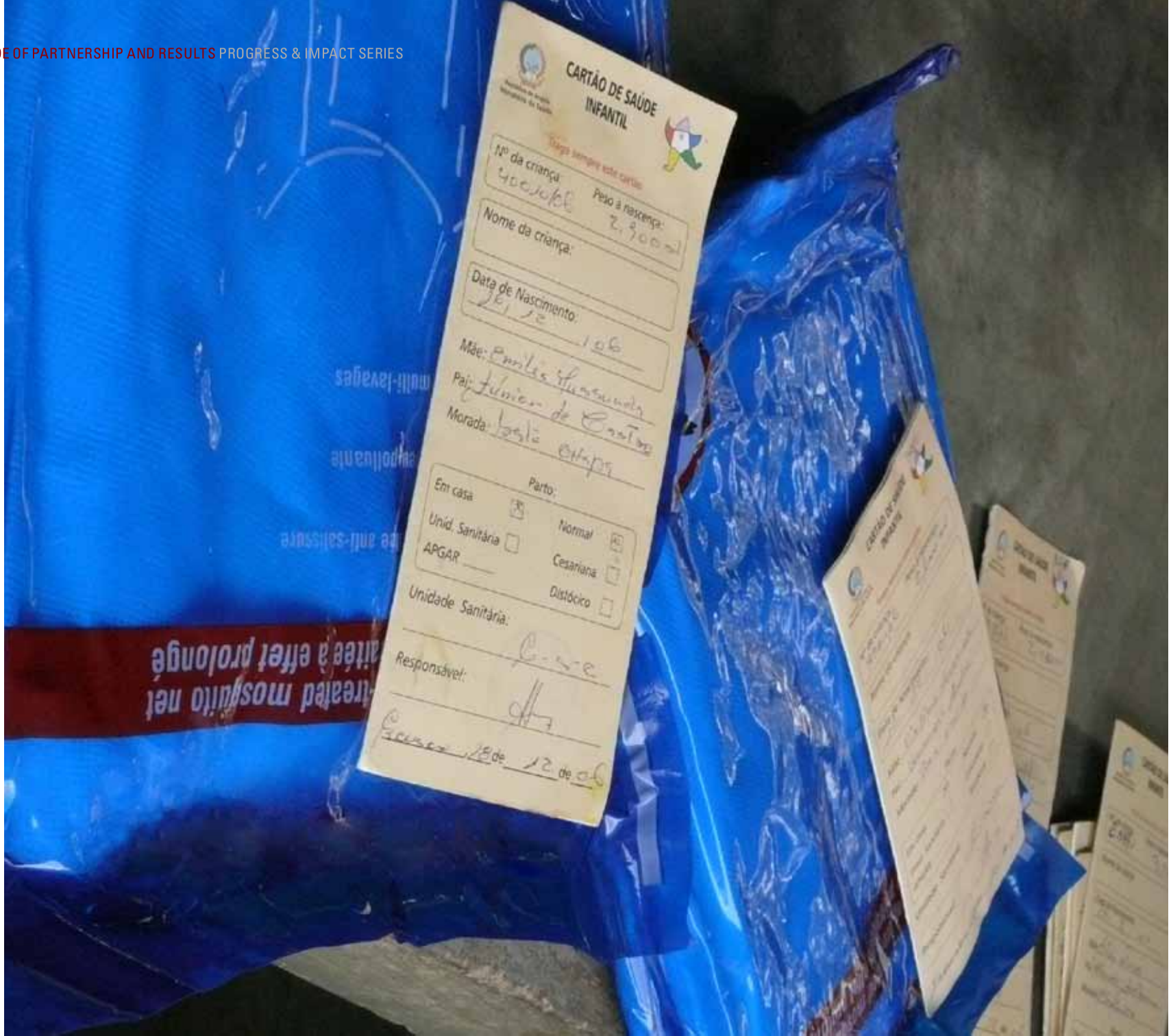
Collaboration has played a critical role in generating these results. The UN system, national leaders, national malaria control programmes of endemic countries and other Roll Back Malaria partners have worked together to exceed even the most optimistic expectations of just 10 years ago. Global malaria deaths have been reduced by an estimated 38%, with 10 African countries—as well as most endemic countries in other regions—cutting malaria cases and deaths by 50% or more. In sub-Saharan Africa alone, the lives of 1.1 million children under five have been saved. Such advances would not have been possible without the individual men and women who spend each day spraying insecticides, sewing nets, prescribing treatment, or struggling themselves with the illness.

Groundbreaking global health initiatives and the designation of a Special Envoy of the Secretary-General for Malaria have dramatically increased the resources devoted to this fight, and have transformed malaria from a neglected tropical disease to a global health priority. The achievements of the past decade and the growing momentum are cause for renewed optimism that we can achieve the goal of a world free of malaria. The Roll Back Malaria Partnership also offers an encouraging example of how the principles of cooperation, aid effectiveness and "One UN" can strengthen the harmonization and impact of our development efforts.

At the same time, the report also cautions that we cannot take recent successes for granted. Gains are fragile. Sustaining them will require our continued commitment, innovative thinking and financial support.

As we move into the next decade of malaria control, we will need to push even harder to sustain the benefits of prevention, press further to reduce infections, invest in human capacity and ensure universal access to diagnostics and treatment, all while aiming to eliminate the disease in as many places as possible. As this report concludes, only rarely have we seen a public health initiative provide so much return on investment. Thanks to the efforts of the past decade, we have a foundation that allows affected countries and communities to reach even greater results in the years to come.

Ban Ki-moon
Secretary-General of the United Nations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Peso à nascença:
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Em casa
Unid. Sanitária
APGAR
Normal
Cesariana
Distócico
Unidade Sanitária:
Responsável:

PREFACE

A decade ago, malaria was out of control in Africa and many other parts of the world. While no one knew for certain how many people were affected, conservative estimates of malaria deaths were around 1 million per year. Killing the most vulnerable and the least empowered of the world's poor—pregnant women and young children—malaria had not attracted adequate international attention for many years.

At the start of the new millennium, the newly founded Roll Back Malaria Partnership began sounding the alarm on the disease's rising death toll. No blueprint existed for how to make this fledgling initiative work. No roadmap showed partners the way to work together to tackle the epidemic. Few could have dreamed they would witness the successes documented in this report.

Today, the Partnership brings together hundreds of institutional partners from malaria-endemic countries, multilateral and donor organizations, the private sector, nongovernmental organizations, foundations, research and academia. Guided by a single collaborative strategy, the *Global Malaria Action Plan*, key stakeholders are working in synergy and comprise a whole that largely surpasses the sum of its parts.

Through aligned advocacy, partners have jointly helped increase international funding for malaria 10-fold in a decade, reaching US$ 1.5 billion in 2010. More funding meant better and more closely linked international and national policies, better tools for fighting malaria and better access to interventions in endemic countries, as well as better means of measuring progress and anticipating future needs.

With endemic countries defining and leading their national strategies for malaria control and partners collaborating through cohesive country-level partnerships, major changes have taken place across Africa. Malaria control measures saved an estimated 1.2 million lives on the continent between 2000 and 2011 and, if they continue, could save a further 3 million lives by 2015. In countries where access to malaria control interventions has improved most significantly, overall child mortality rates have fallen by approximately 20%.

This report reveals a story well worth telling. It shows that a disease-specific partnership can improve maternal and child health, and suggests it can deliver broad health benefits while relieving overburdened health systems. It also shows that a community of organizations can succeed where single ones failed in the past. Today's malaria movement, strengthened by the lessons of former anti-malaria campaigns, is accomplishing and in some cases surpassing the ambitious goals it has set for itself. With more endemic countries reaching universal coverage and reducing malaria deaths, the Partnership has refined its goals, making them more ambitious, more specific and more cognizant of the challenges that lie ahead.

The path to a world free of malaria is long and strenuous, and the gains that have been made to date remain fragile. We cannot afford to stop here or we run the risk of losing a US$ 10 billion investment and going back to the malaria 'dark ages'. The progress outlined so clearly in this report will be squandered if political will wavers or if relatively modest funding levels are not sustained. An opportunity is now in reach for recent successes in tackling malaria in individual countries to be widened to cover all populations at risk, and also for them to be sustained for many years. But threats must also be anticipated and addressed: Emerging resistance to major drugs and insecticides must be contained. Essential research to identify new tools, policies and approaches must continue.

In 2011, the malaria community is united by more than simply an ambitious vision. It has a collective roadmap and has crafted solutions to daunting challenges. It has solid results and lessons to show for a decade of shared commitment and effort. Building on all these assets now will enable this generation to lift the burden of malaria once and for all, and to clear the way to a malaria-free reality for tomorrow.

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EXECUTIVE SUMMARY AND KEY POINTS

The causative agent of malaria, its life-cycle and its mode of transmission were identified just more than one hundred years ago. Fifty years later, the global public health community attempted an ambitious programme to eradicate malaria, which produced many successes in countries, but never reached its stated global goal. In the decades that followed, malaria grew to be an enormous global problem, unchecked by any substantive support, programmes or interventions. In the 1990s, the malaria community re-committed itself to identifying, testing and demonstrating the efficacy of a set of improved affordable interventions that could be delivered on a wide scale to homes and communities. And, in 1997, African Heads of State made a call for a renewed effort against malaria in the *Harare Declaration* on malaria control.[1]

Building on the enthusiasm for effective interventions and in recognition of the enormous growing malaria burden, the Roll Back Malaria (RBM) Partnership was launched in December 1998 with leadership from the World Health Organization (WHO), the United Nations Children's Fund, the World Bank and the United Nations Development Programme. As the RBM Partnership was organizing and a new millennium beginning, the year 2000 was considered the baseline for measurement of the progress that was anticipated. Momentum grew over the next several years, and it was the extraordinary increase in investment on behalf of global donors and multilateral agencies beginning in force in 2005 that transformed partners' collective understanding of what was possible. Many partners had long supported countries in their malaria control efforts, but major shifts in the mid-2000s elevated goals and inspired a sense of urgency and responsibility to bring malaria to a halt, and contribute critically to the Millennium Development Goals (MDGs). Throughout its steep learning curve, the RBM Partnership rapidly evolved from a loosely organized community to where it is today: a model of global partnership with ever-increasing aspirations. Disciplined commitments to strategy and evidence, and prioritization of country ownership and leadership, were central Partnership principles that were fuelled by funding levels finally sufficient to bring about change and impact.

Major shifts have occurred in every aspect of malaria control since 2000, including interventions, global and national policies and strategies, partnerships, financing and systems for monitoring programme scale-up and progress (see Table 1). The evolution of new tools (e.g. new long-lasting insecticide-treated mosquito nets [LLINs], rapid diagnostic tests [RDTs], new drugs) and new strategies (scale-up for impact, expanding from a targeted approach to reach all at-risk people, seeking elimination where possible) is indicative of a partnership that has quickly matured and become responsive to diverse and rapidly changing needs and situations.

Many countries have rapidly scaled up their programmes and compiled remarkable evidence of impact. They have accomplished this through substantial national leadership and commitment, and with broad partnership support. The RBM Partnership has evolved into a range of diverse national, regional and global collaborations. Its underpinnings include high-level political support from the Office of the UN Secretary-General's Special Envoy for Malaria and the African Leaders' Malaria Alliance (ALMA), technical guidance through the WHO Global Malaria Programme, remarkable growth in programme financing from key multi- and bilateral organizations (Global Fund to Fight AIDS, Tuberculosis and Malaria [Global Fund], World Bank, United States President's Malaria Initiative [US-PMI], United Kingdom

Department for International Development [DFID], Bill & Melinda Gates Foundation and others), key intervention development and production from the science community and private sector and support for programme action by national and international nongovernmental public health organizations.

It is this diverse partnership platform that has facilitated the development of the foundations on which malaria control today is achieving unprecedented results, including:

- a more than 10-fold increase in resources available for malaria control since the beginning of the decade, with most of the money raised over the past three years alone;
- an estimated 1.1 million child malaria deaths averted in sub-Saharan Africa in the past decade;
- a more than 50% reduction in malaria cases and deaths in 11 African countries that achieved substantial intervention scale-up;
- a more than 50% reduction in malaria cases and deaths in the majority (but not all) of the malaria-endemic countries in the other (non-African) malarious regions of the world;
- three countries over the past four years (Morocco, Turkmenistan and United Arab Emirates) that have been certified by WHO as having eliminated malaria—the first countries to have achieved this distinction in 20 years.

Global funding of malaria control in the past decade clearly has been one of the most productive health investments ever.

But the work is still far from done. Some countries have not yet begun to scale up malaria interventions; other countries that have scaled up are now struggling to achieve efficiencies in order to sustain high coverage rates and take next steps to further reduce malaria transmission, illness and the remaining malaria-associated deaths. Resistance to drugs and insecticides is also threatening the gains. And the global partnership is challenged by the forces of the global economic downturn and donors' shifting funding priorities, placing at risk even some of the most successful health initiatives.

However, based on the successes and lessons learnt, the RBM Partnership has updated its collective goals for end-2015 to reach higher and to align more closely with the MDGs, identifying the reduction of malaria deaths to near zero, the marked reduction of malaria cases and the elimination of malaria transmission in 10 countries and the European Region as major new objectives. Indeed, the next phase of the malaria response is upon us. It will require yet another extraordinary effort in the near term, including significant financial, technical and human resource commitments from countries and all existing and new partners.

Table 1
Changing malaria context, 2000–2010

	2000	2010
Global malaria policies and strategies	No overarching strategy for malaria control. Treatment policies existed but used failing drugs; few prevention policies existed. Focus on vulnerable populations.	Up-to-date WHO policies and *Global Malaria Action Plan* in place and being implemented; wide adoption of artemisinin-based combination therapy (ACT), intermittent preventive treatment for pregnant women (IPTp), LLINs free to end-users, and indoor residual spraying (IRS) policies; universal coverage for all populations at risk, introduction of recommendations for universal diagnosis.
Partnerships	Few at country, regional and global levels.	Broad and functioning partnerships at all levels.
Financing	Limited bilateral funding for programmes, and much variation between countries and many countries with essentially no external funding support; ~US$ 100 million available in 2003. Limited funding for research.	Substantial global funding led by the Global Fund, World Bank Booster, US-PMI and DFID; ~US$ 1.5 billion available in 2010. US $ 700 million for research.
Interventions		
ITNs (insecticide-treated mosquito nets)	Newly available, required re-treatment every six to 12 months (limited experience with and use of LLINs), distributed preferentially for pregnant women and young children, often via social marketing and voucher schemes; population coverage low (~2% household ownership of ≥1 ITN).	LLINs are standard, distributed widely for full population coverage, seen as a public good and distributed free to end-users in many countries; dramatic increase in household ownership; many countries with 40–80% households with ≥1 LLIN.
IRS	Known but little-used, especially in Africa; limited to a few urban areas and a few countries in southern and the horn of Africa.	Much growth in IRS use in national programmes; funding available from the Global Fund, World Bank Booster and the US-PMI; substantial populations protected with IRS annually.
IPTp	Adopted in one country (Malawi, 1993); most countries used chloroquine chemoprophylaxis to be taken at home; coverage rates were low; not well accepted by pregnant women.	Widely adopted as national policy across Africa and some highly endemic settings outside Africa; coverage rates of 2+ doses during pregnancy still highly variable, from <10% to ~70%.
Case management: diagnosis	Microscopy available. RDTs available in small numbers but quality highly variable and not well understood; thus, presumptive malaria diagnosis was the standard, especially for young children.	Microscopy more available. RDTs widely available, with quality assurance and clarity on sensitivity and specificity widely known; WHO recommends universal use of diagnostics for suspected malaria and treatment on the basis of test results.
Case management: treatment	ACTs available outside of Africa; chloroquine failed badly globally (only limited failure with *Plasmodium vivax* infections); experiencing sulfadoxine-pyrimethamine with growing resistance; country policies on first-line treatment relied heavily on drugs with growing parasite resistance.	ACTs widely available from multiple manufacturers and in many formulations. Policies now in place in most countries and growing standard use of ACTs for malaria; increasing link between laboratory-confirmed malaria and ACT.
Burden and impact		
Transmission	Essentially unchanged from the 1990s.	Tenfold reduction with ITNs and IRS; case management with ACTs may also help further.
Morbidity (malaria and anaemia cases)	Malaria case rates high in clinics and hospitals, often 30–40% of all outpatient and inpatient child visits (but often without laboratory confirmation); child anaemia requiring blood transfusion was common.	Many countries showed dramatic decreases in malaria cases and marked reduction in severe childhood anaemia and child blood transfusions—in 11 African countries >50% reduction in cases; transition to laboratory confirmation of malaria as a reporting standard has contributed to a dramatic reduction in case numbers.
Mortality	High rates and numbers of malaria deaths reported (>1 million/year), mostly in Africa, and mostly in young children, some due to acute rapidly progressive severe malaria, many linked to recurrent or persistent infection, severe anaemia and other childhood infection (bacterial sepsis, respiratory or diarrhoeal disease).	Markedly lower rates and numbers of deaths (<800 000/year) especially. More than 60% decrease in countries with high prevention coverage and transition to diagnostics and ACTs; reductions most evident in young children who had the highest previous burden.

Key points

1. Rapid intervention scale-up has resulted in substantial global and regional reductions in malaria illness and death.

The past decade has witnessed a significant impact of malaria control in countries where interventions have been scaled up. Child survival has improved around the world and across Africa. Estimates indicate that malaria prevention has contributed to saving more than 1 million children from malaria death in Africa since the inception of the RBM Partnership. National population-based surveys, facility surveys, routine health information and special studies have demonstrated consistently fewer malaria cases, less anaemia and fewer blood transfusions, less severe disease, less death and marked reduction in transmission, including elimination of malaria in three countries.

Malaria control impact has been achieved across all endemic regions:[a] Global goals focused on reducing the burden of malaria by one half have brought about dramatic impact in all WHO regions.

In the African Region: Malaria control saved more than 1 million African children from malaria death between 2000 and the launch of this report. In countries with substantial scale-up of interventions, outstanding progress has been seen, and at least 11 countries have recorded a greater than 50% reduction in malaria cases and related deaths.

In the European Region: There has been noteworthy progress in malaria control; malaria mortality has essentially been eliminated, and the region is poised to eliminate malaria in the coming five years.

In the Region of the Americas: The majority of countries have demonstrated substantial progress, and more than one half have achieved a greater than 50% reduction in malaria cases and deaths.

In the Eastern Mediterranean Region: Notable progress has occurred, with elimination having been achieved in several countries and marked progress occurring in others. But some larger countries with considerable burden, such as Somalia and Sudan, experienced limited progress over the last decade, linked to political and economic instability (although Sudan is reporting very recent successes in scale-up of malaria control).

In the South-East Asia Region: Half of the 10 malaria-endemic countries have shown a greater than 50% reduction in cases or deaths, but several large countries and/or heavily populated countries such as Bangladesh, India, Indonesia and Myanmar still suffer a considerable burden.

In the Western Pacific Region: Half of the countries have achieved a greater than 50% reduction in cases or deaths; but again, major scale-up efforts are required in countries such as Cambodia and Papua New Guinea to advance regional progress.

2. The malaria control landscape was transformed in the past decade.

The first decade of the RBM Partnership saw major changes in every aspect of malaria control, including new policies and systems for ITNs, IRS, prevention in pregnancy, and diagnosis and treatment; and systems for monitoring programme action and progress. Malaria control today is unrecognizable from just 10 years ago, and we can anticipate that this rapid pace of change will continue and be required in the coming decade to sustain and increase impact.

Evolution of the global RBM Partnership: The RBM Partnership emerged within a global public health context where partnerships were seen as the way forward, yet there was limited experience with core

[a] This report refers to the regions defined by WHO.

requirements for effectiveness. Today, the Partnership offers a robust platform for discussions and harmonization of partners' goals and actions in malaria programming, resourcing and advocacy, and its structure and function appear to be one of the stronger partnership models in global public health—undoubtedly aided by its flexible and transparent development, as well as its focus on country leadership.

Improvements in malaria control policies and strategies: Between 2000 and 2010, countries moved aggressively to align their malaria control policies with WHO recommendations and to embrace the global strategy as laid out in the *Global Malaria Action Plan*, as well as to respond to the United Nations Secretary-General's call for achieving universal coverage, particularly with ITNs in sub-Saharan Africa. Policies initially targeted the most vulnerable populations (women and young children), but have evolved to address entire populations in order to reach all people at risk, especially those potentially transmitting infections to others. And because of the recognition that malaria prevention and treatment is a global public good, and that the poorest must have access, there has been a dramatic evolution to provide interventions that are affordable and often free to end-users.

Growth in malaria control financing: Starting in earnest by mid-decade, financing commitments and disbursements for malaria control increased seven- to nine-fold (although they remain below estimated required levels to achieve full scale-up across endemic countries). Funding increases have resulted in marked increases in programme coverage and considerable health impact. This success is fragile and inextricably tied to sustained funding; in some areas, gains were quickly lost when financing was not maintained. Particularly in the current unstable global economic environment, consistent and sufficient funding is required to ensure continued success.

Improvements in interventions and delivery systems: During the course of the last decade, malaria interventions changed. ITNs are now long-lasting, in need of re-treatment less frequently. IRS is much more widely applied beyond urban and peri-urban settings and protects many more families. IPTp and ITNs reach many more pregnant and reproductive-age women through antenatal clinics. Following recent clarification of the quality, utility and decreasing price of RDTs, WHO now recommends universal diagnostic testing of suspected malaria with RDTs as a first-line approach—representing a true paradigm change for malaria control. Much more effective treatment with ACTs has reached wide-scale acceptance, distribution and use.

Improvements in measuring progress: In 2000, there was a distinct lack of information to guide programmes. Over the decade, attention to the collection and synthesis of accurate information has increased significantly. A malaria module was introduced into national surveys (Demographic and Health Survey, Multiple Indicator Cluster Survey), and the Malaria Indicator Survey facilitated data collection where these other surveys were not available. National surveillance systems have been pushed to improve timeliness and quality of information. Malaria diagnostic testing is transforming surveillance as countries change to reporting confirmed malaria rather than suspected malaria or simply fever presumed to be malaria. New mobile phone and internet technologies are facilitating novel approaches to surveillance that incorporate real-time feedback for front-line health workers. And as malaria transmission is reduced, improved surveillance and timely local information will be critical to further containing and ultimately stopping transmission.

3. Policy and action supporting intervention scale-up has been broadly accepted and prioritized as critical to stopping malaria.

Efforts to achieve universal intervention coverage, as declared by the United Nations Secretary General in 2008, have been successful in many countries.

Vector control: To date, near-full coverage of populations with LLINs has been achieved in many African countries. IRS has been markedly expanded in many countries as well. But some countries remain in the early stage of scale-up, and resources, infrastructure, technical capacity and commodities are required in those countries to achieve and maintain high coverage.

Prevention in pregnancy: While policy adoption for the prevention of malaria during pregnancy progressed rapidly during the last decade, coverage of women with IPTp has been slower and not as well supported as should have been possible. Efforts in this area need to be redoubled to protect susceptible women and their newborns.

Diagnostic testing: In 2010, WHO recommended diagnostic testing for all suspected malaria cases prior to treatment. This is revolutionary for the field of malaria control—both knowing where the malaria is and treating confirmed malaria rather than all febrile children. It is anticipated that, as with other recommendations, the full adoption of this policy into daily practice will progress rapidly.

Case management: While policy adoption for malaria treatment with ACTs has progressed rapidly, deployment and coverage with ACTs was slow until the past two years. Several African countries have recently turned the corner, and treatment using ACTs is becoming standard practice. Aligning appropriate treatment with confirmed malaria cases and reaching all those in need remain important next steps in malaria control.

4. The continual upgrading of the RBM Partnership's vision, objectives and targets is a demonstration of progress.

The 2011 update of the RBM Partnership's malaria control vision and objectives tightens the focus more closely on actions required to achieve the 2015 MDGs. Four upward changes to global malaria goals and objectives took place over the course of the past decade. The most recent update, with its increasingly ambitious targets, similarly highlights the sense of urgency accumulating as countries build on their successes.

5. Continued success requires building on what works, rapidly anticipating the need for and developing new strategies and tools, addressing threats head on, and ensuring that successful investments are not lost due to competing global priorities.

Build on what works: The rapid and substantial impacts of population-based malaria intervention scale-up are now well established. Strengthening the intervention delivery planning processes, procurement and logistics and supply systems, and financial management mechanisms, remain essential to further progress. In addition to ensuring continued universal coverage of LLINs (and IRS where appropriate), special focus on increasing coverage of IPTp, diagnostic testing and treatment is required.

Rapidly anticipate the need for and develop new strategies and tools: In this next decade, a range of new tools will likely become available: new diagnostic tests, new drugs and drug combinations, new insecticides and new ways to deliver them, and new enthusiasm for making malaria more focal and then containing and eliminating the disease in those small areas. In addition, the first moderately effective malaria vaccine may become commercially available. These new and emerging tools will introduce challenges for countries and partners in keeping updated national policies, aligning essential related budgets and implementing more and more at local levels.

The new objectives for the RBM Partnership include elimination in a growing number of countries. While this is initially focused on the WHO European Region, as other countries complete their scale-up of interventions, the next programme steps require careful examination of existing and new strategies and tools to further reduce malaria transmission on the path to pre-elimination and elimination. Future progress in malaria control will rely on these updated strategies that chart new actions and rapidly build on current success.

Directly address threats to progress: There will be threats to the progress in malaria control. These include waning efficacy of tools; challenges inherent in supporting large, complex countries that are early in their efforts to scale up malaria interventions, or countries with political instability or conflict; strengthening systems for both scaling up and maintaining efforts; supporting countries to further reduce malaria transmission and enter pre-elimination or elimination work; and providing predictable support in an environment of fluctuating global health resources.

Ensure that successful investments are not lost due to competing global development priorities: Malaria control has been an excellent investment.[2] Sleeping under an ITN and having a home sprayed with insecticide are now normal expectations in many millions of households and in most national malaria control programmes. But if financing commitments falter, the substantial gains to date will be quickly lost. RBM partners must continue producing results and communicating these successes to decision-makers in and beyond the health sector so that it will be unthinkable to reduce global commitments to support malaria responses. As with global immunization, this set of essential and highly effective child survival interventions must continue to be uniquely prioritized in a way that guarantees they are in reach for the poorest and most rural or marginalized populations.

Political momentum, particularly among the endemic countries, will be essential to maintain the gains, and keep malaria high on national and international agendas. The recent formation of the African Leaders Malaria Alliance (ALMA), a coalition of 39 African Heads of State focused on ending deaths from malaria, represents a groundbreaking opportunity to ensure that successful investments are maintained.

Roll Back Malaria Partnership vision, objectives and targets, as updated in 2011

Vision: Achieve a malaria-free world.

Objective 1: Reduce global malaria deaths to near zero by end-2015.

Objective 2: Reduce global malaria cases by 75% by end-2015 (from 2000 levels).

Objective 3: Eliminate malaria by 2015 in 10 new countries and in the WHO European Region.

Targets include: Achieve universal access to and utilization of prevention measures; sustain universal access to and utilization of prevention measures; accelerate development of surveillance systems; achieve universal access to case management in the public sector; achieve universal access to case management and referral in the private sector; achieve universal access to community case management of malaria.


Characteristics of
Caractéristiques de
Ready to use.
Prête à l'emploi.
Wide mesh size to provide good airflow.
Larges mailles pour une meilleure ventilation.
Long lasting efficacy.
Efficacité durable.
High durability to washing.
Grande résistance au lavage.

MALARIA: GLOBAL EXTENT AND INTERVENTION STRATEGIES

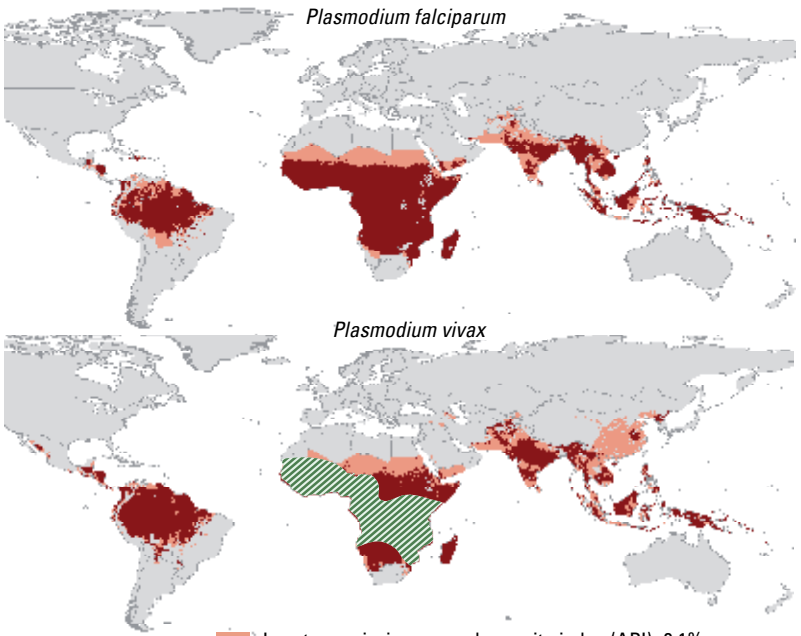
In 2000, malaria was a major public health problem and essentially ubiquitous across the tropics. It was endemic in more than 100 countries and a particular problem in sub-Saharan Africa, which accounted for the vast majority of cases and deaths. There has since been substantial progress made in malaria control in many countries, including a marked reduction in malaria transmission, reduced levels of illness and deaths and elimination of malaria in three countries. Nevertheless, progress is incomplete; malaria remains a global problem threatening nearly 3 billion people around the world and accounting for 8% of child deaths globally and 16% of child deaths in Africa, where infections, illness and mortality are greatest.[3]

Figure 1.1 shows the global extent of *Plasmodium falciparum* (the cause of most severe malaria disease) and *Plasmodium vivax* (the second most prevalent malaria parasite).[4] Because most of the severe illness and death from malaria is due to *P. falciparum* infection, this report will focus mainly on that parasite and on the geographic area where its transmission is most intense and where more than 85% of the global malaria burden exists (sub-Saharan Africa).

Figure 1.1

Global distribution of malaria risk from *Plasmodium falciparum* and *Plasmodium vivax*

P. falciparum transmission dominates across sub-Saharan African populations, while elsewhere both P. falciparum and P. vivax are found.



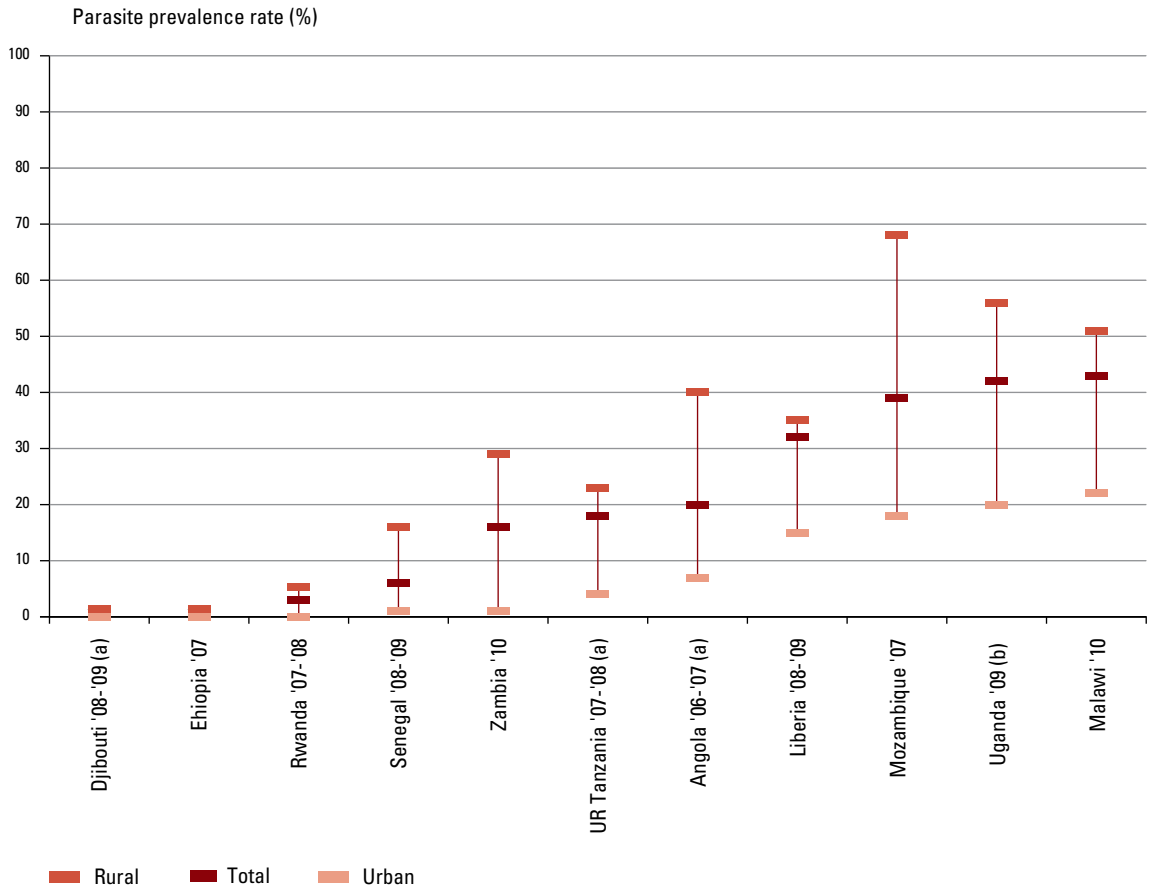
Sources: Malaria Atlas Project.[5,6]

Young children in rural, poor communities are at highest risk of contracting malaria and suffering the most severe disease outcomes. Even today, as control improves, the highest rates of malaria infection, illness and death are found among rural and poor communities (Figure 1.2). This highlights the requirement that intervention programmes must reach these most-at-risk populations through equitable distribution of and access to services.

Figure 1.2

Proportion of rural and urban children aged 6–59 months with laboratory-confirmed malaria infection, African countries, 2007–2010

Malaria is not an equitable disease. In Africa, infection rates among young children are often two or more times greater in rural than in urban areas, and the differences (inequity) tend to increase as overall transmission intensity increases.



Note: (a) Refers to malaria infection detected by a rapid diagnostic test; all others determined by microscopy. (b) Refers to surveys among children aged 0–59 months.

Sources: Demographic and Health Surveys and Malaria Indicator Surveys for 2006–2010 that included testing for malaria infection.

Box 1: Interventions to control malaria

Several highly effective malaria interventions exist today for widespread use in endemic settings. Controlling malaria is based on preventing the infection, prompt diagnostic testing of suspected cases and effective treatment of confirmed infection. 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 may be bitten by an infected mosquito almost nightly. Preventive measures would need to accomplish a 100-fold reduction in levels of transmission to reduce the frequency to one potentially infective bite every three to four months. Fortunately, the combination of available prevention and treatment tools is capable of such transmission reduction and much progress is being made, even in malaria-intense settings.

Prevention requires addressing the interaction of *Anophelene* mosquitoes with humans. Female mosquitoes typically require a blood meal every three days for adequate protein and energy to produce and lay eggs. During a bite, the mosquito abdomen fills with blood to several times the usual body weight, requiring a nearby resting place for digestion. *Anophelene* mosquitoes prefer vertical resting surfaces in warm, dark, humid and protected settings, such as a wall or curtain inside a house. Once the blood meal is digested, the mosquito will then seek a nearby body of water suitable for laying eggs. Malaria parasites ingested by a mosquito must develop over about 10 days before the mosquito can transmit the infection to another human. If prevention measures shorten mosquito survival to less than 10 days, this can interrupt transmission. Because most malaria-carrying mosquitoes in Africa bite indoors at night, and also rest indoors after feeding, vector control with insecticide-treated mosquito nets (ITN) and indoor residual spraying (IRS) with insecticides is highly effective.

Prevention

Insecticide-treated mosquito nets: Most ITNs manufactured today are long-lasting insecticide-treated mosquito nets (LLINs), pre-treated with insecticide; they do not require re-treatment over their lifetime (generally estimated as three years, although actual lifespan varies considerably). One of the most effective ways to prevent malaria transmission is to sleep under an ITN. Regular ITN use has been shown to reduce child deaths by an estimated 20% in endemic areas,[7] and recent evidence suggests possibly larger mortality declines.[8] 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. Scientifically controlled trials of ITNs in settings with varying transmission risk (from low to very high) have shown great efficacy in mosquito killing, marked transmission reduction and markedly improved child survival. When a large proportion of the population is using ITNs, they have been shown to have some 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 to the efficacy and effectiveness of ITNs are an effective insecticide on the surface and regular use.

ITNs were initially targeted to the high-risk groups of young children and pregnant women. As more was understood about malaria risk across the population, and as more resources became available for widespread malaria prevention, it was recognized that full household ITN coverage was a sound, scientifically-based approach. Current World Health Organization (WHO) recommendations for malaria-endemic settings are that all people should sleep under an ITN throughout the malaria transmission season(s). In

households where there are inadequate numbers of ITNs, young children and pregnant women should be prioritized to sleep under an ITN. It is particularly critical that the ITN is used each night so that infective mosquitoes are more likely to come into contact with the insecticide. As noted above, it is optimal if all people in the household are sleeping under an ITN.

Indoor residual spraying: IRS involves applying a long-lasting insecticide to the inside walls of houses and other structures where people sleep, in order to kill mosquitoes when they rest on the walls. IRS is a highly effective malaria prevention approach in settings where it is epidemiologically and logistically appropriate. IRS must be applied prior to the transmission season (either annually or twice a year if there are continuous or multiple seasons of transmission); for this reason, it is most suited to areas of seasonal transmission. IRS must be carried out by a trained cadre of workers who move through a community spraying all appropriate structures. This is easiest when houses are close together, as found in urban or peri-urban settings. As a means of limiting the spread of insecticide-resistant mosquitoes, IRS programmes should rotate the use of different insecticides with subsequent spray cycles.

Intermittent preventive treatment during pregnancy (IPTp): Together with regular use of ITNs, IPTp is central 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 and placental malaria, and babies delivered prematurely and with low birth weight. Currently, sulfadoxine-pyrimethamine is considered a safe and appropriate drug for IPTp in malaria-endemic settings.

Diagnosis and treatment

Prompt and effective malaria diagnosis and treatment: Prompt confirmatory diagnostic testing and treatment with an effective antimalarial agent for those with malaria—preferably within 24 hours of fever onset—is necessary to prevent life-threatening complications. Standard malaria microscopy, or the use of a quality-assured rapid diagnostic test (RDT), is recommended by WHO for universal confirmatory malaria diagnosis prior to treatment. Artemisinin-based combination therapy (ACT) is recommended for the treatment of confirmed, uncomplicated *P. falciparum* infection, whereas chloroquine remains effective for most cases of *P. vivax*.

Prompt malaria diagnostic testing and treatment poses several challenges. First, many cases do not present promptly and many infected people may seek care outside of formal health structures. Programmes must therefore examine opportunities to identify and treat malaria cases in the variety of places where they present, such as through community health workers and in formal and informal private-sector settings. Second, until recently, presumptive treatment of fever has been standard practice and many country programmes and health providers have viewed fever in children as equivalent to malaria. But as malaria prevention capacity improves and access to diagnostic testing increases, this practice is increasingly seen not only as ineffective, but also as adding to malaria over-treatment. In addition, presumptive treatment of fever does not provide appropriate treatment for patients who do not have malaria and who require an alternative treatment. Malaria diagnosis with microscopy or an RDT is therefore viewed as critical.

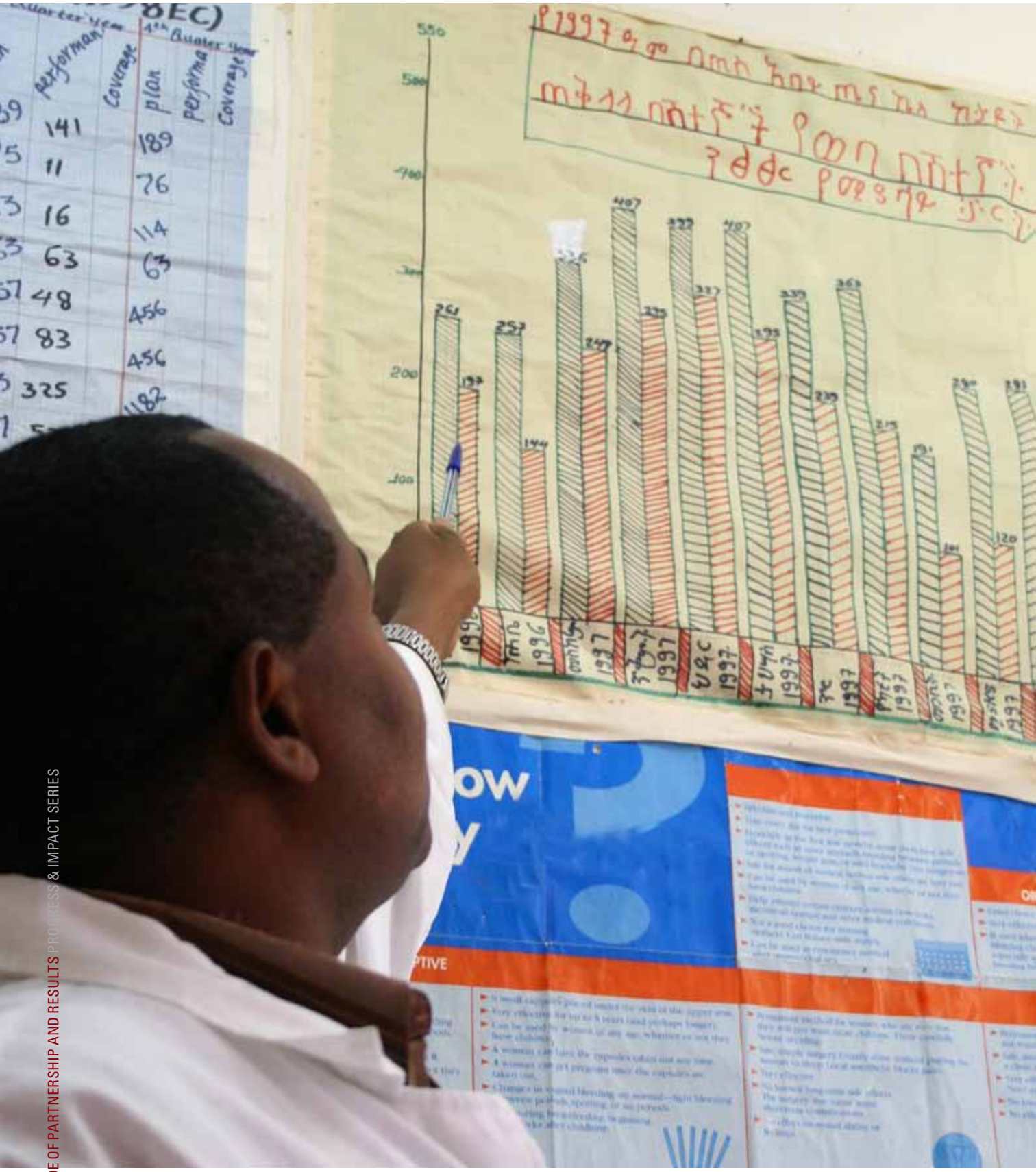
Finally, antimalarial drug efficacy is vital; malaria parasites have long had the ability to develop resistance to antimalarial drugs, posing a threat to intervention effectiveness. Programmes must use

diagnostics to limit and focus drug use to those in genuine need, and must monitor the efficacy of their drugs over time to ensure that the most effective drugs available are used.

Other interventions

Malaria 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. Within 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 1950s and 1960s in WHO's Global Malaria Eradication Programme (GMEP) efforts (see below) and is relevant once again to countries progressing towards malaria elimination today. Plans for implementing these emerging interventions should be developed early so they can be fully in place when needed.

Although other malaria interventions exist, they are not widely recommended for national programme adoption. For example, use of mosquito repellents 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 products in mosquito breeding sites can be effective in reducing the emergence of new mosquitoes; however, the required frequent application, associated time and financial costs and the challenges of reaching the numerous mosquito breeding sites means that this approach may be relevant in only a few, specific settings.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A DECADE OF THE ROLL BACK MALARIA PARTNERSHIP

In the span of a decade, the global movement to stop malaria has evolved from initially cautious, fragmented and modest efforts into a model approach of how a global and national partnership can transform itself to achieve ever-increasing aspirations. Major changes have occurred in every aspect of malaria control since 2000. The Roll Back Malaria Partnership today comprises diverse stakeholders, organizations and collaborative efforts involving national malaria control programmes and country-level partners; the Office of the UN Secretary-General's Special Envoy for Malaria; the WHO Global Malaria Programme (GMP); the United Nations Children's Fund (UNICEF); key multilateral and donor organizations (e.g. the Global Fund to fight AIDS, Tuberculosis and Malaria [Global Fund], World Bank, United States President's Malaria Initiative [US-PMI], UNITAID, United Kingdom Department for International Development [DFID], Bill & Melinda Gates Foundation); the science community; the private sector; and national and international nongovernmental organizations supporting development and introduction of key interventions in countries. Through this powerful collaborative approach, countries have rapidly compiled remarkable evidence of impact, and they continue to achieve unprecedented results. Malaria control today is unrecognizable from just 10 years ago, and we should anticipate that this rapid and striking progress will continue.

Early global commitment and momentum

WHO launched the Global Malaria Eradication Programme (GMEP) in 1955. The initiative used an approach of uniformly introducing targeted interventions in all malaria-endemic areas of many countries. The approach relied predominantly on the rigorous use of IRS (with DDT[b] or other insecticides) and extensive case detection and treatment. It was hoped that the programme would bring malaria down to such low levels that the remaining few cases could be dealt with by surveillance, case-finding and containment. While the results of the GMEP were rapid in areas with enabling circumstances, the African region was not the primary focus and public support for the campaign began to wane in the 1960s as obstacles to global eradication became increasingly evident. While this effort led to malaria elimination in many countries, halting the programme led to significant re-emergence of malaria. Subsequent years of programme neglect resulted in a high and growing malaria burden.

The revised *Global Malaria Strategy* adopted in 1992 in Amsterdam by national policy-makers from African malaria-endemic countries helped catalyze a renewed commitment to malaria, particularly in the most affected countries. Momentum steadily grew over the following five years, until African Heads of State pledged to make tackling the disease one of their main priorities and put forward the malaria plan of action embodied in the *Harare Declaration* in 1997. This visible commitment to regional action stimulated two further malaria initiatives that year: a consortium of malaria researchers including African scientists established the Multilateral Initiative on

[b] DDT (from its full name, dichloro-diphenyl-trichloroethane) is a synthetic pesticide.

Malaria, and representatives of the World Bank, WHO, UNICEF and others launched the African Initiative on Malaria Control. These regionally-led plans and programmes of the late 1990s were early indications of a growing and renewed global malaria control movement.

This renewed interest in malaria control was occurring as other major global health policies and approaches were being developed; key coinciding events in this new environment of global health are described in Box 2.

Upon her election as Director General of WHO in 1998, Gro Harlem Brundtland announced that one of her priorities would be a new effort to "roll back malaria". In support of African regional initiatives the intention was "to approach malaria in a new way" and to halve malaria-related mortality by 2010. Dr Bruntland's leadership was soon followed by a substantial and high-level international response from other leaders. At the 1998 G8 Summit held in Birmingham, United Kingdom, the leaders of G8 nations undertook to support the new Roll Back Malaria initiative and relieve the suffering experienced by hundreds of millions of people, including aiming for a significant reduction in the malaria death rate by 2010. DFID backed up this commitment with a £60 million contribution to kick-start the development of the Roll Back Malaria Partnership. In November 1998, the Roll Back Malaria (RBM) Partnership was launched by WHO, the World Bank, UNICEF and the United Nations Development Programme (UNDP).

The African Summit on Roll Back Malaria, which was held in Abuja, Nigeria, in 2000, reflected a real convergence of political momentum, institutional synergy and technical consensus on malaria. Forty-four malaria-endemic countries in Africa attended and re-committed themselves to an intensive effort to halve malaria deaths by 2010. As part of the 2000 *Abuja Declaration*, leaders agreed to work with partners towards stated targets, ensuring the allocation of necessary resources from the private and public sectors and from nongovernmental organizations. They further pledged to create an enabling environment in their countries to permit increased participation of partners in malaria control actions, and addressed issues such as eliminating taxes and tariffs on core malaria control commodities.

The Abuja Summit was followed in the same year by a critical G8 Summit, in Okinawa, Japan, which also pledged to support the shared goal to reduce the burden of disease associated with malaria by half by 2010 and mobilize additional resources to the maximum extent possible.[9] Malaria was considered also as a development issue and incorporated into the MDGs along with HIV/AIDS (Box 3). By 2001, the launch of the Global Fund laid further groundwork for the transformation in global malaria control.


Land speed

Box 2: Global health in context—the new millennium

The year 2000 marked the beginning of an unprecedented expansion of interest and commitment by countries, multilateral agencies, global bodies and civil society to improving global health and development. This was prompted in the 1990s by a series of global summits on broad development priorities in which pledges were secured to tackle major issues of poverty and development. This culminated in the landmark *United Nations Millennium Declaration*, adopted by all Member Nations of the UN General Assembly in 2000, and its eight corresponding sets of time-bound targets—the Millennium Development Goals (MDGs).

Political and financial commitment intensified, with a sharpened focus on addressing the specific targets and priorities of the MDGs, including combating HIV/AIDS, malaria and other diseases. In parallel, substantial increases in annual international health funding were seen, from around US$ 5.6 billion in 1990 to US$ 21.8 billion in 2007.

At the same time, the number and range of new organizations, initiatives and financing mechanisms addressing the major health-related MDG priorities expanded at all levels. As it became evident that no single entity or sector could alone contend with critical areas, active partnerships were set up to link the efforts of the public and private sectors, nongovernmental organizations, multilateral bodies such as those of the United Nations, and donors and philanthropists to focus collective attention on specific sets of targets and goals.

National, regional and global partnerships began actively leveraging the institutional capacities and expertise required to carry out multiple interventions towards complex targets. This approach was also fuelled by an increasing trend towards results-oriented planning and resource allocation. Partnerships were heralded as a means to enhance the cost-effective delivery of interventions to achieve rapidly evolving coverage objectives.

In addition to increased financing and commitments by multiple stakeholders and constituencies, the global health and political context evolved dramatically over the past decade. Improved health status was no longer considered a simple outcome of development but a powerful determinant of social and economic development at all levels. International policy discussions increasingly considered health outcomes as an essential component.

Specific elements of this changing context continuously influence evolution in strategic thinking: from the former 'military campaign' approach to malaria eradication of the 1950s to the 1970s into the more collaboration-based approaches that characterize the RBM Partnership today.

Aid investment and effectiveness: raising the bar

Soon after the MDGs were adopted, there was widespread recognition that achieving them required a shift in the scale and principles of development assistance. A new approach to global development was established in 2002 at the International Conference on Financing for Development in Monterrey, Mexico. The 'Monterrey Consensus' essentially comprised a new deal: a commitment from donor countries to provide 0.7% of their respective gross national incomes to official development assistance (ODA), in exchange for a commitment from recipient countries to take responsibility for their own development planning and implementation. The *Paris Declaration on Aid Effectiveness* (2005), the G8 Summit in Gleneagles, United Kingdom, in the

same year, and the subsequent *Accra Agenda for Action* (2008) put into practice a set of explicit aid principles for developing countries, donors and the entire development community to work towards.

Within the context of health and malaria, aid effectiveness priorities have been among the explicit guiding principles of the RBM Partnership. National ownership of malaria control at all levels, alignment and harmonization of approaches and a focus on results and mutual accountability are the highest-priority principles that the RBM Partnership seeks to build in country settings. Similarly, the RBM Partnership itself has long been characterized by unprecedented endemic-country engagement in its governance and priority-setting mechanisms.

Harmonizing and strengthening systems

A health system consists of all the state and non-state actors, organizations, institutions, resources and people whose primary purpose is to improve health. The effectiveness of planning, coordination and implementation directly influence programme impact on health outcomes. Applying a harmonized approach to health systems strengthening (HSS) and working through existing systems also can reduce transaction costs, increase efficiency and improve focus on nationally determined priorities. Conversely, weak health systems can become rapidly overburdened by the combined demands of disease-specific health programmes that elect to work outside of established health systems, resulting in little to no health impact.

A cornerstone of the RBM Partnership has always been that the primary partner in each malaria-endemic country is the national government, and in particular, the national malaria control programme. This has helped ensure that collective efforts of all RBM partners are focused on use and strengthening of existing health systems, and has prevented the creation of malaria-specific clinics, laboratories or other structures. In order to be coherent with current and future HSS priorities, national and international malaria plans must continue to help align malaria control programmes with HSS goals, and should be adapted to address key constraints in each area of the emerging health systems framework.[c]

Equity as a guiding principle in health care

The 2008 report of the WHO Commission on the Social Determinants of Health challenged public health thinking on several fronts through its abundant evidence that the true upstream drivers of health inequities reside in the social, economic and political environments. By showing how factors such as educational attainment or poverty directly shape access to health care and resulting health outcomes in all countries, health programmes and policies were challenged to tackle the leading causes of ill-health at their roots—a concept with particular relevance to achieving the health-related MDGs.

Health equity has emerged in the last decade as the central value for strengthening primary health care, and public health programmes have responded by aligning efforts to reach those most at risk—usually the poorest people living in remote areas. Because malaria typically affects impoverished, rural and disenfranchised people and communities, reaching them is a critical priority among RBM partners at all levels.

[c] The current WHO framework describes health systems in terms of six core components or 'building blocks': (i) service delivery, (ii) health workforce, (iii) health information systems, (iv) access to essential medicines, (v) financing, and (vi) leadership/governance.

RBM Partnership evolution

The RBM Partnership emerged in a complex but supportive global environment where consensus on key principles, including the lead role of national governments, and emphasis on performance were solid. The scientific evidence base for existing interventions was robust, and early mechanisms for monitoring progress and impact were established. Its initial steps were cautious, building on partnerships and core country programme strategies that involved modest targets and considerable uncertainty regarding implementation. While momentum for establishing a global partnership around malaria was increasing, questions remained about what the RBM Partnership's exact role should be and how it should function in relation to WHO's established malaria department. In fact, for the initial four years, the malaria department at WHO was called the "Roll Back Malaria Department".

The RBM Partnership was originally conceived and continues to function as a collective movement that involves and strengthens all malaria-related activities, across the health sector and beyond. In 1998, before the Partnership existed, stakeholders expressed that the RBM initiative should set standards for partnership between the public and private sectors.[11] Since its inception, the mandate of the RBM Partnership has avoided creating new structures and systems, and has focused on:

- seeking greater support for malaria control activities, worldwide;
- raising awareness of the global problem of malaria;
- harmonizing partner actions in support of malaria-affected countries as they developed effective programmes.

At the outset of the RBM Partnership, while country aspirations and commitments were high, ITN distribution plans and IRS initiatives were largely absent from national malaria control plans. National malaria control consisted mainly of providing first-line treatment with chloroquine—a drug that had become largely ineffective due to parasite resistance—based on presumptive treatment of fever rather than diagnostic confirmation. While national and global commitment levels were high, capacity, funding, infrastructure and experience to tackle malaria at the community level were quite low.

Recognizing the need to establish a baseline and increase provision of technical support, 15 African countries engaged with the RBM Partnership in 1999 to complete country strategic plans outlining challenges and plans. These strategic plans were based on the RBM Partnership's strategic elements for organizing malaria control activities and concentrating collective efforts on:

- prevention, through the introduction of ITNs and IRS;
- IPTp, in order to improve the health of mothers and their newborns;
- rapid diagnosis and treatment, including the adoption of agreed-upon and coherent drug use guidelines to provide effective care, reduce transmission and slow the development of resistance;
- rapid response to malaria outbreaks or epidemics in areas with unstable malaria.

Box 3: Malaria control contributes broadly to achievement of the Millennium Development Goals

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

MDG 4 target: Reduce by two thirds, between 1990 and 2015, the under-five mortality rate:

- Indicator 4.1: Under-five mortality rate.
- Indicator 4.2: Infant mortality rate.

MDG 6 target: Have halted by 2015 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 bednets.
- Indicator 6.8: Proportion of children under five with fever who are treated with appropriate antimalarial drugs.

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, and placental malaria infection contributes to both premature delivery and low birth weight, which are major contributors to early child mortality. Finally, a comprehensive malaria control programme contributes importantly to the development of open, predictable, non-discriminatory financial systems supporting public health broadly in all malaria-endemic countries.

Source: UN Statistics Division (2011).[10]

Roll Back Malaria Partnership: a time of transition

In the few years following the establishment of the RBM Partnership, new actors and resources continued to emerge; new technologies and financing mechanisms were introduced; and a greater profile for malaria was accompanied by increasing demands for accountability.

A lack of clarity arose regarding the Partnership's focus and emphasis on providing technical guidance to the malaria response; facilitation of cooperation among all partners; and effective advocacy, communication and information-sharing. As a result, the RBM Partnership underwent a rigorous external evaluation in 2002[12] to assess progress to date and identify potential opportunities to ensure the Partnership was on track to help the world achieve its malaria control goals. The evaluation identified pressing needs for the Partnership to establish an autonomous governing body and to distinguish more clearly between the roles of the RBM Partnership Secretariat and the WHO technical, normative roles in malaria control.

In 2004, the RBM Partnership refined and endorsed two important concepts that would further shape the global approach to malaria control. The first was the concept of a national approach to malaria control based on the 'Three Ones'. This approach, developed originally within the international HIV community, embodied the commitment to coordinated action based on a single national plan, a single national coordinating authority and a single system for monitoring and evaluating progress. The second important concept was the 'scale-up for impact' approach to national malaria control. This approach involves intensive coordinated action by national malaria partnerships to rapidly achieve high rates of intervention coverage with ITNs, IRS and preventive and therapeutic medicines to result in rapid reduction of the malaria burden. Development and endorsement of these two concepts were early, bold steps, reflecting growing aspirations and expectations in malaria control.

While progress was being made in conceptualizing a new paradigm for global malaria control, confusion regarding the role and identity of the RBM Partnership, the Partnership Secretariat and individual partners persisted. An RBM Partnership Board was created in an effort to mitigate the challenges, although some of the dichotomy surrounding the respective roles of individual partners within the RBM Partnership remained. At an RBM Partnership Board meeting in 2005, these converging perceptions prompted an open discourse that called into question the value of the Partnership's continued existence. It was at this point that the Board agreed to embark on a comprehensive initiative to redesign the Partnership. The change management process that followed took the Partnership through an essential transition into its second phase, and clarified its main focus, governance and structure, core functions and collaborative models. And, a more recent independent evaluation in 2009[13] has continued the process of strengthening and focusing the RBM Partnership.

Malaria control transformed

At the decade's mid-point, the malaria financing landscape experienced a sea-change. The advent of significant funding from the Global Fund (Box 4), announcement of the World Bank Malaria Control Booster Programme, the US-PMI and new financial commitments to malaria by the Bill & Melinda Gates Foundation shifted the entire malaria response into high gear. 2005 marked the beginning of a five-year period in which global malaria control funding increased approximately fivefold.

The RBM Partnership emerged from 2005 as a well-positioned collaboration among many partners, all aiming to stop malaria. New evidence on the optimal intervention mix, strategies for delivery, and populations targeted to receive interventions resulted in dramatic evolutions in programming during this period. By 2006, a handful of countries were well on their way towards implementing ambitious scale-up plans, quickly achieving high rates of coverage. Seeing early results, strong capacity and high ambitions, global donors stepped up their support. At this time, the RBM Partnership working groups and sub-regional working groups were scrutinized and strengthened to create consensus among partners and help coordinate the response more effectively. Of note, the RBM Partnership Harmonization Working Group, bringing together all mechanisms, was tasked with supporting countries in their applications for additional funding from the Global Fund and other donors and this further helped with malaria control resourcing, especially in sub-Saharan African countries.

In 2007, the Bill & Melinda Gates Foundation sponsored a Malaria Forum in Seattle, Washington (USA), for the first time addressing the question, "…if we can be successful in controlling malaria disease burden, then what's next?" This event reflected a renewed and vigorous confidence within the malaria control community that large-scale malaria control was possible with currently existing tools. At the same time, speakers at the Forum also acknowledged that support for long-term success in malaria transmission reduction and pre-elimination would require new tools and strategies. The outcome was a global consultative process that described for the first time the medium- to long-term Malaria Eradication Research Agenda (MalERA). In this way, the Forum resurrected the discussion of malaria elimination and eradication as a feasible global goal.

Paired with the continued increases in aspirations were commitments at the highest global levels to stop malaria. In February 2008, the United Nations Secretary-General nominated his first Special Envoy for Malaria to ensure that malaria control remained central on the international development agenda, and to mobilize resources and political support from the private and public sectors. This was followed shortly by the United Nations Secretary-General's call for universal coverage of malaria interventions by end-2010 and an end to malaria deaths by end-2015. There was immediate support and encouragement in a message from the President of the African Union. In September 2008, associated with the opening of the UN General Assembly, the Special Envoy organized a major pledging conference. At the same event, the RBM Partnership launched the landmark *Global Malaria Action Plan*. In September 2009, nine African Heads of State created the African Leaders' Malaria Alliance (ALMA) to ensure that African Heads of State would drive the effort themselves and accelerate the achievement of results. By 2011, 39 African presidents or prime ministers were members of ALMA. Thus, over the course of just a few years, a clear and strong global consensus was established, providing a framework and targets, resources and global commitment for malaria control (Figure 2.1). Moreover, ALMA is now working with a few countries to develop financial sustainability plans that propose how countries can finance their malaria programmes both through new sources of funds (including non-traditional donors and domestic resources) and novel mechanisms to channel the resources.

Box 4: Mobilizing resources from the Global Fund to achieve the 2010 targets

While the advent of the Global Fund in 2002 represented the single biggest funding opportunity for malaria control scale-up, it also presented a challenge to the malaria community. Strategic plans to control malaria had been developed by many countries, but when these plans were converted into proposals to the Global Fund, they were generally submitted in piecemeal form, limiting the average malaria success rate to less than 40% between 2002 and 2006. Even though some of the early rounds of funding managed to provide crucial support for the roll-out of the newly adopted ACT policy, limited funding from external sources and challenges in developing high-quality proposals during that time caused momentum to slow by Rounds 5 and 6.

In November 2006, the Executive Director of the Global Fund challenged the newly formed RBM Partnership Board to take advantage of the scale-up opportunity presented by the Global Fund by implementing a proactive process to support countries to develop high-quality proposals. The RBM Partnership Harmonization Working Group (HWG), which emerged from the change management process undertaken by RBM in 2005, was tasked with this challenge because it had broad representation across the Partnership. The HWG implemented a package of support services beginning in 2007, and helped countries achieve an 89% success rate among Round 10 proposals in 2010—the highest rate for any disease across the Global Fund. The package of proposal support includes:

- providing guidance to countries on best practices to scale up;
- assisting countries to respond directly to technical concerns raised in previous submissions by the Global Fund's Technical Review Panel;
- pairing a local consultant who understands the country context with an international consultant who understands the global strategy within which the proposed scale-up will occur;
- forming a Mock Technical Review Panel (TRP) in which countries peer-review each others' proposals, offering constructive criticism and suggestions alongside international experts;
- conducting follow-up partner missions where required;
- providing an expert remote review of proposals prior to submission to iron out any remaining issues.

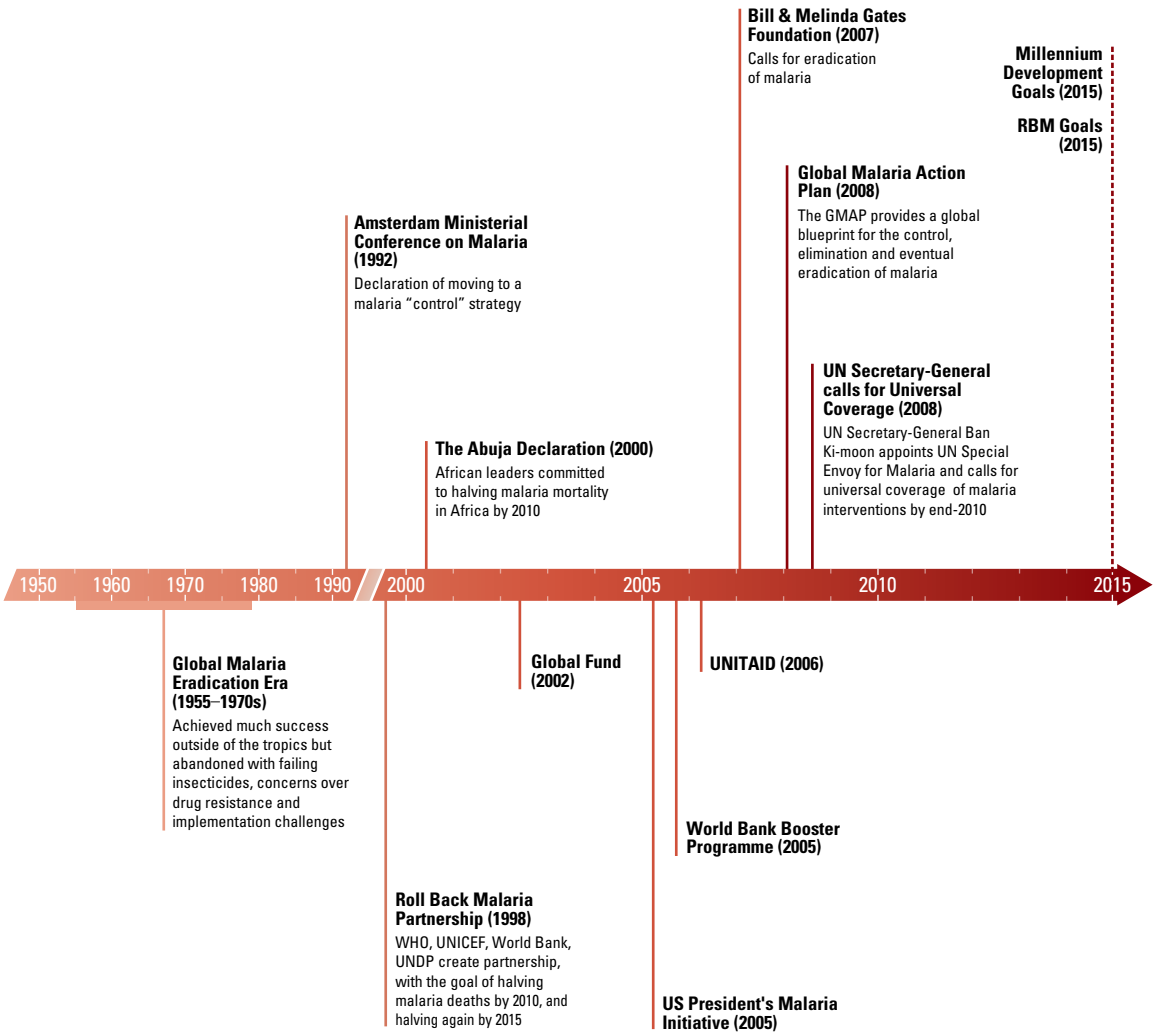
The support package concludes with a joint briefing of the Mock TRP from the HWG and the WHO, respectively, providing the TRP with the operational and technical guidance that was shared with applicants.

The multi-partner nature of the effort cannot be overstated, with WHO playing a critical technical role, while a range of partners provide operational guidance. The process over Rounds 7 through 10 has cost the RBM Partnership approximately US$2.5 million, and secured resources from the Global Fund during 2007–2010 of almost US$4 billion in sub-Saharan Africa and India alone. These results suggest that the commitment to strengthening Global Fund proposals is arguably one of the best value for money investments the international health community has made, and was the key driver of the funding boosts secured by the malaria community in the latter half of the last decade towards achieving universal coverage.

Figure 2.1

Timeline, activities and events in the recent history of global malaria control

After decades of limited malaria control programme action, the RBM Partnership ushered in a sequence of: establishing core programme actions and targets (1998–2000), raising resources (2002 and beyond), connecting programme resources to action and increasing targets and profile of progress (2007 and beyond).



Scientific and private-sector support for the Roll Back Malaria Partnership

The *Global Malaria Action Plan* clearly identified science and research as underpinning malaria prevention and control efforts through developing new tools, improving existing tools, assessing and ensuring quality of interventions and assessing and further evolving malaria control strategies. Since its implementation, businesses and the private sector have been active and critical RBM partners are committed to producing and improving on the package of available malaria tools. Pharmaceutical, chemical and textile companies have all contributed directly and substantively. Many businesses have included malaria control as part of their employee benefits packages and have recouped that investment.[2] Working together in strategic initiatives such as the Medicines for Malaria Venture (MMV), the Foundation for Innovative and New Diagnostics (FIND), the Malaria Vaccine Initiative (MVI), and the Innovative Vector Control Consortium (IVCC), both the scientific and business communities have supported new and improved product developments across the spectrum of the malaria intervention package.

Country progress is fuelling change

The surge in commitments at all levels to reducing the malaria burden has brought about faster and more substantial country impact than previously anticipated. Countries such as Ethiopia, Rwanda and Zambia—and sub-national areas such as Zanzibar—achieved or surpassed many intervention coverage targets within their first 18 months of implementing scale-up activities. Robust evaluation methods provided credible evidence of impact, benefits in terms of lives saved and illness averted, and relief of the burden on health systems accrued rapidly. Over the course of the decade, as national programmes quickly demonstrated the ability to deliver essential prevention, care and treatment interventions to an increasing proportion of their population, the collective malaria community responded by setting increasingly ambitious malaria prevention goals (Box 5).

At the same time, the RBM Partnership acted on its shared commitments to convene working groups and sub-regional networks as formal partnership mechanisms to disseminate new malaria control policies and best practices, and to coordinate programme support activities. The RBM Partnership currently has working groups focusing on advocacy, case management, communications, harmonization, malaria in pregnancy, monitoring and evaluation, procurement and supply management, resources, and vector control. Sub-regional networks include four in Africa (eastern, southern, central and western). In addition, many national governments, foundations and individual donors are supporting multi-country coordination initiatives in the Mekong River region and in the Amazon region of South America, and there are specific efforts such as the Asia-Pacific Malaria Elimination Network, the Asia Pacific *P. vivax* Operational Research Network, the Southern Africa Elimination 8 Initiative, the Meso-America Malaria Elimination Initiative and many others.[d] And in relation to high-level policy advocacy efforts, organizations such as ALMA are creating political will across the African continent, and are now working with some governments to develop new and innovative financing mechanisms to help sustain their malaria control efforts into the future.

[d] Support for these initiatives includes that from Australia, Catalunia, China, Japan, United States, the Bill & Melinda Gates Foundation, Carlos Slim and others.

Box 5: Global malaria goals over the decade (2000–2010)

Over the decade, the partners set a series of increasingly ambitious collective malaria prevention and treatment goals. In 2000, African leaders attending the historic African Summit on Roll Back Malaria in Abuja, Nigeria, re-committed their countries to 'rolling back malaria' and endorsed a set of bold targets for the year 2005.

2005 targets

(established at the 2000 Abuja Summit)

- At least 60% of all people at risk, particularly children younger than five years and pregnant women, use locally appropriate vector control methods.
- At least 60% of all people suffering with malaria have prompt access to, and are able to correctly use, affordable and appropriate treatment within 24 hours of the onset of symptoms.
- At least 60% of all pregnant women who are at risk of malaria, especially those in their first pregnancy, have access to chemoprophylaxis or presumptive intermittent treatment.
- Halve malaria mortality between 2000 and 2010.

These targets were subsequently updated (in 2005) with more ambitious goals for the year 2010, as laid out in the RBM Partnership's *Global Strategic Plan 2005–2015*. However, rapid progress in malaria control in subsequent years led many global leaders to further challenge the malaria community to take full advantage of the important contribution of malaria control in reaching the MDGs and to ultimately envision a malaria-free world.

2010 targets

(established in the 2005 RBM Partnership Global Strategic Plan 2005–2015 and updated in the 2008 RBM Partnership Global Malaria Action Plan)

- At least 80% of people at risk of malaria are protected using locally appropriate vector control methods.
- At least 80% of malaria patients are diagnosed and treated with effective antimalarial medicines within one day of the onset of illness.
- At least 80% of pregnant women are receiving intermittent preventive treatment in areas where malaria transmission is stable.
- Halve the malaria burden between 2000 and 2010.

Universal coverage target

(established in the 2008 RBM Partnership *Global Malaria Action Plan*)

- Achieve universal coverage for all populations at risk using locally appropriate interventions for prevention and case management by 2010.

In 2008, the United Nations Secretary-General called for all countries to achieve "universal coverage" with essential malaria control interventions by 31 December 2010.

Sources: RBM Partnership, *Global Malaria Action Plan,* 2008.[14] RBM Partnership, *Global Strategic Plan 2005–2015,* 2005.[15] African Summit on Roll Back Malaria, *The Abuja Declaration and Plan for Action,* 2000.[16] UN Statistics Division, 2011.[17] Office of the UN Secretary-General's Special Envoy for Malaria, 2009.[18]

A decade of changes in Roll Back Malaria Partnership processes and priorities

Collective and collaborative partnerships in malaria control have resulted in improvements in prevention and control policies and coordination, new and improved interventions, and in burden reduction and programme impact. This is a testament to progress in science and research leading to newly available effective interventions, country programmes receiving sufficient national support, and foreign assistance to increase access to and use of these interventions. Progress since 2000 has been made in global and local malaria policies and strategies, collaboration and partnership, financing, improving intervention tools and delivering them at high levels of population coverage, and in containing and controlling malaria (Table 2.1).

As notable gains accrued in understanding of how to control malaria, important challenges also emerged. Countries that quickly achieved high intervention coverage rates were left with little to no guidance on what to do next. The difficulties of sustaining high coverage rates in light of rapidly achieved success had not been fully anticipated. Where financing and programme action lagged, malaria case and death rates resurged in some areas that had only the year before achieved impressive impacts. Further, there was no body of evidence outlining how to 'grow' the malaria elimination map. The nature of these challenges, while daunting, also reflected an environment in which successes came quickly and the intellectual and evidence base was working hard to keep up. Addressing these types of challenges is a critical focus of the entire RBM Partnership today.

Table 2.1
Changing malaria context, 2000–2010

	2000	2010
Global malaria policies and strategies	No overarching strategy for malaria control. Treatment policies existed but used failing drugs; few prevention policies existed. Focus on vulnerable populations.	Up-to-date WHO policies and *Global Malaria Action Plan* in place and being implemented; wide adoption of artemisinin-based combination therapy (ACT), intermittent preventive treatment for pregnant women (IPTp), LLINs free to end-users, and indoor residual spraying (IRS) policies; universal coverage for all populations at risk, introduction of recommendations for universal diagnosis.
Partnerships	Few at country, regional and global levels.	Broad and functioning partnerships at all levels.
Financing	Limited bilateral funding for programmes, and much variation between countries and many countries with essentially no external funding support; ~US$ 100 million available in 2003. Limited funding for research.	Substantial global funding led by the Global Fund, World Bank Booster, US-PMI and DFID; ~US$ 1.5 billion available in 2010. US $ 700 million for research.
Interventions		
ITNs (insecticide-treated mosquito nets)	Newly available, required re-treatment every six to 12 months (limited experience with and use of LLINs), distributed preferentially for pregnant women and young children, often via social marketing and voucher schemes; population coverage low (~2% household ownership of ≥1 ITN).	LLINs are standard, distributed widely for full population coverage, seen as a public good and distributed free to end-users in many countries; dramatic increase in household ownership; many countries with 40–80% households with ≥1 LLIN.
IRS	Known but little-used, especially in Africa; limited to a few urban areas and a few countries in southern and the horn of Africa.	Much growth in IRS use in national programmes; funding available from the Global Fund, World Bank Booster and the US-PMI; substantial populations protected with IRS annually.
IPTp	Adopted in one country (Malawi, 1993); most countries used chloroquine chemoprophylaxis to be taken at home; coverage rates were low; not well accepted by pregnant women.	Widely adopted as national policy across Africa and some highly endemic settings outside Africa; coverage rates of 2+ doses during pregnancy still highly variable, from <10% to ~70%.
Case management: diagnosis	Microscopy available. RDTs available in small numbers but quality highly variable and not well understood; thus, presumptive malaria diagnosis was the standard, especially for young children.	Microscopy more available. RDTs widely available, with quality assurance and clarity on sensitivity and specificity widely known; WHO recommends universal use of diagnostics for suspected malaria and treatment on the basis of test results.
Case management: treatment	ACTs available outside of Africa; chloroquine failed badly globally (only limited failure with *Plasmodium vivax* infections); experiencing sulfadoxine-pyrimethamine with growing resistance; country policies on first-line treatment relied heavily on drugs with growing parasite resistance.	ACTs widely available from multiple manufacturers and in many formulations. Policies now in place in most countries and growing standard use of ACTs for malaria; increasing link between laboratory-confirmed malaria and ACT.
Burden and impact		
Transmission	Essentially unchanged from the 1990s.	Tenfold reduction with ITNs and IRS; case management with ACTs may also help further.
Morbidity (malaria and anaemia cases)	Malaria case rates high in clinics and hospitals, often 30–40% of all outpatient and inpatient child visits (but often without laboratory confirmation); child anaemia requiring blood transfusion was common.	Many countries showed dramatic decreases in malaria cases and marked reduction in severe childhood anaemia and child blood transfusions—in 11 African countries >50% reduction in cases; transition to laboratory confirmation of malaria as a reporting standard has contributed to a dramatic reduction in case numbers.
Mortality	High rates and numbers of malaria deaths reported (>1 million/year), mostly in Africa, and mostly in young children, some due to acute rapidly progressive severe malaria, many linked to recurrent or persistent infection, severe anaemia and other childhood infection (bacterial sepsis, respiratory or diarrhoeal disease).	Markedly lower rates and numbers of deaths (<800 000/year) especially. More than 60% decrease in countries with high prevention coverage and transition to diagnostics and ACTs; reductions most evident in young children who had the highest previous burden.

The ongoing evolution of the Partnership

The RBM Partnership remains an organic entity, changing in its membership and approaches through time in response to circumstances, and encouraging maximum engagement from the optimal number of partners. The RBM Partnership today plays a unique role in convening, coordinating and facilitating communications in areas where joint work adds significant value to that of individual partners.

Throughout its evolution over a decade, the principles and main characteristics of the RBM Partnership remain and have determined its impact to date:

- country leadership of malaria response and partnership focus;
- pragmatic responses to identified needs and emerging lessons, including from frequent evaluation and self-assessment;
- continual focus on results;
- inclusive, multi-stakeholder approach;
- effective partnership as an essential perquisite for alignment and collaboration;
- transparent and accountable division of labour and roles among all partners.

The core functions and collaborative approaches of the major RBM Partnership constituencies have remained unchanged. In the *Global Malaria Action Plan*, the roles and responsibilities of the Partnership focus on what countries, organizations and the international community can do together to ensure that countries scale up and sustain malaria control, and ultimately eliminate malaria. These actions support advocacy, resource mobilization, policy and regulatory affairs, planning, financing, procurement and supply management, communication and behaviour change, monitoring and evaluation, and appropriate research to inform existing interventions and to seek new tools.

The RBM Partnership continues to grow—and indeed to thrive—because of its early roots in and commitment to remaining a flexible and inclusive collaboration that encourages a strong participatory approach to strengthening specific aspects of the malaria response. The bar has progressively been raised in terms of what is considered possible to achieve based on demonstrated success. The RBM Partnership will continue evolving as success builds on success, adapting to new challenges and making course corrections based on results, striving to set its sights ever higher as it charts a global course towards a malaria-free world.


malaria* with
her/Lumefantrine

CHAPTER III

A DECADE OF GLOBAL IMPACT

Investing in any initiative makes sense only if its outcomes and impact are robust and documented. At the outset of the RBM Partnership, malaria control programmes were generally weak and delivered few services to those at risk. Between 2000 and 2010, the population in malaria-endemic countries grew by nearly 15% globally and by 28% in sub-Saharan Africa—an overall increase of nearly 720 million people at risk of malaria—so the work to decrease the impact of the disease was that much greater. During the decade, among the more than 100 endemic countries, three countries were certified by WHO as having eliminated malaria; another nine are in the pre-elimination phase, 10 are in elimination phase and seven are preventing re-introduction of malaria. Among the 81 countries in the malaria control phase, more than half are in Africa. Elsewhere, there has also been much progress: two thirds of countries reported malaria control progress and more than half reported greater than a 50% reduction in cases and/or deaths during the decade (some countries had no reported deaths; thus, further mortality reductions were not possible). The WHO European Region is poised to eliminate malaria transmission, and in the Region of the Americas, there is the potential in most (perhaps not all) countries to eliminate or move towards elimination in the coming decade. Each region has several countries that have made relatively little progress, however, and continue to have a substantial burden of malaria. These countries will need support and improved information to focus their malaria control efforts in the coming years.

Malaria control in 2000: the baseline for measuring progress

The year 2000 set the baseline for measuring progress in malaria control over the past decade. In that year, more than 3 billion people living in more than 100 malaria-endemic countries were estimated to be at risk of the disease. It was estimated that approximately 233 million cases of clinical malaria occurred (181 to 302 million, upper and lower limits), leading to nearly 1 million deaths. Approximately 800 000 of these deaths occurred among African children younger than five years, accounting for nearly one in five of all child deaths in sub-Saharan Africa and 8% of child deaths globally.[19,20]

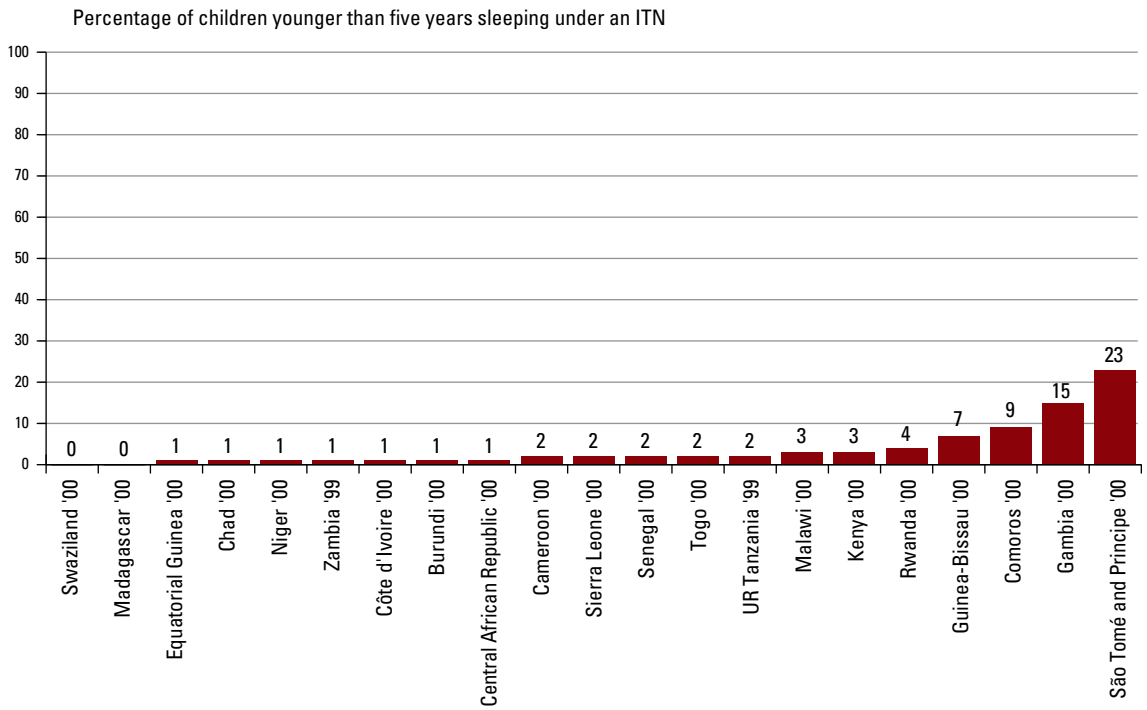
The start of this decade followed years of discouraging trends in malaria burden. During the 1980s and 1990s, the malaria burden worsened in a number of countries, according to data from demographic surveillance sites.[21-24] Malaria transmission intensity increased in South-East Asia while the disease re-emerged in several countries of Central Asia during this time.[25] Malaria in the majority of the endemic countries in the Americas was either high and stable or worsening in the 1990s.[26]

In 2000, there was limited coverage of recommended malaria control interventions. Very few African households owned an ITN and few children were sleeping under one (Figure 3.1), and IRS was very rarely used. IPTp with at least two doses of sulfadoxine-pyrimethamine had just recently been recommended by WHO as a key strategy for malaria control during pregnancy, and most countries had not yet adopted IPTp as national policy.[27] Most children with fever were presumptively treated with an antimalarial drug—often chloroquine—which even then was largely ineffective due to widespread resistance.[28]

Figure 3.1

Proportion of children younger than five years sleeping under an ITN, African countries, 1999–2000

In 2000, ITN use by children was dismally low across African countries.



Source: Based on Multiple Indicator Cluster Survey and Demographic and Health Survey data for 1999–2000, adapted from Monasch R (et al., 2004.)[29]

In addition to its public health burden, the impediment malaria posed to the economic growth and development of countries, particularly in Africa, became more apparent. Malaria and poverty were increasingly viewed as interconnected—either through malaria's impact on economic growth or poverty's role in promoting malaria transmission, or both.[24,30] Studies showed that malaria-endemic countries had annual economic growth rates 1.3% lower than other countries.[30,31] Malaria spending was further estimated to consume 25% of household income and 40% of government health budgets.[15] Malaria was also shown to impact development through its effect on education, causing absenteeism among children and teachers in endemic areas, and leading to lasting cognitive damage in children with cerebral malaria who survived the episode.[15]

There was also growing concern regarding the heavy burden of malaria on weak health systems. In 2000, an estimated 81 million clinical malaria episodes occurred among African children younger than five years. Approximately 500 000 of these episodes caused severe malaria requiring hospital admission, and at least 20 000 children suffered from persistent neurological damage as a result of a cerebral malaria episode.[32] At that time, clinical malaria (e.g. fever) accounted for as many as one third of all outpatient visits and at least a quarter of hospital admissions in endemic African countries.[16]

However, these substantial challenges were met with relatively little global attention and financing for malaria at the start of the decade. In 2000, the Roll Back Malaria Partnership was still in its infancy and important funding mechanisms and initiatives had not yet been established.

Population increase: During the past decade, the population in malaria-endemic countries has increased substantially, by nearly 720 million. This increase is equivalent to a 15% overall increase in population, by 28% in the African Region and 24% in the Eastern Mediterranean Region. This growth placed many more people at risk of malaria infection in 2010 compared to 2000 (Table 3.1). If malaria control scale-up had not been occurring during this time, bringing about reductions in the intensity of malaria transmission, a substantial increase in both the number of malaria cases and deaths would have been expected due to population increases alone.

Given the population growth in the past decade, it is important to understand that compared to the year 2000 baseline, the countries needed to save more lives in 2010 to achieve the 50% reduction. For example, if countries in sub-Saharan Africa had 900 000 malaria deaths in 2000,[19] the 28% population growth in the decade would lead to an expected 1 154 700 child deaths in 2010 if no programme interventions were added—simply as a result of increased population. A 50% reduction against 2000 numbers would require saving 450 000 lives; a similar 50% reduction in 2010 would require saving 576 000 lives. Thus, achievement of the global malaria targets actually required a much larger reduction in the expected malaria deaths in 2010.

Table 3.1

Population growth in malaria-endemic countries between 2000 and 2010

During the past decade, the population in malaria-endemic countries grew by 14.7% overall and by 28.3% in sub-Saharan Africa.

WHO region	Countries	2000 population (000s)	2010 population (000s)	Population growth (000s)	% population growth in the decade
Africa	43	627 921	805 577	177 657	28.3%
The Americas	21	483 880	548 970	65 090	13.5%
Eastern Mediterranean	12	431 328	534 232	102 904	23.9%
Europe	9	264 975	272 735	7760	2.9%
South-East Asia	10	1 565 028	1 806 174	241 147	15.4%
Western Pacific	10	1 517 165	1 642 366	125 201	8.3%
Total	105	4 890 297	5 610 054	719 759	14.7%

Note: For the Western Pacific Region, the combined population growth for China and the Democratic People's Republic of Korea was 6.8%, while the growth rate in the other eight malarious countries was 17.6%.

Source: Total population estimates for all countries and all years are based on UN Department of Economic and Social Affairs, Population Division, 2009.[33]

The global gains in malaria control

RBM partners vowed to "halve the malaria burden between 2000 and 2010". How did they do?

All regions of the world have experienced substantial declines in malaria infection rates, illness and mortality. Malaria cases (Table 3.2) and malaria deaths (Table 3.3) are shown by WHO region in 2000 and 2009; and for comparison and accounting for population growth, the expected number of cases and deaths are shown for 2009 if no malaria programme improvement had occurred. The observed change between the expected and estimated cases suggests that malaria programmes have had a substantial impact on reducing malaria cases (overall 23% decline) and malaria deaths (overall 38% decline).

Table 3.2

Malaria cases, population growth and estimated reduction in case rates by region, 2000 and 2009

Considering population growth rates during the decade and changes in malaria case numbers, there was an approximate 23% reduction in overall malaria cases during the decade, with the greatest drop in malaria cases seen in the European Region (98% decrease) and the Americas (65% decrease).

WHO region	Countries	Cases* in 2000 (000)	% population growth 2000–2009	Expected cases** in 2009 with no malaria programme change (000)	Cases* in 2009 (000)	% change in cases between expected and estimated in 2009
Africa	43	173 000	28.3	221 959	176 000	-21
The Americas	21	2800	13.5	3178	1100	-65
Eastern Mediterranean	12	15 000	23.9	18 585	12 000	-35
Europe	9	47	2.9	48.4	1	-98
South-East Asia	10	38 000	15.4	43 852	34 000	-23
Western Pacific	10	2800	8.3	3032	2300	-24
Total	105	233 000		290 654	225 000	-23

Note: *Estimated case numbers for 2000 and 2009 are from the WHO *World Malaria Report 2010*. **Expected case numbers for 2009 are derived assuming that no change in risk would have occurred in the region and the 2000 case estimate is simply multiplied by the interval population growth rate for that region to determine the expected number of cases in 2009 if there were no change in malaria control programming.

Sources: WHO, 2010.[19] UN Department of Economic and Social Affairs, Population Division, 2009.[33]

Table 3.3
Malaria deaths, population growth and estimated reduction in malaria death rates by region, 2000 and 2009

Considering population growth rates during the decade and changes in malaria death estimates, there was an approximate 38% reduction in overall malaria deaths during the decade, with the greatest drop in the Americas (52% decrease) and in the African Region (39% decrease). The European Region reported no deaths from locally transmitted malaria during this interval.

WHO region	Countries	Deaths* in 2000	% population growth 2000–2009	Expected deaths** in 2009 with no malaria programme change	Deaths* in 2009	% change in deaths between expected and estimated in 2009
Africa	43	900 000	28.3	1 154 700	709 000	-39
The Americas	21	2400	13.5	2724	1300	-52
Eastern Mediterranean	12	18 000	23.9	22 302	16 000	-28
Europe	9	0	2.9	0	0	na
South-East Asia	10	58 000	15.4	66 932	49 000	-27
Western Pacific	10	6800	8.3	7364	5300	-28
Total	105	985 000		1 254 022	781 000	-38

Note: *Estimated death numbers for 2000 and 2009 are from the WHO *World Malaria Report 2010.* **Expected death numbers for 2009 are derived assuming that no change in risk would have occurred in the region and the 2000 case estimate is simply multiplied by the interval population growth rate for that region to determine the expected number of deaths in 2009 if there were no change in malaria control programming. This method is a simple single-cause model that makes no assumption about a secular trend of a decreasing mortality rate for children younger than five years in creating the counterfactual to arrive at the percentage reduction in expected deaths.

Sources: WHO, 2010.[19] UN Department of Economic and Social Affairs, Population Division, 2009.[33]

In a more detailed analysis using WHO *World Malaria Report 2010* information, within each WHO region, some countries achieved significant progress while others did not or did not have the information to substantiate the progress.

African Region: Of 33 countries with reporting (not necessarily complete reporting) during 2005–2009, 20 countries reported some level of malaria decline, and in 11 of these, the decline was estimated to be greater than 50%. Thirteen countries reported no change or even an increase (possibly due to better reporting over time). Because the African Region bears the brunt of the global malaria burden and progress against malaria in Africa will determine overall progress against global goals, we highlight this region in later sections of the report.

European Region: The region has witnessed a marked drop in malaria cases. Among the nine countries considered as malaria endemic in the region (Armenia, Azerbaijan, Georgia, Kyrgyzstan, Russian Federation, Tajikistan, Turkey, Turkmenistan and Uzbekistan), only three deaths were reported in 2005 and two deaths in 2009. Locally transmitted cases (all *P. vivax*) were reported in only five countries in 2009 (Azerbaijan, Georgia, Kyrgyzstan, Tajikistan and Turkey) and totalled only 285 cases (a 92% drop during the decade). Turkmenistan was certified malaria-free in 2010. And, following the 2005 *Tashkent Declaration*[34] and under ambitious goals and objectives, the European Region is seen as capable of achieving malaria elimination in all of its countries by 2015.

Region of the Americas (Figure 3.2): Among the 21 countries in the region considered as having indigenous malaria (Argentina, Belize, Bolivia, Brazil, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, French Guiana, Guatemala, Guyana, Haiti, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname and Venezuela), Argentina, El Salvador, Mexico and Paraguay are considered in pre-elimination phase. The Bahamas and Jamaica are now free of indigenous malaria and are in the prevention of re-introduction phase. Among 20 countries that reported in 2005, only six of these reported 10 or more malaria deaths and nine reported no deaths. Among the six countries with 10 or more reported deaths (range from 16 to 122 deaths in 2005), reductions in mortality numbers of 13% (Dominican Republic), 35% (Brazil), 54% (Guyana), and 57% (Colombia) were seen; Haiti and Venezuela have not reported recently on mortality. Guyana, Haiti and Venezuela are likely to have had malaria deaths but did not report recently on mortality.

During the past decade, there was remarkable progress in malaria control in the Americas. This is well documented in a recent review of control programmes across the region,[35,36] and is summarized here and updated with information from the WHO *World Malaria Report 2010*. Between 2000 and 2009, there was a greater than 50% reduction in malaria cases and an estimated 46% reduction in deaths (less than 150 deaths identified by the reporting countries) in the 21 malaria-endemic countries in the Americas.

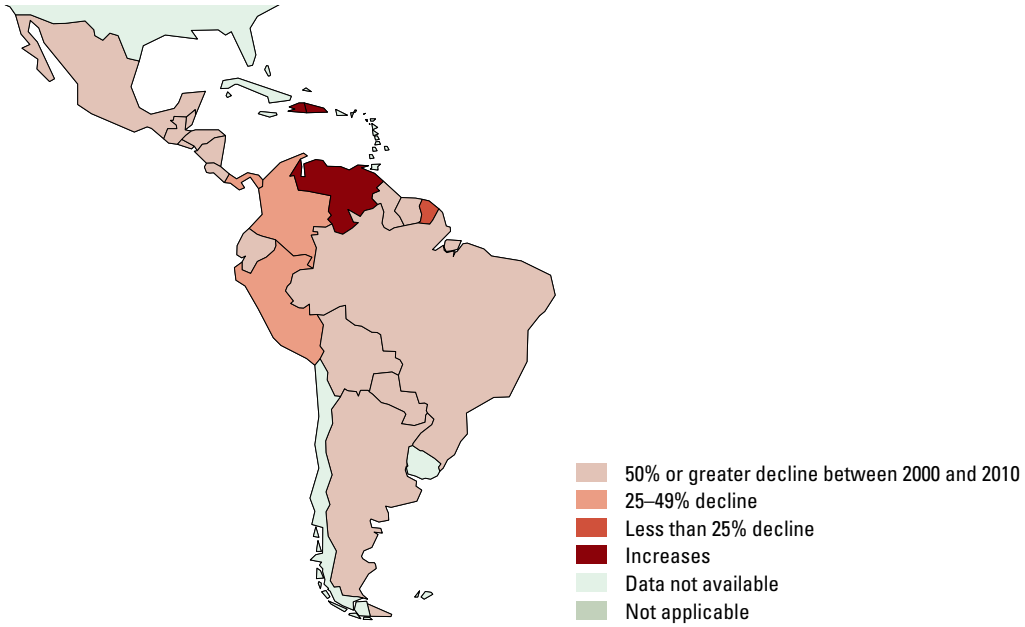
The progress was largely accomplished though the use of standard approaches to prevention (e.g. IRS, distribution of LLINs, environmental management), as well as prompt diagnosis and treatment of cases (and case investigation and transmission containment in some countries). Much of the financing came from national governments, with some external support through the Global Fund and bilateral donors.

Malaria in the Region of the Americas remains a diverse problem. In some countries (Dominican Republic and Haiti), it is caused uniquely by *P. falciparum*, and in recent years, has actually increased in intensity in contrast to the region overall. In other countries (Argentina, Belize, Costa Rica, Ecuador and Mexico), *P. falciparum* has essentially been eliminated and they are focused on *P. vivax* containment only. Almost half of the countries have reported no malaria deaths in the past year.

Figure 3.2

Reported percentage declines in malaria cases between 2000 and 2010 (or nearest year) in the Region of the Americas

Marked reductions in cases were seen in the majority of countries, although the Dominican Republic and Haiti have seen a recent upsurge of malaria.



Source: WHO, *World Malaria Report 2010.*[19]

Seven countries (Argentina, Belize, Costa Rica, El Salvador, Nicaragua, Panama and Paraguay) reported less than 1000 cases annually, and eight additional countries reported less than 10 000 cases annually. Six countries (Brazil, Colombia, Guyana, Haiti, Peru and Venezuela) reported 93% of the cases in the region. Finally, at least 15 of the countries reported less than five cases per 1000 at-risk population, and 12 of these countries were at or below one case per 1000 at-risk population, suggesting that pre-elimination and elimination are within sight for these nations. As the RBM Partnership has set its sights on regional elimination in the European Region by 2015, continued aggressive malaria control in the Americas would set this region as a next potential malaria-free area.

Eastern Mediterranean Region (Figure 3.3): Among 13 countries considered as malarious (Afghanistan, Djibouti, Egypt, Islamic Republic of Iran, Iraq, Oman, Pakistan, Saudi Arabia, Somalia, North Sudan, South Sudan, Syrian Arab Republic and Yemen), eight reported fewer than three deaths in one of the years. Afghanistan had a recent upsurge in reported cases. Sudan (North and South) and Somalia reported the vast majority of the cases in the region and were inconsistent in reporting during this interval due in part to social and political struggles.

Amidst the malaria diversity in this region, Morocco was certified by WHO as malaria free in 2010; Egypt, Oman and Syria are considered to be in the prevention of re-introduction phase; Iraq and Saudi Arabia are considered to be in elimination phase;

Iran is considered to be in the pre-elimination phase of its malaria control; and Djibouti has reported substantial reductions in malaria deaths in recent years.

Thus, while parts of the region are showing great potential for malaria elimination, other countries have much work to do. For example, South Sudan is both an emerging new nation and has intense transmission that requires much work to control.

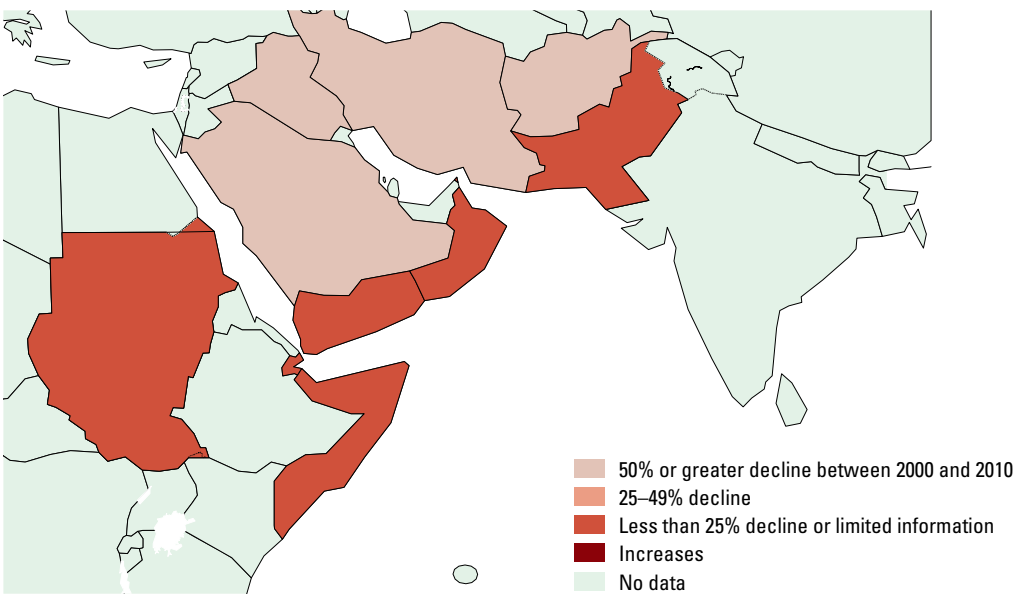
South-East Asia Region (Figure 3.4): Among the 10 endemic countries in the South-East Asia Region (Bangladesh, Bhutan, Democratic People's Republic of Korea, India, Indonesia, Myanmar, Nepal, Sri Lanka, Thailand and Timor-Leste), Bhutan, DPR Korea, Nepal and Sri Lanka reported fewer than 10 deaths annually. Substantial declines in mortality from 2005 through 2009 were reported in Thailand (57%). While half of the countries reported substantial malaria declines (greater than 50% reduction in cases), India, Indonesia and Timor-Leste either reported modest or little change or had incomplete reporting during the decade. DPR Korea is considered to be in the pre-elimination phase of malaria control.

This region has a very large population, and reportedly about 60% of the population has some risk of local malaria transmission. However, incomplete information on transmission extent and intensity means that the level of the risk is not well characterized. This is especially true in some of the large countries. This incomplete information likely hampers good and appropriate focus of malaria control efforts.

Figure 3.3

Reported percentage declines in malaria cases between 2000 and 2010 (or nearest year) in the countries in the Eastern Mediterranean Region

Most cases in the region were in Somalia and Sudan (especially now in South Sudan); other countries had already low numbers of cases or recent reported progress.

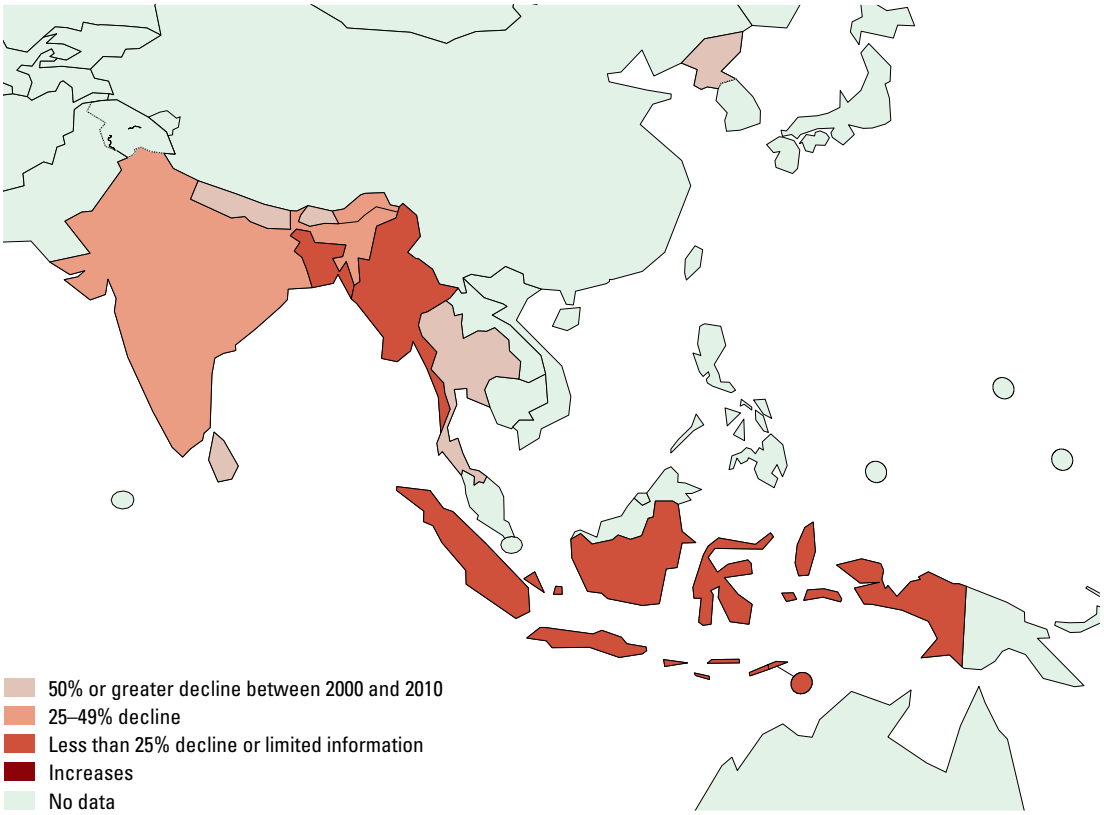


Source: WHO, *World Malaria Report 2010.*[19]

Figure 3.4

Reported percentage declines in malaria cases between 2000 and 2010 (or nearest year) in the countries in the South-East Asia Region

Marked reductions in cases were seen in half of the countries, but incomplete information in the region suggests that control efforts require much additional attention.



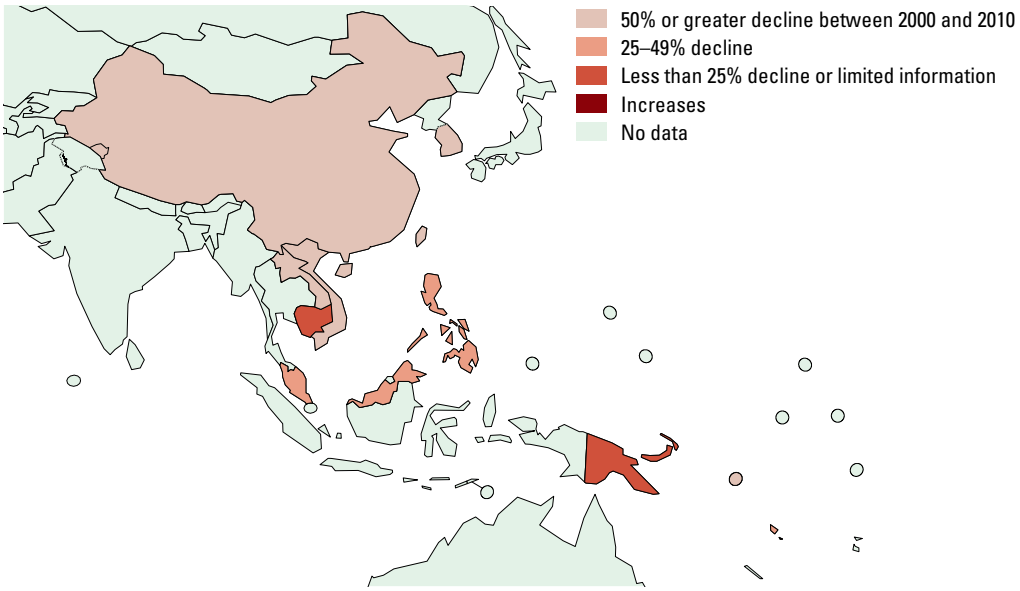
Source: WHO, *World Malaria Report 2010.*

Western Pacific Region (Figure 3.5): Among the 10 countries in the Western Pacific Region (Cambodia, China, Lao People's Democratic Republic, Malaysia, Papua New Guinea, Philippines, Republic of Korea, Solomon Islands, Vanuatu and Viet Nam), two (Korea and Vanuatu) reported fewer than five deaths annually, and six more countries (China, Lao PDR, Malaysia, Philippines, Solomon Islands and Viet Nam) typically reported fewer than 40 deaths annually. Only Cambodia and Papua New Guinea reported more than 100 deaths annually. Clear reductions in reported malaria mortality during the 2000–2009 interval was seen in all but Cambodia and Papua New Guinea. China, Lao PDR, Republic of Korea, Solomon Islands and Viet Nam reported a greater than 50% decline in cases; and Malaysia, Philippines and Vanuatu reported declines between 25% and 50%. The Republic of Korea is considered in the elimination phase, and Malaysia is in the pre-elimination phase of its malaria controla; however, and similar to other regions, diversity in malaria transmission is a hallmark of the Western Pacific Region.

Figure 3.5

Reported percentage declines in malaria cases between 2000 and 2010 (or nearest year) in the 10 endemic countries in the Western Pacific Region

A marked reduction in cases was seen in one half of the countries. Nearly three quarters of reported cases came from Cambodia, Papua New Guinea and the Solomon Islands.



Source: WHO, *World Malaria Report 2010.*

Malaria elimination

While the language of the MDG 6 target reads: "Have halted by 2015 and begun to reverse the incidence of malaria", the concept of malaria eradication was revived in 2007 at the Malaria Forum in Seattle, Washington (USA), hosted by the Bill & Melinda Gates Foundation, which sparked increased attention to the issue of malaria elimination.

More than half (55%) of the countries outside of Africa reported a 50% or greater decline in malaria cases in the last decade, and an additional 13% reported declines of between 25% and 50%. It is likely that malaria elimination can be realized soon in the European Region, and recent progress in the Region of the Americas would suggest that this could be the next region to achieve complete elimination.

In order to achieve elimination targets, we must expand the reach of the RBM Partnership by forging strategic alliances with existing malaria control regional partners, coalitions and networks outside Africa, and support them to own and achieve *Global Malaria Action Plan* targets and milestones.

New tools are essential to sustain recent gains and to reach elimination. For malaria control, tools are needed that will increase ease of use and compliance, delay the emergence of resistance, remove cost barriers and provide consistently accurate diagnosis. For elimination, tools are needed that interrupt transmission sustain transmission interruption, and address asymptomatic reservoirs.

CHAPTER IV

ACHIEVING IMPACT IN SUB-SAHARAN AFRICA

For African countries that achieved substantial scale-up of the package of malaria control interventions, substantial impact was documented. Overall, child mortality dropped dramatically in the last decade in Africa (by approximately 20%), and while this is due to progress in many areas, malaria control undoubtedly contributed importantly to this decline (Figure 4.1).

Since 2000, more than 1 million children's lives have been saved from malaria deaths in Africa. Data from many sub-national studies where malaria control scale-up was documented similarly suggest substantial gains in reduced infection, illness and death from malaria. If the high intervention coverage is maintained and reaches all nations, many more children's lives will be saved; if it is not maintained, they will be lost.

The RBM Partnership efforts have been focused primarily on sub-Saharan Africa, the region that was generally unaddressed by the GMEP and is known to contribute to 85% of the malaria cases and more than 90% of the malaria deaths in the world. Thus, this section addresses in more detail the impact of malaria control in the region and what was done to achieve high and equitable coverage of malaria control interventions in the many malaria-endemic countries.

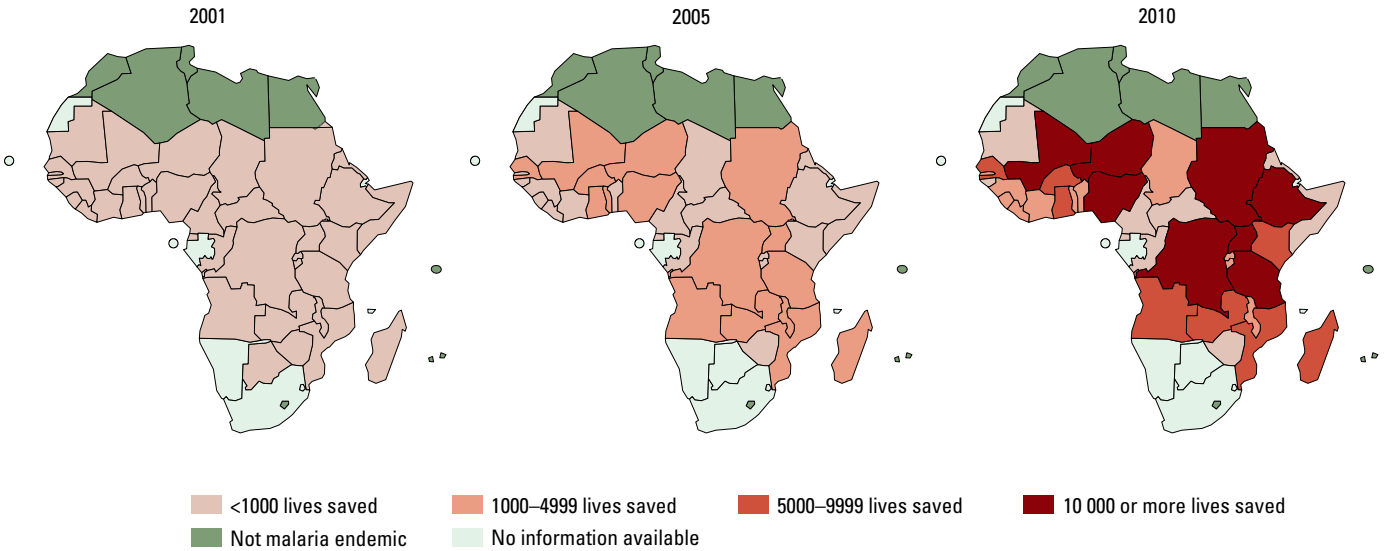
Reliable documentation of programme results is critical, both for countries and supporting partners to demonstrate the return on investments. Yet since malaria is a disease of poverty and is typically worse in poor, rural areas where health information systems are weakest, accurate documentation can be challenging[38,19] and stronger surveillance systems are required.

Despite these limitations, several African countries have been able to track programme progress and impact well, measuring changes in the coverage of malaria control interventions, as well as tracking infection, illness and death where they may be reliably measured. Data sources include population-based household surveys, national disease surveillance systems, modelled estimates and other special studies (such as from demographic surveillance sites). The advantages and limitations of these different data sources are described in the technical annex (Annex 1). Taken together, consistent patterns in malaria disease trends found across these different information sources demonstrate that many malaria control programmes in Africa have scaled up and achieved remarkable impact.

Figure 4.1

Estimated number of children's lives saved by malaria prevention in 2000, 2005 and 2010

Using the Lives Saved Tool (LiST), a health impact model that estimates the under-five child mortality impact of key interventions based on coverage data from surveys and intervention efficacy from randomized controlled trial research, modelled estimates suggest that compared to mortality in 2000, a substantial number of child malaria deaths have been prevented each year and this has occurred largely since 2005. In 2010 alone, an estimated almost 300 000 child malaria deaths were averted in Africa due to malaria control.



Source: LiST modelling done by Tulane University School of Public Health and Tropical Medicine and Johns Hopkins University Bloomberg School of Public Health, based on Stover J et al., 2010.[37]

All-cause under-five mortality

Since the start of the decade, RBM partners have recommended that malaria-endemic countries regularly monitor all-cause under-five mortality based on high-quality data.[31] This recommendation is based on empirical evidence of the impact of malaria control interventions on all-cause under-five mortality. In malaria-endemic settings in Africa, a large proportion of post-neonatal child deaths are directly attributable to malaria (typically 20–30%).[20] Malaria control also has wider benefits on overall child survival, through its effect on nutritional status, immune responsiveness and susceptibility to other infections. It is therefore important not only to track cases and deaths directly attributable to malaria, but also to compare this reduction with declines in all-cause under-five mortality over the same time period.[39] Such comparisons should examine declines in malaria transmission indicators and all-cause under-five mortality, and account for contributions of other factors to both malaria-specific and all-cause child mortality (e.g. other child survival or maternal and child health programmes).[38]

With the support of a public-private partnership, Bioko Island (Equatorial Guinea), for example, showed a marked increase in child survival after four years of intensive malaria control, reducing its under-five mortality rate from 152 per 1000 live births in the pre-intervention period (1999–2004) to 55 in the intervention period (2005–2008).[40] At the same time, prevalence of malaria infection among children two to five years old decreased by more than half. Essentially, Bioko Island met MDGs 4 and 6 (for malaria) in a very short interval due to dramatic malaria control scale-up.

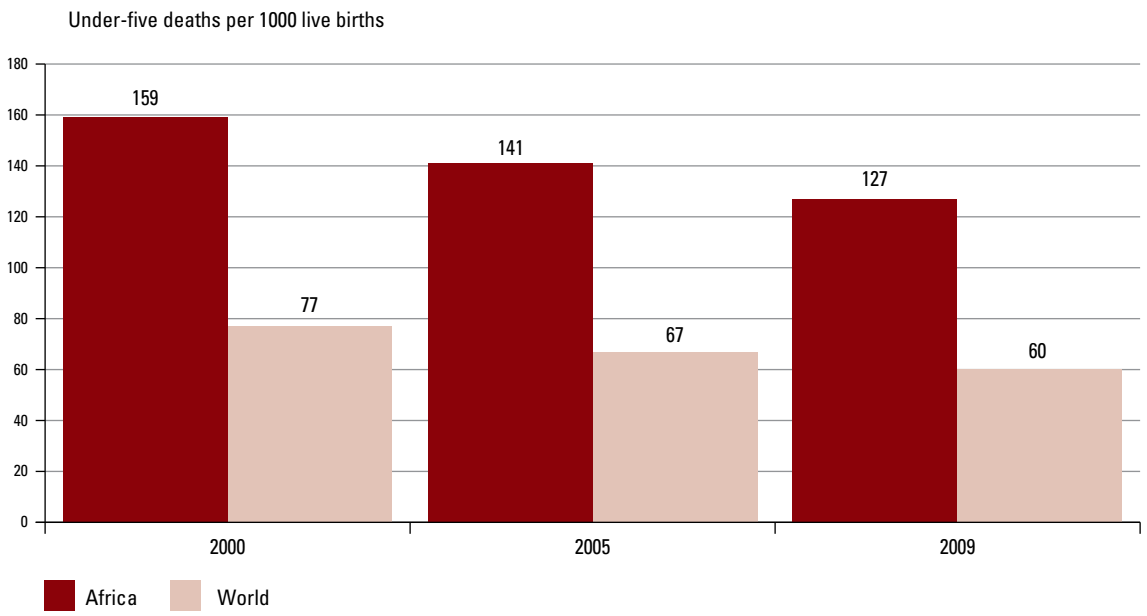
Similarly, Zanzibar, an island on the east coast of Africa, implemented wide-scale coverage with combined vector control and treatment interventions. This programme started in 2003 with widespread availability of ACTs in all public health facilities, and in early 2006, by vector control measures including free LLIN distribution to all children and pregnant women, as well as IRS campaigns. These efforts resulted in substantial malaria declines, including, according to a focused evaluation, a 50% reduction between 2003 and 2005 in prevalence of malaria infection among children younger than five and a further 10-fold decline between 2005 and 2006 following mass ITN distribution targeting this age group. All-cause under-five mortality was halved between 2002 and 2005.[41,42]

Child mortality estimates, along with reliable data from other sources (e.g. vital registration and population censuses), are reviewed annually by the UN Inter-agency Group on Child Mortality Estimation in order to produce best estimates for levels and trends in child and infant mortality for all countries.[43] Based on these estimates, Africa made progress in reducing its under-five mortality rate over the past decade, falling 20%, from 159 child deaths per 1000 live births in 2000 to 127 in 2009 (Figure 4.2). It is important to note that these mortality reductions in the African Region are likely not due to malaria control alone, but are reflective of malaria control, broader child survival programmes and other factors.

Figure 4.2

Under-five mortality rates (per 1000 live births) globally and in Africa in 2000, 2005 and 2009

Africa reduced its under-five mortality rate by 20% over the past decade.



Source: Estimates developed by the UN Inter-agency Group for Child Mortality Estimation. UNICEF, New York, 2010.[43]

Mathematical modelling of lives saved

Intervention coverage estimates from household surveys may be used as inputs to the Lives Saved Tool (LiST) model.[44] The model incorporates current demographic projections and cause-specific mortality distribution for children younger than five years in its predictions. Validation studies have shown that model-estimated reductions in mortality due to increasing availability of malaria vector control measures is similar to measured estimates in published studies from a range of different transmission settings,[45] and these results are in line with model validation studies for other child survival interventions.[46–48]

The LiST model (version 4.22)[49] was used here to quantify the likely impact of increasing malaria prevention intervention coverage on malaria deaths averted over the past decade across 36 malaria-endemic African countries. The potential number of malaria deaths that could be prevented from additional scale-up of prevention measures to 100% between 2011 and 2015 is also modelled. Prevention measures included in the model are protection through vector control (households owning at least one ITN or sprayed with IRS in the previous 12 months) and malaria during pregnancy (IPTp and ITN use by pregnant women). Importantly, it is not possible to model the effects of improving malaria case management at this time due to a lack of relevant, good-quality data on coverage of diagnostic testing and appropriate treatment during the last decade;[50] this means that the LiST

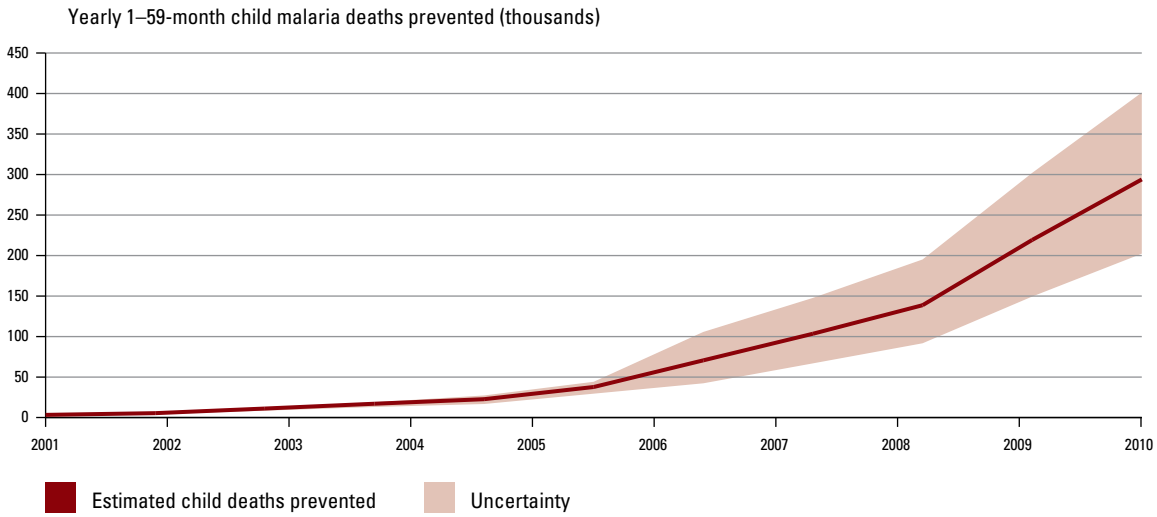
model provides a very conservative estimate of mortality reduction from scale-up of the full malaria intervention package.

The modelled results suggest that compared to the 2000 baseline child mortality, approximately 920 000 child deaths were prevented due to scale-up of malaria prevention measures during 2001–2010 (Figure 4.3). The LiST model estimates that at the time of this report, approximately 1.14 million malaria-related child deaths were prevented in Africa since 2000. The vast majority of deaths prevented occurred since 2008 and were predominantly due to higher levels of household protection with vector control. The greatest impact was estimated for 2010, with 22% fewer child malaria deaths compared to 2000 levels. In addition, a large number of ITNs were delivered to endemic countries in 2010, which suggests that gains made may continue over the coming few years.

Figure 4.3

Predicted annual number of malaria deaths among children aged 1–59 months averted by changes in malaria prevention coverage during 2001–2010

Marked progress was seen in the estimated number of annual child deaths prevented by malaria intervention scale-up over the past decade, including approximately 294 000 child deaths prevented during 2010.



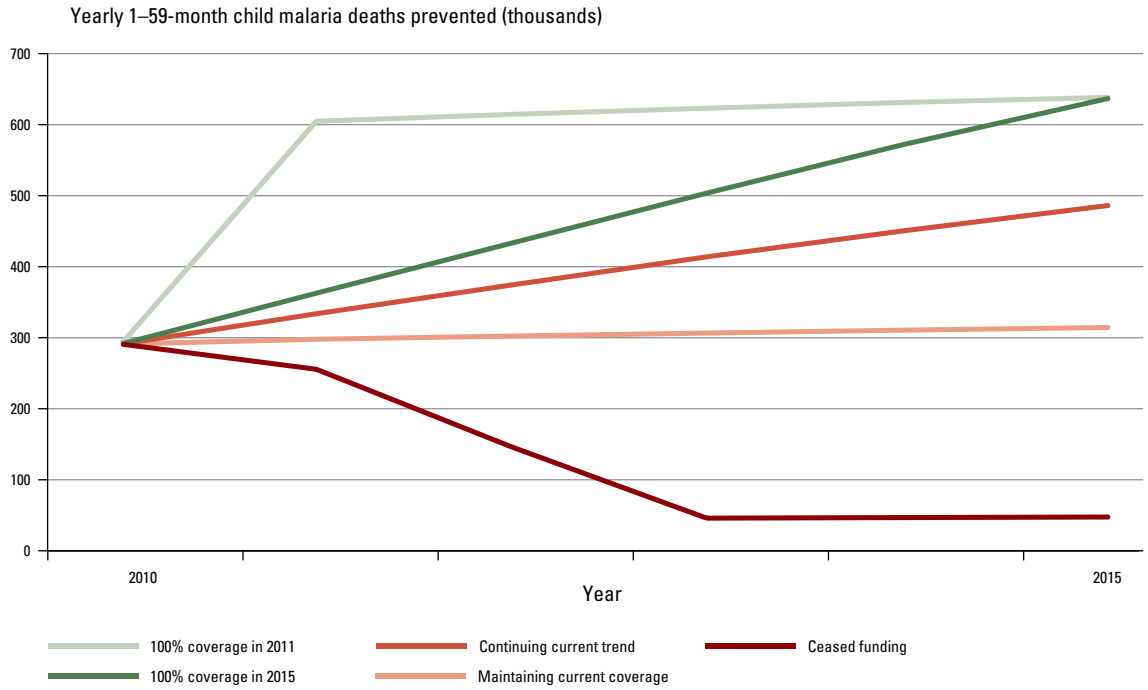
Source: LiST modelling done by Tulane University School of Public Health and Tropical Medicine and Johns Hopkins University Bloomberg School of Public Health, based on Stover J et al., 2010.[37]

Various scenarios were applied using the LiST model to approximate future impact of household vector control interventions on malaria deaths averted during 2011–2015 relative to the baseline year 2000 (Figure 4.4). If rapid scale-up of interventions was achieved universally (100% coverage levels) across Africa by the end of 2011 and maintained through 2015, approximately 3.1 million child malaria deaths could be averted by 2015. Alternatively, LiST estimates that if funding for vector control stopped after 2010, resulting in no LLINs distributed, approximately 1 million additional child malaria deaths would result compared to maintaining coverage at 2010 levels, assuming that the LLINs last and remain fully effective for three years.

Figure 4.4

Predicted annual number of malaria-related deaths among children aged 1–59 months averted by changes in malaria control coverage during 2011–2015

A clear correlation is seen between levels of intervention coverage and child lives saved annually.



Note: The continuing current trend was calculated using the slope between the most recent survey estimates and the earliest survey estimate (orange line). Achieving 100% coverage by 2015 assumes linear vector control coverage increases to 100% from estimated coverage in 2010 (green line). Maintaining coverage assumes estimated coverage in 2010 continues through 2015 (peach line). Ceased funding was calculated by assuming that ITNs last for three years and that 2015 coverage levels would gradually revert to levels expected without donor funding (brown line).

Source: LiST modelling done by Tulane University School of Public Health and Tropical Medicine and Johns Hopkins University Bloomberg School of Public Health based on Stover J et al., 2010.[37]

Health facilities information

Data from health facilities in malaria-endemic countries have been reviewed by WHO with country teams to document changes in the number of malaria cases and deaths recorded by the health system during 2000–2009. WHO provided extensive data in the WHO *World Malaria Report 2010*[19] documenting that in the African Region, 11 countries showed at least a 50% decline in either confirmed malaria cases or malaria admissions and deaths at health facilities during this time period. These same countries also showed evidence of wide-scale implementation of malaria prevention programmes (reaching more than 50% coverage among the at-risk population) and extensive case detection and treatment.

In addition, a number of studies in the scientific literature have used various methods to document changes over time in malaria-associated morbidity and mortality, such as malaria outpatient visits, hospital malaria admissions and deaths, and anaemia and parasite prevalence, as well as blood transfusions. While these studies may have various limitations, they further indicate substantial reductions in the malaria burden at health facilities and in communities in a number of different African settings that have largely coincided with scale-up of malaria programme control.

Published data from studies in health facilities and repeated cross-sectional surveys in Bioko Island (Equatorial Guinea),[40] Eritrea,[51] Ethiopia,[52] Rwanda,[52] São Tomé and Principe,[53] Zambia[54] and Zanzibar (United Republic of Tanzania)[42] showed major declines in the malaria burden in the study area, which encompassed substantial parts of these countries/areas. For example, each of these settings at least halved outpatient malaria visits or hospital admissions and this coincided with scale-up of malaria programme interventions in these countries (Table 4.1). Moreover, a 2009 review[55] of changes in malaria disease patterns in sub-national areas indicated that 21 African countries experienced reductions in the malaria burden in smaller areas within their borders. The declining malaria disease burden seen in different African settings has not been universally experienced across the continent,[56] and settings with a stagnant or worsening malaria disease burden are less likely to have these trends published in the peer-reviewed literature.

Despite the various limitations of individual data sources—national data and estimates, modelled estimates using population-based intervention coverage changes, specific surveys, facility reporting or special studies—the overwhelming message from this recent work is that malaria transmission, illness and death have declined dramatically in the last decade in many, but unfortunately not all countries.

Table 4.1
Changes in malaria burden at national and sub-national levels, 2000–2010

Area	Reference periods	Data reported	Ages	Slide-confirmed	Change reported
Ethiopia *[52]*	2001–05 & 2007	Inpatient and outpatient malaria cases	0–59 months and all ages	Inpatient (both); outpatient (yes)	Inpatient: 73% decrease (0–59 months) and 70% decrease (all ages); Outpatient: 85% decrease (0–59 months) and 81% decrease (all ages)
		Inpatient malaria deaths			62% decrease (0–59 months); 79% decrease (all ages)
Rwanda *[52]*	2001–06 & 2007	Inpatient and outpatient malaria cases	0–59 months and all ages	Inpatient (both); outpatient (yes)	Inpatient: 55% decrease (0–59 months) and 56% decrease (all ages); Outpatient: 58% decrease (0–59 months); 54% decrease (all ages)
		Inpatient malaria deaths			67% decrease (0–59 months); 34% decrease (all ages)
Eritrea *[51]*	2000 & 2004	Outpatient malaria cases	all ages	Yes	83% decrease
		Malaria case fatality rate			33% decrease
Zanzibar (Tanzania) *[42]*	2002 & 2005	All-cause child mortality	<5 years, <1 year and 1–4 years	No	52% decrease (<5 years); 33% decrease (<1 year); 71% (1–4 years)
		Inpatient malaria cases	0–59 months		77% decrease
		Inpatient malaria deaths			75% decrease
		Blood transfusions			67% decrease
	2003 & 2006	Parasite prevalence		Yes	97% decrease
Zanzibar (Tanzania) *[41]*	1999–2003 & 2008	Inpatient and outpatient malaria cases	0–59 months and all ages	Inpatient (both); outpatient (yes)	Inpatient: 80% decrease (0–59 months) and 78% decrease (all ages); Outpatient: >99% decrease (0–59 months and all ages)
		Inpatient malaria deaths			86% decrease (0–59 months); 90% decrease (all ages)
Bioko Island (Equatorial Guinea) *[40]*	1999–04 & 2004–08	All-cause child mortality	<5 years old	No	64% decrease
	2004 & 2008	Parasite prevalence	2–5 years old	Yes	57% decrease
		Anaemia prevalence (Hb <8 g/dL)		No	87% decrease
São Tomé and Principe *[53]*	2000 & 2007	Inpatient and outpatient malaria cases	0–59 months	Yes	88% decrease (inpatient) and 93% decrease (outpatient)
		Inpatient malaria deaths			>95% decrease
São Tomé and Principe *[57]*	2004–2006	Parasite prevalence	<9 years old	Yes	97% decrease
Zambia *[58]*	2006,2008 & 2010	Parasite prevalence	0–59 months	Yes	No consistent trend [(a)]
		Anaemia prevalence (Hb <8 g/dL)		No	69% decrease
Zambia *[58]*	2001–02 & 2008	Inpatient malaria cases	0–59 months and all ages	No	57% decrease (0–59 months); 61% decrease (all ages)
		Inpatient malaria deaths			62% decrease (0–59 months); 66% decrease (all ages)
		Outpatient malaria cases			29% decrease (0–59 months); 13% decrease (all ages)

CHAPTER V

HOW IMPACT WAS ACHIEVED IN SUB-SAHARAN AFRICA

With a known effective package of malaria interventions and a dramatic increase in global funding for malaria (from approximately US$ 100 million available in 2003 to approximately US$ 1.5 billion available in 2010), many countries have been able to dramatically scale up intervention coverage. This section documents that scale-up across the sub-Saharan African countries, showing national data estimates in the early and later part of the decade. Most countries achieved this intervention scale-up in a highly equitable fashion, reaching rural and poor households where the malaria burden has always been the worst.

While global financing is appropriately balanced to address regional differences in burden, within regions, there are still important disparities in available funding for the populations at risk, and those areas with few resources require particular attention. Of note, recent funding increases for the large populations of Nigeria and the Democratic Republic of the Congo have led to marked, nearly immediate increases in intervention coverage.

Among the interventions, the recent recommendation for universal use of malaria diagnostics to provide confirmation of infection and antimalarial treatments only for those with confirmed malaria has had a dramatic effect where it has been deployed. This has established a new standard for case reporting; it has contributed to a dramatic reduction in case numbers; and it has markedly reduced the overuse of ACTs.

Funding malaria control over the decade

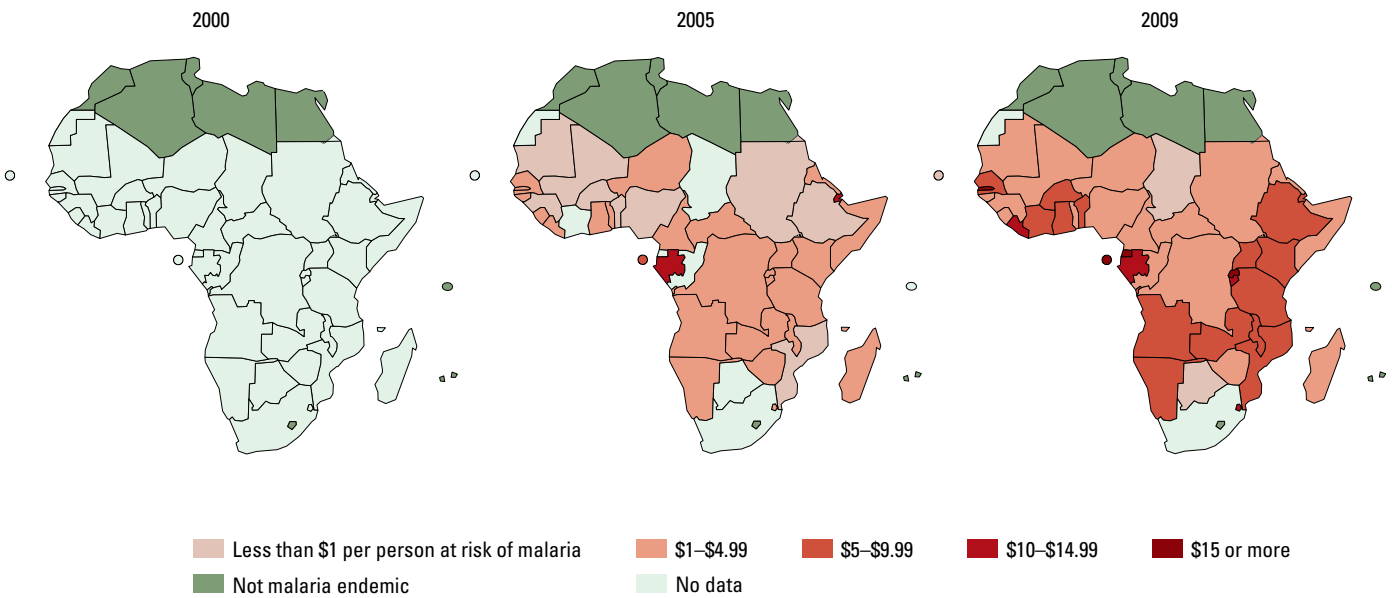
This section provides an overview of international funding to malaria control over the past decade (Figure 5.1), highlighting the updated detailed analyses found in the RBM Partnership Progress & Impact Series report, *Malaria Funding and Resource Utilization: The First Decade of Roll Back Malaria*[59] and the WHO *World Malaria Report 2010*.[19]

The *Global Malaria Action Plan*[14] estimated global financing requirements for scale-up of interventions, sustained control and elimination from now until 2025. This estimate called for more than US$ 5 billion annually between 2011 and 2020 for programme implementation and then lower funding estimates in later years based on the assumption of significantly reduced malaria transmission in countries, and thus, lesser funds needed for malaria case management in the future.

Figure 5.1

Mapping progress in funding towards malaria control over the decade

Cumulative ODA commitments to malaria control per person at risk in constant prices (2008 USD millions) by end-2000, end-2005 (cumulative from 2001) and end-2009 (cumulative from 2006).



Note: Estimates for at-risk populations are based on WHO estimates (as published in the WHO *World Malaria Report 2010*), which were applied to UN Population Division total population estimates for the year 2009. See Annex 1 for additional notes.

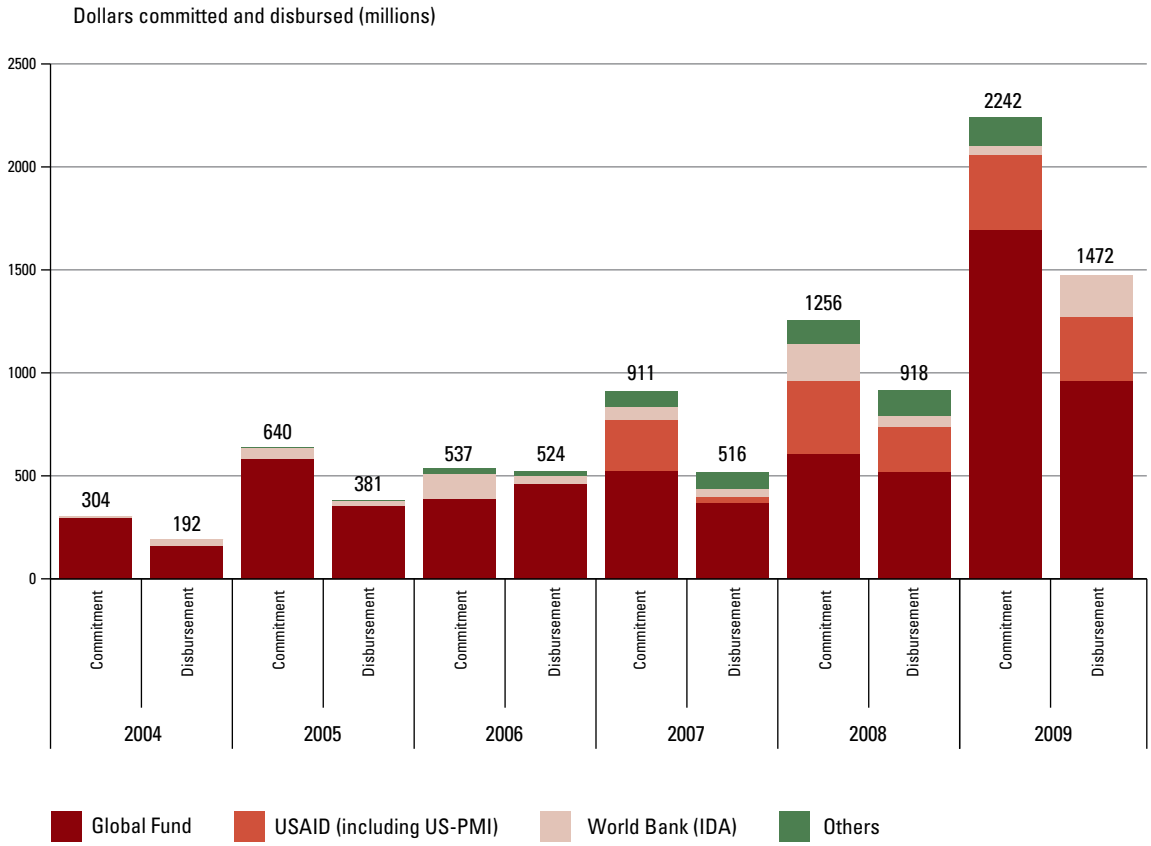
Source: Aid flows to different sectors (including malaria) are based on reporting by Organisation for Economic Co-operation and Development, Development Assistance Committee (OECD DAC) members as well as other partners through the OECD DAC Creditor Reporting System and are made available through the online database (Qwery Wizard for International Development Statistics, available at http://stats.oecd.org/qwids/).

The dramatic increases in international donor commitments and disbursements towards malaria control over the past decade, and particularly in recent years, was recently summarized in an earlier report,[59] and updated in the WHO *World Malaria Report 2010*.[19] Three organizations are responsible for the major share of global malaria financing: The Global Fund, the US-PMI and the World Bank Malaria Booster Programme (Figure 5.2). Compared to 2003 (approximately US$ 100 million disbursed by external donors for malaria control), there was a more than 10-fold increase in funding by the end of the decade, with the majority of the increase occurring since 2005.

Figure 5.2

Annual ODA commitments and disbursements to malaria control by external donors in constant prices (2008 US$ millions), 2004–2009

Nearly US$ 6 billion had been committed to malaria control by end-2009, with more than half committed since 2008.



Note: As of April 2011, data are available for 2004–2009 from this source. The International Development Association (IDA) is part of the World Bank and provides loans to the poorest countries, including those receiving malaria funds. The United States Agency for International Development (USAID) estimates include malaria funds channelled through the US-PMI as well as other parts of USAID. See Annex 1 for definitions of financial terms.

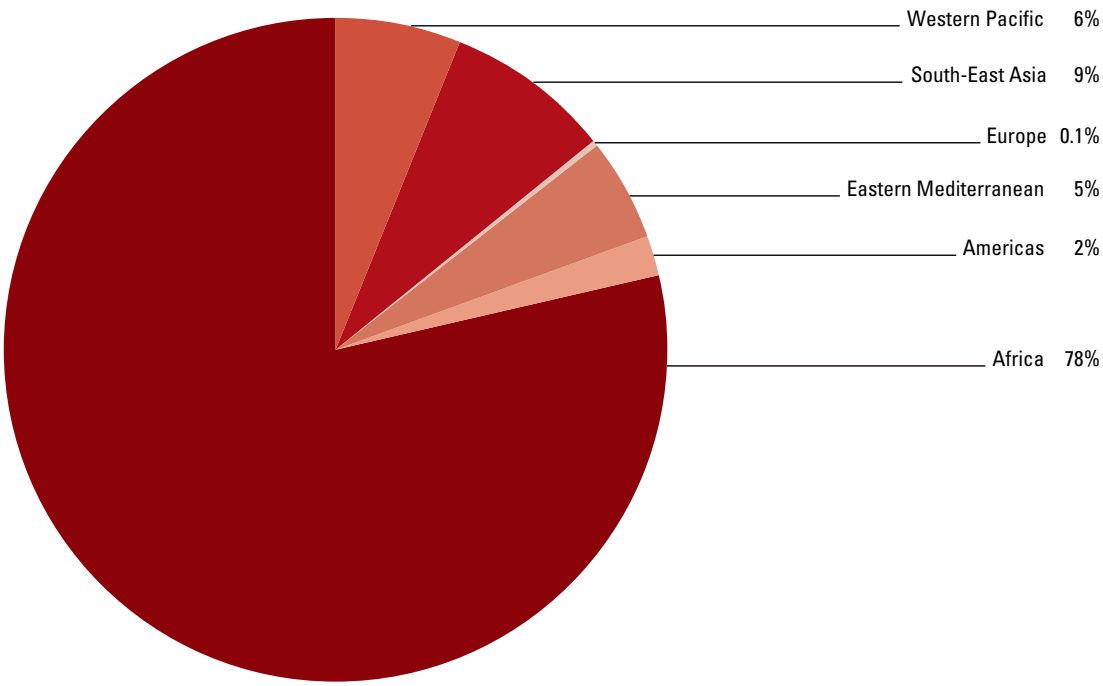
Source: Aid flows to different sectors (including malaria) are based on reporting by OECD DAC members as well as other partners through the OECD DAC Creditor Reporting System and are made available through the online database (Qwery Wizard for International Development Statistics, available at http://stats.oecd.org/qwids/).

Eighty-four endemic countries received donor assistance for malaria control during 2000–2009, out of more than 100 endemic countries worldwide. Most countries that did not receive assistance are in the pre-elimination, elimination or prevention of re-introduction phase, although seven are in the control phase. African countries continued to receive a substantial share of these funds (Figure 5.3), which is in line with the disproportionate burden in this region. However, there is still wide variation across the continent in terms of resources received for malaria control, as well as great year-to-year variation in malaria control funding.

Figure 5.3

Cumulative ODA commitments to malaria control by donors in constant prices (2008 USD millions), 2004–2009, by WHO region

More than three quarters of malaria funding during 2004–2009 was committed to the Africa Region.



Note: As of April 2011, data are available through 2009 from this source. Estimates for at-risk populations are from the WHO *World Malaria Report 2010*. These estimates were applied to the UN Population Division estimates of total population for the year 2009 to derive the total at-risk population in each country. See Annex 1 for definitions of financial terms.

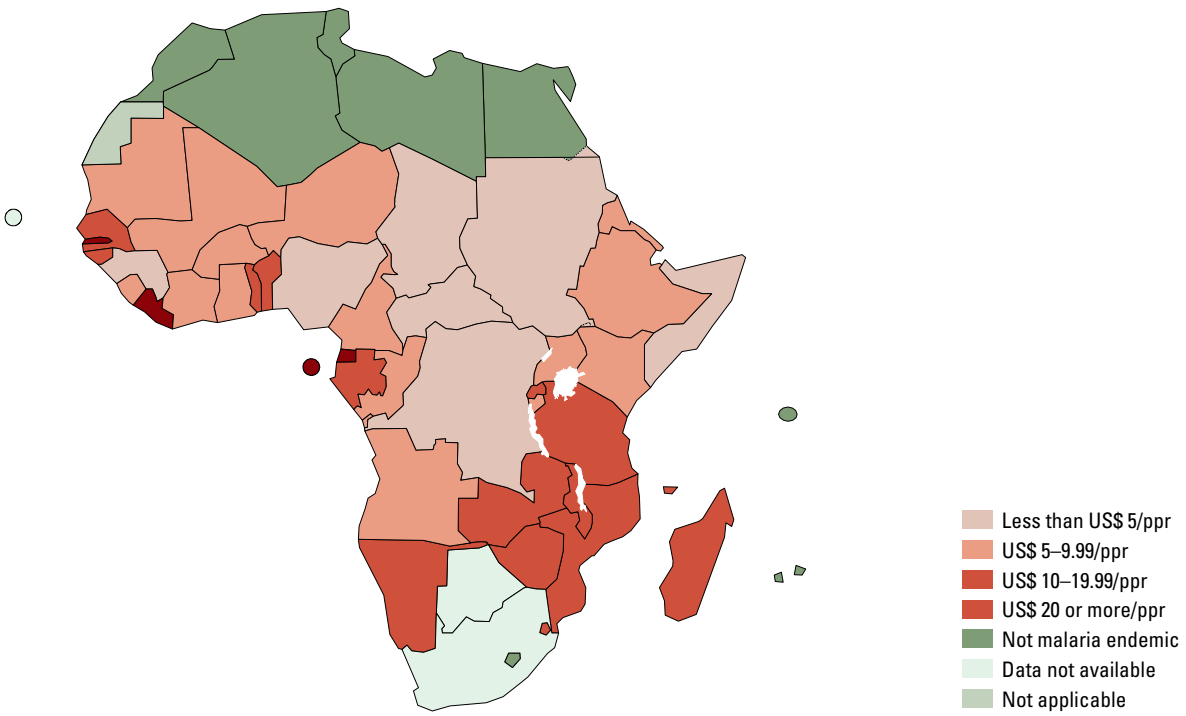
Source: Aid flows to different sectors (including malaria) are based on reporting by OECD DAC members as well as other partners through the OECD DAC Creditor Reporting System and are made available through the online database (Qwery Wizard for International Development Statistics, available at http://stats.oecd.org/qwids/).

A recent analysis[59,60] of resource utilization in 12 African countries showed that spending to procure malaria control commodities, specifically LLINs, was closely associated with coverage gains. These 12 countries spent vastly different amounts on LLIN procurement per person at risk of malaria and subsequently achieved different ITN coverage gains. It was further estimated that all countries needed to spend roughly US$ 2 to US$ 3 per person at risk on ITN procurement in order to initially reach 80% coverage of households with at least one ITN from baseline levels—a funding level that no country in the assessment had met (Figure 5.4). Indeed, while the amount of external funding increased substantially over the past decade, these available funds did not match the estimated need as laid out in the *Global Malaria Action Plan*.

Figure 5.4

Cumulative funding commitments per person at risk (ppr) of malaria over the life of the grant, 2003–2010

Country-specific funding commitment levels per person at risk varied substantially across Africa, from US$ 47/ppr in São Tomé and Principe to US$ 3/ppr in Guinea—a 15-fold difference; 74% of countries had external financing from the Global Fund, US-PMI, and/or the World Bank in the range of US$ 5–20/ppr.



Note: Estimates for funding over the life of the grant were derived by applying the total committed amount over the full funding period. Global Fund grants were estimated by evenly spreading Phase 1 grant approval amounts over a two-year period and Phase 2 grant approval amounts over a 3-year period starting from the grant approval date. World Bank funds were spread evenly over a 3-year period from the approval date. US-PMI commitments are for one-year periods and were converted from fiscal to calendar year by splitting the total commitment proportionally by the days/months across the different calendar years.

Source: Cumulative funding commitments for 2003–2010 from the Global Fund, the World Bank and the US-PMI are based on information as of June 2011.

Seeking universal intervention coverage: a decade of progress

This section assesses the progress of countries over the past decade as they worked to achieve universal coverage with essential malaria interventions by end-2010. These essential interventions are part of the RBM Partnership-recommended four-pronged approach for malaria control (see Annex 1), and include:

- prevention through ITN use;
- prevention through other vector control methods, notably IRS in epidemiologically and logistically appropriate settings;
- prompt diagnosis and treatment of confirmed malaria using appropriate antimalarial medicines;
- IPTp in countries where appropriate (and ITN use in pregnant women).

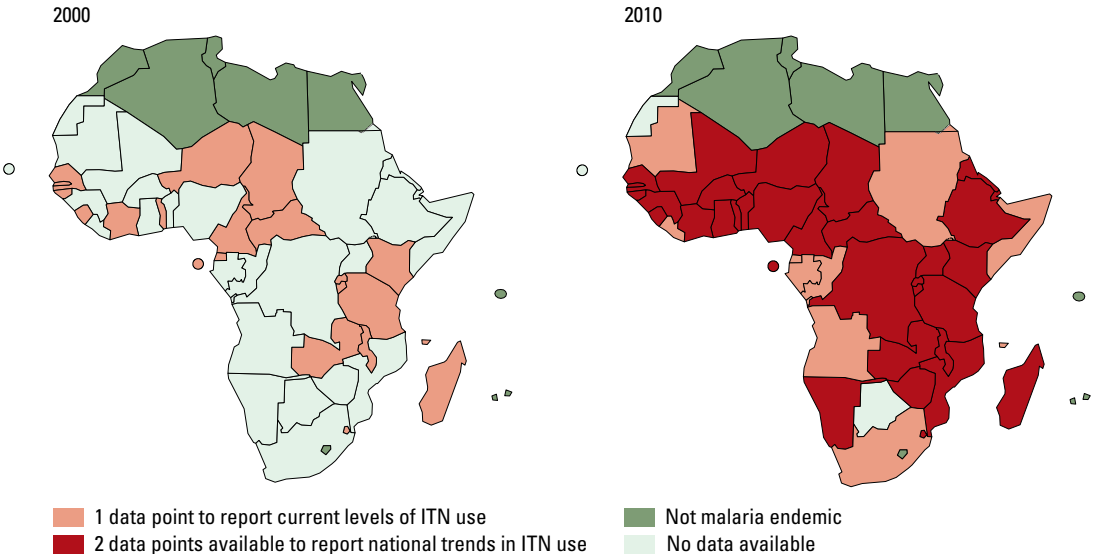
Box 6: Monitoring malaria intervention coverage through household surveys over the decade

In 2009–2010, 30 nationally representative household surveys were conducted in malaria-endemic African countries (see Annex 1). These surveys included the United States Agency for International Development (USAID)-supported Demographic and Health Surveys (DHS), the UNICEF-supported Multiple Indicator Cluster Surveys (MICS) and the Malaria Indicator Surveys (MIS), which were developed under the guidance of the Roll Back Malaria Partnership Monitoring and Evaluation Reference Group. Comparable malaria data were collected across these surveys based on RBM partner consensus on the data needed to monitor malaria programmes and how the data should be collected. This is a major improvement from the start of the decade, when limited data were available in 2000 to effectively monitor malaria intervention coverage. For example, no endemic African country had data to report if ITN use by children was rising or falling—a key indicator to monitor programme success and to track MDG progress (Figure 5.5). Decisions on timing and frequency of these surveys must balance the need for the information and the cost of the work; national population-based surveys are critical for public health decision-making but are also resource intensive.

Figure 5.5

Number and distribution of African countries with survey data to monitor the proportion of children younger than five years who slept under an ITN the previous night, 2000 and 2010

In 2000, no African country could report whether ITN use was rising or falling nationally; by 2010, most countries had data to track this progress.



Source: Survey activity based on information maintained at www.childinfo.org and www.measuredhs.com; *Guidelines for Core Population-Based Indicators*, MEASURE Evaluation, 2009.

Progress in prevention through insecticide-treated mosquito nets

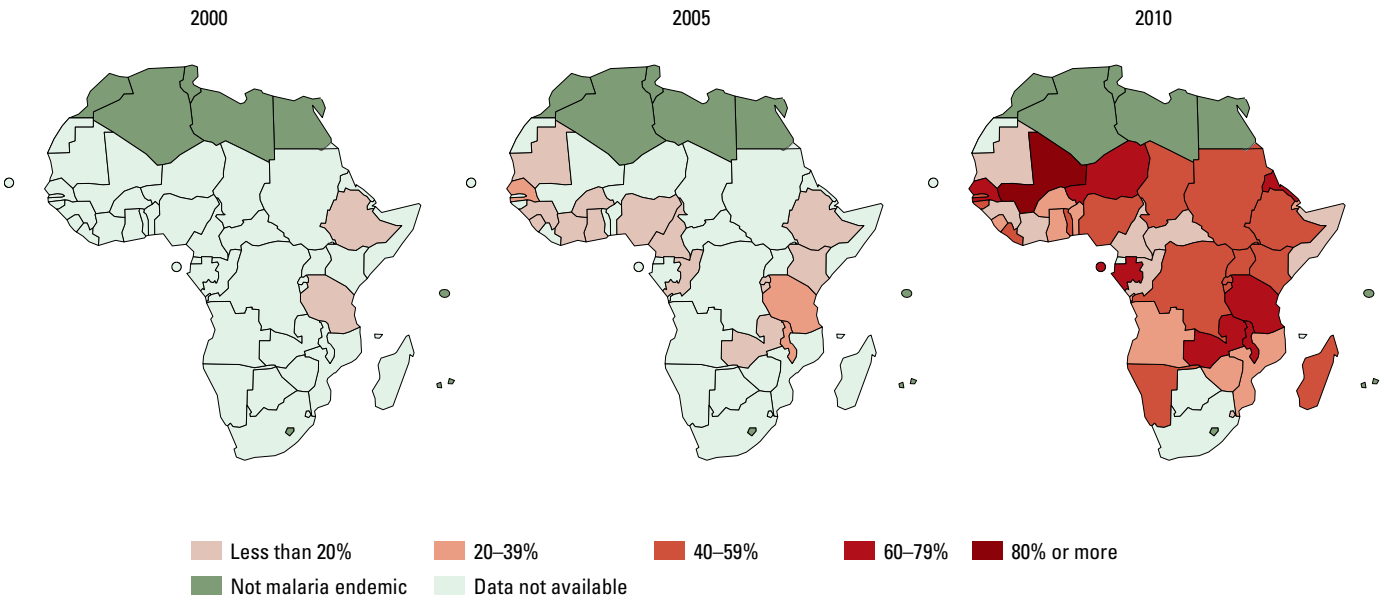
The malaria community began the decade with ITNs that needed annual re-treatment and were often socially marketed to at-risk populations of young children and women of reproductive age. Ten years later, LLINs became the standard net type used across Africa, and they are generally delivered through a variety of mechanisms (mass campaigns, antenatal and immunization clinics, etc.) and free to end-users, with quantities to cover all sleeping spaces (or about one LLIN per two people). More than 400 million LLINs had been delivered to African countries by end-2010, with 290 million delivered since 2008 and available for use. That is enough LLINs to cover nearly 80% of people at risk of malaria in the whole of Africa. The figures in this report demonstrate the rapid dramatic increase in coverage and the fact that this was accomplished while achieving equitable coverage across populations. In the coming years, there remains an urgent need to replace nets delivered three or more years ago, as well as to further expand LLIN coverage and use.

The past decade saw an incredible surge in the production, purchase, distribution and use of ITNs globally, and particularly across Africa. UNICEF, one of the largest net procurers globally, purchased 164 million nets between 2000 and 2010; the vast majority of these nets (79%) were purchased since 2006, further highlighting the recent global scale-up of malaria control since around the middle of the decade (Figure 5.6).

Figure 5.6

Proportion of households with at least one ITN, based on the latest survey data available by the end of 2000, 2005 and 2010

Steep increases were seen in the proportion of African households with at least one ITN.



Note: The maps present the latest survey data available by the end of the specified year, and therefore may include data for earlier time periods. Importantly, some countries conducted household surveys in 2010 but data were not available as of May 2011. These countries include: Burkina Faso, Central African Republic, Ethiopia, The Gambia, Rwanda, Sierra Leone and Togo. National-level estimates may obscure higher coverage achieved in countries where significant shares of their population live in endemic sub-national areas targeted by programmes. In addition, MICS and DHS are generally conducted in the dry season for important technical and logistical reasons. Estimates from these surveys do not reflect coverage during peak malaria transmission seasons, which is assumed to be higher for some indicators (e.g. use of ITNs). See Annex 1 for a detailed discussion.

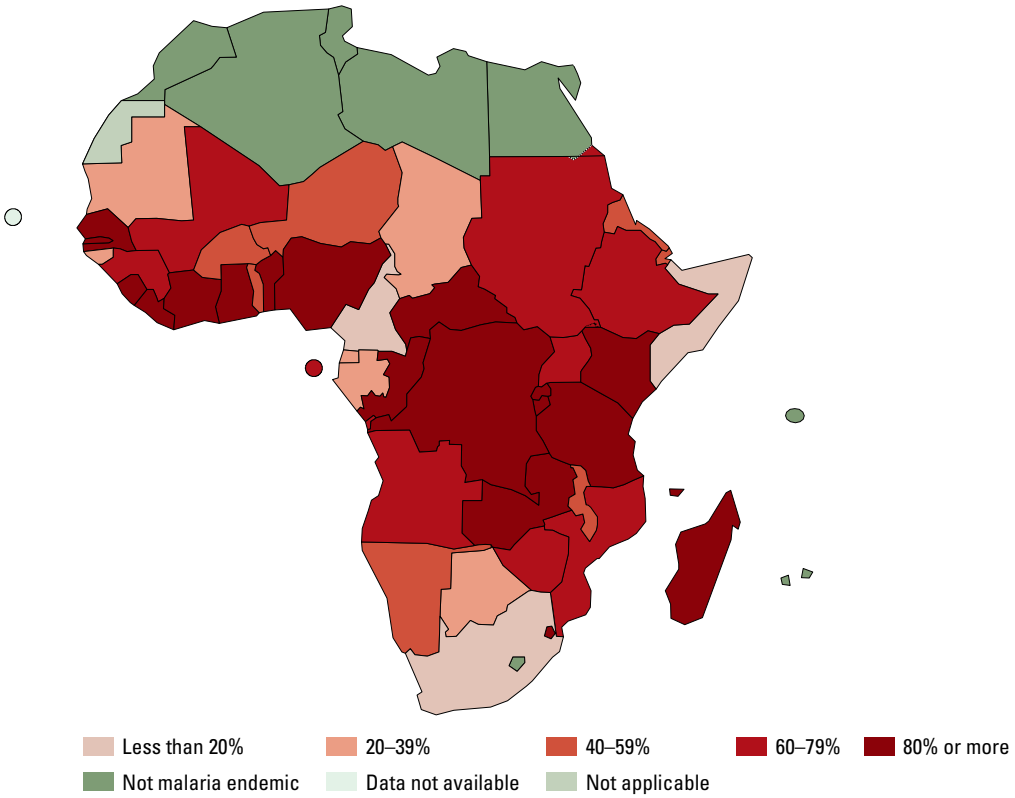
Source: UNICEF global databases 2011, based on DHS, MICS, MIS and other national surveys.

Earlier in the decade, most African countries put together roadmaps[61] that expressed their programmatic needs for scaling up ITN coverage by the end of 2010 (often with a stated need of one net for every two people living in an at-risk area). Based on this definition, African countries had a combined need for approximately 370 million nets to provide one net for every two people per at-risk area. In response, global annual production of nets increased fivefold during 2004–2009 (from 30 million to 150 million per year). Moreover, by the end of 2010, 19 African countries received enough nets to satisfy 80% or more of this stated need (Figure 5.7).

Figure 5.7

Number of LLINs delivered and available for use during 2008–2010 as a percentage of reported need to cover one net for every two people living in an area with malaria transmission

290 million LLINs have been delivered to African countries since 2008, satisfying nearly 80% of reported need across the region.



Source: The Net Mapping Project for the Alliance for Malaria Prevention compiles data on LLIN deliveries to African countries based on reports from seven manufacturers (Sumitomo/A-Z, Vestergaard-Frandsen, Clarke, BASF, BestNet, Tana Netting and Yorkool), which are believed to supply nearly all nets delivered to Africa. Estimates for at-risk populations are from the WHO *World Malaria Report 2010*. These estimates were applied to the UN Population Division estimates of total population for the year 2009 to derive the total at-risk population in each country.

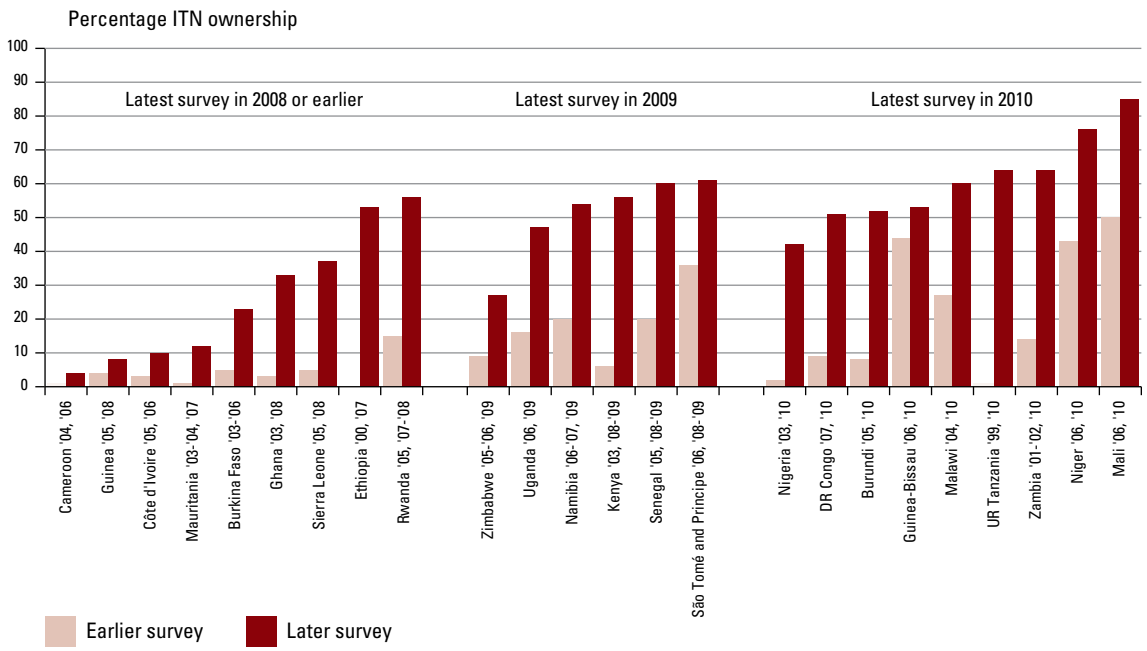
Having at least one net in a household directly affects the likelihood of those most vulnerable sleeping under it. A study[62] published in 2010 demonstrated that the greatest barrier to net use is access to a net—and even in households that own at least one net, children may still not sleep under it simply because not enough nets are available within the home to cover all the people living there. A further study showed that increasing the number of nets available in a home also increased the likelihood of their use by children.[63]

The substantial increase in production, procurement and delivery of ITNs resulted in a marked increase in both net ownership (Figure 5.8) and use by children (Figure 5.9) during the past decade. Household ownership of at least one net rose significantly in all African countries with recent trend data, with Ethiopia, Ghana, Nigeria and the United Republic of Tanzania experiencing at least a 10-fold increase from very low baseline levels. Similarly, ITN use among children younger than five years increased dramatically across Africa over the decade, rising from 2% around 2000 to 38% around 2010.[e] These data represent historic progress in malaria control, and one of the most noteworthy public health achievements in recent years.

Figure 5.8

Proportion of households owning at least one ITN, all African countries with trend data (baseline and latest survey data)

Major gains were made in household ITN ownership across Africa during the past decade; this is particularly seen from recent surveys.



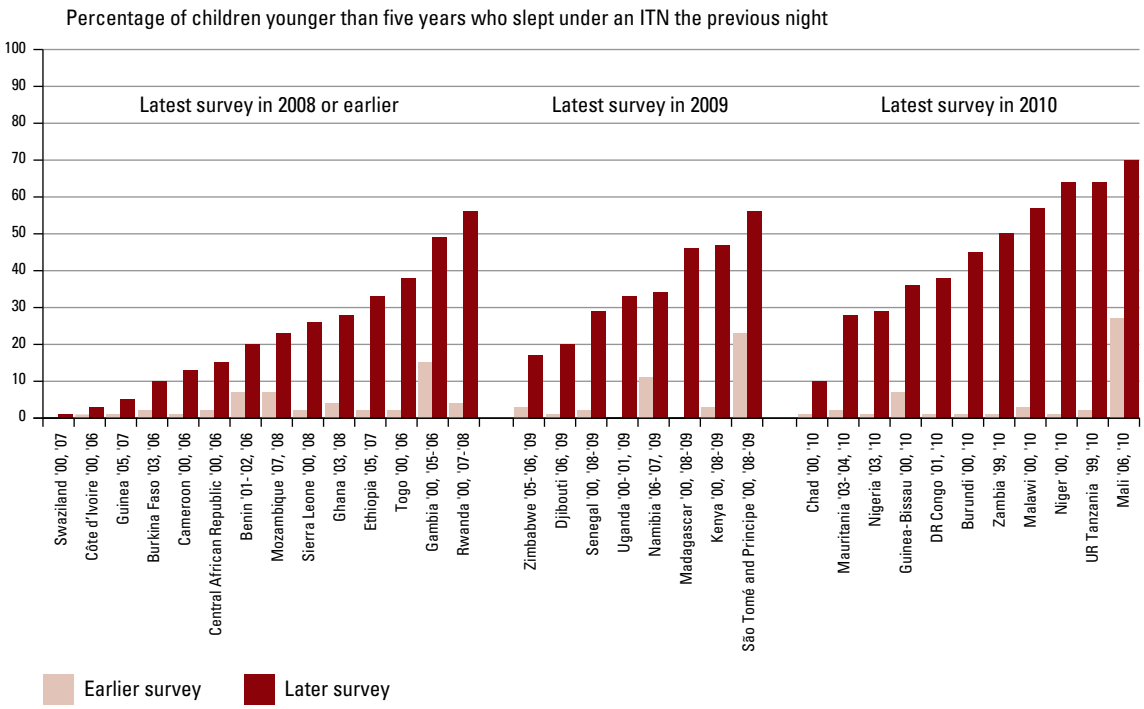
Source: UNICEF global databases 2011, based on DHS, MICS, MIS and other national surveys.

[e] Trends in ITN use by children younger than five years for the WHO African Region aare based on a subset of 19 countries with two comparable data points during the periods 1999-2001 and 2008-2010, representing 61% of the under-five population in that region. A weighted average was taken for each time period among this subset of countries to derive an estimate of regional trends between around 2000 and around 2010.

Figure 5.9

Proportion of children younger than five years who slept under an ITN the previous night, African countries with trend data (baseline and latest survey data)

Significant increases were seen in ITN use among children younger than five years across Africa during the past decade.



Note: The indicator "percentage of children who slept under an ITN the previous night" is the standard indicator used to track progress over time; it is, however, a minimal representation of ITN use in the household, as ITNs may be used appropriately by older children, adolescents and adults.

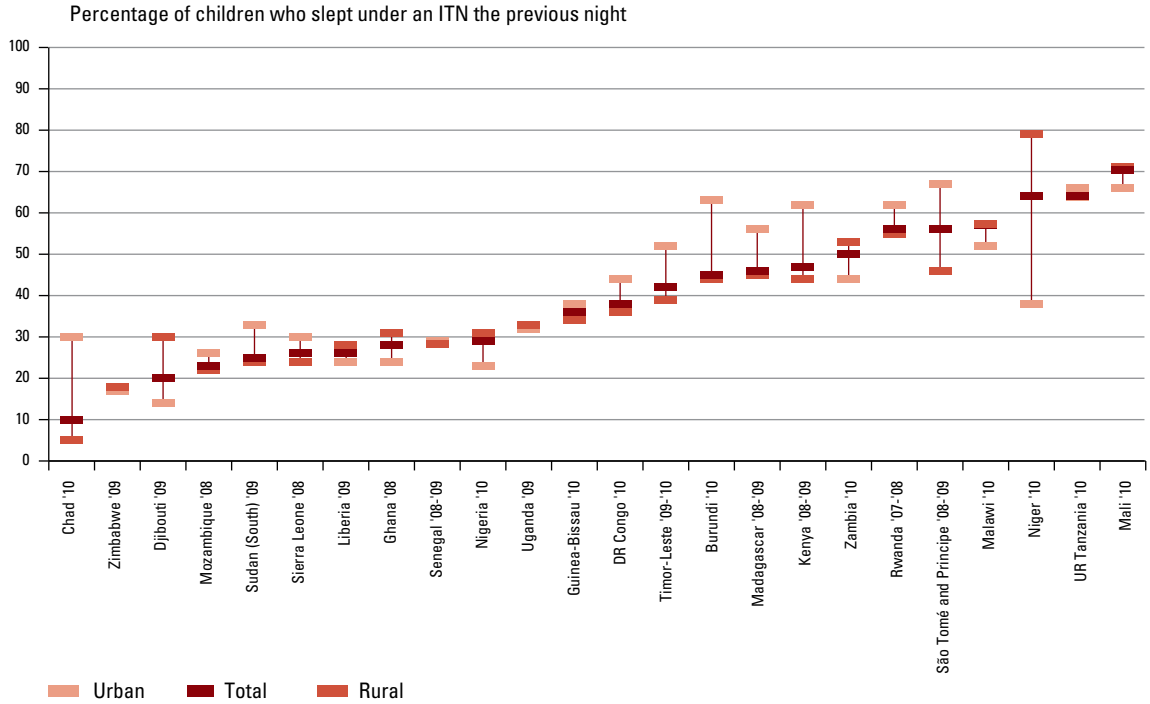
Source: UNICEF global databases 2011, based on DHS, MICS, MIS and other national surveys.

National averages can hide significant in-country disparities where the poorest or those in rural areas are less likely to own a net—and are at higher risk of malaria. But most African countries with data for 2009–2010 for ITN use among children both increased coverage and did this in an equitable way, largely due to nationwide free distribution campaigns that emphasized reaching poor and rural areas (Figure 5.10).

Figure 5.10

Proportion of children younger than five years who slept under an ITN the previous night, based on urban and rural residence, African countries, 2008–2010

Recent data show ITN ownership is often relatively equitable between urban or rural households, or favors rural households.



Note: The indicator "percentage of children who slept under an ITN the previous night" is the standard indicator used to track progress over time; it is, however, a minimal representation of ITN use in the household, as ITNs may be used appropriately by older children, adolescents and adults.

Source: UNICEF global databases 2011, based on DHS, MICS, MIS and other national surveys.

However, data presented here must be viewed within the rapidly changing context of malaria control across Africa. Mass nationwide net distribution is still ongoing in many countries. These major distribution campaigns can drastically and quickly increase national estimates of ITN coverage. Household surveys, however, are implemented in countries only every few years for important technical, logistical and financial reasons. Therefore, surveys conducted prior to a major distribution campaign would not reflect potentially higher coverage achieved by these efforts. For example, more than 35 million nets were distributed in Nigeria between 2009 and early 2011, and so the national-level household survey conducted in early 2010 does not fully reflect the country's progress (Box 7).

Box 7: Nigeria's historic push to scale up long-lasting insecticide-treated mosquito net coverage

Nigeria is one the most populous countries in the world, and bears the greatest malaria burden of any nation worldwide. More than 150 million people live in Nigeria, with nearly all of these people at risk for infection with malaria. In fact, more than one in every five African people at risk of malaria lives in Nigeria.

To tackle this tremendous malaria burden, Nigeria—backed by programmatic and financial support from numerous partners (especially the World Bank, the Global Fund and DFID)—put together an ambitious plan to scale up to reach universal coverage with essential malaria interventions, especially LLINs. Based on this plan, between 2009 and early 2011, Nigeria had distributed more than 35 million LLINs to reach universal coverage targets, an historic and unprecedented effort. The coordinated statewide plans started with 12 million nets distributed in 2009, and then 23 million nets were made available to states in 2010 and early 2011. From thinking that it could not be done to the historic achievements of the past two years, Nigeria might soon become a leader in the African continent in protecting its people from malaria. Yet much still remains to be done, including a similar push for diagnosis and treatment to consolidate the gains against malaria.

The LLIN distribution campaigns are already yielding desired outcomes: an evaluation conducted in Sokoto State, Nigeria, five months after its distribution campaign, found that household ownership of at least one ITN increased from 4% to 64% across the state. However, nationally representative household surveys (e.g. MICS, DHS, MIS) are the most appropriate method for measuring coverage increases at the national level due to LLIN distribution campaigns. The most recent national-level household survey was conducted in Nigeria in early 2010, and its results therefore do not reflect likely higher coverage achieved by major distribution efforts later in 2010 and early 2011. It is expected that the next survey will reflect much higher ITN coverage across Nigeria. Other African countries, such as Kenya, Uganda and the United Republic of Tanzania, similarly distributed a large number of nets in late 2010 and have not yet conducted surveys to document these efforts.

Sources: Total population estimates are from: UN Department of Economic and Social Affairs, Population Division (2009).[64] Total estimates for at-risk populations are from WHO, *World Malaria Report 2010*.[19] Information on Nigeria LLIN distribution efforts is from the African Leaders Malaria Alliance web site, Nigeria page, available at: http://www.alma2015.org/countries/nigeria and from Killian A et al (2010).[65]

A major focus of programmes going forward will be to continue seeking universal net coverage among their at-risk populations as well as to start replacing worn-out nets. Since LLINs generally last about three years, many countries that conducted mass distribution campaigns around 2007–2008 are now facing the challenge of net replacement for a large portion of their population. This may require combined approaches to increase and sustain coverage by delivering nets through both mass campaigns and routine services, such as immunization or reproductive health programmes.

Indoor residual spraying

Over the past decade, IRS was increasingly used in national programmes where appropriate. The funding for IRS programmes increased dramatically from the US-PMI and the Global Fund. WHO reported that IRS protected more than 73 million people across Africa in 2009; more than 27 million people were protected by IRS in 15 countries supported by the US-PMI in 2010 alone. Insecticide resistance is a critical concern for the efficacy of this tool, and opportunities to rotate insecticides through IRS programmes can help mediate this challenge.

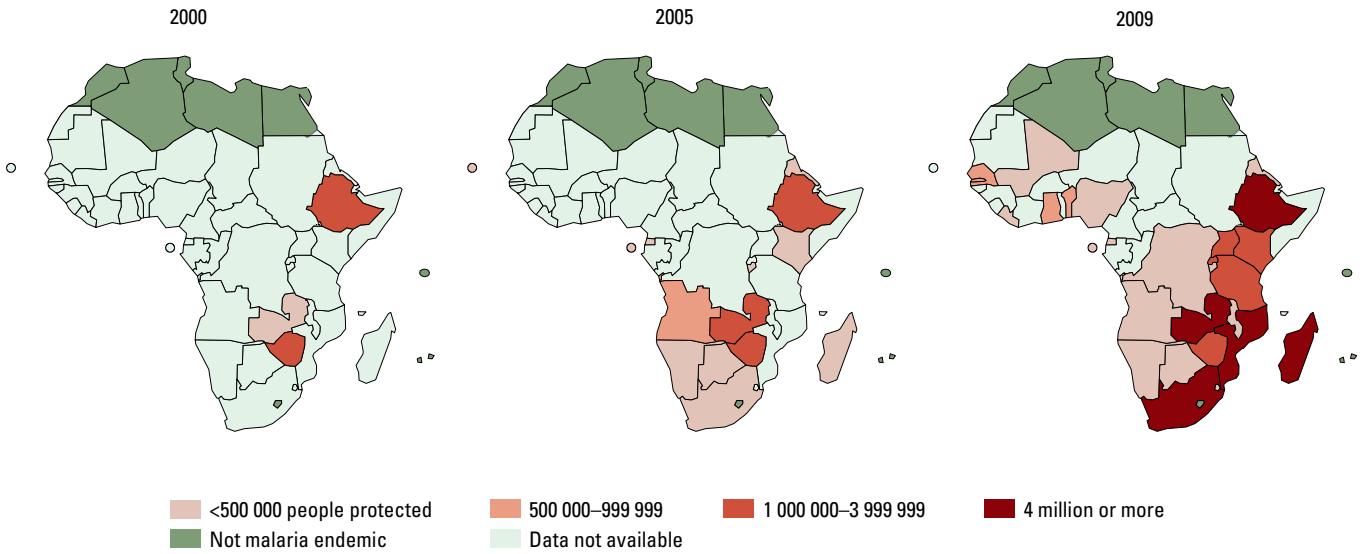
Indoor residual spraying is an effective prevention measure in epidemiologically and logistically appropriate settings, such as urban or peri-urban areas where houses are built close together and malaria transmission is often seasonal. Since IRS programmes often target sub-national areas, programme records are the most reliable data source to monitor IRS coverage. WHO reported that more than 73 million people were protected with IRS in 2009 across Africa.[19] Moreover, consistently collected data from the US-PMI, which has supported IRS activities in its programme countries since 2006, show that more than 27 million people living in 6.7 million houses were protected with IRS in 2010 alone (Figure 5.11).

While LLINs last on average three or more years, they deliver only one insecticide for that duration. With IRS done at intervals, the option exists to rotate insecticides in order to mitigate the risk of evolving insecticide resistance. Integration of these two vector control methods will become increasingly important in coming years to help optimize programme effectiveness in the face of potential insecticide resistance.

Figure 5.11

Number of people protected by IRS in African countries in 2000, 2005 and 2009

With increased funding from the Global Fund, the World Bank and the US-PMI, many countries have recently expanded IRS programmes to protect a larger population.



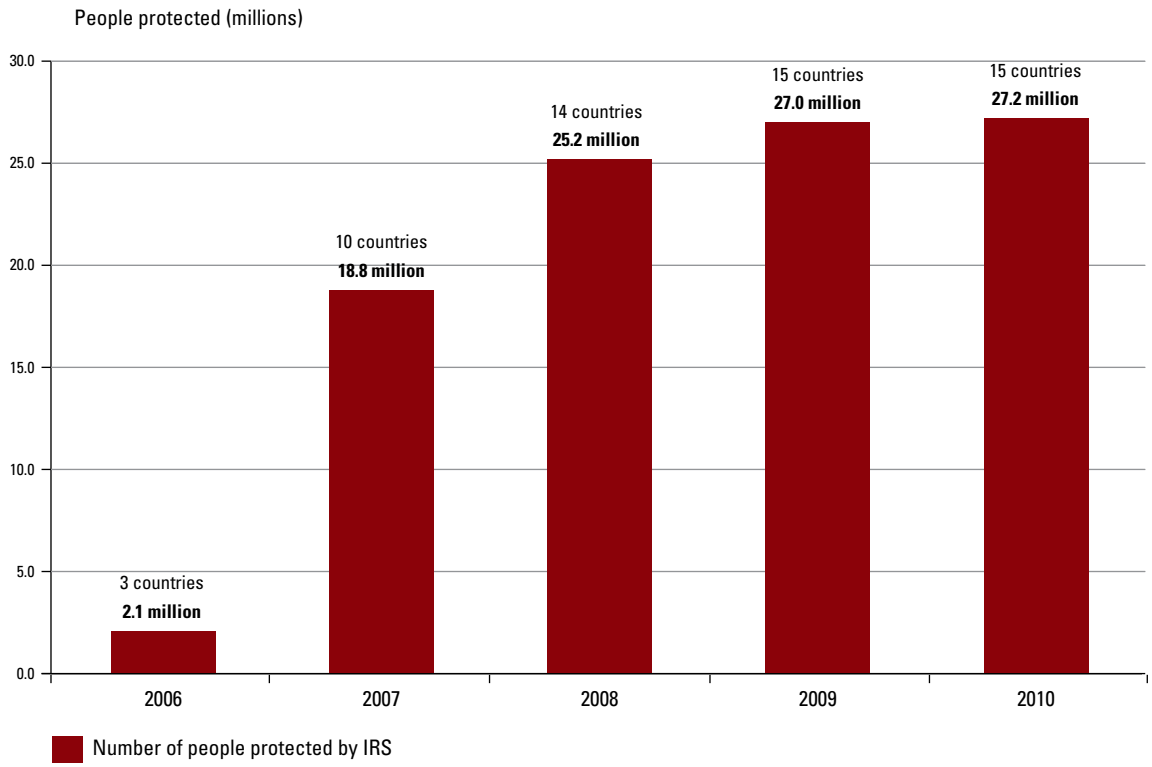
Source: WHO, *World Malaria Report 2010.*[19]

In 2007, with support from the US-PMI, national programmes in several African countries rapidly increased coverage of IRS. The number of people protected from malaria through IRS increased more than 13-fold between 2006 and 2010 (Figure 5.12).

Figure 5.12

Number of people living in houses sprayed during IRS campaigns in countries supported by the US-PMI, 2006–2010

In 2010 alone, more than 27 million people were protected by IRS in 15 African countries through the US-PMI alone.



Source: US-PMI, 2011.[66]

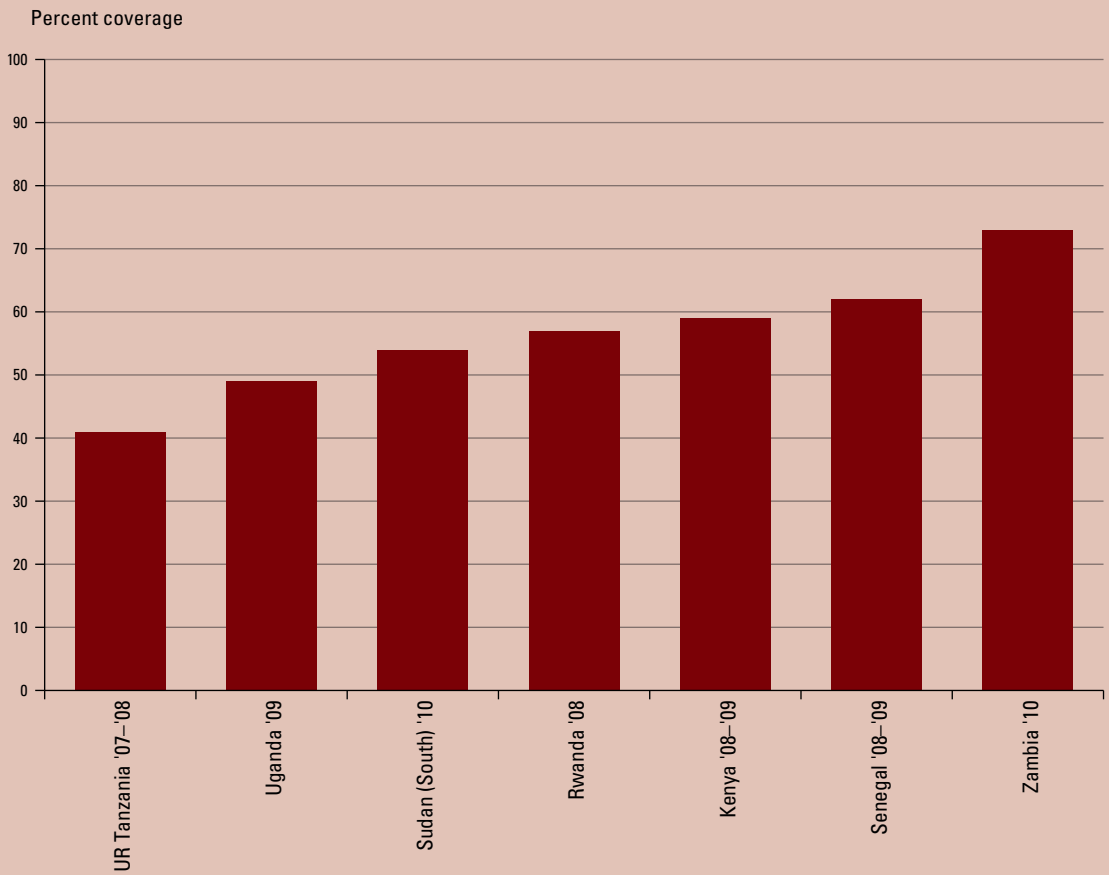
Box 8: Insecticide-treated mosquito nets and indoor residual spraying

Since measuring overall prevention efforts at the national level needs to account for different vector control strategies used in different areas within countries, new survey data have recently become available to measure households protected by *at least one* vector control method—either owning at least one ITN or having been sprayed by IRS in the past 12 months. Seven African countries have recent data to monitor this indicator (Figure 5.13). At this time, vector control coverage is largely determined by ITN coverage, and only modest additional total vector control coverage gains have occurred with current IRS programmes.

Figure 5.13

Proportion of households with at least one ITN or sprayed with IRS in the previous 12 months, African countries, 2008–2010

Where information is available, many African countries have achieved relatively high coverage rates of at least one vector control method.



Source: UNICEF global databases 2011, based on DHS, MICS, MIS and other national surveys.

Malaria during pregnancy

Pregnant women and their newborns benefit from the increasing LLIN availability and use (see previous section), and IPTp has been widely adopted as national policy across Africa: 38 African countries had a national IPTp policy by end-2010. Despite high rates of antenatal clinic attendance, recent data show that about one in four pregnant women across sub-Saharan Africa receives IPTp,[f] and coverage across the different countries is highly variable; there is much room for improvement in coverage with this intervention.

Following the demonstration of the efficacy and effectiveness of both ITNs and IPTp during the 1990s and early 2000s, the WHO Regional Office for Africa developed policy and guidance for countries in the region. Sleeping under an ITN and taking IPTp are the two main strategies for malaria control during pregnancy in moderate to high transmission settings, along with effective case management for clinical malaria and anaemia in pregnant women.[67]

IPTp consists of two or more treatment doses of sulfadoxine-pyrimethamine delivered through antenatal care programmes during the second and third trimesters, which has been shown to be effective in reducing anaemia and placental malaria in pregnant women and in protecting newborns from premature birth and low birth weight.[8,68,69]

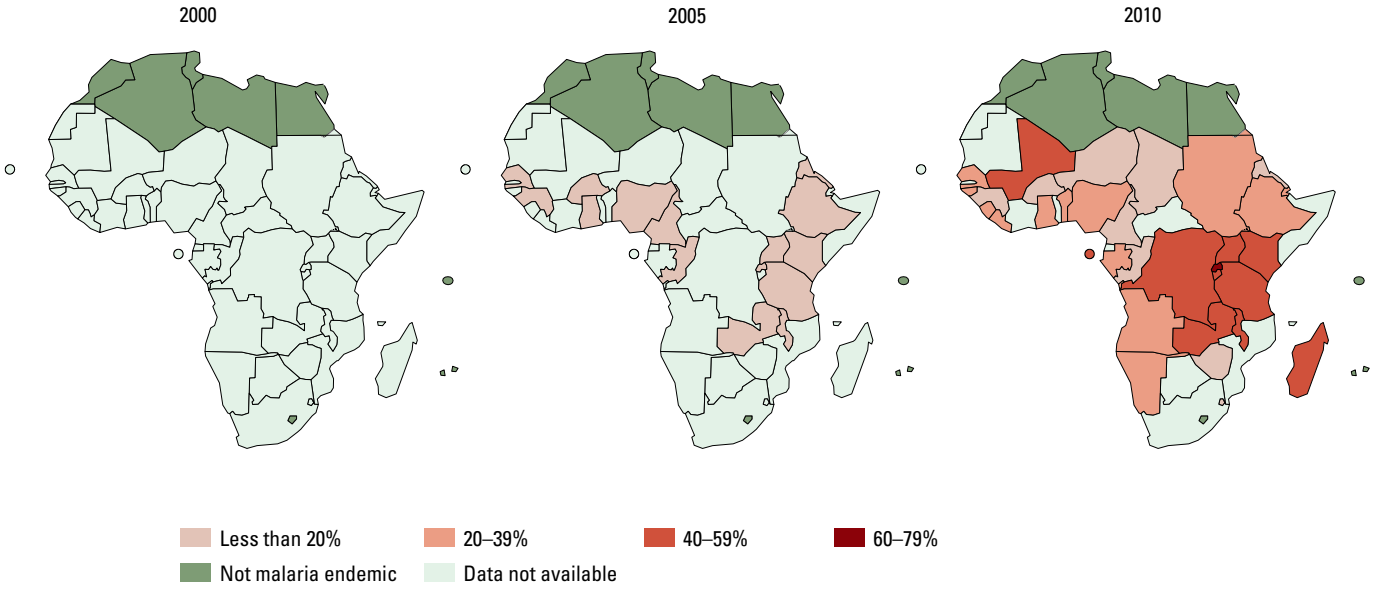
During the early to middle part of this decade, most countries adopted a policy of malaria prevention during pregnancy with ITNs and IPTp. The rates of ITN use among pregnant women have increased dramatically in recent years; this increase coincides with household ITN ownership and is consistently very similar to the use rates in young children (Figures 5.14 and 5.15).

[f] Regional estimate for the WHO African Region is based on 17 countries with data on ITN use among pregnant women in 2008–2010, representing 58% of births in that region in 2009.

Figure 5.14

Proportion of pregnant women sleeping under an ITN, based on the latest survey data available by the end of 2000, 2005 and 2010

ITN coverage among pregnant women was moderate and uneven across African countries.



Note: The maps present the latest survey data available by the end of the specified year, and therefore may include data for earlier time periods. Importantly, some countries conducted household surveys in 2010 but data were not available as of May 2011. These countries include: Burkina Faso, Central African Republic, Ethiopia, The Gambia, Rwanda, Sierra Leone and Togo. National-level estimates may obscure higher coverage achieved in countries where significant shares of their population live in endemic sub-national areas targeted by programmes. In addition, MICS and DHS are generally conducted in the dry season for important technical and logistical reasons. Estimates from these surveys do not always reflect coverage during peak malaria transmission seasons. See Annex 1 for a detailed discussion.

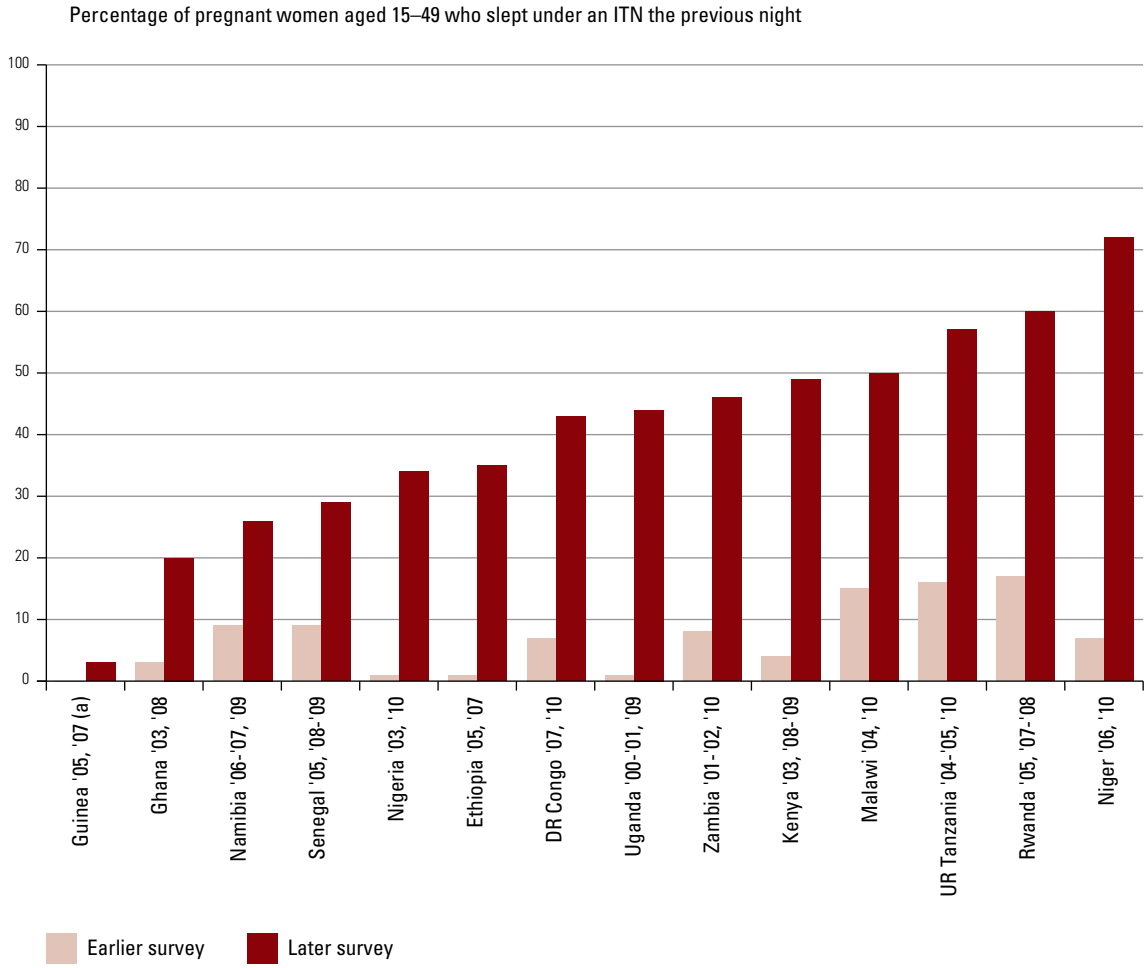
Source: UNICEF global databases 2011, based on DHS, MICS, MIS and other national surveys.

Major gains have been made in the proportion of pregnant women sleeping under an ITN in nearly all African countries with two or more comparable data points (Figure 5.15). Recent data also show that many countries are starting to close the gap between urban and rural households, with some countries even favouring coverage among pregnant women in rural areas instead of urban ones. These results mirror ITN coverage gains described in previous sections.

Figure 5.15

Proportion of pregnant women aged 15–49 who slept under an ITN the previous night, African countries, 2000–2010

In recent years, major gains have been made in ITN use among pregnant women across African countries with data available to assess trends.



Note: (a) ITN definition refers to LLINs or nets obtained or treated within the previous six months (rather than the previous 12 months).

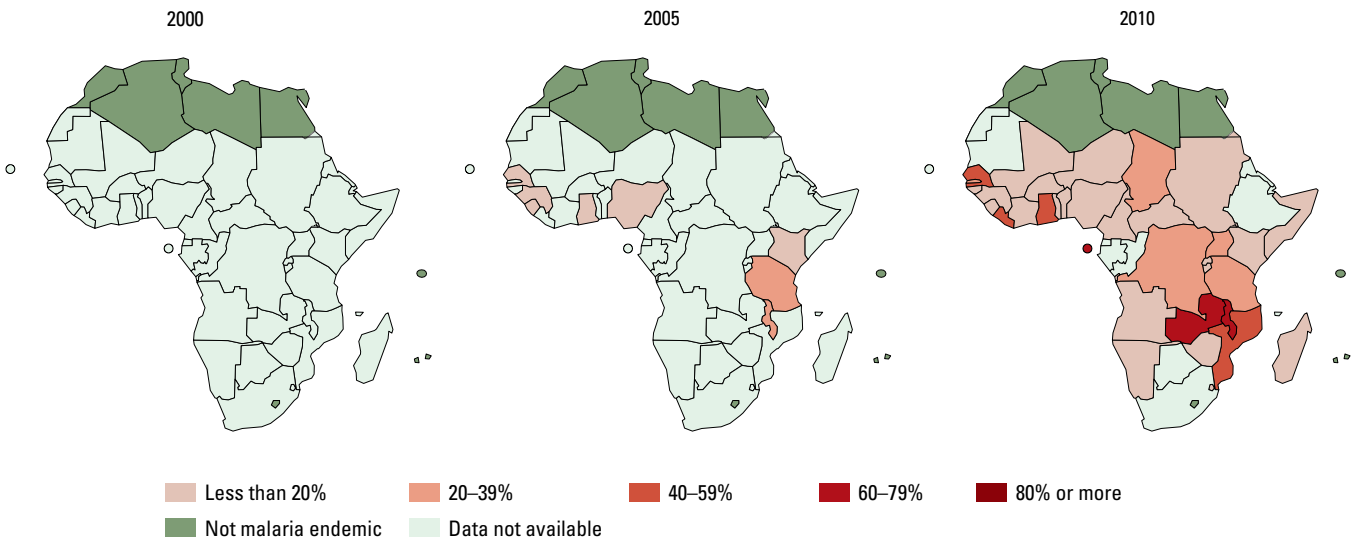
Source: UNICEF global databases 2011, based on DHS, MICS, MIS and other national surveys.

Following guidance on the use of IPTp from the WHO Regional Office for Africa, 38 countries in the region have adopted an IPTp policy. However, wide-scale deployment of the policy and strategy has taken time, and as seen in Figure 5.16, much of the increase in coverage has been achieved in recent years (Figure 5.17) and in an equitable fashion across rural and urban populations (Figure 5.18). While many countries have reported high rates of antenatal care attendance by pregnant women, the actual scale-up of IPTp intervention coverage has missed opportunities to build on these existing services (Figure 5.19).

Figure 5.16

Proportion of last live births where the mother received IPTp,* based on the latest survey data available by the end of 2000, 2005 and 2010

Recent years show progress in use of IPTp by pregnant women, however there remains much room for improved coverage.



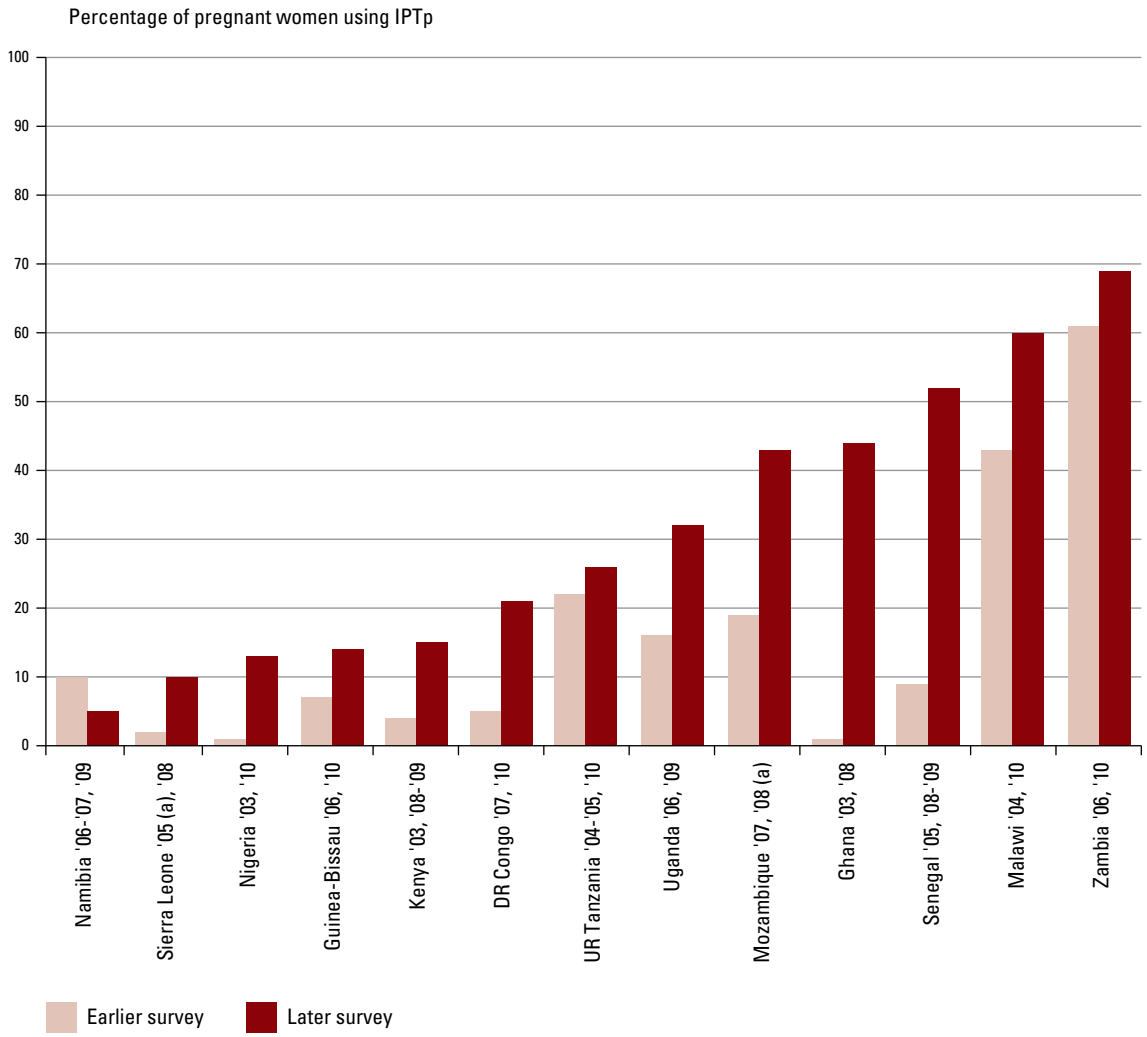
Note: *IPTp is defined as receiving at least two doses of sulphadoxine-pyrimethamine, with at least one dose received at an antenatal care visit. The maps present the latest survey data available by the end of the specified year, and therefore may include data for earlier time periods. Importantly, some countries conducted household surveys in 2010 but data were not available as of May 2011. These countries include: Burkina Faso, Central African Republic, Ethiopia, The Gambia, Rwanda, Sierra Leone and Togo. National-level estimates may obscure higher coverage achieved in countries where significant shares of their population live in endemic sub-national areas targeted by programmes. In addition, MICS and DHS are generally conducted in the dry season for important technical and logistical reasons. Estimates from these surveys do not always reflect coverage during peak malaria transmission seasons. See Annex 1 for a detailed discussion.

Source: UNICEF global databases 2011, based on DHS, MICS, MIS and other national surveys.

Figure 5.17

Proportion of last live births in the in the previous two years where the mother received IPTp,* all African countries with trend data, 2003-2010

IPTp coverage increased across all African countries with trend data, but coverage rates varied dramatically between countries, even in recent years.



Note: *IPTp is defined as receiving at least two doses of sulphadoxine-pyrimethamine, with at least one dose received at an antenatal care visit. (a) IPTp received during antenatal care visit not specified.

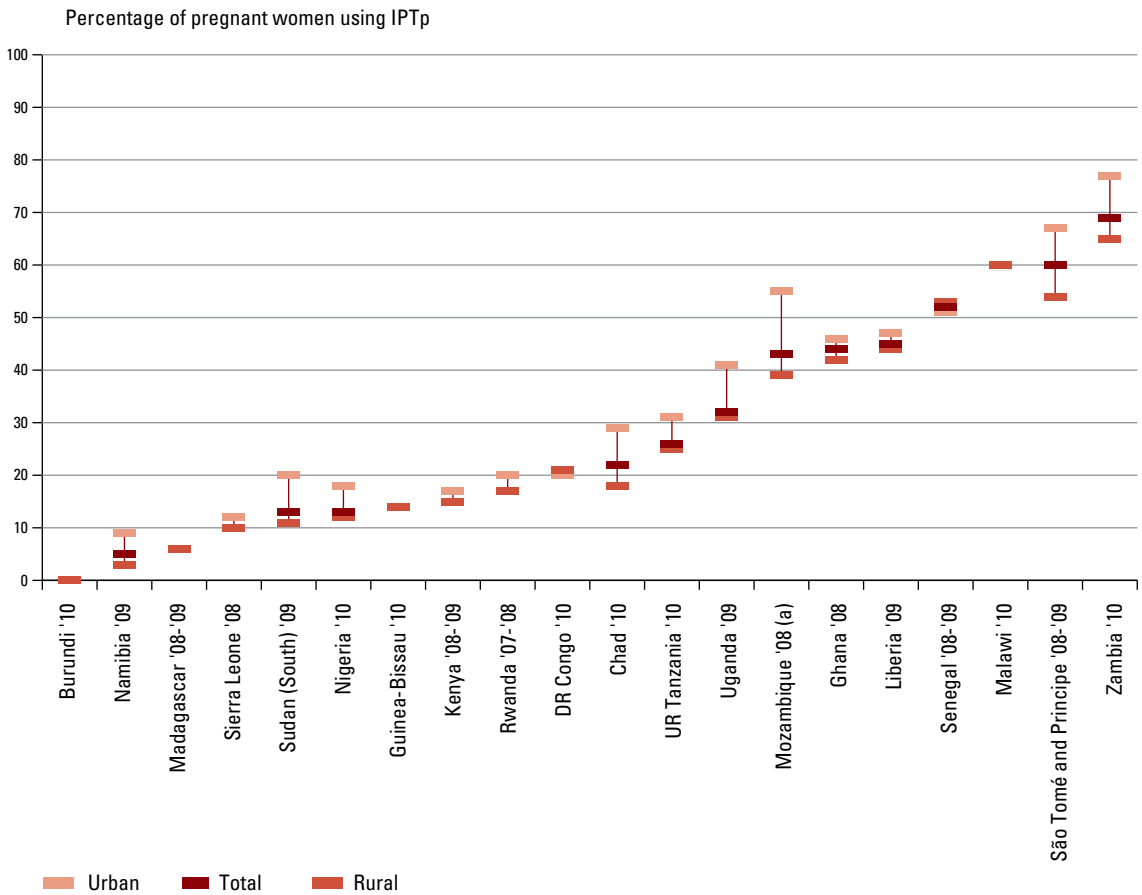
Source: UNICEF global databases 2011, based on DHS, MICS, MIS and other national surveys.

While countries showed generally low national coverage rates for IPTp, coverage rates were usually similar for pregnant women in urban and rural areas (Figure 5.18).

Figure 5.18

Proportion of last live births in the previous two years where the mother received IPTp,* based on urban and rural residence, African countries, 2007–2010

Across the spectrum of IPTp coverage in countries, most coverage was provided in an equitable manner between urban and rural populations.



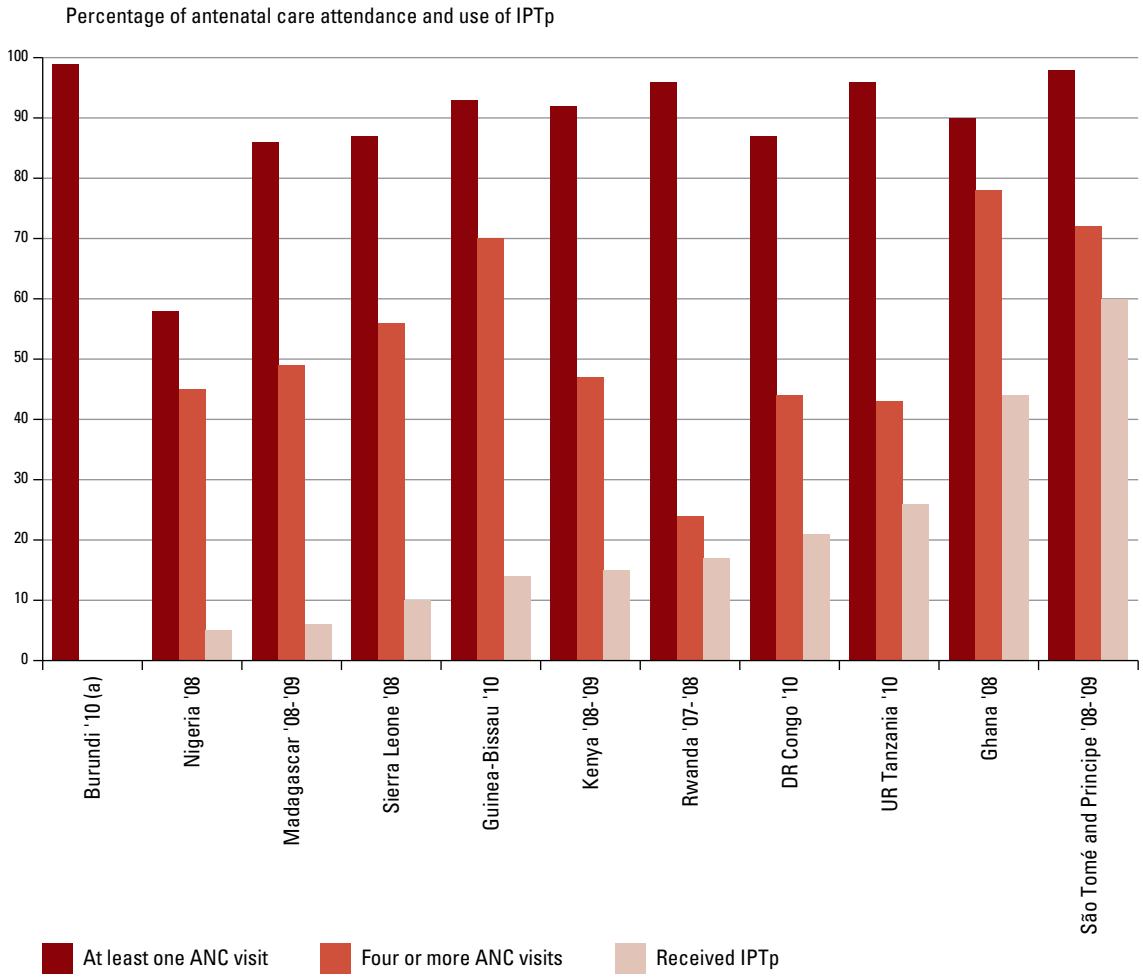
Note: *IPTp is defined as receiving at least two doses of sulphadoxine-pyrimethamine, with at least one dose received at an antenatal care visit. (a) IPTp received during antenatal care visit not specified.

Source: UNICEF global databases 2011, based on DHS, MICS, MIS and other national surveys.

Figure 5.19

Proportion of last live births in the previous two years for which the mother received skilled antenatal care and intermittent preventive treatment, in African countries, 2008–2010

*Antenatal care is an important means of delivering malaria interventions to pregnant women, but is too often a missed opportunity. In the figure, dark red indicates the mother was attended at least once during pregnancy by skilled health personnel; red indicates the mother was attended four or more times during pregnancy by any provider; pink indicates the mother received IPTp.**



Note: *IPTp is defined as receiving at least two doses of sulphadoxine-pyrimethamine, with at least one dose received at an antenatal care visit. (a) Data are not available for the number of women who attended antenatal care four or more times.

Source: UNICEF global databases 2011, based on DHS and MICS surveys.

While some gains have been made, malaria control during pregnancy received inadequate attention over the past decade in terms of translating available evidence into programmes.[70] While research is under way to identify new drugs for IPTp and to determine optimal methods for preventing malaria during pregnancy when malaria transmission levels are reduced, a recent review[71] showed that many countries were slow to adopt national policies for malaria prevention in pregnancy, and those with policies have often been slow to implement programme scale-up.

Antenatal care visits are important opportunities to deliver these key malaria interventions to pregnant women, and increasing coverage in an equitable manner will largely be determined by the quality and reach of reproductive health programmes. Across Africa, 78% of pregnant women attended antenatal care at least one time, although far fewer (43%) attended four or more times, which is the WHO recommendation. Indeed, the relatively low coverage of IPTp compared to levels of antenatal care attendance among pregnant women suggests that reproductive health programmes are missing important opportunities to deliver this critical intervention to pregnant women (Figure 5.19). Moreover, the poorest women as well as those living in rural areas are less likely to attend antenatal care at least one time, and these women are at highest risk of contracting malaria. Some factors cited as affecting programme quality include unclear messaging and limited understanding by some health providers about IPTp (including timing and dosage), sulfadoxine-pyrimethamine stock-outs, and irregular antenatal care visits.[71]

Case management: diagnosis and treatment

One of the most dramatic changes in malaria strategies was the 2010 WHO recommendation for universal use of diagnostic testing to confirm malaria infection and apply treatment based on the results. While microscopy is available in many settings, RDTs are increasingly available and are being rolled out at the national level in some countries, and data are showing dramatic changes in reducing the number of reported cases (reporting only confirmed malaria) and in aligning treatment such that ACT use is also markedly reduced (e.g. in Rwanda and Senegal). Spending on diagnostic tests increased dramatically in 2010, so countries' wide-scale deployment of this strategy will likely begin soon.

Following recommendations early in the last decade to move to ACT as first-line therapy, ACTs are now widely available from multiple manufacturers and in many formulations. Most countries changed national drug policies within the last five years, but only in the last several years have countries begun to provide ACT as the principle antimalarial treatment. Rates of appropriate ACT use are improving but remain low in many countries for a variety of reasons: differing care-seeking practices in public, private, formal and informal sectors; differing practices around diagnostic testing (available or not); and the use (or not) of the test results to guide appropriate treatment. There remains much room for improvement in case management, and this will be critical with the future focus to achieve near-zero malaria deaths by end-2015.

Diagnosis: Prompt diagnosis and treatment with an effective antimalarial drug is needed to prevent life-threatening complications in malaria patients. Accurate diagnosis based on parasitologic testing is a key component of effective malaria case management. Prompt diagnostic testing also reduces overuse of modern and expensive ACTs, and prevents other causes of fever from being appropriately treated,[72,73] placing a financial burden on the health system[74] and potentially hastening antimalarial drug resistance.[75,76]

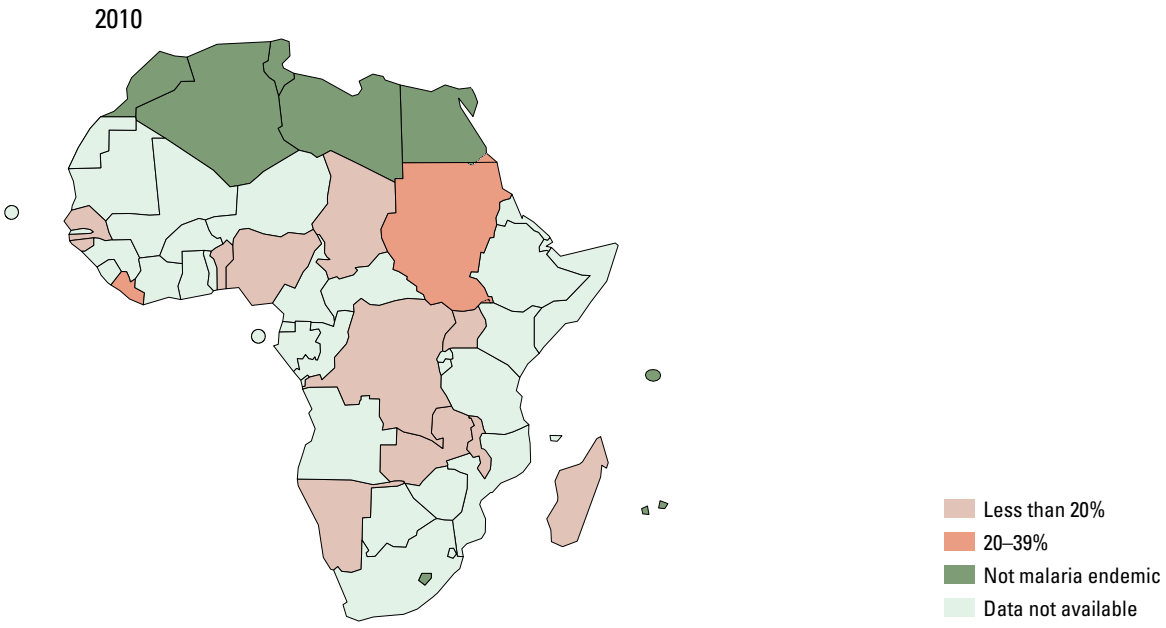
Rapid malaria diagnostic tests have been developed and refined to overcome the significant logistical and quality control issues associated with introducing microscopy for malaria diagnosis in remote and resource-poor health facilities.[77] Some recent studies have indicated high adherence to protocols for RDT results and thus reduced antimalarial use and improved fever case management in health facilities.[78–81] Other studies, however, have suggested that many patients may still be prescribed antimalarial drugs despite a negative test result.[82,83] A recent investigation further confirmed that restricting antimalarial drugs to RDT-positive patients is safe, even in high malaria transmission settings.[84]

In 2010, WHO began recommending parasitological confirmation in all patients with suspected malaria before treatment, rather than presumptive treatment based on clinical symptoms (e.g. fever), as previously recommended for children younger than five years. However, where parasitological diagnosis is still not accessible, presumptive treatment on the basis of clinical suspicion of malaria should still be considered.[85] The adoption of recommendation for universal use of diagnostics is under way but not yet complete in many countries (Figure 5.20). Expenditure data from the Global Fund, World Bank, and the US-PMI show a major increase in spending on diagnostic tests in just in the past two years (Figure 5.21).

Figure 5.20

Proportion of febrile children younger than five years who received a finger/heel stick for testing, based on the latest survey data available by the end of 2010

While some African countries began increasing access to diagnostics late in the decade, meaningful progress is not yet evident; recent marked increases in spending on diagnostic tests suggest that this will change dramatically in the coming years.



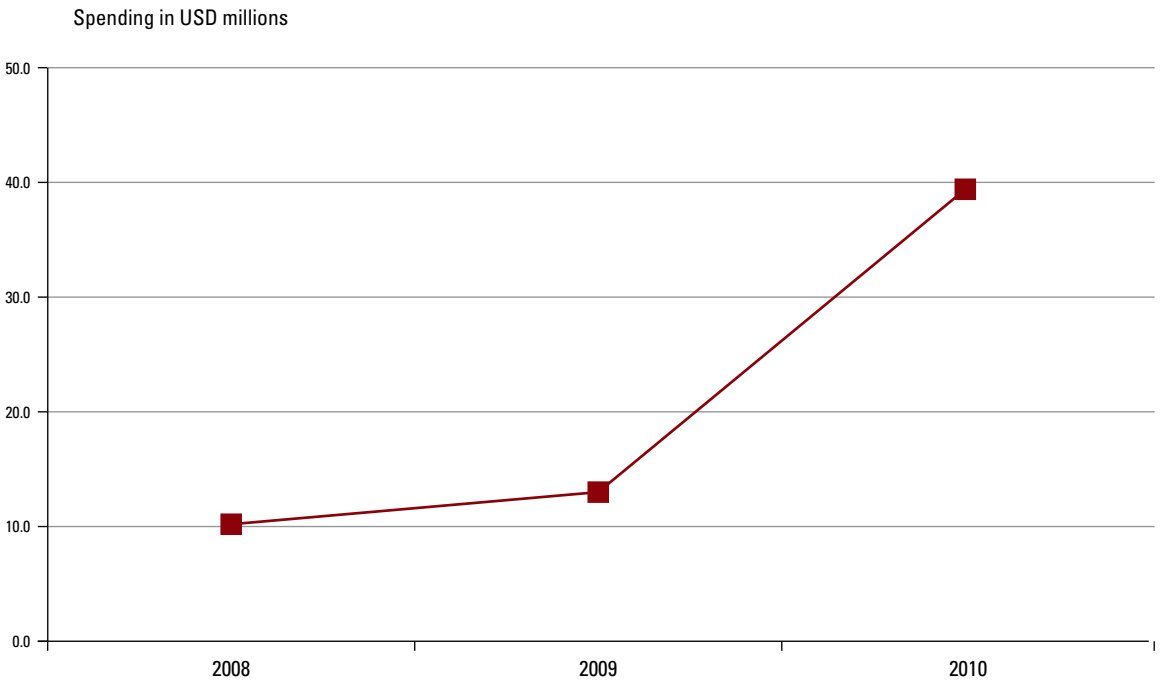
Note: The map presents the latest survey data available by the end of the specified year, and therefore may include data for earlier time periods. Importantly, some countries conducted household surveys in 2010 but data were not available as of May 2011. These countries include: Burkina Faso, Central African Republic, Ethiopia, The Gambia, Rwanda, Sierra Leone and Togo. National-level estimates may obscure higher coverage achieved in countries where significant shares of their population live in endemic sub-national areas targeted by programmes. In addition, MICS and DHS are generally conducted in the dry season for important technical and logistical reasons. Estimates from these surveys do not reflect coverage during peak malaria transmission seasons, which is assumed to be higher for some indicators. See Annex 1 for a detailed discussion.

Source: UNICEF global databases 2011, based on DHS, MICS, MIS and other national surveys. Note that questions on diagnostics use were only recently added to MICS, DHS and MIS; therefore, information is not available from these sources prior to around 2008–2009.

Figure 5.21

Annual expenditures by the Global Fund, the World Bank and the US-PMI towards malaria diagnostics (microscopy and RDTs), 2008–2010

There has been a recent and rapid rise in spending on diagnostics by the Global Fund, the World Bank and the US-PMI.



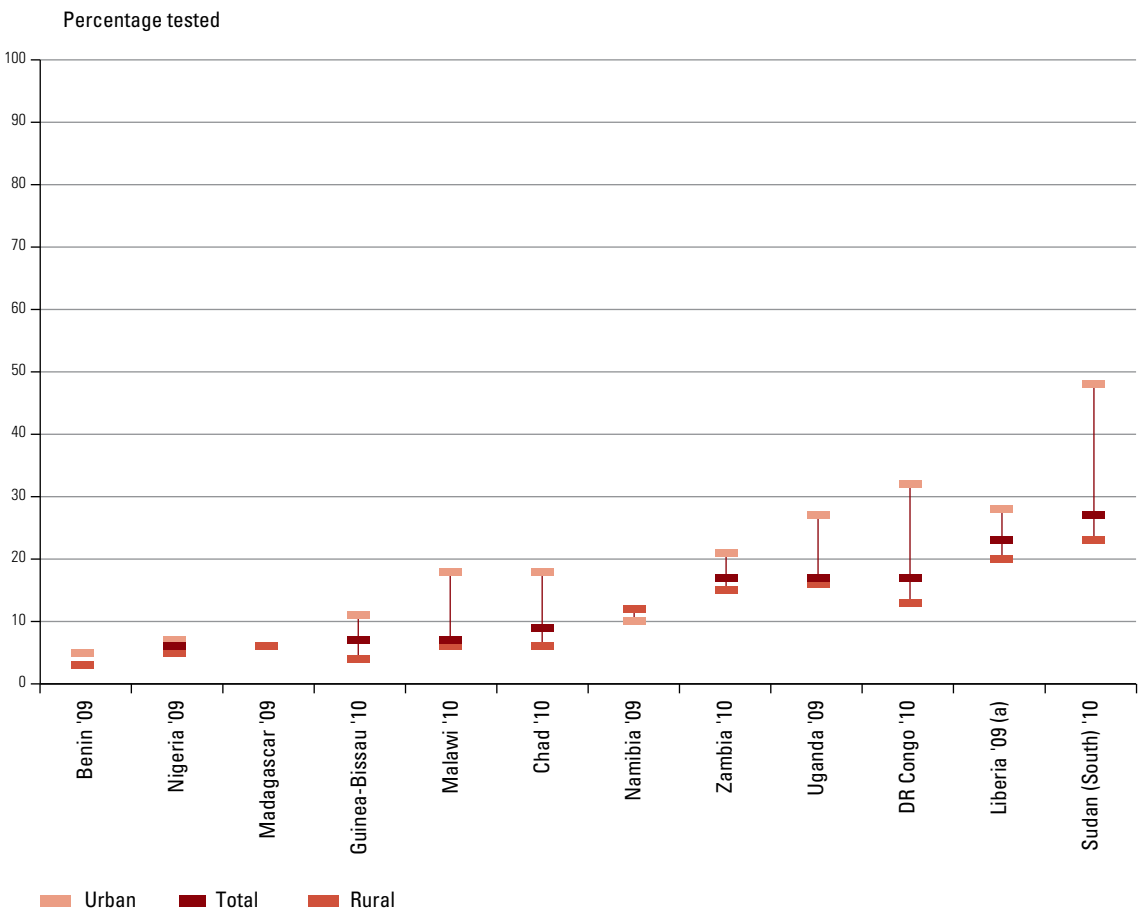
Source: Global Fund, World Bank and US-PMI databases 2011. Note that World Bank data refer to RDTs only; therefore, the amounts presented here may underestimate spending on malaria diagnostic tools.

Based on this new recommendation, questions were recently incorporated into household surveys to collect information on the use of malaria diagnostics (see Annex 1). Twelve African countries have data from household surveys in 2009–2010 to monitor the use of diagnostics among febrile children younger than five years. These data show relatively low coverage across the 12 countries and some disparities between febrile children living in rural versus urban households (Figure 5.22).

Figure 5.22

Proportion of febrile children younger than five years who received a finger/heel stick for testing, 2009–2010

Recent diagnostic data show relatively low coverage in 12 African countries; coverage was typically higher in urban areas.*



Notes: *Limitations exist in these coverage estimates because not all fever is equivalent to suspected malaria, which can lead to diagnostic testing; this is particularly true in the low transmission season, when some of these surveys are performed. (a) Refers to febrile children younger than five years who were brought for treatment (based on the assumption that those who did not present for treatment did not get tested).

Source: UNICEF global databases 2011, based on DHS, MICS, MIS and other national surveys.

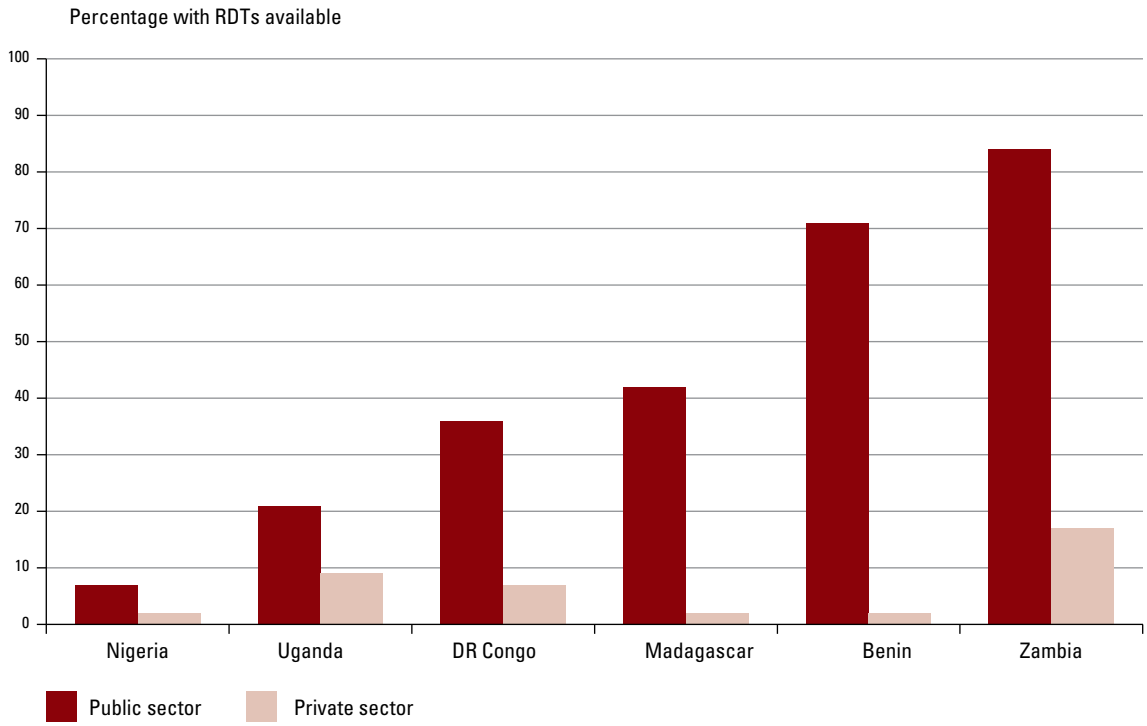
Indeed, many African countries have not yet rolled out diagnostic tests on a wide scale in line with this new recommendation, although these diagnostic tools are more widely available in other regions, such as South-East Asia. Other countries have only recently begun these efforts, and surveys conducted prior to widespread roll-out will not reflect potentially higher coverage achieved. Senegal, for example, started a national-scale RDT roll-out at the end of 2008. A recent study[86] in public health facilities showed that the proportion of suspected malaria cases who received a parasitological test rose from 4% in 2007 (before RDT introduction) to 86% in 2009 (after RDT introduction). Future household surveys in Senegal may show much higher national levels of diagnostic testing for febrile children suspected to have malaria.

Notably, in countries where RDT roll-out has occurred, RDT introduction has generally been targeted towards public health facilities. Data from nationally representative surveys of health facilities and drug outlets in seven countries indicate that the public sector is far more likely to have RDTs available for malaria testing than the private sector (Figure 5.23). Yet the relatively low use of public health facilities for malaria treatment in many endemic countries poses a major challenge for improving overall diagnostics use for febrile children (see next section).

Figure 5.23

Proportion of health facilities or drug outlets with RDTs available for malaria testing in the public and private sectors, seven countries, 2009–2010

Rapid diagnostic tests were more often available in public health settings than private facilities in seven countries.



Note: Data are based on nationally representative surveys of all outlet types with the potential to dispense antimalarial drugs (carried out between March 2009 and May 2010). Data on RDT availability were collected from all outlets with antimalarial drugs in stock on the day of the survey visit or those that were out of stock on that day but stocked with antimalarial drugs within the previous three months. Public-sector data include only public health facilities due to the variability in strategies across countries for community health worker programmes and other public outlet types. The private sector consists of all profitable (formal and informal) outlets with the potential to provide antimalarial drugs, including pharmacies, private health facilities, drug and grocery stores, market stalls, kiosks and itinerant vendors (e.g. street hawkers in Nigeria).

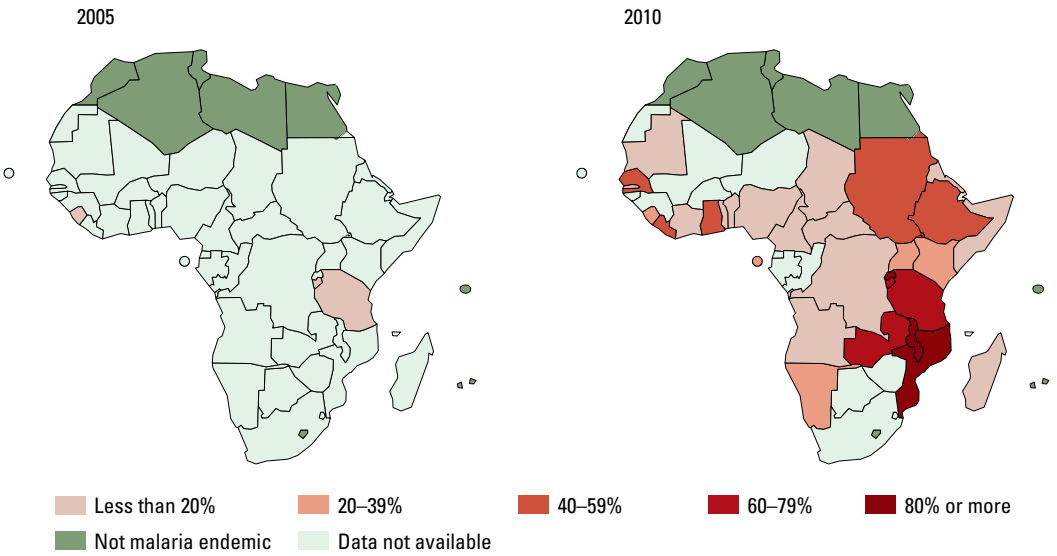
Source: ACTwatch Group (Population Services International and London School of Hygiene and Tropical Medicine), 2010.[87]

Treatment: Following recommendations early in the decade to move to ACT as first-line treatment, funding for ACTs has dramatically increased and ACTs are now widely available from multiple manufacturers and in many formulations. Most countries changed national drug policies three to five years ago, but only in the last several years have countries begun to provide ACT as the principle antimalarial treatment. The dramatic change in the last five years is shown in Figure 5.24.

Figure 5.24

Proportion of febrile children younger than five years treated with any antimalarial drug who received ACT, based on the latest survey data available by the end of 2005 and 2010

While ACTs are the recommended first-line treatment in many countries, rates of administration to febrile children began increasing only late in the decade.



Note: The maps present the latest survey data available by the end of the specified year, and therefore may include data for earlier time periods. Importantly, some countries conducted household surveys in 2010 but data were not available as of May 2011. These countries include: Burkina Faso, Central African Republic, Ethiopia, The Gambia, Rwanda, Sierra Leone and Togo. National-level estimates may obscure higher coverage achieved in countries where significant shares of their population live in endemic sub-national areas targeted by programmes. In addition, MICS and DHS are generally conducted in the dry season for important technical and logistical reasons. Estimates from these surveys do not reflect coverage during peak malaria transmission seasons, which is assumed to be higher for some indicators, including the use of antimalarials for children with fever. See Annex 1 for a detailed discussion.

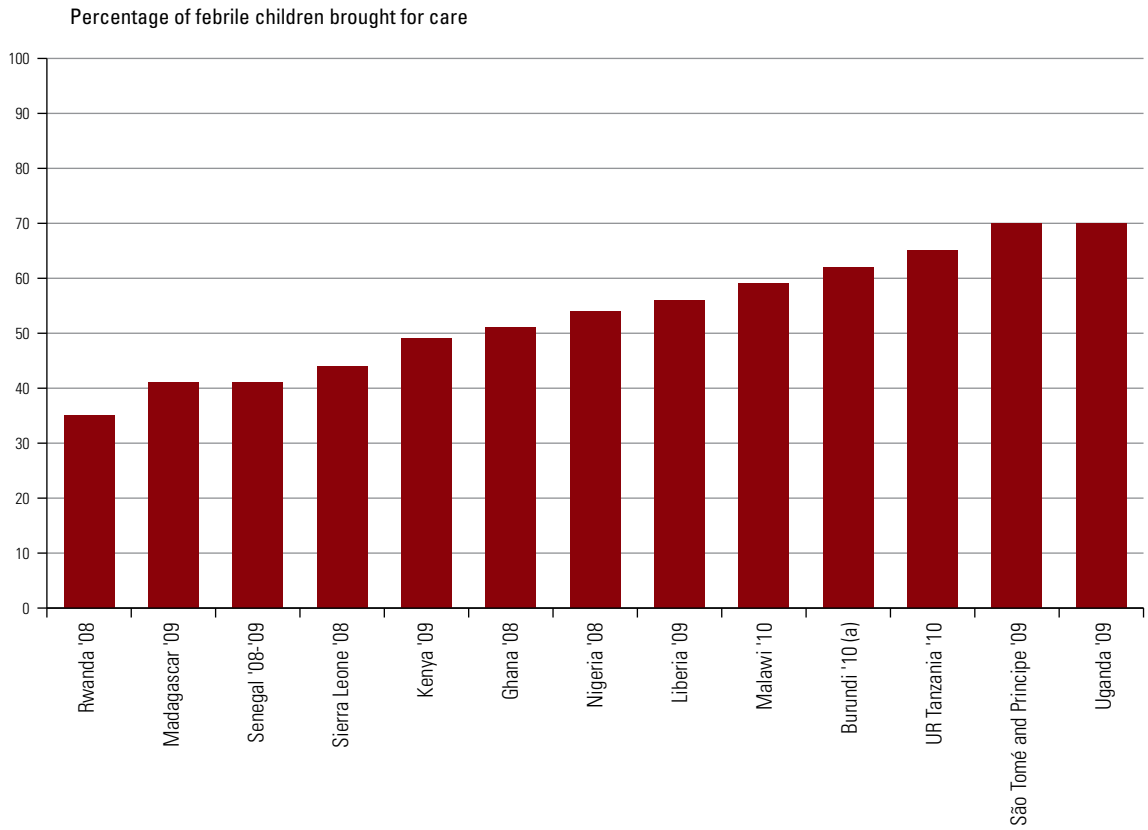
Source: UNICEF global databases 2011, based on DHS, MICS, MIS and other national surveys.

An important first step in treating malaria in children is for caregivers to bring those with fever to an appropriate health care provider within 24 hours of fever onset. These 'appropriate providers' may differ between countries, but generally include public or private hospitals, health centres or posts, mobile clinics, private doctors, and community health workers in some settings, but not pharmacies, shops or traditional practitioners (Figure 5.25). This step is even more critical in light of the new WHO guidelines to provide diagnostic testing for suspected malaria and provide treatment only for those with confirmed *Plasmodium* infection. It is generally these providers—and particularly providers at public health facilities—that will have access to malaria diagnostics if these tools are available.

Figure 5.25

Proportion of febrile children younger than five years who were presented for care from an appropriate health care provider,* African countries, 2008–2010

Seeking appropriate care for febrile children is an important first step for malaria treatment, and some countries are achieving relatively high coverage rates.



Note: *'Appropriate providers' generally includes public or private hospitals, health centres or posts, private doctors or field workers, and excludes pharmacies, shops and traditional practitioners. (a) Excluded providers not specified in survey report; data not currently available for re-analysis.

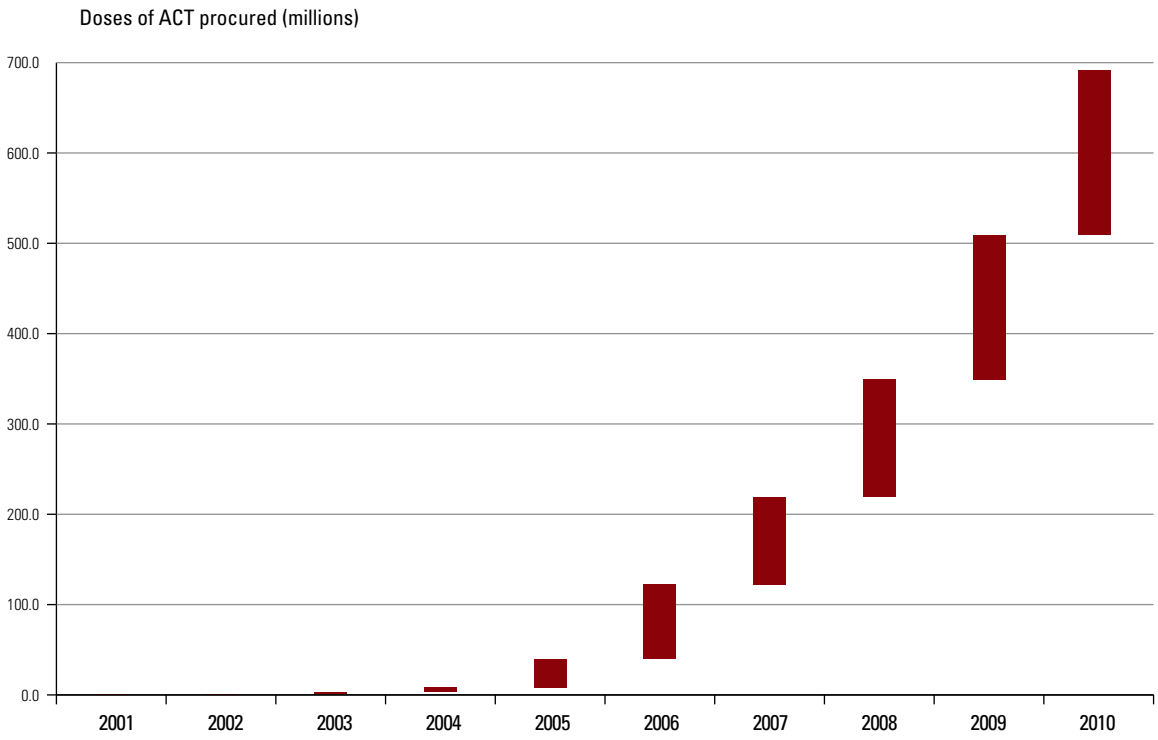
Source: UNICEF global databases 2011, based on DHS, MICS, MIS and other national surveys.

The recommended first-line treatment for uncomplicated malaria in nearly all African countries is ACT, given the widespread parasite resistance to other drugs, such as chloroquine. Many countries changed their policies to promote ACT as first-line treatment around mid-decade, and since this time, there has been a major rise in global ACT procurement. In fact, more than two thirds of treatments purchased between 2001 and 2010 were bought since 2008 (Figure 5.26).

Figure 5.26

Annual and cumulative global procurement of ACT medicines, 2001–2010

There was a major increase in global ACT procurement over the last decade (nearly 700 million doses were procured), with more than two thirds of treatments purchased since 2008.



Source: WHO Global Malaria Programme, 2011.

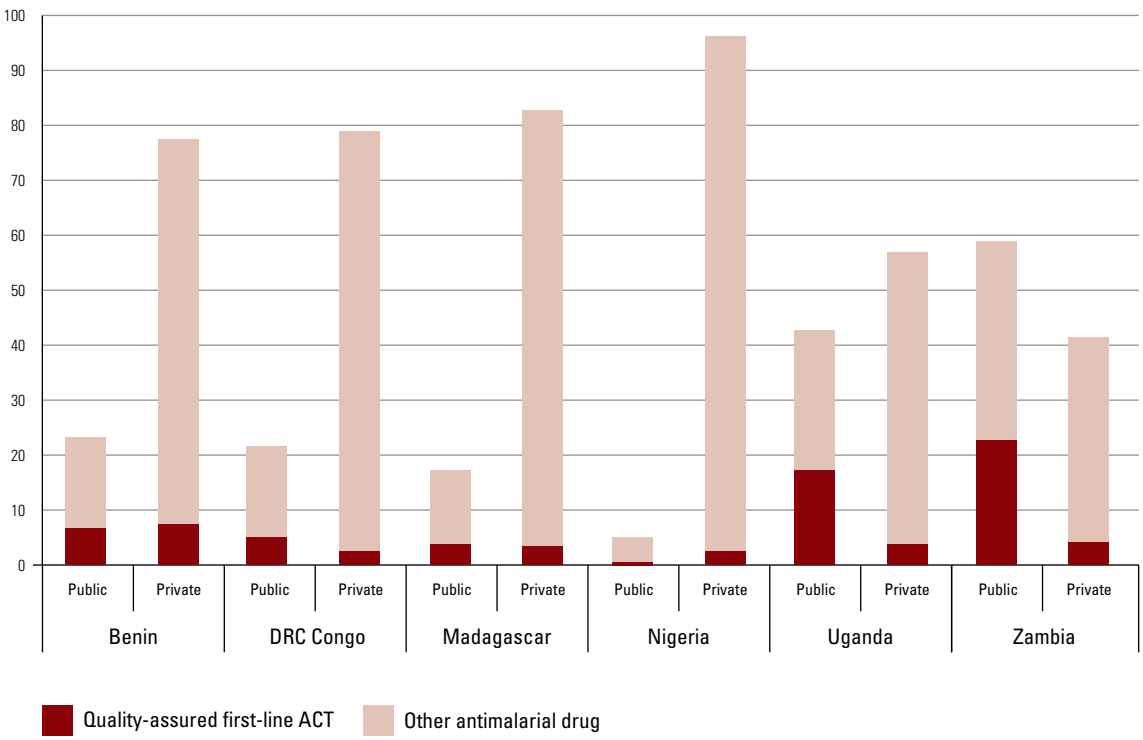
Nationally representative data from health facilities and drug outlets in six malaria-endemic countries (Benin, Democratic Republic of the Congo, Madagascar, Nigeria, Uganda and Zambia) indicate that the public sector is far more likely to have quality-assured first-line antimalarial treatment available compared to the private sector. However, while availability of ACTs is higher in the public sector, higher availability does not necessarily translate into improved treatment for many malaria patients, since care is often sought in the private sector in these countries. For example, across these six countries, the proportion of children younger than five years presented for care from the public sector ranged from 14% (Benin) to 50% (Zambia).

Moreover, among these six countries, the private sector plays a larger role than the public sector in the sale and distribution of antimalarial drugs, with the exception of Zambia. This difference is most pronounced in Nigeria, where 98% of antimalarial drugs were sold or distributed through the private sector and only 7% of these drugs were quality-assured first-line treatments. Across all six countries, ACTs accounted for less than 30% of total antimalarial treatments sold or distributed in both sectors, and less than 15% in the private sector (Figure 5.27). Many children, therefore, are still receiving less effective traditional monotherapies for malaria treatment.

Figure 5.27

Proportion of ACTs and non-ACT antimalarial drugs sold or distributed in the previous week by health facilities or drug outlets, six countries, 2009–2010

The private sector often plays a larger role in antimalarial drug sales and distribution than the public sector, but is less likely to provide quality-assured first-line antimalarial drugs.



Note: (1) Quality-assured first-line drugs for uncomplicated malaria are those appearing in the WHO list of pre-qualified ACTs or UNICEF's procurement list. (2) Data are from ACTwatch outlet surveys carried out between March 2009 and May 2010 in seven malaria-endemic countries. A drug audit questionnaire was used to collect information on all antimalarial drugs found in stock in these outlets on the day of the survey visit, including quality-assured first-line treatment. Public-sector data presented include only public health facilities due to the variability in strategies across countries for community health worker programmes and other public outlet types. The private sector consists of all profitable (formal and informal) outlets with the potential to provide antimalarial drugs, including pharmacies, private health facilities, drug and grocery stores, market stalls, kiosks and itinerant vendors (e.g. mobile private providers in Cambodia, street hawkers in Nigeria).

Source: ACTwatch Group (Population Services International and London School of Hygiene and Tropical Medicine), Outlet Survey Results 2009 and 2010. Available at: www.actwatch.info.[87]

New strategies are needed to strengthen the private sector's role in controlling malaria, including improved regulation of treatment provided through these outlets. Similarly, there is an urgent need to strengthen use of the public health system. Public distribution channels, for example, could be expanded through community health workers delivering malaria treatment as part of integrated community case management. This could bring treatment closer to home—which in turn may further reduce care-seeking from the private sector. The Affordable Medicines Facility (malaria) is an innovative financing mechanism designed to increase the affordability of ACT in the public and private sectors and discourage production and use of monotherapies. It is operational in six countries and evaluation of its impact on affordability, equity and increases in market share is ongoing.

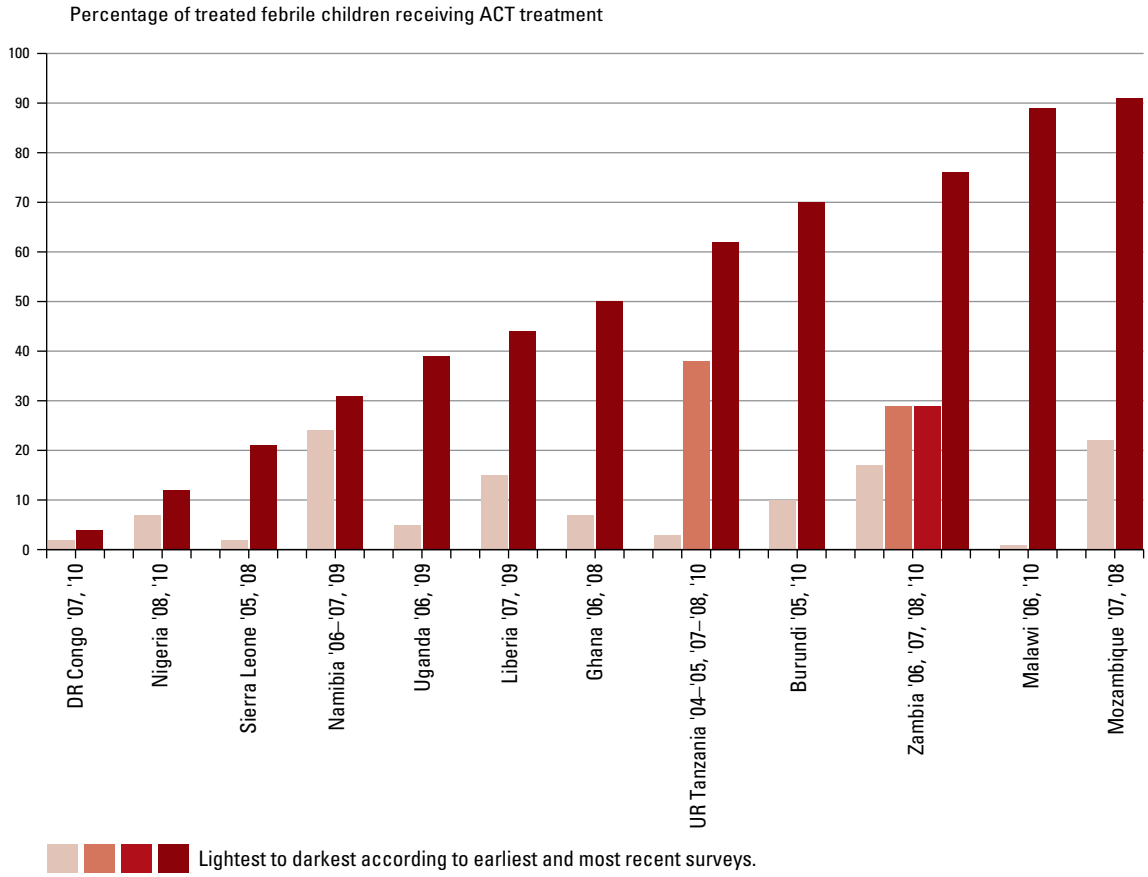
Recent data show that more than one third of febrile children younger than five years across Africa received any antimalarial drug.[g] However, malaria treatment data collected through household surveys is difficult to interpret (described in Annex 1). Nevertheless, limited data show a changing distribution of drugs used when children with fever receive antimalarial treatment. In 12 African countries with trend data, a greater proportion of febrile children receiving antimalarial drugs are using first-line treatment (e.g. ACT) (Figure 5.28), although the use of less effective antimalarial drugs is still too high in many countries.

[g] Regional estimate for the WHO African Region is based on 20 countries with data on antimalarial treatment among febrile children younger than five years in 2008-2010, representing 63% of the under-five population in that region in 2009.

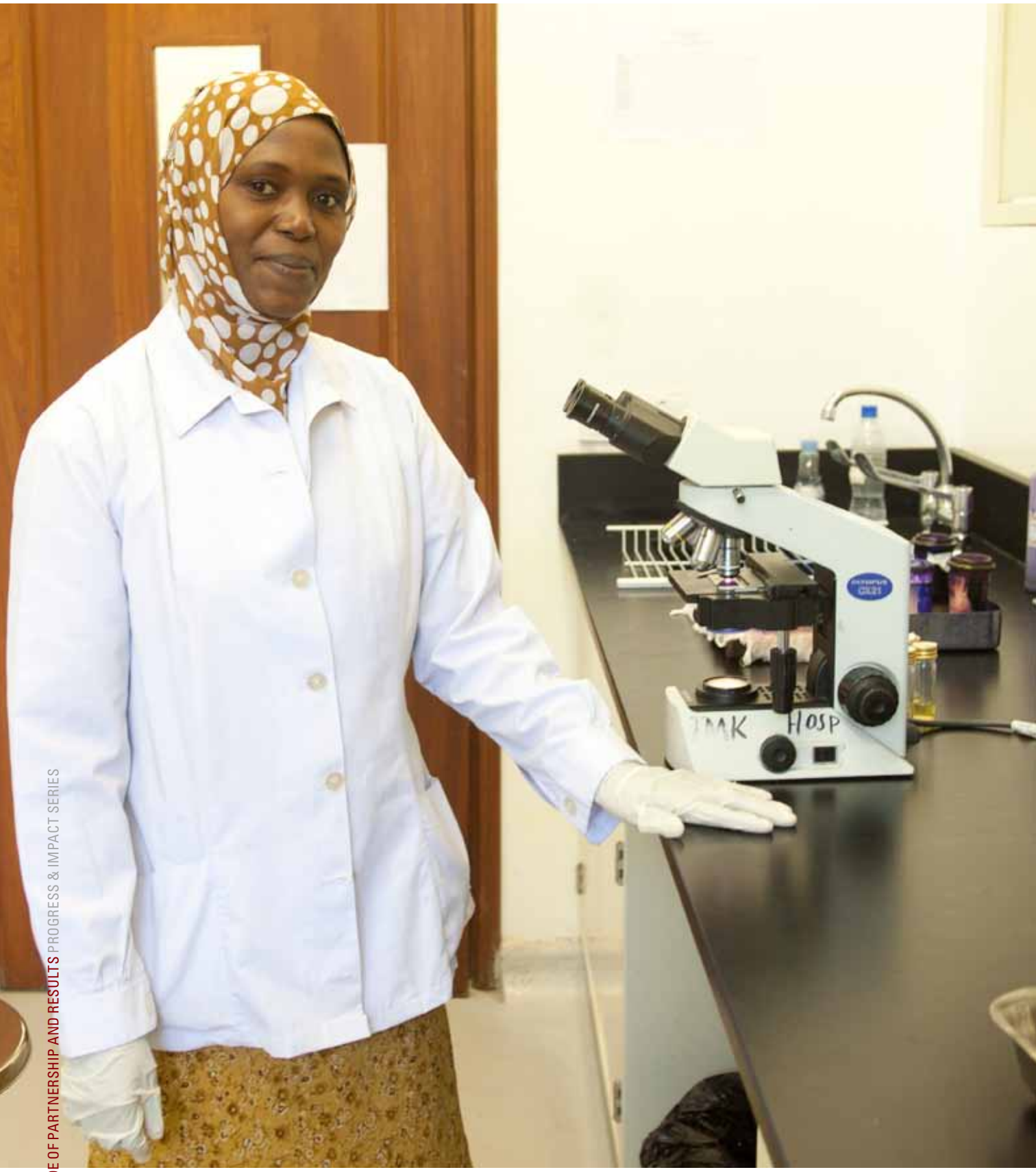
Figure 5.28

Proportion of febrile children younger than five years receiving antimalarial treatment who used ACT in 12 African countries with trend data available for ACT use, 2004-2010

Limited data suggest recent changes in the last three years, whereby ACT is increasingly the first-line antimalarial treatment used for children with malaria.



Source: UNICEF global databases 2011, based on DHS, MICS, MIS and other national surveys.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CHAPTER VI

THE WAY FORWARD

The malaria community today has a critical opportunity to build on a decade of success. The Roll Back Malaria Partnership has been refined from repeated reviews and attention to past weaknesses and inefficiencies and is today a solid, global movement. The commitments from countries and partners are evident, and the partnership structures continue to take systematic steps to ensure a common vision. There is basic agreement on what is working well and what requires improvements in terms of the core tools, technologies and strategies across the spectrum of diverse needs in endemic countries. The planning process has vastly improved and the shared resources—both human and financial—have never been more plentiful. Programme implementation has scaled up dramatically, especially in the past five years and notably most recently in large and heavily malarious countries such as Nigeria and the Democratic Republic of the Congo. Robust evaluation is demonstrating the progress of programmes around the globe.

The RBM partners have delivered on ambitious goals that have sequentially been pushed higher with each new step of progress. The core components remain consistent; however, there is new emphasis on sustaining and building on prevention, seeking universal diagnostic confirmation of all suspected malaria cases, further containing transmission, strengthening surveillance systems both for reporting on progress and for aiding transmission reduction work, and on containing drug and insecticide resistance. The scope (universal coverage of at-risk populations), extent of reach (global) and the time frame (milestones starting in 2012 and targets for 2015) show ambitious intent and growing urgency.

Since 2007, Morocco, Turkmenistan and the United Arab Emirates have achieved malaria elimination and many countries have shown dramatic progress in programme scale-up. But some endemic countries have not yet fully scaled up and are faced with considerable obstacles to doing so. And the countries that have scaled up must gain further efficiencies to ensure continued progress and chart new steps on the path towards elimination.

With the progress to date and the 2015 MDGs looming, the RBM Partnership has again updated its objectives and targets—essentially a fourth update reflecting the dramatic continued progress (Box 9 and Annex 2). This update is also consistent with individual major partner efforts to address the MDGs. For example, the Global Fund and the USA Global Health Initiative are both committed to improving MDGs 4, 5 and 6.[88,89]

The way forward to delivering on the objectives is by building on what works; anticipating new strategies and new tools; addressing the threats to progress head on; and further establishing malaria prevention, control and elimination as a global public good.

Box 9: Updated Roll Back Malaria Partnership vision, objectives and targets

In the first half of 2011, an RBM Partnership task force reviewed and updated the Partnership vision, objectives and targets as described here. These objectives share common features with the MDGs, which call on countries to reduce child mortality and combat AIDS, malaria and other major diseases.

2015 RBM Partnership objectives

(approved by the Partnership Board in 2011)

- Reduce global malaria deaths to near zero by 2015.*
- Reduce global malaria cases by 75% by 2015 (from 2000 levels).
- Eliminate malaria by 2015 in 10 new countries (since 2008) and in the WHO European Region.

*In areas where public health facilities are able to provide a parasitological test to all suspected malaria cases, near-zero malaria deaths is defined as no more than one confirmed malaria death per 100 000 at-risk population.

To achieve these objectives, a number of Partnership targets were identified that are indicative of the recommended work ahead:

- Achieve universal access to and utilization of prevention measures.
- Sustain universal access to and utilization of prevention measures.
- Achieve universal access to case management in the public sector (including diagnostic confirmation of all suspected cases and appropriate treatment with effective drugs).
- Achieve universal access to case management, or appropriate referral, in the private sector.
- Achieve universal access to community case management of malaria (including appropriate referral).
- Accelerate development of surveillance systems.

Universal coverage and utilization is defined as every person at risk sleeping under a good-quality ITN or in a space protected by IRS, and every pregnant woman at risk receiving at least one dose of IPTp during each of the second and third trimesters (in settings where IPTp is appropriate).

Note: The full text of the updated Partnership vision, objectives, targets and milestones is provided in Annex 2.

Building on what works

Achieving the three updated RBM Partnership objectives—reducing malaria deaths to near zero, reducing cases by 75% and eliminating malaria in 10 countries and one region—share a common requirement: a dramatic effort to reduce malaria transmission. This necessitates building on what was already established during the past decade's emphasis on scaling up malaria prevention. While intensive efforts to date in areas with high coverage scale-up have likely resulted in a near 10-fold reduction in malaria transmission[90] and high impact on morbidity and mortality, achieving the updated objectives will require an additional 10-fold reduction before nearly all cases and deaths are eliminated and transmission elimination is within striking distance.

Achieving the updated targets will also rely critically on improved management of malaria in public and private facilities and in communities as a component of helping reduce cases and deaths. With the new emphasis on universal systematic use of diagnostic tests, this will be important in settings where many cases and deaths continue to occur, and increasingly in the settings where few cases exist and the identification and prompt clearance of those infections will be critical to finally stopping transmission. In addition, the scale-up of malaria diagnostic testing will aid the development of better surveillance systems that report only confirmed malaria cases and that allow for increased investigation of cases to understand and contain transmission.

Historically, case management has been a reactive process—waiting for patients to present at a health centre and then trying to provide the right services. Implementing case management in this next decade to help further reduce cases and deaths will require the malaria community to be more proactive. This will include strengthened engagement with the integrated child case management efforts and work to increase community access to treatment through improved outreach. Scaling up diagnostic tests and treatment, and establishing the surveillance systems that will be so critical in the next programme steps is not new, but high-quality case management is now viewed as central to achieving universal coverage and will require considerable strategizing and detailed planning.

Countries have shown that they can scale up and achieve impact; partners have shown that they can assist. But that demonstration is only a few years old, and at times, the work has been extraordinarily challenging. For countries to take the next major steps, efficiencies must be leveraged in delivering ITNs and IRS. While efforts are under way in many countries, shoring up the delivery planning process, the financial management and the procurement and logistics and supply systems remains essential to further progress.

The new Partnership target to support 10 countries and one region to eliminate malaria transmission in the coming decade is technically feasible. Many of the countries with remaining malaria in the WHO European Region have very little transmission and probably have resources available to complete this task. But travelling to the end of the malaria road in each of these areas will require strong, sustained national and international commitment and local diligence.

If we succeed in these 10 countries, how much progress can be made in the next 10 or 20 countries or the next region to expand this work into the future? The vision of a malaria-free world requires that all countries sieze opportunities to further reduce malaria transmission by proactively securing financial resources, building technical capacity and expanding the use of information on cases (surveillance) as an intervention to contain transmission. In fact, the global vision, objectives and targets of the Roll Back Malaria

Partnership are fully amenable to being adopted at country level, where markedly reducing cases and deaths, and taking some number of districts to malaria-free status can be planned, resourced and programmed. As individual countries outside of the European Region look at the regional elimination objective, some might begin to set their sights on step-wise reduction in malaria transmission that will put the country on the path to elimination in the coming years. This work will again rely on high prevention coverage, use of diagnostic testing and treatment both for morbidity reduction *and* for transmission reduction, and the strengthening of surveillance in order to track the numbers and address and contain transmission foci. Effective and rapid sharing of information and experiences will improve national and regional elimination progress and related achievements.

Anticipating new strategies and new tools

The speed of progress during the past 10 years means that essentially all of what is being planned and undertaken today is revised or substantially updated from malaria control efforts a decade ago. An increasingly engaged and effective Partnership now exists for global guidance and national expertise on malaria prevention and control, with regularly updated goals and objectives. Country partners have made remarkable commitments and are similarly updating their plans and aspirations regularly, many of them already having proven their ability to deliver interventions to high coverage. Strategies are in place aiming to reach everyone at risk of malaria, and unprecedented global resources are now available for action. Availability of LLINs and an evolving strategy of rotating IRS insecticides offer significantly improved options in terms of vector control. A robust strategy for preventing malaria in pregnancy in the WHO African Region provides a clear prevention opportunity that will be further enhanced with current research on new drugs and new delivery methods. Technical improvements in understanding the role that rapid diagnostic tests and their performance play in transmission reduction have led to a new emphasis on malaria confirmation that is game-changing for determining who gets treated and for tracking and containing malaria. Wide expansions in the use of artemisinin-based combinations and increasing the drug combinations present increasing treatment options. And new communication technologies are markedly altering how malaria information is shared and opening up new possibilities for local capacity to locate cases and contain transmission.

In the next decade, a range of new tools will likely become available: new diagnostics; new drugs and drug combinations; new insecticides and new ways to deliver them; and new enthusiasm for making malaria more focal and then containing and eliminating disease from those areas. In addition, the first moderately effective malaria vaccine may become commercially available. These new tools will all have considerable strategic repercussions for global and national policies, budgets and implementation plans. RBM partners need to keep a solid bond between those focused on developing and testing new tools, technologies and strategies and those focused on the programme vision, objectives and targets. This way, our collective resources will be spent efficiently on developing (and delivering) what is truly required.

The launch of the Malaria Eradication Research Agenda (MalERA) in 2008 signalled the start of planning for malaria elimination, and ultimately eradication. MalERA's main objective is to identify the critical research areas that must be addressed to eradicate malaria and to lay out a process to best organize research and development efforts to move from malaria control to eradication. This culminated in the publication of 12 papers addressing the spectrum of research issues going forward.[91]

Addressing the threats

Shared progress to date, as substantive as it is, remains fragile. It is built on an incredible campaign of strategic thinking, optimism, hard work and the mobilization of substantial new resources that allowed that work to proceed and deliver. The fragility threatens both the gains already made and the ambition to build on them. The threats come from many quarters; in addition to needing to anticipate new strategies and tools previously discussed, they include: (1) the efficacy of our current tools in light of emerging drug and insecticide resistance; (2) weaknesses in our ability to support some large, countries and complex settings that have not yet fully addressed their malaria problem; (3) systems weaknesses that limit country ability to maintain high coverage rates achieved through a campaign strategy; (4) the waxing and waning of external resources for public health; and (5) our need to recognize that true, sustained progress will be determined by our ability to drive malaria transmission to zero.

Tool efficacy

Malaria control requires effective insecticides and their delivery systems for killing the mosquito vector and effective drugs and their delivery systems to kill parasites. While a number of different drugs and insecticides exist today that are effective against their targets, history and current data suggest that their efficacy is likely limited and can have severe consequences on national programmes. Initiatives for detecting and responding to resistance can move slowly, lacking efficiency in recognizing the extent of a problem and being limited in their ability to respond quickly with alternative strategies. Experiences with chloroquine resistance in South-East Asia in the 1960s and through the 1980s offer a stark example of these limitations.

In Africa, the massive scaling-up of interventions using pyrethroid insecticides (IRS as well as LLINs) has started to put African malaria vectors under unprecedented selection pressure. As a result, a variety of forms of pyrethroid resistance have appeared and spread rapidly; they are now widespread throughout the region. Although there are still very few cases where malaria control failure can be clearly attributed to vector resistance, this nevertheless represents one of the most rapidly growing and potentially dangerous threats to our capacity to sustain recent gains and to make further progress in reducing malaria burden.

The RBM Partnership must attend to the threats of resistance. This requires a multi-pronged approach with good and focused use of chemicals (drugs and insecticides), early identification and containment of resistance spread, and the development of new classes of effective drugs and insecticides. In a recent launch with WHO, the *Global Plan on Artemisinin Resistance Containment* provides just such attention to drug resistance.[92] And the growing emphasis on using diagnostic tests will help focus the use of drugs on treating only those with true malaria infection, which will limit the large population exposure that indirectly supports resistance development. The immediate need to develop insecticide rotation schedules for IRS programmes is critical. The global plan for insecticide resistance management, under preparation by WHO and other RBM partners, will also guide the malaria community, particularly countries. And as articulated by MalERA, the development of new drugs and insecticides must be prioritized. Research for new tools also needs to take into account vector adaptation to interventions (e.g. biting outdoors).

Finally, elimination of malaria transmission will help our containment of drug resistance. As transmission gets very low, resistant parasites will be less able to move from one person to the next. And where there is zero transmission, there will be no malaria, no need for antimalarial drug treatment and no opportunity for propagation of resistant parasites.

Sustaining support for large countries and complex settings

The strength of the entire RBM Partnership depends on country partner efforts. Not all malaria-endemic countries have a solid partnership or even enough diverse partners for implementation. This was recently the case for some large countries (e.g. Nigeria and the Democratic Republic of the Congo) and complex situations (e.g. internally displaced or cross-border populations), but was actively addressed within the Partnership by multiple partners stepping forward with resources and technical support. Evidence from maps of where progress is not reaching desired levels in Africa shows that some malaria-endemic countries and areas may have too small a support network or low per capita support to ensure progress. Similarly, in some places outside Africa, there is an acute need for an effective means for countries and their partners to move towards pre-elimination and elimination. And while it is not an easily addressed issue, there remain many difficult to reach, marginalized and sometimes ostracized populations in malaria-endemic settings that will need continued attention in the future.

Systems for scaling up and sustaining universal coverage

During the past five years, there has been a particular emphasis on rapid scale-up of interventions in which national and sub-national campaigns were called on to rapidly increase coverage, usually through campaign-style approaches; many of them were successful in efficiently achieving scale-up. But *maintaining* high coverage requires a balance of integration of malaria interventions into routine health services as well as intermittent campaigns. Similar strategies are used in national immunization programmes. In building systems that sustain malaria gains, emphasis must be placed on developing efficiencies and making routine those aspects that have been extraordinary. Campaigns potentially win new territory in terms of coverage, but holding that territory requires a different set of system strengths; undoubtedly, both campaigns and local community systems are needed for future sustainability of coverage. Experiences in districts and communities are already charting the path for understanding and planning for the routine, ongoing supply and distribution of malaria prevention and treatment commodities; this bodes well for future systems support that will help both malaria control and other health programmes.

Fluctuating resources for malaria prevention and control

The initial decade of the RBM Partnership witnessed a dramatic upsurge of global public health interest and an incredible growth in funding, including for malaria control. This was followed by an economic downturn that began in 2007 that undermined national, multilateral and bilateral donor support. While these local and global economic fluctuations are part of a larger cycle and process, the global malaria partnership must maintain the spotlight on malaria as a critical, priority health and development problem.

As now generations of children are growing up without ever having had malaria, they are particularly vulnerable to resurgence should financing wane from both countries and partners. Ensuring the continued availability and effectiveness of interventions will require the entire RBM Partnership's targeted attention on many fronts: advocacy, ensuring that countries and donors sustain their financing to malaria control; creating incentives for increasing and sustaining domestic funding; developing innovative financing options; increasing efficiencies with better tools and systems, among other efforts.

An excellent example is epitomized in the recent commitment from African leaders in endemic nations where ALMA is providing political attention and shining a light on the problem of malaria in Africa, even during these unstable economic times. ALMA's attention to regular malaria information updates in order to identify challenges and call for action is an important example for the entire Partnership. It underscores again how national political commitment can make a difference.

We must also ensure that money is well spent. Recent events have confirmed that accountability, good governance and transparent reporting are essential for continued and increased investment.

Focusing on reducing malaria transmission

As malaria control gets even better, the focus of attention must remain the drivers of transmission. Those determine our ability to further reduce cases and deaths and our ability to consider and then expand on elimination opportunities. The current evidence suggests that it has been the marked reduction in malaria transmission (especially as a result of LLINs and IRS) that has led to a large portion of the gains against malaria morbidity and mortality. The use of more effective drugs (e.g. ACTs) has undoubtedly helped; however, the use of RDTs and ACTs has not yet reached a sufficient scale to impact transmission significantly. To build on that transmission reduction, we can certainly improve on the effective use of antimalarial drugs and expand to actively seeking infected people and clearing their infection—both to help the individual and to limit that individual's likelihood of transmitting malaria to others. As the number of countries capable of scaling up increases, the next critical steps in continued transmission reduction will be to ensure true progress towards elimination.

Further establishing malaria prevention, control and elimination as a global public good

Early in the development of the RBM partnership, a strong argument was made for both the health and socioeconomic burdens of malaria. As demonstrated in this report, over the past decade, the RBM Partners have delivered on their promises, and malaria prevention and control proved to be an important driver of child survival[93] and of economic benefit.[2] The evidence shows that the impact is durable, and the drop in cases and deaths occurs with the intervention scale-up and lasts as long as the high coverage and efficacy of the intervention is maintained.

Rarely has a public health initiative provided such a return on investment and contributed so much to global public good.

But this progress was not certain ten, or even just five years ago. We had to tackle challenges as they emerged and new opportunities had to be grasped.

Similarly, future challenges will arise, including maintaining country leadership, sustaining malaria control measures, mobilizing partners and securing essential funding from both domestic and partner resources.

Three major factors characterize the ongoing adaptability required for the RBM Partnership to continue responding to changing contexts:

- Sustainability: the Partnership should increasingly aim for approaches and achievements that are sustainable over time and that can be continued as externally funded programs ultimately come to an end. Indeed, that has been the experience in countries outside of Africa that have greatly reduced their malaria burdens and have increasingly done so with more domestic funds supporting these efforts. But importantly while many resource-poor countries have high malaria burdens, great external financing will be required at least in the near-term.

- Flexibility: Partnership strategies must be increasingly flexible, allowing goals to be adapted to specific countries, regions or vulnerable communities. Malaria goals will be progressively informed at the local or sub-national level as countries approach (pre-)elimination.

- Integrated approaches: Wherever possible, national malaria goals should be linked with those of other national health programmes, such as maternal and child health, human resources for health, and essential medicines. Advisory partners and information from such sectors will add value to the Partnership, place malaria within the context of related national health strategies and critically guide local action.

One of the biggest challenges for the RBM Partnership going forward is to succeed in moving malaria control and elimination to a new level of public health priority and support. This will be critical for the durability of ongoing success, and will require continued attention by the entire malaria community so that the pace towards a malaria-free future can be stepped up.

ANNEX 1. TECHNICAL ANNEX

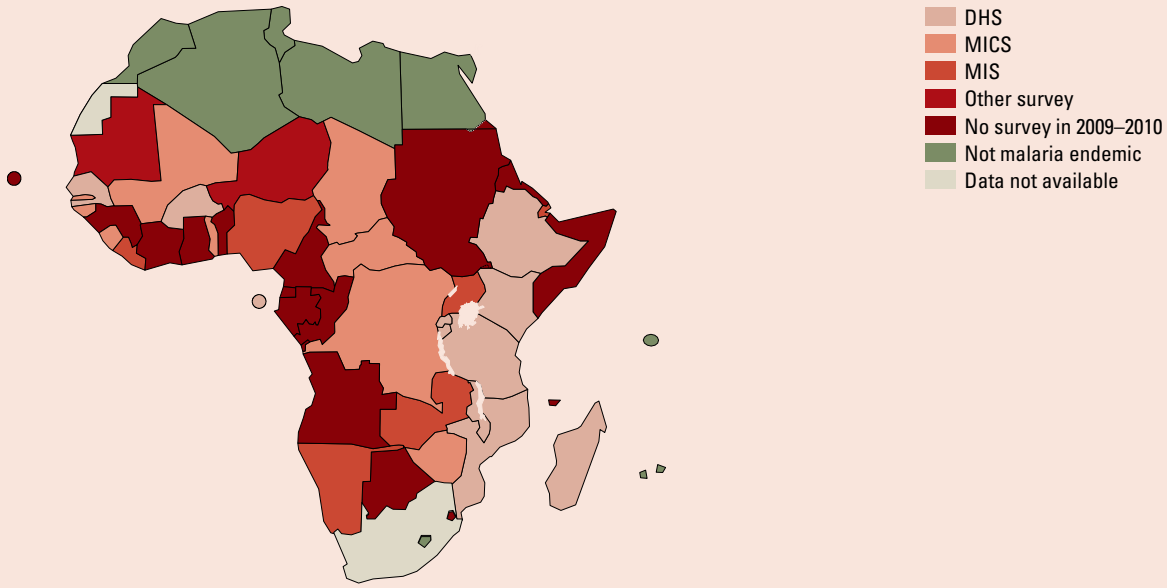
Information in this report draws heavily from the WHO *World Malaria Report 2010*, available at http://www.who.int/malaria/publications/atoz/9789241564106/en/index.html, and previous World Malaria Reports. This report also draws on information that was presented in previous Progress & Impact Series Reports, available at http://rollbackmalaria.org/ProgressImpactSeries/index.html. Data used in the report also come from the public-access United Nations Children's Fund (UNICEF) global databases available at www.childinfo.org. Estimates from these databases are published annually in UNICEF's *The State of the World's Children* report; time-series data and analyses are available at the web site. Malaria-associated morbidity data collected in household surveys (e.g. anaemia and parasitemia prevalence) were provided to UNICEF from MEASURE DHS. The UNICEF global databases include malaria intervention coverage data from population-based nationally representative household surveys (Tables A1.1 and A1.2), including the UNICEF-supported Multiple Indicator Cluster Surveys (MICS), United States Agency for International Development-supported Demographic and Health Surveys (DHS) and the Malaria Indicator Surveys (MIS), which were developed under the guidance of the Roll Back Malaria (RBM) Partnership Monitoring and Evaluation Reference Group. More information on these surveys is available at www.childinfo.org (MICS), www.measuredhs.com (DHS and MIS), www.rollbackmalaria.org and www.malariasurveys.org (MIS).

Malaria intervention coverage information is collected and reported comparably across these different survey programmes, allowing for comparisons of data across countries and over time. This harmonized data collection methodology is based on a broad consensus among RBM partners regarding the core set of indicators needed to monitor malaria programmes, and their standard collection through household surveys. More information on how these data are collected is available in the RBM Partnership report, *Guidelines for Core Population-Based Indicators*.[94]

Figure A1.1

Twenty-nine African countries conducted national population-based household surveys in 2009–2010

A high proportion of malaria-endemic African countries conducted DHS, MICS, MIS or another national survey with malaria information in 2009–2010, allowing for evaluation of malaria intervention coverage and use across these nations.



Source: UNICEF global databases 2011.

Table A1.1
Population-based surveys by African malaria-endemic country and by year of survey

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Angola								MIS	Other	Other	
Benin			DHS				DHS				
Botswana											
Burkina Faso				DHS			MICS				DHS
Burundi	MICS					MICS					DHS
Cameroon	MICS				DHS		MICS				
Cape Verde											
Central African Republic	MICS						MICS				MICS
Chad	MICS										MICS
Comoros	MICS										
Congo						DHS					
Côte d'Ivoire	MICS				Other		MICS				
DR Congo		MICS						DHS			MICS
Djibouti							MICS			MIS	
Equatorial Guinea	MICS										
Eritrea			DHS						MIS		
Ethiopia	DHS					DHS		MIS			DHS
Gabon									Other		
Gambia	MICS						MICS				MICS
Ghana				DHS			MICS		DHS		
Guinea						DHS			Other		
Guinea-Bissau	MICS						MICS				MICS
Kenya	MICS			DHS						DHS	
Liberia								DHS		MIS	
Madagascar	MICS				DHS					DHS	
Malawi	DHS				DHS		MICS				DHS/MIS
Mali		DHS					DHS			MICS	
Mauritania					Other			MIS			Other
Mozambique					Other			MIS	MICS		DHS
Namibia	DHS							DHS		MIS	
Niger	MICS						DHS			Other	Other
Nigeria				DHS				MICS	DHS		MIS
Rwanda	DHS					DHS			DHS		DHS
São Tomé and Principe	MICS						MICS			DHS	
Senegal	MICS					DHS	MIS		MIS		DHS
Sierra Leone	MICS					MICS			DHS		MICS
Somalia							MICS				
Sudan							Other				
Southern Sudan										MIS	
Swaziland	MICS							DHS			
Tanzania, United Rep						DHS			MIS		DHS
Togo	MICS						MICS				MICS
Uganda		DHS					DHS			MIS	
Zambia			DHS				MIS	DHS	MIS		MIS
Zimbabwe							DHS			MICS	DHS

Note: Those listed as "other" were considered to have appropriate similar methodology that provided a national population-based sample of similar size to the DHS, MICS or MIS.

Sources: IFC-Macro and UNICEF global databases 2011.

Table A1.2
National intervention coverage data from population-based surveys

Countries or territories[a]	Year	Percentage of households with at least one insecticide-treated mosquito net			Percentage of children younger than age five sleeping under an insecticide-treated mosquito net[b]			Percentage of pregnant women sleeping under an insecticide-treated mosquito net[b]		
		Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural
Angola	2007	28	29	26	18	17	19	22	15	26
Azerbaijan	2000	..	..	..	1	1	2	..	..	..
Benin	2002	..	..	..	7	14	4	..	..	..
	2006	25	29	21	20	25	18	20	25	17
	2009	..	..	..	..	..	..	..	..	..
Burkina Faso	2003	5	12	3	2	5	1	3	6	2
	2006	23	45	15	10	24	6	..	..	..
Burundi	2000	..	..	..	1	15	0	..	..	..
	2005	8	34	6	8	40	7	..	..	..
	2010	52	68	50	45	63	44	50	65	48
Cambodia	2005	5	2	5	4	2	5	4	2	5
Cameroon	2000	..	..	..	1	3	1	..	..	..
	2004	1	2	1	1	2	0	1	3	0
	2006	4	4	4	13	14	12	..	..	..
Central African Republic	2000	..	..	..	2	2	1	..	..	..
	2006	16	26	11	15	24	10	..	..	..
Chad	2000	..	..	..	1	1	0	..	..	..
	2010	42	61	37	10	30	5	10	30	4
Colombia	2000	3	3	4	..	..	..	..	..	..
Comoros	2000	..	..	..	9	17	7	..	..	..
Congo	2005	8	8	8	6	6	6	4	4	5
Côte d'Ivoire	2000	..	..	..	1	2	1	..	..	..
	2004	3	3	2	4	5	2	..	..	..
	2006	10	11	10	3	4	2	..	..	..
Democratic Republic of the Congo	2001	..	..	..	1	2	0	..	..	..
	2007	9	12	7	6	8	4	7	10	6
	2010	51	58	48	38	44	36	43	43	42
Djibouti	2009	30	21	51	20	14	30	25	21	30
	2006	..	..	..	1	1	1	..	..	..
Equatorial Guinea	2000	..	..	..	1	3	0	..	..	..
Bioko Island (Equatorial Guinea)	2006	26	..	..	..	..	..	..	..	..
	2008	94	..	..	..	..	..	..	..	..
Eritrea	2002	..	..	..	4	5	4	3	5	2
	2008	71	72	71	49	47	50	..	..	..
Ethiopia	2000	0	0	0	..	..	..	..	..	..
	2005	3	5	3	2	4	1	1	6	1
	2007	53	40	56	33	36	33	35	34	34
Gabon	2008	70	72	65	55	56	52	36	34	37
Gambia	2000	..	..	..	15	7	19	..	..	..
	2006	50	34	64	49	38	55	..	..	..
Ghana	2003	3	2	4	4	4	4	..	..	..
	2006	19	15	22	22	16	25	3	2	3
	2008	33	27	38	28	24	31	20	13	25
Guinea	2005	4	6	3	1	3	1	0	1	0
	2008	8	6	9	5	5	4	3	3	3
Guinea-Bissau	2000	..	..	..	7	19	3	..	..	..
	2006	44	35	49	39	32	42	..	..	..
	2010	53	54	53	36	38	34	32	36	29
Indonesia	2000	..	..	..	0	0	0	2	1	3
	2007	3	1	4	3	2	5	..	..	..
Iraq	2000	..	..	..	0	0	0	..	..	..
Kenya	2000	..	..	..	3	4	3	..	..	..
	2003	6	11	4	5	10	4	4	5	4
	2009	56	58	55	47	62	44	49	51	48
Lao People's Democratic Republic	2000	..	..	..	18	11	20	..	..	..
	2006	45	35	49	41	37	41	..	..	..
Liberia	2007	..	..	..	..	..	..	..	..	..
	2009	47	42	52	26	24	28	33	29	36
Madagascar	2000	..	..	..	0	0	0	..	..	..
	2009	57	60	56	46	56	45	46	51	46
	2009	..	..	..	..	..	..	..	..	..
Malawi	2000	..	..	..	3	12	2	..	..	..
	2004	27	41	25	15	30	12	15	30	12
	2006	38	55	35	25	42	22	..	..	..
	2010	57	64	55	40	49	38	35	44	34
	2010	60	57	60	57	52	57	50	43	51
Mali	2006	50	54	48	27	29	26	29	22	31
	2010	85	85	85	70	66	71	..	..	..

Countries or territories[a]	Year	Percentage of children younger than age five with fever who had a finger or heel stick for malaria testing			Among children U5 with fever who received antimalarials, percentage who received ACTs	Percentage of pregnant women who received intermittent preventive treatment (IPTp)[c]			FN	Source
		Total	Urban	Rural	Total	Total	Urban	Rural		
Angola	2007	..	..	..	5	3	4	1		MIS 2006-2007
Azerbaijan	2000	..	..	..	..	..	..	..		MICS 2000
Benin	2002	..	..	..	..	..	..	..		DHS 2001-2002
	2006	..	..	..	1	3	3	3	d	DHS 2006
	2009	3	5	3	24	..	..	..		Other 2009
Burkina Faso	2003	..	..	..	..	..	..	..		DHS 2003
	2006	..	..	..	..	1	2	1	d	MICS 2006
Burundi	2000	..	..	..	..	..	..	..		MICS 2000
	2005	..	..	..	10	..	..	..		MICS 2005
	2010	..	..	..	70	0	0	0		DHS 2010 (prelim data)
Cambodia	2005	..	..	..	..	..	..	..		DHS 2005
Cameroon	2000	..	..	..	..	..	..	..		MICS 2000
	2004	..	..	..	..	..	..	..		DHS 2004
	2006	..	..	..	3	6	8	4	d	MICS 2006
Central African Republic	2000	..	..	..	..	..	..	..		MICS 2000
	2006	..	..	..	4	9	15	5	d	MICS 2006
Chad	2000	..	..	..	..	..	..	..		MICS 2000
Chad	2010	9	18	6	3	22	29	18		MICS 2010 (prelim data)
Colombia	2000	..	..	..	..	..	..	..		DHS 2000
Comoros	2000	..	..	..	..	..	..	..		MICS 2000
Congo	2005	..	..	..	..	..	..	..		DHS 2005
Côte d'Ivoire	2000	..	..	..	..	..	..	..		MICS 2000
	2004	..	..	..	..	..	..	..		Other 2003-2004
	2006	..	..	..	8	8	10	7	d	MICS 2006
Democratic Republic of the Congo	2001	..	..	..	..	..	..	..		MICS 2001
	2007	..	..	..	2	5	7	4		DHS 2007
	2010	17	32	13	4	21	20	21		MICS 2010 (prelim data)
Djibouti	2009	..	..	..	..	..	..	..		MIS 2009
	2006	..	..	..	..	..	..	..		MICS 2006
Equatorial Guinea	2000	..	..	..	..	..	..	..		MICS 2000
Bioko Island (Equatorial Guinea)	2006	..	..	..	..	..	..	..		Other 2009
	2008	..	..	..	..	19	..	..		Other 2009
Eritrea	2002	..	..	..	..	..	..	..		DHS 2002
	2008	..	..	..	5	..	..	..		MIS 2008
Ethiopia	2000	..	..	..	..	..	..	..		DHS 2000
	2005	..	..	..	..	..	..	..		DHS 2005
	2007	..	..	..	47	..	..	..		MIS 2007
Gabon	2008	..	..	..	..	..	..	..		Other 2008
Gambia	2000	..	..	..	..	..	..	..		MICS 2000
Gambia	2006	..	..	..	0	33	31	34	d	MICS 2005-2006
Ghana	2003	..	..	..	..	28	35	24	d	DHS 2003
	2006	..	..	..	7	44	46	42		MICS 2006
	2008	..	..	..	50	1	1	1		DHS 2008
Guinea	2005	..	..	..	..	3	8	1		DHS 2005
	2008	..	..	..	..	..	..	..		Other 2008
Guinea-Bissau	2000	..	..	..	..	..	..	..		MICS 2000
	2006	..	..	..	..	7	9	7	d	MICS 2006
	2010	7	11	4	..	14	14	14		MICS 2010 (prelim data)
Indonesia	2000	..	..	..	..	..	..	..		MICS 2000
	2007	..	..	..	..	..	..	..		DHS 2007
Iraq	2000	..	..	..	..	..	..	..		MICS 2000
Kenya	2000	..	..	..	..	..	..	..		MICS 2000
	2003	..	..	..	..	4	4	4		DHS 2003
	2009	..	..	..	34	15	17	15		DHS 2008-2009
Lao People's Democratic Republic	2000	..	..	..	..	..	..	..		MICS 2000
	2006	..	..	..	1	1	0	1	d	MICS 2006
Liberia	2007	..	..	..	15	..	..	..		DHS 2007
	2009	23	28	20	44	45	47	44		MIS 2009
Madagascar	2000	..	..	..	..	..	..	..		MICS 2000
	2009	..	..	..	..	6	6	6		DHS 2008-2009
	2009	6	6	6	7	..	..	..		Other 2009
Malawi	2000	..	..	..	..	..	..	..		DHS 2000
	2004	..	..	..	..	43	51	42		DHS 2004
	2006	..	..	..	1	45	52	44	d	MICS 2006
	2010	7	18	6	83	55	56	55		DHS 2010 (prelim data)
	2010	..	..	..	89	60	59	60		MIS 2010 (prelim data)
Mali	2006	..	..	..	..	4	10	2		DHS 2006
Mali	2010	..	..	..	..	..	..	..		Other 2010

Countries or territories[a]	Year	Percentage of households with at least one insecticide-treated mosquito net			Percentage of children younger than age five sleeping under an insecticide-treated mosquito net[b]			Percentage of pregnant women sleeping under an insecticide-treated mosquito net[b]		
		Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural
Mauritania	2004	1	1	1	2	2	2	..	..	..
	2007	12	10	13	..	..	..	..	..	..
	2010	..	..	..	28	..	..	..	..	..
Mozambique	2007	16	17	15	7	8	6	..	..	..
	2008	31	32	30	23	25	22	..	..	..
Namibia	2007	20	10	29	11	7	12	9	6	11
	2009	54	43	57	34	34	34	26	23	27
Niger	2000	..	..	..	1	4	1	..	..	..
	2006	43	37	44	7	15	6	7	15	5
	2009	78	72	81	43	..	39	..	..	..
	2010	76	..	..	64	38	79	72	72	71
Nigeria	2003	2	1	3	1	1	1	1	0	2
	2008	8	9	8	6	7	5	5	5	5
	2009	..	..	..	..	..	..	..	..	..
	2010	42	33	45	29	23	31	34	16	39
Pakistan	2007	0	0	0	..	..	..	..	..	..
Rwanda	2000	..	..	..	4	21	1	..	..	..
	2000	..	..	..	5	24	2	..	..	..
	2005	15	32	12	13	26	11	17	29	16
	2008	56	65	54	56	62	55	60	63	60
São Tomé and Principe	2000	..	..	..	23	32	14	..	..	..
	2006	36	44	25	42	51	29	..	..	..
	2009	61	69	52	56	67	46	57	69	42
Senegal	2000	..	..	..	2	2	2	..	..	..
	2005	20	18	22	7	7	7	9	10	8
	2006	36	34	38	16	15	17	17	12	20
	2009	60	50	70	29	29	29	29	25	30
Sierra Leone	2000	..	..	..	2	4	1	..	..	..
	2005	5	5	5	5	5	5	..	..	..
	2008	37	37	37	26	30	24	27	22	29
Solomon Islands	2007	49	50	48	40	44	40	35	29	36
Somalia	2006	12	16	10	11	18	8	..	..	..
Sri Lanka	2007	5	2	5	3	2	3	2	0	2
Sudan	2006	18	..	..	28	..	..	..	..	..
Sudan (North)	2000	..	..	..	0	1	0	..	..	..
Sudan (South)	2009	53	66	51	25	33	24	36	56	32
Suriname	2000	..	..	..	3	..	..	..	..	..
Swaziland	2000	..	..	..	0	0	0	..	..	..
	2007	4	3	5	1	1	1	1	1	1
Tajikistan	2005	2	0	3	1	0	2	..	..	..
Timor-Leste	2002	..	..	..	8	12	6	..	..	..
	2010	42	52	39	42	52	39	42	50	39
Togo	2000	..	..	..	2	4	1	..	..	..
	2006	40	37	42	38	36	40	..	..	..
Uganda	2001	..	..	..	0	1	0	1	0	1
	2006	16	26	14	10	21	8	10	23	9
	2009	47	46	47	33	32	33	44	..	..
United Republic of Tanzania	1999	1	..	..	2	5	1	..	..	..
	2005	23	47	14	16	40	10	16	39	10
	2008	39	59	33	26	49	21	27	48	21
	2010	64	65	63	64	64	64	57	47	59
Viet Nam	2000	..	..	..	16	4	19	..	..	..
	2005	12	5	14	13	3	15	15	1	19
	2006	19	5	23	..	..	..	..	..	..
Zambia	1999	..	..	..	1	2	1	..	..	..
	2002	14	16	12	7	8	6	8	10	7
	2006	44	45	44	23	26	21	24	18	27
	2007	53	53	54	29	30	28	33	29	34
	2008	62	59	64	41	38	42	43	41	50
	2010	64	57	69	50	44	53	46	30	54
Zimbabwe	2006	9	11	7	3	5	2	3	6	2
	2009	27	26	28	17	17	18	..	..	..

.. Data not available

Note: Data are from the UNICEF global malaria databases, which include survey data from DHS, MIS, MICS and other national surveys.

[a] Table includes all countries for which survey data are available for the specific indicators.
[b] Data are for the night before the survey.
[c] Data are for women ages 15–49 with a live birth in the previous two years who received two or more doses of sulfadoxine-pyrimethamine/Fansidar during pregnancy through an antenatal care visit.

Countries or territories[a]	Year	Percentage of children younger than age five with fever who had a finger or heel stick for malaria testing			Among children U5 with fever who received antimalarials, percentage who received ACTs	Percentage of pregnant women who received intermittent preventive treatment			FN	Source
		Total	Urban	Rural	Total	Total	Urban	Rural		
Mauritania	2004	..	..	..	..	..	..	..		Other 2003-2004
	2007	..	..	..	5	..	..	..		MICS 2007
	2010	..	..	..	..	..	..	..		Other 2010
Mozambique	2007	..	..	..	22	19	29	16		MIS 2007
	2008	..	..	..	91	43	55	39	d	MICS 2008
Namibia	2007	..	..	..	24	10	6	13		DHS 2006-2007
	2009	12	10	12	31	5	9	3		MIS 2009 (prelim data)
Niger	2000	..	..	..	..	..	..	..		MICS 2000
	2006	..	..	..	..	0	1	0		MICS/DHS 2006
	2009	..	..	..	..	..	..	..		Other 2009
	2010	..	..	..	..	..	..	..		Other 2010
Nigeria	2003	..	..	..	..	1	2	1		DHS 2003
	2008	..	..	..	7	5	8	4		DHS 2008
	2009	6	7	5	14	..	..	..		Other 2009
	2010	..	..	..	12	13	18	12		MIS 2010 (prelim data)
Pakistan	2007	..	..	..	..	..	..	..		DHS 2006-2007
Rwanda	2000	..	..	..	..	..	..	..		DHS 2000
	2000	..	..	..	..	..	..	..		MICS 2000
	2005	..	..	..	..	..	..	..		DHS 2005
	2008	..	..	..	88	17	20	17		DHS 2007-2008
São Tomé and Principe	2000	..	..	..	..	..	..	..		MICS 2000
	2006	..	..	..	26	..	..	..		MICS 2006
	2009	..	..	..	43	60	67	54		DHS 2008-2009
Senegal	2000	..	..	..	..	..	..	..		MICS 2000
	2005	..	..	..	..	9	11	8		DHS 2005
	2006	..	..	..	..	49	55	46		MIS 2006
	2009	5	4	5	45	52	52	53		MIS 2008-2009
Sierra Leone	2000	..	..	..	..	..	..	..		MICS 2000
	2005	..	..	..	2	2	5	1	d,f	MICS 2005
	2008	..	..	..	21	10	12	10		DHS 2008
Solomon Islands	2007	..	..	..	..	1	2	1		DHS 2007
Somalia	2006	..	..	..	10	1	1	1	d	MICS 2006
Sri Lanka	2007	..	..	..	..	..	..	..		DHS 2006-2007
Sudan	2006	..	..	..	7	..	..	..		Other 2006
Sudan (North)	2000	..	..	..	..	..	..	..		MICS 2000
Sudan (South)	2009	27	48	23	51	13	20	11		MIS 2009 (prelim data)
Suriname	2000	..	..	..	..	..	..	..		MICS 2000
Swaziland	2000	..	..	..	..	..	..	..		MICS 2000
	2007	..	..	..	..	1	1	0	g	DHS 2006-2007
Tajikistan	2005	..	..	..	11	..	..	..		MICS 2005
Timor-Leste	2002	..	..	..	..	..	..	..		MICS 2002
	2010	..	..	..	..	..	..	..		DHS 2009-2010 (prelim data)
Togo	2000	..	..	..	..	..	..	..		MICS 2000
	2006	..	..	..	3	18	18	18	d	MICS 2006
Uganda	2001	..	..	..	..	..	..	..		DHS 2000-2001
	2006	..	..	..	5	16	17	16		DHS 2006
	2009	17	27	16	39	32	41	31		MIS 2009
United Republic of Tanzania	1999	..	..	..	..	..	..	..		DHS 1999
	2005	..	..	..	3	22	29	20		DHS 2004-2005
	2008	..	..	..	38	30	42	28		MIS 2007-2008
	2010	..	..	..	62	26	31	25		DHS 2010
Viet Nam	2000	..	..	..	..	..	..	..		MICS 2000
	2005	..	..	..	..	..	..	..		Other 2005
	2006	..	..	..	..	1	1	0		MICS 2006
Zambia	1999	..	..	..	..	..	..	..		MICS 1999
	2002	..	..	..	..	..	..	..		DHS 2001-2002
	2006	..	..	..	17	61	71	56		MIS 2006
	2007	..	..	..	29	63	72	59		DHS 2007
	2008	..	..	..	29	60	65	58		MIS 2008
	2010	17	21	15	76	69	77	65		MIS 2010
Zimbabwe	2006	..	..	..	..	6	3	8		DHS 2005-2006
	2009	..	..	..	..	14	8	16		MICS 2009

[d] Refers to IPT received during pregnancy; does not specify through ANC visit.
[e] ITN definition differs slightly from the standard indicator, referring to LLINs or nets obtained or treated in the past 6 months rather than 12 months.
[f] Refers to non-urban population, including rural and nomadic populations.
[g] Refers to two doses of chloroquine received during pregnancy; does not specify through ANC visit.
[h] Bioko Island has a population of approximately 250 000 inhabitants, a third of the country's population, and is home to Malabo, the capital city. Data are from Kleinschmid et al 2009. AM. J. Trop. Med. Hyg 80(6), 2009, pp. 882–888.

Interpretation of malaria intervention coverage data from household surveys must take into account two important issues: First, MICS and DHS are often conducted in the dry season for important technical and logistical reasons, although MIS are conducted during the peak transmission season (near and just after the end of the rains). Coverage estimates for some indicators, such as insecticide-treated mosquito net (ITN) use, may vary by season and are assumed to be lower during the dry season, when malaria transmission is at its lowest. Second, some countries have a significant population share living in areas with no or low malaria transmission, and malaria control programmes may not target certain interventions to these areas. In these countries, national-level coverage estimates would underestimate higher coverage achieved among sub-national at-risk populations targeted by national control programmes.

This report relies on national-level coverage estimates for two important reasons: First, it is difficult to accurately identify at-risk sub-national areas in many countries, although modelled estimates are available. Identification of households in sub-national endemic areas may also be a challenge since surveys may not always geocode where interviews occur. Second, survey sample sizes must be large enough to offer meaningful results for sub-national at-risk areas. This is often difficult, particularly for DHS and MICS, because sampling frameworks have not been specifically designed to obtain estimates for sub-national at-risk areas.

Several challenges in data interpretation have been commonly found. While the initial treatment indicators were selected based on stated RBM Partnership objectives and targets, changing approaches to diagnosis and treatment have made comparisons over time and between countries quite challenging; these are further described in Box 10. Additionally, the definitions of "universal coverage" have evolved (described in Box 11).

Other data used in this report
(Table A1.3)

Financing: Funding data for commitments and disbursements to malaria control are based on public-access databases maintained by the Organisation for Economic Co-operation and Development, Development Assistance Committee (OECD DAC). These databases report aid flows to different sectors (including malaria) as reported by bilateral, multilateral and other partners through the OECD DAC Creditor Reporting System and are made available through the online database (Qwery Wizard for International Development Statistics, available at http://stats.oecd.org/qwids and accessed for this report in April 2011). Expenditures data from the Global Fund, the World Bank and the United States President's Malaria Initiative (US-PMI) were provided directly from these organizations (in current USD), and are based on reporting by countries or implementing agencies to these agencies on the use of funds for malaria control activities. More information on these data are available at http://stats.oecd.org/qwids and in the RBM Partnership report, *Malaria Funding and Resource Utilization: The First Decade of Roll Back Malaria*.[59]

Deliveries of long-lasting insecticide-treated mosquito nets (LLINs): Data were compiled by the Net Mapping Project for the Alliance for Malaria Prevention. Information on the total number and location of LLINs delivered to sub-Saharan African countries between 2004 and 2010 was compiled from seven net manufacturers (Sumitomo/A-Z, Vestergaard-Frandsen, Clarke, BASF, BestNet, Tana Netting and Yorkool), which are believed to supply nearly all nets delivered to Africa.

Estimates for at-risk populations: These are based on the work of WHO. WHO estimates of the population share living in areas of malaria transmission (stable and unstable) were applied to the UN Population Division estimates of total population for the year 2009 to derive the total at-risk population in each African country. More information is available in the WHO *World Malaria Report 2010* (http://www.who.int/malaria/publications/atoz/9789241564106/en/index.html).

Table A1.3

Table A1.3: Non-survey data used in the preparation of this report

Countries or territories[a]	Under-5 mortality (rate)	Annual no. of under-5 deaths (thousands)	Population at risk of malaria (rate)	Population at risk of malaria (thousands)	ODA commitments to malaria control per person at risk (2008 USD)	Number of LLINs delivered to the country (thousands)
	2009	2009	2009	2009	2000-2009	2008-2010
Afghanistan	199	237	98	27 587	2,5	..
Algeria	32	23	7	2443	0,0	..
Angola	161	116	100	18 498	7,9	5954
Argentina	14	10	9	3625	0,0	..
Azerbaijan	34	6	2	203	0,8	..
Bangladesh	52	171	34	55 155	0,3	..
Belize	18	0	69	212	0,0	..
Benin	118	39	100	8935	7,5	3752
Bhutan	79	1	74	516	7,7	..
Bolivia (Plurinational State of)	51	13	82	8088	..	..
Botswana	57	3	65	1267	0,2	176
Brazil	21	61	26	50 371	1,1	..
Burkina Faso	166	121	100	15 757	6,0	4204
Burundi	166	46	78	6477	12,9	6658
Cambodia	88	32	53	7847	6,9	..
Cameroon	154	108	100	19 522	2,7	1602
Cape Verde	28	0	26	131	0,2	..
Central African Republic	171	26	100	4422	4,3	1992
Chad	209	100	99	11 094	0,2	1764
China	19	347	51	690 189	0,1	..
Colombia	19	17	22	10 045	0,0	..
Comoros	104	2	100	676	4,3	361
Congo	128	16	100	3683	..	3275
Costa Rica	11	1	36	1648	0,0	..
Côte d'Ivoire	119	83	100	21 075	..	10 162
Democratic People's Republic of Korea	33	11	49	11 714	..	..
Democratic Republic of the Congo	199	558	100	66 832	..	27 790
Djibouti	94	2	50	432	15,0	111
Dominican Republic	32	7	80	8072	0,5	..
Ecuador	24	7	52	7085	0,9	..
El Salvador	17	2	83	5115	0,0	..
Equatorial Guinea	145	4	100	676	37,2	111
Eritrea	55	10	100	5073	3,9	1297
Ethiopia	104	315	67	55 493	8,9	19 278
Gabon	69	3	100	1475	17,5	144
Gambia	103	6	100	1705	20,3	970
Georgia	29	2	1	43	11,4	..
Ghana	69	50	100	23 837	11,3	10 020
Guatemala	40	18	76	10 660	1,9	..
Guinea	142	54	100	10 069	3,0	3599
Guinea-Bissau	193	12	100	1611	5,8	222
Guyana	35	0	93	709	6,1	..
Haiti	87	24	100	10 033	1,6	..
Honduras	30	6	42	3136	2,3	..
India	66	1726	82	982 363	0,2	..
Indonesia	39	163	44	101 184	1,1	..
Iran (Islamic Republic of)	31	43	16	11 871	..	..
Iraq	44	41	13	3997	0,0	..
Kenya	84	124	76	30 250	10,0	14 834
Kyrgyzstan	37	5	0	4	..	..
Lao People's Democratic Republic	59	10	59	3729	7,0	..
Liberia	112	16	100	3955	14,8	2469
Madagascar	58	38	100	19 625	6,6	9 370
Malawi	110	64	100	15 263	7,7	3119
Malaysia	6	3	4	1099	0,0	..
Mali	191	101	100	13 010	3,8	4576
Mauritania	117	12	90	2962	3,5	432
Mexico	17	34	5	5481	0,0	..
Mozambique	142	121	100	22 894	6,0	7826
Myanmar	71	70	69	34 514	0,3	..
Namibia	48	3	72	1563	11,1	360
Nepal	48	34	82	24 051	0,7	..

Countries or territories[a]	Under-5 mortality (rate)	Annual no. of under-5 deaths (thousands)	Population at risk of malaria (rate)	Population at risk of malaria (thousands)	ODA commitments to malaria control per person at risk (2008 USD)	Number of LLINs delivered to the country (thousands)
	2009	2009	2009	2009	2000-2009	2008-2010
Nicaragua	26	4	84	4824	1,9	..
Niger	160	122	100	15 290	4,8	4128
Nigeria	138	794	100	154 729	3,5	65 032
Pakistan	87	460	99	179 000	0,1	..
Panama	23	2	97	3350	0,0	..
Papua New Guinea	68	14	100	6732	11,0	..
Paraguay	23	3	69	4381	0,0	..
Peru	21	13	47	13 707	0,2	..
Philippines	33	75	80	73 387	1,2	..
Republic of Korea	5	2	7	3383	..	..
Rwanda	111	42	100	9998	19,8	6411
São Tomé and Principe	78	0	100	163	..	63
Saudi Arabia	21	12	54	13 889	0,0	..
Senegal	93	43	100	12 534	9,3	8624
Sierra Leone	192	43	100	5696	5,6	4429
Solomon Islands	36	1	99	518	19,0	..
Somalia	180	69	100	9133	4,0	715
South Africa	62	66	10	5011	0,0	90
Sri Lanka	15	5	23	4655	4,4	..
Sudan	108	139	100	42 272	3,0	6866
Sudan (North)	..	..	100	33 353	..	..
Sudan (South)	..	..	100	8919	..	6712
Suriname	26	0	11	57	151,8	..
Swaziland	73	3	28	332	17,3	203
Tajikistan	61	12	33	2322	1,1	..
United Republic of Tanzania	108	188	100	43 739	..	..
Thailand	14	13	50	33 882	0,4	..
Timor-Leste	56	3	100	1134	9,0	..
Togo	98	20	100	6619	3,9	1968
Turkey	20	28	0	17	0,0	..
Uganda	128	184	100	32 710	9,1	11 761
Vanuatu	16	0	99	237	20,8	..
Venezuela (Bolivarian Republic of)	18	10	27	7718	..	..
Viet Nam	24	35	90	79 262	0,6	..
Yemen	66	56	81	19 100	1,1	..
Zambia	141	74	100	12 935	11,4	6971
Zimbabwe	90	33	50	6261	5,7	2186

Note: (a) Table includes only countries or territories with any population at risk of malaria.

Definition of indicators:	*Sources:*
Population at risk of malaria: Persons at risk of malaria (low and high) in malaria-endemic countries. The rate is expressed as percentage of total population in the country.	WHO *World Malaria Report 2010.*
Under five mortality rate: Probability of dying between birth and exactly five years of age. It refers to all-cause mortality. It is expressed per 1000 live births.	Inter-agency Group for Child Mortality Estimation 2010 (UNICEF, WHO, United Nations Population Division and the World Bank).
Annual no. of under-5 deaths: Estimated number of deaths of children between birth and exactly five years of age (all causes).	Inter-agency Group for Child Mortality Estimation 2010 (UNICEF, WHO, United Nations Population Division and the World Bank).
ODA commitments to malaria control per person at risk: Refers to international funding to malaria control. Major external donors include (but are not limited to) the World Bank (IDA), USAID (including PMI), Global Fund (GFATM).	Aid flows to different sectors (including malaria) are based on reporting by OECD DAC members as well as other partners through the OECD DAC Creditor Reporting System and are made available through the online database (Qwery Wizard for International Development Statistics) available at: <http://stats.oecd.org/qwids>. As of April 2011, data are available for 2004-2009 from this source. Population-at-risk estimates are based on WHO estimates (as published in the WHO *World Malaria Report 2010* WHO: Geneva), which were applied to UN Population Division total population estimates for the year 2009.
Number of LLINs delivered to the country: LLINs delivered and available for use between 2008 and 2010.	The Net Mapping Project compiles data on LLIN deliveries to African countries based on reports from seven manufacturers (Sumitomo/A-Z, Vestergaard-Frandsen, Clarke, BASF, Intection, Tana Netting and Yorkool), which are believed to supply nearly all nets delivered to African countries.

Lives saved estimates: These are derived from model-based predictions using the Lives Saved Tool (LiST). A consortium of academic and international organizations, led by the Johns Hopkins University Bloomberg School of Public Health, developed this model to estimate the impact on child mortality of scaling up maternal, newborn and child health interventions. More information on the model is available at http://www.jhsph.edu/dept/ih/IIP/list/. Tulane University School of Public Health and Tropical Medicine and the Johns Hopkins University Bloomberg School of Public Health conducted LiST modelling work for this report.

Because the LiST model estimates for malaria control's contribution to lives saved relies heavily on the efficacy of LLINs and indoor residual spraying (IRS), consensus estimates for coverage were obtained. Given the rapidly changing malaria situation in many countries, WHO and its partners have modelled household ITN ownership for the year 2010 in endemic areas by combining survey data with net distribution and deliveries information. This model predicts that by mid-2010, 42% of households in at-risk areas in Africa owned at least one ITN. According to modelled estimates, three countries potentially achieved at least 80% coverage by the end of the decade, although wide confidence intervals make interpretation of precise coverage levels difficult (Table A1.4).

Table A1.4

Modelled estimates of household ITN ownership for endemic sub-national areas in mid-2010

These modelled estimates of the proportion of households in sub-national African malaria-endemic areas owning at least one ITN (modelled mid-2010 estimates) were used in the LiST model described in this report.

Country	Estimate 2010	Upper bound 2010	Lower bound 2010	Country	Estimate 2010	Upper bound 2010	Lower bound 2010
Mali	90	96	67	Uganda	46	67	39
Zambia	84	92	65	Zimbabwe	44	86	24
São Tomé and Principe	82	93	63	Mozambique	42	62	31
UR Tanzania	72	75	66	Sierra Leone	40	63	27
Ethiopia	72	100	48	Botswana	35	58	18
Kenya	71	101	57	Burundi	31	64	17
Eritrea	69	79	56	Equatorial Guinea	31	48	20
Togo	65	80	56	Namibia	29	61	15
Djibouti	64	120	46	Cameroon	28	42	15
Niger	61	74	56	Swaziland	25	57	14
Rwanda	58	83	33	Angola	23	45	11
Senegal	57	89	24	Sudan	23	47	13
Gambia	57	77	32	Central African Republic	21	36	13
Benin	55	83	34	Comoros	20	37	11
DR Congo	54	78	46	South Africa	20	30	10
Gabon	54	73	39	Somalia	16	34	7
Guinea-Bissau	52	70	28	Nigeria	15	26	11
Madagascar	51	70	39	Côte d'Ivoire	11	26	5
Malawi	51	71	29	Chad	10	20	5
Burkina Faso	49	64	41	Guinea	10	22	5
Ghana	47	69	37	Mauritania	9	17	4
Liberia	46	70	30	Congo	9	23	4

Source: WHO *World Malaria Report 2010*,[19] based on Flaxman AD et al. (2010).[60]

Box 10: Interpreting malaria treatment data from household surveys

In 2010, WHO began recommending parasitological confirmation of diagnosis before malaria treatment of all patients in endemic areas suspected of having malaria,[85] rather than presumptive treatment based on clinical symptoms (e.g. fever).

Interpreting treatment data from household surveys has long been difficult and is even more so within this new malaria diagnostic testing context. Household surveys collect information on antimalarial treatment among all febrile children, rather than among confirmed malaria cases, in accordance with previous guidelines. For programmes now using diagnostic tests to detect malaria cases, low coverage may indicate that antimalarial drugs are being provided to only confirmed cases among febrile children, a more effective and rational treatment practice. However, where diagnostics are not available, low coverage in endemic settings could indicate febrile children that should still be presumptively treated with an antimalarial and are missed. Moreover, antimalarial treatment coverage data over time will inevitably show a downward trend in areas where historical data refer to presumptive treatment of febrile children, while newer data largely reflect treating only the subset of confirmed cases among all febrile children. This issue is even more critical in areas where malaria transmission has significantly declined, and where fewer fever cases are due to malaria. In these areas, there is a greater potential for mistreatment of non-malaria fevers with antimalarial drugs if diagnostic tools are not available or treatment is not restricted to positive cases.

The RBM Partnership Monitoring and Evaluation Reference Group is currently reviewing treatment indicators and their interpretation in light of these issues. Household surveys have incorporated a new question on the use of diagnostics in order to help interpret treatment data. However, information is not routinely collected on results of diagnostic tests due to concerns regarding reliability of caregivers' responses to this question. Without this information, it is not possible to estimate treatment coverage among only confirmed malaria cases using household surveys. Alternative data sources and methods are now being explored to improve treatment monitoring.

Source: RBM Monitoring and Evaluation Reference Group.

Box 11: Achieving universal coverage

Following the 2008 call for all countries to achieve universal coverage with essential malaria control interventions by the end of 2010, the actual target of "universal" did not have a fixed definition, and there was clear emphasis on countries in sub-Saharan Africa, where the reliance was greatest on the full package of interventions. While much progress has been made, in reality, few countries have actually achieved the universal coverage targets across all the interventions.

Because of the high efficacy and effectiveness of ITNs, much emphasis was placed on achieving universal coverage with that intervention. The country-by-country map of available ITNs as of the end of 2010 (Figure 5.7) shows remarkable progress, but many countries remain short of the agreed-upon targets (e.g. greater than 80% coverage of at least one net per household; greater than 80% coverage of sleeping spaces; greater than 80% of households with at least two ITNs; etc.). The typical targeted use of IRS is more geographically focal and variable by country, but when combined with ITN coverage as "vector control coverage", the combination has indeed covered a high proportion of the at-risk population in Africa—but again leaving some areas with much lower coverage. Prevention during pregnancy with ITNs and intermittent preventive treatment has reached high coverage levels only in a few countries where it is recommended, and this is despite relatively high rates of antenatal clinic attendance by all pregnant women—a missed opportunity.

Achieving and documenting high coverage for prompt case management is perhaps the most challenging. The recent global recommendation for universal access to confirmatory diagnostic testing to direct rational antimalarial treatment is an indication of substantial progress. It does, however, mean that it is no longer relevant to compare previous to current "reported malaria cases" because the definition of "malaria case" has changed. In the countries where dramatic scale-up of diagnostics has been achieved, or nearly so, notable progress has been seen, with "malaria case" numbers dropping dramatically due to the reporting only of confirmed malaria and not "suspect malaria" or "fever illness" as was previously reported. And with the dropping number of cases, case management and proper use of effective antimalarials is more feasible (health workers can focus on "confirmed malaria" only), and countries are reporting appropriate high case management coverage rates. This deployment of universal diagnosis and prompt effective case management is still a work in progress, but with much promise for the coming years.

ANNEX 2. UPDATED ROLL BACK MALARIA PARTNERSHIP VISION, OBJECTIVES, TARGETS AND MILESTONES

Approved by the Roll Back Malaria Partnership Board, June 2011

Vision: Achieve a malaria-free world

Objectives, targets and milestones

Objective 1. Reduce global malaria deaths to near zero by 2015

Target 1.1 Achieve universal access to case management in the public sector.
By end-2013, 100% of suspected cases receive a malaria diagnostic test and 100% of confirmed cases receive treatment with appropriate and effective antimalarial drugs. Milestone: None, as the target is set for 2013.

Target 1.2 Achieve universal access to case management, or appropriate referral, in the private sector.
By end-2015, 100% of suspected cases receive a malaria diagnostic test and 100% of confirmed cases receive treatment with appropriate and effective antimalarial drugs. Milestone: By end-2013, in endemic countries, 50% of persons seeking treatment for malaria-like symptoms in the private sector report having received a malaria diagnostic test, and 100% of confirmed cases have received treatment with appropriate and effective antimalarial drugs.

Target 1.3 Achieve universal access to community case management (CCM) of malaria.
By end-2015, in countries where CCM of malaria is an appropriate strategy, 100% of fever (suspected) cases receive a malaria diagnostic test and 100% of confirmed uncomplicated cases receive treatment with appropriate and effective antimalarial drugs, and 100% of suspected and confirmed severe cases receive appropriate referral. Milestone 1: By end-2012, all countries where CCM of malaria is an appropriate strategy have adopted policies to support CCM of malaria (including use of diagnostic testing and effective treatment). Milestone 2: By end-2013, in all countries where CCM of malaria is an appropriate strategy, 80% of fever cases receive a malaria diagnostic test and 80% of confirmed cases receive treatment with effective antimalarial drugs.

Objective 2. Reduce global malaria cases by 75% by end-2015 (from 2000 levels)

Target 2.1 Achieve universal access to and utilization of prevention measures.[9]
By end-2013, in countries where universal coverage and utilization have not yet been achieved, achieve 100% coverage and utilization for all at-risk populations with locally appropriate interventions. Milestone: None, as the target is set for 2013.

Target 2.2 Sustain universal access to and utilization of prevention measures.[7]
By 2015 and beyond, all countries sustain universal coverage and utilization with an appropriate package of preventive interventions. Milestone: From 2013 through 2015, universal access to and utilization of appropriate preventive interventions are maintained in all countries.

Target 2.3 Accelerate development of surveillance systems.
By 2015, all districts are capable of reporting monthly numbers of suspected malaria cases,

number of cases receiving a diagnostic test and number of confirmed malaria cases from all public health facilities, or a consistent sample of them. Milestone: By 2013, 50% of malaria-endemic countries have met the 2015 target.

Objective 3. Eliminate malaria by end-2015 in 10 new countries (since 2008) and in the World Health Organization European Region

Milestone: By end-2013, malaria is eliminated in three new countries.

Priorities

Priority 1: Accelerate progress and impact in countries with the highest burden of malaria-related deaths.
Priority 2: Fully implement the *Global Plan for Artemisinin Resistance Containment*.
Priority 3: Develop and launch a global plan for management of insecticide resistance.
Priority 4: Revise the *Global Malaria Action Plan* for the years beyond 2015.

Assumptions

The Board recognizes that the objectives, targets and milestones for 2012-2015 are aspirational, but asserts that any effort short of achieving universal access to and utilization of available and effective preventive, diagnostic and treatment measures is accepting continued intolerable suffering from malaria.

Sufficient and timely domestic and international funding is available to accomplish and sustain scale-up of the interventions needed to meet the objectives, targets and milestones.

Scale-up of preventive measures and greater access to diagnostic testing and treatment through the public and private sectors and community case management, along with referral when needed, are sufficient to allow effective treatment of all cases of confirmed malaria.

Political commitment to sustain malaria control interventions and high-quality surveillance—including the elimination of malaria where that is technically, operationally and financially feasible—continues even as malaria cases and deaths decline significantly.

Access to vulnerable populations and the safety and security of health workers are preserved to ensure surveillance, outbreak response and delivery of diagnostic, treatment and preventive interventions to populations in fragile and conflict-affected states.

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"As this report concludes, only rarely have we seen a public health initiative provide so much return on investment. Thanks to the efforts of the past decade, we have a foundation that allows affected countries and communities to reach even greater results in the years to come"

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