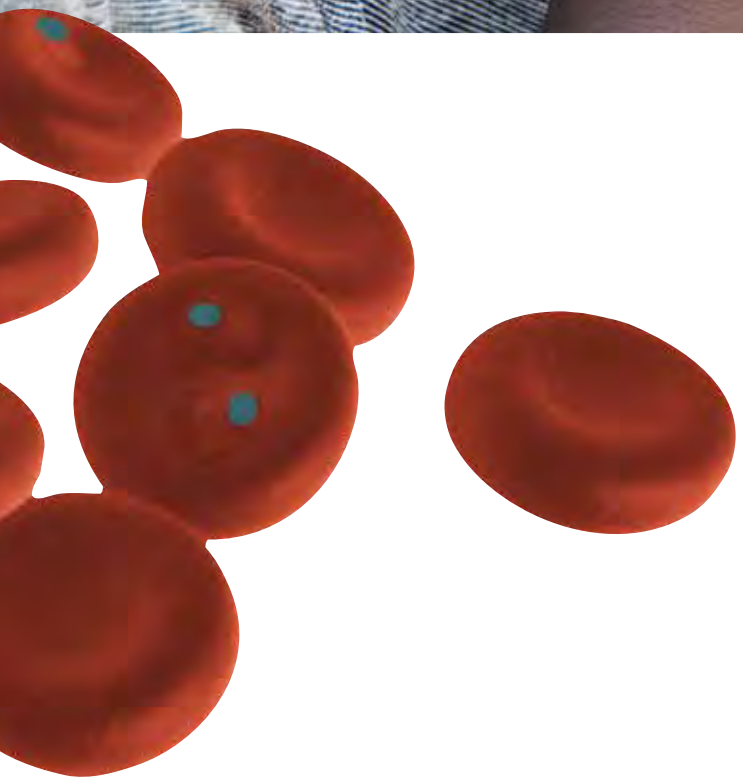

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World Health Organization

WHO GLOBAL MALARIA PROGRAMME

WORLD MALARIA REPORT 2012

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Foreword

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Director-General
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The past five years have seen an impressive increase in international funding for malaria prevention, control and elimination. Following the call in 2008 by United Nations Secretary-General, Ban Ki-moon for universal access to malaria interventions, we saw a rapid expansion in the distribution of life-saving commodities in sub-Saharan Africa, the continent with the highest burden of malaria. The concerted effort by endemic country governments, donors and global malaria partners has led to strengthened disease control and visible results on the ground. During the past decade, an estimated 1.1 million malaria deaths were averted, primarily as a result of a scale-up of malaria interventions.

However, the available funding still falls short of the resources required to reach the health-related Millennium Development Goals and other internationally-agreed global malaria targets. An estimated US$ 5.1 billion is needed every year between 2011 and 2020 to achieve universal access to malaria interventions. At present, only US$ 2.3 billion is available, less than half of what would be needed. There is an urgent need to identify new funding sources in order to further scale up and sustain malaria control efforts, and to protect the investments made in the last decade. We also need to examine new ways to make existing funds stretch further by increasing the value for money of malaria commodities and the efficiency of service delivery.

The *World Malaria Report 2012* brings together the latest available data from malaria-endemic countries and partners, and contains valuable analyses of progress and trends. Behind the statistics and graphs lies a great and needless tragedy: malaria – an entirely preventable and treatable disease – still takes the life of an African child every minute. The most vulnerable communities in the world continue to lack sufficient access to long-lasting insecticidal nets, indoor residual spraying, diagnostic testing, and artemisinin-based combination therapies. Unfortunately, only modest increases in access to these interventions were observed between 2010 and 2011 – the first such plateauing in the past 5 years. It is imperative that we act now to ensure that the recent momentum, and its results, are not diminished.

In addition, while our current tools remain remarkably effective in most settings, resistance to artemisinins – the key compounds in artemisinin-based combination therapies – has been detected in four countries of South-East Asia, while mosquito resistance to insecticides has been found in 64 countries around the world. While such resistance has not yet led to operational failure of malaria control programmes, urgent and intensified efforts are required to prevent a future public health disaster.

We are three years away from the target date set for the Millennium Development Goals. As the report demonstrates, 50 countries are on track to reduce their malaria case incidence rates by 75%, in line with the World Health Assembly and Roll Back Malaria targets for 2015. However, these 50 countries account for only 3% (or 7 million) of the total estimated malaria cases worldwide. International targets for malaria will not be attained unless considerable progress is made in the 14 highest burden countries, which account for an estimated 80% of malaria deaths.

Tracking progress is a major challenge in malaria control. Malaria surveillance systems detect only around 10% of the estimated global number of cases. Stronger malaria surveillance systems are urgently needed to enable a timely and effective malaria response in endemic regions, to prevent outbreaks and resurgences, to track progress, and to hold governments and the global malaria community accountable. In as many as 41 countries around the world, making a reliable assessment of malaria trends is currently not possible due to incompleteness or inconsistency of reporting.

On World Malaria Day this year, I travelled to Namibia to launch the *T3: Test. Treat. Track.* initiative, urging countries and partners to scale up diagnostic testing, quality-assured treatment and surveillance for malaria. WHO has also made available new global surveillance manuals for malaria control and elimination and published the Global Plan for Insecticide Resistance Management in malaria vectors. These practical documents will help countries update and refocus their national malaria strategies to achieve better results with the limited resources available. In addition, the newly constituted WHO Malaria Policy Advisory Committee recommended Seasonal Malaria Chemoprevention for the control of malaria in the Sahel sub-Region of Africa. This simple and inexpensive intervention has the potential to prevent more than 75% of uncomplicated and severe malaria among children younger than five years of age.

Defeating malaria will require a high level of political commitment, strengthened regional cooperation, and the engagement of a number of sectors outside of health, including finance, education, defence, environment, mining, industry and tourism. The fight against this disease needs to be integrated into the overall development agenda in all endemic countries. We cannot achieve further progress unless we work tirelessly to strengthen health systems and ensure that sustained and predictable financing is available. This report shows how far we have come in the struggle against malaria; we must act with urgency and determination to keep this tremendous progress from slipping out of our grasp.

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Abbreviations

ABER	Annual blood examination rate
ACD	Active case detection
ACT	Artemisinin-based combination therapy
AIDS	Acquired immunodeficiency syndrome
AL	Artemether-lumefantrine
ALMA	African Leaders Malaria Alliance
AMFm	Affordable Medicine Facility-malaria
AMP	Alliance for Malaria Prevention
ANC	Antenatal care
API	Annual parasite index
CDC	US Centers for Disease Control and Prevention
CHAI	Clinton Health Access Initiative
DDT	Dichloro-diphenyl-trichloroethane
DFID	The United Kingdom Department for International Development
DHS	Demographic and Health Survey
DTP	Diphtheria, tetanus, pertussis
EPI	Expanded Programme on Immunization
ERG	Expert Review Group
FIND	Foundation for Innovative New Diagnostics
G6PD	Glucose-6-phosphate dehydrogenase
Global Fund	The Global Fund to Fight Aids, Tuberculosis and Malaria
GMAP	Global Malaria Action Plan
GMP	Global Malaria Programme, WHO
GNI	Gross national income
GPARC	Global Plan for Artemisinin Resistance Containment
GPIRM	Global Plan for Insecticide Resistance Management in malaria vectors
HIV	Human Immunodeficiency Virus
HMIS	Health management information system
iCCM	Integrated community case management
IEC	Information, education and communication
IHME	Institute for Health Metrics and Evaluation
IM	Intramuscular
IPTi	Intermittent preventive treatment in infants
IPTp	Intermittent preventive treatment in pregnancy
IRS	Indoor residual spraying
ISGlobal	Barcelona Institute for Global Health
ITN	Insecticide-treated mosquito net
LLIN	Long-lasting insecticidal net
MAP	Malaria Atlas Project
MDG	Millennium Development Goal
MERG	RBM Monitoring and Evaluation Reference Group
MICS	Multiple Indicator Cluster Survey
MIS	Malaria Indicator Survey
MPAC	Malaria Policy Advisory Committee
NGO	Nongovernmental organization
NMCP	National malaria control programme
OECD	Organisation for Economic Co-operation and Development
PATH	Program for Appropriate Technology in Health
PCD	Passive case detection
PMI	The US President's Malaria Initiative
QA	Quality assurance
RAM	Rotarians Against Malaria
RBM	Roll Back Malaria
RDT	Rapid diagnostic test
SAGE	WHO Strategic Advisory Group of Experts on Immunization
SMC	Seasonal malaria chemoprevention
SP	Sulfadoxine-Pyrimethamine
SPR	Slide positivity rate
TEG	Technical Expert Group
TDR	Special Programme for Research and Training in Tropical Diseases
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
UNSE	Office of the United Nations Special Envoy for Malaria
USAID	United States Agency for International Development
WER	WHO Weekly Epidemiological Record
WHA	World Health Assembly
WHO	World Health Organization
WHOPES	WHO Pesticide Evaluation Scheme

Abbreviations of WHO Regions / Offices

AFR	WHO African Region
AFRO	WHO Regional Office for Africa
AMR	WHO Region of the Americas
AMRO	WHO Regional Office for the Americas
EMR	WHO Eastern Mediterranean Region
EMRO	WHO Regional Office for the Eastern Mediterranean
EUR	WHO European Region
EURO	WHO Regional Office for Europe
SEAR	WHO South-East Asia Region
SEARO	WHO Regional Office for South-East Asia
WPR	WHO Western Pacific Region
WPRO	WHO Regional Office for the Western Pacific

Summary and Key Points

The *World Malaria Report 2012* summarizes information received from 104 malaria-endemic countries and other sources, and updates the analyses presented in the 2011 report. It highlights the progress made towards the global malaria targets set for 2015 and describes current challenges for global malaria control and elimination.

The past decade has witnessed tremendous expansion in the financing and implementation of malaria control programmes. International disbursements for malaria control rose steeply from less than US$ 100 million in 2000 to US$ 1.71 billion in 2010 and were estimated to be US$ 1.66 billion in 2011 and US$ 1.84 billion in 2012. Analysis indicates that as funding has risen, international disbursements have been increasingly targeted to the African Region, to countries with the lowest gross national income (GNI) per capita, and to countries with the highest malaria mortality rates. Domestic government funding for malaria control programmes also increased through 2005–2011 and was estimated at US$ 625 million in 2011.

While still falling short of the US$ 5.1 billion required to achieve universal coverage of malaria interventions, the financing provided for malaria control has enabled endemic countries to greatly increase access to malaria preventive interventions as well as diagnostic and treatment services. The percentage of households owning at least one insecticide-treated net (ITN) in sub-Saharan Africa is estimated to have risen from 3% in 2000 to 53% in 2011, and remained at 53% in 2012. Household surveys indicate that approximately 90% of persons with access to an ITN within the household actually use it. The percentage protected by indoor residual spraying (IRS) in the African Region rose from less than 5% in 2005 to11% in 2010 and remained at that level in 2011. For malaria diagnostic testing and treatment, the numbers of rapid diagnostic tests (RDTs) and artemisinin-based combination therapies (ACTs) procured are increasing, and the percentage of suspected cases that receive a parasitological test has also risen, from 68% globally in 2005 to 77% in 2011, with the largest increase in sub-Saharan Africa. But the increase in diagnostic testing rates between 2010 and 2011 was just 1%.

It appears that the rapid increase shown by these measures of programme performance up to 2010 has tended to level off recently in parallel with a leveling of funding, and that millions of people continue to lack access to preventive therapies, diagnostic testing and quality-assured treatment. Considerably more work is needed before the target of universal access to malaria preventive interventions, diagnostic testing and appropriate treatment will be attained. A further complication is that resistance to artemisinins – the key compounds in artemisinin-based combination therapies – has been detected in 4 countries of the South-East Asia Region, while mosquito resistance to insecticides has been found in 64 countries around the world.

Of 99 countries with ongoing malaria transmission in 2011, 58 submitted sufficiently complete and consistent data on malaria cases between 2000 and 2011 to enable an assessment of trends to be made. Based on these reported data, 50 countries, including 9 countries in the African Region, are on track to meet WHA and RBM targets: to reduce malaria case incidence by 75% by 2015. However, the 58 countries that submitted sufficiently complete and consistent data account for only 15% of estimated cases worldwide; surveillance systems are weakest where the malaria burden is highest. There is a critical need to strengthen malaria surveillance in the remaining 41 countries which account for 85% of estimated malaria cases, so that programmes can identify and direct resources to the populations most in need, respond to outbreaks of disease, and assess the impact of control measures.

Because countries with higher numbers of cases are less likely to submit sufficiently consistent data, it is necessary to draw inferences about trends in some countries using estimates of numbers of cases. The estimated numbers of malaria cases and deaths are accompanied by a large degree of uncertainty, but suggest that reductions in malaria case incidence and mortality have occurred faster in countries with lower initial numbers of cases and deaths. Nonetheless, greater numbers of cases and deaths are estimated to have been averted between 2001 and 2010 in countries which had the highest malaria burdens in 2000. If the malaria incidence and mortality rates in 2000 had remained unchanged over the decade, 274 million more cases and 1.1 million more deaths would have occurred between 2001 and 2010. The majority of cases averted (52%) and lives saved (58%) are in the 10 countries which had the highest estimated malaria burdens in 2000. Thus, malaria programmes have had their greatest impact where the burden is highest.

The enormous progress achieved appears to have slowed recently. International funding for malaria control has levelled off, and is projected to remain substantially below the US$ 5.1 billion required to achieve universal coverage of malaria interventions. The number of ITNs procured in 2012 (66 million) is far lower than in 2011 (92 million) and 2010 (145 million). With the average useful life of ITNs estimated to be 2 to 3 years, ITN coverage is expected to decrease if ITNs are not replaced in 2013. There is an urgent need to identify new funding sources to maintain and expand coverage levels of interventions so that outbreaks of disease can be avoided and international targets for reducing malaria cases and deaths can be attained.

Policy development; updated policies, manuals and plans; and global targets for malaria control and elimination

In 2011, WHO completed a major re-design of its policy-setting process, resulting in the creation of the Malaria Policy Advisory Committee (MPAC), which held its inaugural and second meetings in 2012. Several new and updated malaria control policies, operational manuals, plans and initiatives were released in 2012. A

comprehensive set of indicators has been developed to track progress towards internationally-agreed malaria targets.

1. The MPAC came into operation in 2012, with a mandate to provide strategic advice and technical input to WHO on all aspects of malaria control and elimination. In accordance with the MPAC recommendations, WHO released a new policy on Seasonal Malaria Chemoprevention (SMC) and updated policies for Intermittent Preventive Treatment of malaria in pregnancy (IPTp) and for single-dose primaquine as a gametocytocide for treatment of *Plasmodium falciparum* malaria in selected settings.
2. Position statements were released on larviciding in sub-Saharan Africa and on the effectiveness of non-pharmaceutical forms of *Artemisia annua*. Surveillance manuals were published in April 2012 as part of the "T3: Test. Treat. Track." initiative, urging endemic countries and stakeholders to scale up diagnostic testing, treatment, and surveillance for malaria. The *Global Plan for Insecticide Resistance Management in malaria vectors* was launched in May 2012, providing a global blueprint for managing insecticide resistance.

Financing malaria control

The total international and domestic funding committed to malaria control was estimated to be US$ 2.3 billion in 2011, substantially less than the amount that will be needed to reach the global targets.

3. International disbursements to malaria-endemic countries increased every year from less than US$ 100 million in 2000 to US$ 1.71 billion in 2010 and were estimated to be US$ 1.66 billion in 2011 and US$ 1.84 billion in 2012. The leveling off in funds available for malaria control has been primarily due to lower levels of disbursements from the Global Fund. In 2011 the Global Fund also announced the cancellation of Round 11 of Grant Awards.
4. Reported data suggest that domestic financing for malaria has increased in all WHO Regions during 2005–2011 except the European Region. The Region of the Americas and the African Region report the greatest expenditure on malaria control. Total domestic spending in 2011 was estimated to be US$ 625 million.
5. Global resource requirements for malaria control were estimated in the 2008 Global Malaria Action Plan (GMAP) to exceed US$ 5.1 billion per year between 2011 and 2020. In Africa alone, the resource requirements estimated by GMAP were, on average, US$ 2.3 billion per year during the same period. Combining both domestic and international funds, the resources available for malaria control globally were estimated to be US$ 2.3 billion in 2011, leaving a gap of US$ 2.8 billion. Projections of both domestic and international resources available between 2013 and 2015 indicate that total funding for malaria control will remain at less than US$ 2.7 billion, substantially below the amount required to achieve universal access to malaria interventions.
6. Historical funding patterns indicate that international funding for malaria control has been targeted to countries with lower GNI per capita and higher mortality rates, particularly those in Africa. Domestic funding for malaria per person at risk is highest in the European Region and the Region of the Americas and lowest in the South-East Asia Region. Countries in the highest quintile of GNI per capita invest much more money per capita in malaria control than countries from other quintiles. These wealthier countries have lower malaria burdens, accounting for just 1% of estimated cases in 2010 and 0.3% of deaths. The high expenditures are partly related to the drive towards elimination of malaria in some countries. Countries with larger populations at risk of malaria – and the highest malaria mortality rates – have lower levels of domestic malaria funding per capita than countries with lower malaria burdens.

Progress in vector control

During the past decade, coverage with vector control interventions increased substantially in sub-Saharan Africa, with household ownership of at least one ITN reaching an estimated 53% by 2011 and remained at 53% in 2012. However, due to fewer deliveries of ITNs and increasing mosquito resistance to insecticides, recent successes in malaria vector control may be jeopardized.

7. By 2011, 32 countries in the African Region and 78 other countries worldwide had adopted the WHO recommendation to provide ITNs to all persons at risk for malaria. A total of 89 countries, including 39 in Africa, distribute ITNs free of charge.
8. Every year, an estimated 150 million ITNs are needed to protect all populations at risk of malaria in sub-Saharan Africa. Between 2004 and 2010, the number of ITNs delivered annually by manufacturers to malaria-endemic countries in sub-Saharan Africa increased from 6 million to 145 million. However, in 2011 only 92 million ITNs were delivered by manufacturers, while 66 million are estimated to be delivered in 2012. The numbers delivered in 2011 and 2012 are below the number of ITNs required to protect all populations at risk, and they will not fully replace the ITNs delivered 3 years earlier, indicating that ITN coverage will decrease unless deliveries are massively increased in 2013.
9. The percentage of households owning at least one ITN in sub-Saharan Africa is estimated to have risen from 3% in 2000 to 53% in 2011, and remained at 53% in 2012. The proportion of the population sleeping under an ITN, representing the population directly protected, also increased from 2% in 2000 to 33% in 2011, and remained at 33% in 2012.
10. Analysis of household survey data indicates that a high percentage (approximately 90%) of the population with access to an ITN within the household actually uses it, suggesting that efforts to encourage ITN use have been successful, and that the main constraint to increasing the number of at-risk persons sleeping under an ITN is insufficient availability of nets. However, the population that uses available nets includes households in which nets are used beyond their assumed capacity of 2 persons per net as well as those in which nets are not used to full capacity, indicating that further work is needed to ensure that all available nets are fully utilized.

11. The proportion of the population sleeping under an ITN is higher in wealthier, urban areas, and lower among older children. Disparities in ITN access should diminish as programmes move towards universal coverage.

Indoor residual spraying

12. IRS remains a powerful vector control tool for reducing and interrupting malaria transmission. In 2011, 80 countries, including 38 in the African Region, recommended IRS for malaria control.
13. In 2011, 153 million people were protected by IRS worldwide, or 5% of the global population at risk. In the African Region, the proportion of the at-risk population that was protected rose from less than 5% in 2005 to 11% in 2010 and remained at that level in 2011, with 77 million people benefiting from the intervention.

Insecticide resistance

14. Mosquito resistance to at least one insecticide used for malaria control has been identified in 64 countries. In May 2012, WHO and RBM released the *Global Plan for Insecticide Resistance Management in malaria vectors*, a five-pillar strategy for managing the threat of insecticide resistance.
15. Monitoring insecticide resistance is a necessary element of the implementation of insecticide-based vector control interventions. In 2011, 77 countries reported that they had adopted the policy of insecticide resistance monitoring.

Progress on chemoprevention

Among 25 countries reporting this information to WHO, the percentage of pregnant women attending antenatal clinics who received 2 doses of Intermittent Preventive Treatment during pregnancy ranged from 30% to 57% in 2011. Recent WHO recommendations on Intermittent Preventive Treatment for infants and Seasonal Malaria Chemoprevention for children await adoption and implementation by endemic countries.

16. Intermittent preventive treatment (IPT) is recommended for population groups in areas of high transmission who are particularly vulnerable to *Plasmodium* infection and its consequences, particularly pregnant women and infants. In sub-Saharan Africa, an estimated 32 million pregnant women and a large portion of the estimated 28 million infants born each year would benefit from IPT. In addition, about 25 million children in the Sahel subregion of Africa could be protected from malaria through seasonal malaria chemoprevention (SMC).
17. A total of 36 of 45 sub-Saharan African countries had adopted IPT for pregnant women (IPTp) as national policy by the end of 2011. This policy was also adopted by Papua New Guinea (Western Pacific Region) in 2009.
18. Among 25 of the 36 high-burden countries in the African Region which have adopted IPTp as national policy – and for which data are available – 44% (range 30%–57%) of pregnant women attending antenatal clinics received 2 doses of IPTp in 2011, in line with the WHO recommendation at that time. Since October 2012, WHO recommends IPTp at each scheduled antenatal visit after the first trimester.
19. In 16 countries in the African Region for which household survey data were available for 2009–2011, the weighted average of all pregnant women who received 2 doses of IPTp during pregnancy was low, at 22% (range 5%–69%), primarily due to low coverage in Nigeria and the Democratic Republic of the Congo.
20. All infants at risk of *P. falciparum* infection in sub-Saharan African countries with moderate-to-high malaria transmission and low levels of parasite resistance to the recommended agent sulfadoxine-pyrimethamine should receive preventive malaria treatment through immunization services at defined intervals corresponding to routine vaccination schedules. Only one country, Burkina Faso, has adopted a national policy of IPT for infants (IPTi) since the WHO recommendation was issued in 2009.
21. In March 2012, WHO issued a recommendation on seasonal malaria chemoprevention for children aged 3–59 months. No endemic country has yet adopted SMC, but several countries involved in evaluating the policy have indicated that they plan to expand SMC coverage beyond their study populations. The release of implementation guidance, *Seasonal Malaria Chemoprevention with Sulfadoxine-pyrimethamine plus Amodiaquine in Children: a Field Guide*, by WHO in December 2012 should facilitate rapid scale-up of this important intervention.

Progress in diagnostic testing and malaria treatment

The numbers of procured rapid diagnostic tests (RDTs) and artemisinin-based combination therapies (ACTs) are increasing, and the reported rate of diagnostic testing in the public sector in the African Region has increased from 20% in 2005 to 47% in 2011. However, many fever cases are still treated presumptively with antimalarials without parasitological diagnosis, and not all confirmed malaria cases receive appropriate treatment with a quality-assured antimalarial.

Diagnostic testing

22. Implementation of universal diagnostic testing in the public and private sectors would substantially reduce the global requirements for antimalarial treatment. In 2011, 41 of 44 countries with ongoing malaria transmission in the African Region and 46 of 55 countries in other WHO Regions reported having adopted a policy of providing parasitological diagnosis for all age groups. This represents an increase of 4 countries in the African Region since 2010.
23. Malaria diagnostic testing is provided free of charge in the public sector in 84 countries around the world. The proportion of suspected malaria cases receiving a diagnostic test in the public sector increased from 20% in 2005 to 47% in 2011 in the African Region and from 68% to 77% globally. Most of the increase in testing in the African Region is attributable to an increase in the use of RDTs, which accounted for 40% of all cases tested in the Region in 2011.

24. The number of patients tested by microscopic examination increased to a peak of 171 million in 2011, with India accounting for over 108 million blood slide examinations. The number of RDTs supplied by manufacturers increased from 88 million in 2010 to 155 million in 2011. This included increased sales for both *P. falciparum*-specific tests and combination tests that can detect more than one parasite species.

25. A total of 49 countries reported deployment of RDTs at the community level and 12 million patients were reported as having been tested through such programmes in 2011. Data from a limited number of countries suggest that diagnostic testing is less available in the private sector than in the public sector.

Treatment

26. ACTs are recommended as the first-line treatment for malaria caused by *P. falciparum*, the most dangerous of the *Plasmodium* parasites that infect humans. By 2011, 79 countries and territories had adopted ACTs as first-line treatment for *P. falciparum* malaria. *P. vivax* malaria should be treated with chloroquine where it is effective, or an appropriate ACT in areas where *P. vivax* is resistant to chloroquine. Treatment of *P. vivax* should be combined with a 14-day course of primaquine to prevent relapse.

27. From reports of manufacturers and the Affordable Medicines Facility-malaria (AMFm) initiative, the number of ACT treatment courses delivered to the public and private sectors globally increased from 11 million in 2005 to 76 million in 2006, and reached 278 million in 2011. The increases in ACT procurement in 2011 occurred in large part as a result of the AMFm initiative, managed by the Global Fund. Although the AMFm accounted for a substantial portion of public sector sales, the total amount of ACTs procured for the public sector showed a year-on-year decrease between 2010 and 2011.

28. It has been difficult to track the extent to which patients with confirmed malaria received antimalarial medicines because information linking diagnostic testing and treatment has been limited in both household surveys and routine health information systems. An estimate of the proportion of patients in the public sector potentially treated with ACTs (and not a less effective antimalarial) can be made by comparing the number of ACT treatments distributed by national programmes with the number of presumed (treated without testing) and confirmed (by microscopy or RDT) *P. falciparum* malaria cases reported (or estimated cases if reported data are lacking). This proportion varies by WHO Region, reaching 59% in the African Region in 2011.

29. In 12 countries in the African Region with household surveys during 2010–2011, the proportion of febrile children given antimalarial treatment who received ACTs was greater among children treated in the public sector and in the formal private sector than in the informal private sector or in the community. In some countries the proportion of all febrile children given antimalarials who receive ACTs remains low, which implies that a proportion of patients with malaria do not receive appropriate treatment.

30. In the African Region in 2011, the total number of tests (both microscopy and RDTs) was less than half the number of ACTs distributed by national malaria control programmes, indicating that ACTs are given to many patients without confirmatory diagnostic testing.

Antimalarial drug resistance

31. WHO recommends that oral artemisinin-based monotherapies should be progressively withdrawn from the market and replaced with ACTs, a policy endorsed by the World Health Assembly in 2007. The number of countries which still allow the marketing of these products has decreased from 55 countries in 2008 to 15 countries as of November 2012, of which 8 are in the African Region. The number of pharmaceutical companies marketing these products has dropped from 38 in 2010 to 28 in 2011. Most of the countries that allow marketing of these medicines are in the African Region, while most of the manufacturers are in India.

32. Therapeutic efficacy studies remain the gold standard for guiding drug policy and should be undertaken every 2 years. In 2010 and 2011, studies of first- or second-line antimalarial treatments were completed in 47 of 71 countries where *P. falciparum* efficacy studies were possible, an increase from 31 countries during 2008–2009. (In 28 countries with ongoing malaria transmission, efficacy studies are impracticable because of low malaria incidence, or because they are endemic for *P. vivax* only.) Studies were planned in 49 countries during 2012, including 29 countries in Africa.

33. Parasite resistance to artemisinins has now been detected in 4 countries of the Greater Mekong subregion: Cambodia, Myanmar, Thailand and Viet Nam. Despite the observed changes in parasite sensitivity to artemisinins, ACTs continue to cure patients provided that the partner drug is still efficacious. In Cambodia's Pailin province, resistance has been found to both components of multiple ACTs, and special provisions for directly observed therapy using a non-artemisinin-based combination (atovaquone-proguanil) have been put in place.

Malaria surveillance

Malaria surveillance systems currently detect only 10% of cases estimated to occur annually. Case detection rates are lowest in countries with the highest numbers of malaria cases.

34. The proportion of malaria cases tested and reported among all those seeking treatment in public sector health facilities (the "case detection rate") is less than 20% in 39 of the 99 countries with ongoing malaria transmission. These 30 countries account for 185 million cases of malaria or 78% of the estimated global total. Impediments in case detection vary by WHO Region: in the African and Western Pacific Regions, the main constraint is the small proportion of patients attending public facilities who receive a diagnostic test for malaria, whereas in the South-East Asia Region, the most important issue is the high proportion of patients who seek treatment in the private sector.

35. For countries in the phase of malaria control (as opposed to elimination), surveillance systems do not need to detect all cases in order to achieve their objectives which are primarily to assess trends over time and identify geographic differences in malaria incidence. However, in 41 countries around the world which account for 85% of estimated cases, it is not possible to make a reliable assessment of malaria trends due to incompleteness or inconsistency of reporting over time. Thus, surveillance systems appear to be weakest where the malaria burden is greatest; urgent action is needed to improve malaria surveillance in these settings.

Changes in malaria incidence and mortality

Approximately half of countries with ongoing malaria transmission are on track to meet the World Health Assembly (WHA) and RBM target: to achieve a 75% reduction in malaria cases by 2015, compared to levels in 2000. While 50 countries are on track to reach the target, progress in more than a third of countries cannot be assessed due to limitations in their reported data. Further progress towards international malaria targets depends on achieving substantial gains in the highest burden countries.

36. Of 99 countries with ongoing malaria transmission, 58 submitted sufficiently complete and consistent data on malaria cases between 2000 and 2011 to enable an assessment of trends to be made. Based on these reported data, 50 countries, including 9 countries in the African Region, are on track to meet the WHA and RBM target to reduce malaria case incidence by 75% by 2015. A further 4 countries are projected to achieve reductions of between 50% and 75%. Malaria case incidence increased in 3 countries of the Region of the Americas.
37. Of the 104 endemic countries in 2012, 79 countries are classified as being in the malaria control phase, 10 are in the pre-elimination phase, 10 are in elimination phase. Another 5 countries without ongoing transmission are classified in the prevention of re-introduction phase.
38. There were an estimated 219 million cases of malaria (range 154–289 million) and 660 000 deaths (range 610 000–971 000) in 2010. The estimates for 2010 have been updated since they were first published in the *World Malaria Report 2011* after a process of country consultation. Country-level malaria estimates available for 2010 show that 80% of estimated malaria deaths occur in just 14 countries and approximately 80% of estimated cases occur in 17 countries. Together, the Democratic Republic of the Congo and Nigeria account for over 40% of the estimated total of malaria deaths globally. The Democratic Republic of the Congo, India and Nigeria account for 40% of estimated malaria cases.
39. Malaria is strongly associated with poverty. Estimated malaria mortality rates are highest in countries with a lower GNI per capita. Countries with higher proportions of their population living in poverty (less than US$ 1.25 per person per day) have higher mortality rates from malaria. Within countries, parasite prevalence rates in children are highest among poorer populations and in rural areas.
40. Progress in reducing malaria case incidence and mortality rates has been faster in countries with lower numbers of cases and deaths. Nonetheless, greater numbers of cases and deaths are estimated to have been averted between 2001 and 2010 in countries which had the highest malaria burdens in 2000. If the malaria incidence and mortality rates estimated for 2000 had remained unchanged over the decade, 274 million more cases and 1.1 million more deaths would have occurred between 2001 and 2010. The majority of cases averted (52%) and lives saved (58%) are in the 10 countries which had the highest estimated malaria burdens in 2000. Such estimations indicate that malaria programmes are having their greatest impact where the burden is highest.
41. There are many inherent uncertainties in any approach to producing estimates of malaria case incidence and mortality, and in analyses based on these estimates. The global malaria community needs to increase its efforts to support malaria-endemic countries in improving diagnostic testing, surveillance, vital registration, and routine health information systems, so that accurate information on malaria morbidity and mortality can be obtained.

Avant-propos

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Les cinq dernières années ont été marquées par une augmentation considérable des financements internationaux en faveur de la prévention, du contrôle et de l'élimination du paludisme. Suite à l'appel (2008) du Secrétaire général de l'Organisation des Nations Unies, Ban Ki-moon, en faveur de l'accès universel aux interventions antipaludiques, les produits et médicaments essentiels ont été rapidement distribués en Afrique subsaharienne, là où le poids de la maladie est le plus lourd. Les efforts consentis par les gouvernements des pays endémiques, les donateurs et les partenaires internationaux ont renforcé la lutte contre le paludisme, avec des résultats visibles sur le terrain. Quelque 1,1 million de décès liés à la maladie ont ainsi été évités ces dix dernières années, principalement grâce à l'intensification des interventions.

Cependant, les financements disponibles restent inférieurs aux ressources requises pour atteindre à la fois les Objectifs du Millénaire pour le Développement (OMD) liés à la santé et d'autres cibles mondiales définies par la communauté internationale. Pour réaliser l'objectif d'accès universel aux interventions antipaludiques, US$ 5,1 milliards sont estimés nécessaires chaque année entre 2011 et 2020. Or, près de la moitié seulement est disponible aujourd'hui, soit US$ 2,3 milliards. Il est donc urgent d'identifier de nouvelles sources de financement pour intensifier encore, puis pérenniser les efforts antipaludiques, et ainsi protéger les investissements consentis au cours de la dernière décennie. Nous devons aussi trouver de nouveaux moyens d'optimiser les fonds existants en augmentant le rapport qualité/prix des produits antipaludiques et l'efficacité de la prestation de services.

Le *Rapport 2012 sur le paludisme dans le monde* regroupe les données les plus récentes fournies par les pays endémiques et les partenaires, et analyse précisément les progrès accomplis et les tendances. Derrière les données statistiques et autres graphiques se cache une triste réalité : chaque minute, un enfant africain meurt du paludisme, une maladie pourtant totalement évitable et guérissable. L'accès des communautés les plus vulnérables aux moustiquaires imprégnées d'insecticide longue durée, pulvérisations intradomiciliaires d'insecticides à effet rémanent, tests de diagnostic et combinaisons thérapeutiques à base d'artémisinine (ACT) est encore insuffisant. Pour la première fois depuis cinq ans, il semble se stabiliser, n'ayant augmenté que de façon modeste entre 2010 et 2011. Il nous faut donc agir au plus vite pour préserver la récente dynamique et les résultats qu'elle a pu générer.

Nos outils antipaludiques actuels restent efficaces quasiment partout dans le monde. Une résistance aux artémisinines, les principales composantes des ACT, est apparue dans quatre pays d'Asie du Sud-Est et une résistance des moustiques aux insecticides a été observée dans 64 pays. Même si ces phénomènes ne compromettent pas, à l'heure actuelle, la réussite des programmes nationaux de lutte contre le paludisme, des efforts supplémentaires devront être rapidement déployés pour éviter une prochaine catastrophe de santé publique.

Nous sommes à trois ans de l'échéance fixée pour les OMD. Comme expliqué dans ce rapport, 50 pays sont en passe d'atteindre les objectifs de 2015 définis par l'Assemblée mondiale de la Santé et le Partenariat Roll Back Malaria, à savoir réduire de 75 % l'incidence du paludisme au niveau national. À eux seuls, ils ne représentent toutefois que 3 % (soit 7 millions) du nombre total de cas estimés dans le monde. Les cibles internationales en matière de paludisme ne seront atteintes qu'à condition de réaliser des avancées considérables dans les 14 pays les plus durement touchés, là où 80 % des décès liés à la maladie sont recensés.

Le suivi des progrès constitue un défi majeur dans le contrôle du paludisme. Les systèmes de surveillance ne permettent d'identifier que quelque 10 % du nombre total de cas estimés dans le monde. Ils devront donc être renforcés de toute urgence, de façon à i) répondre rapidement et efficacement au paludisme dans les régions endémiques, ii) prévenir la résurgence des cas et les épidémies, iii) suivre les progrès accomplis et iv) responsabiliser les gouvernements et la communauté antipaludique internationale. Une évaluation précise de la tendance en matière de paludisme est actuellement impossible dans 41 pays et ce, en raison d'une collecte incohérente ou incomplète des données.

Cette année, à l'occasion de la Journée mondiale contre le paludisme, je me suis rendue en Namibie pour lancer l'initiative *T3: Test. Treat. Track.* (Tester. Traiter. Tracer.) et pour encourager pays et partenaires à renforcer rapidement la surveillance, ainsi que l'utilisation des tests de diagnostic et du traitement thérapeutique à qualité garantie. L'OMS a également publié de nouveaux manuels de surveillance pour le contrôle et l'élimination du paludisme, ainsi que le Plan mondial pour la gestion de la résistance aux insecticides chez les vecteurs du paludisme. Ces documents pratiques aideront les pays à recentrer et à mettre à jour leurs stratégies antipaludiques nationales, de façon à tirer le meilleur parti des ressources limitées dont ils disposent. Créé récemment, le Comité consultatif sur les stratégies de lutte contre le paludisme (MPAC) de l'OMS a par ailleurs recommandé la chimioprévention du paludisme saisonnier dans la sous-région du Sahel. Cette intervention simple et peu coûteuse pourrait prévenir plus de 75 % des cas de paludisme sévère et sans complications chez les enfants de moins de cinq ans.

Venir à bout du paludisme nécessitera un engagement politique au plus haut niveau, des coopérations régionales renforcées et l'implication d'autres secteurs que la santé, notamment la finance, l'éducation, la défense, l'environnement, l'exploitation minière, l'industrie et le tourisme. La lutte contre cette maladie doit être intégrée à l'agenda de développement de tous les pays endémiques. Des progrès supplémentaires ne seront possibles qu'à condition d'œuvrer sans relâche pour renforcer les systèmes de santé et assurer la disponibilité de financements pérennes et prévisibles. Le présent rapport décrit les avancées remarquables réalisées en matière de lutte contre le paludisme ; nous devons donc agir vite et avec détermination pour ne pas les compromettre.

Résumé et points essentiels

Le *Rapport 2012 sur le paludisme dans le monde* récapitule les informations communiquées par 104 pays d'endémie palustre ainsi que des renseignements émanant d'autres sources. Il s'attache à mettre à jour les analyses figurant dans le Rapport 2011. Il souligne les progrès accomplis dans le but de contribuer au respect des objectifs internationaux fixés à l'horizon 2015 et décrit les défis actuels en ce qui concerne la lutte et l'élimination du paludisme.

Les dix dernières années ont été marquées par une expansion considérable du financement et de la mise en œuvre des programmes de lutte contre le paludisme. Les financements internationaux débloqués pour lutter contre le paludisme se sont nettement accrus, passant d'un peu moins de US$ 100 millions en 2000 à US$ 1,71 milliard en 2010 et ont été estimés à US$ 1,66 milliard en 2011 et à US$ 1,84 milliard en 2012. Une analyse a permis de révéler qu'à mesure que les financements augmentaient, ces derniers ciblaient de plus en plus la région Afrique, notamment les pays au revenu national brut le plus faible par habitant, mais aussi les pays où les taux de mortalité dus au paludisme sont les plus élevés. Les financements accordés par les gouvernements nationaux pour les programmes de lutte contre le paludisme ont aussi augmenté entre 2005 et 2011. Ils ont été estimés à US$ 625 millions en 2011.

Si ces financements restent insuffisants pour dégager les US$ 5,1 milliards nécessaires à la réalisation de la couverture universelle grâce à des interventions de lutte contre le paludisme, les financements alloués à la lutte contre le paludisme ont permis aux pays endémiques d'augmenter considérablement l'accès aux interventions de prévention antipaludiques mais aussi aux services de diagnostic et de traitement. Le pourcentage estimé des ménages possédant au moins une moustiquaire imprégnée d'insecticide à longue durée (MII) en Afrique subsaharienne a augmenté, passant de 3 % en 2000 à 53 % en 2011, puis est resté stable à 53 % en 2012. Les enquêtes auprès de ménages indiquent qu'environ 90 % des personnes ayant accès à une MII au sein d'un foyer l'utilisent effectivement. Le pourcentage de protection par des pulvérisations intradomiciliaires d'insecticides à effet rémanent (PII) dans la Région Afrique a évolué de moins de 5 % en 2005 à 11 % en 2010 puis est resté stable en 2011. Dans le domaine des tests de diagnostic rapide et des traitements, les achats de tests de diagnostic rapide (TDR) et de combinaisons thérapeutiques à base d'artémisinine (CTA) sont en augmentation. Quant au pourcentage des cas suspects soumis à un examen parasitologique, il est passé de 68 % en 2005 dans le monde entier à 77 % en 2011, avec la plus forte hausse enregistrée en Afrique subsaharienne. Toutefois, l'augmentation du pourcentage de tests de diagnostic entre 2010 et 2011 n'était que d'1 %.

Il semble que l'amélioration rapide constatée par ces mesures de la performance des programmes jusqu'à 2010 stagne récemment, parallèlement au plafonnement des financements, et que des millions de personnes continuent à ne pas avoir accès aux thérapies de prévention, aux tests de diagnostic et aux traitements satisfaisants aux normes d'assurance qualité. Il va falloir redoubler d'efforts avant de pouvoir concrétiser la cible de l'accès universel aux interventions de prévention antipaludique, aux tests de diagnostic et aux traitements appropriés. Il existe une autre complication : une résistance aux artémisinines, un composant clé des associations médicamenteuses comportant de l'artémisinine, a été notée dans quatre pays d'Asie du Sud-Est, alors que la résistance des moustiques aux insecticides a été constatée dans 64 pays dans le monde.

Sur 99 pays touchés par la transmission en 2011, 58 pays ont soumis des données suffisamment exhaustives et cohérentes sur les cas de paludisme entre 2000 et 2011 permettant de dégager les tendances. Si l'on se fonde sur ces données soumises, 50 pays sont en bonne voie pour atteindre les cibles fixées par l'Assemblée mondiale de la santé et par le partenariat RBM (« Faire reculer le paludisme ») : réduire de 75 % le nombre de cas de paludisme d'ici 2015, et notamment dans neuf pays de la région Afrique. Toutefois, les 58 pays ayant soumis des données suffisamment exhaustives et cohérentes ne représentent que 15 % des cas estimés dans le monde ; les systèmes de surveillance sont les plus faibles là où la charge du paludisme est la plus élevée. Il est indispensable de renforcer la surveillance du paludisme dans les 41 autres pays représentant 85 % des cas de paludisme estimés, afin que les programmes identifient et dirigent des ressources vers les populations les plus touchées, ripostent aux flambées de la maladie et évaluent l'impact des mesures de lutte.

Les pays ayant le nombre de cas le plus élevé étant moins susceptibles de soumettre des données suffisamment cohérentes, il est essentiel de tirer des enseignements à partir des tendances dans certains pays à l'aide des estimations du nombre de cas. Les estimations du nombre de cas de paludisme et de décès sont entourées d'un degré considérable d'incertitude, mais elles suggèrent que l'incidence des cas de paludisme et la mortalité ont diminué plus rapidement dans les pays où le nombre initial de cas et de décès était plus faible. Cependant, un plus grand nombre de cas et de décès a été évité entre 2001 et 2010 dans les pays où la charge du paludisme était la plus élevée en 2000. Si l'incidence du paludisme et les taux de mortalité en 2000 étaient restés stables au cours de la décennie, 274 millions de cas supplémentaires et 1,1 million de décès en plus auraient été à déplorer entre 2001 et 2010. La majorité des cas évités (52 %) et des vies sauvées (58 %) est située dans les dix pays où la charge estimée du paludisme était la plus élevée en 2000. Par conséquent, les programmes de lutte contre le paludisme ont eu l'impact le plus fort là où la charge était la plus élevée.

Les progrès considérables accomplis semblent avoir ralenti récemment. Les financements internationaux alloués à la lutte contre le paludisme plafonnent et devraient rester sensiblement en dessous des US$ 5,1 milliards nécessaires pour concrétiser la couverture universelle grâce à des interventions antipaludiques.

Le nombre de MII achetées en 2012 (66 millions) est très inférieur à celui de 2011 (92 millions) et de 2010 (145 millions). Avec une durée de vie moyenne estimée à deux ou trois ans, la couverture par les MII devrait diminuer si elles ne sont pas remplacées en 2013. Il est urgent d'identifier de nouvelles sources de financement afin de maintenir et élargir les niveaux de couverture des interventions, pour éviter les flambées de la maladie et atteindre les cibles de réduction des cas de paludisme et de décès fixées à l'échelle internationale.

Élaboration de politiques ; politiques, manuels et plans mis à jour ; et cibles mondiales pour la lutte contre le paludisme et son élimination

En 2011, l'OMS a achevé une révision approfondie de son processus d'élaboration des politiques, donnant naissance au Comité de pilotage de la politique de lutte antipaludique (MPAC), qui a tenu sa deuxième réunion et sa réunion inaugurale en 2012. Des nouvelles politiques, des politiques actualisées, des manuels opérationnels, des plans et des initiatives sur la lutte contre le paludisme ont été publiés en 2012. Un ensemble complet d'indicateurs a été mis au point pour suivre les progrès accomplis vers les cibles convenues à l'échelle internationale pour la lutte contre le paludisme.

1. Le MPAC est devenu opérationnel en 2012, avec pour mission de fournir des conseils stratégiques et une contribution technique à l'OMS sur tous les aspects de la lutte contre le paludisme et de son élimination. Conformément aux recommandations du MPAC, l'OMS a publié une nouvelle politique sur la chimioprévention saisonnière du paludisme (CSP). L'Organisation a aussi actualisé des politiques sur le traitement préventif intermittent pour les femmes enceintes (TPIp) et sur l'administration de primaquine en prise unique en tant que gamétocytocide pour le traitement du paludisme à *Plasmodium falciparum* dans des contextes précis.
2. Des prises de position ont été publiées sur des traitements larvicides en Afrique subsaharienne et sur l'efficacité des présentations non pharmaceutiques d'*Artemisia annua*. Des manuels de surveillance ont été publiés en avril 2012 dans le contexte de l'initiative « T3 : Tester. Traiter. Tracer. » demandant instamment aux pays endémiques et aux parties prenantes d'intensifier les activités de tests de diagnostic, de traitement et de surveillance du paludisme. Le *Plan mondial pour la gestion de la résistance aux insecticides chez les vecteurs du paludisme* a été lancé en mai 2012. Il fournit un schéma directeur mondial pour la gestion de la résistance aux insecticides.

Financement de la lutte antipaludique

Il est prévu que les fonds affectés à la lutte antipaludique en provenance de l'ensemble des sources de financements internationaux et nationaux atteignent US$ 2,3 milliards en 2011, c'est-à-dire un montant sensiblement inférieur aux ressources nécessaires pour atteindre les cibles fixées au niveau mondial.

3. Les financements internationaux alloués aux pays d'endémie palustre ont augmenté chaque année, passant d'un peu moins de US$ 100 millions en 2000 à US$ 1,71 milliard en 2010 et ont été estimés à US$ 1,66 milliard en 2011 et US$ 1,84 milliard en 2012. Le plafonnement des fonds disponibles pour la lutte contre le paludisme est essentiellement dû aux niveaux moindres de financements du Fonds mondial. En 2011, le Fonds mondial a aussi annoncé l'annulation de la Série 11 de l'octroi des subventions.
4. Les données soumises suggèrent que le financement national de la lutte contre le paludisme a augmenté dans toutes les régions OMS au cours de la période 2005-2011, sauf dans la région européenne. La Région des Amériques et la Région Afrique ont déclaré les dépenses les plus élevées dans la lutte contre le paludisme. Les dépenses nationales totales en 2011 ont été estimées à US$ 625 millions en 2011.
5. Dans le Plan d'action mondial contre le paludisme (GMAP) de 2008, les besoins en ressources à l'échelle mondiale ont été estimés à plus de US$ 5,1 milliards par an entre 2011 et 2020. Rien qu'en Afrique, les besoins en ressources estimés selon le GMAP étaient, en moyenne, de US$ 2,3 milliards par an pendant la même période. En combinant les fonds nationaux et internationaux, les ressources disponibles pour la lutte antipaludique dans le monde ont été estimées à US$ 2,3 milliards en 2011, laissant un écart de US$ 2,8 milliards. Les prévisions pour les ressources nationales et internationales disponibles entre 2013 et 2015 indiquent que le financement total de la lutte contre le paludisme stagnera à moins de US$ 2,7 milliards, un montant sensiblement inférieur aux besoins pour concrétiser l'accès universel grâce aux interventions antipaludiques.
6. L'historique des financements indique que les financements internationaux de la lutte antipaludique ont visé les pays où le revenu national brut par habitant était le plus faible et où les taux de mortalité étaient les plus élevés, notamment les pays d'Afrique. Les financements nationaux de la lutte contre le paludisme par personne à risque sont les plus élevés dans le Région Europe et dans la Région des Amériques et les plus faibles dans la Région d'Asie du Sud-Est. Les pays dans le quintile supérieur pour le revenu national brut par habitant investissent davantage par habitant dans la lutte contre le paludisme que les pays des autres quintiles. Dans ces pays plus riches, le fardeau du paludisme est moins lourd, représentant tout juste 1 % des cas estimés en 2010 et 0,3 % des décès. Les dépenses élevées sont en partie liées à la dynamique visant l'élimination du paludisme dans certains pays. Les pays où les populations à risque de paludisme sont plus nombreuses et où les taux de mortalité imputables au paludisme sont les plus élevés ont des niveaux de dépenses intérieures consacrées au paludisme par habitant plus faibles que les pays où la charge du paludisme est moindre.

Progrès réalisés dans lutte antivectorielle

Au cours de la dernière décennie, la couverture par des interventions de lutte antivectorielle s'est considérablement élargie en Afrique subsaharienne. D'ailleurs, les estimations du pourcentage des ménages possédant au moins une MII ont atteint 53 % en 2011

et sont restées stables à 53 % en 2012. Toutefois, en raison d'une distribution moins importante de MII et de la résistance accrue des moustiques aux insecticides, les progrès réalisés dans la lutte antivectorielle pourraient être compromis.

7. Dès 2011, 32 pays de la Région Afrique et 78 pays situés dans d'autres régions du monde avaient adopté les recommandations de l'Organisation préconisant la fourniture de MII à toutes les personnes exposées au paludisme. Au total, 89 pays, dont 39 en Afrique, distribuent gratuitement des MII.

8. Chaque année, selon les estimations, 150 millions de MII sont nécessaires pour protéger toutes les populations à risque de paludisme en Afrique subsaharienne. Le nombre annuel de MII livrées par les fabricants aux pays d'endémie palustre en Afrique subsaharienne a augmenté et est passé de 6 millions en 2004 à 145 millions en 2010. Toutefois, en 2011 seulement 92 millions de MII ont été livrées par les fabricants, et leur nombre est estimé à 66 millions en 2012. Le nombre de MII livrées en 2011 et 2012 est inférieur au nombre de MII nécessaire pour protéger toutes les populations exposées, et elles ne remplaceront pas entièrement les MII fournies trois ans plus tôt. Cette situation signifie que la couverture par les MII sera en baisse si les livraisons ne sont pas augmentées massivement en 2013.

9. Le pourcentage de ménages possédant au moins une MII en Afrique subsaharienne a augmenté selon les estimations, passant de 3 % en 2000 à 53 % en 2011, puis est resté stable à 53 % en 2012. La proportion de la population dormant sous une MII, représentant la population directement protégée, a aussi augmenté, passant de 2 % en 2000 à 33 % en 2011, puis s'est stabilisée à 33 % en 2012.

10. L'analyse des enquêtes auprès des ménages indique qu'un pourcentage élevé (environ 90 %) de la population ayant accès à une MII au sein du foyer l'utilise réellement, ce qui laisse penser que les mesures visant à encourager l'utilisation des MII ont été efficaces, et que le principal obstacle empêchant un plus grand nombre de personnes exposées au paludisme de dormir sous une MII se résume à la disponibilité insuffisante des moustiquaires. Toutefois, la population qui utilise les MII disponibles comprend les ménages au sein desquels les MII sont utilisés au-delà de leur capacité supposée de deux personnes par MII, ainsi que les ménages où les MII ne sont pas utilisés à leur pleine capacité, indiquant que des actions supplémentaires sont requises pour garantir que tous les MII disponibles sont pleinement utilisés.

11. La proportion de la population dormant sous une MII est plus importante dans les zones urbaines aisées et son utilisation est moins importante chez les enfants plus âgés. Les disparités dans l'accès aux MII devraient diminuer alors que les programmes évoluent vers une couverture universelle.

Pulvérisations intradomiciliaires d'insecticides à effet rémanent

12. Les PII à l'aide d'insecticides à effet rémanent constituent encore un outil de lutte antivectorielle puissant destiné à réduire ou interrompre la transmission du paludisme. En 2011, 80 pays, dont 38 pays dans la Région Afrique, recommandaient les PII dans la lutte contre le paludisme.

13. En 2011, 153 millions de personnes ont été protégés par un PII dans le monde, ce qui représente 5 % de la population mondiale exposée au risque de contracter le paludisme. Dans la Région Afrique, la proportion de la population exposée qui a été protégée a augmenté, passant de moins de 5 % en 2005 à 11 % en 2010, puis a stagné à ce niveau en 2011, avec 77 millions de bénéficiaires.

Résistance aux insecticides

14. Une résistance des moustiques à au moins un insecticide utilisé dans la lutte contre le paludisme a été constatée dans 64 pays. En mai 2012, l'OMS et le partenariat RBM ont publié le Plan mondial pour la gestion de la résistance aux insecticides chez les vecteurs du paludisme, une stratégie à cinq piliers de gestion de la menace de résistance aux insecticides.

15. Le suivi de la résistance aux insecticides est une composante indispensable au déploiement des interventions de lutte antivectorielle fondées sur des insecticides. En 2011, 77 pays ont signalé avoir adopté une politique de suivi de la résistance aux insecticides.

Progrès réalisés en matière de chimioprévention

Sur les 25 pays soumettant ces données à l'OMS, le pourcentage de femmes enceintes se présentant dans des établissements de soins prénataux et ayant reçu deux doses du traitement préventif intermittent durant leur grossesse varie de 30 % à 57 % en 2011. Aucun pays d'endémie n'a pour l'instant adopté ni mis en œuvre le traitement préventif intermittent pour les nourrissons et la chimioprévention saisonnière du paludisme pour les enfants, depuis leur recommandation récente par l'OMS.

16. Un traitement préventif intermittent (TPI) est recommandé pour les groupes de populations vivant dans des zones où le taux de transmission reste élevé et qui sont particulièrement exposés au risque d'une infection à Plasmodium et à ses conséquences, notamment les femmes enceintes et les nourrissons. En Afrique subsaharienne, il a été estimé que 32 millions de femmes enceintes et une grande partie des 28 millions de nourrissons nés chaque année tireraient avantage d'une TPI. En outre, environ 25 millions d'enfants dans la région sahélienne de l'Afrique subsaharienne pourraient être protégés contre le paludisme au moyen d'une chimioprévention saisonnière du paludisme (CSP).

17. Au total, sur les 45 pays formant l'Afrique subsaharienne, 36 ont adopté dès la fin 2011 le TPI pour femmes enceintes (TPIp) comme politique nationale. Dans la région Pacifique occidental, la Papouasie-Nouvelle-Guinée a également adopté cette politique en 2009.

18. Dans 25 pays sur les 36 pays de la Région Afrique les plus accablés par le fardeau du paludisme qui ont adopté le TPIp en tant que politique nationale et pour lesquels des données sont disponibles, 44 % (écart de 30 à 57 %) des femmes

enceintes se présentant dans des établissements de soins prénataux ont reçu deux doses de TPIp en 2011, conformément aux recommandations de l'OMS de l'époque. Depuis octobre 2012, l'Organisation recommande d'administrer une dose de TPIp à chaque visite prénatale programmée après le premier trimestre.

19. Sur les 16 pays de la Région Afrique disposant de données provenant d'enquêtes auprès des ménages sur la période 2009-2011, le pourcentage de toutes les femmes ayant reçu deux doses de TPIp pendant leur grossesse est faible. Une fois pondérée, la moyenne affiche 22 % (écart 5 %-69 %), et s'explique principalement par les faibles taux de couverture au Nigéria et en République démocratique du Congo.

20. Tous les nourrissons exposés à un risque d'infection par *P. falciparum* dans des pays d'Afrique subsaharienne, où l'intensité de la transmission est comprise entre modérée et élevée et où les niveaux de résistance des parasites aux agents recommandés, la sulfadoxine-pyriméthamine, sont faibles, devraient recevoir un traitement préventif contre le paludisme par les services de vaccination selon des intervalles définis correspondant aux calendriers de vaccination systématique. Seul un pays, le Burkina Faso, a fait du TPI un élément de sa politique nationale dans le cas des nourrissons depuis sa recommandation en 2009.

21. En mars 2012, l'OMS a publié une recommandation sur la CSP chez les enfants âgés de 3 à 59 mois. Aucun pays d'endémie palustre n'a encore adopté la CSP, mais plusieurs pays impliqués dans l'évaluation de la politique ont indiqué qu'ils prévoyaient d'élargir la CSP à d'autres populations que celles de l'étude. La publication de recommandations de mise en œuvre, *Seasonal Malaria Chemoprevention with Sulfadoxine-pyrimethamine plus Amodiaquine in Children: a Field Guide*, par l'OMS, en décembre 2012 devrait favoriser une amélioration rapide de cette intervention importante.

Progrès réalisés en matière de test de diagnostic et de traitement antipaludique

Les achats de tests de diagnostic rapide (TDR) et de combinaisons thérapeutiques à base d'artémisinine (CTA) sont en augmentation. Le taux notifié des tests de diagnostic dans le secteur public de la Région Afrique est passé de 20 % en 2005 à 47 % en 2011. Pourtant, de nombreux cas fébriles sont encore traités par présomption, sans aucun diagnostic parasitologique préalable, et tous les cas de paludisme confirmés ne reçoivent pas un traitement approprié avec des antipaludiques satisfaisants aux normes d'assurance qualité.

Tests de diagnostic

22. La mise en œuvre universelle des tests de diagnostic dans les secteurs publics et privés réduirait considérablement les besoins en traitements antipaludiques dans le monde. En 2011, 41 des 44 pays affichant encore des taux de transmission du paludisme de la Région Afrique et 46 sur 55 pays des autres Régions de l'OMS ont signalé avoir adopté une politique visant à fournir le diagnostic parasitologique à toutes les tranches d'âge, ce qui représente quatre pays de plus qu'en 2010 pour la Région Afrique.

23. Le test de diagnostic du paludisme est offert gratuitement dans le secteur public de 84 pays dans le monde. La proportion des cas suspects de paludisme soumis à un test de diagnostic dans le secteur public a augmenté, passant de 20 % en 2005 à 47 % en 2011 dans la Région Afrique et de 68 % à 77 % dans le monde. L'essentiel de cette augmentation dans les tests de diagnostic dans la Région Afrique est imputable à une utilisation accrue des TDR, qui représente 40 % de tous les cas dépistés dans la Région en 2011.

24. Le nombre de patients soumis à un examen microscopique a augmenté, pour culminer à 171 millions en 2011, alors que l'Inde représente plus de 108 millions d'examens de prélèvements sanguins sur lames. Le nombre de TDR fournis par les fabricants est passé de 88 millions en 2010 à 155 millions en 2011. Ce chiffre comprend les ventes accrues pour les tests spécifiques de *P. falciparum* et les tests combinés qui peuvent détecter plus d'une espèce de parasites.

25. Au total, 49 pays ont déclaré avoir déployé des TDR au niveau communautaire et 12 millions de patients ont été soumis à un test de diagnostic grâce à ces programmes en 2011 selon les notifications. D'après les données fournies par un nombre limité de pays, il semblerait que les tests de diagnostic soient moins répandus dans le secteur privé que dans le secteur public.

Traitement

26. Une CTA est recommandée dans le traitement de première intention du paludisme à *P. falciparum*, le parasite *Plasmodium* le plus dangereux qui infecte les humains. En 2011, 79 pays et territoires ont adopté la CTA en traitement de première intention pour le paludisme à *P. falciparum*. Le paludisme à *P. vivax* doit être traité par la chloroquine partout où cet antipaludique reste efficace ou par une CTA dans les zones où *P. vivax* est résistant à la chloroquine. Le traitement du paludisme à *P. vivax* doit être complété par l'administration de primaquine pendant 14 jours afin d'éviter les rechutes.

27. Selon les rapports de fabricants et le Dispositif pour des médicaments abordables pour le paludisme (DMAp), le nombre de traitements par CTA livrés aux secteurs publics et privés dans le monde a augmenté, passant de 11 millions en 2005 à 76 millions en 2006, pour atteindre 278 millions en 2011. Cette hausse des achats de CTA en 2011 s'explique en grande partie par le DMAp, géré par le Fonds mondial. Si le DMAp représente une partie importante des ventes du secteur public, le montant total des achats de CTA pour le secteur public a montré une baisse d'une année sur l'autre entre 2010 et 2011.

28. Il est difficile de savoir dans quelle mesure les patients dont le paludisme a été confirmé ont reçu des traitements antipaludiques car les informations reliant le test de diagnostic au traitement ont été limitées dans les deux enquêtes auprès des ménages et des systèmes d'information sanitaire courants. Il est possible d'estimer la proportion de patients dans le secteur public potentiellement traitée par CTA (et non un antipaludique moins efficace) en comparant le nombre

de traitements par CTA distribués par les programmes nationaux au nombre de cas de paludisme présumés (traités sans test préalable) et de cas de paludisme à *P. falciparum* confirmés (par examen microscopique ou TDR) et notifiés (ou les cas estimés si les données n'ont pas été transmises). Cette proportion varie en fonction des Régions de l'OMS, atteignant 59 % dans la Région Afrique en 2011.

29. Dans 12 pays de la Région Afrique où des enquêtes auprès des ménages ont été menées en 2010 et 2011, la proportion d'enfants fébriles sous antipaludiques ayant reçu une CTA était supérieure chez les enfants traités dans le secteur public et dans le secteur privé formel que dans le secteur privé informel ou dans la communauté. Dans certains pays, la proportion d'enfants fébriles sous antipaludiques ayant reçu une CTA reste faible, ce qui implique qu'une proportion de patients infectés par le paludisme ne reçoit pas le traitement approprié.
30. Dans la Région Afrique en 2011, le nombre total de tests (examens microscopiques et TDR) représentait moins de la moitié du nombre de CTA distribués par les programmes nationaux de lutte contre le paludisme, ce qui signifie que de nombreux patients se voient encore prescrire des CTA sans subir de test de confirmation du diagnostic.

Résistance aux médicaments antipaludiques

31. L'OMS recommande de retirer progressivement du marché les monothérapies à base d'artémisinine par voie orale et de les remplacer par des CTA, une politique adoptée par l'Assemblée mondiale de la santé en 2007. Le nombre de pays autorisant encore la commercialisation de ces produits a diminué, passant de 55 pays en 2008 à 15 pays en novembre 2012, parmi lesquels 8 se trouvent dans la Région Afrique. Le nombre de compagnies pharmaceutiques commercialisant ces produits a chuté, passant de 38 en 2010 à 28 en 2011. La plupart des pays qui autorisent encore la commercialisation des monothérapies se trouvent dans la Région Afrique, alors que la majorité des fabricants sont implantés en Inde.
32. Les études relatives à l'efficacité thérapeutique restent la norme de référence pour orienter les politiques sur les médicaments. Elles doivent être réalisées tous les deux ans. Des études d'efficacité des traitements antipaludiques de première ou de seconde intention ont été effectuées dans 47 des 71 pays où étudier l'efficacité de ce type de médicaments face à *P. falciparum* est possible, ce qui représente une hausse par rapport aux 31 pays en 2008-2009 (ces études sont impossibles dans 28 pays d'endémie du fait de la faible incidence du paludisme ou du fait d'une endémie uniquement liée à *P. vivax*). Quarante-neuf pays avaient prévu d'organiser des études en 2012, notamment en Afrique.
33. Des cas possibles de résistance aux artémisinines ont été identifiés dans quatre pays de la sous-région du Grand Mékong : le Cambodge, le Myanmar, la Thaïlande et le Viet Nam. Malgré les changements observés dans la sensibilité des plasmodies aux artémisinines, les CTA continuent à guérir des patients lorsque le médicament partenaire reste efficace. Toutefois, dans la province de Pailin au Cambodge, on a observé une résistance aux deux composants des CTA multiples, et des dispositions spéciales ont été prises pour une thérapie sous surveillance directe par une association ne contenant pas d'artémisinine (atovaquone-proguanil).

Surveillance du paludisme

Les systèmes de surveillance du paludisme dépistent actuellement seulement 10 % des cas estimés se produisant dans une année. Les taux de dépistage des cas sont faibles dans les pays où le nombre de cas de paludisme est élevé.

34. La proportion de cas de paludisme recherchant un traitement dans des établissements de soins de santé du secteur public qui ont été confirmés par un test puis notifiés (le taux de dépistage des cas) est de moins de 20 % dans 39 des 99 pays où la transmission du paludisme se poursuit. Ces 30 pays représentent seulement 78 % ou 185 millions du total des cas de paludisme estimés dans le monde. Les obstacles au dépistage des cas varient d'une région OMS à l'autre : dans les Régions Afrique et Pacifique occidental, la faible proportion de patients fréquentant les établissements publics où sont administrés les tests diagnostic contre le paludisme représente l'obstacle principal, alors que dans la Région d'Asie du Sud-Est, la forte proportion de patients recherchant un traitement dans le secteur privé constitue un frein.
35. Pour les pays dans la phase de lutte contre le paludisme (par opposition à la phase d'élimination), les systèmes de surveillance n'ont pas besoin de dépister tous les cas afin d'atteindre leurs objectifs qui consistent principalement à évaluer les tendances dans le temps et à identifier des différences géographiques dans l'incidence palustre. Toutefois, dans 41 pays à travers le monde, représentant 85 % des cas estimés, il n'est pas possible d'établir une évaluation fiable des tendances palustres en raison du manque d'exhaustivité ou de l'incohérence des rapports au fil du temps. Ainsi, les systèmes de surveillance semblent les plus faibles là où la charge du paludisme est la plus lourde ; une action urgente est requise pour améliorer la surveillance du paludisme dans ce contexte.

Évolutions de l'incidence du paludisme et de la mortalité

Environ la moitié des pays où la transmission du paludisme est active sont en bonne voie pour atteindre la cible de l'Assemblée mondiale de la santé et du partenariat RBM : obtenir une réduction de 75 % des cas de paludisme d'ici 2015, par rapport aux niveaux de 2000. Alors que 50 pays sont en bonne voie pour atteindre la cible, les avancées dans plus d'un tiers des pays ne peuvent être évaluées en raison des limites des données transmises. Des progrès supplémentaires visant les cibles internationales dépendent des acquis importants obtenus dans les pays les plus touchés.

36. Sur 99 pays touchés par la transmission en 2011, 58 pays ont soumis des données suffisamment exhaustives et cohérentes sur les cas de paludisme entre 2000 et 2011 permettant une évaluation des tendances. Si l'on se fonde sur ces

données soumises, 50 pays, dont neuf pays de la Région Afrique, sont en bonne voie pour atteindre les cibles fixées par l'Assemblée mondiale de la santé et par le partenariat RBM afin de réduire l'incidence des cas de paludisme de 75 % d'ici 2015. Quatre pays supplémentaires prévoient d'atteindre des réductions allant de 50 % à 75 %. Le nombre de cas de paludisme a augmenté dans trois pays de la Région des Amériques.

37. Sur 104 pays d'endémie palustre en 2011, 79 pays ont été classés dans la phase de lutte contre la maladie, 10 sont dans la phase de pré-élimination, 10 sont dans la phase d'élimination alors que 5 sont classés dans la prévention de la phase d'introduction.

38. Quelque 219 millions de cas de paludisme (plage comprise entre 154 et 289 millions) et 660 000 décès associés (plage comprise entre 610 000 et 971 000) ont été recensés en 2010. Les données de 2010, initialement publiées dans le Rapport 2011 sur le paludisme dans le monde, ont été mises à jour après un processus de consultations nationales. Les estimations de 2010 sur le paludisme, disponibles au niveau de chaque pays, indiquent qu'environ 80 % des cas et 80 % des décès liés à cette maladie sont observés dans respectivement 17 et 14 pays seulement. À eux seuls, la République démocratique du Congo et le Nigéria représentent plus de 40 % des décès dus au paludisme dans le monde. Ces deux mêmes pays, ajoutés à l'Inde, enregistrent également 40 % des cas de paludisme.

39. Le paludisme est fortement associé à la pauvreté. Les estimations des taux de mortalité pour le paludisme sont plus élevées dans les pays où le revenu national brut par habitant est plus faible. Les pays où la pauvreté touche une proportion importante de la population (moins de US$ 1,25 par personne et par jour) ont des taux de mortalité plus élevés imputables au paludisme. Dans les pays, les taux de prévalence parasitaires les plus élevés sont observés chez les enfants des populations les plus pauvres et dans les zones rurales.

40. Les progrès visant à réduire l'incidence des cas de paludisme et les taux de mortalité ont été plus rapides dans les pays où ces chiffres étaient plus faibles. Toutefois, un nombre supérieur de cas de paludisme et de décès a été évité entre 2001 et 2010, selon les estimations, dans les pays où le fardeau du paludisme était le plus lourd en 2000. Si l'incidence du paludisme et les taux de mortalité estimés pour 200 étaient restés inchangés au cours de la décennie, 274 millions de cas supplémentaires et 1,1 million de décès en plus auraient été à déplorer entre 2001 et 2010. La majorité des cas évités (52 %) et des vies sauvées (58 %) est située dans les dix pays où la charge du paludisme estimée était la plus élevée en 2000. Par conséquent, de telles estimations indiquent que les programmes de lutte contre le paludisme ont eu l'impact le plus fort là où la charge était la plus élevée.

41. Les incertitudes inhérentes au choix d'une méthode de production des estimations de l'incidence de cas de paludisme et de la mortalité et des analyses reposant sur ces estimations sont nombreuses. La communauté antipaludique mondiale doit intensifier ses efforts afin d'aider les pays d'endémie palustre à améliorer les tests de diagnostic, la surveillance les notifications vitales, et les systèmes d'information sanitaire courants, pour fournir des informations précises sur la morbidité et la mortalité imputables au paludisme.

Prefacio

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Los últimos cinco años han sido testigos de un aumento impresionante en el financiamiento internacional para la prevención, control y eliminación de la malaria.

Después de la convocatoria del Secretario General de las Naciones Unidas, Ban Ki-moon en 2008 para el acceso universal a las intervenciones en malaria, vimos una rápida expansión en la distribución de artículos para salvar vidas en la región subsahariana de África, el continente con mayor carga de malaria. El esfuerzo conjunto de gobiernos de países endémicos, donantes y socios mundiales en el tema de la malaria ha llevado a fortalecer el control de la enfermedad y a resultados tangibles. Durante la década pasada se evitó un estimado de 1.1 millones de muertes por malaria, principalmente como resultado de un aumento en las intervenciones para esta enfermedad.

Sin embargo, el financiamiento disponible todavía se queda corto en comparación con los recursos que se necesitan para alcanzar los Objetivos de Desarrollo del Milenio relacionados con la salud y otras metas mundiales para malaria, acordadas internacionalmente. Se necesita un estimado de US$ 5.100 millones por año entre 2011 y 2020 para alcanzar el acceso universal a las intervenciones en malaria. Actualmente solo están disponibles US$ 2.300 millones, menos de la mitad de lo que se necesitaría. Existe una necesidad urgente de identificar nuevas fuentes de financiamiento para incrementar y hacer sostenibles los esfuerzos para el control de la malaria, y para proteger las inversiones que se realizaron durante la última década. También debemos explorar nuevas formas de hacer que los fondos existentes se extiendan aún más, aumentando la relación calidad-precio de los productos básicos para malaria y la eficiencia en la prestación de servicios.

El *Informe Mundial sobre el Paludismo 2012* reúne los últimos datos disponibles de los países endémicos para malaria y sus socios, y contiene valiosos análisis de avances y tendencias. Detrás de las estadísticas y gráficas se esconde una tragedia grande e innecesaria: la malaria, una enfermedad completamente prevenible y tratable, todavía arrebata la vida de un niño africano cada minuto. Las comunidades más vulnerables en el mundo siguen sin tener un adecuado acceso a mosquiteros insecticidas de larga duración, rociado residual intradomiciliario, pruebas para el diagnóstico, y terapias combinadas con artemisinina. Desafortunadamente, entre el 2010 y 2011 solo se observó un ligero aumento en el acceso a estas intervenciones, el primer estancamiento de este tipo en los últimos 5 años. Es imperativo que actuemos ahora para asegurar que no disminuya el impulso actual, y sus resultados.

Además, mientras nuestras actuales herramientas se mantienen muy efectivas en la mayoría de los entornos, se ha detectado resistencia a artemisininas, componentes clave de las terapias combinadas con artemisinina, en cuatro países del sudeste de Asia, mientras que se ha encontrado resistencia de los mosquitos a los insecticidas en 64 países alrededor del mundo. Si bien esta resistencia no ha provocado fallas operativas en los programas de control de la malaria, se requieren esfuerzos urgentes e intensos para prevenir un posible desastre de salud pública en el futuro.

Estamos a tres años de la fecha establecida como límite para alcanzar las Metas de Desarrollo del Milenio. Como lo demuestra el informe, 50 países están en proceso de reducir las tasas de incidencia de casos de malaria en un 75%, en concordancia con las metas de la Asamblea Mundial de la Salud (WHA, por sus siglas en inglés) y de la alianza para Hacer Retroceder el Paludismo (RBM, por sus siglas en inglés) para el 2015. Sin embargo, estos 50 países aportan solo el 3% (o 7 millones) del total de casos estimados de malaria en el mundo. Los objetivos internacionales para el control de la malaria no se alcanzarán a menos que se haga un avance considerable en los 14 países con mayor carga de la enfermedad, que son responsables de aproximadamente el 80% de las muertes por malaria.

El seguimiento de los avances es un gran reto en el control de la malaria. Los sistemas de vigilancia detectan solo un 10% del número estimado de casos a nivel mundial. Se necesitan urgentemente sistemas más sólidos de vigilancia para permitir una respuesta oportuna y efectiva a la malaria en las regiones endémicas, para prevenir brotes y re-emergencias, para dar seguimiento a los avances, y para que los gobiernos y la comunidad contra la malaria puedan informar adecuadamente respecto a la enfermedad. Actualmente no es posible hacer una evaluación confiable de las tendencias de la malaria en 41 países del mundo, debido a que su sistema de reporte de casos es incompleto o inconsistente.

En el Día Mundial del Paludismo de este año, viajé a Namibia para lanzar la iniciativa *T3: Test. Treat. Track.*, urgiendo a los países y a sus socios a aumentar el diagnóstico, el tratamiento de calidad garantizada y la vigilancia de malaria. La OMS también ha puesto a disponibilidad nuevos manuales de vigilancia para el control y eliminación de la malaria a nivel mundial y publicó el *Plan Mundial para el Manejo de la Resistencia a Insecticidas en los Vectores de Malaria*. Estos documentos prácticos ayudarán a los países a actualizar y reorientar sus estrategias nacionales de malaria para alcanzar mejores resultados con los recursos limitados que tienen disponibles. Además, el recién constituido Comité para el Asesoramiento de Políticas de Malaria de la OMS recomendó la Quimioprevención de la Malaria Estacional para el control de la malaria en el África Sub-Sahel. Esta intervención simple y económica tiene el potencial de prevenir más del 75% de casos de malaria no-complicada y severa en niños menores de cinco años.

Ganarle la batalla a la malaria requerirá de un compromiso político de alto nivel, el fortalecimiento de la cooperación regional, y el compromiso de varios sectores, además del sector salud, incluyendo el financiero, educativo, de defensa, ambiente, minería, industria y turismo. La lucha contra esta enfermedad debe integrarse a la agenda general de desarrollo de todos los países endémicos. No podemos seguir avanzando a menos que trabajemos incansablemente para fortalecer los sistemas de salud y asegurar que el financiamiento sostenible y previsible esté a la disposición. Este informe muestra qué tan lejos hemos llegado en la lucha contra la malaria; debemos actuar con urgencia y determinación para evitar que este progreso tan grande se escape fuera de nuestro alcance.

Resumen y Puntos Clave

El *Informe Mundial sobre el Paludismo 2012* resume la información recibida de 104 países endémicos para malaria y otras fuentes, y actualiza los análisis presentados en el informe del 2011. Resalta el progreso que se ha alcanzado hacia los objetivos mundiales para el control de la malaria establecidos para el 2015, y describe los retos actuales para el control y eliminación de la malaria a nivel mundial.

La década pasada fue testigo de una expansión muy grande en el financiamiento e implementación de programas de control de la malaria. Los desembolsos internacionales para el control de la malaria aumentaron considerablemente de menos de US$ 100 millones en 2000 a US$ 1.710 millones en 2010 y se estima que serán de 1.660 millones en 2011 y US$ 1.840 millones en 2012. Los análisis indican que a medida que el financiamiento aumenta, los desembolsos internacionales hacia la Región Africana han ido aumentando, hacia países con los valores más bajos de ingreso nacional bruto (INB) per cápita, y países con las tasas más altas de mortalidad por malaria. Los fondos de los gobiernos nacionales para los programas de control de la malaria también aumentaron a lo largo del período 2005-2011 y se estimaron en US$ 625 millones en 2011.

Si bien todavía estamos por debajo de los US$ 5.100 millones requeridos para alcanzar la cobertura universal de las intervenciones de malaria, el financiamiento proporcionado para el control de la enfermedad ha permitido que los países endémicos aumenten considerablemente el acceso a intervenciones para prevenir la malaria, así como a los servicios de diagnóstico y tratamiento. Se estima que el porcentaje de viviendas que poseen al menos un mosquitero tratado con insecticida (MTI) en la región de África subsahariana ha aumentado de 3% en 2000 a 53% en 2011, y se mantuvo en 53% en 2012. Las encuestas domiciliares indican que aproximadamente el 90% de personas que tienen acceso a un MTI dentro de la vivienda, realmente lo utilizan. En la Región Africana, el porcentaje de personas protegidas mediante el rociado residual intradomiciliario (RRI) aumentó de menos del 5% en 2005 a 11% en 2010 y permaneció a ese nivel en 2011. En cuanto a las pruebas para el diagnóstico y tratamiento, el número de pruebas que se adquieren para el diagnóstico rápido (PDR) y para terapias combinadas con artemisinina (TCA) está aumentando, y el porcentaje de casos sospechosos a los que se les realiza una prueba parasitológica también ha aumentado a nivel mundial, de 68% en 2005 a 77% en 2011, con el mayor aumento en la región de África subsahariana. Sin embargo, el incremento en el número de pruebas de diagnóstico fue solamente de 1% entre el 2010 y el 2011.

Pareciera ser que el rápido incremento mostrado por estas medidas de desempeño del programa hasta el 2010 han tendido a estabilizarse recientemente, al igual que el financiamiento, y que millones de personas continúan sin acceso a terapias preventivas, pruebas para el diagnóstico y tratamiento de calidad garantizada. Se necesita mucho más trabajo antes que se alcance la meta del acceso universal a las intervenciones preventivas de malaria, pruebas para el diagnóstico y tratamiento adecuado. Una complicación adicional es que se ha detectado resistencia a las artemisininas, componentes clave de las terapias combinadas con artemisinina, en 4 países de la región sudeste de Asia, mientras que la resistencia de los mosquitos a los insecticidas se ha encontrado en 64 países alrededor del mundo.

De los 99 países con transmisión activa de malaria en 2011, 58 enviaron datos suficientemente completos y consistentes de los casos de malaria entre el 2000 y el 2011 para poder hacer una evaluación de las tendencias. En base a estos datos reportados, 50 países, incluyendo 9 países de la Región Africana, están en vías de alcanzar las metas del WHA y RBM: reducir la incidencia de casos de malaria en un 75% para el 2015. Sin embargo, los 58 países que enviaron datos suficientemente completos y consistentes aportan solo el 15% de los casos estimados a nivel mundial; los sistemas de vigilancia son débiles donde la carga de malaria es alta. Existe una necesidad crítica de fortalecer la vigilancia para malaria en los restantes 41 países que aportan el 85% de los casos estimados, de forma que los programas puedan identificar y dirigir recursos hacia la población más necesitada, responder a brotes de la enfermedad y evaluar el impacto de las medidas de control.

Debido a que es menos probable que los países con mayor número de casos envíen datos suficientemente consistentes, es necesario sacar conclusiones respecto a las tendencias, usando estimados del número de casos. Las estimaciones de casos y muertes por malaria conllevan un alto grado de incertidumbre, pero sugieren que la incidencia de casos y muertes por malaria han disminuido más rápido en países que inicialmente tenían menor número de casos y muertes. Sin embargo, se estima que se ha evitado un mayor número de casos y muertes entre el 2001 y el 2010 en países que tenían las mayores cargas de malaria en 2000. Si las tasas de incidencia y mortalidad para malaria en el 2000 hubieran permanecido sin cambio durante una década, se habría producido 274 millones más de casos y 1.1 millones de muertes entre el 2001 y el 2010. La mayoría de casos que se evitaron (52%) y vidas que se salvaron (58%) son en 10 países que tenían la carga más alta de malaria en el 2000. Por esto, los programas de malaria han tenido su mayor impacto donde la carga de la enfermedad es mayor.

Pareciera que el enorme avance alcanzado se ha desacelerado recientemente. El financiamiento internacional para el control de la malaria se ha estancado, y se proyecta que permanecerá por debajo de los US$ 5.100 millones requeridos para alcanzar la cobertura universal con las intervenciones en malaria. El número de MTI adquiridos en 2012 (66 millones) es mucho menor al adquirido en 2011 (92 millones) y en 2010 (145 millones). Se estima que el promedio de vida útil de los MTI es de 2 a 3 años, por lo que se espera que la cobertura con MTI disminuya si los mismos no se reemplazan en 2013. Existe una necesidad urgente de identificar nuevas fuentes de financiamiento para mantener y expandir los niveles de cobertura de las interven-

ciones, de forma que puedan evitarse brotes de la enfermedad y que se alcancen las metas internacionales para reducir los casos y muertes por malaria.

Desarrollo de políticas; actualización de políticas, manuales y planes; y metas mundiales para el control y la eliminación de la malaria.

En 2011, la OMS completó un importante proceso de re-diseño en la definición de sus políticas, el cual dio como resultado la creación del Comité para el Asesoramiento de Políticas de Malaria (MPAC, por sus siglas en inglés), el cual sostuvo su reunión inaugural y segunda reunión durante el 2012. Durante este año también se promulgaron revisiones o nuevas políticas para el control de la malaria, manuales operacionales, planes e iniciativas. Se han desarrollado un amplio conjunto de indicadores para dar seguimiento a los avances hacia las metas para malaria, acordadas internacionalmente.

1. El MPAC inició su funcionamiento en 2012 con el mandato de proporcionar recomendaciones estratégicas y aportes técnicos a la OMS en todos los aspectos relacionados con el control y eliminación de la malaria. De acuerdo con las recomendaciones del MPAC, la OMS difundió una nueva política sobre la Quimioprevención de la Malaria Estacional (SMC, por sus siglas en inglés) y actualizó las políticas para el Tratamiento Preventivo Intermitente de la malaria en el embarazo (IPTp, por sus siglas en inglés) y para la dosis única de primaquina como gametocida para el tratamiento de la malaria por *Plasmodium falciparum* en determinados entornos.
2. Se difundieron declaraciones sobre la postura en relación al uso de larvicidas en la región de África subsahariana y sobre la efectividad de formas no farmacéuticas de la Artemisia annua. En abril del 2012 se publicaron manuales de vigilancia como parte de la iniciativa "T3: Test. Treat. Track", urgiendo a los países endémicos y socios interesados a incrementar las pruebas para el diagnóstico, tratamiento y vigilancia para malaria. En mayo de 2012 se lanzó el *Plan Mundial para el Manejo de la Resistencia a Insecticidas en los Vectores de Malaria*, que facilitó un plan a escala mundial para el manejo de la resistencia a insecticidas.

Financiando el control de la malaria

El total del financiamiento nacional e internacional comprometido para el control de la malaria en 2011 se estimó en US$ 2.300 millones, sustancialmente menor a la cantidad que se necesitará para alcanzar las metas a nivel mundial.

3. Los desembolsos internacionales hacia los países endémicos para malaria aumentaron todos los años desde menos de US$ 100 millones en 2000 a US$ 1.710 millones en 2010 y se estimaron en US$ 1.660 millones en 2011 y US$ 1.840 millones en 2012. El estancamiento de los fondos disponibles para el control de la malaria se debe principalmente a la disminución de los desembolsos del Fondo Mundial. En 2011 el Fondo Mundial también anunció la cancelación de la Ronda 11 de financiamiento.
4. Los datos reportados sugieren que el financiamiento nacional para malaria ha aumentado en todas las regiones de la OMS durante el periodo 2005-2011, a excepción de la Región Europea. La Región de las Américas y la Región Africana reportaron el mayor gasto en el control de la malaria. El total gastado a nivel nacional en 2011 se estimó en US$ 625 millones.
5. En el Plan de Acción Mundial contra la Malaria (GMAP, por sus siglas en inglés) del 2008 se estimó que los requerimientos de recursos para el control de la malaria a nivel mundial superarían los US$ 5.100 millones por año entre el 2011 y 2020. Solo en África, los requerimientos de recursos estimados por el GMAP fueron en promedio de US$ 2.300 millones por año, durante el mismo periodo. Combinando los fondos nacionales e internacionales, los recursos disponibles para el control mundial de la malaria en 2011 se estimaron en US$ 2.300 millones, dejando un faltante de US$ 2.800 millones. Las proyecciones de recursos tanto nacionales como internacionales disponibles entre el 2013 y 2015 indican que el total de financiamiento destinado al control de la malaria permanecerá en menos de US$ 2.700 millones, sustancialmente por debajo de la cantidad requerida para alcanzar el acceso universal a las intervenciones en malaria.
6. Los patrones históricos indican que el financiamiento internacional para el control de la malaria se ha enfocado a países con el menor INB per cápita y mayores tasas de mortalidad, particularmente a países de África. En las Regiones Europea y de las Américas, el financiamiento nacional para malaria por cada persona en riesgo es el más alto, y en la Región del sudeste de Asia el más bajo. Los países en el quintil más alto del INB per cápita invierten mucho más dinero per cápita en el control de la malaria que los países de los otros quintiles. Estos países más ricos tienen menos carga de malaria, aportando solo el 1% de los casos estimados en 2010 y 0.3% de las muertes. Los gastos tan altos están relacionados en parte al movimiento hacia la eliminación de la malaria en algunos países. Los países con mayores poblaciones en riesgo de malaria –y las más altas tasas de mortalidad por malaria- tienen menores niveles de financiamiento nacional per cápita que los países con menores cargas por malaria.

Progreso en el control vectorial

Durante la década pasada, la cobertura con intervenciones de control vectorial aumentó sustancialmente en la región de África subsahariana, con la adquisición de al menos un MTI por vivienda, alcanzando un estimado de 53% para el 2011 y manteniéndose en 53% en el 2012. Sin embargo, los logros alcanzados recientemente en el control vectorial de la malaria pueden verse amenazados por una disminución en la entrega de MTI y por el reciente aumento de la resistencia de los mosquitos a los insecticidas.

7. Para el 2011, 32 países en la Región Africana y 78 en otros países alrededor del mundo han adoptado la recomendación de la OMS de proporcionar MTI a todas las personas que están en riesgo de contraer malaria. Un total de 89 países, incluyendo 39 países de África, distribuyen MTI de forma gratuita.

8. Cada año se necesitan aproximadamente 150 millones de MTI para proteger a todas las poblaciones en riesgo de malaria en la región de África subsahariana. Entre el 2004 y 2010, el número de MTI repartido anualmente por los fabricantes en los países endémicos para malaria en el África subsahariana aumentó de 6 a 145 millones. Sin embargo, en 2011 solo se repartieron 92 millones de MTI, mientras que se espera que en 2012 se distribuyan 66 millones. Las cantidades distribuidas en 2011 y 2012 están por debajo de las cifras de MTI que se requieren para proteger a todas las poblaciones en riesgo y no van lograr reemplazar los MTI que se distribuyeron 3 años antes, lo cual indica que la cobertura con MTI va a disminuir, a menos que se aumente de forma masiva la distribución en 2013.
9. Se estima que el porcentaje de viviendas que poseen al menos un MTI en la región de África subsahariana aumentó de 3% en 2000 a 53% en 2011, y se mantuvo en 53% en 2012. La proporción de la población que duerme bajo un MTI, que representa a la población protegida de forma directa, también aumentó de 2% en 2000 al 33% en 2011, y se mantuvo en 33% en 2012.
10. El análisis de los datos de las encuestas domiciliares indica que un gran porcentaje (aproximadamente 90%) de la población que posee un MTI dentro de la vivienda realmente lo utiliza, lo que sugiere que los esfuerzos que se han realizado para promover el uso de los MTI han tenido éxito, y que la principal preocupación para aumentar el número de personas en riesgo que duermen bajo un MTI es la limitación en cuanto a la disponibilidad de mosquiteros. Sin embargo, la población que utiliza los mosquiteros disponibles incluye viviendas en las que los mosquiteros están siendo utilizados más allá de la su capacidad de 2 personas por mosquitero, así como aquellas en las que los mosquiteros no se están utilizando en toda su capacidad, lo que indica que es necesario trabajar más para asegurar que los mosquiteros disponibles se utilizan al máximo.
11. La proporción de población que duerme bajo un MTI es alta en áreas urbanas, más ricas, y más baja entre niños mayores. Las desigualdades en el acceso a MTI deben disminuirse a medida que los programas avanzan hacia la cobertura universal.

Rociado residual intradomiciliario

12. El RRI sigue siendo una herramienta poderosa para el control vectorial para reducir e interrumpir la transmisión de la malaria. En 2011, 80 países, incluyendo 38 en la Región Africana, recomendaron el RRI para el control de la malaria.
13. En 2011, se protegió a 153 personas alrededor del mundo mediante el RRI, o el 5% de la población mundial en riesgo. En la Región Africana, la proporción de población en riesgo que se protegió aumentó de menos del 5% en 2005 al 11% en 2010 y permaneció a ese nivel en 2011 con 77 millones de personas beneficiándose de la intervención.

Resistencia a los insecticidas

14. En 64 países se ha identificado resistencia de los mosquitos a por lo menos uno de los insecticidas utilizados para el control de la malaria. En mayo del 2012, la OMS y la iniciativa RBM lanzaron el *Plan Mundial para el Manejo de la Resistencia a Insecticidas en los Vectores de Malaria*, una estrategia de cinco pilares para el manejo de la amenaza de la resistencia a los insecticidas.
15. El monitoreo de la resistencia a los insecticidas es un elemento necesario en la implementación de las intervenciones para el control vectorial basadas en el uso de insecticidas. En 2011, 77 países reportaron la adopción de la política para el monitoreo de la resistencia a insecticidas.

Progreso en quimioprevención

En 2011, entre los 25 países que reportan esta información a la OMS, el porcentaje de mujeres embarazadas que asistieron a las clínicas de cuidado prenatal que recibieron 2 dosis de Tratamiento Preventivo Intermitente durante el embarazo, variaron entre el 30% y 57%. Se espera la adopción e implementación de las últimas recomendaciones de la OMS en cuanto al Tratamiento Preventivo Intermitente para niños y la Quimioterapia para la Malaria Estacional para niños por parte de los países endémicos.

16. El tratamiento preventivo intermitente (IPT, por sus siglas en inglés) se recomienda para grupos de poblaciones en áreas de alta transmisión, que son especialmente vulnerables a infecciones por *Plasmodium* y a las consecuencias de las mismas, especialmente mujeres embarazadas y niños. En el África subsahariana se calcula que alrededor de 32 millones de mujeres embarazadas y gran parte de los 28 millones de niños que nacen cada año se beneficiarían con el IPT. Además, se podría proteger a cerca de 25 millones de niños en el África Sub-Sahel, mediante la Quimioprevención de la Malaria Estacional (SMC, por sus siglas en inglés).
17. Para finales de 2011, un total de 36 de los 45 países del África subsahariana habían adoptado como política nacional el IPT para mujeres embarazadas (IPTp). Esta política fue adoptada en 2009 por Papúa Nueva Guinea (Región Este del Pacífico).
18. Entre los 25 de los 36 países de la Región Africana que han adoptado el IPTp como una política nacional – y para los que hay datos disponibles- 44% (rango entre 30 y 57%) de mujeres embarazadas que asisten a la clínica prenatal recibieron 2 dosis de IPTp en 2011, en concordancia con las recomendaciones de la OMS de esa época. Desde octubre de 2012, la OMS recomienda el IPTp en cada visita prenatal después de primer trimestre.
19. En 16 países de la Región Africana, para los que existen datos de encuestas domiciliares entre el 2009-2011, el promedio ponderado de mujeres embarazadas que recibieron 2 dosis de IPTp durante el embarazo fue bajo; a un 22% (rango entre 5%-69%); principalmente debido a la baja cobertura en Nigeria y la República Democrática del Congo.
20. Todos los niños en riesgo de infección por *P. falciparum* en los países de África subsahariana con transmisión moderada a alta de malaria y con niveles bajos de resistencia de los parásitos al tratamiento recomendado, sulfadoxina-pirimetamina, deben recibir tratamiento preventivo para la malaria a través de los servicios de inmunización a determinados intervalos que correspondan con sus esquemas rutinarios

de vacunación. Solo un país, Burkina Faso, ha adoptado la política de IPT para niños (IPTi) desde que se difundió la recomendación por parte de la OMS en 2009.

21. En marzo de 2012, la OMS difundió una recomendación sobre la quimioprevención de la malaria estacional para niños en edades entre 3 y 59 meses. Ningún país endémico para malaria ha adoptado todavía la SMC, pero varios países involucrados en la evaluación de la política han indicado que tienen planeado expandir la cobertura de la SMC más allá de las poblaciones de estudio. La difusión de la guía de implementación *Quimioprevención de la Malaria Estacional con Sulfadoxina-pirimetamina y Amodaquina en Niños: una Guía de Campo* en diciembre de 2012 por parte de la OMS, facilitará la expansión de esta intervención tan importante.

Progreso en las pruebas de diagnóstico y tratamiento de la malaria

La cantidad de pruebas de diagnóstico rápido (PDR) y terapias combinadas con artemisinina (TCA) que se han adquirido están aumentando, y la proporción de pruebas para el diagnóstico en el sector público en la Región Africana ha aumentado de 20% en 2005 a 47% en 2011. Sin embargo muchos casos de fiebre son todavía tratados presuntivamente con antimaláricos, sin un diagnóstico parasitológico, y no todos los casos confirmados de malaria reciben tratamiento con antimaláricos de calidad garantizada.

Pruebas de diagnóstico

22. La implementación de la realización universal de pruebas de diagnóstico en los sectores público y privado reduciría sustancialmente los requerimientos mundiales de tratamiento antimalárico. En 2011, 41 de 44 países con transmisión activa de malaria en la Región Africana y 46 de 55 países en otras regiones de la OMS reportaron haber adoptado la política de proporcionar diagnóstico parasitológico a todos los grupos de edades. Esto representa un aumento de 4 países en la Región Africana desde el 2010.
23. La realización de pruebas de diagnóstico para malaria se ofrece de forma gratuita en el sector público de 84 países alrededor del mundo. En la Región Africana, la proporción de casos sospechosos de malaria a los que se les realiza una prueba de diagnóstico en el sector público aumentó de 20% en 2005 a 47% en 2011, y de 68% a 77% a nivel mundial. Gran parte del aumento en la realización de pruebas de diagnóstico en la Región Africana se debe a un aumento en el uso de PDR, responsables del diagnóstico de 40% de todos los casos en la región en 2011.
24. El número de pacientes evaluados mediante examen microscópico aumentó a un pico de 171 millones en 2011, de los cuales la India contabilizó más de 108 millones de pruebas en lámina. La cantidad de PDR suministradas por los fabricantes aumentó de 88 millones en 2010 a 155 millones en 2011. Esto incluye las ventas de pruebas específicas para *P. falciparum* y laspruebas combinadas que pueden detectar más de una especie del parasito.
25. Un total de 49 países reportaron una expansión de PDR a nivel comunitario y según los reportes, 12 millones de pacientes fueron diagnosticados a través de estos programas en 2011. Los datos de un número limitado de países sugieren que la realización de pruebas de diagnóstico está menos disponible en el sector privado que en el público.

Tratamiento

26. Las TCA son recomendadas como primera línea de tratamiento para la malaria por *P. falciparum*, el parasito más peligroso entre todas las especies de *Plasmodium* que infectan al ser humano. Para el 2011, 79 países y territorios habían adoptado las TCA como primera línea de tratamiento para la malaria por *P. falciparum*. La malaria por *P. vivax* debe ser tratada con cloroquina, cuando esta sea efectiva, o con una TCA apropiada en áreas donde *P. vivax* es resistente a la cloroquina. El tratamiento de *P. vivax* debe combinarse con un régimen de 14 días de primaquina para prevenir las recaídas.
27. Según reportes de los fabricantes y de la iniciativa Medicamentos Accesibles contra la malaria (AMFm, por sus siglas en inglés), el número de regímenes de TCA que se distribuyeron a los sectores público y privado a nivel mundial aumentaron de 11 millones en 2005 a 76 millones en 2006, y alcanzaron los 278 millones en 2011. El aumento en el suministro de TCA en 2011 ocurrió en gran parte como resultado de la iniciativa AMFm, administrada por el Fondo Mundial. A pesar que la AMFm es responsable de gran parte de las ventas en el sector público, el número total de TCA adquiridos por este sector mostró un descenso de un año a otro entre el 2010 y 2011.
28. Ha sido difícil poder determinar hasta qué punto los pacientes con malaria confirmada recibieron medicamentos antimaláricos debido a que la información que relaciona la realización de pruebas de diagnóstico y el tratamiento se ha limitado a encuestas domiciliarias y a los sistemas rutinarios de información en salud. Se puede estimar qué proporción de pacientes del sector público pudieron haber sido tratados con TCA (y no con otro antimalárico menos efectivo) comparando el número de TCA distribuidos por los programas nacionales contra el número hipotético (tratado sin realizarle la prueba) y confirmado (por microscopía o PDR) de casos reportados de malaria por *P. falciparum* (o casos estimados si no se cuenta con un reporte de datos). Esta proporción varía con la Región de la OMS en cuestión, alcanzando el 59% en la Región Africana en 2011.
29. En 12 países de la Región Africana que realizaron encuestas domiciliarias durante el 2010-2011, la proporción de niños febriles a los que se les proporcionó tratamiento antimalárico y que recibieron TCA fue mayor entre niños tratados en el sector público y en el sector privado formal, que en el sector privado informal o en la comunidad. En algunos países, la proporción de todos los niños febriles a quienes se les suministraron antimaláricos y que recibieron TCA permaneció baja, lo que implica que una proporción de pacientes con malaria no recibe el tratamiento adecuado.
30. En la Región Africana durante el 2011, el número total de pruebas (tanto por microscopía como PDR) fue menos de la mitad del número de TCA distribuidos por los programas nacionales de control de la malaria, lo que indica que las TCA

se prescriben a muchos pacientes sin realizarles el diagnóstico confirmatorio.

Resistencia a los medicamentos antimaláricos

31. La OMS recomienda que las monoterapias orales a base de artemisinina deben ir retirándose del mercado progresivamente e irlas reemplazando con TAC, una política recomendada por la Asamblea Mundial de la Salud en 2007. El número de países que todavía permiten la comercialización de estos productos ha disminuido de 55 países en 2008 a 15 para noviembre de 2012, de los cuales 8 son de la Región Africana. El número de empresas farmacéuticas que comercializan estos productos ha disminuido de 38 en 2010 a 28 en 2011. La mayoría de los países que permiten la comercialización de estos medicamentos están en la Región Africana, mientras que la mayoría de los fabricantes están en la India.
32. Los estudios de eficacia terapéutica siguen siendo el estándar de oro para guiar las políticas de tratamiento, y deben realizarse cada dos años. En 2010 y 2011, se completaron estudios sobre tratamientos antimaláricos de primera y segunda línea en 47 de 71 países en los que fue posible realizar estudios de eficacia en *P. falciparum*, un aumento de 31 países entre el 2008-2009. (En 28 países con transmisión activa de malaria, es impráctico realizar estudios de eficacia debido a la baja incidencia de malaria o porque son endémicos únicamente para *P. vivax*). Durante el 2012 se planearon estudios de este tipo en 49 países, incluyendo 29 países de África.
33. La resistencia de los parásitos a las artemisininas se ha detectadlo ya en 4 países de la subregión del Gran Mekong: Camboya, Myanmar, Tailandia y Vietnam. A pesar de los cambios en la susceptibilidad de los parásitos a las artemisininas, las TCA continúan curando pacientes dado que el medicamento con el que se combinan todavía es eficaz. En la provincia de Pailin, Camboya, se ha encontrado resistencia a los dos componentes de TAC múltiples, por lo que se han tomado medidas especiales para implementar un tratamiento de observación directa utilizando combinaciones de medicamentos que no sean a base de artemisinina (atovacuona-proguanil).

Vigilancia de la Malaria

Los sistemas actuales de vigilancia de la malaria detectan solo el 10% de los casos estimados anualmente. Las tasas de detección de casos son menores en países con mayor cantidad de casos de malaria.

34. La proporción de casos de malaria que buscan tratamiento en servicios de salud del sector público, que son evaluados y reportados (la "tasa de detección de casos") es menor al 20% en 30 de los 99 países con transmisión activa de malaria. Estos 30 países aportan 185 millones de casos de malaria o el 78% del total estimado a nivel mundial. Los obstáculos a la detección de casos varían de una región de la OMS a otra: en las regiones Africana y del Pacífico Oeste, la principal preocupación es la poca proporción de pacientes que asisten a los servicios públicos a quienes se les realiza una prueba de diagnóstico para malaria, mientras que en la Región de Sudeste de Asia, el aspecto más importante es la alta proporción de pacientes que buscan tratamiento en el sector privado.
35. Para los países que se encuentran en etapa de control de la malaria (en contraposición con eliminación), no es necesario que los sistemas de vigilancia detecten todos los casos para alcanzar sus objetivos, que son principalmente evaluar las tendencias en el tiempo e identificar diferencias geográficas en la incidencia de la malaria. Sin embargo, en 41 países alrededor del mundo, que aportan el 85% de casos estimados, no es posible una evaluación confiable de las tendencias de la malaria debido a lo incompleto e inconsistente del sistema de reporte a lo largo del tiempo. De esta forma, los sistemas de salud aparentan ser más débiles donde la carga de malaria es grande, por lo que se necesita actuar urgentemente para mejorar la vigilancia en entornos de este tipo.

Cambios en la incidencia y mortalidad por malaria

Aproximadamente la mitad de los países con transmisión activa de malaria están en vías de alcanzar las metas de la Asamblea Mundial de la Salud y de la alianza RBM: lograr una reducción del 75% de los casos de malaria para el 2015, en comparación con los niveles del 2000. Mientras que 50 países están en vías de alcanzar la meta, en más de un tercio de los países no se puede evaluar el progreso, debido a limitaciones en el reporte de datos. Los progresos que se hagan en el futuro hacia las metas internacionales para malaria dependen del logro de avances sustanciales en países con las cargas más grandes de la enfermedad.

36. De 99 países con transmisión activa de malaria, 58 enviaron datos suficientemente completos y consistentes respecto a los casos de malaria entre el 2000 y 2011, lo que permite realizar una evaluación de las tendencias. En base a estos datos reportados, 50 países, incluyendo 9 países de la Región Africana, están en vías de alcanzar las metas de la WHA y de la iniciativa RBM de reducir la incidencia de la malaria en un 75% para el 2015. Se espera que otros 4 países más alcancen reducciones de entre 50% y 75%. La incidencia de casos de malaria aumentó en 3 países de la Región de las Américas.
37. De 104 países endémicos para malaria en 2011, 79 países se clasifican en fase de control, 10 en fase de pre-eliminación, 10 en fase de eliminación, y 5 están clasificados en fase de prevención de la introducción.
38. Se estima que en 2010 ocurrieron 219 millones de casos de malaria (rango 154–289 million) y 660 000 muertes (rango 610 000–971 000). Estas estimaciones fueron publicadaspor primera vez en el Informe Mundial sobre el Paludismo 2011y posteriormente han sido actualizadas a través de un proceso de consulta con los países. Los estimados disponibles a nivel de país para el 2010 muestran que más del 80% de las muertes estimadas por malaria ocurren en sólo 14 países y que aproximadamente el 80% de los casos ocurren en 17 países. Juntos, la República Democrática del Congo y Nigeria aportan más del 40% de las muertes estimadas por malaria a nivel mundial. La República Democrática del Congo, India y Nigeria aportan el 40% de los casos estimados de malaria.

39. La malaria está fuertemente ligada a la pobreza. Las tasas estimadas de mortalidad por malaria son más altas en países con el menor INB per cápita. Los países con las proporciones más altas de población viviendo en la pobreza (menos de US$ 1.25 por persona por día) tienen tasas de mortalidad por malaria más altas. Entre países, la prevalencia de parásitos en niños es mayor en poblaciones más pobres y en áreas rurales.

40. Los avances para reducir la incidencia de casos de malaria y las tasas de mortalidad han sido más rápidos en países con menor cantidad de casos y muertes. Sin embargo, se estima que se ha evitado un mayor número casos y muertes entre el 2001 y 2010 en países que tuvieron las cargas más altas de malaria en 2000. Si la incidencia de la malaria y las tasas estimadas de mortalidad para el 2000 hubieran permanecido sin cambio a lo largo de esa década, hubieran ocurrido 274 millones más de casos y 1.1 millones más de muertes entre 2001 y 2010. La mayoría de los casos prevenidos (52%) y vidas salvadas (58%) fueron en los 10 países que tuvieron las cargas estimadas de malaria más altas en 2000. Las estimaciones como estas indican que los programas de malaria están teniendo mayor impacto en sitios donde la carga por la enfermedad es más alta.

41. Hay muchas incertidumbres asociadas a cualquier método que se utilice para producir estimados de incidencia de casos de malaria y mortalidad, y en los análisis basados en estos estimados. La comunidad mundial para malaria necesita aumentar los esfuerzos para apoyar a los países endémicos para malaria en el mejoramiento de la realización de pruebas de diagnóstico, vigilancia, registro de información vital y sistemas rutinarios de información en salud, de forma que pueda obtenerse información exacta sobre la morbilidad y mortalidad por malaria.

Prefácio

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Nos últimos cinco anos, temos assistido a um impressionante aumento do financiamento internacional para a prevenção, controlo e eliminação do paludismo.

Na sequência do apelo feito, em 2008, pelo Secretário Geral das Nações Unidas, Ban Ki-moon, para tornar possível o acesso universal às intervenções contra o paludismo, temos assistido a uma rápida expansão da distribuição de produtos destinados a salvar vidas na África Subsariana, o continente com o fardo mais pesado de paludismo. O esforço concertado dos governos dos países endémicos, doadores e parceiros mundiais da luta contra o paludismo tem conduzido a um controlo mais reforçado da doença, produzindo resultados visíveis no terreno. Durante a última década, evitaram-se cerca de 1,1 milhões de mortes por paludismo, sobretudo como resultado de um aumento das intervenções contra a doença.

Contudo, o financiamento disponível ainda fica aquém dos recursos necessários para se atingirem os Objectivos de Desenvolvimento do Milénio relacionados com a saúde e outras metas internacionalmente acordadas da luta mundial contra o paludismo. Estima-se que sejam necessários 5,1 mil milhões de dólares, todos os anos, entre 2011 e 2020, para se conseguir o acesso universal às intervenções de combate ao paludismo. Presentemente, apenas estão disponíveis 2,3 mil milhões, menos de metade do que é necessário. É preciso identificar urgentemente novas fontes de financiamento, se quisermos reforçar e manter os esforços de luta contra o paludismo e proteger os investimentos feitos na última década. Teremos igualmente de estudar novas formas de fazer render os fundos existentes, melhorando o custo-benefício dos produtos para o paludismo e a eficiência da prestação de serviços.

O *Relatório sobre o Paludismo no Mundo de 2012* reúne os últimos dados disponíveis, fornecidos pelos países com paludismo endémico e pelos parceiros, e contém estudos valiosos sobre os progressos alcançados e as tendências observadas. Por detrás das estatísticas e dos gráficos esconde-se uma enorme e desnecessária tragédia: o paludismo – uma doença completamente evitável e tratável – ainda ceifa a vida de uma criança africana por minuto. As comunidades mais vulneráveis do mundo continuam a não dispor de acesso suficiente a redes insecticidas de longa duração, à pulverização residual interna, aos testes de diagnóstico e às associações medicamentosas à base de artemisinina. Infelizmente, apenas se observaram modestos aumentos no acesso a essas intervenções, entre 2010 e 2011 – o primeiro patamar desse género nos últimos cinco anos. É imperioso agirmos agora para assegurar que essa recente dinâmica e os seus resultados não enfraqueçam.

Por outro lado, embora os nossos actuais instrumentos continuem a ser notavelmente eficazes na maioria dos cenários, já se detectou resistência às artemisininas – os principais componentes das associações medicamentosas à base de artemisinina – em quatro países do Sueste Asiático, enquanto a resistência do mosquito aos insecticidas também já foi observada em 64 países de todo o mundo. Embora essa resistência, ainda não tenha provocado dificuldades operacionais nos programas de luta contra o paludismo, são necessários esforços urgentes e intensificados, para prevenir um futuro desastre de saúde pública.

Encontramo-nos agora a três anos de distância da data estabelecida como meta para se atingirem os Objectivos de Desenvolvimento do Milénio. Como o relatório revela, há 50 países que se encontram no bom caminho para reduzir as suas taxas de incidência de casos de paludismo em 75%, em conformidade com as metas para 2015 da Assembleia Mundial da Saúde e da iniciativa Fazer Recuar o Paludismo. No entanto, esses 50 países representam apenas 3% (ou 7 milhões) do total estimado de casos de paludismo em todo o mundo. As metas internacionais do paludismo não serão atingidas, se não se fizerem progressos consideráveis nos 14 países com maior incidência, que representam, aproximadamente, 80% dos óbitos por paludismo.

Acompanhar os progressos constitui um grande desafio no combate ao paludismo. Os sistemas de vigilância do paludismo detectam apenas cerca de 10% do número mundial estimado de casos. São urgentemente necessários sistemas de vigilância mais fortes, que permitam uma resposta atempada e eficaz ao paludismo nas regiões endémicas e previnam surtos e recidivas, que acompanhem os progressos e responsabilizem os governos e a comunidade mundial contra o paludismo. Em 41 países, em todo o mundo, não é possível, actualmente, fazer uma avaliação fidedigna das tendências do paludismo, pelo facto de a notificação ser incompleta e inconsistente.

Este ano, no Dia Mundial da Luta contra o Paludismo, fui à Namíbia lançar a iniciativa *T3: Test. Treat. Track*. (Testar, Tratar, Acompanhar), que exorta os países e os parceiros a reforçarem os testes de diagnóstico, os tratamentos de qualidade e a vigilância do paludismo. A OMS também disponibilizou novos manuais de vigilância, a nível mundial, para o controlo e eliminação do paludismo e publicou o Plano Mundial para a Gestão da Resistência aos Insecticidas dos vectores do paludismo. Estes documentos práticos ajudarão os países a actualizar e reorientar as suas estratégias nacionais de combate ao paludismo, para que seja possível alcançar melhores resultados, com os limitados recursos disponíveis. Por outro lado, a recentemente constituída Comissão Consultiva da OMS para a Política do Paludismo recomendou a quimioprevenção sazonal do paludismo, destinada a combater a doença na Subregião Africana do Sahel. Esta intervenção simples e economicamente acessível tem o potencial de evitar mais de 75% dos casos de paludismo não complicado e grave entre as crianças menores de cinco anos.

Derrotar o paludismo requer um elevado nível de empenho político, o reforço da cooperação regional e o envolvimento de alguns sectores alheios à saúde, incluindo as finanças, a educação, a defesa, o ambiente, a indústria mineira e o turismo. A luta contra esta doença terá de ser integrada na agenda geral do desenvolvimento em todos os países endémicos. Não poderemos realizar mais progressos, se não trabalharmos incansavelmente para reforçar os sistemas e saúde e garantir a disponibilidade de um financiamento sustentado e previsível. Este relatório revela até que ponto chegámos na luta contra o paludismo; teremos de agir com urgência e determinação, para evitar que estes enormes progressos escapem ao nosso controlo.

Resumo e Pontos-Chave

O *Relatório Mundial do Paludismo 2012* resume a informação recebida de 104 países com paludismo endémico e de outras fontes, e também actualiza as análises apresentadas no Relatório de 2011. Salienta também os progressos conseguidos face aos objectivos definidos para 2015 para o paludismo e descreve os desafios actuais para o controlo e a eliminação do paludismo a nível mundial.

A década passada foi testemunha de uma formidável expansão no financiamento e implementação de programas de controlo do paludismo. O financiamento internacional cresceu vigorosamente, de menos de 100 milhões de dólares americanos em 2000 para 1710 milhões em 2010, estimando-se ter sido de 1660 milhões em 2011 e de 1840 milhões de dólares em 2012. As análises indicam que o crescimento do financiamento foi direccionado para custear a Região Africana, os países com mais baixo rendimento nacional bruto *per capita* e os países com uma taxa de mortalidade por paludismo mais elevada. O financiamento com fundos próprios pelos governos dos programas de controlo do paludismo também aumentou entre 2005 e 2011, sendo estimado um valor de 625 milhões de dólares em 2011.

Se bem que ainda longe dos 5100 milhões de dólares necessários para a cobertura universal do total das intervenções contra o paludismo, o financiamento conseguido para o controlo do paludismo possibilitou aos países com paludismo endémico incrementarem fortemente as actividades de prevenção, assim como as de diagnóstico e de tratamento da doença. A percentagem de habitações com pelo menos uma rede mosquiteira impregnada com insecticida (ITN) na África Subsariana calcula-se ter aumentado de 3% em 2000 para 53% em 2011, mantendo-se a mesma percentagem em 2012. Os inquéritos aos agregados familiares indicam que cerca de 90% das pessoas com acesso a um mosquiteiro impregnado na sua residência, utilizam-no. A percentagem que se encontra protegida pela pulverização intradomiciliária (IRS) na Região Africana cresceu de menos de 5% em 2005 para 11% em 2010 e permaneceu nesse nível em 2011. Quanto aos testes de diagnóstico do paludismo e ao tratamento, tem aumentado a disponibilidade de testes de diagnóstico rápido (TDR) e de terapêuticas combinadas à base de artemisina (TCA) tendo a percentagem de casos suspeitos que foram objecto de um teste parasitológico crescido globalmente de 68% em 2005 para 77% em 2011, com o maior incremento a verificar-se na África Subsariana. No entanto, o aumento nos testes de diagnóstico entre 2010 e 2011 foi apenas de 1%.

Parece que a rápida melhoria evidenciada por estes indicadores de qualidade do programa até 2010 têm uma tendência para a estagnação, em paralelo com a da recolha de fundos, e que milhões de pessoas continuam sem acesso às terapêuticas de prevenção, aos testes de diagnóstico e a tratamentos de qualidade assegurada. É ainda necessário um trabalho considerável para se atingir o objectivo de um acesso universal às medidas de prevenção, aos testes de diagnóstico e ao tratamento correcto do paludismo. Um problema para o futuro é o da resistência à artemisina - o componente essencial das combinações terapêutica baseadas na artemisina, a qual foi detectada em quatro países da Região do Sudeste Asiático, concomitante com a resistência do mosquito aos insecticidas, já observada em 64 países à volta do mundo.

Dos 99 países em que ocorre a transmissão da paludismoem 2011, 58 apresentaram dados suficientes e completos sobre os casos de paludismo entre 2000 e 2011, o que habilita a que uma avaliação de tendências possa ser efectuada. Com base nos dados notificados, 50 países deverão atingir o objectivo da Assembleia Mundial da Saúde e do Programa "Fazer Recuar o Paludismo": reduzir em 75% a incidência de casos de paludismo até 2015, sendo entre estes 9 da Região Africana. No entanto, os 58 países que forneceram informação completa e consistente representam apenas 15% dos casos mundiais estimados de paludismo; os sistemas de vigilância epidemiológica são mais frágeis quando o peso do paludismo é mais elevado. Há uma necessidade crucial de reforçar a vigilância do paludismo nos outros 41 países, em que se calcula ocorrerem 85% dos casos de paludismo a nível mundial, a fim de os programas poderem identificar e dirigir recursos para as populações mais necessitadas, responder aos surtos da doença e avaliar os impactos das medidas de controlo.

Os países com um número mais elevado de casos têm dificuldade em fornecer dados fiáveis, pelo que é necessário recorrer a estimativas para deduzir tendências. Os números estimados de casos e de mortes por paludismo contêm um elevado grau de incerteza, o que não impede que se conclua que as reduções na incidência e na mortalidade tenham ocorrido mais rapidamente nos países que inicialmente tinham um menor número de casos e de mortes. Não obstante, um crescente número de casos e de mortes foi evitado entre 2001 e 2010 nos países em que o paludismo tinha um maior peso em 2000. Se as taxas de incidência e de mortalidade do paludismo do ano 2000 se tivessem mantido inalteradas ao longo da década, entre 2001 e 2010 teriam ocorrido mais 274 milhões de casos e um milhão e cem mil mortes por paludismo. A maioria dos casos evitados (52%) e das vidas poupadas (58%) foram-no nos 10 países com uma estimativa de maior peso do paludismo em 2000. Consequentemente, os programas contra o paludismo tiveram o seu maior impacto nos países de maior incidência da epidemia.

O enorme progresso conseguido parece ter diminuído recentemente. O financiamento internacional para o controlo do paludismo estagnou e as projecções mantém-se substancialmente abaixo dos 5100 milhões de dólares necessários para concluir a cobertura universal das intervenções no domínio do paludismo. O número de mosquiteiros impregnados adquiridos em 2012, (66 milhões) é substancialmente menor que em 2011 (92 milhões) e em 2010 (145 milhões). Considerando a vida média dos mosquiteiros impregnados de 2 a 3 anos, é expectável que a cobertura diminua se os mosquiteiros impregnados não forem substituídos em 2013. Há uma necessidade urgente de identi-

ficar novas fontes de financiamento para manter e alargar os níveis de cobertura das intervenções de forma a poder prevenir surtos epidémicos e possibilitar que os objectivos internacionais de redução do número de casos e de mortes por paludismo sejam atingidos.

Elaboração de políticas; actualização de programas de acção, manuais e projectos; e objectivos mundiais para o controlo e eliminação do paludismo

Em 2011, a OMS completou a reformulação do seu processo de definição de políticas, que resultou na criação do Comité Consultivo para as Políticas do Paludismo, (MPAC) o qual teve a sua reunião inaugural e a sua segunda reunião em 2012. Diversas políticas de controlo do paludismo, manuais operacionais, projectos e iniciativas foram apresentados em 2012. Um conjunto abrangente de indicadores foi desenvolvido para monitorizar os progressos para se atingirem os objectivos internacionalmente acordados para a malária.

1. O MPAC, com um mandato para providenciar aconselhamento estratégico e propostas técnicas à OMS em todos os aspectos respeitantes ao controlo e eliminação do paludismo, tornou-se operacional em 2012. Seguindo as recomendações do MPAC , a OMS deu a conhecer uma nova politica de Químio-profilaxia Sazonal do Paludismo (QSP) e actualizou políticas de Tratamento Preventivo Intermitente (TPI) do paludismo na grávida e de terapêutica, em populações definidas, com dose única de primaquina, como gametocida, no paludismo por *Plasmodium falciparum*.
2. Foram divulgados documentos de orientação sobre os larvicidas na África Subsariana e sobre a eficácia das formulações não farmacêuticas de Artemesia annua. Publicaram-se manuais de vigilância epidemiológica em 2012, como parte da iniciativa " Teste, Tratamento e Monitorização", incitando os países endémicos e os financiadores a incrementarem quer o diagnóstico com teste, quer o tratamento, quer ainda a vigilância do paludismo. O Plano Mundial de Gestão das Resistências dos Vectores aos Insecticidas no Paludismo foi apresentado em Maio de 2012, estabelecendo uma directiva mundial para a gestão da resistência aos insecticidas.

Financiar o Controlo do Paludismo

Em 2011, o total estimado dos fundos internacionais e nacionais destinados ao controlo do paludismo eram de 2 300 milhões de dólares americanos, substancialmente abaixo do montante necessário para atingir as metas mundiais definidas.

3. O financiamento internacional aos países com paludismo endémico aumentou anualmente de menos de 100 milhões de dólares em 2000 para 1710 milhões em 2010; estima-se ter sido de 1660 milhões em 2011 e de 1840 milhões em 2012. A estabilização dos fundos disponíveis para o controlo do paludismo foi principalmente devida ao baixo nível de financiamento pelo Fundo Mundial. Em 2011 o Fundo Mundial cancelou a 11.ª Ronda de Atribuição de Subvenções.
4. Os dados fornecidos indicam que o financiamento nacional, com fundos próprios do país, para o paludismo aumentou em todas as Regiões da OMS, excepto na Região Europeia. A Região das Américas e a Região Africana registaram a maior despesa no controlo do paludismo. O total dos financiamentos nacionais, em 2011, estima-se em 625 milhões de dólares.
5. O Plano de Acção Mundial para o Paludismo (GMAP) de 2008 estimava que os recursos globais necessários para o controlo da paludismo excederiam os 5100 milhões de dólares por ano entre 2011 e 2020. Só para África, o GMAP estimava em média a necessidade de 2300 milhões de dólares por ano no mesmo período. Combinando os fundos nacionais e os internacionais, os recursos disponíveis eram estimados em 2300 milhões em 2011, estando assim em falta 2800 milhões de dólares. As projecções respeitantes aos recursos nacionais e internacionais disponíveis entre 2013 e 2015 apontam para que o total dos fundos disponíveis para o controlo do paludismo seja inferior a 2700 milhões, substancialmente abaixo do montante necessário para efectivar as actividade universais contra o paludismo.
6. Os padrões de financiamento internacional para o controlo do paludismo tem sido, historicamente, direccionados para os países de mais baixo produto nacional bruto e com maiores taxas de mortalidade, principalmente em África. O financiamento nacional por pessoa em risco é maior na Região da Europa e na Região das Américas e menor na Região do Sudeste Asiático. O quinteto de países com maior Produto Nacional Bruto investe muito mais dinheiro no controlo do paludismo do que os outros. Nestes países ricos o paludismo tem pouco peso, constituindo apenas 1% do total de casos e 0,3% das mortes por malária. As despesas mais elevadas com paludismodecorrem das medidas para a eliminação do paludismo em alguns países. Os países endémicos com maiores populações em risco e com as mais altas taxas de mortalidade por paludismo têm níveis de financiamento nacional per capita mais baixos do que os países com um menor peso do paludismo.

Progressos no controlo do vector

Durante a última década, as intervenções para o controlo do vector aumentaram substancialmente na África Subsariana, estimando-se que 53% das habitações possuam pelo menos uma rede mosquiteira impregnada com insecticida (ITN) em 2011, valor mantido em 2012. No entanto, devido à diminuição de entregas de ITN e à crescente resistência do mosquito aos insecticidas, os recentes sucessos no controlo do vector podem ser desperdiçados.

7. Em 2011, 32 países da Região Africana e 78 países do resto do mundo tinha adoptado as recomendações da OMS para fornecer mosquiteiros impregnados a todas as pessoas em risco de contraírem paludismo. Um total de 89 países, dos quais 39 em África, distribuem mosquiteiros impregnados gratuitamente.
8. Estimam-se em 150 milhões os mosquiteiros impregnados necessários anualmente para proteger as populações em risco de paludismo na África Subsariana. Entre 2004 e 2010 o

número de mosquiteiros impregnados disponibilizados pelos fabricantes para os países com paludismo endémico na África Subsariana aumentou de 6 milhões para 145 milhões. No entanto, em 2011, apenas 92 milhões de mosquiteiros foram entregues pelos fabricantes, e estima-se que em 2012 serão apenas 66 milhões. Os números de 2011 e 2012 são inferiores ao necessário para cobrir toda a população em risco e a não substituição da totalidade dos mosquiteiros distribuídos há três anos conduzirá a uma baixa da cobertura, a não ser que haja um aumento massivo da distribuição em 2013.

9. A percentagem de habitações possuindo pelo menos um mosquiteiro impregnado na África Subsariana estima-se ter tido um crescimento de 3% em 2000 para 53% em 2011, valor mantido em 2012. A percentagem de população que dorme sob um mosquiteiro, o que representa a população directamente protegida, também aumentou, de 2% no ano 2000 para 33% em 2011, mantendo-se nos 33% em 2012.

10. Análise dos resultados dos inquéritos às famílias indicam que uma elevada percentagem da população, rondando os 90%, tem acesso aos mosquiteiros na sua residência os utiliza, o que sugere que os esforços desenvolvidos para encorajar o uso de mosquiteiros tem sido bem sucedido e que o grande entrave que impede as pessoas em risco de dormirem sob mosquiteiros é a indisponibilidade destes. No entanto, a população que usa os mosquiteiros disponíveis inclui a das habitações em que são usados para além da sua capacidade de 2 pessoas por mosquiteiro, assim como outras em que a capacidade não é utilizada plenamente, o que aponta para a necessidade de trabalho futuro a fim de ser assegurado que a capacidade dos mosquiteiros impregnados é completamente utilizada.

11. A percentagem da população dormindo debaixo de um mosquiteiro impregnado é maior nas áreas urbanas, nas mais saudáveis e é menor entre as crianças mais velhas. As disparidade no acesso aos mosquiteiros diminuirá tanto mais quanto se avançar na cobertura universal.

Pulverização Intradomiciliária

12. A Pulverização Intradomiciliária (IRS) continua a ser um poderoso instrumento para reduzir e interromper a transmissão do paludismo. Em 2011, 80 países, incluindo 38 da Região Africana, recomendavam a IRS no controlo do paludismo.

13. Em 2011, 153 milhões de pessoas eram protegidas pela IRS no Mundo, i.e., 5% da população total em risco. Na Região Africana, a percentagem da população em risco que estava protegida pela IRS cresceu de menos de 5% em 2005 para 11% em 2010, e permaneceu ao mesmo nível em 2011, com 77 milhões de pessoas beneficiando da IRS.

Resistência aos Insecticidas

14. A resistência do mosquito a pelo menos um dos insecticidas usados para o controlo do paludismo foi identificada em 64 países. Em Maio de 2012, a OMS e o Programa "Fazer Recuar o Paludismo" publicaram o Plano Mundial de Gestão das Resistências dos Vectores aos Insecticidas no Paludismo, uma estratégia em cinco pontos para a gestão do risco da resistência aos insecticidas.

15. A monitorização da resistência aos insecticidas é um componente necessário na implementação das intervenções de controlo do vector com insecticida. Em 2011, 77 países notificaram ter adoptado a política de monitorização da resistência aos insecticidas.

Progressos na Quimioprofilaxia

O Tratamento Preventivo Intermitente (TPI), com toma de duas doses, foi seguido, por 30% a 57% das mulheres grávidas que frequentaram as clínicas pré-natais, segundo os dados dos 25 países que forneceram informação neste domínio, respeitante a 2011, à OMS. Espera-se que os países endémicos adoptem e implementem as recentes recomendações da OMS sobre o Tratamento Infantil Intermitente Preventivo e Quimioprofilaxia Sazonal da Paludismopara Crianças.

16. O Tratamento Preventivo Intermitente, (TPI) é recomendado em grupos populacionais de áreas com uma elevada transmissão e que sejam particularmente vulneráveis à infestação pelo *Plasmodium* e às suas consequências, em particular as mulheres grávidas e as crianças. Na África Subsariana, estima-se que beneficiam anualmente do TPI 32 milhões de mulheres grávidas e grande parte dos 28 milhões de crianças que se calcula nascerem cada ano. Acresce que cerca de 25 milhões de crianças da sub-região africana do Sahel podem ser protegidas da paludismo através da quimio-prevenção sazonal do paludismo.

17. Um total de 36 de 45 países da África Subsariana tinham adoptado o TPI para as mulheres grávidas como política nacional, no fim de 2011. Também a Papua Nova Guiné, da Região do Pacífico Ocidental, a adoptou em 2009.

18. Em 25 dos 36 países da África Subsariana com uma forte endemia que adoptaram o TPI como política nacional - e para os quais há dados fiáveis, 44% (variando entre 30% e 57%) das mulheres grávidas observadas numa consulta pré-natal receberam duas doses de TPI em 2011, de acordo com a recomendação da OMS de então. Desde Outubro de 2012 a OMS recomenda TPI em cada uma das consultas do calendário pré-natal depois do primeiro trimestre.

19. Nos 16 países da Região Africana para os quais os resultados do inquérito de 2009-2011 às famílias está disponível, o valor médio respeitante às mulheres que receberam duas doses de TPI durante a gravidez era baixo, na ordem dos 22% (variando entre 5% e 69%), principalmente devido à baixa cobertura terapêutica na Nigéria e na República Democrática do Congo.

20. Todas as crianças em risco de infecção pelo *Plasmodium falciparum* nos países da África Subsariana com risco de transmissão médio ou elevado e com baixos níveis de resistência do parasita à terapêutica recomendada de sulfadoxina-pirimetamina devem receber tratamento preventivo para o paludismo através dos serviços de vacinação em intervalos definidos e acordados com os intervalos correspondendo ao calendário de vacinação definido. Apenas um país, o Burkina Faso, adoptou uma politica nacional de TPI para as crianças, desde que a OMS a recomendou em 2009.

21. Em Março de 2012, a OMS publicou uma recomendação sobre a químio-profixia sazonal do paludismo para as crianças entre os 3 e os 59 meses. Ainda nenhum pais endémico adoptou esta recomendação, mas vários países envolvidos na avaliação desta politica deram a conhecer a sua intenção de alargar a cobertura com a químio-profilaxia sazonal para além das populações em estudo. A publicação das linhas de orientação para a sua implementação, Quimio-profilaxia Sazonal da Paludismocom Sulfadoxina-Pirimetamina e Amodiaquina em Crianças: um Manual de Utilização, pela OMS em Dezembro de 2012, deverá facilitar uma rápida difusão desta importante medida de intervenção.

Progressos nos testes de diagnóstico e no tratamento do paludismo

O número de testes de diagnóstico rápido (TDR) e de terapêuticas combinadas à base de artemisina (TCA) disponibilizados estão a aumentar e os dados respeitantes ao uso de testes de diagnóstico mostram que este cresceu de 20% em 2005 para 47% em 2011, no sector público da Região Africana. No entanto, muitos casos de febre são ainda tratados com antipalúdicos com base num diagnóstico de presunção, sem diagnóstico parasitológico, e nem todos os casos de paludismo confirmado recebem um tratamento adequado, com um antipalúdico de qualidade comprovada.

Testes de Diagnóstico

22. A implementação universal de testes de diagnóstico, quer no sector público, quer no privado, deverá reduzir substancialmente as necessidades mundiais quanto ao tratamento do paludismo. Em 2011, em 41 dos 44 países da Região Africana, e em 46 dos 55 países de outras Regiões em que há transmissão de paludismo, foi adoptada uma politica de disponibilização de testes de diagnóstico parasitológico para todos os grupos etários, o que representa uma aumento de 4 países desde 2010.
23. Os testes de diagnóstico do paludismo são disponibilizados sem custos, no sector público, de 84 países em todo mundo. A percentagem de casos suspeitos de paludismo que foram objecto de teste de diagnóstico subiu de 20% em 2005 para 47% em 2011 e, na Região Africana, globalmente, de 68% para 77%. Grande parte do acréscimo na utilização de testes observado na Região Africana é atribuível ao aumento no uso de testes de diagnóstico rápido, os quais foram utilizados em 40% dos casos testados na Região em 2011.
24. O número de doentes objecto de teste de diagnóstico por leitura microscópica de lâmina de sangue atingiu um pico de 171 milhões em 2011, dos quais 108 milhões na Índia. O número de testes de diagnóstico rápido fornecidos pelos fabricantes aumentou de 88 milhões em 2011 para 155 milhões em 2011. Estão incluídas vendas de testes apenas para *P. Falciparum* e também de testes combinados, que permitem detectar mais de uma espécie do parasita.
25. Em 2011, um total de 49 países reportou a disponibilização de testes rápidos de diagnóstico a nível da comunidade e 12 milhões de doentes testados no âmbito dos programas. Dados referentes a um número limitado de países sugerem que o recurso aos testes de diagnóstico é menos frequente no sector privado que público.

Tratamento

26. As TCA são recomendadas como tratamento de primeira linha para o paludismo por *P. falciparum*, o mais perigoso dos *Plasmodium* que parasitam o ser humano. Em 2011, 79 países e territórios tinham adoptado as TCA como tratamento de primeira linha para o paludismo por *P. falciparum*. A paludismo por *P. vivax* deverá ser tratado com cloroquina onde esta seja eficaz, ou por uma TCA apropriada nas áreas de resistência do *P. vivax* à cloroquina. O tratamento da paludismopor *P. vivax* deverá ser combinado com 14 dias de terapêutica com primaquina, para prevenção da recaída.
27. Relatórios da indústria e da Iniciativa para Medicamentos Acessíveis – paludismo (AMFm) evidenciam que o número de tratamentos de TCA providenciados nos sectores público e privado aumentou globalmente de 11 milhões em 2005 para 76 milhões, em 2006, tendo alcançado os 278 milhões em 2011. O aumento na aquisição de TCA resultou em grande medida como fruto da AMFm, gerida pelo Fundo Global. Embora a AMFm seja responsável por grande parte das vendas ao sector público, verificou-se um decréscimo das mesmas em 2010 e 2011.
28. Tem sido difícil monitorizar quais os doentes com diagnóstico confirmado de paludismo que recebem a terapêutica indicada, dado que a informação ligando o diagnóstico confirmado por teste e a terapêutica tem sido limitada aos inquéritos às famílias e aos dados de rotina dos sistemas de informação da saúde. Uma estimativa da percentagem de doentes do sector público potencialmente tratados com TCA (e não antipalúdicos menos eficazes) pode ser feita comparando o número de tratamentos com TCA distribuídos nos programas nacionais com o número de casos de paludismo por *P. falciparum* presumíveis (i.e., sem teste de diagnóstico) e confirmados (com teste diagnóstico) reportados (ou estimados, na ausência de dados). Esta percentagem varia segundo as Regiões da OMS, tendo atingido 59% na Região Africana, em 2011.
29. Em 12 países da Região Africana em que houve inquéritos às famílias em 2010-2011, a percentagem de crianças febris que receberam tratamento antipalúdico com TCA foi maior entre crianças tratadas no sector público e no sector privado formal do que no sector privado informal, ou na comunidade. Em alguns países a proporção de crianças que recebe TCA permanece baixa, o que significa que uma parte dos doentes com paludismo não recebe tratamento adequado.
30. Na Região Africana em 2011, o número total de testes (microscópicos e testes rápidos) foi inferior a metade do número de tratamentos TCA distribuídos pelos programas nacionais de controlo da paludismo, evidenciando-se assim que muitos tratamentos TCA foram dados a doentes sem teste de confirmação do diagnóstico.

Resistência aos medicamentos antipalúdicos

31. A OMS recomenda que a monoterapia oral com artemisina deve ser progressivamente retirada do mercado e substi-

tuída por TCA, uma politica defendida pela OMS desde 2007. O número de países que ainda permite a comercialização destes produtos diminuiu de 55 em 2008 para 15 em Novembro de 2012, sendo 8 destes da Região Africana. O número de empresas farmacêuticas que vendem estes produtos baixou de 38 em 2010 para 28 em 2011. Muitos dos países que ainda permitem a comercialização destes medicamentos são da Região Africana, embora muitos dos fabricantes sejam da Índia.

32. Os estudos de eficácia terapêutica continuam a ser o padrão de excelência para orientar as políticas do medicamento e deverão ser efectivados todos os 2 anos. Em 2010 e 2011 estudos sobre as terapêuticas antipalúdicas de primeira e segunda linhas foram concluídos em 47 dos 71 países onde eram possíveis os estudos com *P. falciparum*, uma aumento face aos 31 países de 2007-2008. (Em 28 países onde persiste a transmissão do paludismo, os estudos de eficácia terapêutica são impraticáveis, quer pela baixa incidência, quer por serem endémicos apenas para o *P. vivax*). Estavam planeados, para 2012, estudos em 49 países, dos quais 29 eram países africanos.

33. A resistência dos parasitas às artemisinas foi recentemente detectada em 4 países da sub-região do Grande Mekong: Cambodja, Birmânia, Tailândia e Vietname. A despeito as alterações observadas na sensibilidade do parasita às artesiminas, as TCA continuam a curar os doentes enquanto os medicamentos associados forem eficazes. Na província de Pallin, no Cambodja, a resistência foi observada em ambos os componentes de múltiplas TCA, tendo sido tomadas medidas específicas, entre elas, a toma presencial de terapêutica combinada sem artemisina (atovaquona-proguanil).

Vigilância do Paludismo

Os sistemas de vigilância da paludismo detectam correntemente apenas 10% dos casos que se estimam ocorrer anualmente. As taxas de casos detectados são menores nos países com maior número de casos.

34. A proporção de casos de paludismoque procuraram tratamento nos serviços públicos de saúde, diagnosticados e notificados (taxa de casos detectados), era inferior a 20% em 39 dos 99 países onde existe transmissão de paludismo. Destes, 30 países representam 185 milhões de casos de paludismo, 78% do total estimado a nível mundial. Os obstáculos à detecção de casos variam segundo a Região da OMS: nas Regiões Africana e do Pacífico Ocidental o principal obstáculo é a baixa percentagem de doentes que recorrem aos serviços públicos, aos quais é feito um teste diagnóstico para o paludismo, enquanto na Região do Sudeste Asiático o maior obstáculo é a elevada percentagem de doentes que procura tratamento nos serviços privados de saúde.

35. Nos países em fase de controlo do paludismo (em contraste com os que estão em fase de eliminação), os sistemas de vigilância não necessitam de detectar todos os casos para atingirem os seus objectivos, os quais são, sobretudo, definir as tendências ao longo do tempo e identificar as diferenças geográficas na incidência do paludismo. No entanto, nos 41 países em todo o mundo em que ocorrem 85% dos casos estimados, não é possível ter uma avaliação fiável das tendências do paludismo devido à insuficiência e à incoerência da notificação ao longo do tempo. Consequentemente, os sistemas de vigilância são mais frágeis onde o peso do paludismo é maior; são necessárias medidas urgentes para melhorar a vigilância epidemiológica do paludismo nestes cenários.

Mudanças na Incidência e na Mortalidade por Paludismo

Aproximadamente, metade dos países correntemente com transmissão da paludismo estão no bom caminho para atingirem o objectivo da Assembleia Mundial de Saúde e do Programa "Fazer Recuar o Paludismo": conseguir uma redução de 75% dos casos de paludismo em 2015, po comparação com os níveis do ano 2000. Se por um lado 50 países estão em vias de atingir o objectivo, a evolução em mais de um terço dos países não pode ser aferida por limitações na notificação de dados. Os progressos a realizar para se atingirem as metas internacionais para o paludismo estão condicionados pela obtenção de melhorias substanciais nos países com uma carga mais pesada de endemia.

36. Dos 99 países em que ocorre a transmissão da paludismo, 58 apresentaram dados sobre o paludismo de 2000 a 2011, suficientemente completos e consistentes para possibilitar uma avaliação das tendências. Com base nesses dados, 50 países, dos quais 9 da Região Africana estão em vias de atingir a meta da Assembleia Mundial da Saúde e do Programa "Fazer Recuar o Paludismo" de reduzir a incidência de casos de paludismo em 75%, até 2015. Outros 4 países têm previsto atingir reduções entre 50% e 75%. Em 3 países da Região das Américas observou-se um aumento de incidência do paludismo.

37. Dos 104 países com endemia em 2012, 79 consideram-se na fase de controlo, 10 estão fase de pré-eliminação e 10 em fase de eliminação. Os outros 5 países, actualmente sem transmissão, classificam-se na fase de prevenção da reintrodução.

38. Estima-se que em 2010 ocorreram 219 milhões de casos de paludismo (num intervalo entre 154 e 289 milhões) e 660 000 mortes (de 610 000 a 971 000). As estimativas para 2010 foram actualizadas na sequência de uma consulta aos países, após uma primeira publicação no Relatório Mundial do Paludismo 2011. As estimativas país a país disponíveis para 2010, mostram que 80% das mortes estimadas por paludismo ocorreram apenas em 14 países e que 80% dos casos estimados ocorreram em 17 países. Em conjunto, a República Democrática do Congo e a Nigéria assumem mais de 40% do total mundial de mortes. Estima-se que 40% do número total dos casos de paludismo ocorram na República Democrática do Congo, na Índia e na Nigéria.

39. A paludismo está fortemente associado à pobreza. As taxas de mortalidade estimadas para o paludismo são mais elevadas nos países com um produto nacional bruto *per capita* mais baixo. Os países com maiores percentagens de

pessoas vivendo abaixo do limiar da pobreza (menos de 1,25 dólares por pessoa e por dia) têm taxas de mortalidade por paludismo mais elevadas. No interior dos países, as populações mais pobres e as populações rurais apresentam as taxas mais elevadas de prevalência de infecção parasitária nas crianças.

40. Os progressos na redução das taxas de incidência e de mortalidade por paludismo têm sido mais rápidos nos países com menos casos e menos mortes. No entanto, considera-se que o maior número de casos e de mortes evitados entre 2001 e 2010 ocorreu nos países com uma carga mais elevada de paludismo em 2000. Se a incidência e a mortalidade por paludismo estimadas no ano de 2000 se tivessem mantido sem alteração ao longo da década, teriam ocorrido mais 274 milhões de casos de paludismo e teriam havido mais 1 100 000 mortes por paludismo, entre 2001 e 2010. A maioria dos casos prevenidos (52%) e de vidas salvas (58%) foram-no nos países em que se estima que o paludismo tinha um maior peso, em 2000. Os programas contra o paludismo têm evidenciado, segundo as estimativas, um impacto mais elevado quando o peso da doença é maior.

41. Há muita incerteza inerente a qualquer processo para estimar a incidência e a mortalidade por paludismo e nas subsequentes análises baseadas nestas estimativas. A comunidade global do paludismo tem de redobrar os seus esforços para apoiar os países com a endemia a melhorar, quer o diagnóstico com testes, quer a vigilância, os registos vitais e ainda a informação sanitária de rotina, para que se possa obter informação rigorosa sobre a morbilidade e a mortalidade por paludismo.

CHAPTER 1

Introduction

This edition of the *World Malaria Report* summarizes the current status of malaria control in all affected countries worldwide. It reviews progress towards internationally agreed targets and goals, describes trends in funding, intervention coverage and malaria cases and deaths.

Malaria is caused by five species of parasites of the genus *Plasmodium* that affect humans (*P. falciparum*, *P. vivax*, *P. ovale*, *P. malariae* and *P. knowlesi*). Malaria due to *P. falciparum* is the most deadly form and it predominates in Africa; *P. vivax* is less dangerous but more widespread, and the other three species are found much less frequently. Malaria parasites are transmitted to humans by the bite of infected female mosquitoes of more than 30 anopheline species. Globally, an estimated 3.3 billion people were at risk of malaria in 2011, with populations living in sub-Saharan Africa having the highest risk of acquiring malaria: approximately 80% of cases and 90% of deaths are estimated occur in the WHO African Region, with children under five years of age and pregnant women most severely affected.

Malaria is an entirely preventable and treatable disease, provided the currently recommended interventions are properly implemented. These include (i) vector control through the use of insecticide-treated nets (ITNs), indoor residual spraying (IRS) and, in some specific settings, larval control, (ii) chemoprevention for the most vulnerable populations, particularly pregnant women and infants, (iii) confirmation of malaria diagnosis through microscopy or rapid diagnostic tests (RDTs) for every suspected case, and (iv) timely treatment with appropriate antimalarial medicines (according to the parasite species and any documented drug resistance).

The *World Malaria Report* is a key publication of the WHO Global Malaria Programme (GMP), providing over the years a historical record of the global malaria situation and the progress made through national and international efforts to control the disease. GMP has four essential roles: (i) to set, communicate and promote the adoption of evidence-based norms, standards, policies and guidelines; (ii) to ensure ongoing independent assessment of global progress; (iii) to develop strategies for capacity building, systems strengthening and surveillance; and (iv) to identify threats to malaria control and elimination, and new opportunities for action.

The *World Malaria Report* presents a critical analysis and interpretation of data provided by national malaria control programmes (NMCPs) in endemic countries. In 2012 there are 99 countries and territories with ongoing malaria transmission and 5 countries in the prevention of reintroduction phase, making a total of 104 countries and territories in which malaria is presently considered endemic. Standard reporting forms were sent in March 2012 to the 99 countries with ongoing malaria transmission and two countries that recently entered the prevention of reintroduction phase. Information was requested on: (i) populations at risk, (ii) vector species, (iii) number of cases, admissions and deaths for each parasite species, (iv) completeness of outpatient reporting, (v) policy implementation, (vi) commodities distributed and interventions undertaken, (vii) results of household surveys, and (viii) malaria financing. Table 1.1 summarizes the percentage of countries responding by month and by WHO Region in 2012.

Information from household surveys was used to complement data submitted by NMCPs, notably the Demographic and Health Surveys (DHS), Multiple Indicator Cluster Surveys (MICS) and Malaria Indicator Surveys (MIS). These surveys provide information on the percentage of the population that sleeps under a mosquito net, and of children with fever who are treated and the medication they receive. Information on malaria financing was obtained from the Organisation for Economic Co-operation and Development (OECD) database on foreign aid flows and directly from the Global Fund and the US President's Malaria Initiative (PMI).

Table 1.1 Percentage of reporting forms received by month and by WHO Region, 2012

WHO region	June	July	August	September	October	Total countries/ areas
African				98%	98%	44
Region of the Americas				90%	100%	21
Eastern Mediterranean			40%	70%	90%	10
European	50%	100%	100%	100%	100%	6
South-East Asia		100%	100%	100%	100%	10
Western Pacific	40%	100%	100%	100%	100%	10
Total	**7%**	**26%**	**30%**	**94%**	**98%**	**101**

Source: *NMCP reports*

Data were analysed and interpreted by WHO staff at headquarters and regional offices, in extensive consultation with WHO country offices and NMCPs regarding the interpretation of country information. Assistance in data analysis and interpretation was also provided by the African Leaders Malaria Alliance (ALMA), the Institute of Health Metrics and Evaluation (IHME), the Malaria Atlas Project (MAP), US Centers for Disease Control and Prevention (CDC), the Global Fund, the Monitoring and Evaluation to Assess and Use Results Demographic and Health Surveys (MEASURE DHS) project, and the United Nations Children's Fund (UNICEF).

The following chapters consider the policies and interventions recommended by WHO, the implementation of interventions, and the impact on malaria cases and deaths from a global and regional perspective. This year's report explores these issues with special attention to equity (by indicators such as wealth, urban/rural residence, sex, and age).

Chapter 2 summarizes the WHO policy setting process and the policies and strategies recommended by WHO to achieve the internationally agreed goals for malaria control and elimination. The goals and targets for malaria control and elimination and recommended indicators of progress are described.

Chapter 3 reviews recent trends in international and domestic financing in relation to the resource requirements for meeting global malaria control targets. It considers the observed distribution of malaria funding in relation to different models of resource allocation.

Chapter 4 reviews the commodity needs for malaria vector control. It considers the policies that national programmes have adopted for vector control implementation and the progress made towards universal access to ITNs and IRS. An update is provided on the growing problem of insecticide resistance and the appropriate monitoring and management of resistance.

Chapter 5 reviews progress in implementation of chemoprevention, particularly the intermittent preventive treatment of malaria in pregnancy and in infants, and the introduction of seasonal chemoprevention in older children. It also reports on the current status of malaria vaccine development.

Chapter 6 reviews the commodity needs for malaria diagnostic testing and treatment. It reports on the extent to which national programmes have adopted policies for universal diagnostic testing of suspected malaria cases and examines trends in the availability of parasitological testing. The adoption of policies and implementation of programmes for improving access to effective treatment for malaria are reviewed. Progress in the withdrawal of oral artemisinin-based monotherapies from the market, the current status of drug efficacy monitoring, recent trends in antimalarial drug resistance and efforts to contain artemisinin resistance are also reported.

Chapter 7 examines the extent to which malaria surveillance systems are able to detect malaria cases and explores the existing factors which influence case detection rates, by WHO Region. It also briefly examines how well surveillance systems can assess trends over time and provides information on geographical differences in malaria incidence.

Chapter 8 reviews trends in *reported* malaria cases for 58 countries which have reported consistently between 2000 and 2011; for countries with low numbers of cases, their progress towards elimination is summarized. An analysis is presented of the global distribution of the *estimated* numbers of cases and deaths for countries with ongoing transmission and trends in *estimated* malaria cases and deaths 2000 in 2010.

Regional Profiles summarize the epidemiology of malaria in each WHO Region, trends in malaria case incidence, and the links between malaria trends and malaria programme implementation.

Country Profiles of 99 countries with ongoing malaria transmission are provided, followed by **Annexes** which give data by country for the malaria-related indicators.

South Sudan became a separate State on 9 July 2011 and a Member State of WHO on 27 September 2011. South Sudan and Sudan have distinct epidemiological profiles comprising low transmission and high transmission areas respectively. For this reason data up to June 2011 from the high transmission areas of Sudan (10 southern states which correspond to South Sudan) and low transmission areas (15 northern states which correspond to contemporary Sudan) are reported separately.

CHAPTER 2

Policies, strategies, goals and targets for malaria control and elimination

This chapter summarizes (i) the policies and strategies recommended by WHO to achieve the internationally agreed goals for malaria control and elimination, (ii) the need for surveillance systems, and (iii) indicators of progress.

2.1 Policy development

The WHO Global Malaria Programme (GMP), in keeping with its normative role for malaria prevention, control, and elimination, embarked on a major review and re-design of its policy-setting process in 2011. The conclusion of that process was the creation of the Malaria Policy Advisory Committee (MPAC) which came into operation at the start of 2012 following approval by the WHO Director-General of its terms of reference and membership. The members were selected by a review panel following an open call for member nominations. The mandate of the MPAC is to provide strategic advice and technical input to WHO on all aspects of malaria control and elimination, as part of a transparent and timely policy-setting process that is responsive to a rapidly changing malaria landscape.

The MPAC advises WHO on:

1. appropriate malaria policies and standards based on data from malaria programme implementation by member states and malaria control partners as well as reviews of the best available evidence,
2. engagement of WHO in malaria-related initiatives,
3. major issues and challenges to achieving global malaria goals, and
4. the identification of priority activities to address identified challenges.

The MPAC met for the first time in January 2012 and again in September 2012. In future it is scheduled to meet in March and September every year; all related documents are available on the MPAC website (*1*).

The MPAC has 15 members who serve in an independent, personal and individual capacity and represent a broad range of disciplines, expertise, and experience. WHO may also set up MPAC Evidence Review Groups (ERGs) on a time-limited basis to help address specific questions identified by the MPAC. Depending on the nature and complexity of the issue concerned, the MPAC may, in certain cases, recommend that it could be most efficiently addressed through a standing Technical Expert Group (TEG).

MPAC meetings are held primarily in open session. In addition to 4 standing Observers (Global Fund, Roll Back Malaria Partnership, UNICEF, and the Office of the United Nations Secretary General's Special Envoy for Malaria), and 7 rotating National Malaria Control Programme Managers, any member of the global malaria community is welcome to attend. Interventions from observers participating in MPAC discussion are at the invitation of the Chair.

Box 2.1 New or updated WHO policies, operational manuals, guidelines, and strategies for malaria control and elimination in 2012

New Policies:

- Seasonal Malaria Chemoprevention (SMC) for *Plasmodium falciparum* malaria control in highly seasonal transmission areas of the Sahel subregion in Africa, March 2012 (*2*).

Updated Policies:

- Intermittent Preventive Treatment of malaria in pregnancy using Sulfadoxine-Pyrimethamine (IPTp-SP), October 2012 (*3*).
- Single dose primaquine as a gametocytocide in *Plasmodium falciparum* malaria, October 2012 (*4*).

Position Statements:

- WHO interim position statement on larviciding in sub-Saharan Africa, March 2012 (*5*).
- WHO position statement on effectiveness of non-pharmaceutical forms of *Artemisia annua* against malaria, June 2012 (*6*).

Operational manuals, handbooks and guidelines:

- Disease surveillance for malaria control: an operational manual, April 2012 (*7*).
- Disease surveillance for malaria elimination: an operational manual, April 2012 (*8*).
- Guidelines for procuring public health pesticides, 2012 (*9*).
- Management of severe malaria: A practical handbook. Third edition, December 2012 (*10*).
- Seasonal Malaria Chemoprevention with sulfadoxine-pyrimethamine plus amodiaquine in children: a field guide, December 2012 (*11*).
- Information note on recommended selection criteria for procurement of malaria rapid diagnostic tests (RDTs), April 2012 (*12*).

Strategies, Action Plans and Initiatives:

- Global Plan for Insecticide Resistance Management in Malaria Vectors (GPIRM), May 2012 (*13*).
- T3: Test. Treat. Track. initiative (Box 2.1), April 2012 (*14*).

A draft agenda and details on how to register are made available approximately 2 months prior to every biannual meeting. MPAC decisions are taken in closed session and are agreed by consensus. MPAC conclusions and recommendations are published within 3 months of every MPAC meeting in the *Malaria Journal* as part of a series (*15*). Policy statements, position statements, and guidelines that arise from the conclusions and recommendations of the MPAC are formally issued and disseminated to member states by the WHO Global Malaria Programme.

To date, meeting sessions have focused on: a policy for Seasonal Malaria Chemoprevention (SMC); the use of single dose primaquine as a *P. falciparum* gametocytocide; an update on the use of sulfadoxine-pyrimethamine for Intermittent Preventive Treatment (IPT) of malaria in pregnancy; an interim position statement on the role of larviciding for malaria control in sub-Saharan Africa; improving the criteria for Rapid Diagnostic Test procurement; and the need for developing a Global Technical Strategy for Malaria Control and Elimination 2016–2025, which will also serve to underpin the next version of the Global Malaria Action Plan.

In addition, the MPAC has been briefed on: the development of the RTS,S/AS01 malaria vaccine; methods for estimation of malaria burden; the AMFm independent evaluation and promoting quality-assured diagnostic testing and treatment in the private sector; artemisinin resistance in the Greater Mekong subregion; policy-setting for vector control; country classification criteria; and the process for updating the WHO Malaria Treatment Guidelines. In all of these topics the MPAC has provided input or will do so in the near future.

2.2 Malaria control policies and strategies

The strategic approaches to malaria control come within two major domains: (i) prevention and (ii) case management. Together, these strategies work against the transmission of the parasite from mosquito vector to humans (and from humans to the mosquito vector), and the development of illness and severe disease.

2.2.1 Malaria prevention through malaria vector control

The goals of malaria vector control are two-fold:

- to protect individual people against infective malaria mosquito bites
- to reduce the intensity of local malaria transmission at community level by reducing the longevity, human-vector contact and density of the local vector mosquito population.

The most powerful and most broadly applied interventions are (i) long-lasting insecticidal nets (LLINs) and (ii) indoor residual spraying (IRS). These interventions work by reducing human-vector contact and by reducing the lifespan of adult female *Anopheles* mosquitoes (so that they do not survive long enough to transmit the parasite).

Insecticide-treated nets (ITNs), which include both LLINs and conventional nets that are later treated with an insecticide, work both by protecting the person sleeping under the net (individual level) and by extending the effect to an entire area (community level). Since 2007, WHO has recommended universal coverage with ITNs (preferably LLINs), rather than a pre-determined number of nets per household or exclusively targeting household members at high risk (pregnant women and young children).

IRS involves the application of residual insecticides to the inner surfaces of dwellings where many vector species of anopheline mosquito tend to rest after taking a blood meal (*16*). IRS is effective in rapidly controlling malaria transmission, hence in reducing the local burden of malaria morbidity and mortality, provided that most houses and animal shelters (>80%) in targeted communities are treated (*17*).

Achieving universal coverage with effective vector control requires a sustained programme of vector control delivery operations which are carried out correctly and on time. This in turn requires specialized personnel at national, provincial, district and community levels. As well as practical experience in the delivery of vector control interventions, these teams must also have the capacity to monitor and investigate vector-related and operational factors that may compromise intervention effectiveness, for which specialized entomological knowledge and skills are essential.

Box 2.2 New and updated vector control plans, position statements, and guidelines developed in 2011–2012

- Global Plan for Insecticide Resistance Management in Malaria Vectors (GPIRM), May 2012 (*13*);
- Interim position statement on larviciding in sub-Saharan Africa, March 2012 (*5*);
- Guidelines for procuring public health pesticides, 2012 (*9*);
- A proposal to improve value for money in LLIN procurement through market competition based on cost per year of effective coverage rather than unit price, November, 2011 (*18*);
- Draft interim recommendations on the sound management of packaging for Long Lasting Insecticidal Nets (LLINs), November 2011 (*19*);
- Updated WHO position statement on the use of DDT in malaria vector control, 2011 (*20*)

WHO recommendations for malaria vector control are the following:

Insecticide-treated nets

1. As high coverage rates are needed to realize the full potential of vector control, WHO recommends that in areas targeted for malaria prevention, and for which ITNs are selected as the vector control method, they should be made available to all people at risk, i.e. universal access (*21*). Because of the operational advantages of LLINs over ITNs, and the fact that the vast majority of nets being procured and distributed today are indeed LLINs, the remainder of this section will refer to LLINs rather than ITNs. In order to meet the target of universal access, it is currently proposed that 1 LLIN should be distributed for every 2 persons. At the household level, the distribution of 1 LLIN for every 2 members of the household will entail rounding up in households with an odd number of

members (e.g. 3 LLINs for a household with 5 members, etc.) Because of this rounding up, the achievement of 1 LLIN for every 2 people at household level requires an overall ratio, for procurement purposes, of 1 LLIN for every 1.8 people in the target population (*17*).

2. LLINs should be provided either free of charge or be highly subsidized. Cost should not be a barrier to their availability to all people at risk of malaria, especially those at greatest risk such as young children and pregnant women (*21*) and those in rural communities with least ability to purchase outright or provide a supplemental co-payment.

3. Universal access to LLINs is best achieved and maintained by a combination of delivery systems. The basic concept is a combination of 'catch up' and 'keep up'. Catch up involves mass distribution campaigns which can rapidly achieve universal coverage of LLINs. However, it is essential to complement such campaigns with continuous 'keep up' delivery systems, particularly routine delivery to pregnant women through antenatal services and to infants at immunization clinics. It should also be noted that targeted distribution to infants and pregnant women will fall short of the quantity needed to maintain universal coverage, and other strategies involving further campaigns may be required (*21*).

4. In order to be protected, individuals must not only own LLINs but also use them. Behaviour change interventions including information, education, communication (IEC) campaigns and post-distribution "hang-up campaigns" are strongly recommended, especially where there is evidence of their effectiveness in improving LLIN usage (*21*).

5. Only LLINs recommended by the WHO Pesticide Evaluation Scheme (WHOPES) should be procured by national programmes and partners for malaria control. At present there are 13 recommended products (*22*). Detailed guidance on good practice in the handling and use of pesticides, and on quality control in procurement, can be found on the WHOPES website (*23*). Independent quality control of products (including insecticides) should be undertaken before shipment, to ensure that substandard products are not delivered to countries. The suppliers of pesticide should bear the cost of analysis, including the cost of sending samples to an accredited or recognized laboratory for analysis on behalf of countries that do not have adequately equipped or staffed national quality control laboratories (*9*).

6. It is now recognized that the lifespan of LLINs is variable, among settings and among products. Therefore, all large-scale LLIN programmes (including those implemented by NGOs) should make efforts to monitor LLIN durability in local settings, using standard methods published in 2011 (*24*). The collection of local data on the comparative durability of alternative LLIN products, using rigorous and auditable methods, is expected to enable procurement decisions to be made on the basis of price per year of protection rather than unit price per net; this in turn is expected to bring rapid and potentially substantial cost savings. This is important because LLINs represent a large proportion of the global malaria control budget (*18*). Efforts are also under way to develop more varied and sophisticated methods for testing the durability of LLINs under simulated laboratory conditions.

Indoor residual spraying

7. IRS is applicable in many epidemiological settings, provided the operational and resource feasibility are considered in policy and programming decisions. IRS requires specialized spray equipment and techniques, and the equipment, the quality of application, as well as monitoring and disposal capabilities must be scrupulously maintained given the difficulty of carrying out spray operations.

8. Currently 12 insecticides belonging to 4 chemical classes are recommended by WHOPES for IRS (*25*). An insecticide for IRS is selected in a given area on the basis of data on resistance, the residual efficacy of the insecticide, costs, safety, and the type of surface to be sprayed.

9. DDT has a comparatively long residual efficacy (≥6 months) as an insecticide for IRS. The use of DDT in agriculture is banned under the Stockholm Convention, but countries can use DDT for IRS for as long as necessary and in the quantities needed, provided that the guidelines and recommendations of WHO and the Stockholm Convention are all met, and until locally appropriate, cost-effective alternatives are available for a sustainable transition from DDT (*20*).

Larval control

10. In a few specific settings and circumstances, the core interventions of IRS and LLINs may be complemented by other methods, such as larval control including environmental management. However, WHO recommends larviciding only in settings where mosquito breeding sites are few, fixed, findable and easy to identify, map and treat. In other circumstances, it is very difficult to find a sufficiently high proportion of the breeding sites within the flight range of the vector (*5*). Currently 10 compounds and formulations for mosquito larval control are recommended by WHOPES (*26*). In Africa, larviciding interventions are most likely to be appropriate in urban settings, and are unlikely to be cost effective in most rural settings where malaria mosquitoes breed in many small water sources such as hoof prints and fallen leaves (*5*).

2.2.2 Insecticide resistance

Development and launch of The Global Plan for Insecticide Resistance Management in malaria vectors (GPIRM)

11. Insecticide resistance has been detected in 64 countries with ongoing malaria transmission, affecting all major vector species and all classes of insecticides. In 2011, the World Health Assembly and the Board of the Roll Back Malaria Partnership requested WHO to draft a global strategy to provide a basis for coordinated action to maintain the effectiveness of vector control interventions.

    The GPIRM was developed through a broad-based consultation with over 130 stakeholders representing all constituencies of the global malaria community, including malaria-endemic countries, multilateral agencies, development partners, academia, and industry. The strategy was launched in May 2012 and is based on 5 pillars:

(i) Plan and implement insecticide resistance management strategies in malaria-endemic countries.

(ii) Ensure proper, timely entomological and resistance monitoring and effective data management.

(iii) Develop new, innovative vector control tools.

(iv) Fill gaps in knowledge on mechanisms of insecticide resistance and the impact of current insecticide resistance management strategies.

(v) Ensure that enabling mechanisms (advocacy, human and financial resources) are in place.

The GPIRM (*13*) provides detailed technical recommendations on both monitoring and managing insecticide resistance in different settings, depending on the extent and mechanisms of insecticide resistance, and the type of vector control interventions used.

Resistance management

12. The spread of insecticide resistance, especially pyrethroid resistance in Africa, is a major threat for vector control programmes. Insecticide resistance management has to be considered as important as epidemiology and cost-effectiveness in all programmatic decisions about vector control, including the selection of insecticides for IRS (*25*). In particular:

- Resistance management measures should be part of every vector control programme and deployed pre-emptively (ideally initiated even prior to the selection of insecticides for initial rounds of spraying), without waiting for signs of the presence of resistance or of control failure.
- A substantial intensification of resistance monitoring is needed, using both bioassay (susceptibility) tests and genetic methods. Resistance monitoring should be seen as a necessary element of any medium or large scale deployment of an insecticidal intervention (including LLIN distribution by NGOs); it is the responsibility of the implementing agency to make sure that this testing is done properly. All data on vector resistance should be submitted (in confidence if necessary) to the NMCP within 3 months of the test performance, even if the study is not yet complete. Donors financing insecticide procurement should ensure that the decision regarding the choice of insecticide is supported by adequate and up-to-date information on resistance among local anopheline vectors.
- Using the same insecticide for multiple successive IRS cycles is not recommended; it is preferable to use a system of rotation with a different insecticide class being used each year. In areas where IRS is the main vector control intervention, this rotation system may include the use of a pyrethroid.
- In areas with high LLIN coverage, pyrethroids should not be used for IRS.

13. Currently, vector control interventions rely heavily on one class of insecticides, the pyrethroids, and pyrethroids are the only class used on currently recommended LLINs. The preservation of pyrethroid susceptibility in target vector populations should therefore be a key priority in the choice of vector control methods. The combination of non-pyrethroid IRS with LLINs involves significantly increased costs, but it has two expected advantages. First, there is evidence that the presence of a non-pyrethroid on the wall reduces the strength of selection for pyrethroid resistance that might occur as a result of a LLIN in the same room; this combination is therefore recommended as one means of insecticide resistance management (*13*). Second, there is evidence suggesting that the combination of IRS and LLINs is more effective than either intervention alone, especially if the combination helps to increase overall coverage with vector control or in managing insecticide resistance through insecticide rotations (*27*). However, further data collection is needed to strengthen the evidence base for the effectiveness of these interventions. It should be noted that in areas with high levels of LLIN coverage in which pyrethroid resistance is identified, focal IRS is recommended. Broad deployment of IRS and LLINs in combination, while potentially very effective, is currently financially unsustainable.

2.2.3 Preventive chemotherapy

Preventive chemotherapy is the use of complete treatment courses of effective antimalarial medicines for the targeted populations at risk of malaria for preventive purposes, with the goal of preventing malaria infection and thereby reducing morbidity and mortality due to malaria. The two strategies presently recommended by WHO are Intermittent Preventive Treatment (IPT) and Seasonal Malaria Chemoprevention (SMC).

(i) IPT is the administration of a full course of an effective antimalarial treatment at specified time points to a defined population at risk of malaria, regardless of whether they are parasitaemic, with the objective of reducing the malaria burden in the specific target population.

Intermittent preventive treatment in pregnancy (IPTp)

Based on a recent review of the evidence (*28*) and assessment by the MPAC, in areas of moderate to high malaria transmission WHO recommends IPTp with sulfadoxine-pyrimethamine (SP) for all pregnant women at each scheduled antenatal care visit. The first IPTp-SP dose should be administered as early as possible during the 2nd trimester of pregnancy. Each SP dose should be given at least 1 month apart and the last dose can be administered up to the time of delivery.

Intermittent preventive treatment in infants (IPTi)

All infants at risk of *P. falciparum* infection in countries in sub-Saharan Africa with moderate to high malaria transmission should receive 3 doses of SP along with the DPT2, DPT3 and measles vaccines through the routine immunization programme (*29*, *30*).

(ii) SMC is the intermittent administration of full treatment courses of an effective antimalarial medicine during the malaria season to prevent malarial illness in children aged 3 to 59 months with the objective of maintaining therapeutic antimalarial drug concentrations in the blood throughout the period of greatest malaria risk. WHO recommends the use of SMC in areas of highly seasonal malaria transmission[1] across the Sahel subregion of Africa. SMC should be administered through a complete treatment course of amodiaquine plus sulfadoxine-pyrimethamine at monthly intervals beginning at the start of the transmission

1. Areas where on average more than 60% of clinical malaria cases occur within a maximum of 4 months.

season, to a maximum of 4 doses during the malaria transmission season (*2*).

2.2.4 Diagnosis and treatment of malaria

The main objectives of an antimalarial treatment policy are:

- to reduce morbidity and mortality by ensuring rapid, complete cure of *Plasmodium* infection, thus preventing the progression of uncomplicated malaria to severe and potentially fatal disease, as well as preventing chronic infection that leads to malaria-related anaemia;
- to curtail the transmission of malaria by reducing the human parasite reservoir; and
- to prevent the emergence and spread of resistance to antimalarial medicines.

The 2nd edition of the *WHO Guidelines for the treatment of malaria* was published in March 2010 and was updated in April 2011, recommending injectable artesunate for the management of severe malaria in all age groups and epidemiological settings (*31*).

WHO recommendations for diagnosis and treatment:

Prompt parasitological confirmation by light microscopy, or alternatively by rapid diagnostic tests (RDTs), is recommended in all patients with suspected malaria before treatment is started. Antimalarial treatment solely on the basis of clinical suspicion should only be considered when a parasitological diagnosis is not accessible.[2] Treatment based on diagnostic testing is good clinical practice and has the following advantages over presumptive treatment of all fever episodes:

- improved care of parasite-positive patients because of confirmation of infection;
- identification of parasite-negative patients, for whom another diagnosis must be sought and treated accordingly;
- avoidance of the use of antimalarial medicine in parasite-negative patients, thereby reducing side effects, drug interactions and selection pressure for drug resistance;
- better public trust in the efficacy of artemisinin-based combination therapy (ACT) when it is used only to treat confirmed malaria cases;
- confirmation of malaria treatment failures; and
- improved malaria case detection, surveillance, and reporting.

Uncomplicated *P. falciparum* malaria should be treated with an ACT. The 5 ACTs currently recommended for use by WHO are artemether plus lumefantrine, artesunate plus amodiaquine, artesunate plus mefloquine, artesunate plus sulfadoxine-pyrimethamine, and dihydroartemisinin plus piperaquine. The choice of the ACT should be based on the therapeutic efficacy of the combination in the country or area of intended use. Artemisinin and its derivatives should not be used as monotherapies for the treatment of uncomplicated malaria as poor adherence to the required 7-day course of treatment results in partial clearance of malaria parasites which will promote resistance to this critically important class of antimalarials.

P. vivax malaria should be treated with chloroquine in areas where this drug is effective; an appropriate ACT (not artesunate plus sulfadoxine-pyrimethamine) should be used in areas where *P. vivax* resistance to chloroquine has been documented. Both chloroquine and ACTs should be combined with a 14-day course of primaquine for the radical cure of *P. vivax* malaria in order to prevent relapses, subject to consideration of the risk of haemolysis in patients with G6PD deficiency.

Severe malaria should be treated with injectable artesunate and followed by a complete course of an effective ACT as soon as the patient can take oral medications. Where complete parenteral treatment of severe malaria is not possible, e.g. in peripheral health posts, patients should be given pre-referral treatment and referred immediately to an appropriate facility for further

2. Within a short time (less than 2 hours) of the patient's presentation at the point of care.

Box 2.3 The T3: Test. Treat. Track. initiative: Scaling up diagnostic testing, treatment and surveillance for malaria

On World Malaria Day 2012, WHO Director-General Margaret Chan launched a new initiative called T3: Test. Treat. Track (*14*) urging malaria-endemic countries, donors and the global malaria community to scale up diagnostic testing, treatment and surveillance for malaria. The initiative calls on endemic countries and stakeholders to ensure that every *suspected* malaria case is tested, that every *confirmed* case is treated with a quality-assured antimalarial medicine, and that every malaria case is tracked in a surveillance system.

T3 is derived from, and builds on, the following core WHO documents:

- *Universal Access to Malaria Diagnostic Testing: an Operational Manual,* 2011
- *Guidelines for the Treatment of Malaria, Second Edition,* 2010
- *Disease surveillance for malaria control: an operational manual,* 2012 (*7*)
- *Disease surveillance for malaria elimination: an operational manual,* 2012 (*8*)

Accurate diagnosis will significantly improve the quality of patient care and ensure that antimalarial medicines are used rationally and correctly. The scale-up of quality-assured antimalarial medicines in the public and private sectors will ensure that all patients with confirmed malaria receive prompt treatment. Improved surveillance for malaria cases and deaths will help ministries to determine which areas or population groups are most affected and help target resources to where they are most needed.

treatment. Options available for pre-referral treatment are: artesunate (rectal), quinine (IM), artesunate (IM) or artemether (IM).

In settings with limited health facility access, diagnosis and treatment should be provided at community level through a programme of community case management (formerly known as home-based management) of malaria. With the introduction of malaria RDTs, malaria can be distinguished from non-malaria febrile illnesses which also need appropriate care, notably pneumonia which is a major cause of childhood mortality. The new strategy targeting the diagnosis and treatment of malaria, pneumonia and diarrhoea at community level is termed integrated community case management (iCCM) of childhood illness.

Based on a recent review of the evidence (*32*) and assessment by the MPAC, WHO recommends that in areas where there is a threat of artemisinin resistance and in areas targeted for *falciparum* malaria elimination, and where a single dose of primaquine as gametocytocide for *P. falciparum* malaria is not yet implemented, a single 0.25 mg base/kg primaquine dose should be given to all patients with confirmed *P. falciparum* malaria on the first day of ACT treatment, except to pregnant women and infants <1 year of age.

2.2.5 Management of antimalarial drug resistance

Antimalarial drug resistance is a major public health problem which hinders the control of malaria. Continuous monitoring of the efficacy of and resistance to antimalarial drugs is important to inform treatment policy and ensure early detection of changing patterns of resistance. Resistance is occurring as a consequence of several factors, including poor treatment practices, inadequate patient adherence to prescribed antimalarial regimens, and the widespread availability of artemisinin-based monotherapies and substandard forms of the drug. In recent years, parasite resistance to artemisinins – the key compounds in ACTs – has been detected in four countries of the Greater Mekong subregion: Cambodia, Myanmar, Thailand and Viet Nam.

WHO recommends that countries routinely conduct therapeutic drug efficacy studies to allow for measurement of the clinical and parasitological efficacy of medicines and the detection of small changes in treatment outcomes when monitored consistently over time. These studies are considered the 'gold standard' for determining antimalarial drug efficacy, and their results are the primary data used by national programmes to revise their national malaria treatment policies for first- and second-line drugs and ensure appropriate management of clinical cases. Therapeutic drug efficacy studies are also used to detect suspected artemisinin resistance, defined as an increase in parasite clearance time, as evidenced by ≥10% of cases with parasites detectable on day 3 after treatment with an ACT.

To interpret and compare results within and between regions and to follow trends over time, therapeutic efficacy monitoring must be conducted with similar standardized procedures. WHO updated the protocol for assessing antimalarial drug efficacy in 2009 (*33*). WHO has also developed a guideline on genotyping malaria parasites to distinguish between reinfection and recrudescence, which is necessary as part of therapeutic efficacy testing (*34*). The following recommendations are drawn from the 2009 edition of *Methods for surveillance of antimalarial drug efficacy* (*31*).

WHO recommendations for management of antimalarial drug resistance are as follows:

1. National malaria control programmes should establish sentinel sites (selected health facilities) for the surveillance of antimalarial drug efficacy. Experience suggests that 4–8 sites per country will achieve a balance between representativeness and practicality. The sentinel sites should represent all the epidemiological strata in the country but it is essential to select a 'manageable' number of sites to ensure proper monitoring and supervision.
2. Efficacy of first- and second-line medicines should be tested at least once every 24 months at all sites. For the purposes of comparability, assessments should always be conducted at the same time of year.
3. A follow-up of 28 days is recommended as the minimum duration for medicines with elimination half-lives of less than 7 days (amodiaquine, artemisinin derivatives, atovaquone–proguanil, chloroquine, lumefantrine, quinine, and sulfadoxine-pyrimethamine). For medicines with longer elimination half-lives (mefloquine, piperaquine), a longer follow-up period of 42 days is necessary.
4. The standard protocol to test the efficacy of medicines against *P. falciparum* needs adjustment for *P. vivax*. Since *P. vivax* infection has a dormant liver stage and therefore the potential to relapse, many countries recommend primaquine therapy for radical cure. Administration of primaquine concurrently or soon after administration of chloroquine may conceal resistance to chloroquine alone, resulting in underestimation of the risk of therapeutic failure or resistance to chloroquine. Therefore, in certain cases primaquine therapy should be postponed until after the 28-day follow-up. Nonetheless, if local health policy includes mandatory administration of primaquine with chloroquine, the failure rate should be considered to be that of the combination regimen.
5. Countries should consider changing the first-line treatment for malaria if the total failure rate (defined as the sum of the patients presenting with early treatment failure, late clinical failure or late parasitological failure) exceeds 10%. The selection of a new antimalarial treatment for use at public health level in the context of national treatment guidelines should be based on an average cure rate of ≥95% as assessed in clinical trials (*31*).

While therapeutic efficacy studies conducted according to a standard protocol provide an excellent indication of drug efficacy, additional studies are needed to confirm and characterize drug resistance. These additional studies include: (i) in vitro studies to measure the intrinsic sensitivity of parasites to antimalarial drugs; (ii) molecular marker studies to identify genetic mutations and subsequently confirm the presence of mutations in blood parasites; and (iii) pharmacokinetic studies to characterize drug absorption and drug action in the body. WHO has prepared a field manual on in vitro assays (*35*) and on methods for assessing exposure to antimalarial drugs (*36*).

Artemisinin resistance

Over the last decade, most countries endemic for *P. falciparum* have shifted their national treatment policies to ACTs, although

therapeutic efficacy studies are still not routinely conducted in many of these countries (*37*). The development of parasite resistance to artemisinins – the key compounds in ACTs – is a major public health concern. In recent years, artemisinin resistance has been detected in four countries of the Greater Mekong subregion: Cambodia, Myanmar, Thailand and Viet Nam. If artemisinin resistance were to spread to India or sub-Saharan Africa, the global consequences could be dire, as no alternative antimalarial medicine is available at present with the same level of efficacy and tolerability as ACTs.

WHO's current working definition of artemisinin resistance is:

- an increase in parasite clearance time, as evidenced by ≥10% of cases with parasites detectable on day 3 after treatment with an ACT (suspected resistance); or
- treatment failure after treatment with an oral artemisinin-based monotherapy with adequate antimalarial blood concentration, as evidenced by the persistence of parasites for 7 days, or the presence of parasites at day 3 and recrudescence within 28–42 days (confirmed resistance).[3]

In January 2011, WHO released the *Global Plan for Artemisinin Resistance Containment* (GPARC) (*37*), outlining the necessary actions to contain and prevent resistance to artemisinins.

Five activities are recommended by the GPARC as important for successful management of artemisinin resistance:

1. Stop the spread of resistant parasites. In areas for which there is evidence of artemisinin resistance, an immediate comprehensive response using a combination of malaria control and elimination measures is needed to stop the survival and spread of resistant parasites.
2. Increase monitoring and surveillance to evaluate the threat of artemisinin resistance. Regular monitoring and surveillance are essential to rapidly identify new foci of resistant parasites and to provide information for containment and prevention activities. Countries endemic for malaria should undertake routine monitoring of antimalarial drugs at sentinal sites every 24 months in order to detect changes in their therapeutic efficacy.
3. Improve access to diagnostics and rational treatment with ACTs. Programmes should ensure: consistent, accurate diagnostic testing of suspected malaria cases; better access to ACTs for confirmed cases; compliance with ACT treatment; removal from the market of oral artemisinin-based monotherapies as well as substandard and counterfeit antimalarial medicines.
4. Invest in research related to artemisinin resistance. Research is important to improve understanding of resistance and the ability to manage it. Priority should be given to research in five disciplines: laboratory research, research and development, applied and field research, operational research, and mathematical modeling.
5. Motivate action and mobilize resources. Successful implementation of the GPARC will depend on motivating many stakeholders at global, regional and national levels to support or conduct the recommended activities.

Neither the mechanism of artemisinin resistance, nor a molecular marker to screen for it, has yet been identified.

Box 2.4 The Technical Expert Group (TEG) on Antimalarial Drug Resistance and Containment

The Technical Expert Group (TEG) on antimalarial drug resistance and containment is a standing committee set up following the recommendations to WHO elaborated at the inaugural meeting of the Malaria Policy Advisory Committee (MPAC) in January 2012. The TEG is tasked with advising the MPAC on policy and recommendations regarding antimalarial drug resistance and containment. The specific roles and responsibilities of the TEG include: evaluating the data being generated on drug resistance; providing evidence-based advice on standards for monitoring antimalarial drug resistance; providing recommendations on the strategies to detect drug resistance and to prevent its spread; and identifying research priorities on drug resistance and containment. The MPAC will review the TEG recommendations.

2.3 Malaria surveillance

The design of malaria surveillance systems depends on two factors: (i) the level of malaria transmission and (ii) the resources available to conduct surveillance. In the control phase in areas of moderate to high transmission, there are often so many malaria cases that it is not possible to examine and react to each confirmed case individually; rather, analysis must be based on aggregate numbers, and action taken at a population level. As transmission is progressively reduced, it becomes increasingly possible, and necessary, to track and respond to individual cases. Indeed in the elimination phase, malaria programmes need to detect each infection, whether or not it is symptomatic, and conduct an investigation of each case to ascertain whether infection was imported or locally acquired and undertake appropriate control measures. The principal feature of surveillance systems in different stages of control are summarized below. Further details can be found in the operation manuals (i) *Disease surveillance* for *malaria control* (*7*) and (ii) *Disease surveillance for malaria elimination* (*8*), which were launched in Namibia by the WHO Director-General on World Malaria Day 2012.

2.3.1. Malaria surveillance systems in the control phase: high and moderate transmission settings

Registers of individual cases are maintained at health facilities, which allow recording of diagnostic tests performed and test results. Given the high frequency of malaria cases and the limited resources for maintaining an extensive recording and reporting system, malaria surveillance systems rely on the reporting and use of aggregate data by district and higher administrative levels. Malaria surveillance is frequently integrated into a

3. This definition is prone to confounding factors (known and unknown) such as splenectomy, haemoglobin abnormalities and reduced immunity.

broader system of health information or communicable disease surveillance.

At the health facility level, case-based surveillance of malaria inpatient cases and deaths is undertaken with the aim of responding to cases of severe disease and attaining a target of zero malaria deaths. Cases are graphed monthly to assess the extent to which control measures are reducing the incidence of malaria.

At district and national levels, cases and deaths are summarized monthly on 5 control charts, in order to assess the efficacy of malaria control interventions and identify trends that require an urgent response. The control charts cover: (i) malaria incidence and mortality rates, (ii) proportional malaria incidence and mortality rates, (iii) general patient attendance rates, (iv) diagnostic activity (annual blood examination rate), and (v) quality of diagnosis and health facility reporting. Analysis is also undertaken by health facility catchment area and by district in order to set priorities for malaria control activities.

2.3.2. Malaria surveillance systems in the control phase: low transmission settings

Registers of individual malaria cases are maintained at health facilities, with records of the diagnostic tests performed and the results. As well as aggregate data being reported to district and higher administrative levels, line lists of inpatients and inpatient deaths are forwarded to district level, and, when case loads and district capacity permit (for example, < 150 patients per district per month), lists of all confirmed cases are submitted monthly. At the health facility level, case-based surveillance of malaria cases and deaths is undertaken, with the aim of identifying population groups with the highest malaria incidence and probable sources of infection. Cases are graphed daily or weekly to identify trends that require attention and are mapped by village to identify clusters of cases.

At the district level, malaria cases and deaths are summarized weekly or monthly on the same 5 control charts used in high-transmission settings, in order to assess the impact of malaria control interventions and identify trends that require urgent response. Analysis is undertaken by health facility catchment area and by village in order to set priorities for activities. A register of severe cases and deaths is maintained and investigations undertaken to identify and address programme weaknesses.

At the national level, cases and deaths are summarized monthly on the 5 control charts in order to assess the impact of malaria control interventions. Analysis is undertaken by district in order to set priorities for activities.

2.3.3. Malaria surveillance systems in the elimination phase

Case-based surveillance is carried out and each confirmed case is immediately notified to the district, provincial and central levels. A full investigation of each case is undertaken to determine whether the infection was imported, acquired locally by mosquito-borne transmission (indigenous or introduced) or induced. The national reference laboratory reconfirms all positive test results and a sample of negative test results, and organizes laboratory participation in a national quality assurance network.

Each new focus of transmission is investigated, including an entomological investigation, to ascertain risk factors and devise the optimal strategies for control. The focus is classified, and its status is updated continuously.

The malaria programme monitors the extent of surveillance, mainly by tracking blood examination rates by village and by month in high-risk foci and comparing the number of diagnostic tests done with the number expected.

Programme managers at district level keep: (i) malaria case investigation forms, patient records, focus investigation forms and a register of foci with changes in status; (ii) maps showing the distribution of cases by household, vector breeding places, possible sites of transmission and geographical features, such as hills, rivers and roads; and (iii) data on integrated vector control interventions.

Full documentation of programme activities and surveillance results is kept securely at national level in preparation for certification of malaria elimination.

2.4 Malaria elimination

Box 2.5 Definitions of control, elimination, certification and eradication (*38*)

Malaria control: the reduction of the malaria disease burden to a level at which it is no longer a public health problem.

Malaria elimination: the reduction to zero of the incidence of infection caused by human malaria parasites in a defined geographical area as a result of deliberate efforts. Continued measures to prevent re-establishment of transmission are required.

Certification of malaria-free status: granted by WHO after it has been proven beyond reasonable doubt that the chain of local human malaria transmission by *Anopheles* mosquitoes has been fully interrupted in an entire country for at least 3 consecutive years.

Malaria eradication: permanent reduction to zero of the worldwide incidence of infection caused by a particular malaria parasite species.

From a country perspective, interruption of local mosquito-borne malaria transmission, i.e. elimination of malaria, is the ultimate goal of malaria control. The WHO recommendations regarding malaria elimination are summarized below: (*38*, *39*)

1. In areas of high, stable transmission, where a marked reduction in malaria transmission has been achieved, a 'consolidation period' should be introduced, in which (i) achievements are sustained, even in the face of limited disease; (ii) control strategies are reviewed; (iii) health services adapt to the new clinical and epidemiological situation including reduced levels of immunity; and (iv) surveillance systems are strengthened to allow rapid response to new cases. This transformation phase precedes a decision to re-orient programmes towards elimination. As countries achieve marked reductions in levels of transmission, they should review their malaria control strate-

gies. It is crucial to avoid failure to sustain malaria control and the resulting resurgence of malaria, as has occurred in the past.

2. Countries with low, unstable transmission should be encouraged to proceed to malaria elimination. Before making this decision, however, countries should take account of the overall feasibility, including entomologic situation, programmatic capacity, fiscal commitment, political commitment, and potential threats to success, including the malaria situation in neighbouring countries. Malaria elimination may require regional initiatives and support, and will require strong political commitment.
3. Countries with an absence of locally acquired malaria cases for 3 consecutive years, and with sufficiently robust surveillance and reporting systems in place to demonstrate this achievement, are eligible to request WHO to initiate procedures for certification that they are malaria-free.
4. Failure to sustain malaria control will result in a resurgence of malaria. Therefore, public and government commitment to intensified malaria control and elimination needs to be sustained even after the malaria burden has been greatly reduced.

Malaria control today relies heavily on a limited number of tools, in particular artemisinin derivatives and pyrethroids, both of which can become less effective because of resistance. The future of global malaria control and elimination therefore depends on the ability of research and development to deliver

Table 2.1 Updated Global Malaria Action Plan (GMAP) objectives, targets, and milestones beyond 2011

Objective	Targets	Milestones
Objective 1 Reduce global malaria deaths to near zero by end 2015	**Target 1.1 Achieve universal access to case management in the public sector.** By end 2013, 100% of suspected malaria cases receive a malaria diagnostic test and 100% of confirmed cases receive treatment with appropriate and effective antimalarial drugs.	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 malaria cases receive a malaria diagnostic test and 100% of confirmed cases receive treatment with appropriate and effective antimalarial drugs.	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 having 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.	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). 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.** By end 2013, in countries where universal access and utilization have not yet been achieved, achieve 100% access to and utilization of prevention measures for all populations at risk with locally appropriate interventions.	None, as the target is set for 2013.
	Target 2.2 Sustain universal access to and utilization of prevention measures. By 2015 and beyond, all countries sustain universal access to and utilization of an appropriate package of preventive interventions.	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 end 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.	By end 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 WHO European Region		By end 2013, malaria is eliminated in 3 new countries.

Table 2.2 Indicators for measuring progress towards GMAP objectives and targets

GMAP Objective or Target	Key Indicator	Further Analysis	Supporting Indicator
Objective 1 Reduce global malaria deaths to near zero* by end 2015	Inpatient malaria deaths per 1000 persons per year	Has health facility reporting completeness changed over time?	Completeness of monthly health facility reports
	All-cause under 5 mortality rate	What factors are responsible?	**Programme coverage indicators in this table (detailed below)**
Target 1.1 Achieve universal access to case management in the public sector	Proportion of suspected malaria cases that receive a parasitological test		
	Proportion of children under 5 years old with fever in the last 2 weeks who had a finger or heel stick	Are people seeking advice or treatment for fever and from where?	**Proportion of children under 5 years old with fever in the last 2 weeks for whom advice or treatment was sought**
Target 1.2 Achieve universal access to case management, or appropriate referral, in the private sector	Proportion of confirmed malaria cases that receive first-line antimalarial treatment according to national policy	Are adequate quantities of antimalarial medicines available?	Proportion of health facilities without stock-outs of key commodities by month
Target 1.3 Achieve universal access to community case management (CCM) of malaria	**Proportion receiving first-line treatment among children under 5 years old with fever in the last 2 weeks who received any antimalarial drugs**		
Objective 2 Reduce global malaria cases by 75% by end 2015 (from 2000 levels)	Confirmed malaria cases (microscopy or RDT) per 1000 persons per year	Has diagnostic effort changed over time?	Annual blood examination rate
		Has health facility reporting completeness changed over time?	Completeness of monthly health facility reports
		Have test positivity rates changed over time?	Malaria test positivity rate
	Parasite prevalence: proportion of children aged 6–59 months with malaria infection	Is there other evidence of morbidity change?	**Proportion of children aged 6–59 months with a hemoglobin measurement of <8 g/dL**
Target 2.1 Achieve universal access to and utilization of prevention measures**	**Proportion of population with access to an ITN within their household**	How many households have at least one ITN?	**Proportion of households with at least one ITN**
		How many households have enough ITNs for each occupant?	**Proportion of households with at least one ITN for every two people**
		Were enough ITNs delivered to ensure at least one ITN per two people at risk?	Proportion of population at risk potentially covered by ITNs distributed
		Are specific risk groups receiving ITNs?	Proportion of targeted risk group receiving ITNs
	Proportion of population that slept under an ITN the previous night	Are specific population groups using ITNs?	**Proportion of children under 5 years old who slept under an ITN the previous night**
			Proportion of pregnant women who slept under an ITN the previous night
Target 2.2 Sustain universal access to and utilization of prevention measures**		Are available ITNs being used?	**Proportion of existing ITNs used the previous night**
	Proportion of population protected by IRS within the last 12 months		
	Proportion of households with at least one ITN for every two people and/or sprayed by IRS within the last 12 months	How many households have been reached with at least one vector control method?	**Proportion of households with at least one ITN and/or sprayed by IRS within the last 12 months**
	Proportion of women who received 3 or more doses of intermittent preventive treatment for malaria during ANC visits during their last pregnancy* **	Is IPTp received by all pregnant women at each scheduled ANC visit?	Proportion of women attending ANC who received 1, 2, 3, or 4 doses of IPT***
Target 2.3 Accelerate development of surveillance systems	Percent of districts reporting monthly numbers of suspected malaria cases, number of cases receiving a diagnostic test and number of confirmed malaria cases		
Objective 3 Eliminate malaria by end 2015 in 10 new countries (since 2008) and in the WHO European Region	Number of new countries in which malaria has been eliminated	What are the trends in malaria cases?	Number of active foci reported per year
			Number of cases by classification (indigenous, introduced, imported, induced)
		How strong are surveillance systems?	Proportion of private facilities reporting to national malaria surveillance system

■ Indicator derived from household surveys

* In areas where public health facilities are able to provide a parasitological test for all suspected malaria cases, near zero malaria deaths is defined as no more than 1 confirmed malaria death per 100,000 population at risk.

** Universal access to and utilization of prevention measures is defined as every person at risk sleeping under a quality insecticide-treated net or in a space protected by indoor residual spraying and every pregnant woman at risk receiving at least one dose of intermittent preventive treatment (IPTp) during each of the second and third trimesters (in settings where ITPp is appropriate).

*** Reflects WHO IPTp policy updated in 2012. Indicators focused on 2 doses of IPTp presented in chapter 5 reflect experience through 2011 with the previous IPTp policy.

a steady output of tools to replace those which become ineffective because of resistance, and to devise new tools to make elimination of malaria possible in high transmission situations.

2.5 Goals and targets for malaria control and elimination

Malaria control forms part of Millennium Development Goal (MDG) 6, Target 6.C – to have halted by 2015 and begun to reverse the incidence of malaria and other major diseases. Given that malaria accounted for 7% of post-neonatal child deaths globally in 2010 and 15% of post-neonatal child deaths in Africa (*40*), it is also central to MDG 4, Target 4.A – to reduce by two thirds, between 1990 and 2015, the under-five mortality rate. Malaria control is additionally expected to contribute to achievement of MDG 1 (eradicate extreme poverty and hunger), MDG 2 (achieve universal primary education) MDG 3 (promote gender equality and empower women), MDG 5 (improve maternal health) and MDG 8 (develop a global partnership for development).

In 2005, the World Health Assembly set as a target the reduction of malaria cases and deaths by 75% by 2015 (*41*). In 2011 the RBM partnership updated the objectives, targets and milestones set out in the Global Malaria Action Plan in 2008 (*42*). The update retains the objective to reduce malaria cases by 75% from 2000 levels by 2015, but also has a more ambitious target, the reduction of malaria deaths to near zero by 2015 (see **Table 2.1**).[4] The objectives of mortality and morbidity reduction are linked to targets for malaria prevention and case management, and to the milestones for individual years before 2015. Another objective is to eliminate malaria by the end of 2015 in 10 new countries (since 2008) and in the WHO European Region.

2.6 Indicators of progress

The updated objectives, targets and milestones not only provide direction for the implementation of malaria control programmes but also a framework for monitoring and evaluation. A list of recommended indicators for each target is shown in **Table 2.2**. With one exception, the selection of indicators is the same as those outlined previously in the *World Malaria Report 2011* (*43*), but arranged according to the updated objectives and targets. The exception is that malaria-specific mortality, as measured through verbal autopsy, has been excluded as a means of routine malaria mortality monitoring owing to lack of specificity in most settings. Indicators that can be generated from household surveys are shown in bold. In some cases, the indicators generated by household surveys, such as parasite prevalence, do not measure a target directly but the indicator is in widespread use and therefore placed with the most appropriate RBM target.

4. 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 1 confirmed malaria death per 100 000 population at risk.

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CHAPTER 3

Financing malaria control

This chapter reviews (i) recent trends in international and domestic financing for malaria control in relation to resource requirements, and (ii) the observed distribution of malaria funding in relation to different models of resource allocation.

3.1 International financing of malaria control

International disbursements to malaria-endemic countries increased every year from less than US$ 100 million in 2000 to US$ 1.71 billion in 2010 and were estimated to be US$ 1.66 billion in 2011 and US$ 1.84 billion in 2012 (**Figure 3.1**, **Box 3.1**). The Global Fund remains the largest source of funding for malaria control globally, accounting for 39% of estimated disbursed funds in 2011 and 40% in 2012. The recent leveling off in the rate of increase in funds available for malaria control has been primarily due to lower levels of disbursements from the Global Fund in 2011 and 2012 compared to 2009 and 2010 when it accounted for 58% of funds disbursed (reflecting the large amounts allocated to malaria in Rounds 8 and 9 of grant awards). In 2011 the Global Fund announced the cancellation of Round 11 of Grant Awards. A Transitional Funding Mechanism was established to ensure continuity of programmes in countries due for grant renewal in Round 11 but the mechanism does not allow for further scale-up of programmes. In 2012 the Global Fund Board approved a new funding model which will be implemented between 2013 and 2014 (**Box 3.2**). AMFm operations will be integrated into the new Global Fund grant management process (**Box 3.3**). The reductions in Global Fund disbursements have been offset by increased funding from the US President's Malaria Initiative (PMI) and the United Kingdom's Department for International Development (DFID), which accounted for 31% and 11% respectively of estimated disbursements in 2011–2012.

Estimates of the funds available for malaria control between 2012 and 2015 are projected from formal commitments made by funding agencies or, if data are not available, from pledges (**Box 3.1**). The analysis predicts modest increases in international funding for malaria control of 8% in 2013 and 6% in 2014 compared to 2012.

Box 3.1 Sources of information on international funding for malaria control

The Global Fund provides information on disbursements for malaria control continuously online and data were available for the purpose of this report up to November 2012 (*1*).

For the Global Fund, actual disbursements are shown up to November 2012 and annualized by multiplying by 12/11. Future funding is assumed to follow the grant disbursements in the forecast of assets presented to the Global Fund 28th Board Meeting in November 2012 (*2*) with malaria funding comprising 28% of future disbursements, in keeping with the proportion of disbursements attributed to malaria observed between 2010 and 2012.

For other development agencies information on disbursements is available up to, and including, 2010 through the OECD Development Co-operation Directorate data base on official development assistance (*3*). For 2011 and 2012 PMI funding is estimated at US$ 547 million based on the commitments in PMI's Operational Plans (*4,5*), and is assumed to be held at that level until 2015. DFID funding to endemic countries for malaria control, excluding the funds it provides to AMFm, is projected to increase from US$ 77 million in 2010 to US$ 375 million in 2015. Future funding for DFID was estimated as the average of a lower case scenario (amounts allocated for malaria control in country operational plans (*6*)) and an upper case scenario (a total of US$ 500 million allocated to malaria control excluding Global Fund and other contributions). Funding from the PMI and DFID are subject to annual legislative review. For the World Bank, future funding is assumed to remain at 2010 levels, the latest year for which data are available, at US$ 72 million. This assumption is also made for agencies falling into the "other" category of **Figure 3.1**. AMFm disbursements in 2010 and 2011 totaled US$ 139 million excluding supporting interventions (*7*), with a total of US$ 245 expected to be disbursed during 2012 and 2013. AMFm funding beyond 2013 is uncertain, and is excluded from the graph (applications for AMFm funding will be rolled into general Global Fund grant applications in the future, see **Box 3.3**). AUSAid projected disbursements include US$ 100 million pledged in November 2012 over the course of 4 years, commencing 2013 (*8*).

Notes:

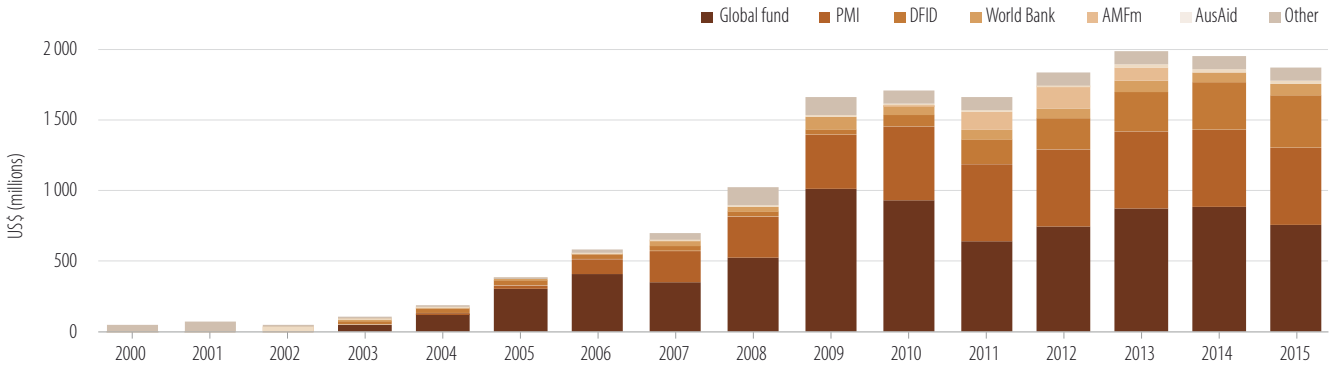
Pledge: A non-binding announcement to contribute a certain amount of funds.

Commitment: A firm obligation to provide money for malaria control activities or purchasing commodities.

Disbursement: The disbursement is the transfer of funds which places resources at the disposal of a government or other implementing agencies.

Expenditure: The use of funds to pay for commodities, buildings, equipment, salaries or services (including training, supervision, quality control, monitoring and surveillance etc.

Figure 3.1 Past and projected international funding for malaria control 2000–2015



Source: *See Box 3.1*

3.2 Domestic financing of malaria control

WHO obtains information on domestic financing from data submitted by NMCPs for the *World Malaria Report*. Such reports include malaria-specific expenditures incurred by NMCPs for commodities, programme supervision and management, training, and behavioural change interventions. They exclude general health systems spending such as the cost of health workers, hospitals, clinics and other infrastructure for the treatment of malaria, which are typically provided by the national governments or supported by non-governmental organizations (NGOs).

Where NMCP data were unavailable, published estimates of domestic financing for 2006–2010, derived from information contained in Global Fund grant applications, were used (*10*). Reported data suggest that domestic financing for malaria increased in all WHO Regions between 2005 and 2011 except in the European Region (**Figure 3.2**). The Region of the Americas and the African Region report the greatest expenditure on malaria control. Total domestic spending was estimated to be US$ 625 million in 2011.

Box 3.2 Summary of the Global Fund New Funding Model – November 2012

The Global Fund announced on November 15th, 2012 the adoption of a new method of funding programmes in HIV, TB and malaria (*9*). The new funding model will replace the rounds-based system, used by the Global Fund from 2002 to 2010. Key features of the new funding model are:

1. Fund allocation

Resources available for allocation to countries will be determined every 3 years in alignment with the Global Fund replenishment cycle.

A notional funding amount for each disease will be determined (for 1 year until a new formula is developed) based on historical expenditure (i.e. 52% for HIV, 32% for malaria and 16% for TB).

Countries will be grouped into Country Bands based upon a composite score which is a combination of a country's GNI and its disease burden. There will be 4 Country Bands as follows, with the Board retaining the right to review the composition of bands prior to each allocation period:

- Band 1: Lower income[1]/high burden
- Band 2: Lower income/low burden
- Band 3: Higher income/high-medium burden
- Band 4: Specific high risk populations

After making the global disease split (i.e. 52% for HIV, 32% for malaria and16% for TB), until a new formula is determined, the Board will then apportion a share of the total available funding to each of the Country Bands. As a hypothetical example: Band 1 might contain 29 countries and receive 52% of the available funding; Band 2, 20 countries and 7% fund allocation; Band 3, 17 countries and 31% fund allocation; Band 4, 60 countries and 10% fund allocation.

As part of this allocation, the Board will divide the total resources allocated to each of the Country Bands into Indicative Funding and Incentive Funding. Indicative Funding will allow predictability for applicants' prioritized needs, whereas Incentive Funding will encourage high impact/performance to obtain additional funding.

Funding for the 3 diseases – HIV, TB and malaria – will be allocated in one block to recipient countries which will then decide upon the allocations to each of the 3 disease programmes.

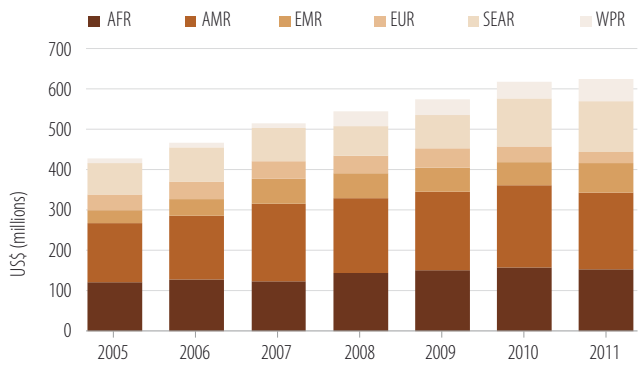
2. Access to funding

The Global Fund will transition to the new funding model immediately, with pilot testing of the system in a transition phase during 2013. Before the end of 2012, the Board will advise as to the level of uncommitted assets which will be made available during the transition phase. The Secretariat will then invite selected countries to participate in the transition phase.

Countries that are not selected to participate in the transition phase will nevertheless be encouraged to develop their national strategies. This will ensure that Concept Notes articulating full expressions of demand can be developed and ready to request funding, based on the replenishment in early 2014.

1. "Lower income" is defined as less than US$ 1200 GNI per capita based on World Bank data. "Higher income" is defined as greater than US$ 1200 GNI per capita.

Figure 3.2 Domestic funding for malaria control 2005–2011



Source: NMCP reports

3.3 Comparison of resources available and resource requirements

Global resource requirements for malaria control were estimated in the 2008 Global Malaria Action Plan (GMAP) to exceed US$ 5.1 billion per year between 2011 and 2020. In Africa alone, the resource requirements estimated by GMAP were, on average, US$ 2.3 billion per year during the same period (*11*). Combining both domestic and international funds, the resources available for malaria control globally were estimated to be US$ 2.3 billion in 2011, leaving a gap of US$ 2.8 billion. Projections of both domestic and international resources available indicate that total funding for malaria control will remain at less than US$ 2.7 billion between 2013 and 2015.

In an effort to estimate future spending shortfalls, the Roll Back Malaria Harmonization Working Group supported 41 malaria-endemic countries in sub-Saharan Africa to undertake gap analyses in 2012. The gap analysis estimates the resources required to achieve universal coverage of malaria control interventions between 2012 and 2015 and identifies resources already committed. Each country generates its own projections of resources required, which means that the estimates may not be standardized across countries, but do reflect the gaps that the countries expect. In line with the GMAP, the gap analysis suggests that an average of US$ 2.1 billion per year is required between 2012 and 2015 to achieve universal coverage in the 41 participating countries. Taking account of the funds already secured by countries, the financing gap amounts to US$ 3.8 billion between 2012 and 2015.

3.4 Raising additional funds

As current funding for malaria programmes falls short of the amount required to achieve universal access to malaria interventions, this implies that funding needs to be increased from existing levels and/or that malaria control programmes should seek cost savings so that more can be done with existing

Box 3.3 Affordable Medicine Facility-malaria (AMFm)

The Affordable Medicines Facility–malaria (AMFm) has been hosted as a separate business line within the Global Fund since 2008. It is a financing mechanism designed to expand access to quality-assured artemisinin-based combination therapies (QAACTs) by increasing their availability and decreasing their prices relative to less effective antimalarial medicines and artemisinin monotherapies. Its goals are to reduce malaria-related deaths and delay the onset of resistance to artemisinin.

The AMFm operates through three parallel mechanisms: (i) negotiations with pharmaceutical manufacturers to reduce ex-factory prices of QAACTs for public and private sector buyers, (ii) further reductions of the price paid by primary buyers (importers) through a subsidy ("co-payment") paid on their behalf directly to manufacturers, and (iii) supporting interventions at country-level to facilitate the safe and effective scale-up of access to QAACTs.

The AMFm Phase 1 has been funded from 2010 to 2012 from two sources: (i) a co-payment fund of approximately US$ 338 million to subsidise ACTs, financed by UNITAID, the governments of the United Kingdom and Canada, and the Bill & Melinda Gates Foundation; and (ii) a further amount of US$ 127 million to finance supporting interventions at country level, funded from the re-programming of ACT procurement funds from existing Global Fund malaria grants in the pilot countries.

The AMFm has been implemented through the public, private for-profit, and private not-for-profit sectors in 9 pilot trials in 8 countries: Cambodia, Ghana, Kenya, Madagascar, Niger, Nigeria, Uganda, and United Republic of Tanzania (Mainland and Zanzibar). Implementation of Phase 1 started in mid-2010 with the signing of grant agreements with the Global Fund and the ordering of co-paid ACTs by in-country buyers, and will end on 31 December 2012.

In line with WHO recommendations, the Global Fund at its 28th Board Meeting in November 2012, agreed that in order to improve the targeting of malaria treatment, efforts are necessary to improve access to affordable and quality-assured malaria diagnostic testing as an integral part of future initiatives aiming at improving access to ACTs in both the public and private sectors (*9*).

The Global Fund Board decided to modify the existing AMFm business line by integrating the current operations (price negotiations with manufacturers, direct co-payments from the Global Fund to manufacturers on behalf of approved first-line buyers, and use of supporting interventions) into the new Global Fund grant management and financial processes. Existing pilot countries will continue to receive support in 2013, considered to be a transition period, to ensure a smooth and orderly transition to the new co-payment mechanism. For this the Global Fund has estimated a need for US$ 114–154 million to fund co-payment of ACTs, and up to an additional US$ 26 million for critical supporting interventions. In recognizing the importance of ensuring access to both affordable diagnostic testing and treatment for malaria, and the role of the private sector in providing this access, the Global Fund will assess how to incorporate diagnostic testing in the co-payment system.

Figure 3.3 Example options for closing funding gaps

funds. The *World Malaria Report 2011* reviewed options for cost savings and raising revenue. Potential options are summarized in **Figure 3.3**.

In many settings ITNs and other vector control interventions account for the majority of malaria programme expenditure. ITNs have a limited lifespan and need to be replaced every 2 to 3 years; as 2010 was the year in which the procurement of ITNs peaked, funding is urgently needed to replace ITNs in 2013. As well as overall levels of funding, the timing of funding is also critical.

Experience has repeatedly shown that weakening of malaria control efforts leads to resurgences of malaria (*12*), with reductions in funding being the most important contributing factor. It is therefore essential that levels of funding for malaria control are at least maintained at previous levels if outbreaks are to be avoided, and increased if further reductions in malaria cases and deaths are to be attained.

3.5 Distribution of available funding

Figure 3.4 shows domestic and external disbursements in 2006–2010 according to: (i) WHO Region, (ii) size of population at high risk of malaria, (iii) GNI per capita, and (iv) estimated malaria mortality rates.

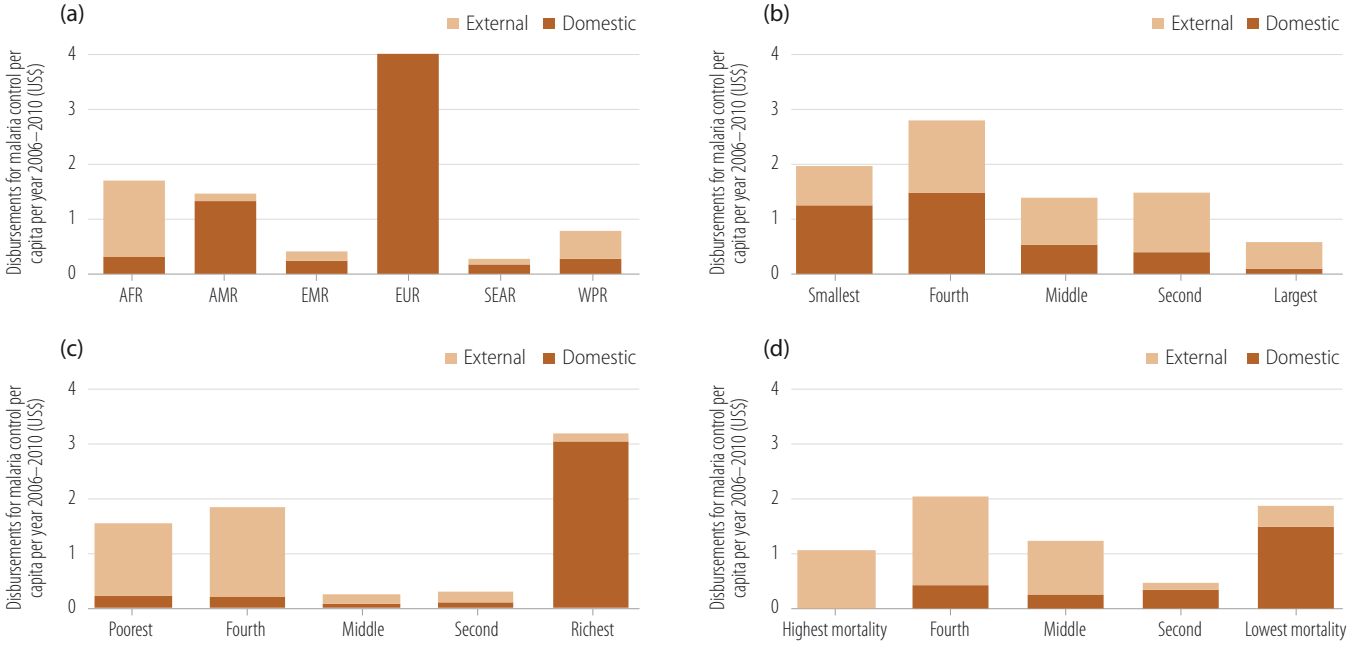
Domestic funding per capita for malaria in 2006–2010 is highest in the European Region and the Region of the Americas, while external funding is greatest in the African and Western Pacific Regions. Total disbursements for malaria control were lowest in the Eastern Mediterranean and South-East Asia Regions.

Countries with larger populations at high risk of malaria have lower levels of domestic malaria funding per capita than those with smaller populations at risk. Countries with the largest populations at risk also receive the lowest levels of international financing per capita and, as a consequence, have the least amounts per person at risk overall. Part of the reason for the apparent low levels of disbursements in large countries could be that populations at risk are estimated less precisely and are prone to over-estimation. In particular, if populations at risk are defined at a comparatively high administrative level (e.g. province), all of the population may be classified as being at high risk even if risk is confined to a limited part of the administrative area. Another factor in the lower level of international funds received by countries with larger populations at risk is affordability; the 20% of countries with the largest populations at risk account for 67% of the total population at risk of malaria and spend approximately US$ 0.60 per capita per year. If spending on malaria control in these countries were to increase to the levels seen in the smallest countries (approximately US$ 2.00 per capita) then total spending on malaria would increase to US$ 3.9 billion per year, 70% higher than the US$ 2.3 billion estimated expenditure in 2011.

Countries in the highest quintile of GNI per capita invest vastly more of their own money per capita on malaria control than countries in other quintiles. These wealthier countries have lower malaria burdens, accounting for just 1% of estimated cases in 2010 and 0.3% of deaths; they include 5 countries which spend more than US$ 5.00 per capita per year (Azerbaijan, Costa Rica, Malaysia, South Africa, and Turkey). The high expenditures are partly related to the drive towards elimination of malaria in

Figure 3.4 Domestic and external disbursements 2006–2010 according to: (a) WHO Region (b) size of population at risk of malaria (c) GNI per capita (d) estimated malaria mortality rates

Data on disbursements are available only up to 2010 for most agencies (See **Box 3.1**)



Source: *WHO financing database, NMCP reports, World Bank GNI data, WHO estimates*

some countries. International assistance is focused on countries in the lower two quintiles of GNI per capita.

Domestic financing is lowest in countries with the highest malaria mortality rates; these are usually countries with lower GNI per capita (**Chapter 8**, **Section 8.4**). International financing is targeted to countries with relatively high malaria mortality rates, but it appears that countries with the highest mortality rates receive less per capita than those in the middle and fourth quintiles.

3.6 Options for resource allocation

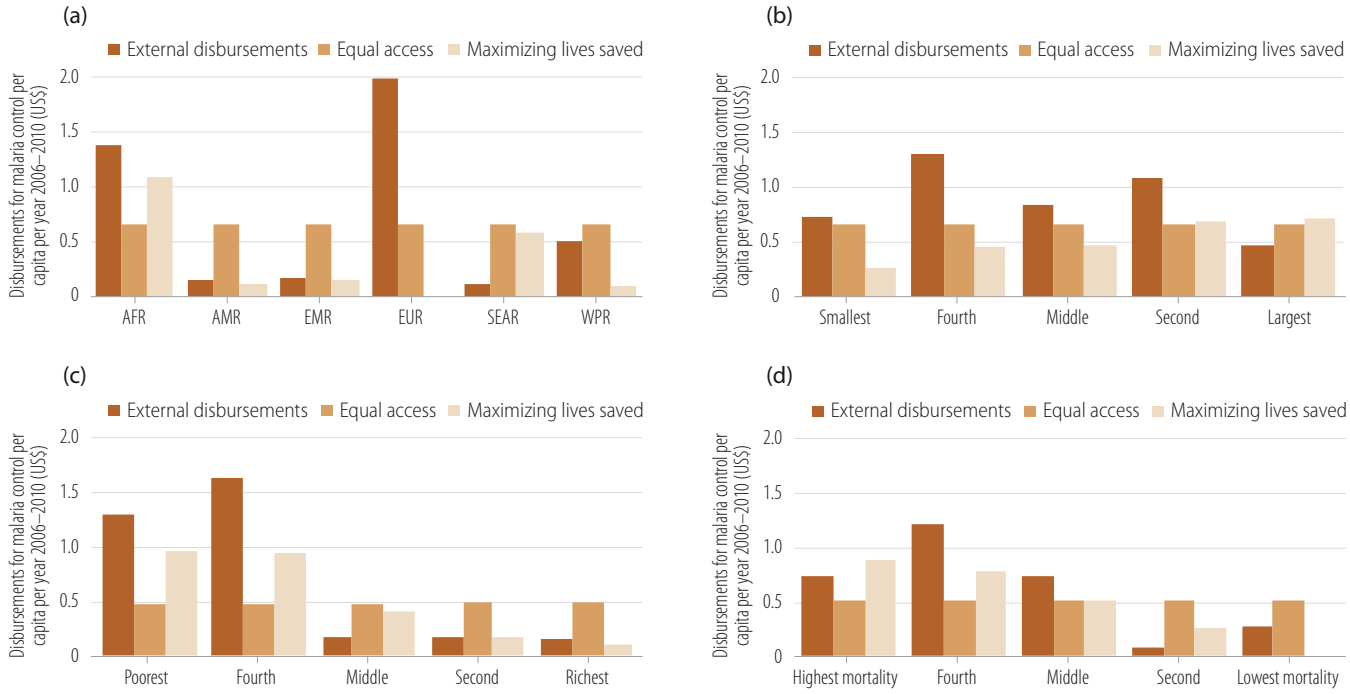
The observed gap between the funding available for malaria control and the amount required to achieve universal coverage of malaria interventions implies that choices need to be made (and have been made) about which countries or populations should benefit from malaria control and which should not. Clearly, there is little scope for reallocating domestic government funds for malaria control – the amount raised per capita in a country will depend on domestic government revenues and on the priority given to spending on malaria relative to other government programmes. For international funding the choice of countries that should benefit will be influenced by the ability of domestic governments to pay for malaria control, commitments made by other donors, and the impact achievable, which is influenced by the epidemiological setting and the capacity of endemic countries to utilize funds. Each choice will have consequences in terms of cases averted and lives saved. It is possible to illustrate the consequences of different choices by comparing two models of international resource allocation:

1. Allocation of available funding according to the size of population at risk (*equal access model*). A justification for this model is that in many malaria programmes the majority of international funding is spent on malaria prevention (ITN and IRS programmes) (*13*). Achievement of universal coverage of malaria interventions would largely follow this pattern of resource allocation since a main driver of costs is malaria prevention which depends on the size of the population at risk. Two features of this model are that: (i) the allocation of funds is not influenced by a country's wealth or malaria mortality rates, but funds are allocated simply in proportion to the resources required to achieve universal access to malaria interventions; and (ii) each person at risk is given equal opportunity to receive malaria interventions.
2. Allocation of funding according to malaria mortality rates estimated in each country (*maximizing lives saved model*). A justification for this model is that when malaria interventions, such as ITNs, are deployed in areas with high mortality rates they are likely to have greater impact in terms of averting cases and saving lives than if deployed in lower risk areas. In this model, funds are first allocated to the country where malaria mortality rates are highest (this is also where the benefit per unit of investment is likely to be greatest or where the cost of saving a life is lowest). After disbursing sufficient funds to achieve universal coverage of interventions in that country, funds are allocated to the country with the second highest mortality rate (and second lowest cost per life saved). This pattern is repeated until all funding for that year has been exhausted.

With the *equal access* model funds would flow equally to each Region or grouping of countries and population sub-group according to the size of population at risk. With the *maximizing lives saved* model, funds would flow preferentially to the African and South-East Asia Regions, and resources would be prioritized to poorer countries and countries with larger populations at risk and higher malaria mortality rates. A feature of the *maximizing lives saved* model is that as funds become more constrained, a

Figure 3.5 Comparison of historical external disbursement patterns with two models of resource allocation by: (a) WHO Region (b) size of population at risk of malaria (c) GNI per capita (d) estimated malaria mortality rates

Data on disbursements are available only up to 2010 for most agencies (See **Box 3.1**)

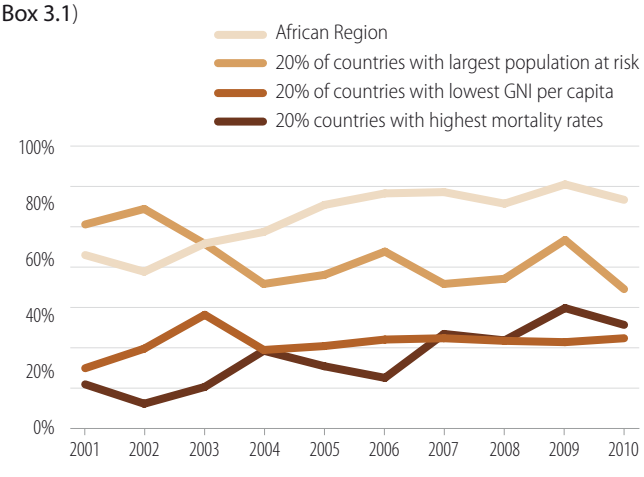


greater proportion of funds go to countries with the highest mortality rates (which are also generally the poorest). In contrast, in the *equal access* model the proportion of funds allocated to a country remains constant irrespective of the total budget envelope.

Historical funding patterns have prioritized the African Region, providing fewer funds to the South-East Asia Region and countries with larger populations at risk than in either of the two models outlined above (**Figure 3.5**). A comparison over time indicates that international disbursements have been increasingly targeted to the African Region and to countries with the highest malaria mortality rates and lowest GNI per capita (**Figure 3.6**). The proportion of funds received by countries with the largest populations at risk has decreased (although the absolute value of these funds increased from US$ 32 million in 2001 to US$ 800 million in 2010).

Figure 3.6 Change over time in allocation of international funds for malaria control

Data on disbursements are available only up to 2010 for most agencies (See **Box 3.1**)



Source: *See Box 3.1*

3.7 Conclusions

International disbursements to malaria-endemic countries increased every year from less than US$ 100 million in 2000 to US$ 1.71 billion in 2010, and were estimated to be US$ 1.66 billion in 2011 and US$ 1.84 billion in 2012. The leveling off in the rate of increase in funds available for malaria control has been primarily due to lower levels of disbursements from the Global Fund in 2010 and 2011 compared to 2009 and 2010. In 2011 the Global Fund announced the cancellation of Round 11 of Grant Awards. A Transitional Funding Mechanism was established to ensure continuity of programmes in countries due for grant renewal in Round 11 but the mechanism does not allow for further scale-up of programmes.

Reported data suggest that domestic financing for malaria has increased in all WHO Regions during 2005–2011 except in the European Region. The Region of the Americas and the African Region report the greatest expenditure on malaria control. Total domestic spending in 2011 was estimated to be US$ 625 million.

Global resource requirements for malaria control were estimated in the 2008 Global Malaria Action Plan (GMAP) to exceed US$ 5.1 billion per year between 2011 and 2020. Combining both domestic and international funds, the resources available for malaria control globally were estimated to be US$ 2.3 billion in 2011, leaving a funding gap of US$ 2.8 billion. Projections of available domestic and international resources indicate that total funding for malaria control will remain at less than US$ 2.7

billion between 2013 and 2015, substantially below the amount required to achieve universal access to malaria interventions.

A review of historical funding patterns indicates that international funding for malaria control has been targeted to countries with lower GNI per capita and higher mortality rates, particularly those in Africa. Domestic funding for malaria per person at risk is highest in the European Region and the Region of the Americas and lowest in the South-East Asia Region. Countries in the highest quintile of GNI per capita invest much more money per capita in malaria control than countries in other quintiles. These wealthier countries have lower malaria burdens, accounting for just 1% of estimated cases in 2010 and 0.3% of deaths; their higher expenditures are partly related to the drive towards elimination of malaria in some countries. Countries with the largest populations at risk of malaria – and the highest malaria mortality rates – have the lowest levels of domestic malaria funding per capita.

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CHAPTER 4

Vector control for malaria

This chapter (i) quantifies the need for malaria vector control, (ii) reviews adoption of national policies for malaria vector control, (iii) reviews progress towards the goal of universal ITN/LLIN access and utilization, and (iv) reviews monitoring and management of insecticide resistance in malaria vectors.

4.1 Need for vector control

WHO recommends that in areas targeted for malaria vector control, all persons at risk should be protected by ITNs or IRS. The choice of ITNs or IRS depends on a number of entomological, epidemiological, and operational factors including seasonality of transmission, vector survival and behavior, and insecticide susceptibility of anopheline vectors. Malaria-endemic countries which report to WHO classify their populations as being at high risk (annual parasite index of ≥1/1000) or at low risk (API <1/1000) for malaria. Areas of high malaria risk are considered most in need of vector control interventions. The need is most obvious for sub-Saharan Africa, where the characteristics of the predominant malaria vectors and the homogeneity of malaria risk indicate that almost all 780 million persons at risk would benefit from vector control with ITNs or IRS. To protect all those at risk of malaria in sub-Saharan Africa, approximately 150 million ITNs would be needed each year (assuming that they are LLINs, that a typical LLIN lifespan is 3 years, and that 1 LLIN is distributed per 1.8 persons). If the average LLIN lifespan is actually less than 3 years, as suggested by some data (*1*), then true replacement needs could be greater. Increased coverage with IRS could decrease these estimated LLIN requirements.

In malaria-endemic areas outside Africa, due to the heterogeneity of malaria transmission, estimating the population at risk of malaria is more challenging and estimating vector control needs, in particular the needs for ITNs, has proven difficult. Among the 2.6 billion persons at risk of malaria outside Africa, 568 million are considered by NMCPs to be at high risk and may therefore benefit most from vector control measures. Nearly half (273 million) of the high risk population outside Africa resides in India. Given the heterogeneity of malaria transmission in most malaria-endemic areas outside Africa, these numbers may be overestimates, as high malaria rates measured in one area may not be applicable to the entire administrative region. As malaria risk is defined at more precise levels through improvements in surveillance, the estimated needs for vector control outside Africa may also become clearer.

4.2 ITN/LLIN policy and implementation

4.2.1 Policy adoption and ITN/LLIN distribution

Adoption and implementation of policies for ITN/LLIN programmes by WHO Regions is shown in **Table 4.1** and adoption of policies by country is shown in **Annex 2A**.

A total of 89 countries distribute ITNs free of charge, including 39 of 43 countries with ongoing *P. falciparum* transmission in the African Region. In 78 countries, ITNs are distributed to all age groups, and in 67 of those, ITNs are delivered to all age groups through mass campaigns. Of 40 countries in the African Region which distribute ITNs free of charge, 33 distribute them through antenatal clinics, reflecting policies where the effects of malaria in pregnancy are a particular concern. Globally, 27 countries distribute ITNs through EPI clinics.

The Alliance for Malaria Prevention has collated information on the number of LLINs delivered by the 7 WHOPES-approved manufacturers which supply nearly all LLINs for public sector distribution in Africa (while nearly all ITNs distributed in Africa are LLINs, this chapter refers to all treated nets as ITNs). The number

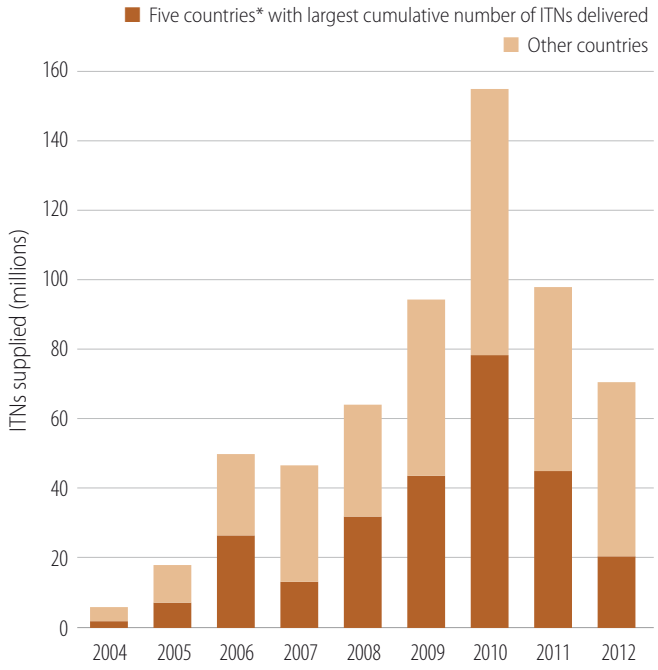
Table 4.1 Adoption of policies for ITN programmes by WHO Region, 2011

Policy	AFR	AMR	EMR	EUR	SEAR	WPR	Grand Total
ITNs/LLINs are distributed free of charge	39	17	9	4	10	10	89
ITNs/LLINs are sold at subsidized prices	19	1	1		1	2	24
ITNs/LLINs are distributed to all age groups	32	17	7	3	10	9	78
ITNs/LLINs distributed through mass campaigns to all age groups	32	15	5		7	8	67
ITNs/LLINs are distributed through antenatal clinics	33	4	3		4	5	49
ITNs/LLINs are distributed through EPI clinics	27		1		1		29
Number of countries/areas with ongoing malaria transmission	**44**	**21**	**9**	**5**	**10**	**10**	**99**
Number of countries/areas with ongoing *P. falciparum* transmission	**43**	**18**	**9**	**0**	**9**	**9**	**88**

Source: *NMCP reports*

of nets delivered by manufacturers increased dramatically from 6 million in 2004 to 145 million in 2010 (**Figure 4.1**); however, the numbers delivered in 2011 (92 million) and projected to be delivered by the end of 2012 (66 million) have decreased from the 2010 peak. From 2009 to 2011 approximately 326 million nets were delivered to countries by manufacturers, well below the 450 million required for each person at risk to have access to a treated net in their household during the 3-year time period.

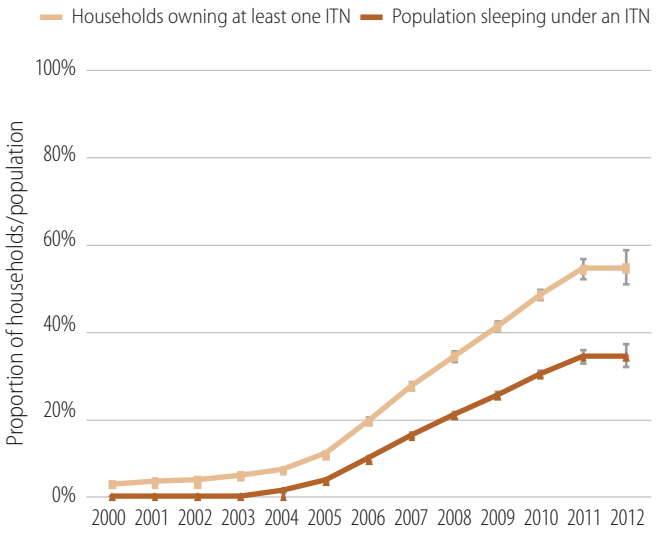
Figure 4.1 Number of ITNs delivered by manufacturers to countries in sub-Saharan Africa, 2004–2012



* Democratic Republic of the Congo, Ethiopia, Kenya, Nigeria, United Republic of Tanzania

Source: *Alliance for Malaria Prevention. Data for the first three quarters of 2012 have been multiplied by 4/3 to provide an annual estimate.*

Figure 4.2 Estimated trend in proportion of households with at least one ITN and proportion of the population sleeping under an ITN in sub-Saharan Africa, 2000–2012



Proportion of population sleeping under an ITN derived from relationship with household ownership of at least one ITN analyzed by linear regression in 48 household surveys 2001-2011, y= 0.67x - 0.03.

Source: *ITN coverage model from the Institute for Health Metrics and Evaluation, which takes into account ITNs supplied by manufacturers, ITNs delivered by NMCPs and household survey results (1). Includes Djibouti, Somalia and Sudan which are in the WHO Eastern Mediterranean Region.*

Moreover, the number of ITNs supplied in 2012 is less than that distributed in 2009, indicating that the number of nets procured may not be sufficient to replace those distributed 3 years earlier. Through gap analysis supported by RBM (*2*), country programmes reported that well over 100 million LLINs were financed by donors in 2012, suggesting that the lower number delivered in 2012 may have been due in part to a decrease in funding disbursements.

NMCPs in the African Region report using mass campaigns as the main ITN distribution channel, accounting for 78% of nets distributed, followed by antenatal care clinics (14%), immunization clinics (6%) and other channels (2%).

Outside Africa, NMCP reports indicate that 54 million ITNs were distributed during 2009–2011, with 6 countries accounting for 70% of the total (India 18.4 million, Indonesia 6.5 million, Afghanistan 4.6 million, Myanmar 3.6 million, Philippines 3.0 million, China 2.2 million). Approximately 81% of ITNs outside Africa were reportedly distributed through mass campaigns, while 6% were distributed through immunization clinics, 1% through antenatal clinics and 12% through other channels.

4.2.2 Trend in ITN ownership and utilization

The extent of coverage of populations at risk of malaria with ITNs can be best measured through household surveys. However, household surveys are not conducted frequently enough to provide annual estimates of ITN coverage for all countries. To obtain more up-to-date estimates of ITN coverage, it is possible to combine information from previous household surveys with data provided by manufacturers on the number of ITNs delivered to countries, and data from NMCPs on the number of ITNs distributed within countries (*3*). Estimates modeled in this way for the World Malaria Report, produced in collaboration with the Institute for Health Metrics and Evaluation, show that the proportion of households in sub-Saharan Africa owning at least one ITN increased dramatically from 3% in 2000 to 53% in 2011, and remained at 53% (range 50%–58% in 2012 (**Figure 4.2**). The rate of increase in the estimated proportion of households owning at least one ITN has slowed recently, related to the decreased number of ITNs delivered to countries in the last two years. With typical attrition of ITNs due to loss, physical degradation and inadequate replacement, the proportion of households owning at least one ITN may decrease next year and beyond.

The proportion of the population sleeping under an ITN over time in sub-Saharan Africa can be derived from household ownership of at least one ITN in the model by comparing the relationship between these two measures within individual household surveys.[1] The estimated proportion of the population that sleeps under an ITN, although lower than the proportion owning at least one ITN, has also increased since 2000, reaching 33% in 2012.

Trends in ownership and use of ITNs, and progress towards recommended universal coverage of all populations at risk, can be illustrated by considering countries with multiple household surveys conducted over time. Among 5 countries with at least 3 household surveys since 2003 (**Figure 4.3**), the proportion of households owning at least one ITN increased substantially

1. In 48 household surveys conducted in Africa 2003-2011, regression line y=0.67x -0.03.

Figure 4.3 Proportion of ITN-owning households with and without enough ITNs for all occupants, among countries with at least three household surveys, 2003–2011

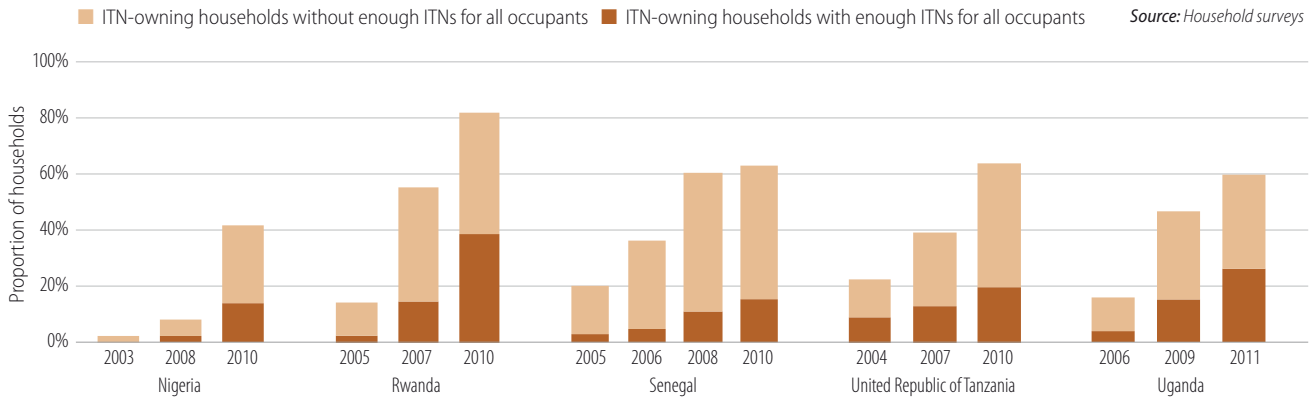
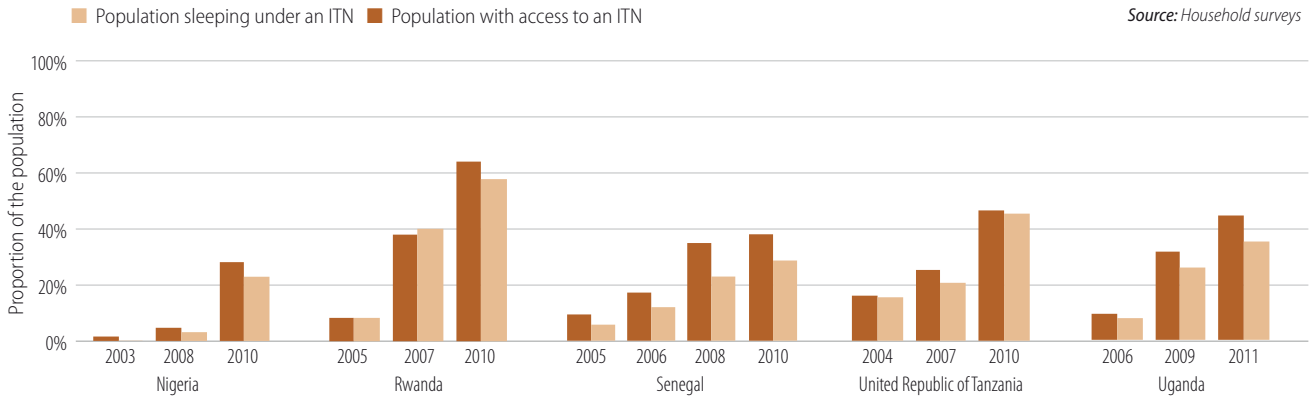


Figure 4.4 Proportion of the population with access to an ITN and proportion sleeping under an ITN in household, among countries with three or more surveys, 2003–2011



during 2003–2011, from 5%–22% in the initial survey in each country to 42%–82% in surveys during 2010–2011. The proportion of households in these countries with enough ITNs for all household members also increased during this period, reaching 14%–39% across countries in the most recent surveys, below the 100% required for universal access for the entire population. Further, the majority of households with an ITN only have a single net, which is not enough to cover all occupants.

As ownership of ITNs by households and the proportion of households with enough ITNs for all members have risen, so have the proportion of the population with access to an ITN and use of these ITNs (**Figure 4.4**). The proportion of the population with access to an ITN in the household[2] ranged from 2%–18% in initial surveys to 28–64% in the most recent surveys. Similarly, the proportion of the population sleeping under an ITN in these countries increased from 1%–16% to 23–58%.

By comparing the proportion of the population with access to an ITN and the proportion sleeping under an ITN, one may see that use of nets by persons with access to them is consistently high across countries and survey years. In the most recent surveys in these 5 countries, the proportion of the population using an ITN among those with access to an ITN ranges from 76%–97%. In surveys from 17 sub-Saharan African countries conducted during 2009–2011, the median proportion of the population using an ITN among the population with access to one was 91% (IQR 82%–98%). However, this includes households using nets beyond their assumed capacity of two persons per net and those households using nets at or below their full capacity. For example, in 21% of Rwandan households surveyed in 2010, a greater proportion of the population slept under an ITN than the proportion which had access to one, while in the remaining 79% of households approximately 71% of persons with access to an ITN slept under one. This same phenomenon resulted in the fraction of the population sleeping under an ITN to be higher than the fraction deemed to have access to one in the Rwanda 2007 survey (**Figure 4.4**). People use nets that are available at high rates; however, more work needs to be done to ensure that all persons with nets available to them use their nets to full capacity. Information on the uptake of ITNs according to a range of background variables is shown in **Box 4.1**.

4.3 IRS policy adoption and implementation

4.3.1 IRS policy adoption

Adoption and implementation of policies for IRS programmes by WHO Region are shown in **Table 4.2** and adoption of policies by country is shown in **Annex 2A**. IRS is recommended for control of malaria in 80 countries, 38 of which are in Africa. IRS is used for control of epidemics in 42 countries and in combination with ITNs in 58 countries, 30 of which are in Africa. A total of 77 countries reported that monitoring of insecticide resistance is undertaken, which is less than the number of countries implementing IRS. Resistance monitoring should be undertaken in all

2. Assuming 2 persons per ITN and the number of persons with access to an ITN cannot be greater than the number of persons sleeping in the household.

Box 4.1 Disparities in persons protected by ITNs

Equity in access to and use of ITNs among different populations will be attained if the goal of universal access is achieved. When access to an ITN falls short of universal it is informative to examine which populations benefit from the intervention and which do not, in order to assess whether the intervention is reaching those most in need. Through analysis of household survey data, it is possible to examine access to and use of ITNs according to urban and rural setting, socioeconomic status, sex and age. Data were examined from 50 household surveys conducted during 2003–2011. As use of ITNs is correlated with access and can be examined across all factors of interest, analysis is presented for ITN use.

In most surveys since 2003, the proportion of the population sleeping under an ITN was higher in urban than in rural areas (**Figure Box 4.1a**). The difference was less in more recent surveys, where the overall proportion of the population sleeping under an ITN was higher. In most of the countries surveyed, a higher proportion of urban than rural households had enough ITNs for all members, and consequently a higher proportion of persons in urban households slept under an ITN the previous night.

The proportion of the population with access to an ITN and sleeping under an ITN also varied according to socioeconomic status in the countries surveyed, and does not appear to have become more equitable as the overall proportion sleeping under an ITN increased (**Figure Box 4.1b**). At lower levels of overall ITN ownership, more countries had higher ITN use in the highest wealth quintile than in the lowest wealth quintile.

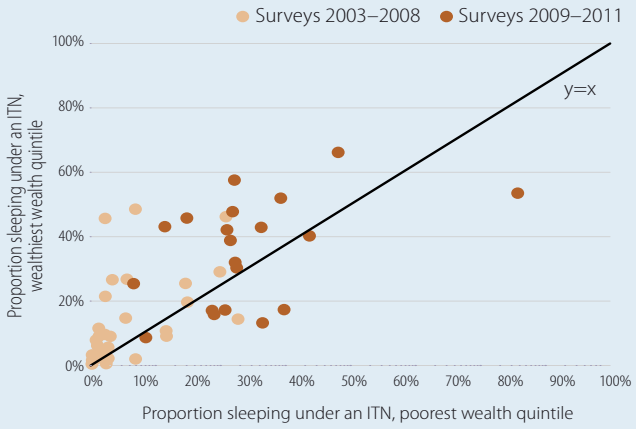
A similar proportion of males and females reported having slept under an ITN in all surveys. For children under 5 years of age, ITN use was remarkably similar among males and females (**Figure Box 4.1c**), while for those older than 5 years, a slightly higher proportion of females reported sleeping under an ITN (**Figure Box 4.1d**), a difference that does not change substantially as overall ITN use increases. The higher proportion among female adults may be related to greater use of ITNs by pregnant women.

A lower proportion of older children, aged 5–19 years, slept under an ITN than younger children and adults (*4*) both in earlier surveys (**Figure Box 4.1e**) and those conducted more recently (**Figure Box 4.1f**). Even at high levels of use overall, the ratio of ITN use in older children

Figure Box 4.1a Proportion of the population sleeping under an ITN, by urban and rural areas and by older and more recent surveys

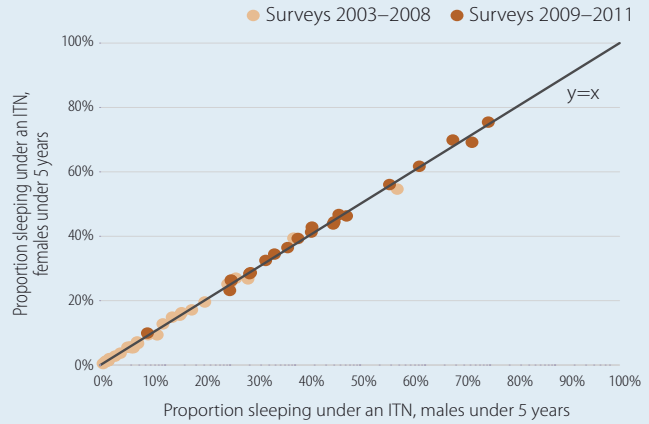
Source: *Household surveys*

Figure Box 4.1b Proportion of the population sleeping under an ITN, by poorest and wealthiest quintiles and by older and more recent surveys



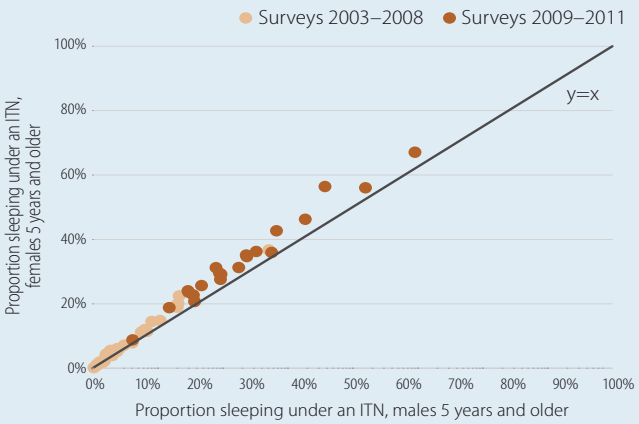
Source: *Household surveys*

Figure Box 4.1c Proportion of the population under age 5 years sleeping under an ITN, by sex and by older and more recent surveys



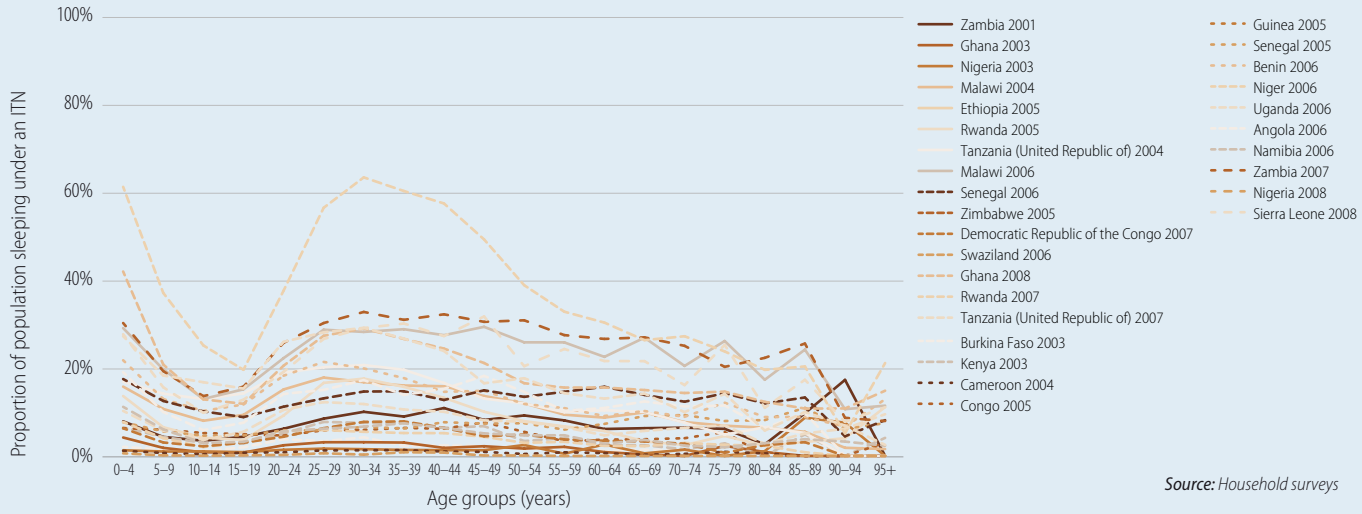
Source: *Household surveys*

Figure Box 4.1d Proportion of the population age 5 years and older sleeping under an ITN, by sex and by older and more recent surveys



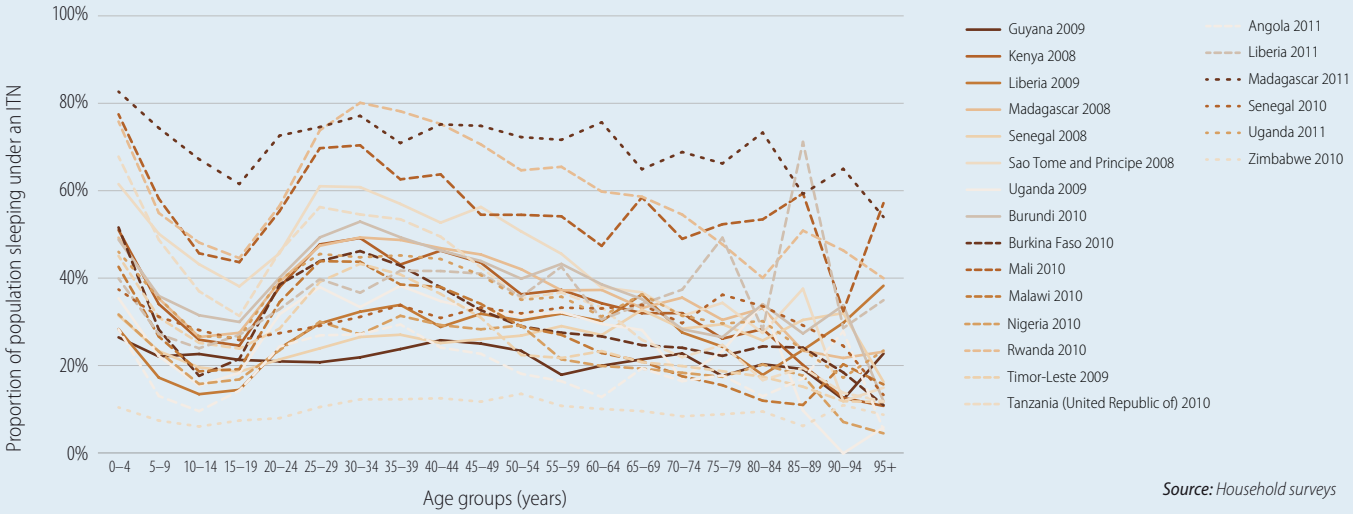
Source: *Household surveys*

Figure Box 4.1e Proportion of the population sleeping under an ITN, by five-year age groups, 2003–2008



Source: *Household surveys*

Figure Box4.1f Proportion of the population sleeping under an ITN, by five-year age groups, 2009–2011

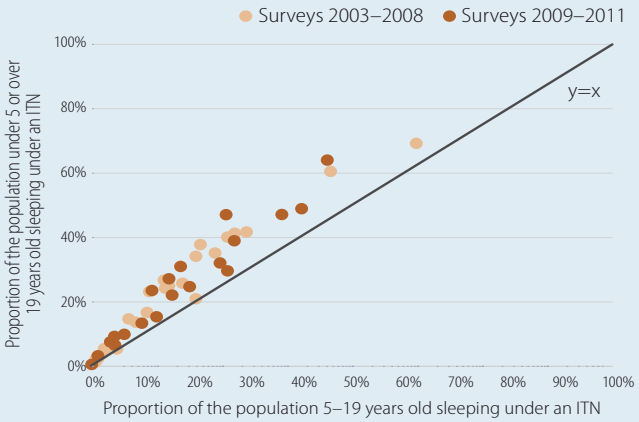


Source: *Household surveys*

compared with other age groups has not increased over time (**Figure Box 4.1g**). Older children can be an important potential reservoir of infection, especially in areas where transmission has been reduced from high levels by interventions (*5*). Increasing the proportion protected by ITNs in this group by ensuring universal access may make an important contribution to further reduction of transmission in these areas.

In summary, the proportion of the population sleeping under an ITN has been higher among urban than rural and in wealthier than poorer populations; ITN use among older children has been lower than among younger children and adults. There is little sex difference in ITN use although a higher proportion of females ≥5 years of age sleep under an ITN than do males of the same age.

Figure Box 4.1g Proportion of 5–19 year olds compared to other age groups sleeping under an ITN, by older and more recent surveys



Source: *Household surveys*

Table 4.2 Adoption of policies for IRS programmes by WHO Region, 2011

Policy	AFR	AMR	EMR	EUR	SEAR	WPR	Grand Total
IRS is recommended by malaria control programme	38	17	6	5	8	6	80
IRS is used for the prevention and control of epidemics	19	9	3		4	7	42
IRS and ITNs used together for malaria control in at least some areas	30	14	3		5	6	58
DDT is used for IRS	10	2			1		13
Insecticide resistance monitoring is undertaken	34	11	8	5	9	10	77
Number of countries/areas with ongoing malaria transmission	**44**	**21**	**9**	**5**	**10**	**10**	**99**
Number of countries/areas with ongoing *P. falciparum* transmission	**43**	**18**	**9**	**0**	**9**	**9**	**88**

Source: *NMCP reports*

countries where insecticide-based vector control measures are implemented.

4.3.2 IRS coverage achieved

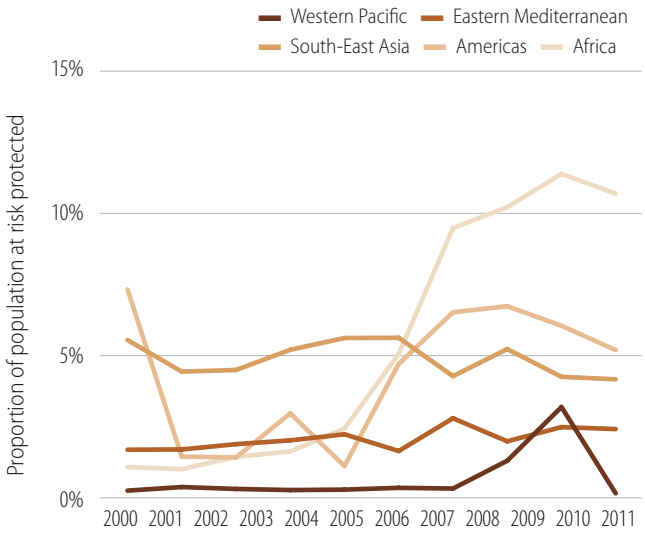
National programmes reported that 153 million people were protected by IRS in 2011, representing 5% of the global population at risk. The proportion of the population protected by IRS increased substantially in the African Region during 2006–2008, and the increased coverage was then maintained above 10% during 2009–2011; in 2011, 77 million people in the Region, or 11% of the population at risk, were protected (**Figure 4.5**). The coverage of IRS programmes was expanded in the Americas during the same time period, protecting 5% of the population at risk in 2011. The proportion of the population protected by IRS increased more recently in the Western Pacific Region, largely due to an increase in the numbers protected by IRS in China, where 24 million people were protected in 2010. IRS coverage by national programmes in the Eastern Mediterranean and South-East Asia Regions has varied little during the last 10 years, with the proportion of the populations at risk protected in these Regions at 2% and 4% respectively in 2011. As several countries in the European Region move towards elimination of malaria, IRS programmes are focused on much smaller populations at risk than in other Regions and the proportion of the population at risk protected by IRS is substantially higher, reaching 65% in 2011 (not shown in figure).

Information on the insecticides used for IRS was provided by 24 of 79 malaria-endemic countries which reported the use of IRS. Pyrethroids were the primary agents used, as reported by 18 of the 24 countries, while carbamates were used by 3 countries, and 3 used DDT.[3]

The proportion of the population protected by IRS reported by NMCPs can be combined with the estimated proportion of the population with access to an ITN derived from household surveys, and from manufacturer and national programme reports (**Section 4.2.2**) to estimate the proportion of the population at risk in each country protected by vector control interventions. In countries employing both ITNs and IRS, the extent to which the populations targeted for these interventions overlap is difficult to quantify but it is likely to be small in most countries. An upper limit for a combined coverage estimate can be

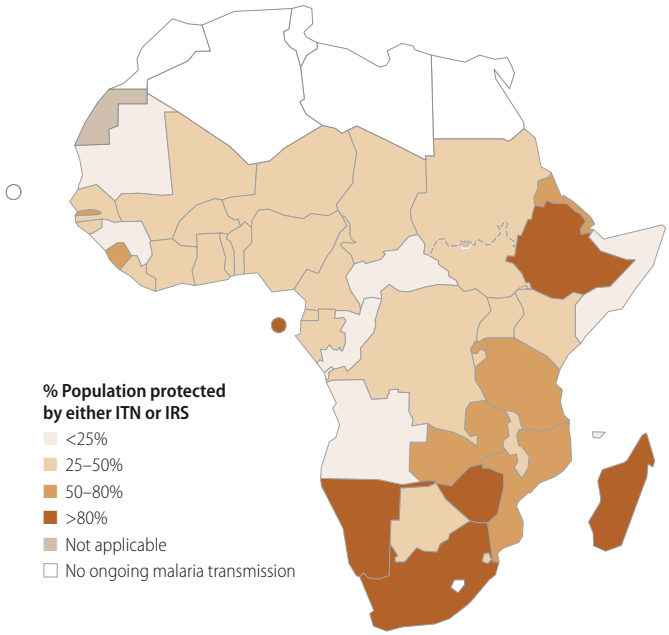
3. Of 99 countries with ongoing malaria transmission, 13 reported having adopted a policy of using DDT for IRS (see table 4.2).

Figure 4.5 Proportion of population at malaria risk protected by IRS by WHO Region, 2000–2011



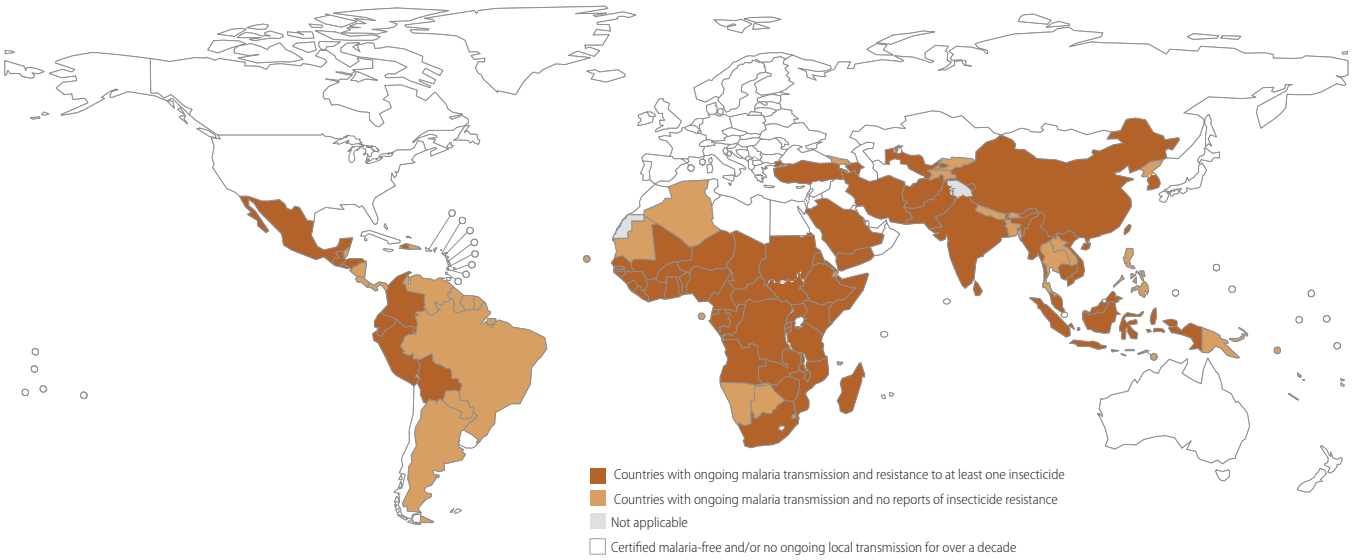
Source: *NMCP reports*

Figure 4.6 Proportion of population at malaria risk protected by ITNs or IRS, sub-Saharan Africa, 2011



Note: estimates are as of June 30, 2011.
Source: *ITN coverage model from the Institute for Health Metrics and Evaluation, which takes into account ITNs supplied by manufacturers, ITNs delivered by NMCPs and household survey results (3). Proportion population sleeping under an ITN derived from relationship with household ownership of at least one ITN analyzed by linear regression in 48 household surveys 2001-2011, y= 0.67x - 0.03*
Proportion population protected by IRS from NMCP reports
Map production: Global Malaria Programme (GMP), World Health Organization

Figure 4.7 Countries with ongoing malaria transmission where insecticide resistance has been identified in at least one of their major vectors



Source: Adapted from Global Plan for Insecticide Resistance Management in malaria vectors, WHO, Geneva, 2012. From WHO regional entomologists in WHO Regional Offices and literature review by the Global Malaria Programme. Map production: Global Malaria Programme (GMP), World Health Organization

Countries with ongoing malaria transmission and no reports of insecticide resistance include countries with confirmed susceptibility to all insecticides used and countries where susceptibility testing is not currently conducted or results are unknown. The map provides no indication of how widespread resistance is within a country; therefore, a single report of resistance would be sufficient to mark a country as having resistance

obtained by assuming there is no overlap in the populations protected by IRS or by ITNs, so that the combined coverage for a particular country is obtained by adding the proportion protected by IRS and that protected by ITNs. (A lower limit can be obtained by assuming that there is complete overlap in the population protected by IRS and that protected by ITNs, and therefore, the combined coverage would be equal to the higher of the 2 population proportions protected by ITNs or IRS.[4])

For Africa, the maximum estimated coverage of vector control interventions varies among countries (**Figure 4.6**). In 13 countries, more than half of the population was protected by vector control measures including more than 80% of the population in Madagascar and South Africa. In Mozambique, Namibia, Sao Tome and Principe, South Africa, Zambia, and Zimbabwe, more than half of the estimated population protected by vector control was covered by IRS.

4.4 Larval source management strategies

WHO recommends that in a few specific settings and circumstances, the core vector control interventions of IRS and ITNs may be complemented by other methods, such as mosquito larval source management. Anti-larval measures are appropriate and advisable only in a minority of settings, where mosquito breeding sites are few, fixed, and findable (i.e. easy to identify, map and treat) (*6*).

Reports received from national programmes indicate that 27 malaria-endemic countries worldwide use larval control in certain specific foci of malaria transmission, including 9 countries in the African Region, 5 in the Region of the Americas, 3 in the Eastern Mediterranean Region, 6 in the European Region, 2 each in the South-East Asia and Western Pacific Regions. Various larval control strategies were reported, and many countries engaged in more than one type of larval control activity. In 2011, 9 countries reported activities involving habitat manipulation (temporary changes to vector habitats) and 9 reported some form of habitat modification (long-lasting physical transformations to reduce vector larval habitats). Larval control through chemical larviciding was reported by 16 countries, while 13 reported biological larviciding activities. Reports from endemic countries give an indication of the range of larval control methods employed, although the scale of efforts are not quantified and the impact on individual country malaria burden is not easily measured.

4.5 The Global Plan for Insecticide Resistance Management in malaria vectors

Vector control through ITNs and IRS is a core component of malaria control programmes today, and the success of these interventions is dependent upon the continued effectiveness of the insecticides used. Currently, insecticides used for IRS come from only 4 classes: pyrethroids (the most commonly used class), organochlorines (of which DDT is the only compound in use), organophosphates, and carbamates; all WHO-recommended LLINs use pyrethroids. As malaria vector control, and consequently the success of global malaria control, is heavily reliant on a single class of insecticide, the pyrethroids, increasing resistance of malaria vectors to pyrethroids and to other insecticides jeopardizes global malaria control efforts. Recognizing the threat posed by insecticide resistance, in 2010 WHO initiated a consultation process on technical strategies to preserve the effectiveness of insecticides used for malaria control.

4. This approach may underestimate the coverage since, if only a small proportion of households with ITNs have enough for all occupants, IRS would offer protection for those who do not have access to a net in their household.

The product of the consultative process, *The Global Plan for Insecticide Resistance Management in malaria vectors* (GPIRM), was released by WHO in May 2012. It summarizes the current status of insecticide resistance, the potential effect of resistance on the burden of malaria, the available approaches to managing resistance, and outlines a global strategy and action plan for insecticide resistance management for the global malaria community.

To inform the GPIRM, during 2011–2012 the WHO regional entomologists in WHO Regional Offices collected information on insecticide resistance monitoring activities by WHO Member States. Insecticide resistance in malaria vectors is widespread, and affects all currently used insecticides; resistance to at least one insecticide in one malaria vector in one study site has been identified in 64 countries worldwide (**Figure 4.7**). Most of these reports concerned resistance to pyrethroids. The extent of resistance within the countries is unknown – however, in analysis conducted for the GPIRM, if resistance to pyrethroids were to reach a level at which they became ineffective in all areas, in Africa, an estimated 26 million malaria cases and 120 000 malaria deaths averted by current vector control efforts would instead occur. Strategies to manage insecticide resistance described in the GPIRM include rotations of insecticides used in IRS, use of vector control interventions in combination, and mosaic spraying.

4.6 Conclusions

Access to ITNs is increasing but programmes are still far from universal coverage targets

Tremendous progress had been made in the distribution of ITNs, especially in Africa, where it is estimated that more than half of all households in malaria-endemic areas had at least one ITN in 2012. Malaria control programmes are, however, far from achieving universal coverage targets for the availability of ITNs, since most households do not have enough ITNs for all household members and only an estimated 33% of the population slept under an ITN in their home.

Where nets are available they are used at high levels and high use of available nets is maintained as overall coverage improves. In the most recent household surveys, approximately 91% of the population with access to a net in their household slept under it the night before. Current efforts to encourage the use of nets should be maintained and efforts to increase the number of available nets within households should be strengthened.

Progress towards achieving universal coverage is hindered by decreased distribution of ITNs in the last 2 years. In 2010, approximately 145 million ITNs were distributed by manufacturers to countries in Africa, which is close to the estimated number required each year to maintain universal coverage (assuming each net lasts 3 years and protects 2 persons); in 2011 and 2012 the number of ITNs distributed to countries was well below that level, at 92 and 66 million respectively. Attaining universal coverage with vector control measures will be a monumental achievement; maintaining universal coverage will be essential to ensure that the benefits of that achievement are sustained. National programmes, domestic and international financers of malaria control, and other partners in the malaria community should work to ensure a sufficient ongoing supply of ITNs to achieve and maintain universal coverage.

Equity in distribution and use of ITNs

Distribution of ITNs by national programmes has resulted in slightly greater availability and use of ITNs in urban over rural households, of wealthier over the poorer households, and among young children and adults over older children. There is little difference in ITN use between sexes although a higher proportion of females ≥5 years of age sleep under an ITN. These differences may be a consequence of the logistical challenges of distributing ITNs to the more remote rural populations and continued targeting of ITNs to particular population groups such as children and pregnant women. Country programmes should ensure that nets are made available to, and used by, all age groups equally.

IRS coverage in Africa may have reached a plateau

After a substantial increase in the proportion of the population protected by IRS in Africa during 2006–2009, IRS coverage has remained at about 11% of the population at risk the past 3 years. The reasons for the lack of increase in IRS implementation are not clear. IRS is a powerful vector control tool, offers certain advantages over ITNs, not least by offering more flexibility in insecticide choice, and has been used as the predominant vector control method in a number of countries. However, for most programmes implementing IRS, it is relatively more expensive per person protected per year than ITNs (*7*, *8*), which may preclude its use on a larger scale than has currently been achieved.

Monitoring and management of insecticide resistance

The effectiveness of both IRS and ITNs is threatened by the development of insecticide resistance. Monitoring and management of insecticide resistance for malaria control is set out in the recently released GPIRM. More could be done to manage resistance by more active strategies using existing tools. Addressing insecticide resistance will benefit greatly from the development of new insecticides, especially those appropriate for insecticide-treated nets, and from vector control and other interventions to reduce transmission that do not rely on insecticides.

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CHAPTER 5

Preventive chemotherapy for malaria

This chapter (i) quantifies the need for malaria preventive chemotherapies; (ii) reviews the adoption of policies and implementation of programmes for intermittent preventive treatment of malaria in pregnancy and in infants, and of seasonal malaria chemoprevention in children; and (iii) reviews progress in the development of a malaria vaccine.

5.1 Need for malaria preventive chemotherapy

WHO currently recommends three strategies for the use of antimalarial agents for the prevention of malaria, targeting specific groups at high risk of *P. falciparum* malaria, predominantly in sub-Saharan African countries:

(i) in areas of moderate-to-high malaria transmission in sub-Saharan Africa, intermittent preventive treatment in pregnancy (IPTp) with sulfadoxine-pyramethamine (SP) is recommended for all pregnant women at each scheduled antenatal care visit;

(ii) the co-administration of intermittent preventive treatment in infants (IPTi) with sulfadoxine-pyrimethamine (SP-IPTi) together with the second and third diphtheria-pertussis-tetanus (DPT) and measles vaccination of infants, through routine Expanded Programme on Immunization (EPI) services in countries in sub-Saharan Africa, in areas with moderate-to-high malaria transmission[1] and where parasite resistance to SP is not high;[2]

(iii) seasonal malaria chemoprevention (SMC) with amodiaquine plus sulfadoxine-pyrimethamine (AQ+SP) for children aged 3–59 months is recommended in areas of highly seasonal malaria transmission across the Sahel subregion in Africa.

High risk groups targeted for these strategies represent important fractions of populations in malaria-endemic countries. Among the approximately 780 million persons at risk of malaria in endemic countries in sub-Saharan Africa in 2011, an estimated 32 million women who become pregnant each year (*1*) could benefit from IPTp, a large proportion of the approximately 28 million infants born each year[3] could benefit from IPTi, and an estimated 25 million children aged 3–59 months living in the Sahel subregion could benefit from SMC (*2*). A large proportion of the groups targeted for two of the WHO recommended preventive malaria treatments, IPTp and IPTi, have access to malaria preventive services through their attendance at health facilities for other reasons. In more than half of the countries in sub-Saharan Africa, the proportion of pregnant women making at least one visit to an antenatal clinic (ANC), where IPTp is most often delivered, is at least 90% (*3*) and approximately 71% of infants in sub-Saharan African countries complete a full schedule of DPT vaccination at immunization clinics (*4*), where IPTi is recommended to be delivered. WHO recommends that, if possible, SMC should be integrated into existing community-based programmes. However, a single deployment strategy for SMC has not yet been devised, and therefore the extent to which the targeted population could be reached through different existing service delivery platforms is uncertain.

The estimated burden of malaria is high in groups targeted for preventive treatments. Some of the disease burden may not be immediately recognized as attributable to malaria. For example, low birth weight arising from malaria in pregnancy, which commonly occurs without symptoms of malaria, is estimated to result in as many as 100 000 infant deaths each year in sub-Saharan Africa (*5*). More directly attributable to malaria, approximately 108 000 malaria deaths in children under 5 years of age occurred in 2010 in areas of the Sahel targeted for SMC (*2*). Thus important reductions in infant and childhood mortality could be achieved through expanded implementation of IPTp, IPTi and SMC.

5.2 Malaria chemoprevention policies and implementation

5.2.1 Intermittent preventive treatment of pregnant women

During 2012, the WHO Malaria Policy Advisory Committee (MPAC) convened an Evidence Review Group (ERG) on IPTp to review current evidence on IPTp and develop an interim policy statement on IPTp. The revised policy statement, endorsed by the MPAC and issued by WHO in October 2012, affirms that in areas of stable (moderate-to-high) malaria transmission, IPTp with SP is recommended for all pregnant women at each scheduled antenatal care visit after the first trimester. The previous IPTp policy stated that pregnant women in areas of stable malaria transmission should receive at least 2 doses of SP and was not sufficiently clear on the timing and the ideal number of SP doses recommended. Information on IPTp policy adoption and implementation described in this chapter reflects experience with the previous IPTp policy. The evidence review also noted that IPTp with SP remains effective in preventing the adverse consequences on maternal and fetal outcomes even in areas where a high proportion of *Plasmodium falciparum* parasites carry quintuple mutations associated with *in vivo* therapeutic failures to SP and therefore, IPTp with SP should still be administered to women in such areas. Furthermore, the ERG found no evidence of a threshold level of malaria transmission below which IPTp-SP is no longer cost-effective.

1. Annual entomological inoculation rates >10
2. Defined as a prevalence of the pfdhps 540 mutation of <50%
3. Projected using crude birth rates of endemic countries

Table 5.1 Adoption of policies for intermittent preventive treatment for pregnant women (IPTp), 2011

Policy	AFR	AMR	EMR	EUR	SEAR	WPR	Grand Total
IPTp used to prevent malaria during pregnancy	34	N/A	2	N/A	N/A	1	37
Number of countries/areas with ongoing transmission	**44**	**21**	**9**	**5**	**10**	**10**	**99**
Number of endemic countries/areas with ongoing transmission of *P. falciparum*	**43**	**18**	**9**	**0**	**9**	**9**	**88**

The countries which had adopted IPTp with SP as national policy by the end of 2011 include 36 high-burden countries in sub-Saharan Africa spanning the African and Eastern Mediterranean WHO Regions. Although the WHO policy focuses on Africa, IPTp has also been adopted and implemented in Papua New Guinea in the Western Pacific Region (Table 5.1).

Consistent data on both the number of second doses of IPTp administered (numerator) and the number of women who had attended antenatal care (ANC) at least once (denominator) were available for 25 of the 36 NMCPs which had IPTp as national policy in 2011; data were available for 10 countries for each of the last 5 years. Approximately half of women attending antenatal clinics in 2011 (44%, inter-quartile range 30%–57%) received a second dose of SP for IPTp in the reporting countries (Figure 5.1). Although some low coverage rates of 2 IPTp doses may be attributable to the fact that some pregnant women only make a single ANC visit, the low rates of IPTp coverage among those attending ANC suggest that a large number of opportunities to deliver recommended preventive treatment during antenatal care are missed. For countries which consistently reported data on the second dose of IPTp and ANC attendance, no consistent trend over time was seen across countries in the proportion of women receiving IPTp (Figure 5.2). It is unclear how much variation in the proportion receiving IPTp is due to changes in programme performance in delivering IPTp and how much may be due to variation in completeness and quality of reporting.

Information on the proportion of all pregnant women receiving the second dose of IPTp can be derived from household surveys. Data were available on IPTp for pregnant women from 60 surveys in 38 countries between 2003 and 2011. Overall during 2009–2011, the population-weighted average of the proportion of pregnant women who received 2 doses of IPTp across 16 surveyed countries was low, at 22%, primarily due to low coverage rates in large countries such as Nigeria and the Democratic Republic of the Congo. Information on the uptake of IPTp according to a range of background variables is shown in Box 5.1.

5.2.2 Intermittent preventive treatment of infants

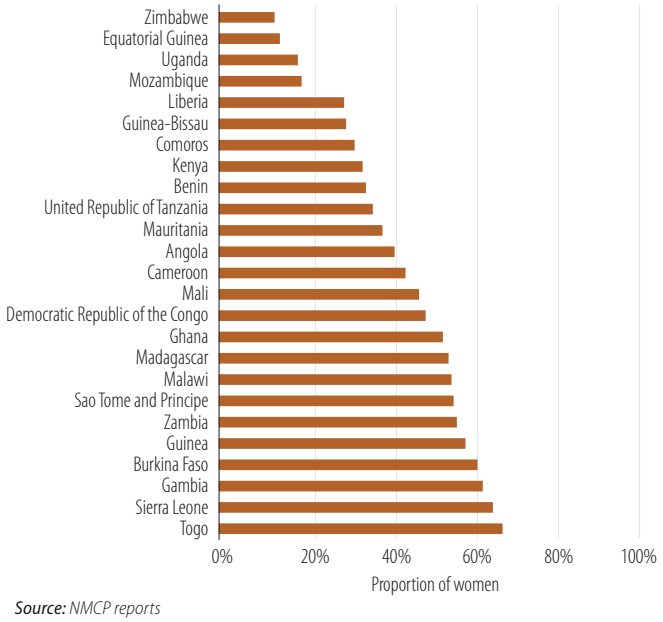
Intermittent preventive treatment of infants with SP (IPTi) is the administration of a therapeutic dose of SP delivered through immunization services at defined intervals corresponding to routine vaccination schedules – usually at 10 weeks, 14 weeks, and approximately 9 months of age – to those at risk of malaria. WHO recommends IPTi in countries with moderate-to-high malaria transmission, and with low levels of parasite resistance to SP. So far only Burkina Faso has adopted IPTi as national policy since it was recommended by WHO in 2009; however, the IPTi implementation guidelines were published[4] in September 2011, and several countries are developing plans for its adoption and implementation.

5.2.3 Seasonal malaria chemoprevention

Seasonal malaria chemoprevention (SMC), previously termed intermittent preventive treatment in children, is defined as the

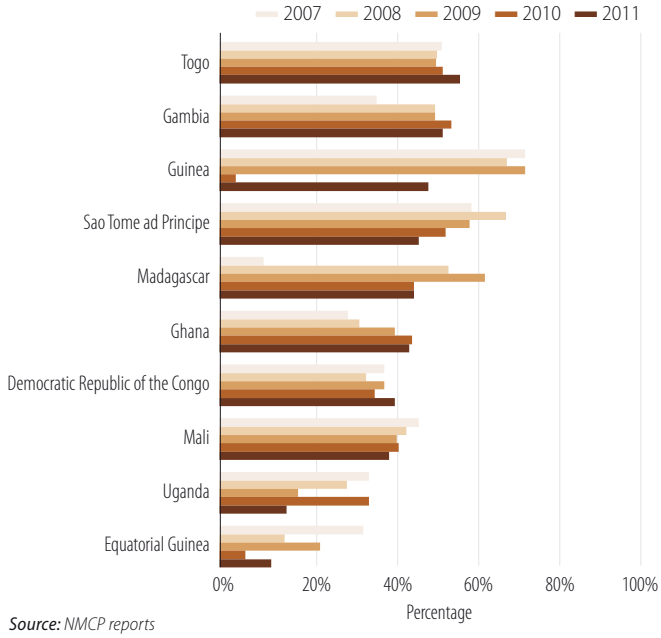
4. *Intermittent preventive treatment for infants using sulfadoxine-pyramethamine (SP-IPTi) for malaria control in Africa: Implementation field guide* available at: whqlibdoc.who.int/hq/2011/WHO_IVB_11.07_eng.pdf

Figure 5.1 Proportion of women attending antenatal care receiving the second dose of IPTp, 2011



Source: NMCP reports

Figure 5.2 Proportion of women attending antenatal care receiving a second dose of IPTp, by country and year, 2007-2011



Source: NMCP reports

intermittent administration of full treatment courses of an effective antimalarial medicine during the malaria season to prevent malarial illness. The objective of SMC is to maintain therapeutic antimalarial drug concentrations in the blood throughout the period of greatest malaria risk. SMC has been studied most frequently in areas with seasonal malaria transmission where the main burden of malaria is in children, rather than in infants, and the main risk of clinical malaria is restricted to a few months each year.

WHO convened the Technical Expert Group (TEG) on Preventive Chemotherapy in May 2011 to review the current evidence on the efficacy, safety and feasibility of large-scale implementation of SMC; the TEG recommended that SMC be adopted as policy in targeted areas. The report of this consultation was presented to the MPAC in January 2012. The MPAC endorsed the TEG recommendation and advised WHO to promote SMC in the control of malaria in targeted areas (in the Sahel subregion of Africa). In accordance with this advice, WHO formulated a policy recommendation which was released in March 2012.

According to this new WHO policy, SMC is recommended for use in areas of highly seasonal malaria transmission across the Sahel subregion in Africa. In areas where both drugs retain sufficient antimalarial efficacy, a complete treatment course of amodiaquine plus sulfadoxine-pyrimethamine (AQ+SP) should be given to children aged 3–59 months at monthly intervals, beginning at the start of the transmission season, to a maximum of 4 doses during the malaria transmission season. SMC with AQ+SP is not currently recommended for countries in southern and eastern Africa, even though there are some locations in those regions where the transmission pattern would suggest suitability. This is because of the high level of *P. falciparum* resistance to AQ and/or SP, and the absence of adequate efficacy and safety data for other potential anti-malarial regimens for use in SMC.

Given that the the policy recommendation was made only recently, no countries have yet adopted SMC; however several countries involved in evaluating SMC have plans to expand SMC activities beyond their study populations. An implementation manual for SMC, *Seasonal malaria chemoprevention with sulfadoxine-pyramethamine plus amodiaquine in children, a field guide*, developed by WHO, was issued in December 2012 (*6*).

5.3 New tools for malaria prevention

Malaria vaccine development

An effective vaccine against malaria has long been envisaged as a potentially valuable addition to the available tools for malaria control. Research towards the development of malaria vaccines has been pursued in this technically complex field since the 1970s.

As yet there are no licensed malaria vaccines. A number of candidate vaccines are being evaluated in clinical trials, with one candidate vaccine currently being assessed in Phase 3 clinical trials and approximately 20 others in Phase 1 or Phase 2 clinical trials.

Vaccine candidate RTS,S/AS01

The RTS,S/AS01 vaccine targets *P. falciparum*. It comprises a fusion protein of a malaria antigen with hepatitis B surface antigen and includes a new potent adjuvant. Now in Phase 3 clinical trials, the vaccine is being developed in a partnership between GlaxoSmithKline (GSK) and PATH Malaria Vaccine Initiative (MVI), with funds provided by the Bill & Melinda Gates Foundation to MVI. The vaccine manufacturer's clinical development plan for this vaccine is focusing on African infants and young children resident in malaria-endemic countries.

The full Phase 3 trial results will become available to WHO in late 2014 and will include 30 months' safety and efficacy data from

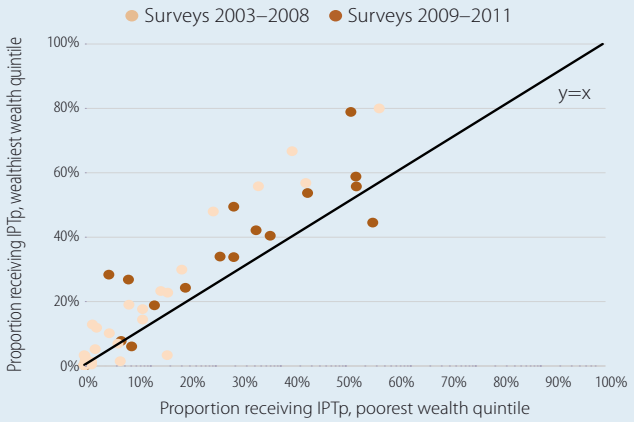
Box 5.1 Disparities in the use of IPTp

Household surveys enable an analysis to be made of differences in the use of IPTp according to rural/urban residence and wealth quintile. In most surveyed countries, a higher proportion of women in urban areas received 2 doses of IPTp than women in rural areas (**Figure Box 5.1a**). Differences between urban and rural areas in the uptake of IPTp appeared to be smaller in more recent years, during which there was also higher overall coverage. Similarly, when examining IPTp coverage by wealth quintile, a higher proportion of women in the highest wealth quintile received 2 doses of IPTp than those in the lowest wealth quintile, though disparities in IPTp by wealth did not change substantially in more recent surveys (**Figure Box 5.1b**).

Figure Box 5.1a Proportion of all pregnant women receiving a second dose of IPTp, by urban and rural area and by older and more recent surveys

Source: Household surveys

Figure Box 5.1b Proportion of all pregnant women receiving a second dose of IPTp, by poorest and wealthiest quintiles and by older and more recent surveys



Source: Household surveys

groups of children aged 6–14 weeks and 5–17 months, together with data on an 18-month booster dose and site-specific efficacy data. The WHO Joint Technical Expert Group on Malaria Vaccines, set up in April 2009 (jointly by the Global Malaria Programme and Department of Immunization, Vaccines & Biologicals), has advised that, in the light of the published results to date, a policy recommendation could be considered once the full trial results become available. The timelines of the Phase 3 trial may allow a policy recommendation in 2015, subject to vaccine performance, in which case this vaccine could then be assessed for potential addition to the current WHO recommended malaria preventive measures.

Preliminary Phase 3 trial results published in November 2012 (*7*) do not change the timing of a possible WHO policy recommendation for RTS,S/AS01 in 2015, which as noted above, will be based on the full results from the completed Phase 3 trial in late 2014. For malaria vaccines, the Joint Technical Expert Group on malaria vaccines will draft proposed policy recommendations for review by the Strategic Advisory Group of Experts on Immunization and the MPAC in 2015. RTS,S/AS01 will be evaluated as a possible addition to, and not a replacement for, existing preventive, diagnostic and treatment measures.

Other malaria vaccine candidates in development

Several other scientifically promising vaccine candidates are currently being explored, but their development is at least 5–10 years behind that of RTS,S/AOS1. Details are provided in The Rainbow Tables,[5] WHO's comprehensive annually updated spreadsheets of global malaria vaccine project activity.

In the longer term WHO is committed to working with malaria vaccine stakeholders towards the strategic goal set out in the malaria vaccine technology roadmap. The strategic goal, as defined in 2006, is now being re-examined in a consultative process with the likely outcome that the revised goal(s) will include both protection against malaria morbidity and impact against malaria transmission. *P. vivax* will also be included for the first time in the malaria vaccine roadmap.

5.4 Conclusions

Burden of malaria in pregnancy and IPTp implementation

Although the burden of malaria during pregnancy is substantial, and the benefit of IPTp in reducing it has been well established, implementation of IPTp has lagged when compared to that of other malaria control interventions. Analysis of data reported by country programmes and data available through household surveys shows relatively high levels of ANC attendance (88%, IQR 68%–95%) but much lower proportions of women attending ANC receiving IPTp (44%, IQR 30%–57%). These findings suggest that there are missed opportunities to deliver preventive therapy and that efforts to overcome barriers to implementation are best focused at the level of antenatal service delivery. Simplified guidelines for administration of IPTp following the revised IPTp policy may help overcome these barriers. Though the recent evidence review concluded that SP remains effective for IPTp in areas where it is no longer effective as a therapeutic agent, further recommendations are pending on the best approach to malaria in pregnancy in light of increasing SP resistance and changes in malaria burden.

Disparities in the delivery of IPTp

IPTp is recommended for all pregnant women in areas of moderate-to-high malaria transmission. In available household surveys, the proportion of pregnant women receiving the second dose of IPTp was higher in urban than in rural areas, and in the highest wealth quintile compared with the lowest wealth quintile. This may be due to better access to antenatal services in urban areas, although in several more recent surveys, the difference in receipt of IPTp between pregnant women in urban and rural areas was negligible. Further investigation is needed to understand why there are greater differences between urban and rural areas, or between wealth quintiles, in some countries than in others and how more equitable scale-up of IPTp can be replicated in other countries.

Implementation of IPTi and SMC

The studies on which the WHO policy recommendation for IPTi is based showed that in areas of moderate-to-high transmission of malaria, IPTi delivered through EPI services provides protection in the first year of life against clinical malaria and anaemia, as well as reductions in hospital admissions for infants with malaria parasitaemia and admissions for all causes. The slow uptake of IPTi and its implementation highlight the challenges to implementation of new control strategies, even where an established system for delivery of preventive services, such as EPI, exists. Uptake of IPTi may have been slowed in part due to lack of implementation guidance at the time the policy recommendation was made and may accelerate now that guidance is available. This lesson will be useful in devising a strategy for implementing the recently recommended policy on SMC, particularly as no single existing preventive service has been identified in which to implement it. These considerations may also be relevant for implementation of malaria vaccines in the future.

5. Malaria Vaccine Project Spreadsheets: www.who.int/vaccine_research/links/Rainbow/en/index.html

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7. The RTS,S Clinical Trials Partnership. A Phase 3 Trial of RTS,S/AS01 Malaria Vaccine in African Infants. *New England Journal of Medicine* 2012; epublished ahead of printing DOI: 10.1056/NEJMoa1208394.

CHAPTER 6

Diagnostic testing and treatment of malaria

This chapter (i) quantifies needs for malaria diagnostic testing and treatment; (ii) reviews the extent to which national programmes have adopted policies for universal diagnostic testing of suspected malaria cases and trends in the availability and utilization of parasitological testing; (iii) reviews the adoption of policies and implementation of programmes to expand access to, and utilization of, effective treatment for malaria; (iv) reviews the progress made in withdrawing oral artemisinin-based monotherapies from the market; (v) reviews the current status of drug efficacy monitoring and the latest trends in antimalarial drug resistance; and (vi) reviews efforts to contain artemisinin resistance.

6.1 Needs for diagnostic testing and treatment

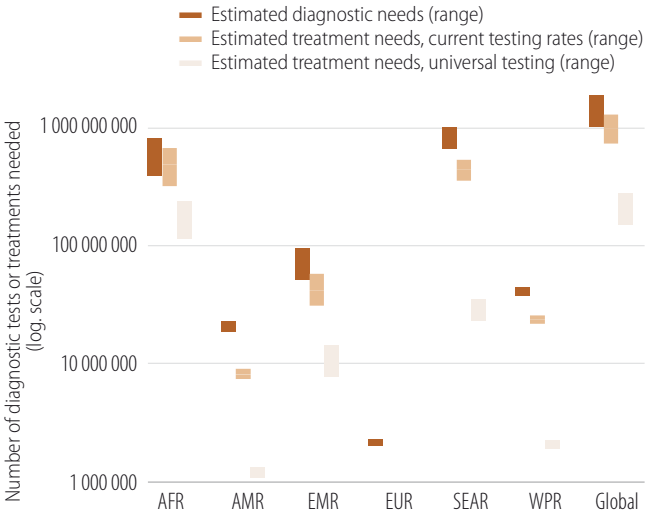
WHO recommends that all persons of all ages in all epidemiological settings with suspected malaria should receive a parasitological confirmation of diagnosis by either microscopy or rapid diagnostic test (RDT), and that uncomplicated *P. falciparum* malaria should be treated with an ACT (*1*). WHO guidance for quantifying, at the national programme level, diagnostic needs using malaria surveillance data[1] and treatment needs based on malaria morbidity[2] can be used to assess the scale of global and regional diagnostic and treatment needs that follow from this policy recommendation.

To estimate diagnostic needs by WHO Region, the number of malaria cases obtained from malaria burden estimates[3] and malaria diagnostic test positivity rates derived from national programme data can be used to calculate the total number of suspected malaria cases that would require a malaria diagnostic test. For this analysis, malaria test positivity rates are assumed to be the same among suspected malaria cases in the public and private sectors, and one half this rate among persons who do not seek treatment.

Malaria treatment needs depend in part on the extent to which malaria diagnostic testing is employed. If diagnostic testing were universally applied, the number of malaria cases from malaria burden estimates could be taken as the number of cases requiring treatment. However, at current levels of diagnostic testing, it is necessary to examine the proportion of patients with suspected malaria who receive a diagnostic test and have confirmed malaria, and the proportion treated for malaria without diagnostic testing (*2*). Another factor to be taken into account is the proportion of patients with suspected malaria presenting for care at public and at private health facilities, as the proportion receiving a diagnostic test differs by health sector and by Region. In this analysis, in order to estimate total treatment needs, the proportion of persons who report not seeking treatment for fever are apportioned to public and private treatment according to the proportions among those who do seek care. The proportion tested at public facilities can be calculated from national programme data. Data on the extent of diagnostic testing of suspected malaria cases in the private sector are more limited, but can be derived from household surveys. In household surveys conducted by ACTwatch during 2008-2010 in 6 African countries (*3*), the proportion of suspected malaria cases tested in the private sector was approximately one third of that tested in the public sector.

Taking these factors into account, the estimated number of suspected malaria cases which require diagnostic testing is large and varies by WHO Region, from as many as 1 billion in the South-East Asia Region to just over one million in the European Region (**Figure 6.1**). Treatment needs based on current levels

Figure 6.1 Estimated malaria diagnostic and treatment needs, by WHO Region, 2010



Estimated treatment needs for current and universal testing rates not shown for European Region, as below 1 000 000

Source: *World Malaria Report 2011, NMCP reports*

Estimated diagnostic needs = suspected malaria cases, derived from estimated confirmed cases and programme reported test positivity rates; Estimated treatment needs, current testing rates = confirmed + presumed cases, derived from the proportion of febrile persons seeking care by health sector, proportion suspected cases tested by health sector, reported test positivity rates; Estimated treatment needs, universal testing = estimated confirmed cases, 2010. Treatment needs include treatment for all Plasmodium species.

1. Universal access to malaria diagnostic testing, WHO 2011: http://www.who.int/malaria/publications/atoz/9789241502092/en/index.html
2. Good procurement practices for artemisinin-based antimalarial medicines, WHO, 2010: http://apps.who.int/medicinedocs/en/m/abstract/Js17072e/
3. *World Malaria Report, 2011*. http://www.who.int/malaria/world_malaria_report_2011/en/

of diagnostic testing also vary by Region, and are greatest in the African and South-East Asia Regions. If all suspected cases were tested, and only confirmed malaria cases treated with antimalarial medicines, the need for malaria treatment would be dramatically reduced. This is true for all Regions, including Africa, where diagnostic testing of suspected cases is lower than in other Regions, as well as for the South-East Asia Region, where a large proportion of patients seek care in the private sector, with estimated testing rates lower than in the public sector.

The levels of diagnostic or treatment needs presented here are intended to illustrate the differences among malaria-endemic regions and the potential effect of implementing universal diagnostic testing, and should not be interpreted as absolute needs for programme procurement purposes. Confidence limits around these calculated diagnostic and treatment needs are large, based on the limits of the malaria burden estimates from which they are derived, and other data inputs into the calculation carry their own uncertainty. The diagnostic needs for the African Region, for example, may underestimate true diagnostic needs, as the test positivity rates derived from reported national programme data are higher than those derived from published studies (*4*).

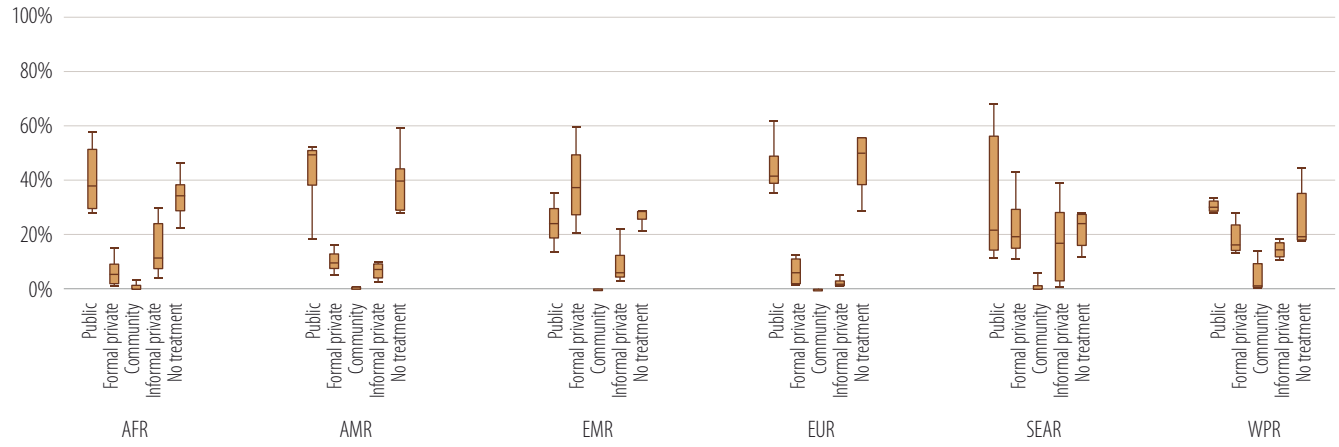
For full implementation of a universal diagnostic testing policy for suspected malaria, delivery of care by trained health-care providers is increasingly important. In data from the most recently conducted survey in 56 countries during 2000 to 2011, the majority from countries in the African Region, the proportion of children receiving care at different places varied widely (**Figure 6.2**). Comparison of the inter-quartile range by health sector suggests that more children received care at public health facilities than at private facilities in the African, American, and European Regions, while a relatively small proportion overall received care from community health workers.

6.2 Diagnostic testing for malaria

6.2.1 Policy adoption

National adoption and implementation of policies for parasitological confirmation of diagnosis of malaria by WHO Region are shown in **Table 6.1** and by country in **Annex 2A**. In 2011, 41 of 44 countries with ongoing malaria transmission in the African Region reported having adopted a policy of parasitological diagnosis for all age groups, an increase of 4 countries since 2010; in other Regions a policy of universal diagnostic testing was adopted in 46 of 55 countries with ongoing malaria transmission. Malaria diagnosis is provided free of charge in the public sector in 84 countries across all Regions. A total of 26 African countries are now deploying RDTs at the community level, as are 23 countries in other Regions, 6 more countries than in 2010.

Figure 6.2 Proportion of children presenting for treatment of fever by health sector, by WHO Region

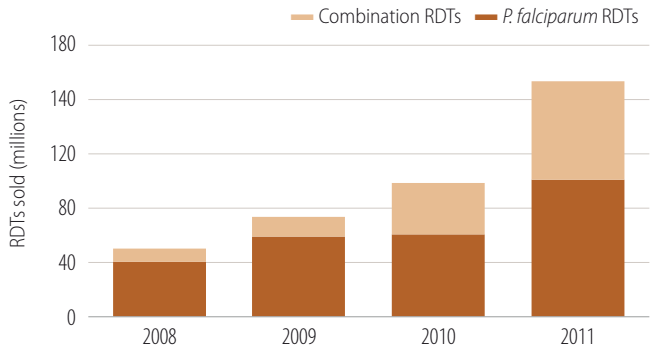


Source: *Household surveys, 56 worldwide, 2000-2011 (AFR-30, AMR-9, EMR-4, EUR-4, SEAR-6, WPR-3)*
Public health sector includes government and non-profit facilities; Formal private sector includes private clinics and providers; Community sector is community health workers; Informal private sector includes pharmacies, shops and traditional providers.
The top and bottom of the lines are the 90th and 10th percentile, the box represents the limits of the 25th to 75th percentile or interquartile range, and the horizontal line through the box is the median value.

Table 6.1 Adoption of policies for malaria diagnosis by WHO Region, 2011

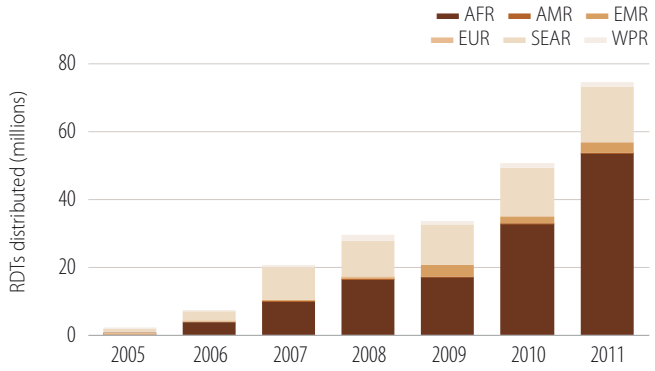
Policy	AFR	AMR	EMR	EUR	SEAR	WPR	Grand Total
Patients of all ages should undergo a diagnostic test	41	20	5	5	8	8	87
Only patients >5 years old undergo a diagnostic test	1		1				2
RDTs used at community level	26	8	3		7	5	49
Malaria diagnosis is free of charge in the public sector	33	18	9	5	10	9	84
Number of countries/areas with ongoing malaria transmission	**44**	**21**	**9**	**5**	**10**	**10**	**99**
Number of countries/areas with ongoing *P. falciparum* transmission	**43**	**18**	**9**	**0**	**9**	**9**	**88**

Figure 6.3 RDT sales to public and private sectors, 2008–2011



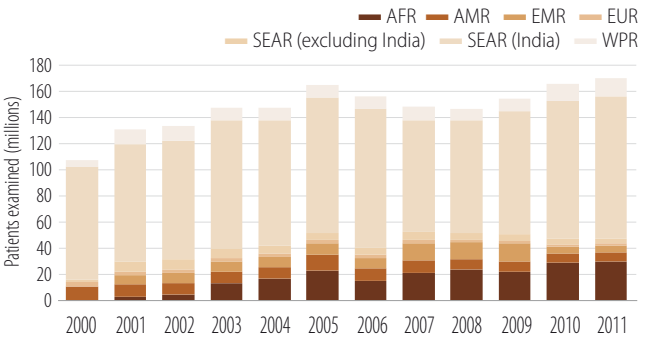
Source: *Data provided by 36 manufacturers eligible for the WHO Malaria RDT Product Testing Programme*

Figure 6.4 RDTs distributed by NMCPs, by WHO Region, 2005–2011



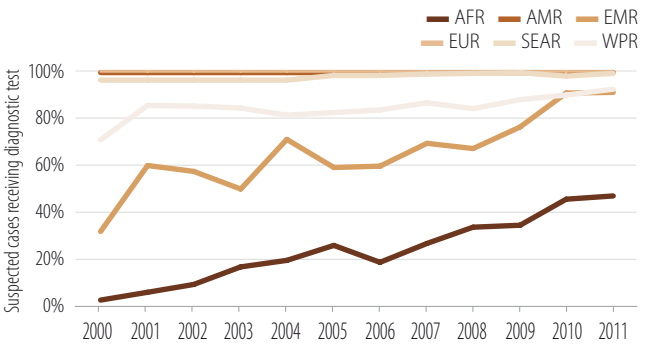
Source: *NMCP reports*
RDTs distributed in Europe and Americas are a very small fraction of the number distributed in other WHO Regions

Figure 6.5 Number of patients examined by microscopy, by WHO Region, 2000–2011



Source: *NMCP reports*

Figure 6.6 Proportion of suspected malaria cases attending public health facilities that receive a diagnostic test, 2000–2011



Source: *NMCP reports*

6.2.2 RDTs procured and distributed and microscopic examinations undertaken

RDTs procured

Since 2011, many manufacturers participating in the WHO Malaria RDT Product Testing Programme have supplied data on RDT sales to public and private sectors in malaria-endemic Regions (**Figure 6.3**). The volume of sales has increased dramatically over the last 4 years, for both *P. falciparum*-only tests and combination tests that can detect more than one species, reaching a total of 155 million in 2011. Results of product quality testing undertaken by WHO, FIND, TDR, and CDC show an improvement in test quality and proportionally more high quality RDTs being procured over time (*5*).

RDTs distributed

The reported number of RDTs delivered by NMCPs provides information on where RDTs procured from manufacturers are deployed in the public sector; the number has increased rapidly from less than 200 000 in 2005 to more than 74 million in 2011 (**Figure 6.4**). Most of the RDTs delivered (72%) were used in the African Region, followed by the South-East Asia Region (22%) and Eastern Mediterranean Region (4%). Although these totals are for the public sector only and underestimate the total quantity of RDTs distributed (only 32 of the 44 endemic countries in Africa reported these data in 2011), the same upward trend is seen as for RDT sales, with most growth occurring in the African Region.

Microscopic examinations undertaken

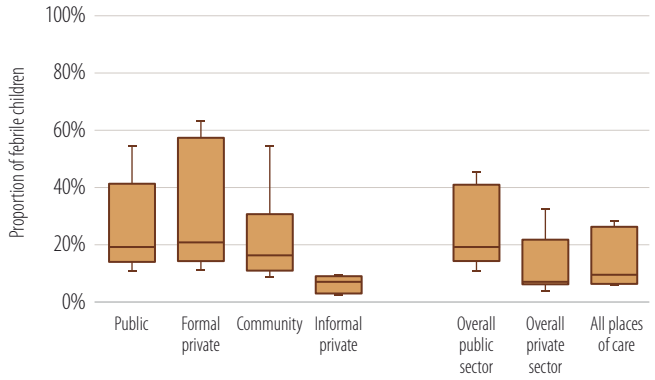
The number of patients tested by microscopic examination increased to a peak of 171 million in 2011 (**Figure 6.5**). The global total is dominated by India, which accounted for over 108 million slide examinations in 2011, an increase of 2 million slides since 2010. Increases in the number of patients examined by microscopy were also reported in the African, Eastern Mediterranean, and Western Pacific Regions. The number of patients examined by microscopy remains relatively low in the African Region, although it has increased over the last 4 years.

6.2.3 Parasitological testing in the public sector, private sector and in the community

Parasitological testing in the public sector

The proportion of reported suspected cases receiving a parasitological test is highest in the American and European Regions followed by South-East Asia and Western Pacific, Eastern Mediterranean and African Regions (**Figure 6.6**, **Box 6.1**). The value for the South-East Asia Region is heavily influenced by India, where the proportion of suspected cases receiving a diagnostic test is very high; without India, the proportion drops from 99% to 55%. The testing rate in the Eastern Mediterranean Region rose to 80% in 2010, while in the African Region it rose from 20% in 2005 to 47% in 2011. The pace of increase in these two regions appears to have slowed over the past year. Globally the proportion of suspected cases receiving a diagnostic test increased from 68% in 2005 to 77% in 2011. Much of the increase in testing in the African Region is from an increase in use of RDTs, which accounted for 40% of all reported cases in 2011. The reported testing rate may overestimate the true extent of diagnostic testing in the public sector, since countries with higher testing rates have a greater propensity to report, and therefore countries with lower testing rates are underrepresented in the overall rate.

Figure 6.7 Proportion of febrile children who had a blood test, by place of care in 9 African countries, 2010–2011



Source: *Household surveys, 2010-2011, from 9 African countries (Burkina Faso, Burundi, Liberia, Madagascar, Nigeria, Rwanda, Senegal, Uganda, Zimbabwe)*
Public health sector includes government and non-profit facilities; Formal private sector includes private clinics and providers; Community sector is community health workers; Informal private sector includes pharmacies, shops and traditional providers. The top and bottom of the lines are the 90th and 10th percentile, the box represents the limits of the 25th to 75th percentile or interquartile range, and the horizontal line through the box is the median value.

Parasitological testing in the private sector

Data reported by ministries of health on the number of RDTs distributed and patients examined by microscopy or RDTs generally cover the public sector only. However, approximately 40% of patients with suspected malaria worldwide seek treatment in the private sector, which includes regulated health facilities, pharmacies and other retail outlets (*2*). Information on the extent of parasitological testing in the private sector is limited but some may be derived from household surveys. The private sector includes a range of facilities, both formal, such as private health-care providers, and informal, such as shops.

In 9 household surveys conducted in Africa during 2010 and 2011, information on testing was available to compare testing in different health sectors. Comparison of the range of testing rates in different sectors suggests that the proportion of children <5 years of age who received a diagnostic test for suspected malaria was similar in public facilities and in the formal private sector, and lower in the community and the informal private sector (**Figure 6.7**). Because more children present for care at

Box 6.1 Improving diagnostic testing, treatment, and surveillance in the Americas: an example of T3: Test Treat Track

Three programmes were designated as the "Malaria Champions" during the commemoration of *Malaria in the Americas Day 2012*, hosted by the Pan American Health Organization. All three have made substantial progress in improving malaria diagnostic testing, treatment, and surveillance. Their achievements highlight the principles WHO seeks to promote in its T3: Test Treat Track Initiative.

The State of Acre in Brazil is home to the malaria-endemic municipalities of Cruzeiro do Sul, Rodrigues Alves, and Mâncio Lima which contribute almost 95% of the malaria cases in the state.

The State Health Department of Acre has developed and expanded programmes for the early diagnosis and treatment of malaria including the use of rapid diagnostic tests in areas that are difficult to access. It evaluates the services provided through systematic supervision of diagnostic stations and expansion of units for quality control of diagnosis. Surveillance data has been used to stratify endemic areas and produce a monthly epidemiological bulletin. The programme is recognized for: strong commitment and leadership, responsiveness to populations in areas affected by malaria, innovative use of school programmes, involvement of the community, strong health promotion efforts, judicious use of surveillance information in programme implementation, and sustained and strong impact in reducing malaria statewide. Among the major advances achieved is early diagnosis and timely treatment, with 80% of cases treated within 48 hours after the onset of symptoms and 99% of cases treated within 24 hours after diagnosis. In 2011 Acre recorded 22 958 cases compared to 93 864 cases in 2006, a reduction of 76%.

The Malaria Control Programme of Ecuador has strengthened various aspects of the national programme's capacity to diagnose, treat, and track malaria cases. The programme has expanded coverage of diagnostic testing through rapid tests and thick smears and implemented current therapeutic regimens. It also promotes improvement in quality management of the network for microscopic diagnosis through supervision and periodic external evaluation of microscopists at the provincial and national levels. Action is guided by a national epidemiological surveillance system for malaria (SIVEMAE) which includes data collection, analysis, and interpretation at local level, and the issuing of periodic reports of the epidemiological situation. It has engaged civil society, demonstrated leadership, taken steps towards elimination of local transmission in areas where it is deemed feasible, and implemented innovative efforts such as 100% screening of pregnant women in areas at risk and combinations of vector management methods. In 2011, 32% of positive cases were followed up and, of these, 94% were found to be treated according to national standards. Malaria incidence has declined steadily in the country since 2001 and during the past two years, it was further reduced by 70%.

The National Malaria Eradication service (SENEPA) of the Ministry of Public Health and Welfare in Paraguay is responsible for malaria control efforts at national, regional and local levels. The service is geographically decentralized into 18 zones and 40 sectors. There is a laboratory for the diagnosis of malaria in most areas, totaling 20 at the central level; 7 areas have entomology laboratories. The main strategy for malaria control focuses on intensive surveillance through a national network of 4868 community-based volunteers, coordinating with the evaluation assistants from local reporting units. The network enables timely actions to deal with cases as they occur. Prompt and free access to good quality malaria diagnosis and treatment is accomplished through the Primary Health Care (APS) service and the Family Health Unit (USF) which were formed in 2008. All cases are microscopically confirmed, radically treated, recorded and reported nationally through a database and a geographic information system. Cases of malaria have declined from 2 778 in 2002 to 91 in 2009, with only 27 in 2010 (18 indigenous and 9 imported cases), and just 10 in the year 2011 (1 indigenous case). This represents a reduction of 99% compared to 2002. There has been no mortality due to malaria in Paraguay since 1989.

public facilities, where testing is relatively more likely, and in the informal private sector, where testing is rates are lower, overall a higher proportion of children are tested in the public sector than in the private sector. The low proportion of all children tested includes those who do not present for care.

Malaria diagnostics in the community

A total of 46 countries reported deployment of RDTs at the community level and 12 million patients were tested in 2011, including 10 million tested with RDTs in India. However, patients tested with RDTs in the community represent a relatively small proportion (6%) of the reported total number of patients who received a parasitological test. Information on the utilization of malaria diagnostic testing in relation to a range of background variables is shown in **Box 6.2**.

6.3 Treatment of malaria

6.3.1 Policy adoption

By the end of 2011, ACTs had been adopted as national policy for first-line treatment in 79 of 88 countries where *P. falciparum* is endemic; chloroquine is still used in some countries in the Region of the Americas where it remains efficacious. By mid-2011, 70 countries were deploying ACTs in their general health services, with varying levels of coverage.[4] The adoption of policies for the treatment of malaria is summarized by WHO Region in **Table 6.2** and by country in **Annex 2B**.

6.3.2 Quantity of ACTs procured and distributed

ACTs procured

From reports of manufacturers and the Affordable Medicines Facility-malaria (AMFm) ititiative collected by WHO, the number of ACT treatment courses delivered by manufacturers to the public and private sectors increased greatly from 11 million in 2005 to 76 million in 2006, and reached 278 million in 2011[5] (**Figure 6.8**). Artemether-lumefantrine (AL) accounted for the largest volume of ACTs delivered (77%) in 2011. The second ACT in terms of volume delivered was artesunate + amodiaquine, which increased from fewer than 1 million treatment courses in 2007 to 63 million in 2011. The proportion of fixed-dose combination ACTs (with the 2 active pharmaceutical ingredients combined in the same tablet), which are preferred because of improved patient adherence to the recommended regimen, has been increasing and in 2011 accounted for 96% of all ACT deliveries.

4. Information on adoption of the WHO policy on ACTs and their deployment: (i) country adoption of ACTs: the WHO/GMP Antimalarial Drug Policies Database (http://www.who.int/malaria/am_drug_policies_by_region_afro/en/index.html); and (ii) country deployment of ACTs to general health services: compiled by the GMP Supply Chain Management Unit on the basis of reports from WHO regional and country offices.

5. Data provided by 8 manufacturers eligible for procurement from WHO/UNICEF and AMFm reports. Routine ACT public sector deliveries monitored 2005–2011; AMFm-facilitated public and private sector deliveries monitored 2010-2011, in 2010 by AMFm reports and in 2011 by reports of manufacturers. ACT deliveries through non-AMFm private-sector channels are not monitored, but are estimated to be a small fraction (approx. 5-10%) compared to public sector deliveries.

Box 6.2 Disparities in diagnostic testing for malaria

From household surveys conducted during 2010-2011 in 9 African countries (Burkina Faso, Burundi, Liberia, Madagascar, Nigeria, Rwanda, Senegal, Uganda, Zimbabwe), the relationship between diagnostic testing for malaria and residence, wealth, or gender can also be assessed. In countries where the overall proportion of suspected cases tested for malaria is greater than 10%, febrile children who received care in urban areas were more likely to have a diagnostic test than children in rural areas (**Figure Box 6.2a**), and febrile children from wealthier households who received care were more likely to be tested (**Figure Box 6.2b**). Male and female children were equally likely to be given a diagnostic test for malaria (**Figure Box 6.2c**).

Figure Box 6.2a Proportion of febrile children who had a blood test, by rural and urban residence, 2010–2011

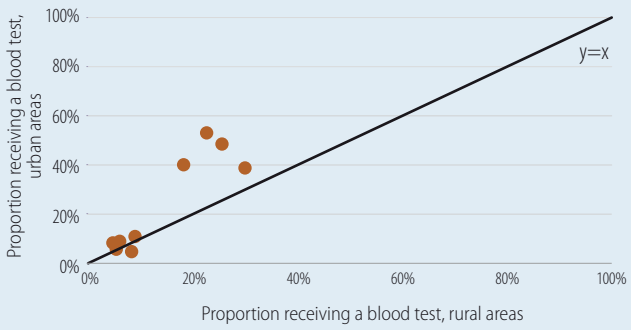
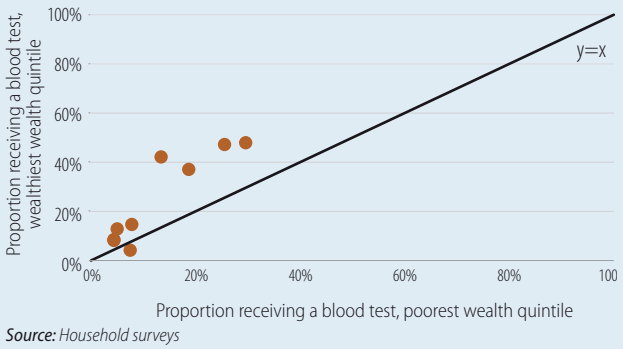


Figure Box 6.2b Proportion of febrile children who had a blood test, by poorest and wealthiest quintiles, 2010–2011



Source: Household surveys

Figure Box 6.2c Proportion of febrile children who had a blood test, by sex, 2010–2011

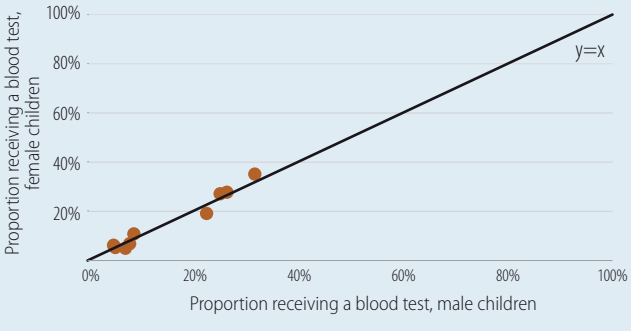


Table 6.2 Adoption of policies for malaria treatment, by WHO Region, 2011

Policy	AFR	AMR	EMR	EUR	SEAR	WPR	Grand Total
ACT is used for treatment of of *P. falciparum*	43	8	9		9	9	79
ACT is free of charge for all age groups in public sector	33	13	7		8	8	69
ACT is free of charge only for children under 5 years old in the public sector	9						9
ACT is delivered at community level	26	7	4		3	4	44
Pre-referral treatment with quinine/artemether IM/artesunate suppositories	31	5	6		6	6	58
Number of countries/areas with ongoing malaria transmission	**44**	**21**	**9**	**5**	**10**	**10**	**99**
Number of countries/areas with ongoing *P. falciparum* transmission	**43**	**18**	**9**	**0**	**9**	**9**	**88**

In 2011, the largest proportion of AL (37%) was procured for patients with a body weight >35 kg and the second largest (28%) for young children weighing <15 kg, followed by doses for children weighing 25–34 kg and the smallest proportion was supplied for patients with a body weight of 15–24 kg. Compared with previous years, an increased amount of AL was procured for young children weighing <15 kg than for older children and adults weighing >35 kg (**Figure 6.9**).

The increase in ACTs delivered in 2011 was due in large part to medicines procured through the AMFm initiative (**Figure 6.10**). Although AMFm accounted for a substantial portion (27%) of public sector deliveries in 2011, the total amount of ACTs procured for the public sector decreased in 2011 compared to 2010. Tracking of global ACT availability and national programme ACT needs by the Interagency ACT Supply Task Force is increasingly important to ensure an adequate supply of medicines as programmes scale up ACTs (**Box 6.3**).

ACTs distributed by national programmes

The number of ACTs distributed by NMCPs provides information on where ACTs procured from manufacturers are deployed in the public sector. The number distributed appears to have increased between 2007 and 2011, however reporting by countries is incomplete, and the totals do not match those delivered by manufacturers (**Figure 6.11**). The majority of ACTs distributed by NMCPs are in Africa, which accounted for 135 of 139 million treatments reportedly distributed by NMCPs worldwide in 2011.

6.3.3 Utilization of appropriate antimalarial medicines to treat febrile children in the public sector, private sector and community

It has been difficult to track the extent to which patients with confirmed malaria (by RDT or microscopy) received antimalarial medicines because information on diagnostic testing has not generally been included in household surveys. In the few

Box 6.3 Interagency ACT Supply Task Force

The InterAgency Supply Task Force (Task Force) was established in September 2011 to monitor the supply and demand constraints for ACTs, mainly reflected in increasing manufacturer lead time and rising cost of artemisinin. The Task Force, which is coordinated by WHO (GMP) and includes resource persons from the ALMA, CHAI, Global Fund, PMI, UNDP and UNICEF, was requested to monitor ACT stock levels to identify countries at risk of stock-out and recommend corresponding corrective actions.

Its activities have focused on:

(a) Quarterly data collection on in-country stock levels, past consumption, projected requirements and orders pipelines;

(b) Development of a database to compile and analyse data provided by countries and manufacturers, based on simple metrics to identify risks of stock-out within defined time periods;

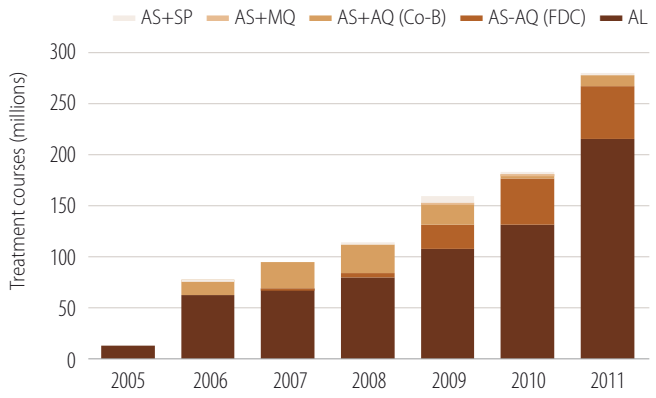
(c) Preparation of stock-out risk assessment reports for validation by the country;

(d) Interventions for risk mitigation in case of country-confirmed supply problems.

Task Force interventions included discussions to release delayed donor funding, mobilizing new funding, expediting deliveries with manufacturers, splitting deliveries to address temporary shortfalls, liaising with regulators and facilitating the intra-country and intra-region movement of surplus stocks. The Task Force observed that lack of funding, delays in disbursement and suboptimal in-country planning and supply management substantially impact ACT procurement and distribution. In addition, many countries have weak management information systems with limited information as to consumption of medicines and diagnostic tests and difficulties with quantification and forecasting.

Despite multiple interventions by the Task Force, countries continue to experience stock-outs due to systematic shortcomings. The Task Force therefore in November 2012 proposed a number of changes for the future: (i) integration of the data collection function into the newly created WHO/RBM Situation Room, effective from January 2013, with referrals to the Task Force for required interventions; (ii) development of a user-friendly online web-based monitoring tool for stock levels which all countries can use at their discretion, to improve stock monitoring; and (iii) improvement of communication with countries highlighting applied interventions and the range of assistance the Task Force offers. Simultaneously, the Task Force aims to strengthen collaboration with other groups, particularly the RBM Procurement and Supply Management (PSM) Working Group, to address the root causes of stock-outs.

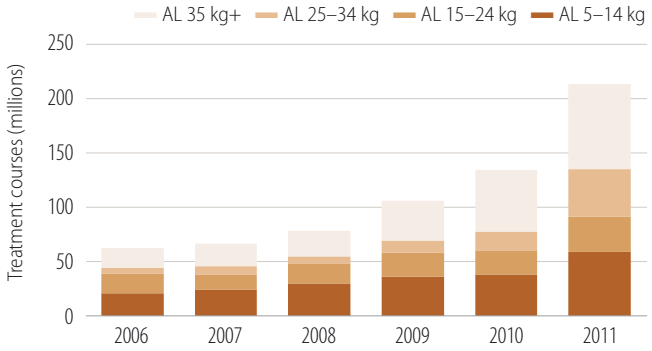
Figure 6.8 ACT deliveries to the public and private sector, 2005–2011



AL= Artemether-lumefantrine, AQ=Amodiaquine, AS=Artesunate, MQ = Mefloquine, SP = Sulfadoxine-pyrimethamine, Co-B =co-blistered pack, FDC=fixed dose combination

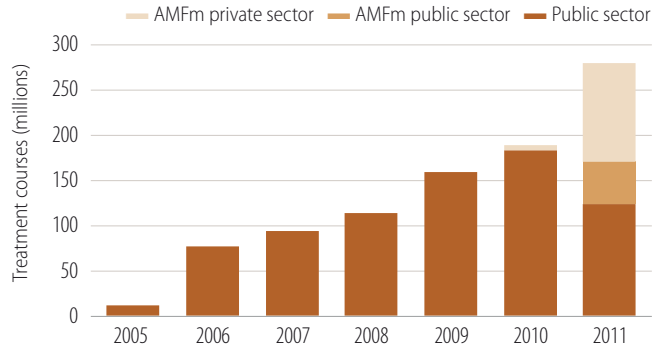
Source: *Data provided by 8 manufacturers eligible for procurement from WHO/UNICEF and AMFm reports. Routine ACT public sector deliveries monitored 2005–2011; AMFm-facilitated public and private sector deliveries through AMFm monitored 2010-2011, in 2010 by AMFm reports and in 2011 by reports of manufacturers. ACT deliveries through non-AMFm private sector channels are not monitored, but are estimated to be a small fraction (approx. 5-10%) compared to public sector deliveries.*

Figure 6.9 Artemether-lumefantrine deliveries to the public and private sector, by weight-based treatment course, 2006-2011



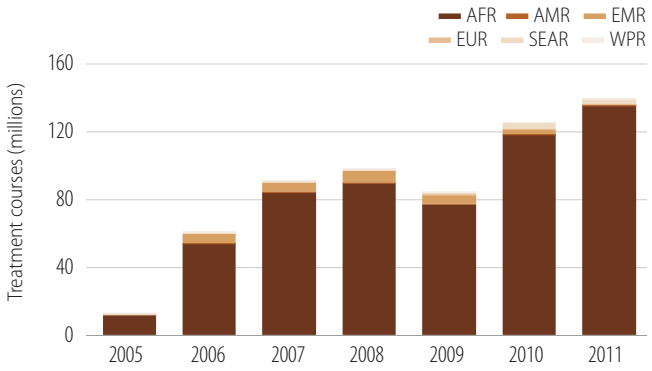
Source: *Data provided by AMFm reports and by 4 companies prequalified by WHO. Routine ACT public sector deliveries monitored 2005–2011; AMFm-facilitated public and private sector deliveries through AMFm monitored 2010-2011, in 2010 by AMFm reports and in 2011 by reports of manufacturers. ACT deliveries through non-AMFm private-sector channels are not monitored, but are estimated to be a small fraction (approx. 5-10%) compared to public sector deliveries.*

Figure 6.10 ACT deliveries, by health sector and AMFm contribution, 2005–2011



Source: *Data provided by 8 manufacturers eligible for procurement from WHO/UNICEF and AMFm reports (as of 30 August 2012). Routine ACT public sector deliveries monitored 2005–2011; AMFm-facilitated public and private sector deliveries through AMFm monitored 2010-2011, in 2010 by AMFm reports and in 2011 by reports of manufacturers. ACT deliveries through non-AMFm private-sector channels are not monitored, but are estimated to be a small fraction (approx. 5-10%) compared to public sector deliveries.*

Figure 6.11 Number of ACT treatment courses distributed by NMCPs, by WHO Region, 2005-2011



Source: *NMCP reports*

recent surveys which included questions on diagnostic testing, the validity of survey responses regarding test results and treatments given is uncertain. Similarly, while routine information systems usually include data on diagnostic confirmation, they rarely track treatments given to patients diagnosed with malaria. The development of routine systems that track febrile patients, testing, results, and treatments given, would enable better tracking of antimalarial utilization. However, such systems seldom exist, especially in Africa, and comprehensive information on the relationship between diagnostic test results and treatments given is therefore lacking.

Utilization of appropriate antimalarial medicines, national programme reports

On the basis of the available data from national programmes on the number of ACT treatments distributed and the estimated number of presumed and confirmed *P. falciparum* cases at public facilities, it is possible to calculate the proportion of malaria cases from public facilities which would potentially be treated with ACTs. In 2011, the proportion of estimated presumed and confirmed *P. falciparum* cases at public facilities potentially treated by distributed ACTs varied by Region. In the Region of the Americas, the Eastern Mediterranean Region, European Region, and the Western Pacific Region, essentially all *P. falciparum* cases in public facilities could potentially be treated with distributed ACTs, whereas 73% in the South-East Asia Region, and 59% in the African Region could potentially be treated. In the African Region, 13 countries distribute enough ACTs to potentially treat 100% of *P. falciparum* cases seen in public facilities. Because the African Region accounts for nearly 90% of all *P. falciparum* cases globally, approximately half of all *P. falciparum* cases could potentially be treated with distributed ACTs (**Figure 6.12**).

Utilization of appropriate antimalarial medicines, household surveys

From household survey data it is possible to examine the proportion of febrile children receiving antimalarial treatments who were given an ACT in different health sectors. In surveys conducted in 12 African countries during 2010-2011 which included information on the type of malaria treatment, the proportion of children receiving ACTs among those who received any antimalarial varied widely (**Figure 6.13**). Among all febrile children, a moderate

proportion (median, 65%) who were treated with an antimalarial received an ACT. Comparing the median proportions among different places of care, a greater proportion of children presenting at public facilities, and in the formal and informal private sectors, received ACTs than those presenting in the community. Because a higher proportion of children present and receive antimalarial treatment at public facilities than in the community, the overall median proportion of children in the overall public sector (public facilities and community) who receive ACT as the antimalarial treatment is higher than in the overall private sector.

It is not possible to determine from these data what proportion of the children had confirmed malaria; however, the results suggest that ensuring access to ACTs remains a challenge in both public and private settings. Children treated in the community still represent a small fraction of all treated patients, although these numbers may be underestimated in many reporting systems. Expanding malaria diagnostic testing and treatment to the community level would further improve access to appropriate antimalarial therapy. Information on the utilization of ACTs stratified by a range of demographic characteristics is shown in **Box 6.4.**

6.3.4 Scaling up diagnostics and reducing treatment needs

Despite recent expansion of malaria diagnostic testing, as evidenced by increases in sales of RDTs and of RDTs distributed by country programmes, and in the proportion of suspected malaria cases tested at public facilities, many patients with suspected malaria still do not receive a parasitological test. In the African Region during 2006–2011, the total number of tests (microscopy + RDTs) conducted in the public sector was less than half the number of ACTs distributed by NMCPs during the year (**Figure 6.14**), indicating that many patients received ACTs without confirmatory diagnosis. Considering that test positivity rates in most areas in Africa are less than 50%, the ratio of diagnostic tests to ACTs should be ≥2. The data indicate that the scale-up of RDTs remains far from complete. Shortfalls in the availability of diagnostic testing can be attributed at least in part to the relatively recent policy change and the expected lag time in securing funds, subsequent procurement of RDTs, and training of health workers

The increasing use of RDTs has accounted for most of the increase in malaria diagnostic tests carried out in recent years and provides the most feasible means of rapidly expanding diagnostic testing, especially in peripheral health facilities and at the community level in remote rural areas. The introduction of RDTs can significantly reduce the need for ACTs and consequently, expenditures on antimalarial drugs (*6*). While overall cost-savings will depend on the intensity of malaria transmission and other factors, RDTs are cost-effective compared to presumptive treatment, in part due to improved patient outcomes for non-malarial febrile illness (*7*). Promotion of testing starts at the level of programme planning, budgeting and procurement. Country programmes and their supporting donors should aim to procure an appropriate number of RDTs and ACTs based on local data

Box 6.4 Disparities in ACT utilization

Household surveys from 12 countries in Africa (Angola, Burkina Faso, Burundi, Liberia, Madagascar, Malawi, Nigeria, Rwanda, Senegal, Uganda, United Republic of Tanzania, Zimbabwe) conducted during 2010-2011 enable examination of the relationship between ACT utilization and urban/rural residence, wealth, or gender. The proportion of febrile children in urban areas given any antimalarial medicine who received an ACT compared to those in rural areas varies across surveyed countries (**Figure Box 6.4a**). Similarly, the proportion of febrile children residing in wealthier households given any antimalarial who received an ACT compared to those residing in poorer households also varies (**Figure Box 6.4b**). In most surveys, male and female febrile children given an antimalarial were equally likely to receive an ACT (**Figure Box 6.4c**).

Figure Box 6.4a Proportion of ACTs among antimalarial treatments given to febrile children, by urban or rural residence, 2010–2011

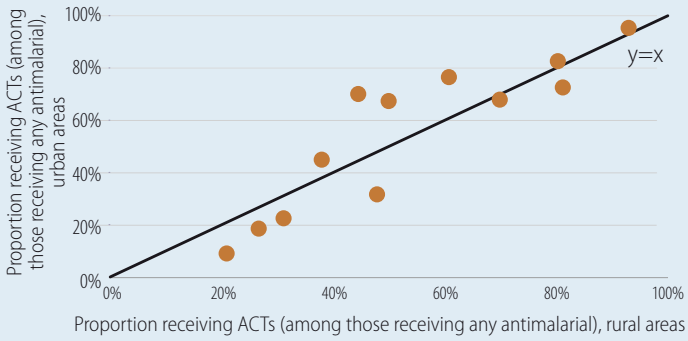


Figure Box 6.4b Proportion of ACTs among antimalarial treatments given to febrile children, by household wealth quintile, 2010–2011

Source: Household surveys

Figure Box 6.4c Proportion of ACTs among antimalarial treatments given to febrile children, by sex, 2010–2011

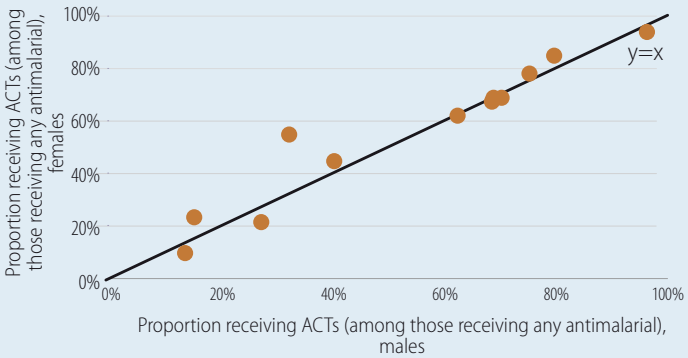
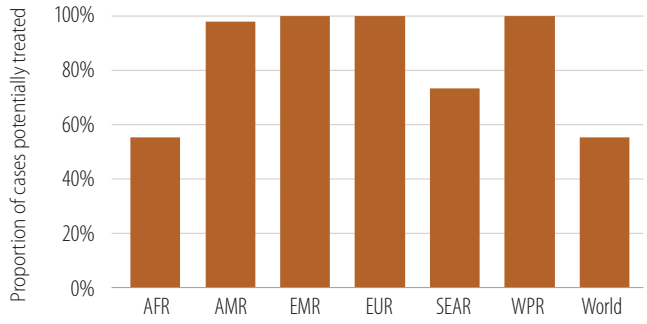
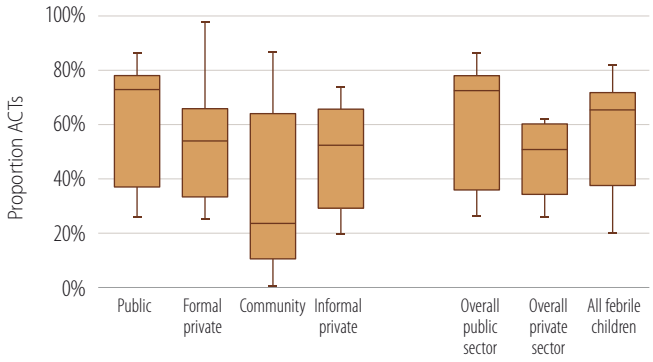


Figure 6.12 Proportion of estimated presumed and confirmed *P. falciparum* cases at public facilities potentially treated with distributed ACTs, by WHO Region, 2011



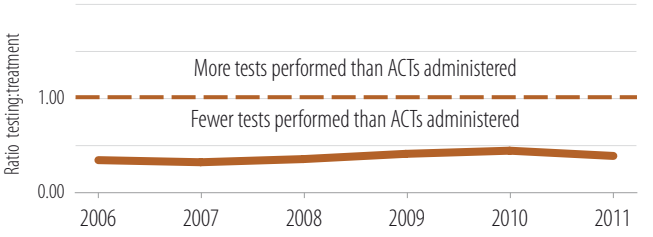
Source: *NMCP reports*

Figure 6.13 Proportion of ACTs among antimalarial treatments given to febrile children, by health sector, selected countries with household surveys, 2010-2011



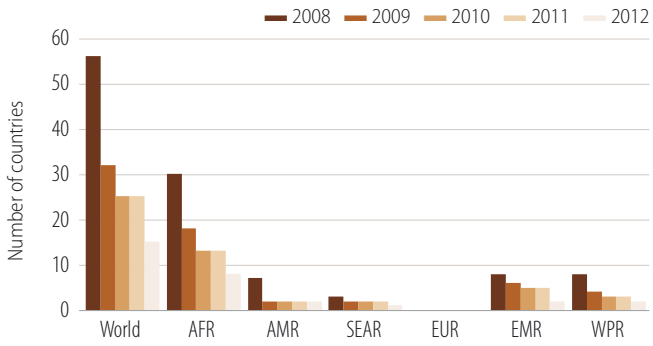
Source: *Household surveys, 2010-2011, 12 African countries (Angola, Burkina Faso, Burundi, Liberia, Madagascar, Malawi, Nigeria, Rwanda, Senegal, Uganda, United Republic of Tanzania, Zimbabwe)*
Public health sector includes government and non-profit facilities; Formal private sector includes private clinics and providers; Community sector is community health workers; Informal private sector includes pharmacies, shops and traditional providers.
The top and bottom of the lines are the 90th and 10th percentile, the box represents the limits of the 25th to 75th percentile or interquartile range, and the horizontal line through the box the median value.

Figure 6.14 Ratio of RDT and microscopy performed to ACTs distributed, African Region, 2006-2011



Source: *NMCP reports*

Figure 6.15 Number of countries allowing marketing of oral artemisinin-based monotherapies, by WHO Region, 2008–2012



Source: *http://www.who.int/malaria/monotherapy_NDRAs.pdf*

according to procurement guidance described in WHO documents. If the projected number of ACTs required exceeds the estimated number of RDTs required, the calculations should be carefully reviewed, as the ratio of all diagnostic tests to ACTs should exceed 2 in most malaria-endemic settings.

6.4 Antimalarial drug resistance

6.4.1 Policy adoption: withdrawal of oral artemisinin-based monotherapy medicines

The use of oral artemisinin-based monotherapies threatens the long-term usefulness of ACTs by fostering the emergence and/or spread of resistance to artemisinin. To contain this risk and to ensure high cure rates for *P. falciparum* malaria, WHO recommends the withdrawal of oral artemisinin-based monotherapies from the market and their replacement by ACTs, as endorsed by the World Health Assembly in 2007.[6] WHO also calls upon manufacturers to cease the marketing of oral artemisinin-based monotherapies.

To track adherence to this recommendation, WHO compiles data on the marketing of oral artemisinin-based monotherapies by manufacturers and on the regulatory action taken by malaria-endemic countries; these data are posted on the Global Malaria Program Website.[7] At the time the WHA resolution was adopted in 2007, 55 countries worldwide, including 30 in Africa, allowed the marketing of oral artemisinin-based monotherapies. By December 2012, 15 countries were still allowing the marketing of these products, including 8 in the African Region, and as of November 2012, 28 pharmaceutical companies were manufacturing these products, down from 38 one year previously. Most of the countries still allowing the marketing of monotherapies are in the African Region (**Figure 6.15**), while most of the manufacturers are located in India. Although weak regulation of pharmaceutical markets in many malaria-endemic countries presents a challenge, steady progress has been made in phasing out oral artemisinin-based monotherapy. Greater collaboration and involvement of national regulatory authorities is required to ensure complete withdrawal of oral artemisinin-based monotherapies from all countries.

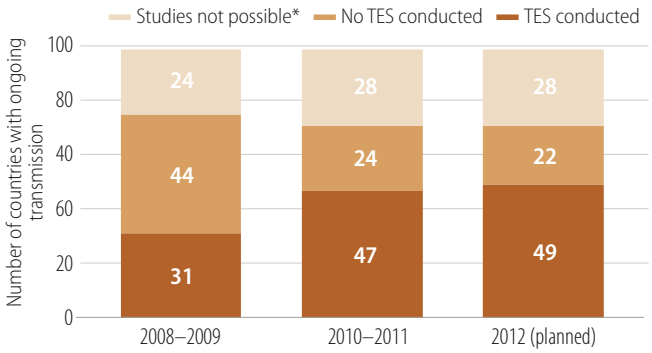
6.4.2 Drug efficacy monitoring

Status of drug efficacy monitoring

Therapeutic efficacy studies remain the gold standard for guiding drug policy; the standard WHO protocol was updated in 2009 (*8*). WHO compiles the results of efficacy tests conducted by national programmes and research institutes in the WHO Global Database on Antimalarial Drug Efficacy. The database currently contains over 4000 studies carried out between 1996 and 2011 and it formed the basis of the *Global*

6. The full text of the WHA resolution (WHA 60.18) can be found at http://apps.who.int/gb/ebwha/pdf_files/WHA60/A60_R18-en.pdf
7. Information is available on the internet via the following links: Manufacturing companies: http://www.who.int/malaria/monotherapy_manufacturers.pdf
National Regulatory Authorities: http://www.who.int/malaria/monotherapy_NDRAs.pdf

Figure 6.16 Status of therapeutic efficacy monitoring in countries with ongoing malaria transmission, 2008-2012



* Therapeutic Efficacy Studies (TES) are impractical in countries with low malaria transmission or transmission of *P. vivax* only.

Source: *WHO Global Malaria Programme database on antimalarial therapeutic efficacy monitoring by country, November, 2012*

report on antimalarial drug efficacy and drug resistance: 2000–2010 (*9*). Experience with previous antimalarial treatments shows that significant levels of resistance can develop within a short time, and therefore WHO recommends that the efficacy of first- and second-line antimalarial treatments should be monitored at least once every 2 years.

In 2010–2011, studies of first- or second-line antimalarial treatments were completed in 47 of 71 countries where *P. falciparum* efficacy studies were possible,[8] an increase from 31 countries which conducted studies during 2008–2009 (**Figure 6.16**). However 24 countries did not conduct studies during 2010–2011 and were therefore not in compliance with the WHO recommendation on antimalarial drug efficacy monitoring. Studies were planned to occur during 2012 in 49 countries, including 29 countries in Africa.

Status of *P. falciparum* resistance to artemisinin[9]

Routine monitoring of the therapeutic efficacy of ACTs is essential for timely changes to treatment policy and can help to detect early changes in *P. falciparum* sensitivity to artemisinins. WHO currently recommends changing antimalarial treatment policy when the treatment failure rate in a 28 or 42 day follow-up study (depending on the medicine) exceeds 10%. The proportion of patients who are parasitaemic on day 3 of treatment is currently the best widely available indicator used in routine monitoring to measure *P. falciparum* sensitivity to artemisinins. The working definition of suspected resistance to artemisinins is defined as an increase in parasite clearance time, as evidenced by 10% or more cases with parasites detectable on day 3 of treatment with an ACT; confirmed resistance is defined as treatment failure after treatment with an oral artemisinin-based monotherapy with adequate antimalarial blood concentration, as evidenced by the persistence of parasites for 7 days, or the presence of parasites on day 3 and recrudescence within 28 or 42 days (depending on the drug).

In recent years, *P. falciparum* resistance to artemisinins has been detected in 4 countries in the Greater Mekong subregion: Cambodia, Myanmar, Thailand, and Viet Nam (**Figure 6.17**). Despite these changes in parasite sensitivity to artemisinins, ACTs have generally remained clinically and parasitologically efficacious so long as the partner drug remains efficacious. In Pailin province, Cambodia, resistance to artemisinin and to several partner drugs in commonly used ACTs has been confirmed. Resistance to piperaquine is under investigation after a study in 2010 found 27% treatment failure with dihydroartemisinin-piperaquine. Due to the high failure rate of ACTs in Pailin, a consensus meeting – held in November 2011 in Cambodia – recommended the use of atovaquone-proguanil delivered as directly observed therapy for Pailin province; stringent follow-up of all treated patients was also recommended to detect any emergence of atovoquone resistance. To date, there have been no reports of delayed parasite clearance during routine therapeutic efficacy studies conducted in Africa.

Chloroquine resistance in *P. vivax* malaria

Chloroquine remains the drug of choice in areas where it remains effective. Treatment failure on or before day 28 and/or prophylactic failures have been observed in 23 countries: Afghanistan, Bolivia (Plurinational State of), Brazil, Cambodia, China, Colombia, Ethiopia, Guyana, India, Indonesia, Madagascar, Malaysia, Myanmar, Pakistan, Papua New Guinea, Peru, the Republic of Korea, Solomon Islands, Sri Lanka, Thailand, Turkey, Vanuatu and Viet Nam. However, confirmation of true chloroquine resistance requires additional drug concentration studies and for this reason it is not entirely clear to what extent chloroquine-resistant *P. vivax* has spread. Among the countries with *P. vivax* treatment or prophylactic failure listed above, at least 1 case of chloroquine-resistant *vivax* malaria has been confirmed in each of 10 countries: Bolivia (the Plurinational State of), Brazil, Ethiopia, Indonesia, Malaysia, Myanmar, Solomon Islands, Thailand, Papua New Guinea, and Peru. ACTs are now recommended for the treatment of chloroquine-resistant *P. vivax*, particularly where ACTs have been adopted as the first-line treatment for *P. falciparum*.

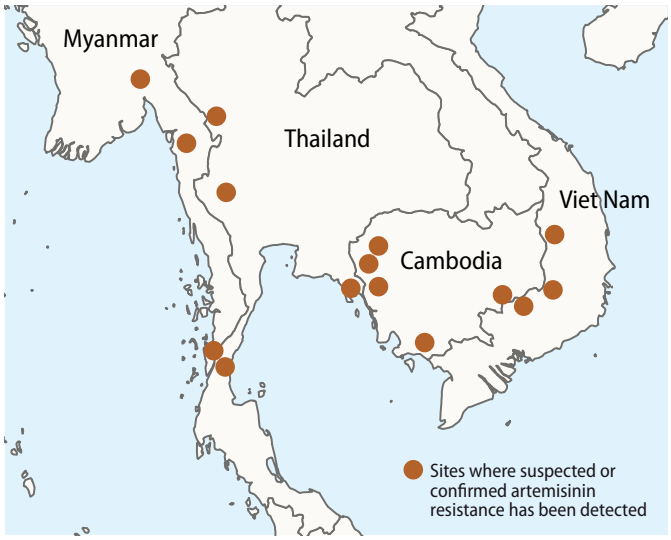
6.4.3 Containment of artemisinin resistance

In accordance with the *Global Plan for Artemisinin Resistance Containment* (GPARC) (*10*), in areas with evidence of artemisinin resistance, an immediate, multifaceted response should be launched with the goal of containing and, if feasible, eliminating the resistant parasites. Containment efforts are underway in all areas with suspected or confirmed artemisinin resistance in the 4 affected countries (Cambodia, Myanmar, Thailand, and Viet Nam). In higher transmission areas, efforts focus on limiting the risk of spread by lowering the malaria burden through intensified malaria control, by increasing access to diagnosis and appropriate treatment, and by scaling up provision of healthcare services to migrant and mobile populations. Containment programmes in lower transmission areas seek to achieve an accelerated elimination of *P. falciparum* parasites. These efforts have been effective in lowering the burden of *falciparum* malaria, but need to be strengthened and expanded if efforts at containment, and ultimately elimination, are to be successful. Implementing all WHO recommendations requires consider-

8. In certain countries (28 with ongoing malaria transmission in 2012), efficacy studies are impractical because of low malaria incidence, or because they are endemic for *P. vivax* only

9. Status of artemisinin resistance as of April, 2012: http://www.who.int/malaria/diagnosis_treatment/resistance/updateartemsininresistanceapr2012/en/index.html

Figure 6.17 Sites where suspected or confirmed artemisinin resistance has been detected in therapeutic efficacy studies, Mekong subregion, 2007–2012



Map production: Global Malaria Programme (GMP), World Health Organization; ***Source of data:*** *WHO Global Database on Antimalarial Drug Efficacy, as of November, 2012*

able financial resources, long term political commitment, and stronger cross-border cooperation. Following recommendations made during a joint assessment by international development partners and WHO on the response to artemisinin resistance in the Greater Mekong subregion,[10] WHO and international partners are formulating an emergency response plan for artemisinin resistance in the greater Mekong subregion. The emergency plan will provide further guidance for field implementation of the containment efforts outlined in the GPARC, and is to be released in early 2013.

It is not known whether new foci of artemisinin resistance represent the spread of existing *P. falciparum* resistant strains or the de novo emergence of resistance, in part because molecular markers of artemisinin resistance are not yet available. However, the possibility exists that artemisinin resistance will spread to or develop independently in other parts of the world. The spread of artemisinin resistance is difficult to predict based on previous patterns of resistance as malaria control interventions have been significantly scaled up during the past decade. There is an urgent need for further research on artemisinin resistance, including the identification of molecular markers and better in vitro sensitivity tests.

6.5 Conclusions

10. Joint Assessment report of the Response to Artemisinin Resistance in the Greater Mekong subregion (http://malaria2012conference.com/cms/wp-content/uploads/2012/10/Joint-Assessment-of-the-Response-to-Artemisinin-Resistance.pdf) – conducted November 2011 to February 2012 in partnership with the World Health Organization, UK Department for International Development and the US Agency for International Development. Sponsored by the Australian Agency for International Development and the Bill and Melinda Gates Foundation (http://malaria2012conference.com/cms/wp-content/uploads/2012/10/Joint-Assessment-of-the-Response-to-Artemisinin-Resistance.pdf).

Implementation of parasitological testing

There have been significant increases in the availability and use of parasitological testing in the last few years, particularly in the African Region where the proportion of reported suspected cases receiving a parasitological test in the public sector increased from 20% in 2005 to 47% in 2011; however, progress has slowed during the past year. Most of the increase is attributable to an increase in use of RDTs. The limited information available indicates that testing in the private sector and in the community is lower than in the public sector and overall testing rates are well below the target to test all suspected malaria cases. Further funding and technical support are required to assist countries to achieve universal diagnostic testing of suspected malaria in the public sector, private sector and in the community. Promotion of malaria diagnostic testing needs to begin during planning, budgeting and procurement. Considering that in most malaria-endemic areas, malaria diagnosis will be confirmed in less than half of patients tested, programmes should aim to obtain at least as many RDTs as ACT treatment courses until such time as surveillance data allow for more precise procurement estimation.

Access to treatment

Information from manufacturers and from country programmes indicates that the number of ACTs procured has increased dramatically since 2005. It is difficult to track the extent to which patients with confirmed malaria (by RDT or microscopy) receive antimalarial medicines because diagnostic test results are not usually linked to the treatment given to patients, in either household surveys or routine information systems. A limited number of recent household surveys suggest that febrile patients attending public health facilities are more likely to receive an ACT than those attending private facilities; in countries surveyed most recently, the proportion has increased in both public and private sectors. In some countries the proportion of febrile patients who receive ACTs remains low, which implies that a proportion of febrile patients with malaria do not receive appropriate treatment. At the same time, given low rates of testing among patients treated for malaria, a substantial proportion of those who do receive ACTs do not have malaria. Consequently, both under and over treatment with ACT continues. The development of routine systems that track febrile patients, diagnostic testing, test results, and treatments administered, would enable better tracking of antimalarial utilization. As routine system development may take time, national programmes may consider other sources of testing and treatment information, such as health facility-based surveys.

Equity in testing and treatment

A higher proportion of febrile children who are residents of urban areas and those from wealthier households receive diagnostic testing for malaria than children from rural areas and poorer households; these differences are more pronounced at moderate overall rates of testing than when testing rates are lowest. Differences in diagnostic testing rates between male and female children are small. The proportion of febrile children receiving an ACT for antimalarial treatment by urban or rural residence and household wealth varies across surveyed countries; there is little difference by gender. Ensuring availability of diagnostic testing and appropriate antimalarial therapy for all

those in need is a priority for country programmes. The new "T3: Test. Treat. Track" initiative aims to support malaria-endemic countries in these efforts (see **Chapters 2 and 7**).

Combating drug resistance

The recent spread of resistance to antimalarial medicines has led to an intensification of efforts to prohibit the marketing of oral artemisinin-based monotherapies and to expand antimalarial drug efficacy monitoring. In the last year, 8 more countries have withdrawn marketing authorization of oral artemisinin-based monotherapies, but 15 countries have not done so. The number of countries conducting therapeutic efficacy studies for antimalarials has increased, in particular in the African Region, where the reliance on ACTs is high. Despite the observed changes in parasite sensitivity to artemisinins, ACTs remain efficacious in curing patients provided the partner drug is still efficacious. In Pailin province, Cambodia, resistance to both components of multiple ACTs has been found, and special provisions for directly observed therapy using a non-artemisinin-based combination (atovaquone-proguanil) have been put in place. Containment efforts in the Mekong subregion have shown that the incidence of *falciparum* malaria can be decreased, which is a key component of the overall containment plan to halt the spread of resistant parasites. Greater use of diagnostic tests to better target appropriate antimalarial treatment will contribute to this effort.

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CHAPTER 7

Malaria surveillance

This chapter examines (i) the extent to which malaria surveillance systems are able to detect malaria cases, and (ii) how well surveillance systems can assess trends over time and provide information on geographical differences in malaria incidence.

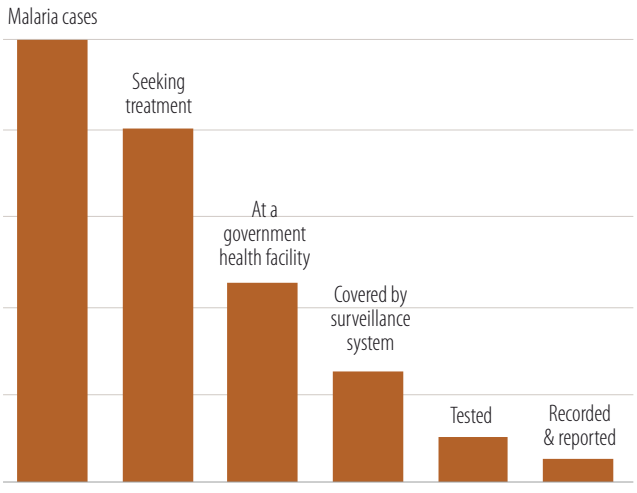
7.1 Bottlenecks in case detection

All malaria-endemic countries have systems to record and report malaria cases and deaths. The extent to which these systems provide reliable information on trends and distribution of malaria varies widely across countries and WHO Regions. In 2010 WHO estimated that there were 219 million malaria cases worldwide (**Chapter 8**, **Table 8.2**), and received reports of 23 million confirmed cases from endemic countries, representing a case detection rate of 10% globally.

The ability of surveillance systems to detect cases is influenced by: (i) the extent to which malaria patients seek treatment, (ii) whether or not patients use health facilities covered by a country's surveillance system, (iii) the proportion of patients who receive a reliable diagnostic test, and (iv) the completeness of recording and reporting (**Figure 7.1**).

Figure 7.1 Bottlenecks in case detection

For a malaria case to be captured by a surveillance system several conditions must be met: (i) the patient seeks treatment, (ii) the patient seeks treatment at a health facility or provider covered by a surveillance system – usually a government run health facility, (iii) the patient receives a diagnostic test of high quality, and (iv) the diagnostic test result is recorded and reported through the information or surveillance system. The proportion of cases that meet these conditions decreases progressively as each condition is considered. Cases that fulfil all conditions may represent only a small fraction of the true number of malaria cases in a country, as illustrated in this hypothetical figure.



7.1.1 The proportion of malaria patients who seek treatment

Information on where malaria patients seek treatment can be derived from household surveys which ask care-givers whether or not children under 5 years with fever in the previous two weeks were taken for treatment and, if so, where (e.g. government health facility, private clinic, pharmacy, shop, traditional healer). Although most household surveys do not record where adults with fevers seek treatment, some evidence suggests that treatment-seeking patterns are similar across all age groups (*1,2*) A drawback of household surveys is that in most settings, the majority of fever cases recorded would not have been caused by malaria, and adjustment of proportions is needed by taking into account the likelihood that fevers are caused by malaria in the local setting (*2*). When such an adjustment is made it is found that the proportion of malaria patients who seek treatment, whether in the public or private sector, is generally more than 60% (**Figure 7.2a**). A higher proportion of patients appear to seek treatment in countries in the WHO Regions of the Americas, South-East Asia and Western Pacific than in the African Region. It is assumed that almost 100% of patients in countries in the elimination phase, which includes all affected countries in the European Region, seek treatment.

7.1.2 Proportion of malaria patients treated in public sector health facilities

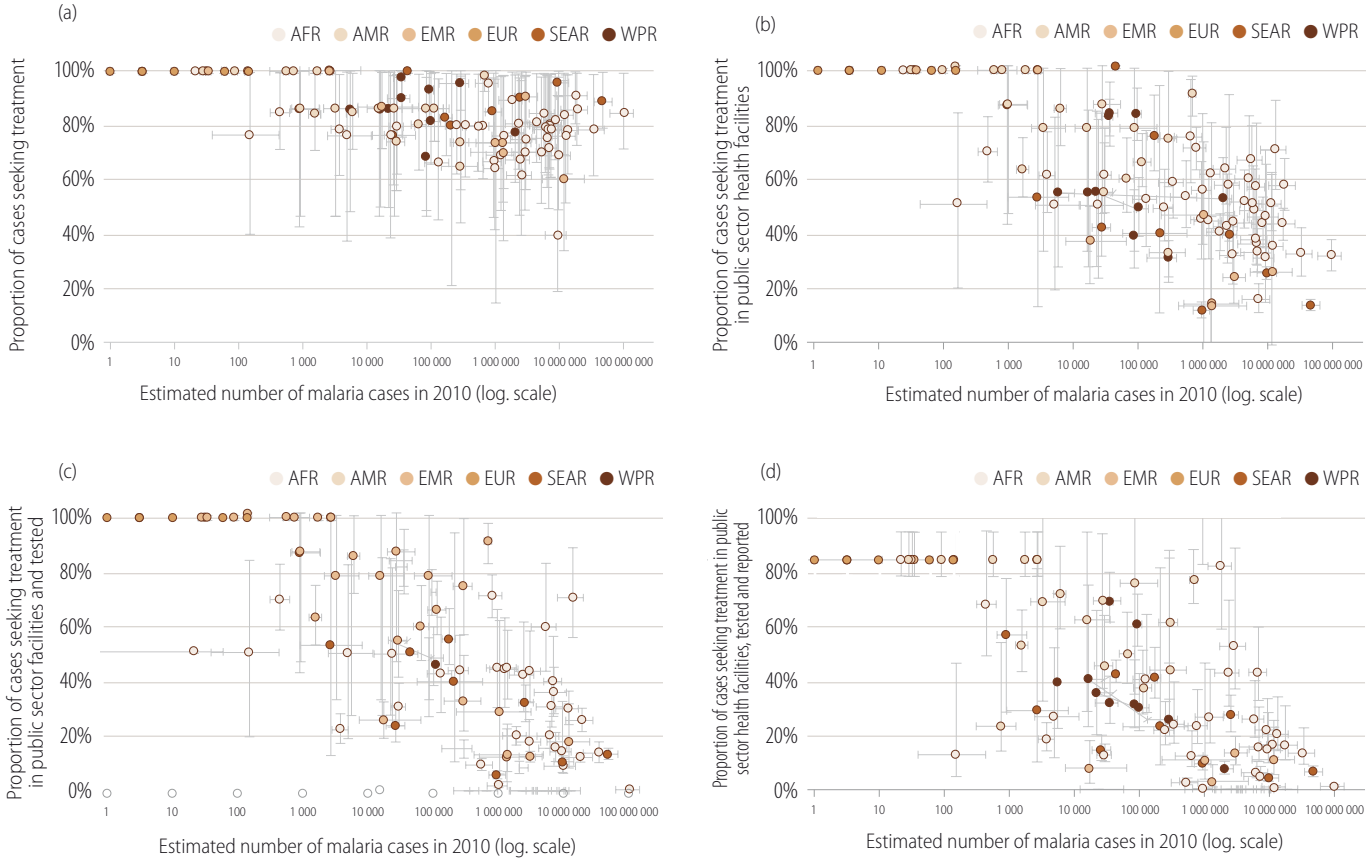
The surveillance systems of most countries focus on government-run public health facilities; indeed 44% of national malaria programmes receive information only from government health facilities (**Figure 7.3**). A small proportion of national surveillance systems do not include government-run hospitals. This is possibly because hospitals are administered separately from health centres and health posts, which are often considered to be part of the primary health-care network. On the other hand, a small proportion of countries do not include health centres and only obtain reports from hospitals (secondary and tertiary health-care facilities). Most national surveillance systems include health posts but almost 20% do not. In many countries relatively few malaria patients appear to be treated at health posts; the majority access care through health centres and hospitals (**Figure 7.4**).

Less than 40% of countries receive information from private sector health facilities. Even for those countries which receive reports from the private sector, the reports generally cover only a small proportion of all private sector health facilities. Thus most surveillance systems essentially capture only cases seen at public sector health facilities.

There is great variation across WHO Regions in the extent to which malaria patients seek treatment in public sector health

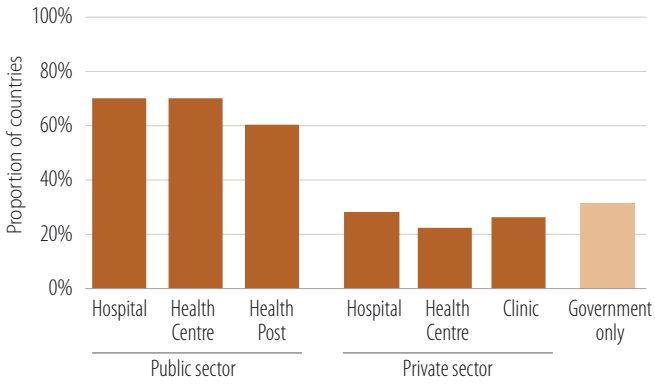
Figure 7.2 Proportion of malaria cases captured by a surveillance system in relation to total number of cases estimated to occur in a country

Public sector includes cases in the private sector that are reported through the public sector



Source: *NMCP reports, WHO estimates, household surveys*

Figure 7.3 Types of health facility covered by malaria surveillance systems



Source: *NMCP reports*

facilities (**Figure 7.2b**). The European Region and the Americas have the highest proportions of patients seeking treatment in public sector health facilities. However, for most countries, the proportion is less than 60% – with countries in the Eastern Mediterranean, South-East Asia and Western Pacific Regions having proportions similar to, or lower than, most countries in the African Region. The data also show that the proportion of patients seeking treatment in the public sector is lower in countries with the greatest number of malaria cases.

7.1.3 Proportion of malaria patients treated in public sector health facilities who receive a diagnostic test

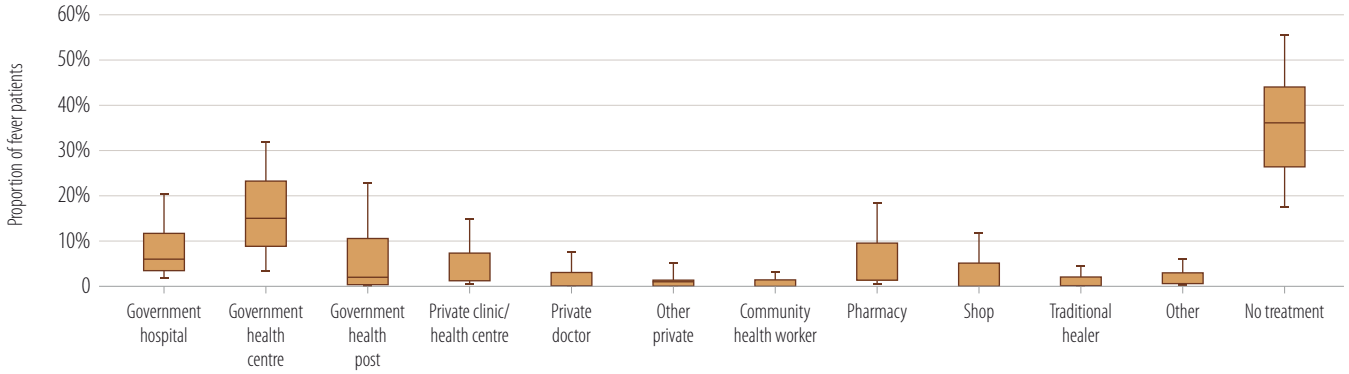
The proportion of malaria patients treated and tested in public sector health facilities is less than 20% in 30 of the 99 countries with ongoing malaria transmission (**Figure 7.2c**); these 30 countries accounted for 78% of estimated cases globally in 2010. The proportion of malaria patients seeking treatment in public sector health facilities and receiving a diagnostic test is estimated to be 27% globally. The proportion is higher in the European Region and the Americas. The proportion tested is zero for several countries in the African Region which undertake limited or no testing, or do not include the results of testing in their reporting systems.

7.1.4 Proportion of malaria patients treated in public sector health facilities, tested and reported

Not all health facilities submit complete reports on malaria patients to the national control programme. In assessing the completeness of reporting within a surveillance system it is useful to consider: (i) the extent to which individual patients are registered when they attend health facilities and diagnostic test results recorded, (ii) the extent to which registered cases and/or diagnostic test results are transcribed onto a monthly report, (iii) the proportion of health facilities submitting monthly reports to the NMCP or ministry of health, and (iv) the size of health facility failing to report – a missing report from a hospital is likely to have more impact on the data than a missing report from a health post. In practice such information is not readily available for most malaria-endemic countries, and an assessment of

Figure 7.4 Treatment source used for treatment of fever cases

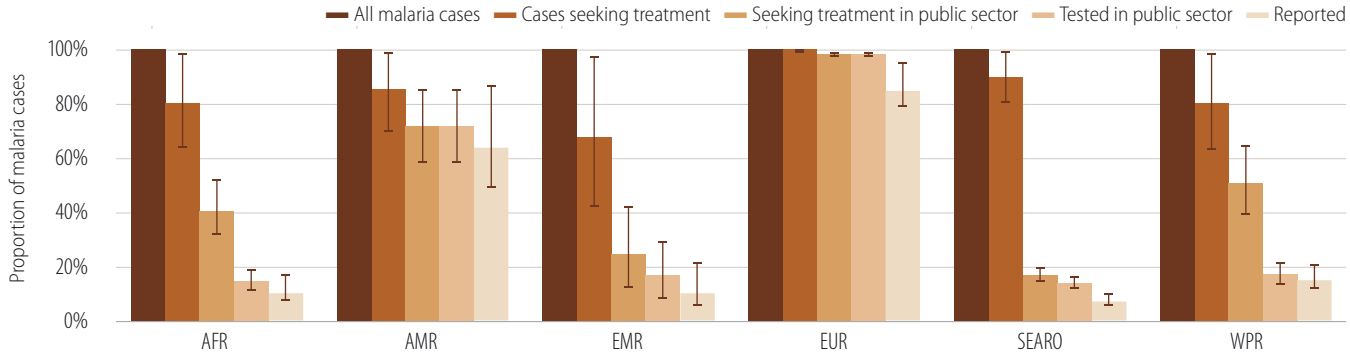
The box-plots summarize, for all household surveys available since 2000, where fever cases in children under 5 years of age were treated. The middle box shows the 25% and 75% percentiles and the end lines the 10% and 90% percentiles. The median is the horizontal line through the middle box.



Source: *Household surveys*

Figure 7.5 Bottlenecks in case detection, by WHO Region

Public sector includes cases in the private sector that are reported through the public sector



Source: *NMCP reports, WHO estimates*

reporting completeness is confined to assessing the proportion of health facilities that submit monthly reports to the NMCP. While this indicator has limitations, it is nevertheless instructive to incorporate it in an assessment of case detection rates.

The proportion of malaria cases seeking treatment in public sector health facilities, tested and reported (the "case detection rate"), is less than 20% in 37 of the 99 countries with ongoing malaria transmission (**Figure 7.2d**). These 37 countries account for 189 million cases of malaria or 86% of the estimated global total. It is evident that case detection rates are lower in countries with higher numbers of cases. In other words, measured by this criterion, surveillance systems are weakest where the malaria burden is highest.

7.1.5 Bottlenecks in case detection, by WHO Region

Figure 7.5 shows the percentage of malaria patients who seek treatment in facilities covered by surveillance systems, and who receive a diagnostic test, and are reported. The bottlenecks in case detection vary by WHO Region. In the African Region a large problem lies in the small proportion of patients attending public health facilities who receive a diagnostic test. In the Americas, small gaps appear at different stages of case detection. In the Eastern Mediterranean Region, a relatively small proportion of patients seek treatment – and generally not in the public sector. In the European Region, only very small gaps are assumed to occur in case detection. In the South-East Asia Region, the largest obstacle in case detection is the fact that a large proportion of patients seek treatment in the private sector, and these cases are not captured by existing surveillance systems. In the Western Pacific Region, the main constraint is the low proportion of patients attending public health facilities who receive a diagnostic test. The Regional patterns are sometimes dominated by individual countries with the highest number of cases – for instance a large proportion of patients in India seek treatment in the private sector, and in Papua New Guinea only a small proportion of suspected cases receive a diagnostic test.

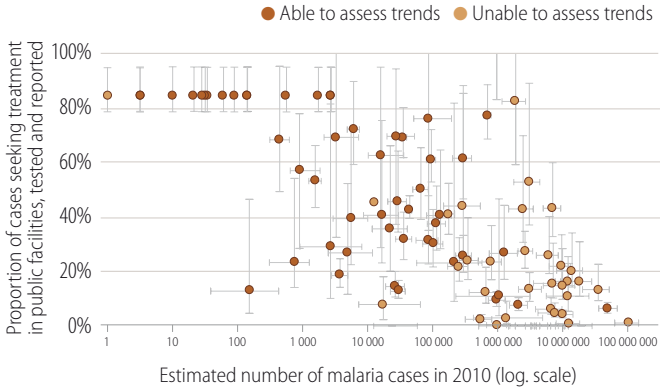
7.2 Objectives of surveillance systems in different phases of malaria control

While the proportion of cases detected by surveillance systems globally is currently low, this does not necessarily imply that surveillance systems are unable to serve important functions at country level. In April 2012, WHO issued two manuals on malaria surveillance: *Disease surveillance for malaria control* (*3*), and *Disease surveillance for malaria elimination* (*4*). These manuals describe the objectives of surveillance systems at different stages of malaria control.

7.2.1 Objectives of surveillance systems in the control phase

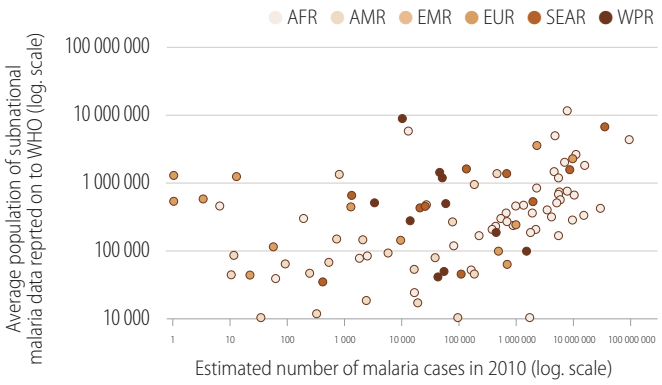
For programmes in the control phase, the principal objectives of a surveillance system are to reduce incidence and mortality rates as rapidly as possible by:

Figure 7.6 Proportion of malaria cases captured by surveillance systems, in relation to total estimated number of cases and whether trends over time can be assessed



Source: *NMCP reports, WHO estimates*

Figure 7.7 Average size of geographical unit for which incidence data are available in relation to total estimated number of cases in a country



Source: *NMCP reports, WHO estimates*

- identifying areas or population groups most affected by malaria,
- identifying trends in cases and deaths (e.g. epidemics, or the absence of a decrease in the number of cases despite widespread implementation of interventions) that require additional intervention, and
- assessing the impact of control measures to identify effective measures and those which are less effective or ineffective.

With this information, programmes in the control phase can direct resources to the populations most in need and respond to unusual trends. For these functions it is not necessary for a surveillance system to detect all cases. However, case detection efforts need to be reasonably uniform across the country if a system is to identify geographical differences in malaria incidence. Similarly a consistent sample is needed over time in order to assess trends in malaria incidence.

7.2.2 Objectives of surveillance systems in the elimination phase

The objective of a malaria surveillance system in the elimination phase is to stop local transmission by detecting all malaria infections, whether symptomatic or not, and ensuring that they are radically cured sufficiently early so that they do not generate secondary cases. In practice, this is accomplished in two stages:

- All areas or foci with local transmission of malaria are identified using reports of confirmed malaria cases from public and private sector health facilities. Pro-active case detection may be undertaken for populations which are not adequately served by fixed health facilities or in which faster reductions in transmission are sought. Each malaria case is then investigated (reactive case detection) to determine whether infection was locally acquired or imported, and if imported, from where.
- The characteristics of transmission in a focus are documented by conducting a focus investigation. Control and surveillance activities are then intensified in the focus.

Thus the principal goals of a surveillance system in the elimination phase are: (i) to detect all malaria cases, and (ii) to undertake case investigation to determine whether infection was acquired locally or imported.

The data submitted by endemic countries to WHO do not allow a complete assessment of the extent to which surveillance systems are able to meet their objectives. However, it is instructive to examine, for each country, the consistency of case detection efforts over time and geographically, in order to assess whether or not programmes can reliably assess trends or differences in incidence rates by geographical location.

7.2.3 Ability of surveillance systems to assess trends

Every year, WHO reviews the malaria data submitted by the ministries of health of all endemic countries to determine whether there have been changes in the total numbers of cases. In doing so, a strategy is used to minimize the influence of the use of private sector health facilities, lack of diagnostic testing and incompleteness of reporting. This includes focusing on confirmed cases only (or in the case of high-burden countries in the African Region, admissions for malaria), monitoring the number of diagnostic tests carried out, assessing reporting completion rates, monitoring trends in proportionate morbidity (such as test positivity rate and percentage of admissions and deaths due to malaria) and examining the consistency of trends between different indicators (**Regional Profiles**, **Section R2**). In following this strategy an assessment is made of whether or not case reporting is sufficiently consistent from year to year to be able to draw conclusions about trends in disease incidence. In 2011, reporting was considered to be sufficiently consistent in 58 of the 99 countries with ongoing transmission to make a reliable judgment about malaria trends (**Figure 7.6**). Although these countries comprise the majority of malaria-endemic countries, they account for just 15% of the estimated total number of cases worldwide. In the remaining 41 countries, in which most of the

malaria burden is present, it is not possible to make an assessment of malaria trends using the data submitted to WHO.

7.2.4 Ability of surveillance systems to identify populations at greatest risk

The ability of a surveillance system to identify locations in which the incidence of malaria is highest depends partly on how far national programme managers are able to disaggregate data subnationally. The smaller the geographical unit with available data, the better able the manager is to identify populations with the highest incidence and to target interventions to populations most in need. In general, the smaller the number of malaria cases then the smaller is the geographical unit for which data are available, or the greater the ability of a surveillance system to define which populations are at highest risk (**Figure 7.7**). Such a relationship is influenced by two factors: (i) many countries with lower numbers of malaria cases also have smaller populations, and there is a limit to the possible size of population in subnational geographical units in small countries – the size of a subnational unit cannot exceed the total population size; and (ii) the relationship is based on data submitted to WHO, whereas data available within countries may be disaggregated to smaller population sizes. Nonetheless, the relationship suggests that countries with the highest numbers of malaria cases are less able to define precisely the geographical areas/populations at greatest risk of malaria.

7.3 Conclusions

Malaria surveillance systems detect only 10% of cases estimated to occur globally. Case detection rates are lowest in countries with the highest numbers of malaria cases.

There are four main bottlenecks in case detection: (i) the extent to which malaria patients seek treatment in the public sector, (ii) whether or not patients use health facilities covered by a country's surveillance system, (iii) the proportion of patients who receive a diagnostic test, and (iv) the completeness of recording and reporting including the extent to which laboratory findings are linked to case reporting. The relative importance of these factors varies by WHO Region. In the African and Western Pacific Regions the main constraint is the small proportion of patients attending public health facilities who receive a diagnostic test. In the South-East Asia the most important issue is in the high proportion of patients who seek treatment in the private sector. The regional patterns are sometimes dominated by individual countries with the greatest number of cases.

A principal reason for low rates of case detection in countries with the highest numbers of cases is the use of private health facilities by a large proportion of patients, these facilities are usually not covered by a ministry of health surveillance system. This pattern of care-seeking presents challenges not only for establishing surveillance systems but also for ensuring universal access to diagnostic testing and appropriate treatment.

Surveillance systems do not need to detect all cases in order to achieve their objectives in the control phase, which is to assess trends over time and/or identify geographical differences in malaria incidence. However, case detection efforts need to be reasonably uniform over time and geography, and countries with the highest numbers of cases appear to be least able to assess temporal or geographical variation in incidence. In 41 countries around the world, which account for 85% of estimated cases, it is not possible to make a reliable assessment of malaria trends due to incompleteness or inconsistency of reporting over time.

Thus surveillance systems appear to be weakest where the malaria burden is greatest. Improvement of malaria surveillance in these settings is an urgently required.

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CHAPTER 8

Changes in malaria incidence and mortality

This chapter reviews (i) trends in *reported* malaria cases for 58 countries which have reported consistently between 2000 and 2011, and (ii) for countries with low numbers of cases, summarizes their progress towards elimination; it then presents (iii) analysis of the global distribution of the *estimated* numbers of cases and deaths in 2010 for 99 countries with ongoing transmission, and (iv) trends in *estimated* malaria cases and deaths for 99 countries with ongoing transmission from 2000 to 2010.

8.1 Introduction

For individual countries the reported number of confirmed malaria cases can be used as a core indicator for tracking progress towards the WHA and RBM targets for 2015 – to reduce malaria cases by 75% from 2000 levels – if cases are reported consistently over time. The first part of this chapter reviews data on reported malaria cases between 2000 and 2011 for the 99 countries and areas with ongoing malaria transmission, 58 of which have submitted data that are sufficiently complete and consistent to draw inferences about trends. It then considers progress towards elimination for countries with low numbers of cases.

Surveillance systems do not capture all malaria cases occurring in a country, and surveillance data are not sufficiently reliable to assess trends in some countries (**Chapter 7**). It is therefore necessary to use *estimates* of the total number of cases or deaths occurring in countries to make inferences about trends in malaria cases and deaths at regional and global level. The methods for producing estimates either (i) adjust the number of reported cases to take into account the proportion of cases that are not captured by a surveillance system; or (ii) for countries with insufficient surveillance data, produce estimates using a modeled relationship between malaria transmission, case incidence or mortality and intervention coverage (*1*). While helping to make numbers more comparable between countries, and filling gaps where data are missing, the estimates rely on relationships between variables that are uncertain, and draw upon data that may have been imprecisely measured, or measured in previous years and projected forward. Thus estimates of the number of malaria cases or deaths are accompanied by a large degree of uncertainty, and inferences concerning trends are less certain than those made directly from good quality surveillance data. Nevertheless, the estimates can provide useful insight into the distribution of malaria across countries and trends over time. The second part of this chapter analyses the global distribution of the *estimated* numbers of cases and deaths in 2010 and trends in estimates of malaria cases and deaths from 2000 to 2010. The numbers were published at regional level in the *World Malaria Report 2011* (*2*). They have been updated after a process of country consultation. Updated results are shown in **Table 8.2** and **Annex 6A** which also shows country level estimates.

8.2 Changes in disease incidence at country level, 2000–2011

A description of the strategy used to analyse trends, and a summary of results for individual countries is provided in the **Regional Profiles** (**Section R2**). For most countries the reported number of confirmed malaria cases per 1 000 is used as a core indicator for tracking progress towards WHA and RBM targets. For many high-burden countries in the WHO African Region, where case confirmation remains variable and often inadequate, it is not possible to assess trends in confirmed cases (**Chapter 5**). Therefore attempts are made to evaluate trends in the reported numbers of malaria admissions (inpatient cases) and deaths; although the diagnosis of admitted patients is not always confirmed with a diagnostic test, the predictive value of diagnosis undertaken for an admitted patient is considered to be higher than for outpatient diagnosis based only on clinical signs and symptoms.

The analysis strategy aims to exclude data-related factors, such as incomplete reporting or changes in diagnostic practice, as explanations for a change in the reported incidence of disease. However, even if trends in health facility data appear to be real, and not an artifact of data reporting, they may not reflect changes in the entire community. They are nevertheless the best information available by which to assess progress. The conclusion that trends inferred from health facility data reflect changes in the community has more weight if: (i) the changes in disease incidence are large; (ii) coverage with public health services is

Figure 8.1 Decreases necessary in order to achieve a 75% reduction in malaria case incidence from 2000 levels by 2015

For countries to achieve this target they need to have reduced the incidence of malaria by 64% between 2000 and 2011, assuming a constant compounded reduction of 8.83% per year between 2000 and 2015

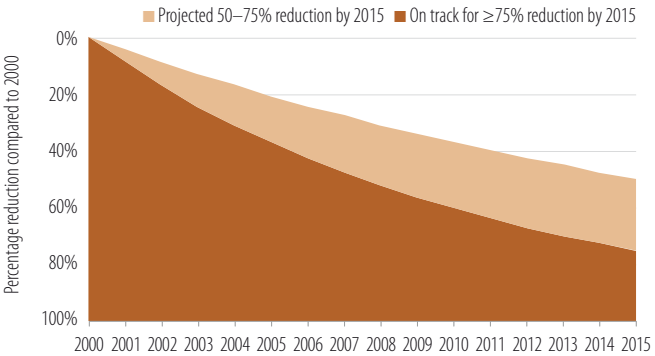
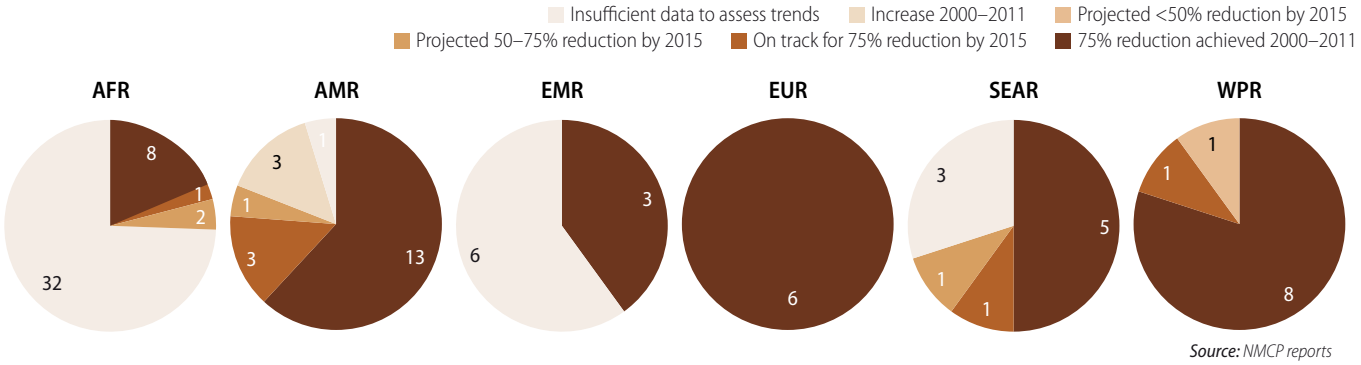


Figure 8.2 Decreases in reported malaria case incidence rates 2000–2011, by WHO Region
The number of countries in each category is shown in each pie slice



Source: NMCP reports

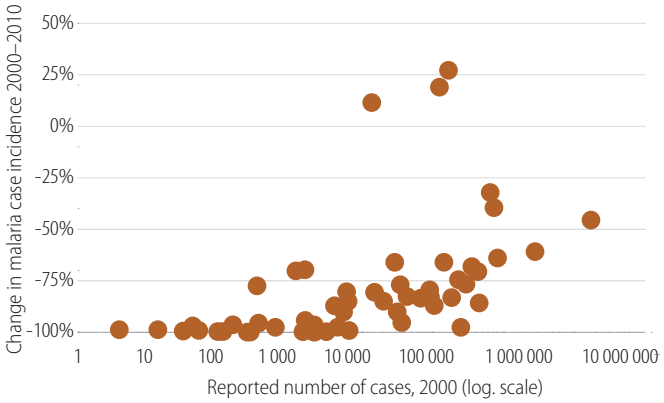
high; and (iii) interventions that promote a reduction in cases, such as use of ITNs, are delivered throughout the community and not restricted to health facilities.

In considering progress towards WHA and RBM targets it is preferable to examine changes in malaria case incidence rather than absolute numbers, in order to take into account the expected rise in the number of cases due to population growth over a long period of time. A 75% reduction in malaria case incidence is equivalent to an 8.83% reduction per year (compounded) between 2000 and 2015. Thus, to be on track to achieve the targets, countries need to have reduced the incidence of malaria by at least 64% between 2000 and 2011. Countries which reduced malaria incidence rates by 40%–64% between 2000 and 2011 are on track to achieve reductions in malaria case incidence of 50%–75% in 2015 (**Figure 8.1**). A summary of progress by WHO Region is provided in **Figure 8.2**, the Regional Profiles (**Table R.1**) and the following text.

In the **African Region**, of 43 countries with ongoing malaria transmission 8 countries (Algeria, Botswana, Cape Verde, Namibia, Rwanda, Sao Tome and Principe, South Africa and Swaziland) and the island of Zanzibar, (United Republic of Tanzania), have achieved reductions in malaria case incidence or malaria admission rates of 75% or more. In addition Eritrea is on track to achieve reductions in malaria admission rates of 75% or more by 2015, while 2 countries are projected to achieve reductions in malaria admission rates of 50%–75% by 2015 (Madagascar and Zambia). After falling substantially between 2004 and 2008, malaria admissions in Ethiopia have increased; the increase may be related to improved access to health facilities as the number of hospitals increased from about 120 in 2005 to more than 195 in 2010. In the remaining countries it was not possible to make a reliable assessment to malaria trends owing to incompleteness or inconsistency in reported data.

In the **Region of the Americas**, reductions in incidence of ≥75% in microscopically confirmed malaria cases were reported in 13 countries between 2000 and 2011 (Argentina, Belize, Bolivia (Plurinational State of), Costa Rica, Ecuador, El Salvador, French Guiana, (France), Guatemala, Honduras, Mexico, Nicaragua, Paraguay and Suriname). A further 3 countries recorded reductions of more than 64% and are therefore on track to achieve reductions of 75% by 2015 (Colombia, Panama and Peru) while Brazil is projected to achieve reductions of 50%–75%. Increases in numbers of cases between 2000 and 2011 were reported by 3 countries (the Dominican Republic, Guyana, and Venezuela

Figure 8.3 Percentage change in reported case incidence versus reported cases in 2000
Countries reporting a smaller number of cases in 2000 achieved larger rates of decrease in malaria incidence. There are a few outliers from this general pattern, in particular 3 countries in the Region of the Americas which have recorded an increase in malaria case incidence since 2000.



Source: NMCP reports

(Bolivarian Republic of), although the Dominican Republic had registered decreases since 2005. In Haiti, malaria cases increased to over 80 000 in 2010 following the earthquake in January of the same year and then fell to 32 000 cases in 2011; it is unclear whether this reflects a real rise in incidence, or is a consequence of increased availability of resources for case detection during the emergency response.

In the **Eastern Mediterranean Region**, 3 of the 9 countries with ongoing transmission have attained a decrease of more than 75% in case incidence rates in 2011 compared to 2000 (Afghanistan, Iran (Islamic Republic of), Iraq, and Saudi Arabia). The number of microscopically confirmed cases has fluctuated from year to year in the other 6 countries (Djibouti, Pakistan, Somalia, South Sudan,[1] Sudan, Yemen) and it is not possible to deduce whether malaria case incidence is increasing, decreasing or is constant.

1. South Sudan became a separate State on 9 July 2011 and a Member State of WHO on 27 September 2011. South Sudan and Sudan have distinct epidemiological profiles comprising low transmission and high transmission areas respectively. For this reason data up to June 2011 from the high transmission areas of Sudan (10 southern states which correspond to South Sudan) and low transmission areas (15 northern states which correspond to contemporary Sudan) are reported separately.

In the **European Region**, all malaria-affected countries have achieved reductions in case incidence of more than 75% between 2000 and 2011. Only 69 indigenous cases were reported in 2011, of which 65 were in Tajikistan, the others in Azerbaijan and Turkey. The Region as a whole appears to be on track to achieve elimination of malaria by 2015 as planned, if countries address the remaining challenges and prevent the reintroduction of malaria transmission, in particular responding effectively to outbreaks recently reported in Greece and Turkey.

In the **South-East Asia Region**, 5 countries have registered decreases in the incidence of microscopically confirmed malaria incidence rates of 75% or more between 2000 and 2011 (Bhutan, the Democratic People's Republic of Korea, Nepal, Sri Lanka and Thailand). Bangladesh is on track to achieve a 75% reduction by 2015, and India is projected to reduce case incidence by 50%–75% by 2015. It was not possible to discern the direction of trends in Indonesia, Myanmar and Timor-Leste owing to inconsistency of reporting over time. In Myanmar and Timor-Leste this is partly due to a change in diagnostic practice, with large increases in the use of RDTs since 2007.

In the **Western Pacific Region**, decreases of more than 75% in the incidence of microscopically confirmed cases between 2000 and 2011 have been reported in 8 of the 10 endemic countries (Cambodia, China, Lao People's Democratic Republic, Philippines, Republic of Korea, Solomon Islands, Vanuatu and Viet Nam). Malaysia is on track to achieve a 75% reduction by 2015. Papua New Guinea is projected to achieve a reduction in case incidence of less than 50% by 2015, if rates of reduction observed between 2000 and 2011 continue; however, results of household surveys in 2009 and 2011 suggest that recent expan-

Box 8.1 Reduction in malaria prevalence following widespread distribution of ITNs in Papua New Guinea

Papua New Guinea has one of the highest burdens of malaria outside Africa. In 2012 the population was estimated to be about 7 million people, located in 22 000 villages spread across some of the most challenging landscapes found in any country of the world. The use of ITNs for malaria control has a long tradition in Papua New Guinea, where some of the first studies on the efficacy of treated nets were carried out.

In 2009 the country received an award of US$ 102 million from the Global Fund. The Rotarians Against Malaria (RAM) were allocated the task of coordinating the distribution of ITNs purchased with Global Fund financing. RAM carries out this function through teams of 6–8 people who work with provincial and district health authorities to plan the distribution of ITNs. RAM arranges all logistics and funds for the work to be carried out. The RAM teams then work with provincial health staff and other partners locally to implement the programme.

Papua New Guinea is an extremely difficult environment in which to distribute mosquito nets. In many parts of the country the road infrastructure is poor, resulting in the need to use a combination of road transport, aircraft, boats, helicopters, and often many days of trekking to reach many of the villages. This results in very complicated and expensive distribution.

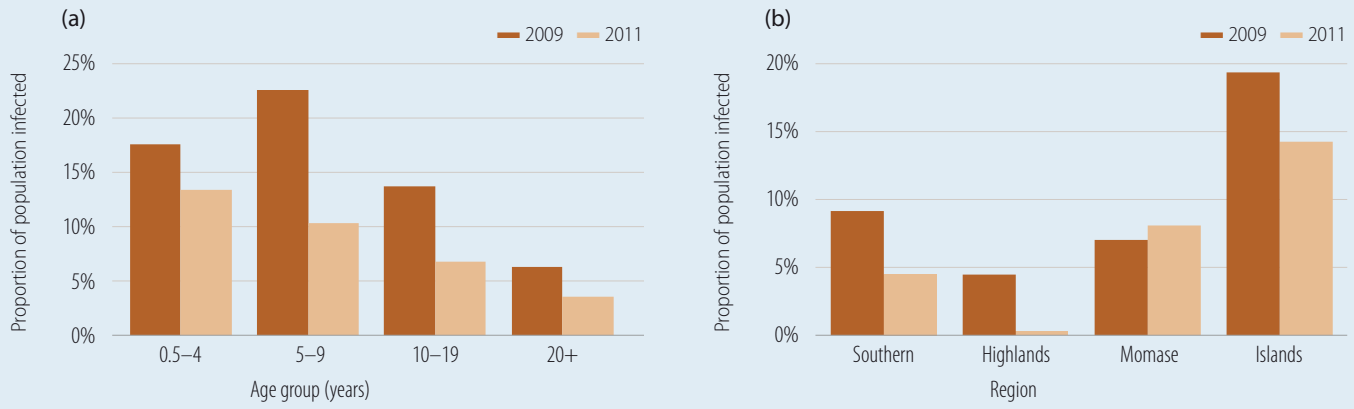
Between 2009 and 2011 RAM coordinated the distribution of over 2.5 million nets to all households in 18 provinces and another 400 000 LLINs to vulnerable groups, particularly pregnant women to whom nets were provided through antenatal services. The distribution of nets to vulnerable groups was implemented in collaboration with provincial health services (both government and church health services), supported by the private sector and NGOs in some places.

RAM was able to attain a consistently high coverage of nets because:

- As an NGO, it had flexibility to move funds and respond quickly to numerous technical difficulties in the field, which is particularly important in a country such as Papua New Guinea where infrastructure and reliability of services are very poor.
- Being the sole organization to coordinate all LLIN distributions in the country it was able to develop a consistency of approach to the distribution of nets in all areas.
- As an organization specializing in one activity (LLIN distribution) it could focus on quality of delivery and more detailed reporting (RAM can report on the distribution of nets by each village in the country), through its dedicated and motivated staff.

An evaluation undertaken by the Papua New Guinea Institute of Medical Research indicated that the proportion of the population sleeping under an ITN increased from 32% in 2009 to 59% in 2011 (**Figure Box 8.1**). Parasite prevalence dropped from 18.2% to 6.7% between 2009 and 2011. Reductions were seen in all regions and age groups but were most marked in the Highlands Region and in children aged 5–9 years. People using an ITN were less likely to be parasitaemic than those not using an ITN.

Figure Box 8.1 Change in parasite prevalence following nationwide distribution of ITNs (a) by age group (b) by region



Source: *Papua New Guinea Institute of Medical Research/The University of Queensland*

sion in the availability of ITNs has led to reductions in parasite prevalence (see **Box 8.1**).

Among countries where the data permit an assessment of trends it is apparent that rates of decrease have been higher in countries with smaller numbers of cases in 2000 (**Figure 8.3**).

Of 33 countries with less than 10 000 reported cases in 2000, 30 (91%) registered decreases in malaria case incidence rates of more than 75% by 2011 compared to 8 of 19 countries (42%) with more than 10 000 cases. There are a few outliers from the general pattern, in particular 3 countries in the Region of the Americas which recorded increases in malaria case incidence (Dominican Republic, Guyana and Venezuela (Bolivarian Republic of)).

The 50 countries that are on track to reduce malaria case incidence rates by 75% by 2015 account for only 7 million (3%) of the total estimated cases of 223 million in 2000. Only 1 country with more than 1 million estimated cases in 2000, Afghanistan, is projected to achieve a reduction in malaria case incidence of 75% or more. While this is partly because progress has been faster in countries with lower numbers of cases, it is also influenced by the poorer quality of surveillance data submitted by countries with larger estimated numbers of cases. Because countries with higher numbers of cases are less likely to submit sufficiently consistent data for assessing trends (**Section 7.1.4**) it is necessary to draw inferences about trends in these countries using estimated numbers of cases rather than surveillance data (**Section 8.5**).

8.3 Progress towards elimination

The criteria used to classify countries according to their stage of malaria control were updated in 2012 in order to facilitate tracking of progress over time. The updated criteria are based on an evaluation of 3 main components: the malaria epidemiological situation, case management practices, and the state of the surveillance system (see **Section R4** for the updated criteria). The evaluation concentrates on the situation in districts of the country reporting the highest API values. The status of malaria-endemic countries in 2012 is summarized below.

In the **African Region**, Cape Verde (with a total of 36 confirmed cases reported in 2011, of which 18 were locally acquired) has been in the pre-elimination phase since 2010, and Algeria (with 191 confirmed cases reported in 2011, including only 4 local cases) has been in the elimination phase since 2007 when WHO published the first country classification. Algeria implements active case detection, case investigation, a QA system for diagnosis guided by the national reference laboratory, and a radical treatment policy for *P. vivax* and gametocytocidal treatment for *P. falciparum*. Tamanrasset, the Algerian province with the highest incidence (116 confirmed cases in 2011), reported just over 1 malaria case per 1000 inhabitants, pointing to the importance of trans-Saharan migration as a source of infection in this sparsely populated desert area. The relatively high CFR of 9% in Cape Verde (4 deaths among 36 reported malaria cases) in 2011 underscores the need to maintain early diagnostic testing and inpatient treatment capacity when progressing towards elimination.

In 2011, Namibia reported 1860 confirmed malaria cases among 61 861 persons tested, giving an SPR of 3% at the national level. Based on this relatively low reported malaria burden, Namibia may progress towards the elimination phase in the coming years. At subnational level, the SPR ranged in 2011 from 0.4% in Kavango to 11.6% in Omusati, with ABER of 1.5% and 0.4% respectively, reflecting low diagnostic activity. In line with these findings, the 2011 Malaria Programme Review raised concerns about malaria treatment without prior diagnostic testing, the quality of diagnostic testing, and the need for improvement of the surveillance system to allow location-identification and tracking of cases. The country is therefore still classified by WHO as being in the control phase.

Other African nations with relatively low reported malaria incidences include Swaziland (171 confirmed cases and 405 presumed to be malaria) and Botswana (432 confirmed cases), where malaria risk is geographically limited and seasonal. It is expected that these countries will continue their progress towards elimination, although they do not yet meet the case management and surveillance criteria for the pre-elimination phase. Mauritania also reports relatively few cases (2 721 confirmed cases), but has a high SPR of 30% among febrile patients and is therefore classified as being in the control phase.

In the **Eastern Mediterranean Region**, Oman had achieved interruption of transmission in 2004–2006, but has been battling small outbreaks since 2007 involving both *P. falciparum* and *P. vivax*. The country reported 1 532 cases in 2011, of which 13 were locally acquired. Oman is applying a prevention of reintroduction strategy, with general health services vigilant for the occurrence of any new cases, and case investigation followed by outbreak response as needed. In the Region, 3 other countries are also in the prevention of reintroduction phase: Egypt, Iraq, which has not reported indigenous malaria since 2009, and the Syrian Arab Republic which reported zero local cases in 2011. Iran (Islamic Republic of) and Saudi Arabia have been in the elimination phase since 2010 and 2008 respectively.

In the **European Region**, Azerbaijan, Tajikistan and Turkey have been in the elimination phase since 2007, 2005 and 2008 respectively. These countries reported a total of only 69 indigenous cases in 2011 (65 in Tajikistan), all due to *P. vivax*. The SPR and API in the most affected districts of these 3 countries are near zero, QA is carried out by the national reference laboratory and there is 100% radical treatment of *P. vivax*. Kyrgyzstan and Uzbekistan have been in the elimination phase since 2008. Georgia is in the prevention of reintroduction phase: the country has reported zero indigenous cases in 2010, followed by one locally acquired case in 2011. The Russian Federation reported zero local transmission in 2009 and 2011, with only 1 introduced case in 2010, and is once again considered malaria-free (and is on the *Supplementary list*). The year 2010 marked the start of renewed local *P. vivax* transmission in Greece subsequent to importation of parasites, and if this outbreak is not stopped by 2013, the country will once again be considered endemic (Greece is on the *Supplementary list*).

In the **Region of the Americas**, Argentina, El Salvador, Mexico and Paraguay remain in the pre-elimination phase. In addition, Ecuador and Costa Rica have moved from the control phase to the pre-elimination phase. The outbreaks in the Bahamas and Jamaica have been controlled, with no local transmission

Table 8.1. Classification of countries by stage of elimination, as of December 2012

Region	Pre-elimination	Elimination	Prevention of re-introduction	Recently certified as malaria free
African	Cape Verde	Algeria		
Region of the Americas	Argentina Costa Rica Ecuador El Salvador Mexico Paraguay			
Eastern Mediterranean		Iran (Islamic Republic of) Saudi Arabia	Egypt Iraq Oman Syrian Arab Republic	Morocco - 2010 United Arab Emirates – 2007
European		Azerbaijan Kyrgyzstan Tajikistan Turkey Uzbekistan	Georgia	Armenia - 2011 Turkmenistan – 2010
South-East Asia	Bhutan Democratic People's Republic of Korea	Sri Lanka		
Western Pacific	Malaysia	Republic of Korea		

Source: *NMCP reports*

reported since 2009 in Jamaica and since 2011 in the Bahamas. Jamaica is on the *Official Register* of areas where malaria eradication has been achieved and Bahamas was added to the Supplementary list in 2012.

In the **South-East Asia Region**, Sri Lanka had been in the pre-elimination phase since 2007 and progressed to the elimination phase in 2011. It reported 124 locally-acquired malaria cases in 2011 (including 3 *P. falciparum*), down from 632 local cases in 2010. Intense case detection efforts have been pursued in 2010–2011, reflected in an average ABER of 25.4% for these 2 years in the most affected district Mulattivu, where an API of 0.8 was measured. Regional laboratories and the national reference laboratory carry out QA for microscopy. Radical treatment for *P. vivax* malaria was introduced in 2006 and ACTs for gametocytocidal treatment of *P. falciparum* in 2008. A 24-hour case reporting policy using SMS was introduced in 2009.

Bhutan has also made remarkable progress since its Malaria Programme Review in 2010, and moved into the pre-elimination phase this year. Malaria is a notifiable disease in Bhutan, with malaria cases reported by the districts to the central level Vector-borne Disease Control Programme on a weekly basis. A total of 228 malaria cases were detected in 2011, confirmed mainly by microscopy; a QA system for microscopy is in place. In the most endemic district of Sarpang where there is perennial transmission, the API averaged 4.7 during 2010–2011, with an average ABER of 44.3%. Case management and surveillance systems for malaria elimination are being set up.

The Democratic People's Republic of Korea has been in the pre-elimination phase since 2007. The continuing high number of malaria cases and transmission foci reported on the Korean Peninsula, with a combined total of 17 598 cases in 145 foci in 2011 in the Democratic People's Republic of Korea and the Republic of Korea (which is in the elimination phase) is a serious concern for the long-term viability of the elimination strategy.

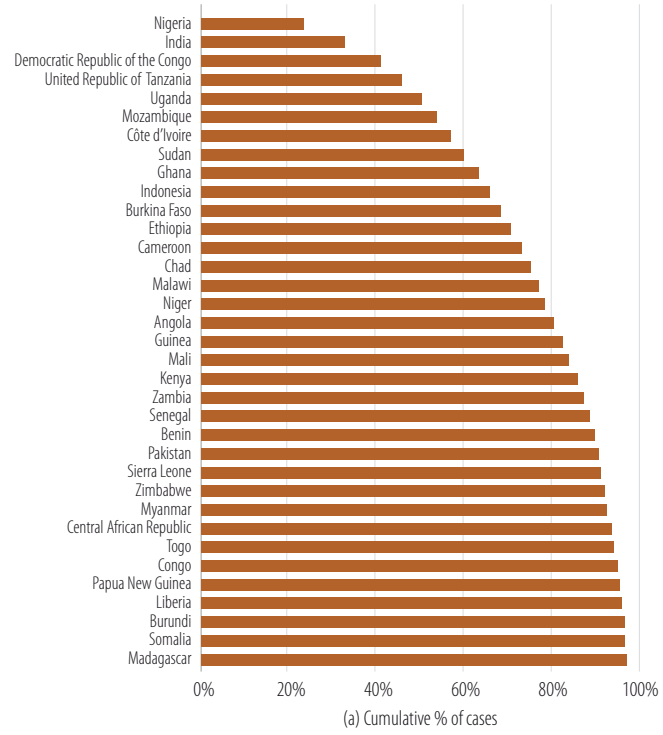
Lastly, India, Nepal and Thailand could potentially move towards the pre-elimination phase by continuing their progress, assuring that all malaria cases are laboratory confirmed and including the private sector in the health reporting system

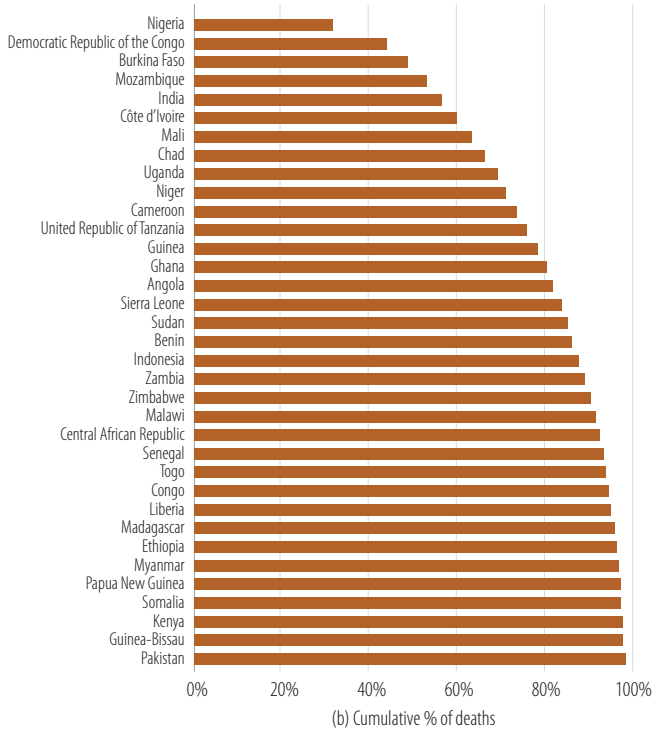
In the **Western Pacific Region**, Malaysia continues to meet the pre-elimination criteria regarding case management and surveillance system. Malaria transmission is geographically very limited. The highest endemic districts are found in Sarawak (Marudi district, population 90 100, average API 13.34 and ABER 15% in 2010–2011; Belaga, (population 30 300, API 7.2), and in Sabah (Tongod, population 32 000, API 6.7). With a total of 5306 malaria cases from 3 134 transmission foci (villages) reported in 2011, the achievement of malaria elimination in Malaysia remains an enormous task.

The Philippines is progressing with subnational elimination at the provincial level, and has declared 22 of its 80 provinces malaria-free. The national SPR is 4.6%, but provincial SPRs reached up to 49% in Maguindanao (Mindanao). The highest APIs in 2010 were in the islands Palawan (10.3) and Tawi-Tawi (5.2). The Philippines is progressively meeting the pre-elimination criteria regarding case management and surveillance system: all suspected malaria cases are confirmed by microscopy and there is a QA system for malaria microscopy (the Research Institute for Tropical Medicine is the reference laboratory); there is a national policy for radical treatment; and there is a malaria surveillance system. However, the worst affected malaria-endemic areas of the Philippines are still in the control phase, and thus the country is classified as control phase.

China is successfully aiming for subnational elimination in Hainan, which is reflected in the average ABER of 11.3% in the province over the period 2010–2011, and an API of 0.002 (with

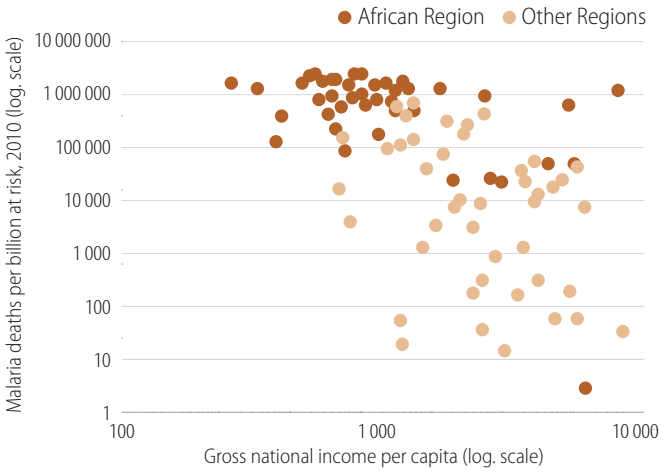
Figure 8.4 Cumulative proportion of the global estimated cases and deaths accounted for by the countries with the highest number of (a) cases and (b) deaths





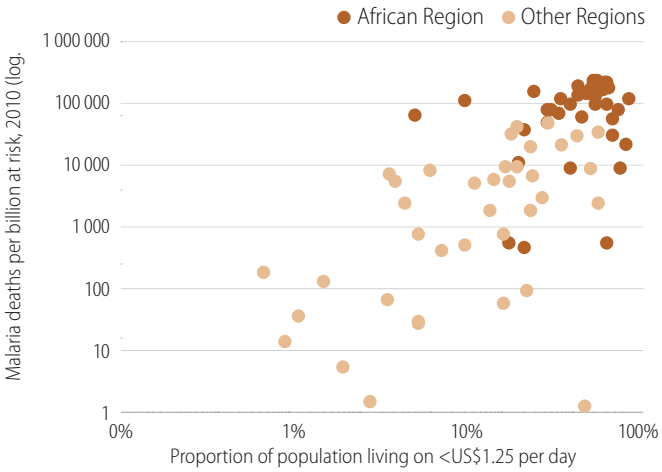
Source: *WHO estimates*

Figure 8.5 Relation between gross national income and malaria mortality rates



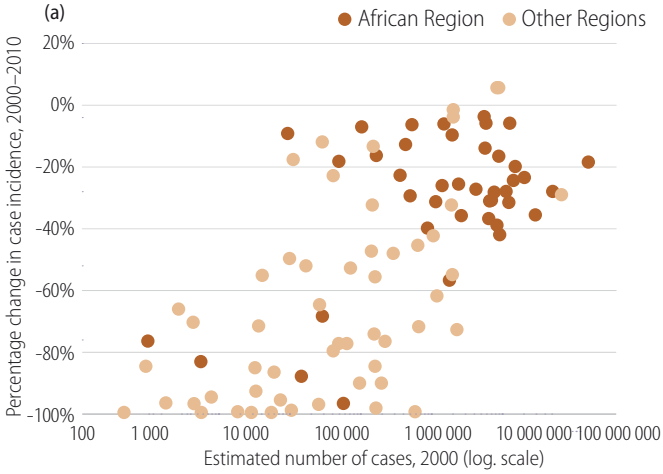
Source: *WHO estimates, World Bank GNI data*

Figure 8.6 Relation between proportion of country's population living in poverty and malaria mortality rates

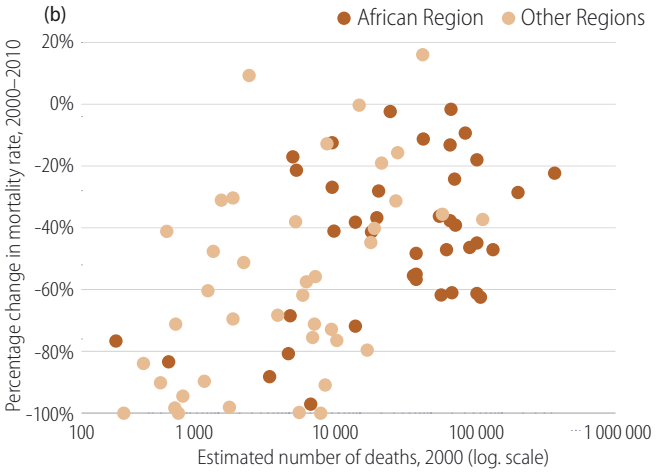


Source: *WHO estimates, Human Development Report 2011*

Figure 8.7 Relations between (a) change in estimated number of cases between 2000 and 2010 versus estimated cases in 2000 (b) change in estimated number of deaths between 2000 and 2010 versus estimated deaths in 2000



Source: *WHO estimates*



Source: *WHO estimates*

Table 8.2 WHO estimates of the number of malaria cases and deaths in 2010

	Estimated cases ('000s)				Estimated deaths			
Region	**Estimate**	**Lower**	**Upper**	**% *falciparum***	**Estimate**	**Lower**	**Upper**	**% <5**
African	174 000	110 000	242 000	98%	596 000	429 000	772 000	91%
Region of the Americas	1 100	900	1 300	35%	1 100	700	1 800	29%
Eastern Mediterranean	10 400	6 400	16 600	83%	15 300	7 200	23 500	70%
European	0.2	0.2	0.2	–	0	0	0	–
South-East Asia	32 000	25 900	41 900	53%	43 000	31 100	60 300	32%
Western Pacific	1 700	1 300	2 100	79%	4 000	2 400	6 100	41%
World	**219 000**	**154 000**	**289 000**	**90%**	**660 000**	**490 000**	**836 000**	**86%**

Source: *WHO estimates*

only 7 reported cases in 2011). In Yunnan, the province with the greatest malaria burden, 1321 cases were detected in 2011 (API 0.03, ABER 1.2%). The highest API for the period 2010–2011 was reported in Xizang (API 0.44, ABER 0.6%). Programmatically, the country has not yet met the surveillance and treatment criteria for the nationwide pre-elimination phase and therefore remains classified as being in the control phase.

Table 8.1 shows the current classification of endemic countries by programme phase, and the movement between phases over 2010–2011. Altogether, 26 countries were in the pre-elimination, and elimination and prevention of reintroduction phases in 2012.

8.4 Distribution of the total estimated malaria cases and deaths in 2010

Because cases reported through surveillance systems represent only a fraction of the total number of cases occurring in a country, and the fraction is smaller in countries with the highest number of cases (see Chapter 7), it is not possible to draw inferences about regional or global trends in malaria incidence by simply aggregating the reported number of cases across countries (regional totals are disproportionately influenced by trends in countries with a lower number of cases as they report a higher fraction of all cases). Therefore WHO makes estimates of the total number of cases and deaths occurring in each country which allows the aggregation of numbers of cases and deaths across countries and provides a measure of the full magnitude of the malaria burden by WHO Region and globally. Despite the wide uncertainty intervals associated with estimates of the number of malaria cases and deaths, the estimates can provide some insight into the distribution of malaria and trends over time. The *World Malaria Report 2011* summarized the estimates at regional and global level. The estimates have been subject to some modification after a process of country consultation. Updated results are shown in Table 8.2 and Annex 6A which also shows country level estimates (see also Box 8.2). This section reviews the distribution of cases and deaths estimated for 2010 at country level.

More than 80% of malaria deaths occur in just 14 countries and 80% of cases occur in 17 countries (Figure 8.4), indicating that international targets for reducing cases and deaths will not be attained unless considerable progress can be made in these

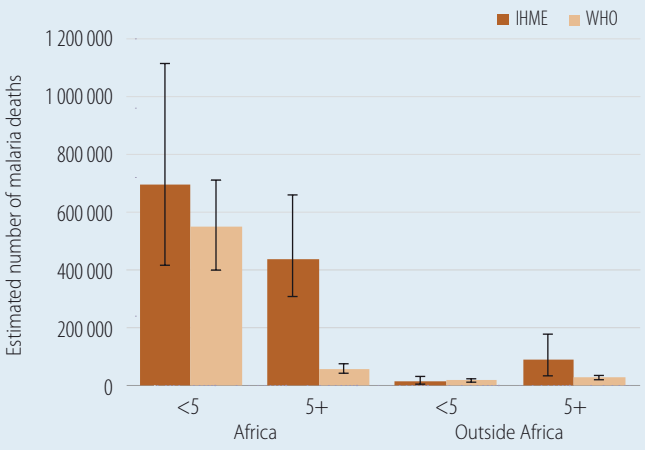
Box 8.2 Estimated number of malaria cases and deaths in 2010, by WHO Region

Estimates by WHO Region of the number of cases and deaths from malaria from 2000 to 2010 were published in the *World Malaria Report 2011* (*1*). The estimated numbers of cases and deaths are summarized by WHO Region for 2010 in Table 8.2 (and by country in Annex 6A and by region over time in Annex 6B). The vast majority of estimated cases (80%) and deaths (91%) occur in sub-Saharan Africa and the vast majority of deaths (86%) occur in children <5 years of age.

Estimates differing from those calculated by WHO in 2011 (*1*) have been published this year by Murray et al (*2*). Wide uncertainty ranges accompany both sets of estimates, and with one exception – for deaths in people older than 5 years in Africa – these ranges overlap, so that in most settings the estimates cannot be regarded as significantly different (Figure Box 8.2).

Finding a large number of malaria deaths in people older than 5 years in Africa, relative to those younger than 5 years, is unexpected in stable endemic areas, since partial immunity to malaria generally develops at an early age and protects most older children and adults against severe disease and death. In Africa, much lower adult-to-child death ratios have been found when the cases had been confirmed microscopically (*3*). Moreover, the proportion of malaria deaths occurring over 50 years of age has been observed to be considerably smaller in a wide range of settings (*4*). Verbal autopsy, which was used to assign cause of death in children in Africa in both sets of estimates for children, and for all ages in the Institute for Health Metrics and Evaluation (IHME) estimates is an imprecise estimator of malaria mortality since it cannot distinguish severe malaria from other severe febrile illnesses.

Figure Box 8.2 Estimates of number of malaria deaths in 2010, by age group and geographical region (*1,2*)



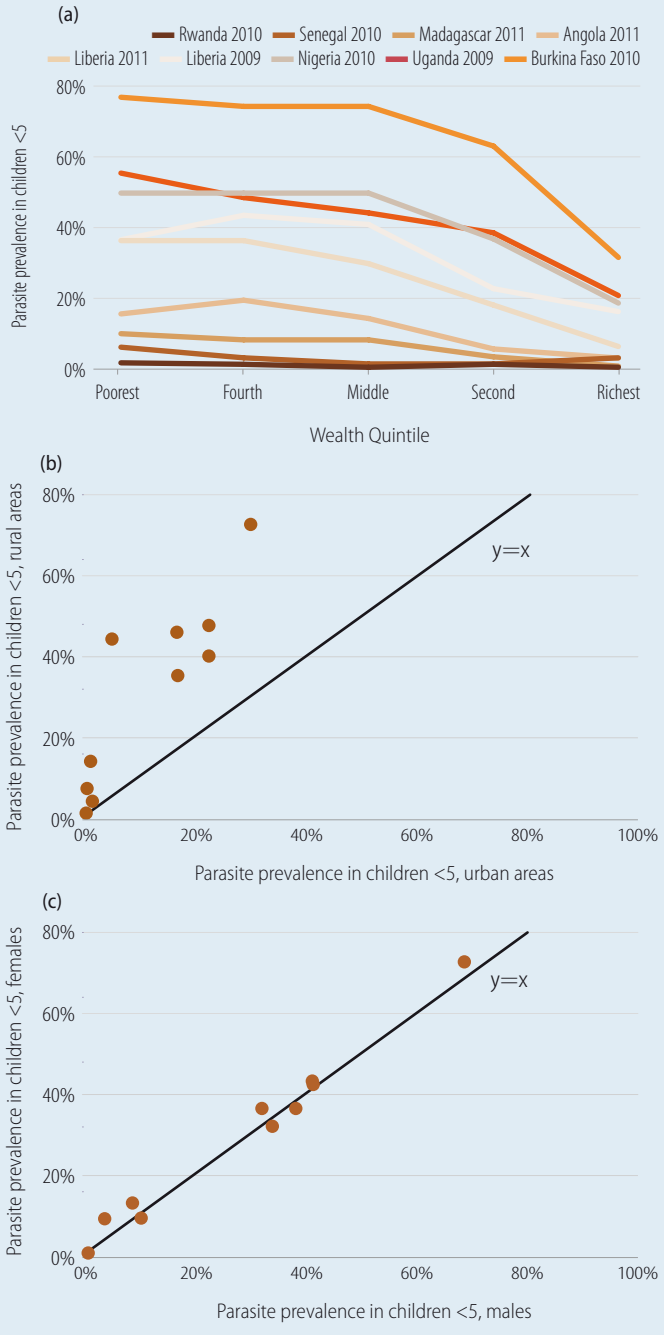
Source: *IHME and WHO estimates*

Box 8.3 Disparities in prevalence of malaria infections in some African countries

Parasite prevalence rates in children <5 years of age are highest in poorer populations and rural areas (**Figure Box 8.3 a,b**). Poorer populations are more prone to infection because they are more likely to live in rural areas, in housing that offers little protection against mosquitoes, and they are generally less likely to have access to ITNs or IRS (**Chapter 4**). They are also less likely to use health facilities which can offer effective diagnostic testing and treatment (**Chapter 5**). There is little difference in parasite prevalence rates between sexes in children <5 years of age (**Figure Box 8.3c**).

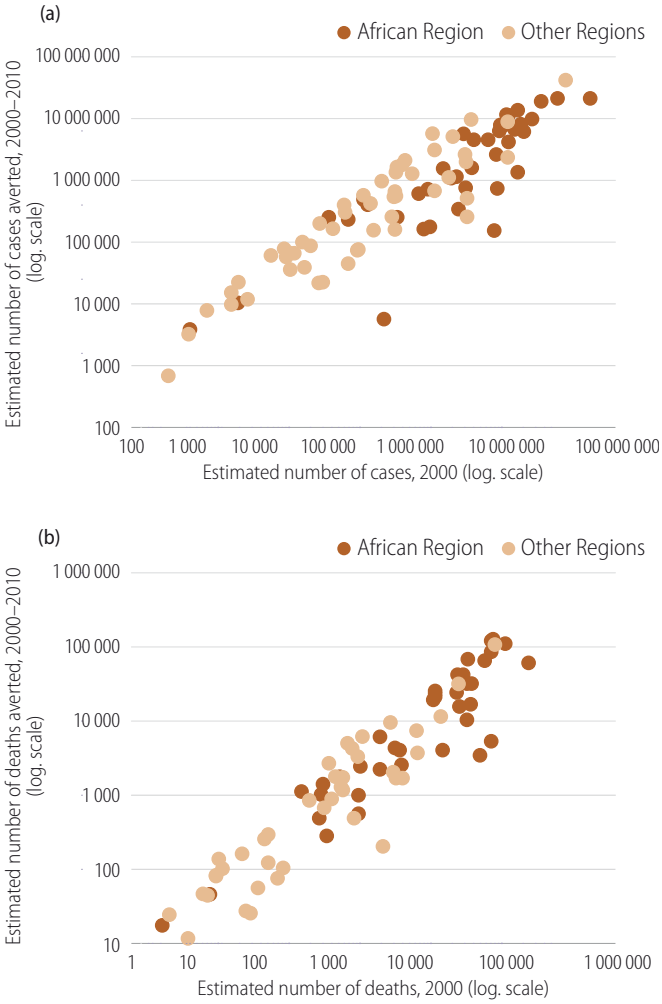
Figure Box 8.3. Parasite prevalence in children <5 years of age according to (a) wealth quintile (b) rural or urban residence and (c) sex

In (b) and (c) the diagonal line signifies where parasite prevalence rates are equal between urban and rural, and between male and female populations respectively.



Source: *Household surveys*

Figure 8.8 Estimated numbers of (a) cases averted in 2000–2011 versus cases in 2000 and (b) number of deaths averted in 2000–2011 versus deaths in 2000



Source: *WHO estimates*

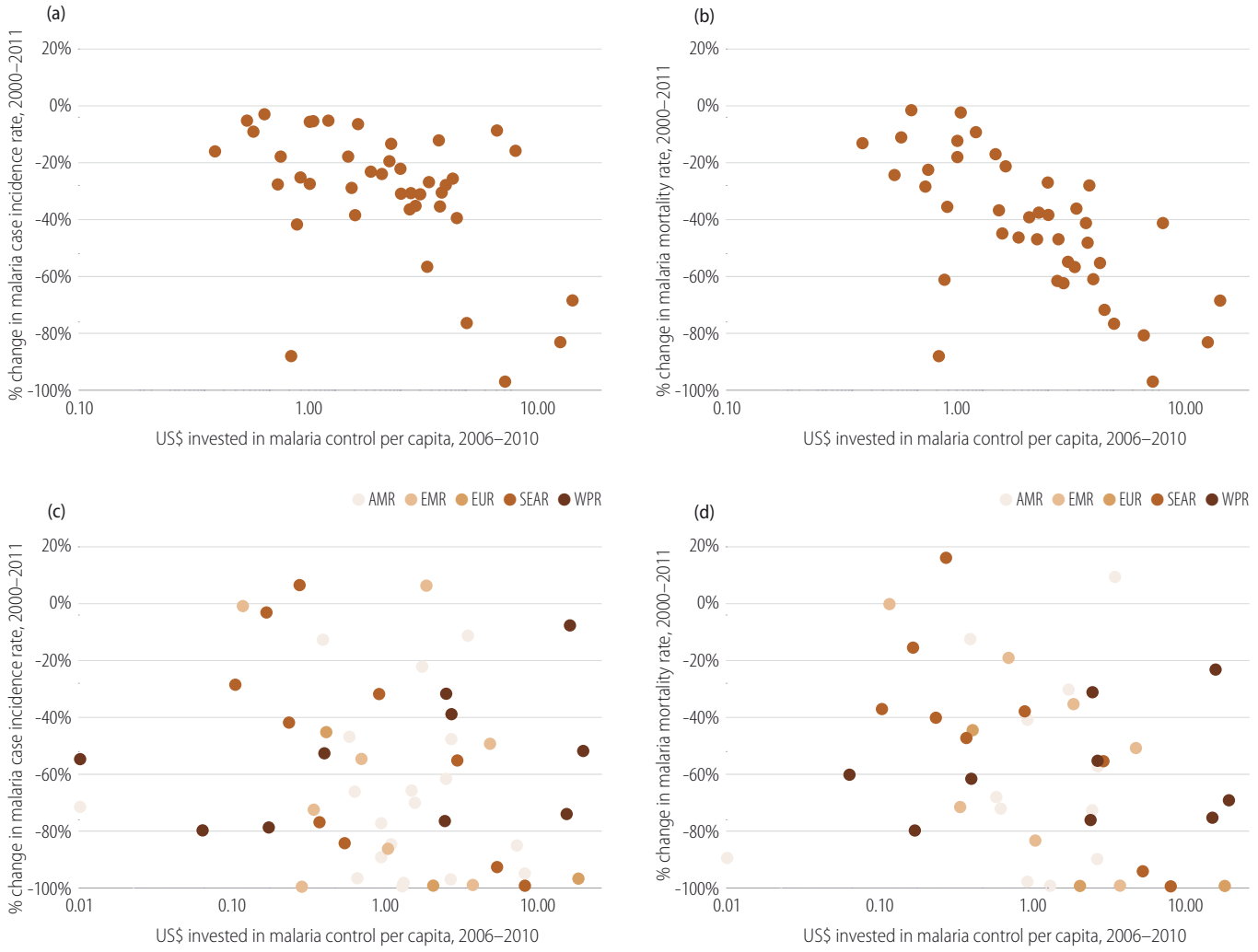
countries. Owing to wide uncertainty intervals surrounding individual country estimates, the composition of the country grouping that comprises 80% of the global burden is also subject to some uncertainty. Nevertheless, the global burden is clearly dominated by countries in sub-Saharan Africa: the Democratic Republic of the Congo (DR Congo) and Nigeria together account for >40% of the global total of estimated malaria deaths.

Malaria remains inextricably linked with poverty. Malaria mortality rates are highest in countries with lower gross national income (GNI) per capita (**Figure 8.5**). Countries with higher proportions of their population living in poverty (on less than US$ 1.25 per person per day) have higher death rates from malaria (**Figure 8.6**). Within countries the prevalence of malaria infections in children <5 years of age is highest in poorer populations and rural areas (**Box 8.3**).

8.5 Cases and deaths averted, 2001–2010

As reported in the *World Malaria Report 2011*, estimated incidence rates decreased by 17% globally between 2000 and

Figure 8.9 Change in malaria case incidence rate and mortality rate in relation to per capita investments in malaria control: (a) change in malaria case incidence rate among countries in the WHO African Region; (b) change in malaria mortality rate among countries in the WHO African Region; (c) change in malaria case incidence rate among countries in other WHO Regions; (d) change in malaria mortality rate among countries in other WHO Regions



Source: *WHO estimates, WHO financing database*

2010, and mortality rates by 26% (33% in the WHO African Region). An estimate of the number of cases averted and lives saved between 2001 and 2010 can be made by calculating the number of cases and deaths that would have occurred if incidence and mortality rates remained at 2000 levels throughout the decade (i.e. there was no progress). The calculated number of cases and deaths can be compared with the number of cases estimated for each year presented in the *World Malaria Report 2011*. Such an analysis indicates that 274 million fewer cases and 1.1 million fewer malaria deaths occurred between 2001 and 2011 globally than would have occurred had incidence and mortality rates remained unchanged since 2000 (**Table 8.2**). The majority of cases averted (66%) and lives saved (88%) are in the African Region.

From the numbers of malaria cases reported through surveillance systems, it appears that progress has been most rapid in countries with lower initial burdens of malaria. A similar pattern is observed in estimated incidence and mortality rates; larger percentage decreases in case incidence and mortality rates are seen in countries with the lowest estimated malaria burdens in 2000 (**Figure 8.7**). However, while progress in reducing incidence and mortality rates has been faster in countries with smaller estimated numbers of malaria cases and deaths, this does not imply a lack of impact in higher burden countries: overall more cases and deaths have been averted 2001–2011 in countries with the highest estimated initial number of cases and deaths (**Figure 8.8**).[2]

Not all of the malaria cases and deaths averted can be attributed to malaria control programmes. Some progress is likely to be related to increased urbanization and overall economic development, which lead to improvements in housing and nutrition. In assessing the impact of malaria interventions, it is of interest to examine changes in estimated malaria case incidence or mortality in relation to financial investments made in malaria control.

In the African Region, there is a strong association between per capita expenditures on malaria control and estimated decreases in malaria case incidence and mortality rates between 2000 and 2010 (**Figure 8.9a**). The association is stronger for mortality rates than for incidence rates (**Figure 8.9b**). A clear relationship between investments and reductions in incidence and mortality

2. 52% of cases and 58% of deaths averted are in the 10 countries which had the highest estimated malaria burdens in 2000

rates is not evident outside Africa, except possibly in the South-East Asia Region (**Figure 8.9c,d**).

The stronger associations in Africa may be because information on malaria expenditures concerned the period 2006–2010 in which there was a rapid expansion in ITN and IRS programmes and a consequent reduction in incidence and mortality rates. Outside Africa, much of the decline in morbidity and mortality rates was achieved before this period. In addition, the estimated numbers of cases and deaths in Africa are derived from a model which relies on changes in intervention coverage to predict changes in case incidence and mortality rates. Such a model is not affected by natural variation in malaria levels that occur from year to year owing to climatic and other factors. In contrast, estimates for countries outside Africa are derived from reported cases, which do vary according to climatic and other factors.

8.6 Conclusions

Of 99 countries and areas with ongoing malaria transmission in 2011, 58 submitted sufficiently complete and consistent data on malaria cases between 2000 and 2011 to enable an assessment of trends to be made. Based on the reported data, 50 countries, including 9 in the African Region, are on track to meet WHA and RBM targets: to reduce malaria case incidence by 75% by 2015. Of these 50 countries, 44 had already attained a 75% reduction in case incidence by 2011 and 6 countries are projected to achieve reductions of 50%–75% by 2015. Malaria case incidence has increased in 3 countries in the Region of the Americas.

Progress in reducing case incidence has been faster in countries with lower initial numbers of cases. The 50 countries that are on track to reach the 2015 target, as measured through surveillance systems, accounted for only 7 million (3%) of the global total of 223 million estimated cases in 2000. This is partly due to faster progress in countries with fewer cases, but it is also heavily influenced by the poorer quality of surveillance data submitted by countries with a larger estimated number of cases. Improved surveillance and evaluation in countries with higher malaria burdens is essential for the impact of malaria investments to be properly assessed.

Of 99 countries with ongoing transmission in 2012, 11 are classified as being in the pre-elimination phase of malaria control, and 10 countries are classified as being in the elimination phase. A further 5 countries were classified as being in the prevention of introduction phase.

Because countries with higher numbers of cases are less likely to submit sufficiently consistent data, it is necessary to draw inferences about the distribution of malaria and trends in some countries using estimates of numbers of cases. The estimated numbers of malaria cases and deaths are accompanied by a large degree of uncertainty but can provide insight into the distribution of malaria across countries and trends over time.

More than 80% of estimated malaria deaths occur in just 14 countries and 80% of estimated cases occur in 17 countries, with Democratic Republic of the Congo and Nigeria together accounting for >40% of the estimated global deaths. International targets for reduction of cases and deaths will not be attained unless substantial progress can be made in these countries.

Malaria is strongly associated with poverty. Malaria mortality rates are highest in countries with a lower GNI per capita. Countries with higher proportions of their population living in poverty (less than US$ 1.25 per person per day) have higher mortality rates from malaria. Within countries parasite prevalence rates in children are highest in poorer populations and rural areas. There is little difference in parasite prevalence rates by sex in children <5 years of age.

While progress in reducing malaria case incidence and mortality *rates* has been faster in countries with lower numbers of cases and deaths, the vast majority of *numbers* of cases and deaths averted between 2000 and 2011 have been in countries which had the highest malaria burdens in 2000. If the malaria incidence and mortality rates in 2000 had remained unchanged over the decade, 274 million more cases and 1.1 million deaths would have occurred between 2001 and 2010. The majority of cases averted (52%) and lives saved (58%) are in the 10 countries which had the highest estimated malaria burdens in 2000.

The relation between investments in malaria control and changes in estimated numbers of cases and deaths is not clear except in the African Region, where there is a strong association between per capita investments in malaria control in 2006–2010 and a fall in estimated malaria mortality rates between 2000 and 2011.

There remain many inherent uncertainties in any approach to producing estimates of malaria case incidence and mortality, and on analyses based on the estimates. The global malaria community needs to increase its efforts to support malaria-endemic countries in improving diagnostic testing, surveillance, vital registration, and routine health information systems, so that accurate information on malaria morbidity and mortality can be obtained.

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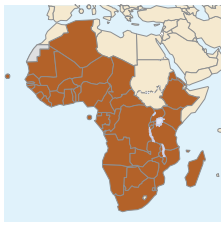
Regional profiles

African Region



Central Africa

Algeria
Benin
Burkina Faso
Cape Verde
Côte d'Ivoire
Gambia
Ghana
Guinea
Guinea-Bissau
Liberia
Mali
Mauritania
Niger
Nigeria
Sao Tome & Principe
Senegal
Sierra Leone
Togo

West Africa

Angola
Burundi
Cameroon
Central African Republic
Chad
Congo
Democratic Republic of the Congo
Equatorial Guinea
Gabon

East Africa and high transmission areas in Southern Africa

Comoros
Eritrea
Ethiopia
Kenya
Madagascar
Malawi
Mozambique
Rwanda
Uganda
United Republic of Tanzania (Mainland)
United Republic of Tanzania (Zanzibar)
Zambia

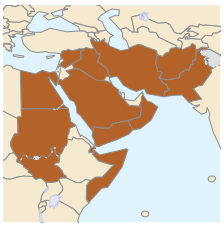
Low transmission Southern African Countries

Botswana
Namibia
South Africa
Swaziland
Zimbabwe

Region of the Americas

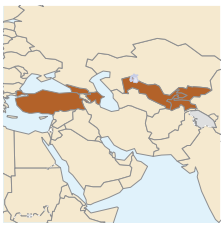
Argentina
Belize
Bolivia (Plurinational State of)
Brazil
Colombia
Costa Rica
Dominican Republic
Ecuador
El Salvador
French Guiana, France
Guatemala
Guyana
Haiti
Honduras
Mexico
Nicaragua
Panama
Paraguay
Peru
Suriname
Venezuela (Bolivarian Republic of)

Eastern Mediterranean Region



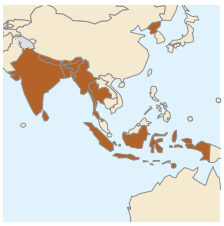
Afghanistan
Djibouti
Iran (Islamic Republic of)
Iraq
Pakistan
Saudi Arabia
Somalia
South Sudan
Sudan
Yemen

European Region



Azerbaijan
Georgia
Kyrgyzstan
Tajikistan
Turkey
Uzbekistan

South-East Asia Region



Bangladesh
Bhutan
Democratic People's Republic of Korea
India
Indonesia
Myanmar
Nepal
Sri Lanka
Thailand
Timor-Leste

Western Pacific Region

Cambodia
China
Lao People's Democratic Republic
Malaysia
Papua New Guinea
Philippines
Republic of Korea
Solomon Islands
Vanuatu
Viet Nam

This section describes (i) the graphs shown in the Regional Profiles; (ii) the strategy to assess trends in malaria case incidence; (iii) the criteria used to classify countries as being in the control, pre-elimination, elimination or prevention of reintroduction phase; (iv) the epidemiology of malaria in each Region; and (vi) the trends in malaria case incidence and their link to malaria programme implementation.

R.1 Graphs used in Regional Profiles

The following graphs are shown for each WHO Region:

Figure A. Percentage of cases due to *P. falciparum*: percentage of confirmed cases in which *P. falciparum* or a mixed infection was detected.

Figure B. Population at risk: The population at high risk for malaria is that living in areas where the incidence is at least 1 per 1000 per year (defined at the second or lower administrative level). The population at low risk for malaria is that living in areas with less than 1 case of malaria per 1000 per year (see country profile methods).

Figure C. Annual blood examination rate (ABER): number of slide examinations or RDT tests carried out each year in relation to the population at risk for malaria, expressed as a percentage (see country profile methods).

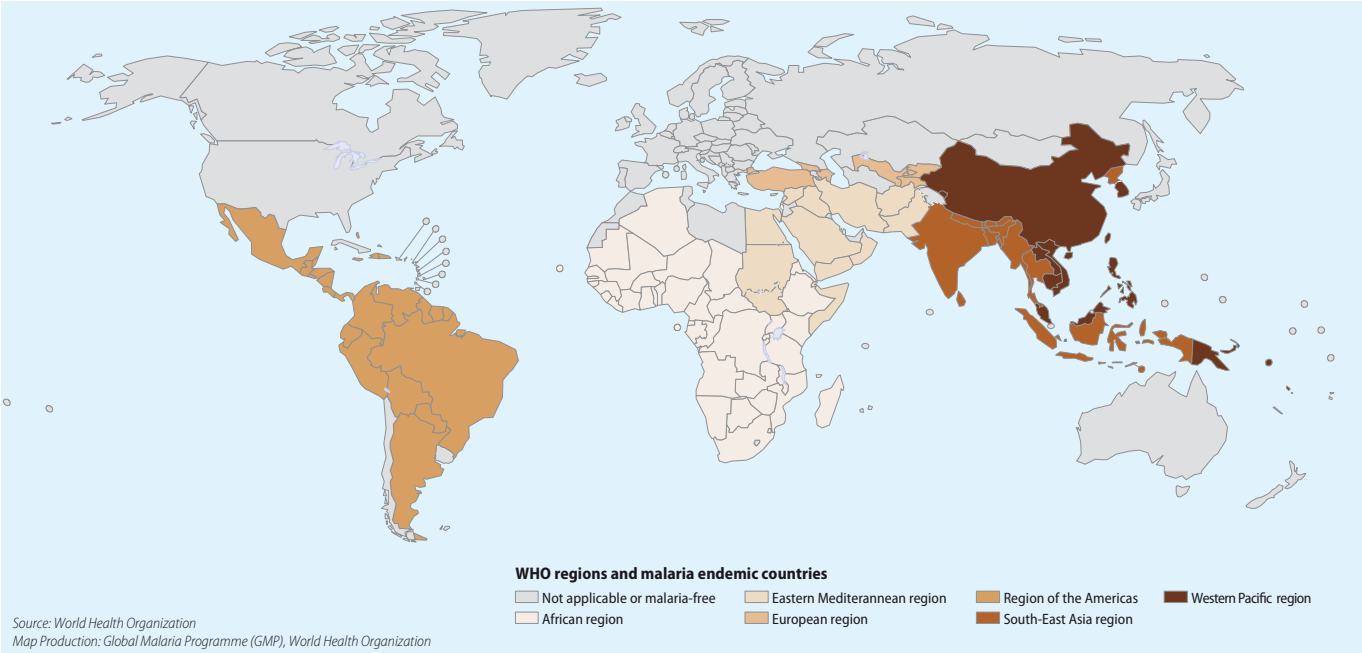
Figures D–H. Change in number of reported cases: Figure D shows the percentage change in the incidence of reported confirmed cases between 2000 and 2011 (decrease, downward bars; increase, upward bars). For countries in the African Region percentage reductions are in rate of hospital admissions (except for Algeria, Cape Verde, Sao Tome and Principe, and 5 countries in low transmission south-east Africa, where confirmed cases are used). Figures E and F show the numbers of cases (or admissions) for each country between 2000 and 2011, dividing countries between those that are on track to achieve a ≥75% decrease in case incidence by 2015 (E) or <75% (F) reduction in malaria incidence. Figures G and H present trends in malaria case incidence for each country between 2000 and 2011, again dividing countries based on those that are on track to achieve a ≥75% decrease in case incidence by 2015 (G) or <75% (H) reduction in malaria incidence. The vertical axes in Figures G and H are on a logarithmic scale. Countries with an increase in malaria case incidence or for which reported data are not sufficiently consistent to make an inference about trends, are presented in the graphs for the countries with reductions of <75% (F and H).

Figure I. IRS and ITNs delivered: The vertical bars show the proportion of the population at risk for malaria potentially covered by IRS and ITNs through preventive programmes.. It is assumed that each ITN delivered can cover on average 1.8 people, that conventional nets are re-treated regularly, and that no nets are replaced before the end of their presumed 3-year lifespan..

Figure J. Cases potentially treated with antimalarial drugs: Few countries have information systems that record treatments given to individual patients. It is therefore necessary to use aggregate information on numbers of treatment courses delivered to public health facilities who would receive antimalarial treatment, including both those with presumed (treated without testing) and confirmed cases, and relate these to the number of patients attending health facilities. The proportion of malaria cases potentially treated with any antimalarial in the public sector is the number of antimalarial treatment courses delivered divided by the number of estimated presumed and confirmed malaria cases in the public health facilities, multiplied by 100. The bars for any antimalarial treatment show the number of all treatment courses supplied in relation to all presumed and confirmed malaria cases, including those due to *P. falciparum*. The bars for ACT show the number of ACT treatment courses in relation to the number of estimated presumed and confirmed *P. falciparum* cases reported in the public sector. In many countries in sub-Saharan Africa patients with clinically diagnosed malaria do not receive a diagnostic test but are presumed to have *P. falciparum*.

R.2 Assessing trends in the incidence of malaria

The reported numbers of malaria cases and deaths are used as core indicators for tracking the progress of malaria control programmes (the working definition of a case of malaria is



Source: World Health Organization
Map Production: Global Malaria Programme (GMP), World Health Organization

considered to be "fever with parasites" (*1*)). The main sources of information on these indicators are the disease surveillance systems operated by ministries of health. Data from such systems have 3 strengths: (i) case reports are recorded continuously over time and can thus reflect changes in the implementation of interventions or other factors, (ii) routine case and death reports are often available for all geographical units of a country, and (iii) they reflect the burden that malaria places on the health system. Changes in the numbers of cases and deaths reported by countries do not, however, necessarily reflect changes in the incidence of disease in the general population because: (i) not all health facilities report each month, and so variations in case numbers may reflect fluctuations in the number of health facilities reporting rather than a change in underlying disease incidence; (ii) routine reporting systems often do not include patients attending private clinics or morbidity treated at home, so disease trends in health facilities may not reflect trends in the entire community; and (iii) not all malaria cases reported are confirmed by microscopy or RDT, so some of the cases reported as malaria may be other febrile illnesses (*1*,*2*). When reviewing data supplied by ministries of health in malaria-endemic countries, the following strategy was used to minimize the influence of these sources of error and bias:

- Focusing on confirmed cases (by microscopy or RDT) to ensure that malaria, and not other febrile illnesses, are tracked. For high-burden countries in the WHO African Region, where little case confirmation is undertaken, the numbers of malaria admissions (inpatient cases) and deaths are reviewed because the predictive value of diagnosis undertaken for an admitted patient is considered to be higher than outpatient diagnosis based only on clinical signs and symptoms. In such countries, the analysis may be heavily influenced by trends in severe malaria rather than trends in all cases.
- Monitoring the number of laboratory tests undertaken. It is useful to measure the ABER, which is the number of parasitological tests (by microscopy or RDT) undertaken per 100 people at risk per year, to ensure that potential differences in diagnostic effort or completeness of reporting are taken into account. To discern decreases in malaria incidence, the ABER should ideally remain constant or increase.[1] In countries progressively reducing their malaria endemicity, the population at risk also reduces, becoming limited to foci where malaria transmission is present, or where there is potentially a high risk due to receptivity. In addition, it is useful to monitor the percentage of suspected malaria cases that were examined with a parasite-based test. When reviewing the number of malaria admissions and deaths, the health facility reporting rate (the proportion of health facilities that report) should remain constant and should be high, i.e. >80%.
- Monitoring trends in the malaria (slide or RDT) positivity rate (SPR). This rate should be less severely distorted by variations in the ABER than trends in the number of confirmed cases.
- Monitoring malaria admissions and deaths. For high-burden African countries, when the number of malaria admissions or deaths is being reviewed, it is also informative to examine the percentage of admissions or deaths due to malaria of total inpatient cases and deaths respectively, as this proportion is less sensitive to variation in reporting rates than the number of malaria admissions or deaths.
- Monitoring the number of cases detected in the surveillance system in relation to the total number of cases estimated to occur in a country (see chapter 7). Trends derived from countries with high case detection rates are more likely to reflect trends in the broader community. When examining trends in the number of deaths, it is useful to compare the total number of deaths occurring in health facilities with the total number of deaths estimated to occur in the country.
- Examining the consistency of trends. Unusual variation in the number of cases or deaths that cannot be explained by climate or other factors, or inconsistency between trends in cases and in deaths, can suggest deficiencies in reporting systems.
- Monitoring changes in the proportion of cases due to *P. falciparum* or the proportion of cases occurring in children <5 years of age. While decreases in the incidence of *P. falciparum* malaria may precede decreases in *P. vivax* malaria, and there may be a gradual shift in the proportion of cases occurring in children <5 years, unusual fluctuations in these proportions may point to changes in health facility reporting or to errors in recording.

The aim of these procedures is to rule out data-related factors, such as incomplete reporting, or changes in diagnostic practice, as explanations for a change in the incidence of disease and to ensure that trends in health facility data reflect changes in the wider community. The results of the analysis are shown in **Table R.1**. The conclusion that trends inferred from health facility data reflect changes in the community has more weight if (i) the changes in disease incidence are large; (ii) coverage with public health services is high; and (iii) interventions promoting change, such as use of ITNs, are delivered throughout the community and not restricted to health facilities.

R.3 Establishing a link between malaria disease trends and control activities

In establishing a causal link between malaria disease trends and control activities, one should consider what the disease trends would have been without application of the control activities and then assess whether the decrease in malaria observed is greater than that expected without control activities. A realistic view of what would have happened without control activities (i.e. counterfactual) cannot be established from the data currently available; however, it can be expected that, without a change in control activities, the malaria incidence might fluctuate in response to short-term climate variations but would otherwise show little change, as improved living conditions, environmental degradation or long-term climate change have only gradual effects (although there may be local exceptions). Thus, a plausible link with control efforts can be established if the disease incidence decreases at the same time as control activities increase, if the magnitude of the decrease in malaria incidence is consistent with the magnitude of the increase in

1. Some authorities recommend that the ABER should exceed 10% to ensure that all febrile cases are examined; however, the observed rate depends partly on how the population at risk is estimated, and trends may still be valid if the rate is <10%. Some authorities have noted that 10% may not be sufficient to detect all febrile cases. It is noteworthy that the ABER in the Solomon Islands, a highly endemic country, exceeds 60%, with a slide positivity rate of 25%, achieved solely through passive case detection.

Table R.1 Summary of trends in reported malaria incidence 2000–2011

WHO Region	On track for ≥75% decrease in incidence 2000–2015		50%–75% decrease in incidence projected 2000–2015	<50% decrease in incidence projected 2000–2015	Increase in incidence 2000–2011	Insufficiently consistent data to assess trends	
African	**Algeria** **Botswana** **Cape Verde** **Namibia** **Rwanda** **Sao Tome and Principe** **South Africa** **Swaziland** Eritrea		Madagascar Zambia			Angola Benin Burkina Faso+ Burundi+ Cameroon Central African Republic Chad Comoros Congo Côte d'Ivoire Democratic Republic of the Congo Equatorial Guinea Ethiopia Gabon Gambia Ghana	Guinea Guinea-Bissau Kenya* Liberia+ Malawi Mali Mauritania Mozambique Niger Nigeria Senegal Sierra Leone+ Togo+ Uganda+ United Republic of Tanzania* Zimbabwe+
Region of the Americas	**Argentina** **Belize** **Bolivia (Plurinational State of)** **Costa Rica** **Ecuador** **El Salvador** **French Guiana, France**	**Guatemala** **Honduras** **Mexico** **Nicaragua** **Paraguay** **Suriname** Colombia Panama Peru	Brazil		Dominican Republic Guyana Venezuela (Bolivarian Republic of)	Haiti	
Eastern Mediterranean	**Afghanistan** **Iran (Islamic Republic of)**	**Iraq** **Saudi Arabia**				Djibouti Pakistan* Somalia	South Sudan Sudan* Yemen*
European	**Azerbaijan** **Georgia** **Kyrgyzstan**	**Tajikistan** **Turkey** **Uzbekistan**					
South-East Asia	**Bhutan** **Democratic People's Republic of Korea**	**Nepal** **Sri Lanka** **Thailand** Bangladesh	India			Indonesia Myanmar+ Timor-Leste+	
Western Pacific	**Cambodia** **China** **Lao People's Democratic Republic** **Philippines** **Republic of Korea**	**Solomon Islands** **Vanuatu** **Viet Nam** Malaysia		Papua New Guinea			

Source: NMCP reports
Countries in prevention of reintroduction phase are not included in this table
Countries in bold achieved ≥75% decrease in case incidence by 2011
* Progress in reducing cases has been reported sub-nationally where interventions have been intensified.
+ Country has recently expanded diagnostic testing, so assessment of trends is difficult.

Table R.2 Criteria for classifying countries according to malaria programme phase

	Pre-elimination	Elimination	Prevention of reintroduction
Malaria situation in areas with most intense transmission			(1) Recently endemic country with zero local transmission for at least three years; or (2) Country on the Register or Supplementary list that has ongoing local transmission*
Test positivity rate	≤5% among suspected malaria patients (PCD) throughout the year		
API in the district with the highest number of cases/1000 population/year (ACD and PCD)**, averaged over the last two years	<5 (less than 5 cases / 1000 population)	<1 (less than 1 case / 1000 population)	
Total number of reported malaria cases nationwide		A manageable number, e.g. <1000 cases nationwide (local & imported)	
Case management			Imported malaria. Maintain capacity to detect malaria infection and manage clinical disease
All cases detected in the private sector are microscopically confirmed	National policy being rolled out	Yes	Yes
All cases detected in the public sector are microscopically confirmed	National policy being rolled out	Yes	Yes
Nationwide microscopy quality assurance system covers public and private sector	Initiated	Yes	Yes
Radical treatment with primaquine for *P. vivax*	National policy being updated	National policy fully implemented	Yes
Treatment with ACT plus single dose primaquine for *P. falciparum*	National policy being updated	National policy fully implemented	Yes
Surveillance			Vigilance by the general health services
Malaria is a notifiable disease nationwide (<24–48 hrs)	Laws and systems being put in place	Yes	Yes
Centralized register on cases, foci and vectors	Initiated	Yes	Yes
Malaria elimination database	Initiated	Yes	Certification process (optional)
Active case detection in groups at high risk or with poor access to services ("pro-active" case detection)	Initiated	Yes	In residual and cleared-up foci; among high risk population groups
Case and foci investigation & classification (including "reactive" case detection and entomological investigation)	Initiated	Yes	Yes

* Ongoing local transmission = 2 consecutive years of local *P. falciparum* malaria transmission; or 3 consecutive years of local *P. vivax* malaria transmission in the same locality or otherwise epidemiologically linked.

** The API has to be evaluated against the diagnostic activity in the risk area (measured as the ABER). Low values of ABER in a district raise the possibility that more cases would be found with improved diagnostic efforts.

Table R3 Countries that have been certified by WHO as malaria-free or added to the supplementary list of countries where malaria never existed or disappeared without specific measures

WHO Region	Country/territory	Year added to the official register*	Year added to the supplementary list**
African	Lesotho		2012
	Mauritius	1973	
	Seychelles		2012
Eastern Mediterranean	Bahrain		2012
	Jordan		2012
	Kuwait		1963
	Lebanon		2012
	Libya		2012
	Morocco	2010	
	Qatar		2012
	Tunisia		2012
	United Arab Emirates	2007	

WHO Region	Country/territory	Year added to the official register*	Year added to the supplementary list**
European	Albania		2012
	Andorra		2012
	Armenia	2011	
	Austria		1963
	Belarus		2012
	Belgium		1963
	Bosnia and Herzegovina	1973	
	Bulgaria	1965	
	Croatia	1973	
	Cyprus	1967	
	Czech Republic		1963
	Denmark		1963
	Estonia		2012
	Finland		1963
	France (with exception of French Guiana and the island Mayotte)		2012
	Germany		1964
	Greece		2012
	Hungary	1964	
	Iceland		1963
	Ireland		1963
	Israel		2012
	Italy	1970	
	Kazakhstan		2012
	Latvia		2012
	Lithuania		2012
	Luxembourg		2012
	Malta		1963
	Monaco		1963
	Montenegro	1973	
	Netherlands	1970	
	Norway		1963
	Poland	1967	
	Portugal	1973	
	Republic of Moldova		2012
	La Réunion, France	1979	
	Romania	1967	
	Russian Federation		2012
	San Marino		1963
	Serbia	1973	
	Slovakia		1963
	Slovenia	1973	
	Spain	1964	
	Sweden		1963
	Switzerland		1963
	The former Yugoslav Republic of Macedonia	1973	
	Turkmenistan	2010	
	Ukraine		2012
	United Kingdom		1963
Region of the Americas	Antigua and Barbuda		2012
	Bahamas		2012
	Barbados		1968
	Canada		1965
	Chile		1968
	Cuba	1973	
	Dominica	1966	
	Grenada	1962	
	Jamaica	1966	
	Saint Kitts and Nevis		2012
	Saint Lucia	1962	
	Saint Vincent and the Grenadines		2012
	Trinidad and Tobago	1965	
	United States of America	1970	

WHO Region	Country/territory	Year added to the official register*	Year added to the supplementary list**
Region of the Americas	Uruguay		2012
	Venezuela (Bolivarian Republic of, northern part)	1961	
South-East Asia	Maldives		2012
Western Pacific	Australia	1981	
	Brunei Darussalam	1987	
	China, Taiwan	1965	
	Cook Islands		1963
	Fiji		1963
	Japan		2012
	Kiribati		2012
	Marshall Islands		1963
	Micronesia (Federated States of)		1963
	Mongolia		1963
	Nauru		1963
	New Zealand		1963
	Niue		1963
	Palau		1963
	Samoa		1963
	Singapore	1982	
	Tonga		1963
	Tuvalu		2012

**WHO Official Register of areas where malaria elimination has been achieved*

**Supplementary list indicates countries where malaria never existed or disappeared without specific measures

control activities (a 50% decrease in the number of cases is unlikely to occur if malaria control activities cover only 10% of the population at risk) and if the decreases in malaria incidence cannot readily be explained by other factors.

R.4 Classification of countries according to malaria programme phase

In February 2012, the Malaria Policy Advisory Committee (MPAC) discussed the classification of countries according to their malaria programme phase and the milestones on the path to malaria elimination (*4*). It noted that the format of the classification criteria as used in previous editions of the *World Malaria Report* (*5,6,7*) did not facilitate tracking over time. This discussion led to the development of updated classification criteria supported by indicators to make the process of classification as transparent as possible. The updated WHO country classification criteria are based on an evaluation of 3 main components: i) the malaria situation, ii) case management practices, and iii) the surveillance system as shown in **Table R.2**.[2] The evaluation concentrates on the situation in those districts of the country reporting the highest API.

Also as a result of the MPAC discussions, the list of countries that are officially recognized as being malaria-free has been expanded to include all countries that i) never had malaria transmission, or ii) have been malaria-free for well over a decade. In consultation with the WHO Regional Offices, 31 malaria-free countries have therefore been added to the "*Supplementary list*"[3] (see Table **R.3**). The *Supplementary list* complements the list of countries that have been certified by WHO as malaria-free ("*The Register*")[4] (*6*). All the countries and areas on these two lists have been without local malaria transmission for significant periods of time, even though some may suffer renewed outbreaks of local transmission subsequent to importation of parasites from abroad (including, as of 2011, Greece). Countries included in the *Supplementary list* do not need to request (and are not eligible for) certification of their malaria-free status.

The northern part of Venezuela (Bolivarian Republic of) is the only subnational administrative level immediately adjacent to endemic areas that has ever been certified by WHO as malaria-free, and was the first area so certified by the Pan American Health Organization (PAHO) in 1961. The other WHO certification exercises concerned entire nations, in addition to the islands of Taiwan (China, 1965) and La Réunion (France, 1979). Since 1980, WHO certification has only taken place at national level. As of 2011, elimination at subnational level, usually in the form of a "malaria-free initiative", is a declared goal in several control-phase countries, including China, Indonesia, the Philippines, Solomon Islands, Sudan, Vanuatu, and Yemen. In the Philippines, the Ministry of Health is providing subnational certification of achievement of malaria elimination at provincial level.

R.5 Regional profiles

2. Other components such as (1) the stated programme goal; (2) vector control and malaria prevention practices; and (3) health systems and financing are also important for tracking progress towards elimination, however they are less specific and therefore not included as classification criteria.
3. The *Supplementary list* was started in the 1960s during the Global Malaria Eradication Programme (1955–1972) to indicate countries where malaria never existed or disappeared without specific measures.
4. The *WHO Official Register of areas where malaria eradication has been achieved*.

West Africa

Of the 17 countries in this subregion, 2 reduced malaria case incidence rates by ≥75% between 2000 and 2011 (Algeria and Cape Verde). In the other countries, evidence of change in malaria case incidence is scant owing to inconsistent reporting over time despite a marked scale-up of key interventions.

This subregion is generally characterised by a high intensity of malaria transmission and cases that are almost exclusively due to *P. falciparum* (**Figures A, B**). However, transmission intensity is lower in Cape Verde and Algeria and these countries are in the pre-elimination and elimination phase respectively. All other countries are in the control phase.

Only 2 countries (Algeria and Cape Verde) have consistent records of diagnostic testing since 2000, and in these countries, the incidence rate of confirmed indigenous malaria cases decreased by ≥75% between 2000 and 2011 (**Figures D, E, G**). Algeria reported only 4 local cases and 187 imported cases in 2011. In Cape Verde the number of indigenous cases decreased by 72% between 2000 and 2011; numbers have fluctuated with fewer than 100 cases per year with no further decreases since the beginning of the decade.

For the other 15 countries in this subregion, attempts to evaluate malaria trends are based on time series of hospital admissions and deaths (**Figures D, F, H**) because of inadequate historical data on parasitologically confirmed cases. Senegal had reported a reduction in admissions of 40% between 2000 and 2009 (**Figures D, F, H**) but has failed to report data since then owing to labour disputes within the health service. Mali did not report on admissions for malaria between 2000 and 2011. For most countries that reported, the numbers of admitted malaria cases and malaria deaths have been rising (**Figures D, F, H**). These striking upward trends are likely to be due to improved reporting or access to health services, as the total number of admissions and deaths from all causes has also been rising. As a result, routinely collected data from most of the countries in this subregion do not enable trends to be assessed.

Country in the pre-elimination phase

Cape Verde

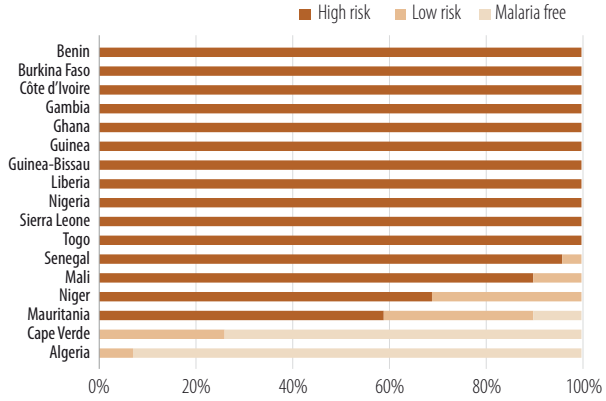
Country in the elimination phase

Algeria

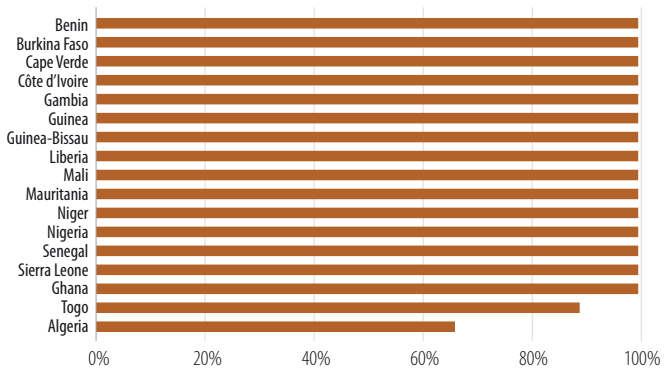
The number of ITNs reported as delivered between 2009 and 2011 could potentially have protected more than half of the populations at risk in Benin, Burkina Faso, Côte d'Ivoire, Gambia, Liberia, Mali, Mauritania, Senegal, Sierra Leone and Togo (**Figure I**). The countries with the highest populations at risk (Ghana, Niger and Nigeria) had a lower estimated ITN coverage in 2011 than in previous years. Most of the countries reported delivering sufficient ACTs to treat all patients attending public health facilities but the quantities supplied in Mauritania were inadequate (**Figure J**). Cape Verde, Senegal and Guinea-Bissau did not report on ACT deliveries.

A few research studies have documented successes in some countries of this subregion. In Niger, child mortality decreased from 226 in 1998 to 126 in 2009; ITNs were estimated to contribute to 25% of the reduction (*8*). In Benin, a reduction in malaria transmission was reported after implementation of IRS with bendiocarb in 4 districts (*9*). A study in 8 villages in Burkina Faso (*10*) found a reduction in parasite prevalence from 64% to 46% between 1999 and 2009 associated with an increase in ITN use from 0% to 73%. Many more studies of this kind are needed to gain a full understanding of the effects of malaria control in the African subregions.

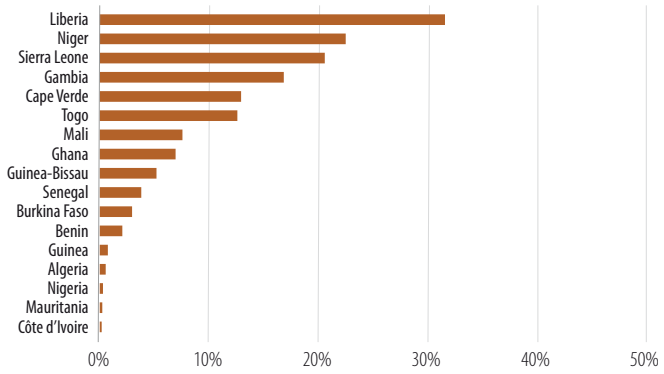
A – Population at risk, 2011



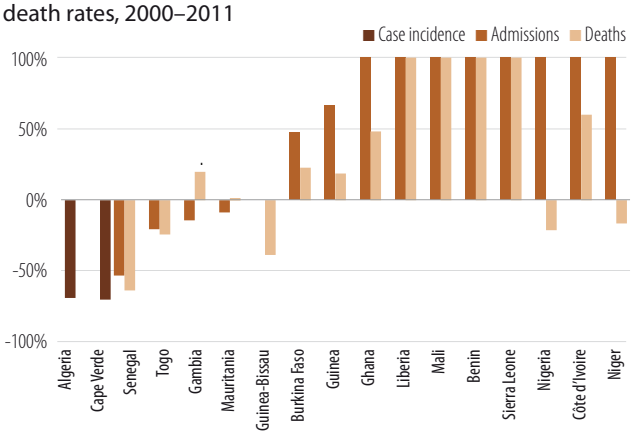
B – Percentage of cases due to *P. falciparum*, 2007–2011



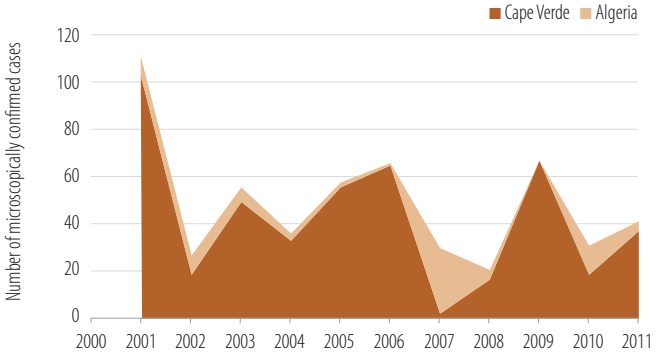
C – Annual blood examination rate, 2007–2011



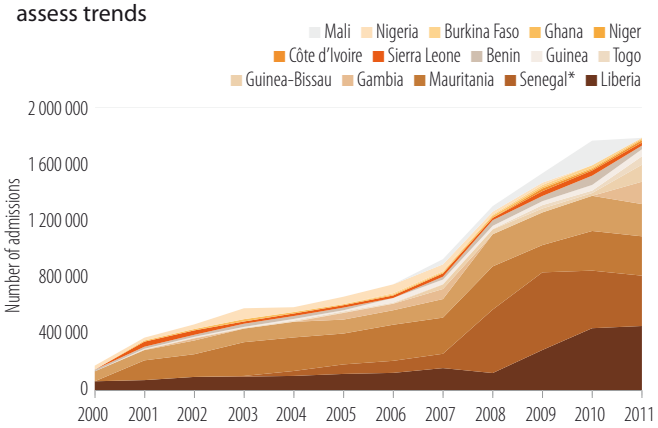
D – Percentage change in case incidence or admissions and death rates, 2000–2011



E – Cases among countries projected to achieve ≥75% decrease in case incidence by 2015

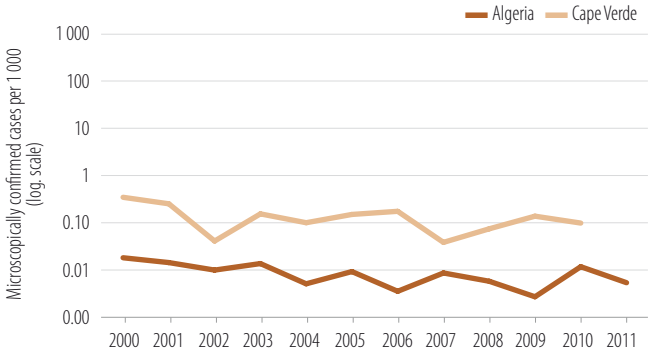


F – Admissions among countries projected to achieve <75% decrease in admission rates by 2015 or with insufficent data to assess trends

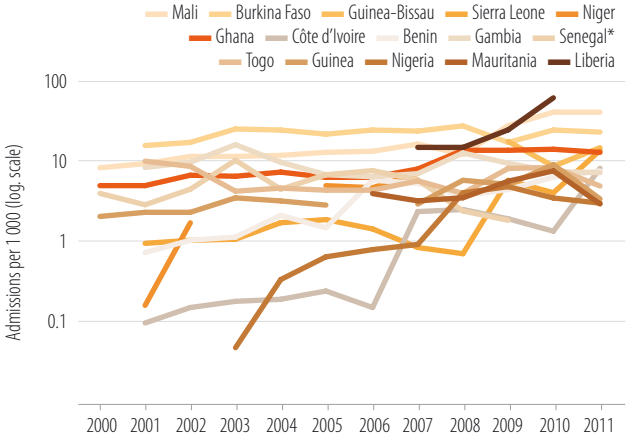


* No data for 2010 and 2011

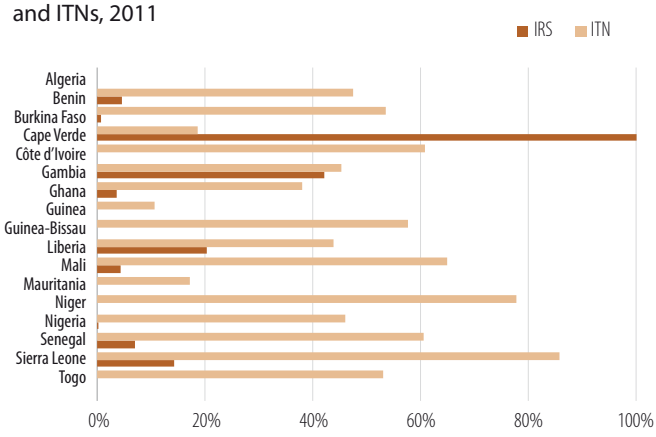
G – Case incidence rate among countries projected to achieve ≥75% decrease in case incidence by 2015



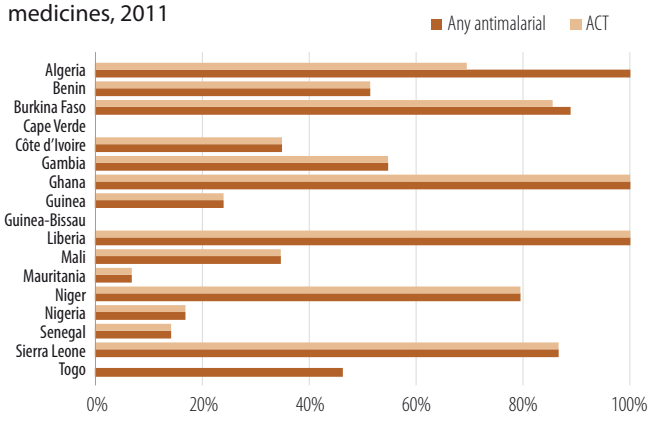
H – Admission rate among countries projected to achieve <75% decrease in admission rates by 2015 or with insufficient data to assess trends



I – Percentage of high risk population protected with IRS and ITNs, 2011



J – Percentage of cases potentially treated with antimalarial medicines, 2011



Central Africa

Of the 10 countries in this subregion, one country has reduced malaria case incidence rates by ≥75% between 2000 and 2011 (Sao Tome and Principe). Incompleteness or inconsistency of reporting malaria cases, admissions and deaths restricts the possibility of drawing reliable conclusions about malaria trends elsewhere in this subregion.

Malaria endemicity in all the countries of this subregion is characterised by moderate to high transmission, exclusively caused by *P. falciparum* (**Figures A, B**). All countries are in the control phase.

In Sao Tome and Principe, the number of confirmed malaria cases fell by 87% between 2000 and 2011 and the number of malaria admissions by 84% (**Figures D, E, G**). Recent years have seen higher numbers of cases and admissions; the number of cases reported in 2011 (6 400) is the highest since 2005 and the number of malaria admissions is the highest since 2006. Nonetheless the country had achieved a reduction in malaria case incidence of >75% by 2011.

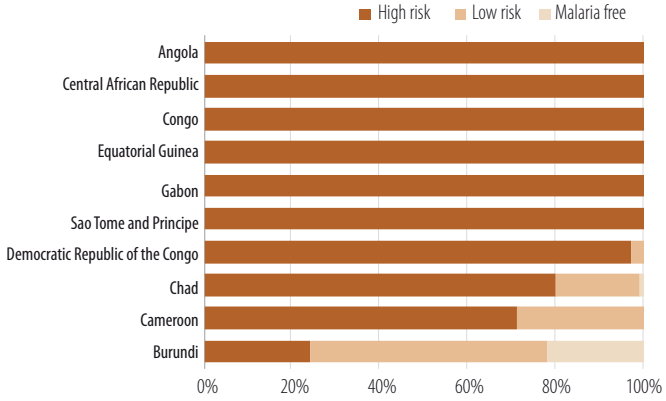
Due to low rates of diagnostic testing, the data used to assess trends in other countries in this subregion are the numbers of malaria admissions to hospitals and health centres. In most countries the reported numbers of malaria admissions and deaths were stable or rising (**Figures D, F, H**). Angola reported slight decreases in malaria admissions and deaths since 2007. The increase in the number and rate of admissions for some countries since 2007 may be due to improved reporting and/or better access to health services, since, with the exception of the Central African Republic, the total number of admissions for all causes reported has increased (and the proportion of admissions due to malaria has been constant or decreasing). Gabon did not report any data for 2011.

Evidence of change in malaria incidence or mortality rates from peer-reviewed publications is scanty in this subregion. A study in the Island of Bioko in Equatorial Guinea found a decrease in parasite prevalence in children between 2004 and 2011, and a shift in the age of peak prevalence from 8 year-olds to 12 year-olds in this period, after the combined implementation of ITNs and IRS (*11*). However, such selective studies do not allow general conclusions to be drawn about trends in malaria throughout the subregion.

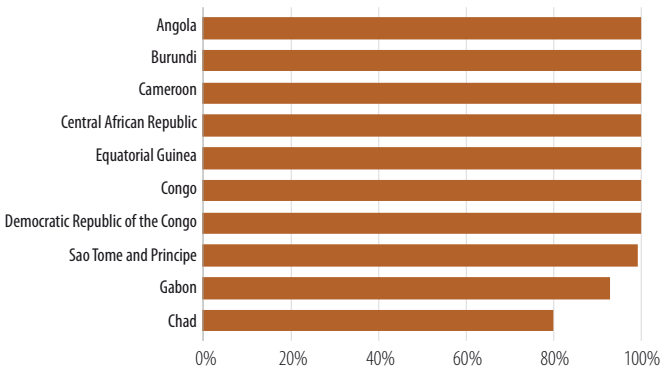
The strongest association between interventions and their impact on malaria morbidity and mortality is seen in Sao Tome and Principe (**Figures C, E, G, I, J**). Reported coverage with IRS or ITNs and diagnostic testing is high: ABER exceeds 60%, far greater than in other countries in this subregion. However, the recent increase in malaria admissions despite maintaining high coverage of the interventions requires further investigation. Burundi and Cameroon reported a high (>70%) percentage of the population potentially covered by ITNs delivered in 2011 but did not report a decrease in admissions and deaths. Angola, Central African Republic, Chad and the Democratic Republic of the Congo reported moderate (around 30%–60%) coverage with ITNs (**Figure I**). The Democratic Republic of the Congo, Equatorial Guinea and Gabon reported little evidence of intensified vector control. Half of the countries in the subregion, (Angola, Burundi, Cameroon, and Democratic Republic of the Congo) reported delivery of sufficient ACTs to treat all presumed and confirmed cases of malaria attending public health facilities (**Figure J**).

In summary, only one country in this subregion, Sao Tome and Principe, was able to reliably document changes in the incidence of malaria. Nearly half of the countries had made only slow progress in delivering interventions, both vector control and ACTs. Even in the countries that have scaled up both ITNs and ACTs (Angola, Burundi, Cameroon and Democratic Republic of the Congo), it has not been possible to evaluate the impact of these efforts because the quality of routinely collected data is generally poor, the parasitological confirmation rate is low, and there are few alternative sources of information such as population-based surveys or specific studies of the impact of interventions. Following substantial investments in malaria control in this subregion, the need for improved surveillance and evaluation is critical.

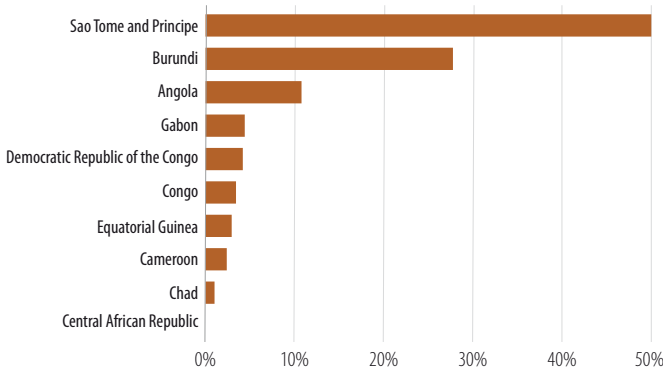
A – Population at risk, 2011



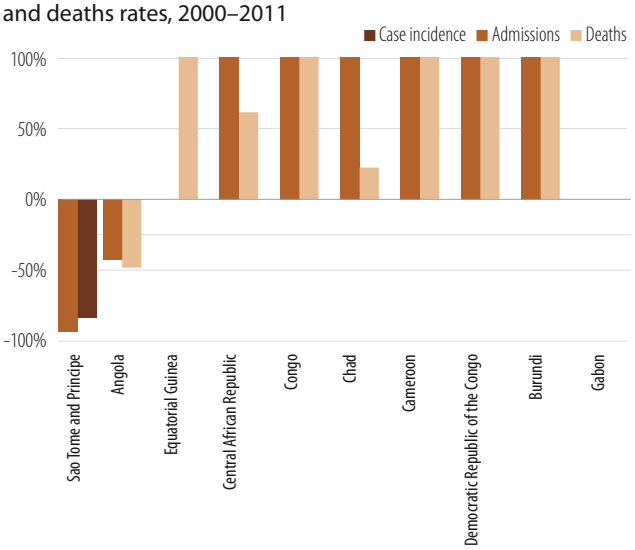
B – Percentage of cases due to *P. falciparum*, 2007–2011



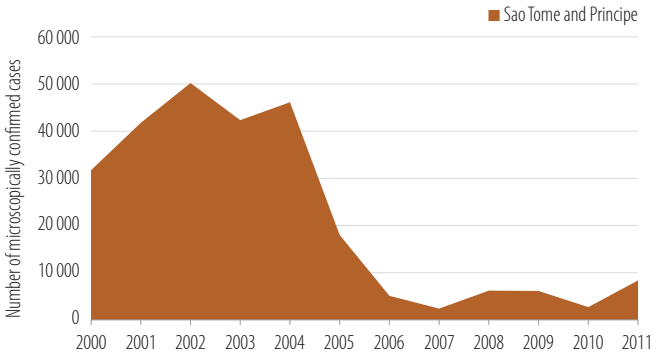
C – Annual blood examination rate, 2007–2011



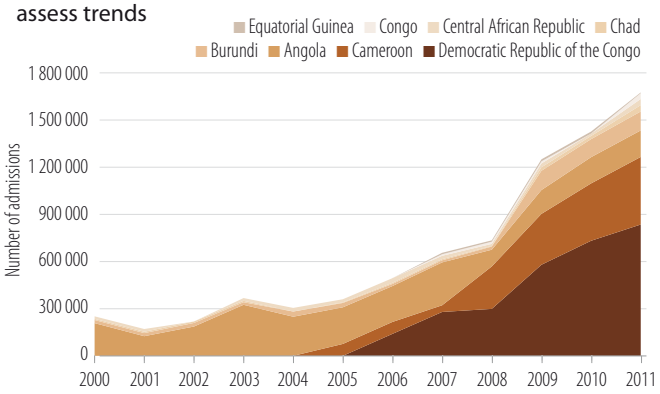
D – Percentage change in case incidence or admissions and deaths rates, 2000–2011



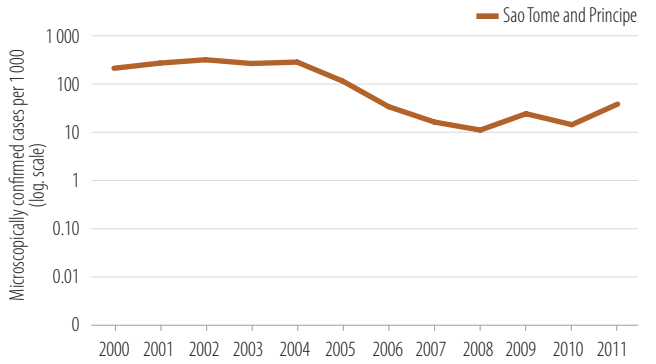
E – Cases among countries projected to achieve ≥75% decrease in case incidence by 2015



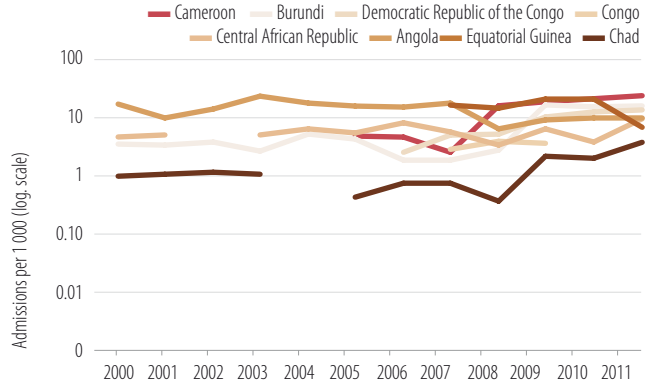
F – Admissions among countries projected to achieve <75% decrease in admission rates by 2015 or with insufficent data to assess trends



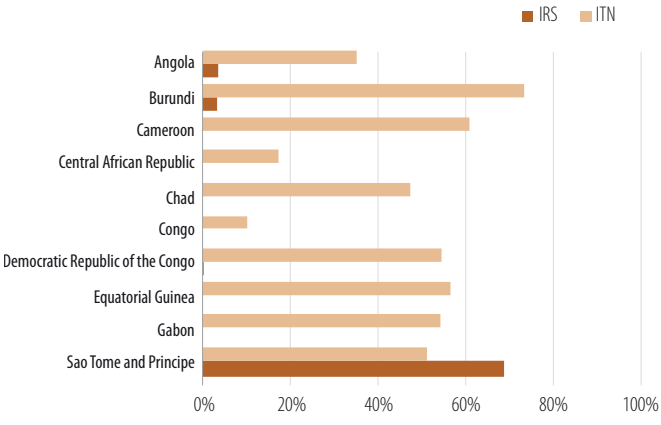
G – Case incidence rate among countries projected to achieve ≥ 75% decrease in case incidence by 2015



H – Admission rate among countries projected to achieve <75% decrease in admission rates by 2015 or with insufficient data to assess trends



I – Percentage of high risk population protected with IRS and ITNs, 2011



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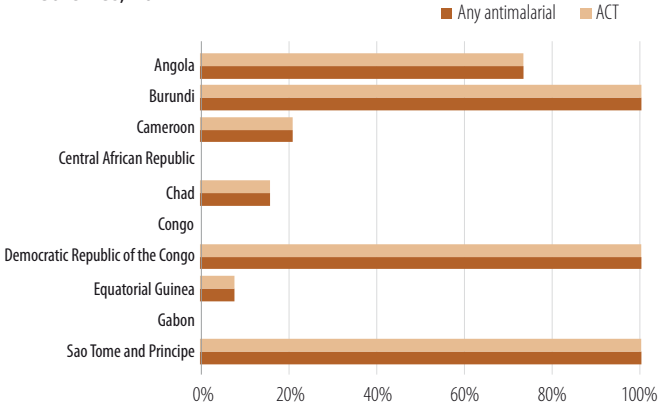


East and southern Africa

(excluding low transmission countries in southern Africa)

Of the 11 countries in this subregion, Rwanda reduced malaria admission rates by ≥75% between 2000 and 2011. Eritrea is on track to reduce admission rates by 75% by 2015 and 2 countries are projected to reduce admission rates by 50%–75% (Madagascar and Zambia). In the remaining 7 countries it was not possible to make a reliable assessment of malaria trends owing to changes in health service accessibility or inconsistency of reporting over time. However, amongst these 7, the island of Zanzibar (United Republic of Tanzania) reduced malaria admission rates by ≥75% between 2000 and 2011.

All countries in this subregion are in the control phase. The majority of the inhabitants are exposed to a high risk of malaria (**Figure A**), although more than 25% of the population of Ethiopia and Kenya live in malaria-free areas. In most countries, cases of malaria are predominantly due to *P. falciparum* (**Figure B**), with the exception of Eritrea and Ethiopia where the proportions of cases due to *P. vivax* are 50% and 37% respectively.

Access to diagnostic testing has been low and inconsistent in the subregion except in Rwanda and Eritrea. In recent years almost all the countries have expanded diagnostic testing with RDTs and microscopy, resulting in increases in the number of confirmed cases in most settings. Given the change in diagnostic practice it is necessary to use numbers of malaria admissions to examine changes in malaria incidence over time.

Between 2000 and 2011 the number of malaria admissions to hospitals and health centres decreased by ≥75% in Rwanda and the island of Zanzibar (United Republic of Tanzania), by 50%–75% in Eritrea (**Figures D, E, G**), and by 25%–50% in Madagascar and Zambia (**Figures D, F, H**). Rwanda has reversed the increases in cases and admissions observed in 2009 and consolidated its progress by reporting the lowest ever recorded numbers of confirmed cases, malaria admissions and deaths in 2011. The number of admissions reported in Zanzibar (United Republic of Tanzania) increased in 2011 compared to 2010, but was still the second lowest reported since 2000. The declines in malaria admissions and deaths seen in nationally aggregated hospital data are consistent with published studies of data from health facilities in Rwanda and Zanzibar (United Republic of Tanzania) (*12,13*).

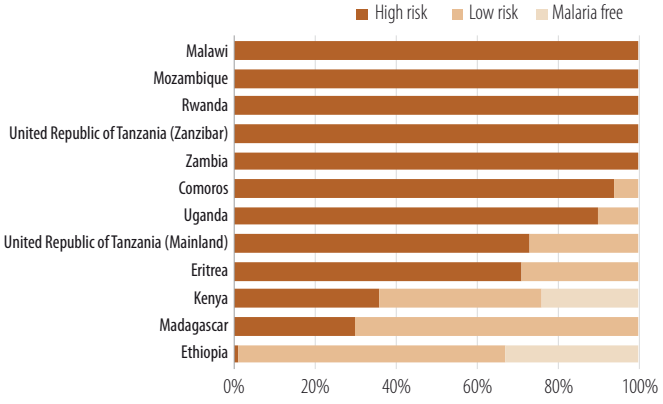
Malaria admission rates, taking into account population growth, decreased by ≥75% in Rwanda and Zanzibar (United Republic of Tanzania) (**Figures D, E, G**). Eritrea is on track to achieve a 75% reduction in malaria admission rates by 2015 (**Figures D, E, G**) whereas Madagascar and Zambia are projected to achieve reductions in malaria admission rates of 50–75% by 2015 (**Figures D, F, H**). The number of national aggregated admissions in Ethiopia has increased every year since 2008, and in 2011 was the second highest on record since 2000; the increase may be related to improved access to health facilities as the number of hospitals increased from about 120 in 2005 to more than 195 in 2010. A preliminary result of a WHO-led impact assessment using retrospective surveillance data in 39 hospitals below 2000m of elevation in Ethiopia shows that malaria admissions decreased by 43% between 2001–2011.

Data on admissions were too incomplete or inconsistently reported to make an assessment of trends in Comoros, Kenya, Malawi, Mozambique, Uganda, and the United Republic of Tanzania (Mainland) (**Figures D, F, H**). Trends in hospital deaths were similar to the trends in hospitalized cases, as would be expected (**Figure D**).

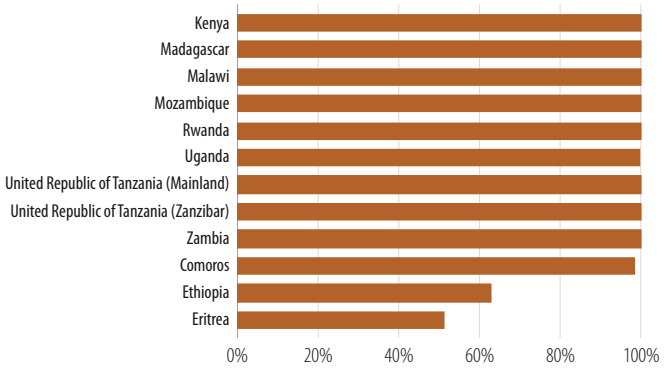
ITNs are the principal method of vector control in this subregion but the use of IRS is expanding in Ethiopia, Madagascar, Mozambique, and Zambia. In 7 countries (Comoros, Ethiopia, Kenya, Madagascar, Rwanda, United Republic of Tanzania, and Zambia) enough ITNs were distributed to cover >60% of the population at risk (**Figure I**). In Rwanda and Zambia a relatively high coverage of vector control might explain why cases declined substantially between 2000 and 2011. But this association has not yet been observed in Comoros or in mainland Tanzania (**Figures D, F, H, I**). In-depth investigations are needed to explain these inconsistencies. The proportion of the population potentially protected by ITNs decreased in 2011 in Zanzibar (United Republic of Tanzania) compared to 2009 and 2010 but IRS coverage was maintained at high levels. Most countries reported distributing sufficient ACTs to treat patients attending public health facilities, but Eritrea, Kenya and Rwanda did not report on ACT deliveries in 2011 (**Figure J**).

In summary, in 2011, Eritrea, Madagascar, Rwanda and Zambia, and the island of Zanzibar (United Republic of Tanzania) are on track to achieve at least a 75% reduction in malaria admission rates by 2015, and similar trends are seen in malaria death rates. In all these countries, there was high potential coverage (>60%) of either ITNs or IRS and good access to ACTs. In the remaining countries that are scaling-up interventions, the impact of interventions on malaria morbidity and mortality remains to be confirmed.

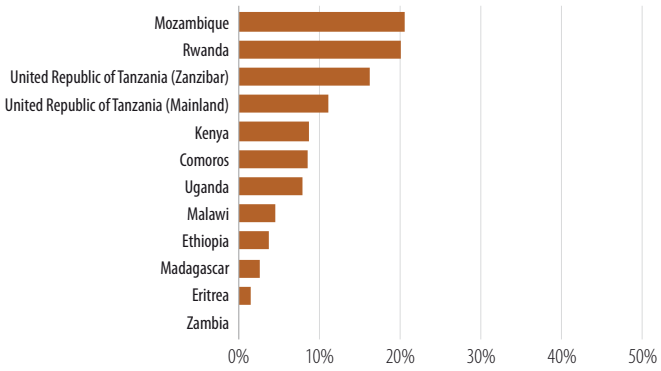
A – Population at risk, 2011



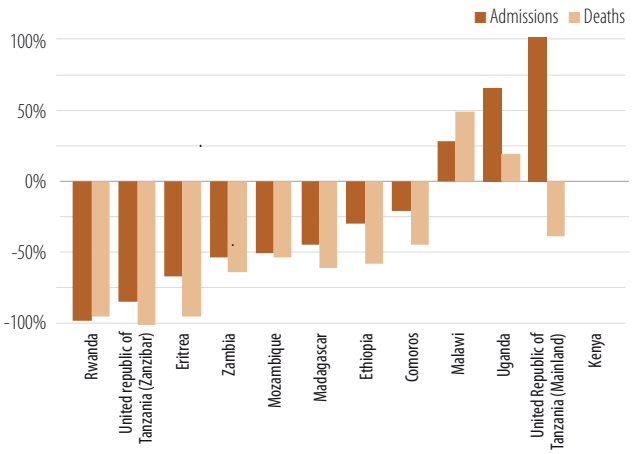
B – Percentage of cases due to *P. falciparum*, 2007–2011



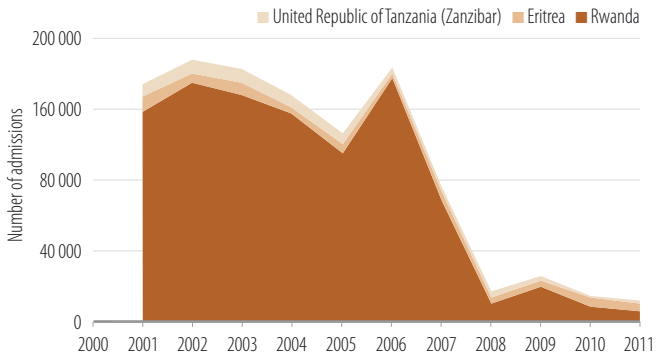
C – Annual blood examination rate, 2007–2011



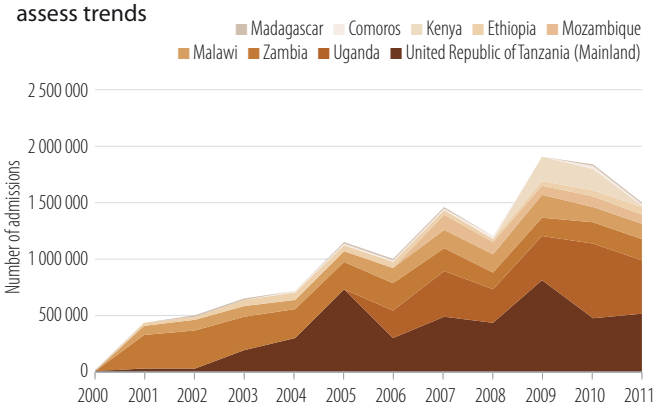
D – Percentage change in admission and death rates, 2000–2011



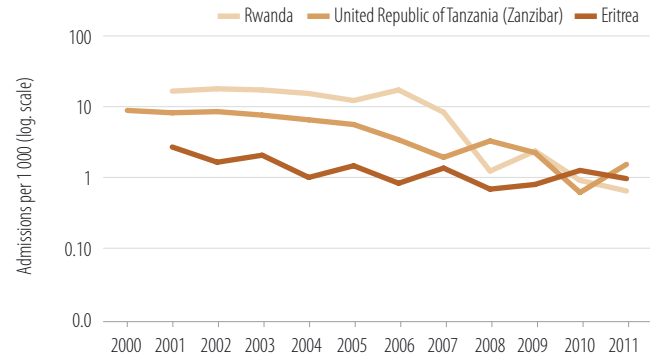
E – Cases among countries projected to achieve ≥75% decrease in admission rates by 2015



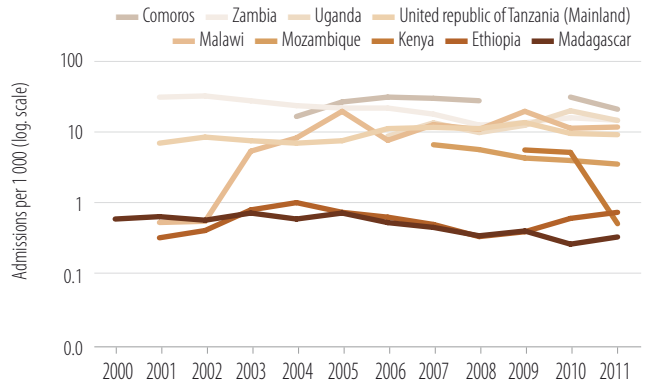
F – Admissions among countries projected to achieve <75% decrease in admission rates by 2015 or with insufficent data to assess trends



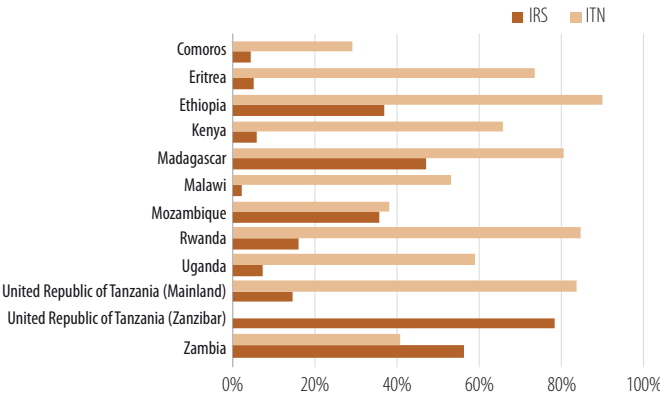
G – Case incidence rate among countries projected to achieve >75% decrease in admission rates by 2015



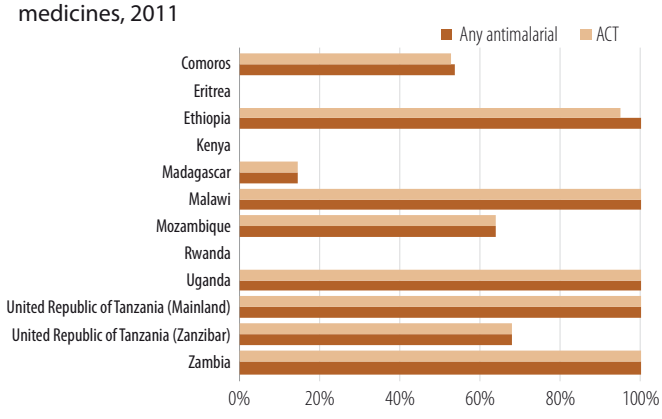
H – Admission rate among countries projected to achieve <75% decrease in admission rates by 2015 or with insufficient data to assess trends



I – Percentage of high risk population protected with IRS and ITNs, 2011



J – Percentage of cases potentially treated with antimalarial medicines, 2011



Low transmission southern African countries

Of the 5 countries in this subregion, 4 have recorded decreases in malaria case incidence of ≥75% between 2000 and 2011 (Botswana, Namibia, South Africa and Swaziland). It is not possible to assess trends in Zimbabwe owing to inconsistent reporting and a change in diagnostic practice.

All countries in this subregion have low levels of malaria transmission, but are still in the control phase. Approximately 20% of the populations in these countries are at some degree of malaria risk while substantial proportions live in areas that are free of malaria (**Figure A**). Malaria transmission is highly seasonal, and during the transmission season parts of the population of all these countries, with the exception of Swaziland, are temporarily at high risk. Almost all malaria cases in the 5 countries are caused by *P. falciparum* (**Figure B**).

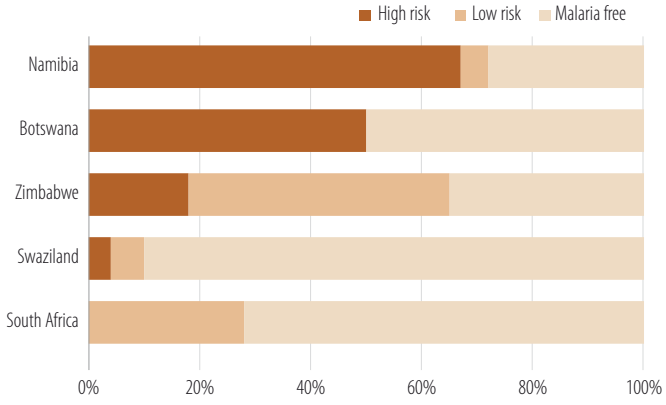
Diagnosis by microscopy has been widely used in the subregion since 2000. The use of RDTs has substantially increased in Botswana, Namibia, South Africa and Zimbabwe in recent years. Trend analyses were based on microscopically confirmed cases in order to examine trends over a longer period of time. Botswana, Namibia, South Africa and Swaziland reported decreases in microscopically confirmed malaria cases, and in case incidence rates, of ≥75% during 2000–2011, albeit with some fluctuations from year-to-year (**Figures D, E, G**).

Case reports from Zimbabwe have been inconsistent over the past decade, with no data reported for years 2000–2003 and the reported number of confirmed cases varying between a minimum of 16 000 and a maximum of 320 000 between 2008 and 2011 (**Figure D, F, H**). Since 2008, Zimbabwe has increasingly shifted its diagnostic services from microscopy to RDTs. Given the changes in diagnostic practice, and inconsistencies in data reported, it is not possible to make an assessment of trends in cases in Zimbabwe. All 5 countries, including Zimbabwe, reported a decrease in malaria deaths by >70% in the decade.

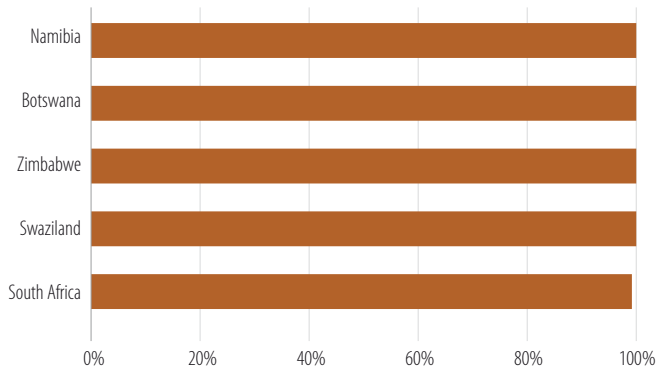
In South Africa, IRS is the primary vector control measure and nearly all of the population at risk was protected in 2011 (**Figure I**). Malaria transmission has been halted in most of the country, but occurs in north-eastern border regions adjacent to Mozambique and Swaziland. Swaziland reported distributing sufficient ITNs between 2009 and 2011 to cover >60% of its population at risk. In Zimbabwe, sufficient ITNs were distributed to cover 52% of the population at risk, while 52% were protected by IRS. Both Botswana and Namibia reported reductions in IRS and ITN coverage in 2011 compared to previous years. All countries reported delivering sufficient ACTs to treat patients attending public health facilities, apart from South Africa which did not submit data in 2011 (**Figure J**).

The 5 countries in this subregion are signatories to Malaria Elimination 8 (E8) in southern Africa, launched in March 2009. The initiative focuses on the 4 countries that aim to achieve elimination by 2020, namely Botswana, Namibia, South Africa and Swaziland (E4), but also includes Zimbabwe and the neighbouring countries: Angola, Mozambique and Zambia.

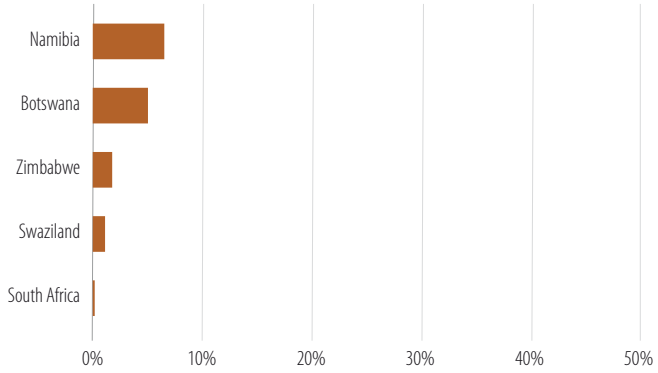
A – Population at risk, 2011



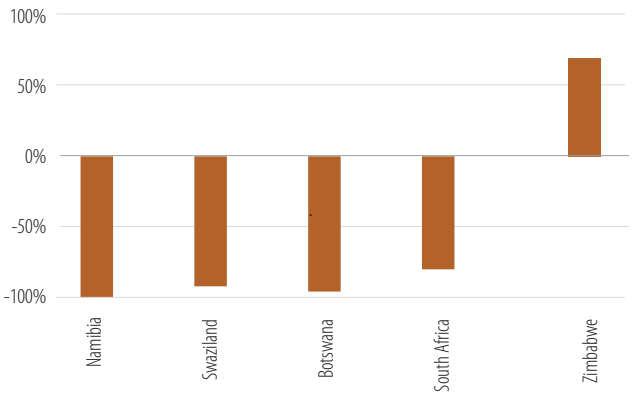
B – Percentage of cases due to *P. falciparum*, 2007–2011



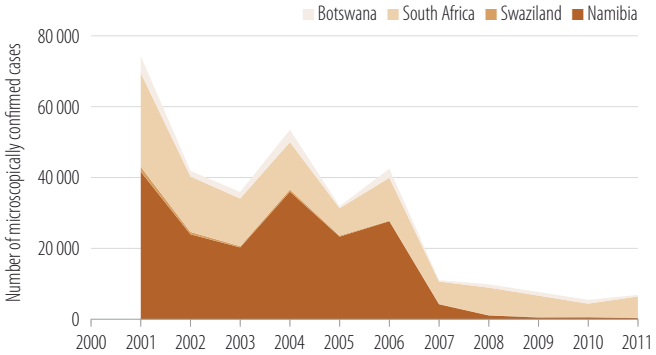
C – Annual blood examination rate, 2007–2011



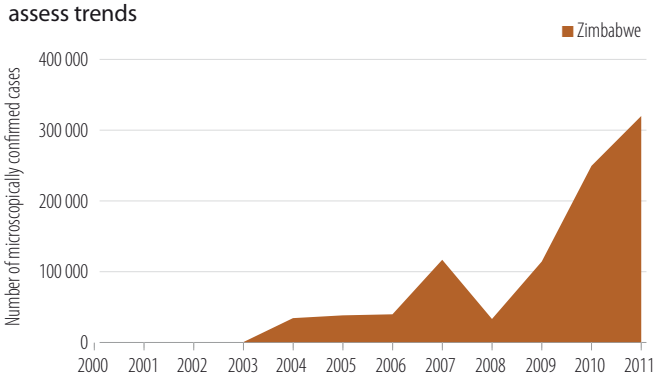
D – Percentage change in case incidence, 2000–2011



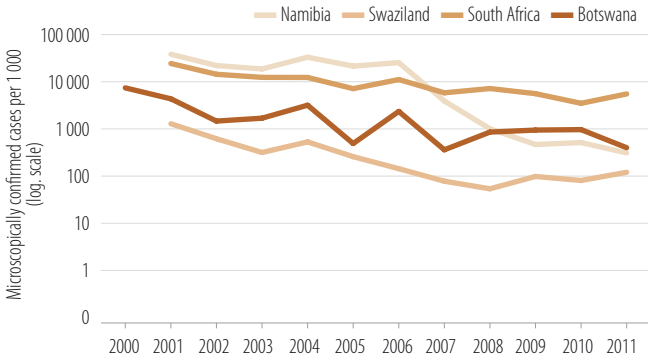
E – Cases among countries projected to achieve ≥75% decrease in case incidence by 2015



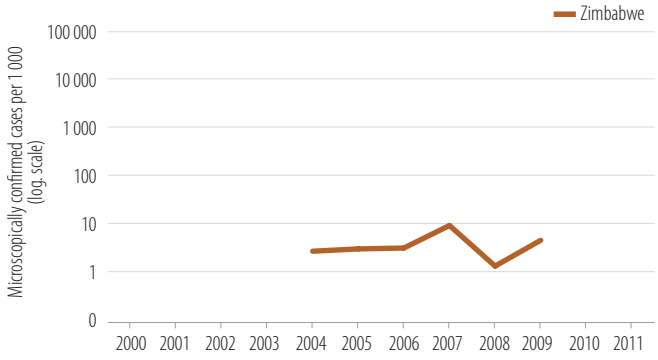
F – Admissions among countries projected to achieve <75% decrease in case incidence by 2015 or with insufficent data to assess trends



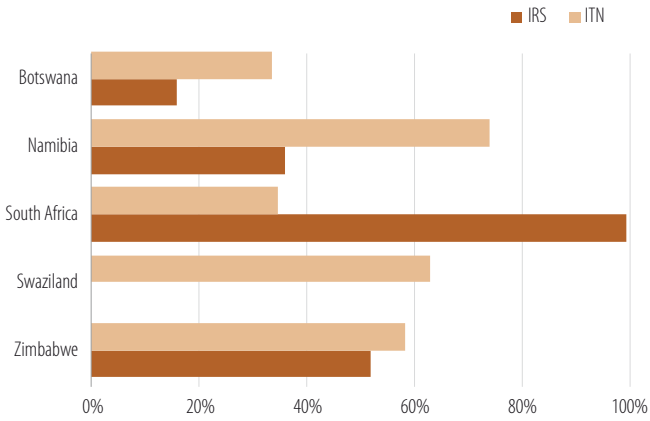
G – Case incidence rate amongountries projected to achieve ≥75% decrease in case incidence by 2015



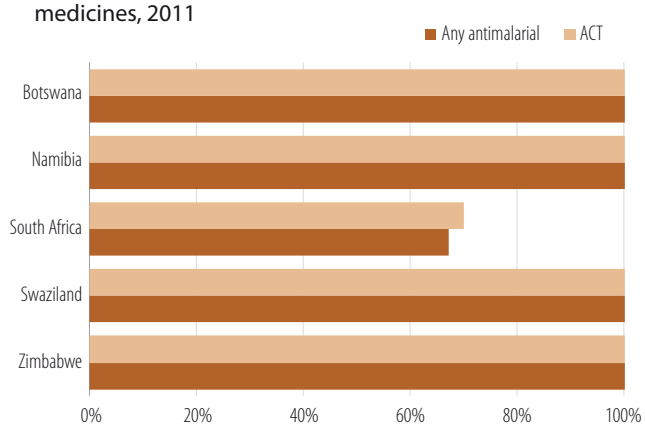
H – Admission rate among countries projected to achieve <75% decrease in case incidence by 2015 or with insufficient data to assess trends



I – Percentage of high risk population protected with IRS and ITNs, 2011



J – Percentage of cases potentially treated with antimalarial medicines, 2011



Region of the Americas

Of the 21 malaria-endemic countries in the Region of the Americas, 13 had achieved a reduction in malaria incidence rates of ≥75% between 2000 and 2011. Another 3 countries are on track to achieve a reduction of at least 75% by 2015 and one country is projected to reduce incidence rates by 50%–75%. Increases in the number of microscopically confirmed cases were observed in 3 countries. It was not possible to assess trends in Haiti owing to inconsistencies in reporting over time.

About 30% of the population of the 21 countries with ongoing transmission is at some degree of risk and about 8% of the population is at high risk. Argentina, Costa Rica, Ecuador, El Salvador, Mexico and Paraguay are in the pre-elimination phase (**Figure A**). The 15 other endemic countries are all in the control phase. In 2011, less than 60% of cases in most countries in the Region were caused by *P. falciparum*, but in the Dominican Republic and Haiti they are almost exclusively due to *P. falciparum* (**Figure B**). The proportion of cases due to *P. falciparum* fell by 20% or more in Ecuador, French Guiana, (France) and Suriname between 2000 and 2011. Smaller but consistent decreases in the proportion of cases due to *P. falciparum* were also seen in Brazil, Colombia and Peru.

The number of microscopically confirmed cases in the Region decreased from 1.18 million in 2000 to 490 000 in 2011 (a decrease of 58%). Brazil and Colombia accounted for 68% of the cases in 2011. Reductions in the number of microscopically confirmed cases, and in case incidence rates, of more than 75% were recorded in 13 countries between 2000 and 2011 (Argentina, Belize, Bolivia (Plurinational State of), Costa Rica, Ecuador, El Salvador, French Guiana (France), Guatemala, Honduras, Mexico, Nicaragua, Paraguay and Suriname) while 3 countries are on track to achieve a reduction of at least 75% before 2015 (Colombia, Panama and Peru) (**Figures D, E, G**), and Brazil is projected to reduce incidence rates by 50%–75% (**Figures D, F, H**). It should be noted that several countries had considerable fluctuations in numbers of cases despite large decreases over the decade. Panama experienced a 5-fold increase in confirmed cases during 2001–2004. Similarly, Costa Rica experienced a 3-fold increase during 2005–2006 (more than 3 000 cases) but this fell to only 17 cases in 2011. Bolivia (Plurinational State of) and Colombia reported upturns during 2009–2010 but in 2011 numbers of cases dropped to the lowest levels ever reported in those countries.

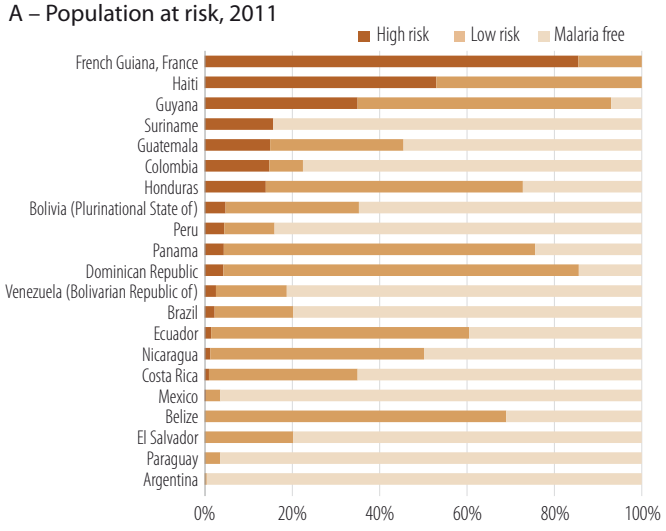
Countries in the pre-elimination phase

Argentina	El Salvador
Costa Rica	Mexico
Ecuador	Paraguay

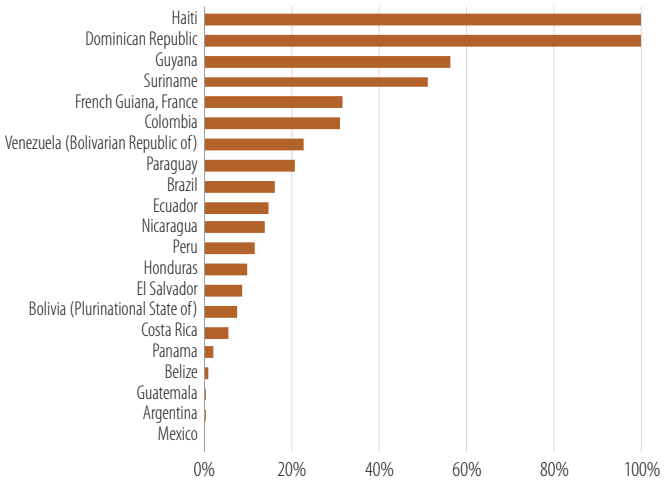
The Dominican Republic, Guyana, and Venezuela (Bolivarian Republic of) reported increases in case numbers between 2000 and 2011 (**Figures D, F, H**). In Haiti, malaria cases increased from 17 000 in 2000 to 84 000 in 2010 following the earthquake in January of the same year and then fell to 32 000 cases in 2011; it is unclear whether the peak observed in 2010 reflects a real rise in incidence, or is a consequence of increased availability of resources for case detection during the emergency response. In Guyana, the number of cases decreased to less than 14 000 during 2007–2009 but increased to almost 23 000 in 2010 and to more than 29 000 in 2011.

The link between decreases in malaria cases and implementation of vector control is not always clear-cut. In 5 countries (Costa Rica, Dominican Republic, Ecuador, Nicaragua and Venezuela (Bolivarian Republic of)), coverage of high risk populations with either ITNs or IRS exceeded 50% (**Figure I**) and but only in 3 of these countries (Costa Rica, Ecuador and Nicaragua) have malaria cases decreased by >50%. Reports on the availability of ACTs were complete for only 3 of the 8 countries which have resistance to chloroquine and which therefore use ACTs. Brazil, Colombia and Guyana reported adequate availability of ACTs for the treatment of *P. falciparum* malaria in the public sector (**Figure J**). From the available information, the association between prevention (IRS, ITN) or treatment (antimalarial drugs) and malaria trends across the endemic countries in the Region of the Americas is inconsistent and requires further in-depth evaluation.

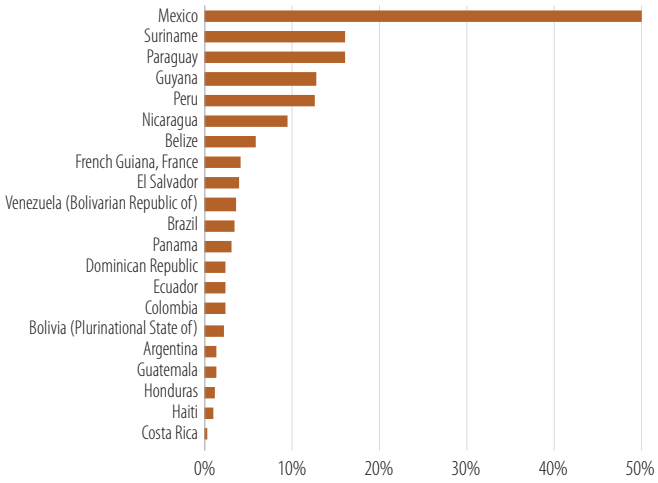
A – Population at risk, 2011



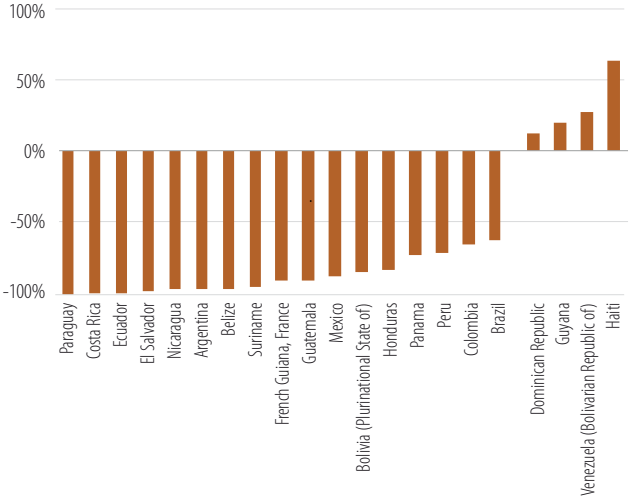
B – Percentage of cases due to *P. falciparum*, 2007–2011



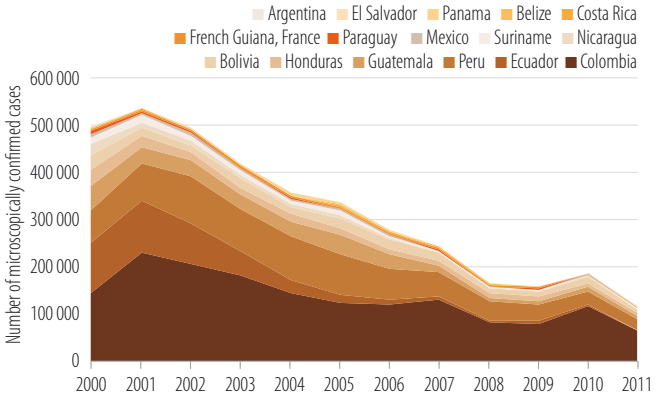
C – Annual blood examination rate, 2007–2011



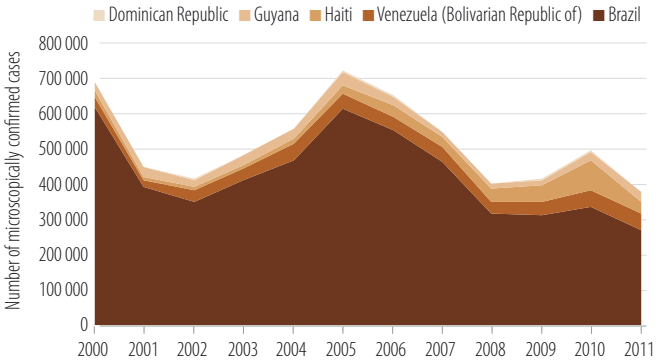
D – Percentage change in case incidence, 2000–2011



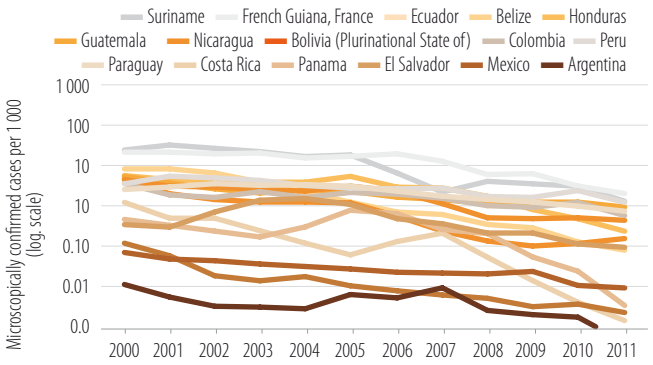
E – Cases among countries projected to achieve ≥75% decrease in case incidence by 2015



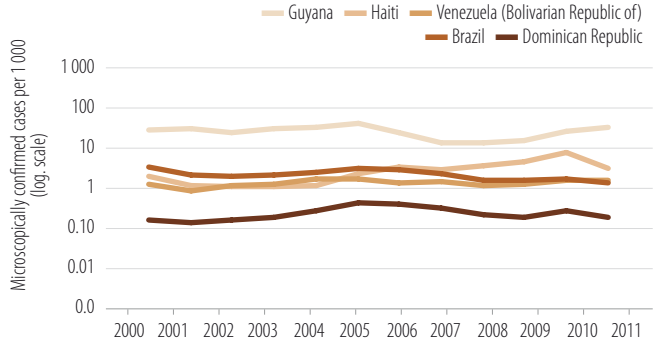
F – Admissions among countries projected to achieve <75% decrease in case incidence by 2015 or with insufficent data to assess trends



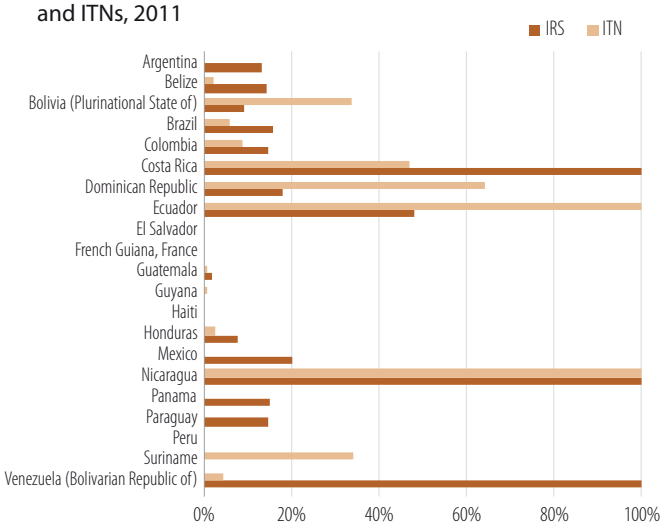
G – Case incidence rate among countries projected to achieve ≥75% decrease in case incidence by 2015



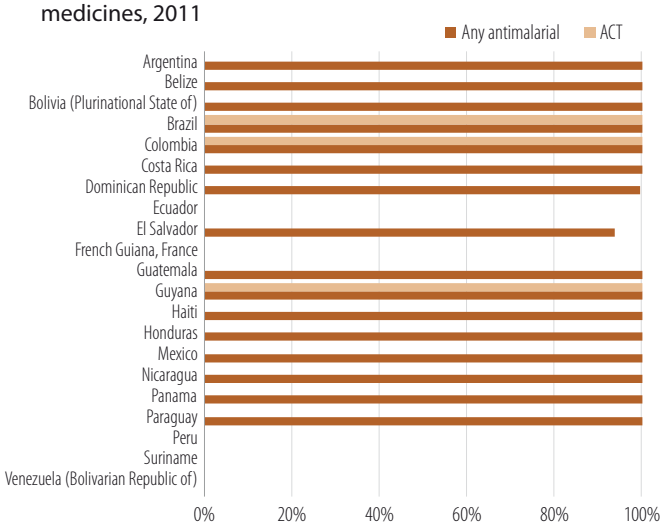
H – Admission rate among countries projected to achieve <75% decrease in case incidence by 2015 or with insufficient data to assess trends



I – Percentage of high risk population protected with IRS and ITNs, 2011



J – Percentage of cases potentially treated with antimalarial medicines, 2011



Eastern Mediterranean Region

Of the 9 countries with ongoing transmission in the Eastern Mediterranean Region, 4 have attained a decrease of ≥75% in microscopically confirmed cases and in case incidence rates in 2011 compared to 2000. The number of microscopically confirmed cases has fluctuated from year to year in the other 6 countries and it is difficult to assess trends owing to inconsistent reporting.

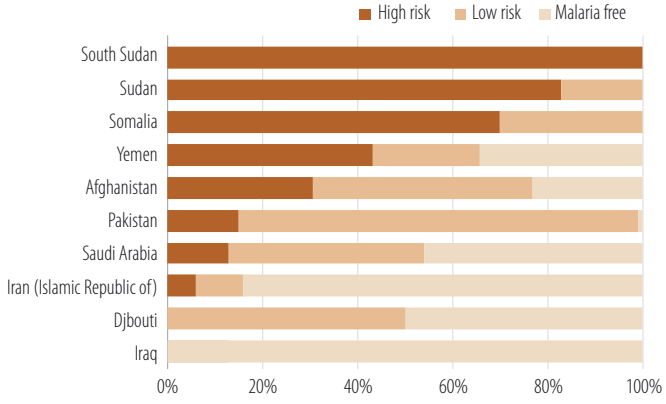
Countries in the elimination phase	
Iran (Islamic Republic of)	Saudi Arabia
Countries in the prevention of re-introduction phase	
Iraq	Syrian Arab Republic
Oman	Egypt
Countries certified malaria free	
Morocco, 2010	United Arab Emirates, 2007

In September 2011, South Sudan became a new WHO member state, increasing the number of member states in the Eastern Mediterranean Region to 23. Approximately 55% of the population in the Region is at some risk of malaria and about 20% of the population is at high risk (**Figure A**). Malaria endemicity varies considerably: 7 countries still have areas of high malaria transmission (Afghanistan, Djibouti, Pakistan, Somalia, South Sudan, Sudan and Yemen) (**Figure A**); malaria transmission is geographically limited in 2 countries (Iran (Islamic Republic of) and Saudi Arabia) whereas Iraq has not reported locally acquired cases since 2009. *P. falciparum* is the dominant malaria species in Djibouti, Saudi Arabia, Somalia, South Sudan, Sudan and Yemen, while the majority of cases in Afghanistan, Iran (Islamic Republic of) and Pakistan are due to *P. vivax* (**Figure B**).

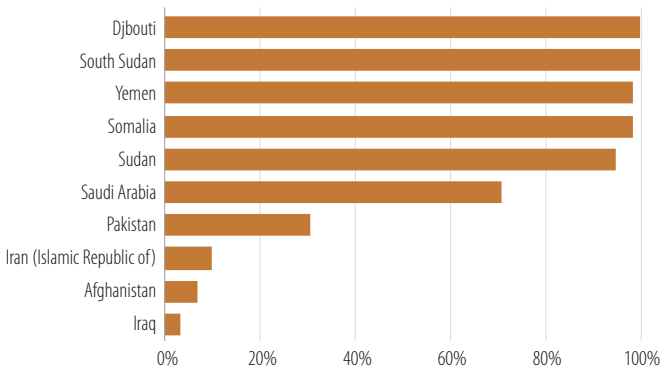
Afghanistan, Iran (Islamic Republic of), Iraq, and Saudi Arabia achieved a decrease in malaria cases and case incidence rates of ≥75% between 2000 and 2011 (**Figures D, E, G**). The decline in case numbers in Saudi Arabia and Iran (Islamic Republic of) has been aided by the high coverage of IRS, by the use of ITNs (**Figure I**) and by the consistent availability of antimalarial drugs free of charge (**Figure J**). Following a steep decline in case numbers, Iraq was able to report zero locally-acquired cases for the first time in 2009 and continued to have zero locally-acquired cases in 2010 and 2011; all 11 reported cases in 2011 were imported. In 2011, Saudi Arabia reported 69 locally-acquired cases and 2 719 imported cases; Iran (Islamic Republic of) recorded 1 710 locally-acquired cases and 1 529 imported cases. Afghanistan, having achieved a decline from approximately 415 000 cases in 2002 to 86 000 cases in 2006, continues to report an average of 77 000 cases every year against a background of increasing availability of health services. The availability of ITNs has greatly increased, with more than 4.5 million delivered between 2009 and 2011, sufficient to cover approximately 80% of the population at high risk (**Figure I**). Availability of antimalarial medicines including ACT in the public sector in 2011 was reported as adequate in Iraq and Yemen (**Figure J**).

In Yemen the number of microscopically confirmed cases has fluctuated from year to year showing no clear trend (**Figures D, F, H**). In Djibouti, Pakistan, Somalia, South Sudan and Sudan it is not possible to make an assessment of trends owing to inconsistent reporting of microscopically confirmed cases. Pakistan did not submit a report to WHO in 2011 and Djibouti did not report on parasitologically confirmed cases. South Sudan delivered enough ITNs to cover nearly all the population at risk in 2011 (**Figure I**). Somalia, Sudan and Yemen reported delivering sufficient ITNs, or undertaking IRS, to protect <50% of the population at high risk of malaria in 2011. A more detailed appraisal of malaria epidemiology and trends in disease and their link to the coverage of interventions is needed in these 6 countries.

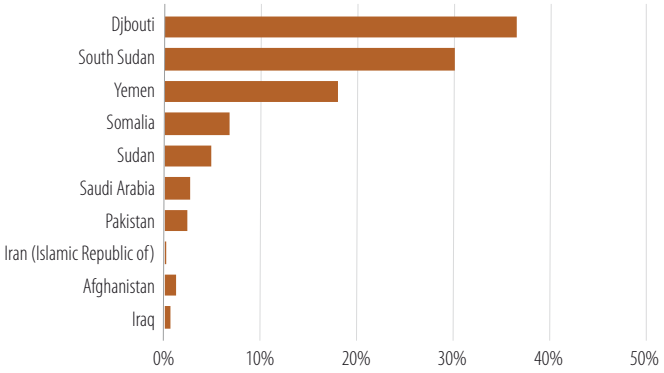
A – Population at risk, 2011



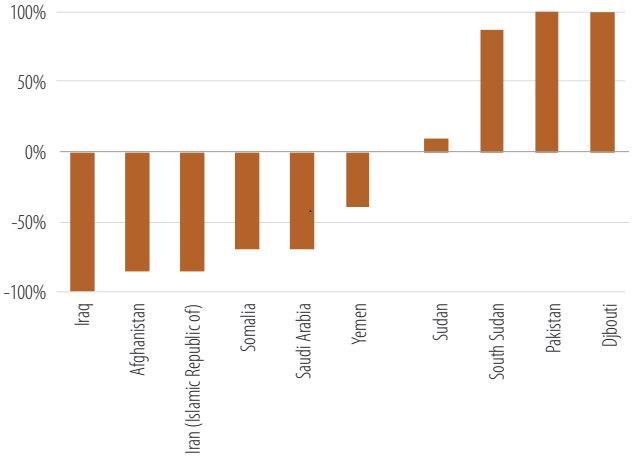
B – Percentage of cases due to *P. falciparum*, 2007–2011



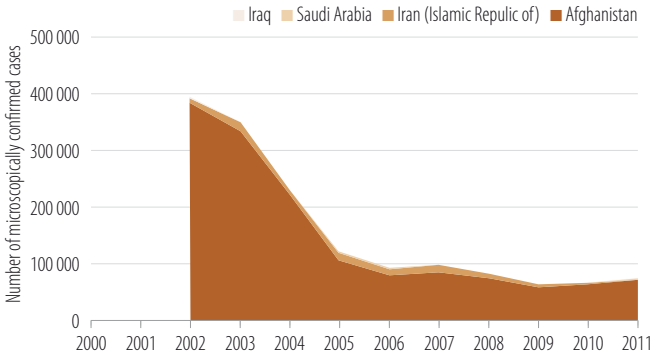
C – Annual blood examination rate, 2007–2011



D – Percentage change in case incidence , 2000–2011



E – Cases among countries projected to achieve ≥75% decrease in case incidence by 2015



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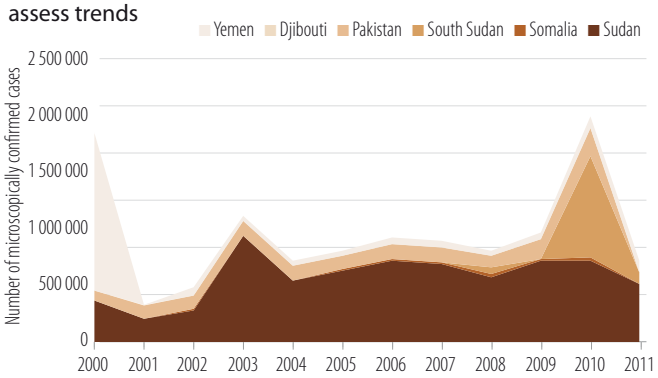

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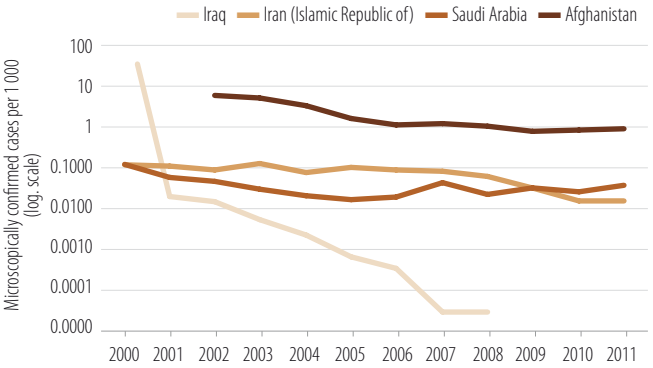

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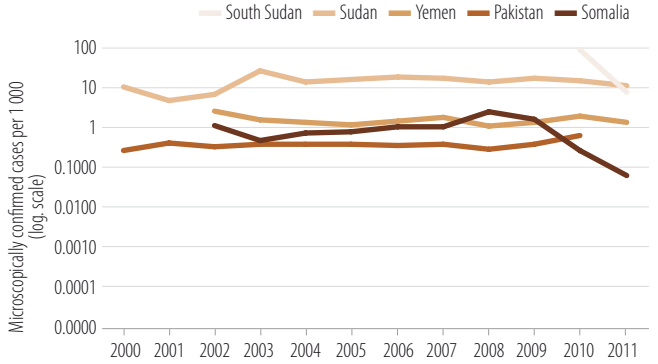

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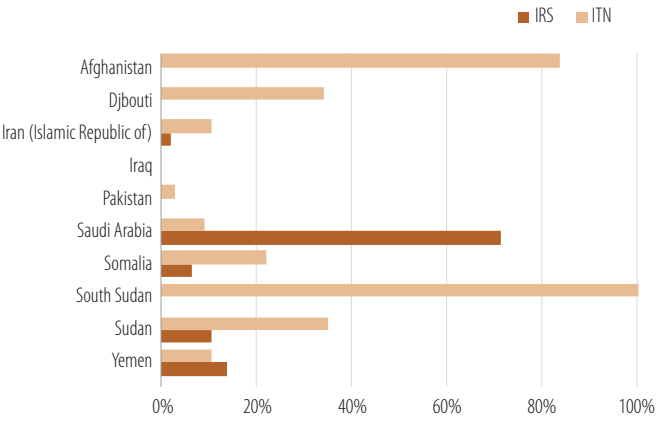
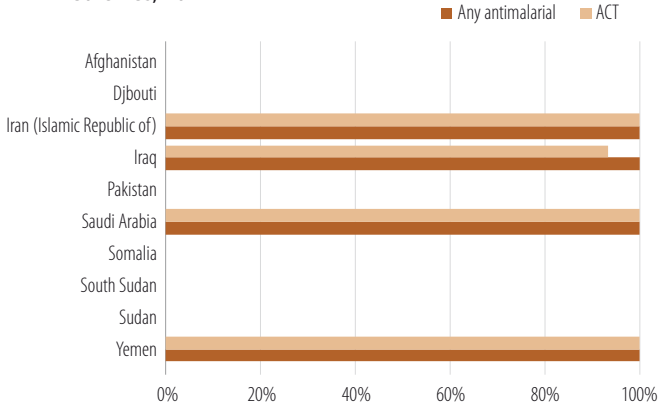


J – Percentage of cases potentially treated with antimalarial medicines, 2011



European Region

All malaria-affected countries in the European Region have achieved reductions in case incidence of ≥75% between 2000 and 2011. The Region has a real possibility of becoming the first to achieve the complete elimination of malaria and aims to do so by 2015 in line with the ambitions of the 2005 Tashkent Declaration (*14*), which was endorsed by 9 malaria-affected countries. However, despite the achievements made to date, the Region faces challenges due to reintroduction of malaria from neighbouring countries or through population migration from more distant countries.

Countries in the elimination phase

Azerbaijan
Kyrgyzstan
Tajikistan
Turkey
Uzbekistan

Countries in the prevention of re-introduction phase

Georgia

Countries certified malaria free

Armenia, 2011
Turkmenistan, 2010

The total number of reported malaria cases in the European Region decreased from 33 365 in 9 countries in 2000 to just 226 in 5 countries in 2011. Only 69 of the 226 malaria cases were indigenous; these were reported from Tajikistan and Azerbaijan. No locally-acquired *P. falciparum* cases have been reported since 2008; the last case was reported from Tajikistan. All other *P. falciparum* malaria cases found in the Region in 2011 were imported (**Figure B**, see also Section 6.8).

Figures D and **E** show how case incidence has fallen in 6 countries. Kyrgyzstan suffered a large outbreak in 2002 but had zero locally-acquired cases in 2011 (**Figure E**). Between 2001 and 2005, Turkey reported around half of all cases in the Region, but it had zero cases in 2011 (**Figure E**). Uzbekistan reported zero indigenous cases in 2009, 3 *P. vivax* cases in 2010, and again zero indigenous cases in 2011. Georgia reported zero indigenous cases for the first time in 2010 and continued to have zero cases in 2011. Turkmenistan and Armenia were certified malaria-free by the Director-General of WHO, in October 2010 and September 2011, respectively.

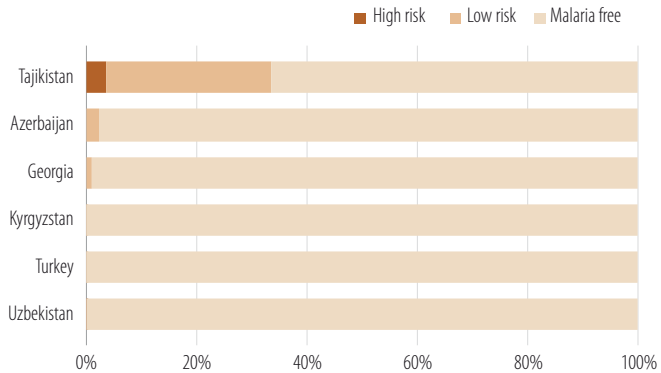
Although malaria was not increasing in any country of the Region in 2011 (**Figure F**), a localized malaria outbreak occurred in 2012 in one village in Mardin province in Turkey where 208 *P. vivax* cases were recorded. The reasons for the outbreak have not been fully elucidated but it appears to be linked to truck drivers returning from endemic countries.

Greece, which has remained malaria-free since 1974, reported 3 locally acquired *P. vivax* cases in 2010 and 40 in 2011, originating primarily from migrant workers from Pakistan. Most of the 40 cases were clustered in the prefecture of Lakonia in the south of mainland Greece. In 2011, 11 local cases were reported of which 7 were again in Lakonia, posing a risk of re-establishment of malaria in the country. The Ministry of Health is making concerted efforts to contain the outbreak.

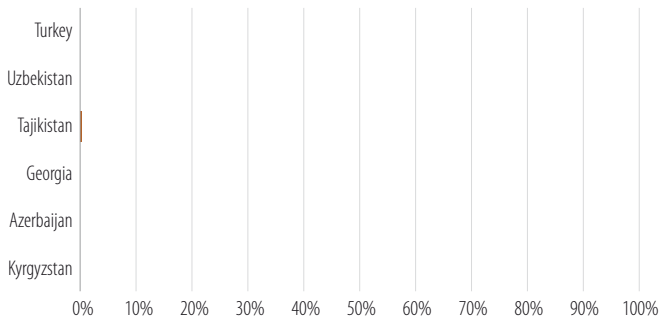
IRS is the primary vector control measure in the Region, where each country aims for complete coverage of all remaining active and any new foci of malaria (**Figure I**). ITNs were used as a supplementary intervention with IRS in Tajikistan and Uzbekistan (**Figure G**).

Intensive diagnostic testing efforts being made in Armenia, Azerbaijan, Kyrgyzstan, Tajikistan, Turkey, and Uzbekistan are reflected in high ABER values in 2011 (**Figure C**). All suspected cases in the Region are examined microscopically, and all cases are investigated to determine whether infection is due to local transmission or has been imported. Antimalarial supplies are maintained to ensure radical treatment of all local and imported confirmed cases (**Figure J**). Countries pay particular attention to the risk of malaria spreading among nations in the Region, and between the European and Eastern Mediterranean Regions.

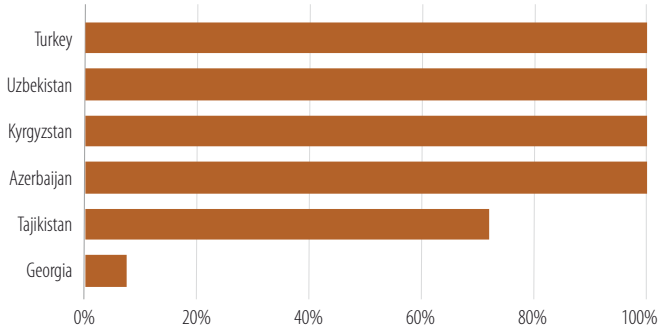
A – Population at risk, 2011



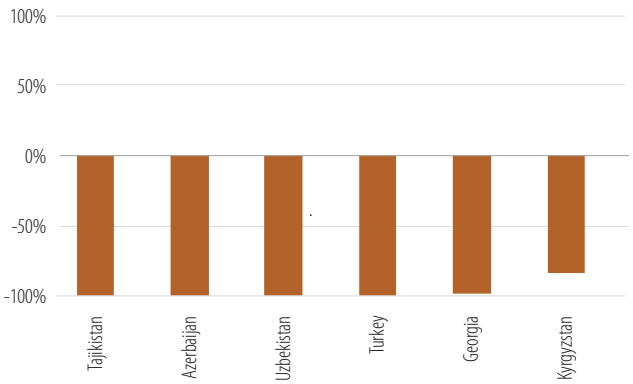
B – Percentage of cases due to *P. falciparum*, 2007–2011



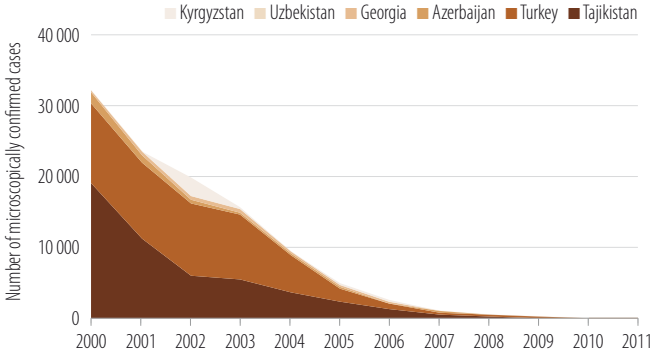
C – Annual blood examination rate, 2007–2011



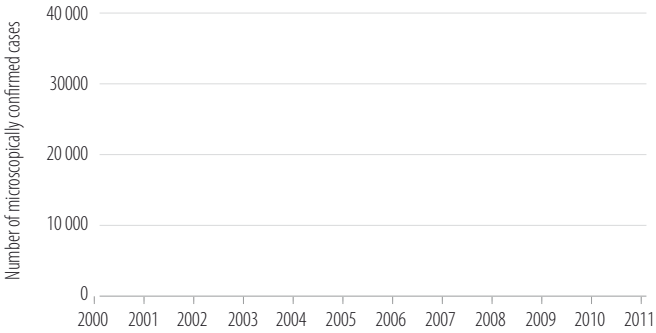
D – Percentage change in case incidence, 2000–2011



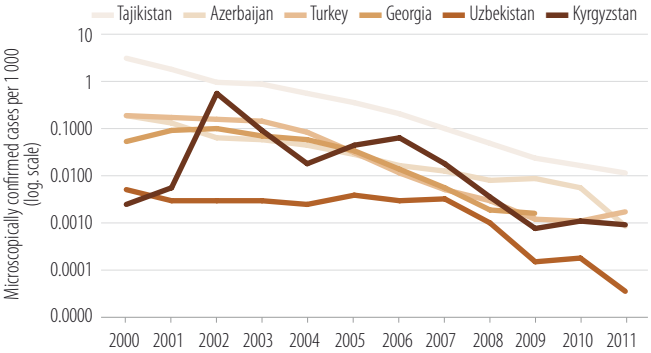
E – Cases among countries projected to achieve ≥75% decrease in case incidence by 2015



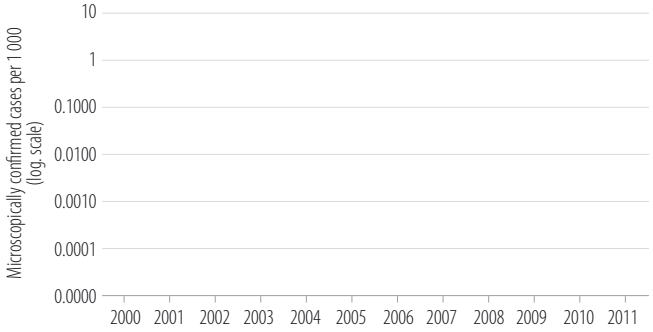
F – Admissions among countries projected to achieve <75% decrease in case incidence by 2015 or with insufficent data to assess trends



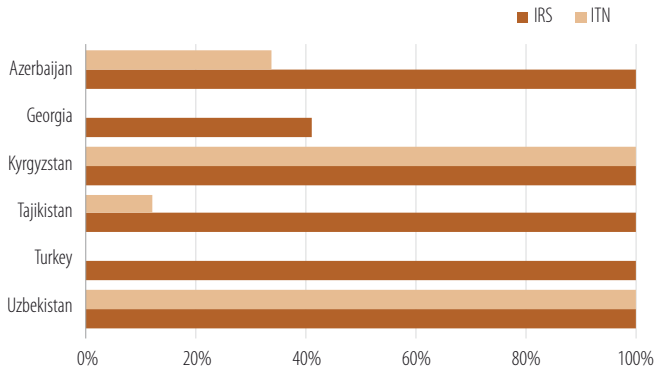
G – Cases incidence rate among countries projected to achieve ≥75% decrease in case incidence by 2015



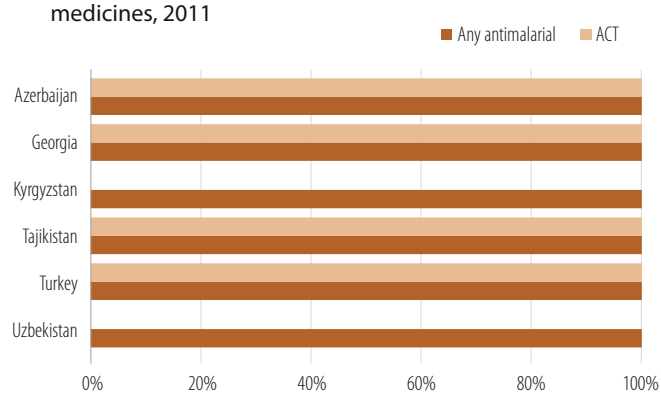
H – Admission rate among countries projected to achieve <75% decrease in case incidence by 2015 or with insufficient data to assess trends



I – Percentage of high risk population protected with IRS and ITNs, 2011



J – Percentage of cases potentially treated with antimalarial medicines, 2011



South-East Asia Region

Of the 10 malaria-endemic countries in the South-East Asia Region, 5 reported decreases in malaria cases and incidence rates of ≥75% between 2000 and 2011, and another (Bangladesh) is on track to achieve a decrease in malaria case incidence of at least 75% by 2015. India, the country with the highest number of cases in the Region, is projected to achieve decreases of 50%–75% in malaria case incidence by 2015.

In South-East Asia Region approximately 70% of the population of 1.8 billion people is at some risk for malaria, with 26% at high risk: 460 million people inhabit areas with a reported incidence of >1 case per 1000 population per year (**Figure A**). The majority of confirmed cases in the Region are due to *P. falciparum*, although the proportion varies greatly among countries (**Figure B**). Malaria is predominantly due to *P. falciparum* in Bangladesh, Myanmar and Timor-Leste, mostly to *P. vivax* in Nepal and Sri Lanka, and exclusively due to *P. vivax* in the Democratic People's Republic of Korea. In Sri Lanka, the percentage of cases due *P. falciparum* has fallen from 29% in 2000 to 4% in 2011.

In 2011, 2.15 million parasitologically confirmed malaria cases were reported, with 3 countries accounting for 95% of confirmed cases: India (61%), Myanmar (22%) and Indonesia (12%). Both cases and deaths are substantially underreported (see Section 7.9), but these proportions are indicative of the geographical distribution of malaria in the Region.

Bhutan, Democratic People's Republic of Korea, Nepal, Sri Lanka and Thailand reported decreases in the number and incidence rate of microscopically confirmed cases of ≥75% since 2000. Bangladesh recorded a decrease of 69% in malaria case incidence between 2000 and 2011 and is therefore on track to achieve a decrease of at least 75% by 2015 (**Figures D, E, G**). India has reported a slow but steady decline in case numbers of 36%, and case incidence of 45%, between 2000 and 2010 (**Figures D, F, H**), while continuing to examine more than 100 million blood slides each year (**Figure C**). The number of reported malaria deaths fell by >75% in Bangladesh, Bhutan, Sri Lanka and Thailand between 2000 and 2011 (**Annex 6D**). The number of reported deaths in Democratic People's Republic of Korea and Nepal is too small to make an assessment of trends. A decrease of 16% was observed in India.

Countries in pre-elimination phase

Bhutan Democratic People's Republic of Korea

Countries in the elimination phase

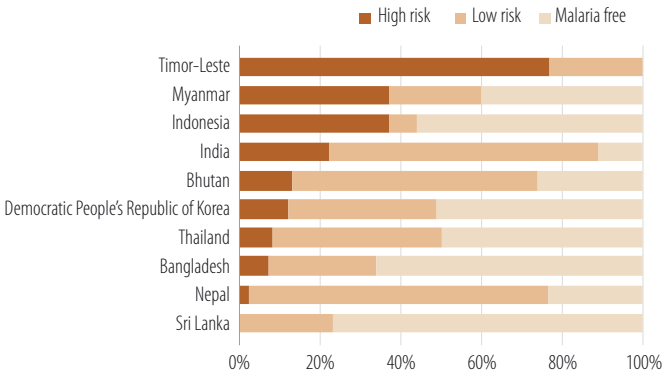
Sri Lanka

It was not possible to discern the direction of trends in Indonesia, Myanmar and Timor-Leste owing to inconsistency of reporting over time (**Figures F, H**). In Myanmar and Timor-Leste this is partly due to a change in diagnostic practice with large increases in the use of RDTs since 2007. Reported deaths in Myanmar have decreased since 2000 by 79% but this is largely due to a change in reporting practices as only confirmed malaria deaths have been reported since 2007. In Timor-Leste, reported malaria deaths decreased by 75% between 2007 and 2011, thus progress in reducing malaria may be wider in the South-East Asia Region than suggested by an analysis of cases.

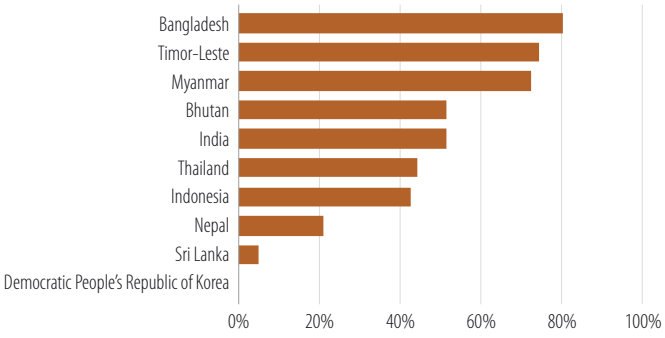
Of the 5 countries that reported a decrease of at least 75% in the incidence of confirmed malaria between 2000 and 2011(**Figure E**), 4 countries (Bhutan, Democratic People's Republic of Korea, Nepal and Sri Lanka) had distributed sufficient ITNs (both LLINs and conventional ITNs), or had undertaken sufficient IRS, to cover >80% of the population at high risk. In Thailand 38% of the population at high risk was protected with either ITNs or IRS. All these countries reported having distributed adequate supplies of antimalarial medicines (**Figure J**) to treat all patients attending public sector health facilities.

Timor-Leste had distributed sufficient ITNs, or undertaken IRS, to cover >50% of its population at high risk, but it is not yet possible to conclude that this has had an impact on trends in malaria cases. As in other Regions, further analyses are needed of the determinants of malaria trends in the South-East Asia Region, specifically the potential association with scale-up of vector control and treatment.

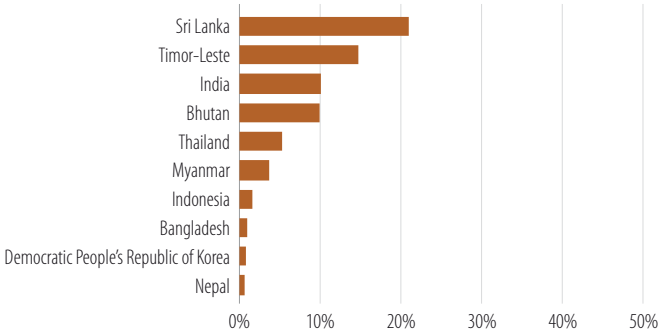
A – Population at risk, 2011



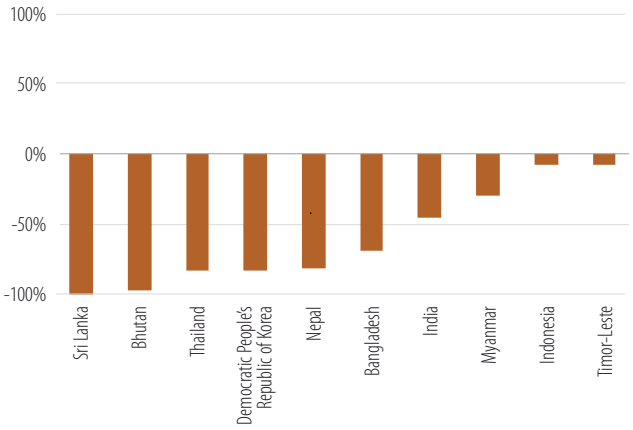
B – Percentage of cases due to *P. falciparum*, 2007–2011



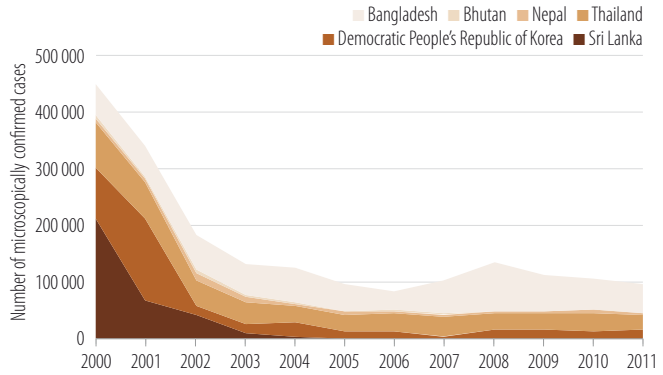
C – Annual blood examination rate, 2007–2011



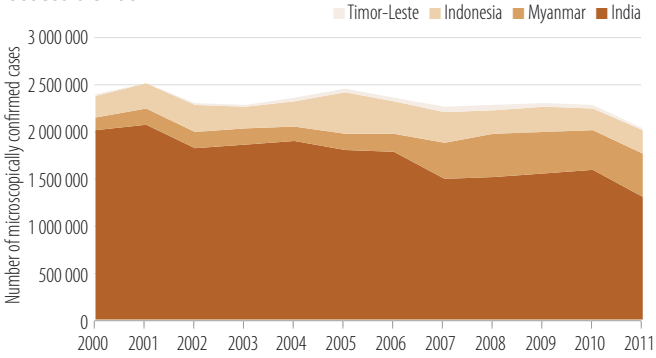
D – Percentage change in case incidence, 2000–2011



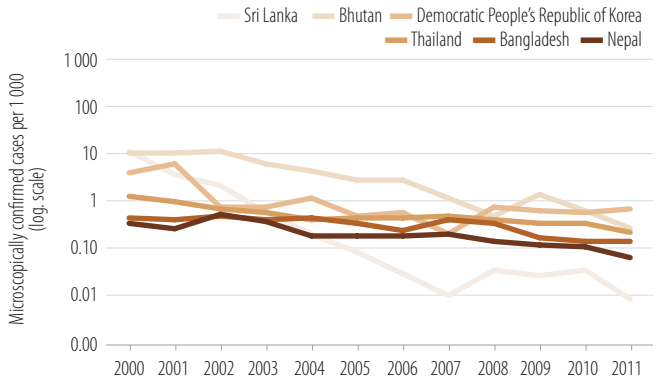
E – Cases among countries projected to achieve ≥75% decrease in case incidence by 2015



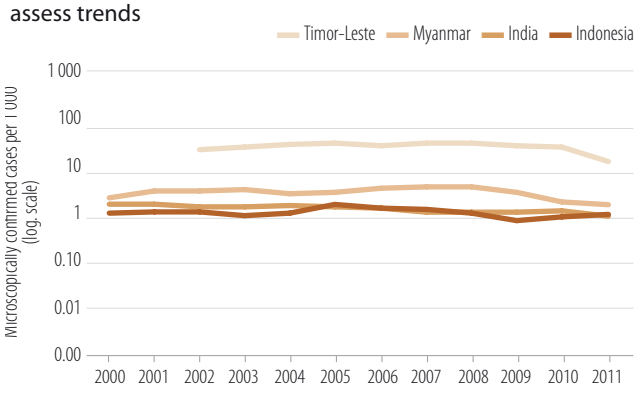
F – Admissions among countries projected to achieve <75% decrease in case incidence by 2015 or with insufficent data to assess trends



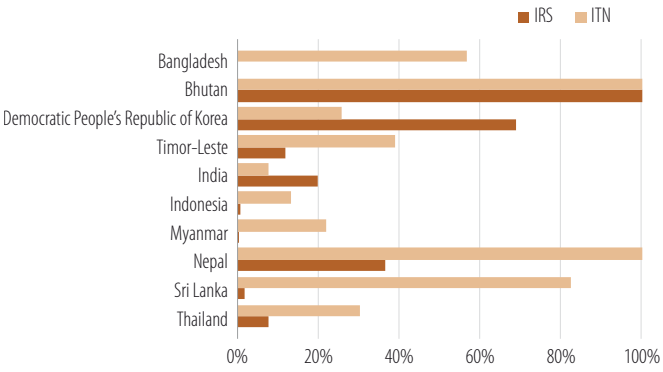
G – Case incidence rate among countries projected to achieve ≥75% decrease in case incidence by 2015



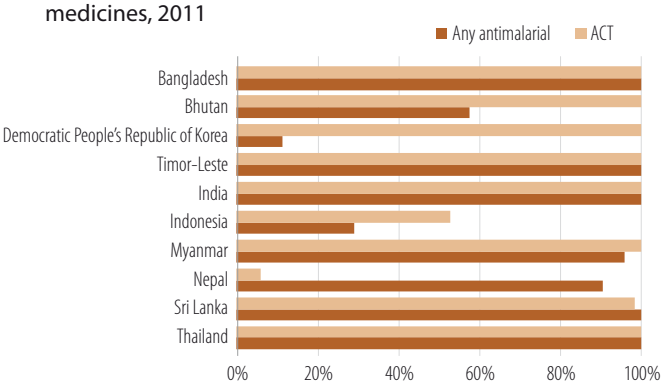
H – Admission rate among countries projected to achieve <75% decrease in case incidence by 2015 or with insufficient data to assess trends



I – Percentage of high risk population protected with IRS and ITNs, 2011



J – Percentage of cases potentially treated with antimalarial medicines, 2011



Western Pacific Region

Of the 10 malaria-endemic countries in the Western Pacific Region, 8 reported decreases in malaria cases and incidence rates of ≥75% between 2000 and 2011, and Malaysia is on track to achieve at least a 75% decrease in case incidence rates by 2015. The reported incidence of microscopically confirmed malaria is projected to decrease by <50% by 2015 in Papua New Guinea, the country with the highest number of cases in the Region.

In the Region approximately 870 million are at some risk of malaria of whom 69 million (8%) people inhabit areas with a reported incidence of ≥1 case per 1000 population per year (**Figure A**). Malaria transmission is intense through most of Papua New Guinea, Solomon Islands and Vanuatu. Transmission is highly focal in the countries and areas of the Greater Mekong subregion, including Cambodia, Yunnan province (China), Lao People's Democratic Republic and Viet Nam, where it is most intense in remote forested areas and where the disease disproportionately affects ethnic minorities and migrants. Malaria is also restricted in distribution in Malaysia, the Philippines and the Republic of Korea. Of the Region's principal malaria-endemic countries, only the Republic of Korea has no high-risk areas of significant size.

Most countries have transmission cycles of both *P. falciparum* and *P. vivax*, but transmission is entirely due to *P. vivax* in the Republic of Korea and in central areas of China (**Figure B**). The proportion of cases due to *P. falciparum* has decreased by more than 20% since 2000 in 3 countries of the Region (Cambodia, Malaysia and Philippines).

The total number of reported confirmed malaria cases in the Region decreased from 385 000 in 2000 to 221 000 in 2011 (42% decrease). In 2011, 3 countries accounted for approximately 75% of these cases: Papua New Guinea (37%), Cambodia, (26%) and Solomon Islands (12%). Decreases of ≥75% in the number of microscopically confirmed malaria cases between 2000 and 2011 have been recorded by 6 countries (Cambodia, China, Lao People's Democratic Republic, Philippines, Republic of Korea and Viet Nam), and 3 have recorded decreases of 50%–75% (Malaysia, Solomon Islands and Vanuatu) (**Figures D, E, G**). The number of reported malaria deaths decreased by more than 75% in Cambodia, Lao People's Democratic Republic, Philippines, and Viet Nam, and by 50%–75% in Malaysia, Solomon Islands and Vanuatu (**Annex 6D**). Papua New Guinea recorded a decrease in microscopically confirmed cases of <25% (**Figures D, F, H**).

Country in pre-elimination phase

Malaysia

Country in elimination phase

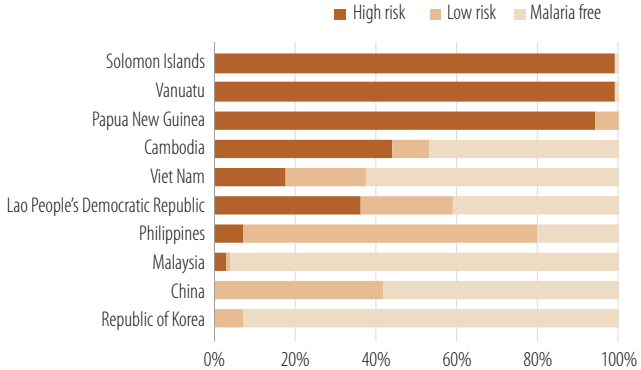
Republic of Korea

Reported incidence rates, which take into account population growth since 2000, decreased by ≥75% in 8 countries between 2000 and 2011 (Cambodia, China, Lao People's Democratic Republic, Philippines, Republic of Korea, Solomon Islands, Vanuatu and Viet Nam) (**Figures D, G**). Malaysia is on track to achieve a 75% decrease in case incidence by 2015. The reported incidence of microscopically confirmed malaria is projected to decrease by <50% in Papua New Guinea by 2015 if the rates of change observed between 2000 and 2011 are unchanged (**Figures D, H**). However, population-based surveys suggest a recent decrease in parasite prevalence from18% to 6.8% between 2009 and 2011 associated with ITN use (see **Box 8.1**).

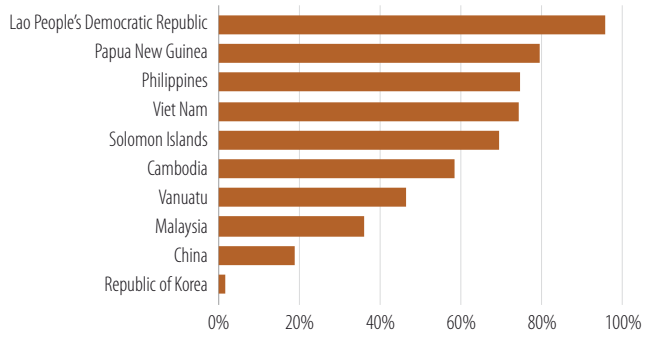
Malaria interventions are implemented widely in the Region, both vector control and enhanced diagnosis and treatment. However, the intensity of control varies among countries and the links between interventions and malaria trends in routinely collected data are imprecise. Of the 9 countries with large decreases in malaria, 5 (Cambodia, Malaysia, Philippines, Solomon Islands and Vanuatu) also reported a coverage of >50% with either ITNs or IRS in 2011 in populations living in areas at high risk (**Figure I**). Mosquito nets have been widely used in Viet Nam but a household survey (MICS 2006) found that only 19% of households owned an ITN. The proportion of households owning an ITN is also low in Cambodia (5% in DHS 2005); re-treatment of nets was practiced until 2009, but has been increasingly replaced by distribution of LLINs in recent years. The Republic of Korea reported almost no vector control activity in 2010. Papua New Guinea which, until 2011, had not recorded large decreases in confirmed malaria cases, had distributed sufficient ITNs to cover >60% of the population at high risk by 2011.

Malaysia, Solomon Islands and Vanuatu have a high diagnostic examination rate (ABER) (**Figure C**) but the ABER in the other endemic countries is much lower. Antimalarial medicines were widely available in 9 of the 10 malaria-endemic countries in 2011 (**Figure J**). However, in 2011 inadequate supplies of ACTs were reported by Papua New Guinea, where *P. falciparum* constitutes a major public health problem.

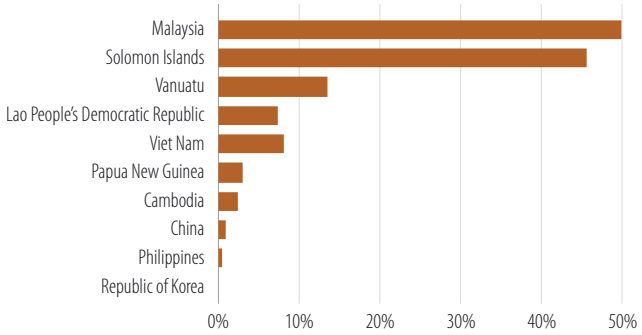
A – Population at risk, 2011



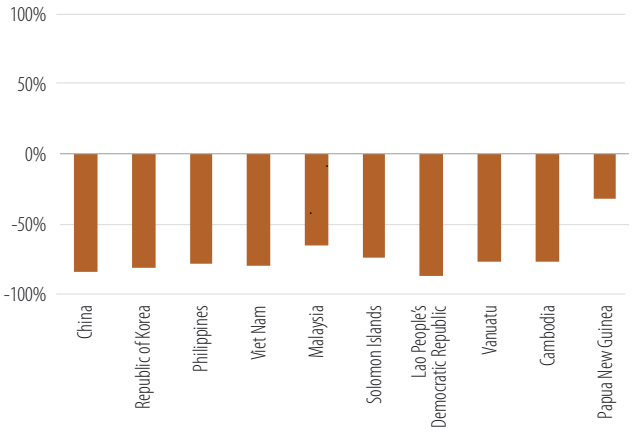
B – Percentage of cases due to *P. falciparum*, 2007–2011



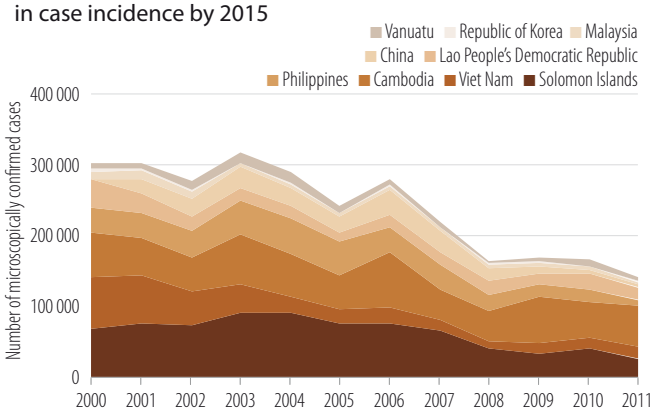
C – Annual blood examination rate, 2007–2011



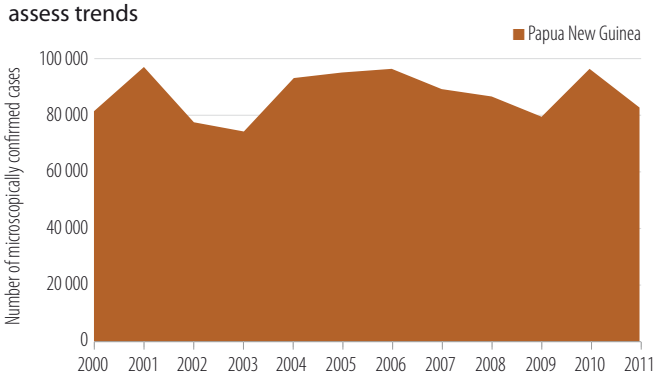
D – Percentage change in case incidence, 2000–2011



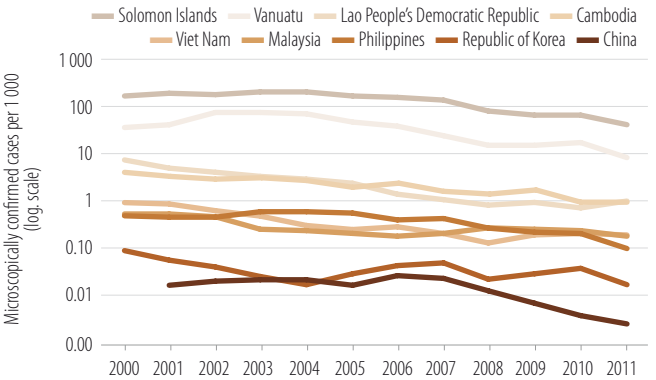
E – Cases among countries projected to achieve ≥75% decrease in case incidence by 2015



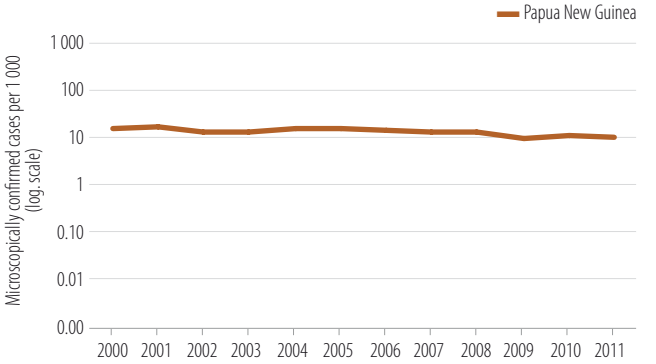
F – Admissions among countries projected to achieve <75% decrease in case incidence by 2015 or with insufficent data to assess trends



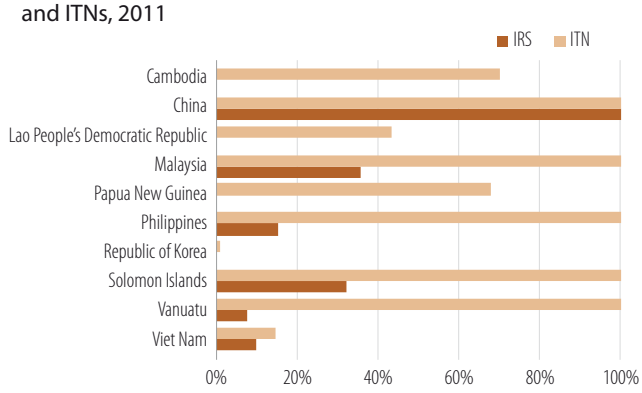
G – Case incidence rate among countries projected to achieve ≥ 75% decrease in case incidence by 2015



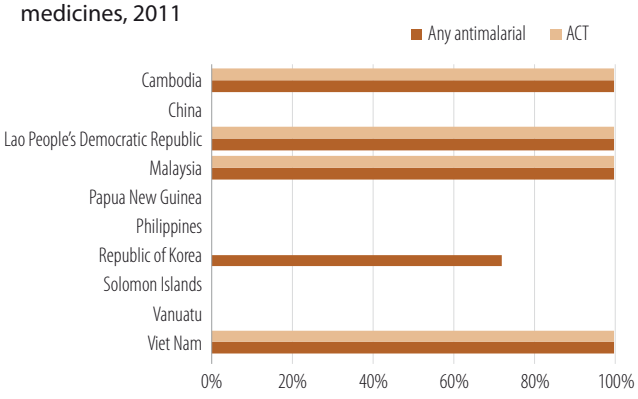
H – Admission rate among countries projected to achieve <75% decrease in case incidence by 2015 or with insufficient data to assess trends



I – Percentage of high risk population protected with IRS and ITNs, 2011



J – Percentage of cases potentially treated with antimalarial medicines, 2011



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Country profiles

A.1 Methods for preparing country profiles

This section describes the methods used for preparing country profiles. The methods also apply to other sections of the report.

A.1.1 Epidemiological profile

Populations at risk

The total population of each country is taken from the *World population prospects*, 2010 revision (*1*). The country population is subdivided into three levels of malaria endemicity, as reported by the NMCP:

1. Areas of high transmission, where the reported incidence of confirmed malaria due to all species was ≥1 per 1000 population per year in 2011.
2. Areas of low transmission, where the reported malaria case incidence from all species was < 1 per 1000 population per year in 2011 but greater than 0. Transmission in these areas is generally highly seasonal, with or without epidemic peaks.
3. Malaria-free areas, where there is no continuing local mosquito-borne malaria transmission, and all reported malaria cases are imported. An area is designated malaria-free when no cases have occurred for several years. Areas may be naturally malaria-free due to altitude or other environmental factors that are unfavourable for malaria transmission; or areas may become malaria-free as a result of effective control efforts. In practice, malaria-free areas can be accurately designated by national programmes only after taking into account the local epidemiological situation and the results of entomological and biomarker investigations. If a national programme did not provide the number of people living in high- and low-risk areas, the numbers were inferred from subnational case incidence data provided by the programme.

The population at risk is the total population living in areas where malaria is endemic (low and high transmission), excluding the population living in malaria-free areas. The population at risk is used as the denominator in calculating the coverage of malaria interventions, and hence in assessing current and future needs for malaria control interventions, taking into account the population already covered. For countries in the pre-elimination and elimination stages, population at risk is defined by the countries based on the resident populations in foci where active malaria transmission occurs.

Maps of malaria

The epidemiological maps for each country shown in the country profiles are based on the number of confirmed cases per 1000 population in 2011. Seven levels of endemicity are shown:

- >100 cases per 1000 population per year;
- > 50 cases per 1000 population per year and < 100 cases;
- >10 cases per 1000 population per year but < 50 cases
- >1 cases per 1000 population per year but < 10 cases
- > 0.1 case per 1000 population per year but < 1 cases;
- > 0 case per 1000 population per year but < 0.1 cases;
- 0 recorded cases.

The first four categories correspond to the high-transmission category defined above. It should be noted that case incidence rates for 2011do not necessarily reflect the endemicity of areas in previous years. If subnational data on population or malaria cases were lacking, an administrative unit was labelled "no data" on the map. In some cases, the subnational data provided by a malaria control programme did not correspond to a mapping area known to WHO. This may be the result of modifications to administrative boundaries or the use of names not verifiable by WHO.

The maps for countries in sub-Saharan Africa display a combination of: (i) cases per 1000 per year and, (ii) parasite prevalence in areas with > 10 cases per 1000 population per year. To obtain a measure of combined parasite prevalence for both *P. falciparum* and *P. vivax*, the sum of the two independent parasite rates (2, 3) was calculated at each point (~5km^2). Data on environmental suitability for malaria transmission were used to identify areas that would be free of malaria.

Vector and parasite species

The species of mosquito responsible for malaria transmission in a country and the species of *Plasmodium* involved are listed according to information provided by WHO regional offices. The proportion of malaria cases due to *P. falciparum* is estimated from the number of *P. falciparum* and mixed infections detected by microscopy divided by the total number of microscopically confirmed malaria cases.

A.1.2 Intervention policies and targets

Intervention policy

The policies and strategies adopted by each country for malaria prevention, diagnosis and treatment may vary according to the epidemiological setting, socioeconomic factors and the capacity of the national malaria programme or country health system. Adoption of policies does not necessarily imply immediate implementation, nor does it indicate full, continuous implementation nationwide.

Antimalarial treatment policy

Antimalarial treatment policies are shown along with the results of recent therapeutic efficacy tests where these are available. Data on therapeutic efficacy were extracted from the WHO global database on antimalarial drug efficacy and originate from three main sources: published data, unpublished data, and regular monitoring data from surveillance studies conducted according to the WHO standard protocol. The percentage of treatment failures is equal to the total number of early treatment failures plus late clinical failures plus late parasitological failures, divided by the total number of patients who completed the study follow-up. The number of studies included in the analysis and the years during which the studies were conducted are shown for each antimalarial medicine. The median, minimum and maximum describe the range of treatment failures observed in the studies for each antimalarial medicine.

A.1.3 Financing

Government and external financing

The data shown are those reported by the programme. The first graph shows financial contributions by source or name of agency

by year. The government contribution is usually the declared government expenditure for the year. When government expenditure was not reported by the programme, the government budget was used. External contributions are contributions allocated to the programme by external agencies, which may or may not be disbursed. Additional information about contributions from specific donor agencies, as reported by these agencies, is given in Annex 2. All countries were requested to convert their local currencies to 2011 US$.

Expenditure by intervention

The pie chart shows the proportion of malaria funding from all sources, spent on different activities in 2011: ITNs, insecticides and spraying materials, IRS, diagnosis, antimalarial medicines, monitoring and evaluation; human resources, technical assistance; management. There may be differences in the completeness of data, and the expenditures on activities listed may not include all items of expenditure. Government expenditures usually only include expenditures specific to malaria control and do not take into account costs related to maintaining health systems, human resources, etc.

A.1.4 Coverage

Coverage with ITNs

Household surveys: The percentage of the population with access to an ITN in their household and the percentage of persons who sleep under an ITN are taken from nationally representative household surveys, such as multiple indicator cluster surveys (MICS), demographic and health surveys (DHS), and malaria indicator surveys (MIS). Other available national surveys were also included. The results of subnational surveys undertaken to support local project implementation are difficult to interpret nationwide and hence are not presented in the profiles, although they can be useful for assessing progress locally. It should be noted that many of these surveys are conducted during the dry season for logistical reasons, and the estimates may not reflect the use of nets during peak malaria transmission when the rate of ITN use may be higher.

- *Proportion of population with access to an ITN within their household* – an indicator to measure the proportion of households that have a sufficient number of ITNs to cover all individuals who spent the previous night in surveyed households, assuming each ITN is shared by two people. It is useful for determining what proportion of households has achieved universal access to ITNs. It is labeled as "With access to an ITN in household" in the graphs.
- *Proportion of population who slept under an ITN the previous night* – an indicator to provide a direct measure of ITN use by all age groups at the time a survey is conducted. It is labeled as "All ages who slept under an ITN" in the graphs.

Programme data: Nationally representative surveys are usually not undertaken frequently enough to allow assessment of trends in intervention coverage or to provide contemporary information. This is particularly true for WHO Regions other than the African Region. Therefore estimates of intervention coverage are made using routinely reported data. Data on the number of ITNs distributed by malaria programmes are supplied annually by ministries of health to WHO as part of reporting for the World Malaria Report. This information is used to estimate the following indicator:

- *Proportion of population potentially protected with ITNs* – calculated as the number of ITNs distributed multiplied by 1.8 (a ratio of one ITN for every two persons but allowing for only one person sleeping under some ITNs in households with an odd number of inhabitants) divided by the population at high risk. It is labeled as "At high risk protected with ITNs" in the graphs.

As LLINs are considered to have an average useful lifespan of 3 years, the cumulative total of mosquito nets distributed over the past 3 years is taken as the number of ITNs distributed for any particular year. Other ITNs are considered to have an average lifespan of 1 year; some nets will be effective for longer if re-treated with insecticide. Therefore, the numerator for LLINs and ITNs is the sum of the cumulative LLINs distributed in the latest 3 years and the number of ITNs distributed and re-treated during the latest year. Outside Africa the population at high risk is used as the denominator for vector control coverage because the population at low risk is often at very low risk and it is not clear whether ITNs or IRS are needed by the entire population.

For high-burden countries in the African Region a model was used to estimate the percentage of households owning at least one ITN:

- *Proportion of households with at least one ITN* – an indicator measuring the proportion of households that have acquired ITNs or have been reached by an ITN programme, or, conversely, the proportion that has no access to an ITN. It is labeled as "Modeled % of households with ≥ 1 ITN" in the graphs.

The model takes into account data from three sources: household surveys, the number of ITNs delivered by manufacturers to a country, and the number of ITNs distributed by NMCPs (Section 4.1) (*4*). For years where survey results are available, the estimates of the model are the same as those of the survey.

Such operational estimates contain no information about the geographical distribution of ITNs or their distribution within households. ITNs may be clustered in certain subpopulations, thus depriving others at risk, and the number of ITNs delivered to a household may exceed or fall short of the recommended ratio of one net per two people.

Coverage with IRS

The following indicator is calculated:

- *Proportion of the population at risk protected by IRS* – calculated as the number of people living in a household where IRS has been applied during the preceding 12 months, divided by the population at risk (the sum of populations living in low- and high-transmission areas), multiplied by 100 for countries in the African region including Djibouti, Somalia and South Sudan. For countries outside Africa, population at high risk only was considered.

Programme data are the most important source of information for estimating IRS coverage, as household surveys do not generally include questions on IRS. In addition, IRS is often focalized, carried out on a limited geographical scale, for which nationally representative household surveys may not provide an adequate sample size for coverage to be measured accurately. The percentage of people protected by IRS is a measure of the extent to which IRS is implemented and the extent to which the population at risk benefits from IRS nationwide. The data show

neither the quality of spraying nor the geographical distribution of IRS coverage in a country.

Cases tested and ACT delivered

Household surveys frequently ask what treatment was received by febrile children, but in most cases it is not known whether the fever can be attributed to malaria (even if a finger or heel prick was done during a consultation at a health facility the result of the diagnostic test is seldom recorded in a household survey). Few countries have information systems that are able to record the treatments given to individual patients. Instead, programme data on the numbers of diagnostic tests performed and antimalarial medicines distributed by the programmes are used to calculate proxy indicators for access to diagnosis and treatment.

The following indicator on access to diagnostic testing is calculated:

- *The proportion of suspected cases attending public health facilities that receive a diagnostic test* – the number of suspected cases examined by microscopy or by RDT divided by the total number of suspected malaria cases, multiplied by 100.

This indicator reflects the extent to which a programme can provide diagnostic services to patients attending public health facilities. It does not consider patients attending privately run health facilities, and therefore does not reflect the experience of all patients seeking treatment. In many situations health facilities in the private sector are less likely to provide a diagnostic test than those in the public sector. The indicator may also be biased if health facilities that provide a diagnostic test, such as hospitals, are more likely to submit monthly reports.

Aggregate information on numbers of treatment courses delivered to public health facilities is used to relate these to the number of patients treated. Two indicators can be calculated:

- *Proportion of malaria cases potentially treated with any antimalarial in the public sector* – the number of antimalarial treatment courses delivered divided by the number of estimated presumed and confirmed malaria cases in public health facilities, multiplied by 100.
- *Proportion of P. falciparum malaria cases potentially treated with ACT in the public sector* – the number of ACT courses delivered divided by the number of estimated presumed and confirmed *P. falciparum* malaria cases in the public sector, multiplied by 100.

The first of these indicators can provide information on whether the malaria control programme delivers sufficient antimalarials to treat all malaria patients who seek treatment in the public sector. For high transmission countries in the African Region the estimated number of cases attending public sector health facilities is used as a denominator. For other countries, the denominator is the total number of confirmed cases, adjusted for reporting completeness.

The second indicator can provide information on whether the malaria control programme delivers sufficient ACTs to treat the number of patients with P. falciparum malaria seeking treatment in the public sector. For high transmission countries in the African Region the estimated number of cases attending public sector health facilities is used as a denominator. For other countries, the denominator is the total number of reported confirmed cases, adjusted for reporting completeness.

A.1.5 Impact

Confirmed cases, admissions and deaths

Where available, the numbers of confirmed malaria cases, admissions and deaths are shown in order to provide information on trends in malaria. The numbers of confirmed cases, admissions and deaths are derived from case reports divided by the population at risk x 100 000. Values are plotted on a logarithmic scale, except for countries with low numbers of reported cases for which values are plotted on an arithmetic scale. These indicators help to asses changes in the incidence of malaria over the years, provided that there has been consistency in case reporting over time. For countries in the pre-elimination or elimination phases the total number of cases is plotted on an arithmetic scale along with those acquired within the country (indigenous cases).

Malaria test positivity rate and ABER

The following indicators are presented to help interpret observed trends:

- *Annual blood examination rate (ABER)* – the number of parasitological tests (by microscopy or RDT) undertaken per 100 people at risk per year
- *Slide positivity rate (SPR)* – the number of microscopically positive cases divided by the total number of slides examined, multiplied by 100
- *RDT positivity rate* – the number of positive RDT tests divided by the total number of RDT tests carried out, multiplied by 100.

These indicators help to ensure that potential differences in diagnostic effort or completeness of reporting are taken into account and allow proper interpretation of the trends on confirmed cases. To discern decreases in malaria incidence, the ABER should ideally remain constant or be increased. In countries progressively reducing their malaria endemicity, the population at risk also reduces, becoming limited to active and residual foci where malaria transmission is present, or where there is a potential high risk due to receptivity. In addition, it is useful to monitor the percentage of suspected malaria cases that were examined with a parasite-based test. When reviewing the number of malaria admissions and deaths, the health facility reporting rate (the proportion of health facilities that report) should remain constant and should be high, i.e. > 80%.

RDT and slide positivity rates are derived from the number of parasitologically positive cases per 100 cases examined by RDT or microscopy. They measure the prevalence of malaria parasites among people who seek care and are examined in health facilities. These rates should be less distorted by variations in the ABER than trends in the number of confirmed cases.

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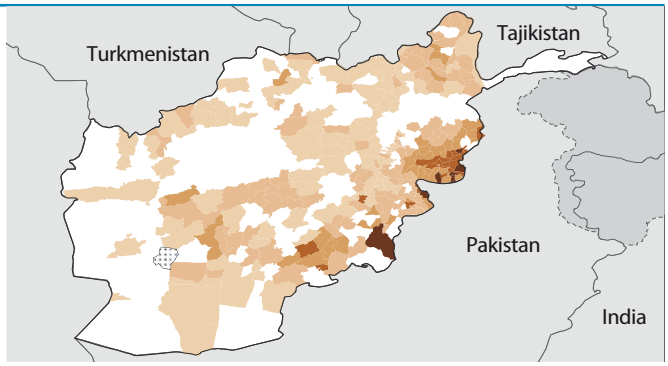
Afghanistan

Phase: Control. Impact: >75% decrease in case incidence 2000–2011.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	9 920 000	31
Low transmission (0-1 cases per 1000 population)	14 900 000	46
Malaria-free (0 cases)	7 490 000	23
Total	32 310 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (7%), *P. vivax* (93%)
Major anopheles species: *An. superpictus, stephensi, pulcherrimus, subpictus, hyrcanus, culicifacies, fluviatilis*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2005
	ITNs/LLINs distributed to all age groups	Yes	2010
IRS	IRS is recommended	No	–
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	NA	–
Case management	Patients of all ages should receive diagnostic test	Yes	2000
	RDTs used at community level	Yes	2009
	ACT is free for all ages in public sector	Yes	2003
	Pre-referral treatment with recommended medicines	Yes	2003
	Oral artemisinin-based monotherapies are not registered	Yes	2003

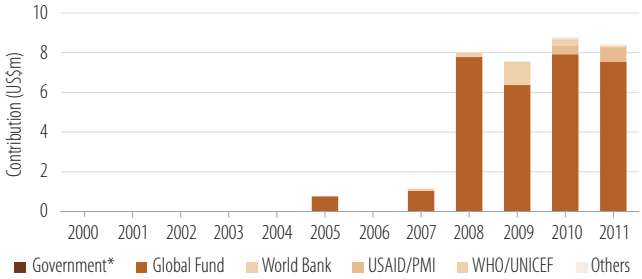
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	CQ	–
First-line treatment of *P. falciparum*	AS+SP	2004
For treatment failure *of P. falciparum*	QN	–
Treatment of severe malaria	AM ;QN	–
Treatment of *P. vivax*	CQ+PQ(14d)	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+SP	2005-2012	8	0	0	3.8	28 days

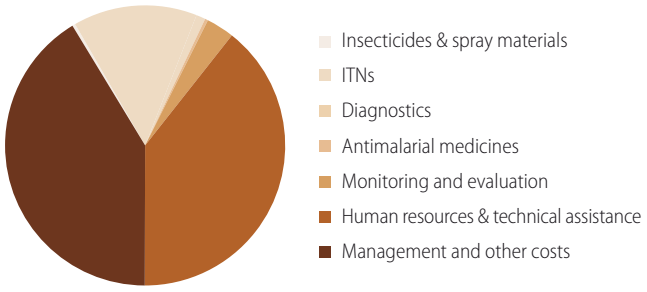
III. Financing

Government and external financing



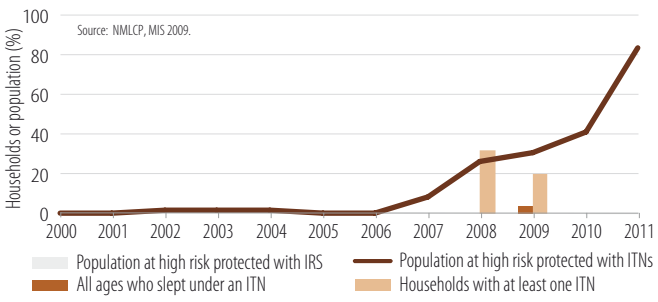
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

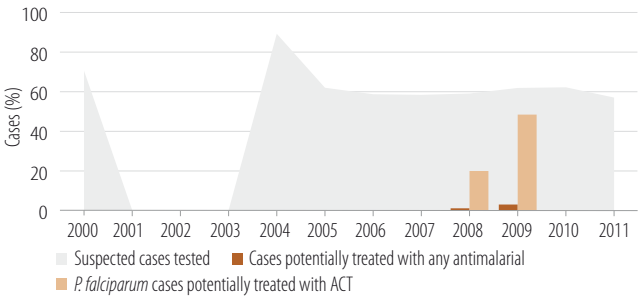


IV. Coverage

Coverage of ITN and IRS

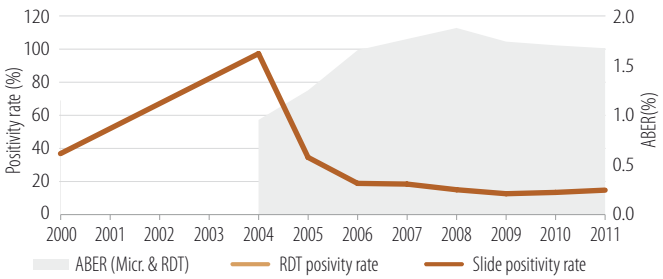


Cases tested and antimalarials delivered: Programme data (public sector)

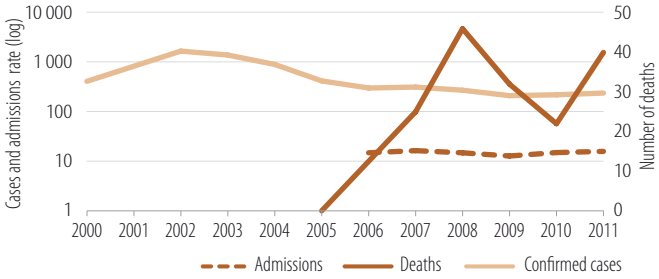


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed cases, admissions (per 100 000) and deaths



Algeria

African Region

Phase: Elimination. Impact: >75% decrease in case incidence 2000–2011.

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
Number of active foci	0	
Number of people living within active foci	–	
Number of people living in malaria-free areas	–	
Total	36 000 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An.labranchiae, multicolor, hispaniola, claviger*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	No	–
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	Yes	1980
	DDT is used for IRS	Yes	–
Case management	Malaria diagnosis is free of charge in the public sector	Yes	1968
	Gametocidal treatment of *P.falciparum* cases	No	–
	Radical treatment of *P. vivax* cases	Yes	–
Surveillance	Foci and case investigation undertaken	Yes	1980
	Case reporting from private sector is mandatory	Yes	0

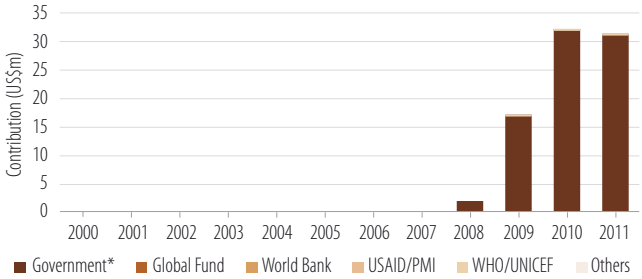
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	–	–
First-line treatment of *P. falciparum*	–	–
For treatment failure *of P. falciparum*	–	–
Treatment of severe malaria	–	–
Treatment of *P. vivax*	CQ	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

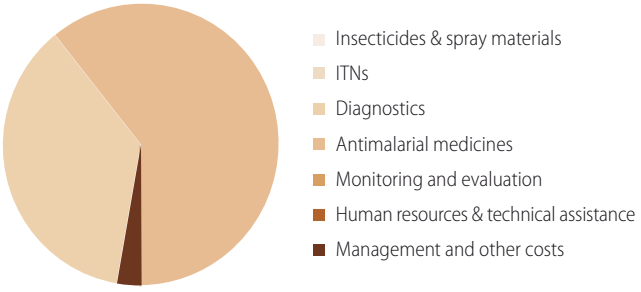
III. Financing

Government and external financing



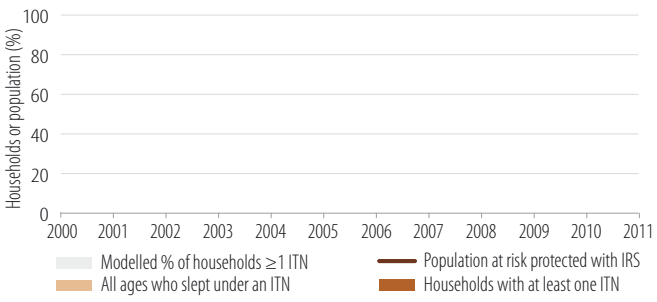
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

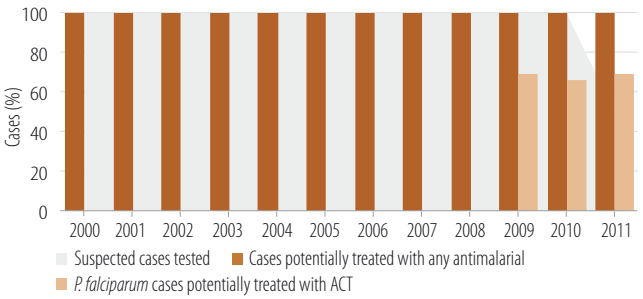


IV. Coverage

Coverage of ITN and IRS

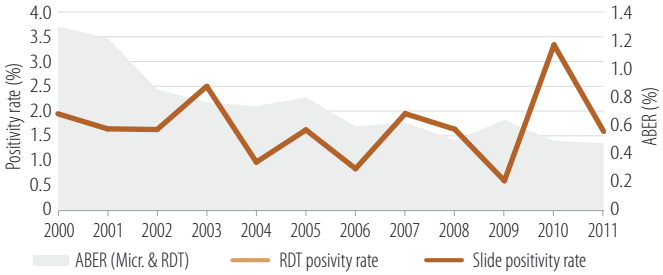


Cases tested and antimalarials delivered: Programme data (public sector)

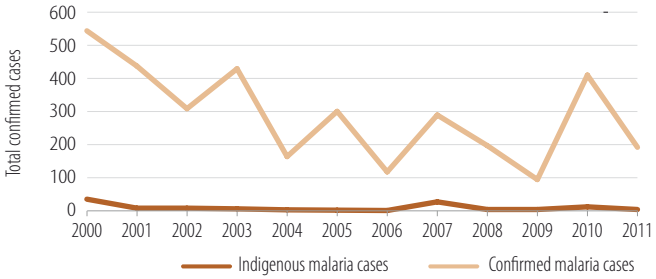


V. Impact

Malaria test positivity rate and ABER



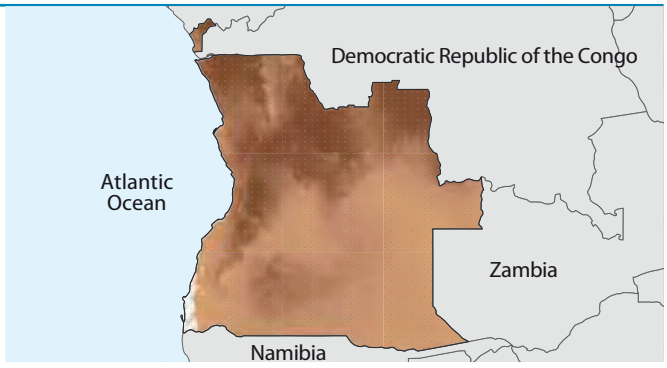
Microscopically confirmed malaria cases and indigenous cases



Angola

African Region

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	19 600 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	19 600 000	

Parasites and vectors	
Major plasmodium species:	*P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species:	*An. gambiae, funestus, nili*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2001
	ITNs/LLINs distributed to all age groups	Yes	2010
IRS	IRS is recommended	Yes	2003
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	N/A	–
Case management	Patients of all ages should receive diagnostic test	Yes	2010
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	Yes	2005
	Pre-referral treatment with recommended medicines	Yes	2003
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	No	–

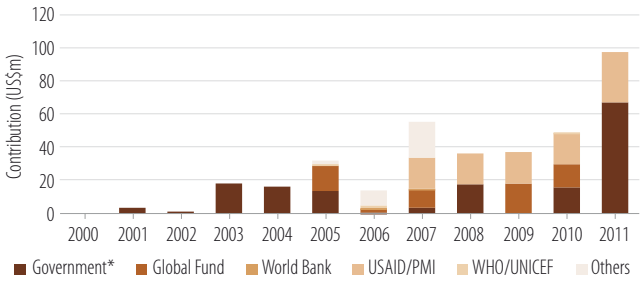
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2006
First-line treatment of *P. falciparum*	AL	2006
For treatment failure *of P. falciparum*	QN	2006
Treatment of severe malaria	QN	2006
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AL	2004–2004	2	0	1.15	2.3	28 days

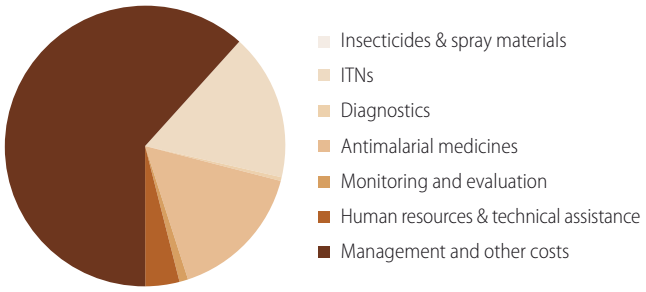
III. Financing

Government and external financing



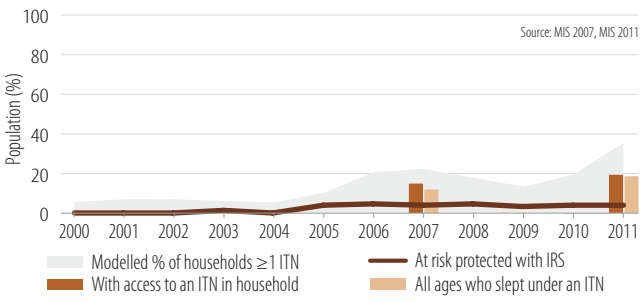
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

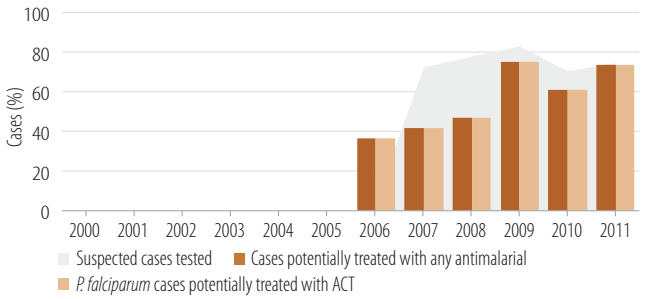


IV. Coverage

Coverage of ITN and IRS

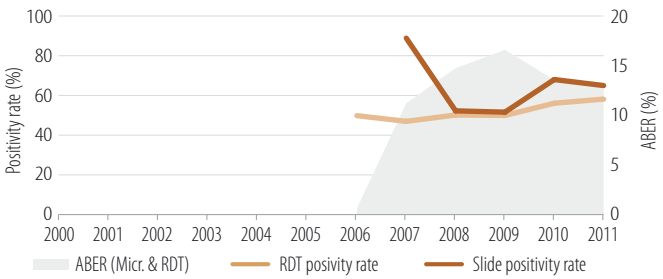


Cases tested and antimalarials delivered: Programme data (public sector)

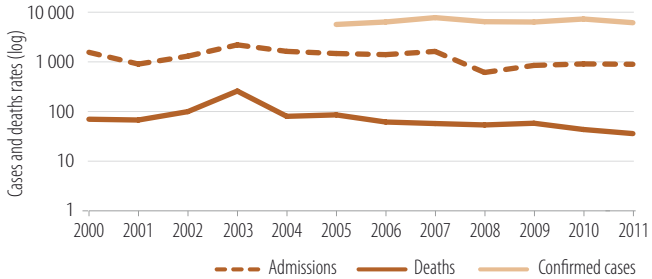


V. Impact

Malaria test positivity rate and ABER

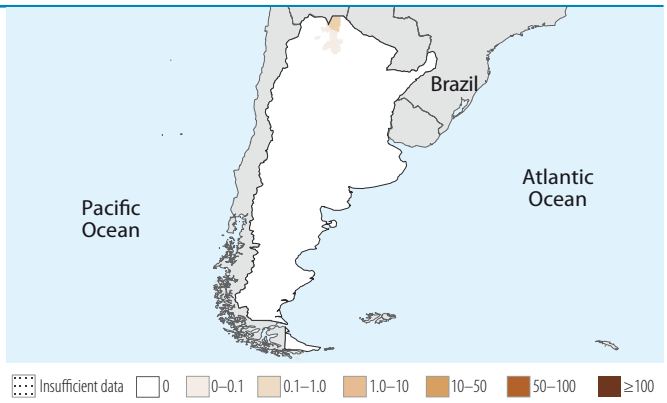


Microscopically confirmed cases, admissions and deaths (per 100 000)



Argentina

Phase: Pre-elimination. Impact: >75% decrease in case incidence 2000–2011.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	0	0
Low transmission (0-1 cases per 1000 population)	204 000	0
Malaria-free (0 cases)	40 600 000	100
Total	40 804 000	

Parasites and vectors

Major plasmodium species: *P. vivax* (100%)
Major anopheles species: *An. pseudopunctipennis, darlingi*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	No	–
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	Yes	–
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	N/A	–
Case management	Patients of all ages should receive diagnostic test	Yes	–
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	Yes	–
	Pre-referral treatment with recommended medicines	–	–
	Oral artemisinin-based monotherapies are not registered	–	–

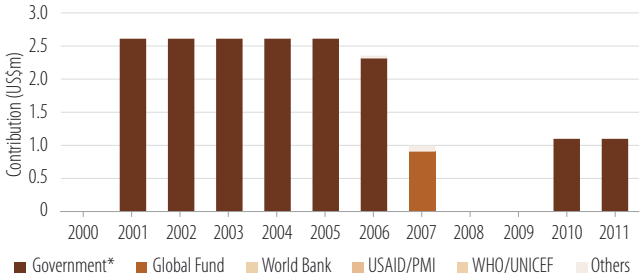
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	–	–
First-line treatment of *P. falciparum*	–	–
For treatment failure *of P. falciparum*	–	–
Treatment of severe malaria	–	–
Treatment of *P. vivax*	CQ+PQ	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

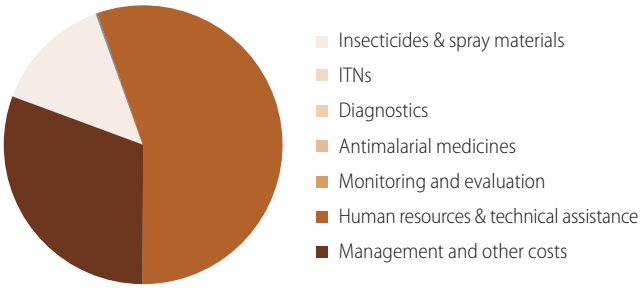
III. Financing

Government and external financing



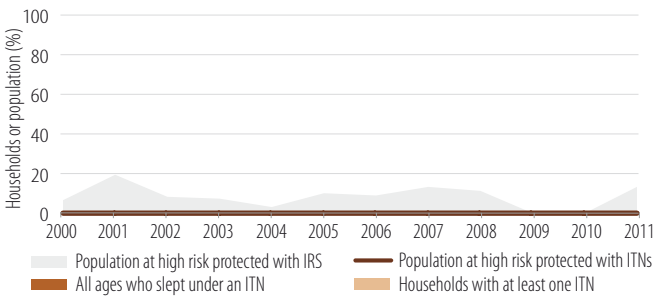
* Expenditure: costs for local level, health systems, etc. not included.

Expenditure by intervention in 2011

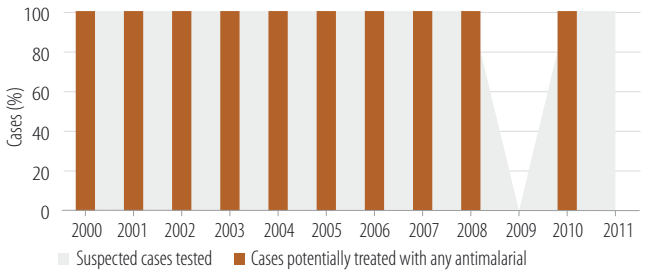


IV. Coverage

Coverage of ITN and IRS

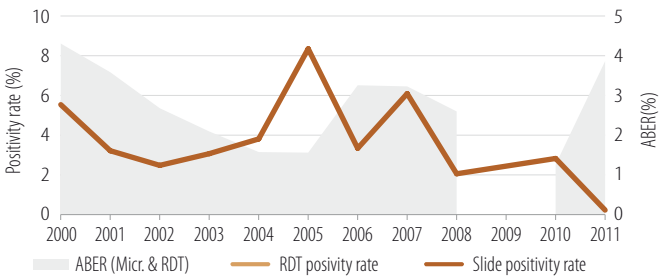


Cases tested and antimalarials delivered: Programme data (public sector)

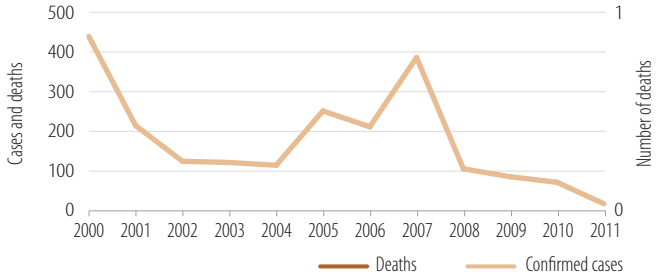


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed cases and deaths



Azerbaijan

European Region

Phase: Elimination. Impact: >75% decrease in case incidence 2000–2011. Application of elimination measures contributed to improvement of malaria situation in Azerbaijan - 4 indigenous cases reported in 2011. Malaria elimination strategy 2008-2013 is supported by the government, WHO and the Global Fund.

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
Number of active foci	22	
Number of people living within active foci	254 000	3
Number of people living in malaria-free areas	9 050 000	97
Total	9 304 000	

Parasites and vectors

Major plasmodium species: *P. vivax* (100%)
Major anopheles species: *An.sacharovi, maculipennis*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2009
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	Yes	1930
	DDT is used for IRS	No	–
Case management	Malaria diagnosis is free of charge in the public sector	Yes	1930
	Gametocidal treatment of *P.falciparum* cases	–	–
	Radical treatment of *P. vivax* cases	Yes	1956
Surveillance	Foci and case investigation undertaken	Yes	1930
	Case reporting from private sector is mandatory	–	–

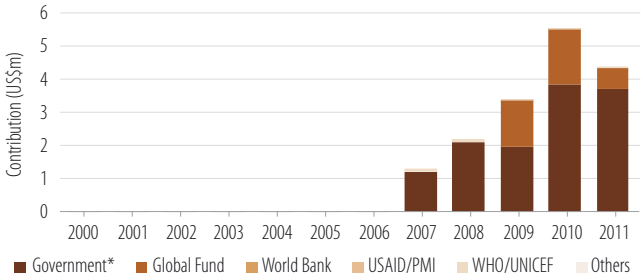
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+SP	2008
First-line treatment of *P. falciparum*	AS+SP	2008
For treatment failure *of P. falciparum*	QN+CL	2008
Treatment of severe malaria	AS ;QN	2008
Treatment of *P. vivax*	CQ+PQ(14d)	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

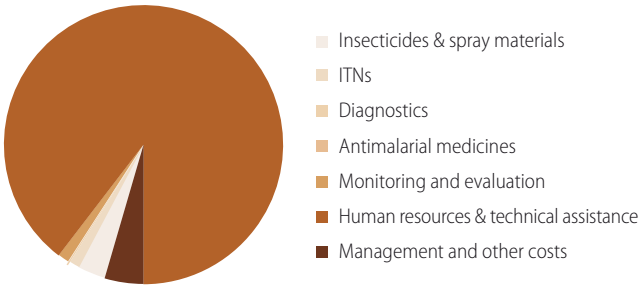
III. Financing

Government and external financing



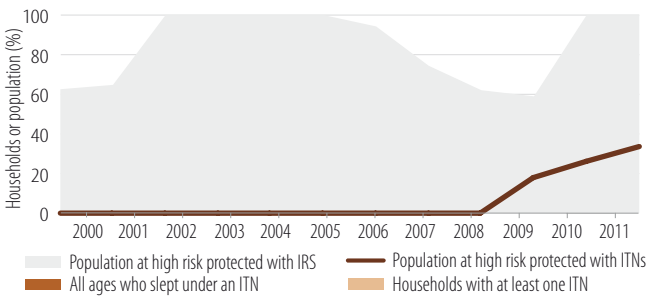
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

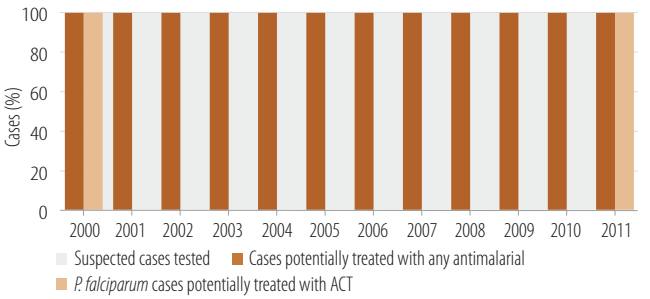


IV. Coverage

Coverage of ITN and IRS

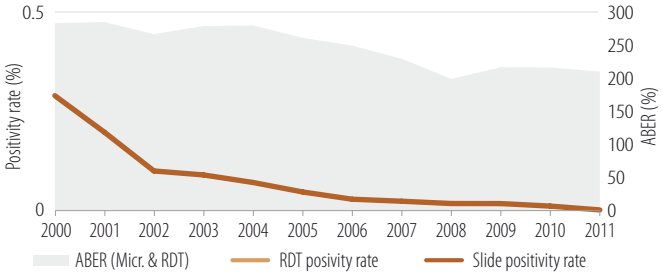


Cases tested and antimalarials delivered: Programme data (public sector)

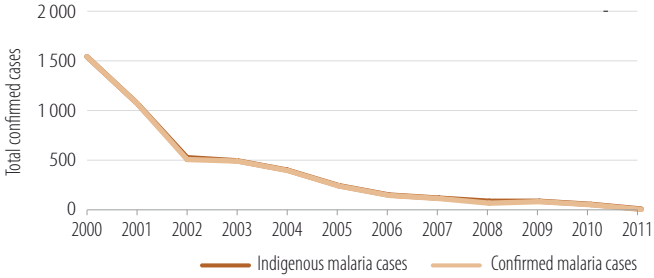


V. Impact

Malaria test positivity rate and ABER



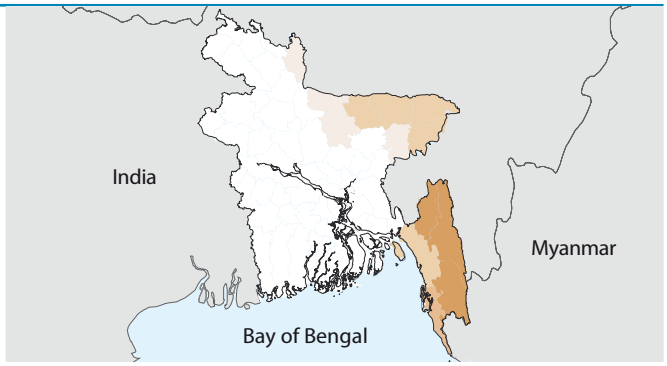
Microscopically confirmed malaria cases and indigenous cases



Bangladesh

South-East Asia Region

Phase: Control. Impact: >75% decrease in case incidence projected 2000–2015.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	3 860 000	3
Low transmission (0-1 cases per 1000 population)	11 200 000	7
Malaria-free (0 cases)	135 000 000	90
Total	150 060 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (87%), *P. vivax* (13%)
Major anopheles species: *An. dirus, minimus, philippinensis, sundaicus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2008
	ITNs/LLINs distributed to all age groups	Yes	2008
IRS	IRS is recommended	No	–
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	NA	–
Case management	Patients of all ages should receive diagnostic test	Yes	2000
	RDTs used at community level	Yes	2007
	ACT is free for all ages in public sector	Yes	2007
	Pre-referral treatment with recommended medicines	Yes	2004
	Oral artemisinin-based monotherapies are not registered	Yes	–

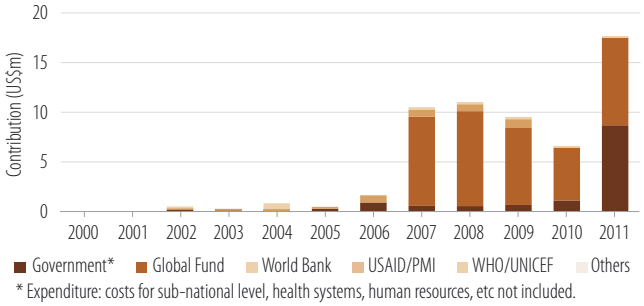
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	–
First-line treatment of *P. falciparum*	AL	2004
For treatment failure *of P. falciparum*	QN+D	2004
Treatment of severe malaria	;QN+TAM ;QN	2004
Treatment of *P. vivax*	CQ+PQ(14d)	2004

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AL	2008-2009	7	0	0	2	28 days
QN+D	2008-2009	1	0	0	0	42 days

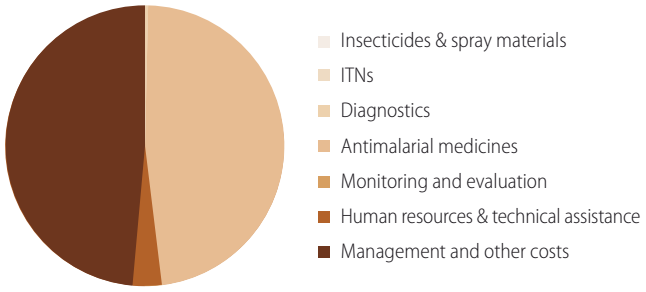
III. Financing

Government and external financing



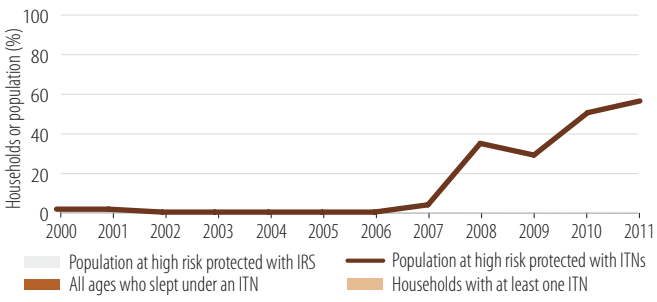
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

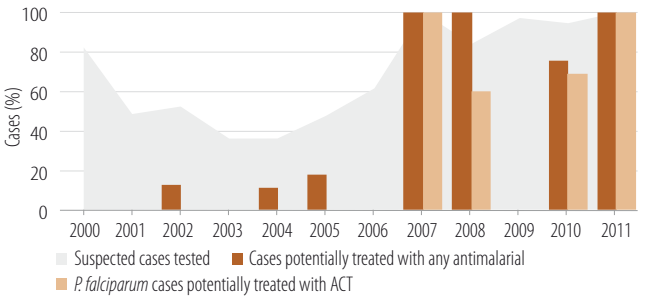


IV. Coverage

Coverage of ITN and IRS

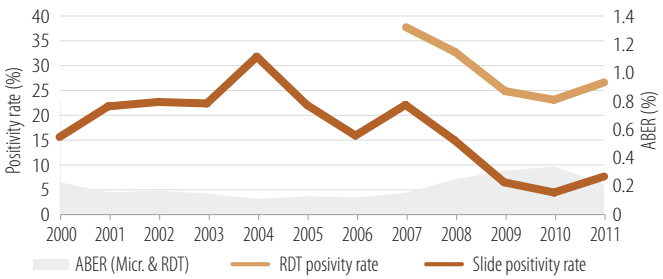


Cases tested and antimalarials delivered: Programme data (public sector)

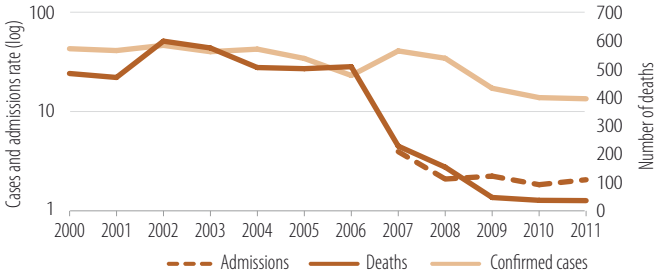


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed cases, admissions (per 100 000) and deaths



Belize

Phase: Control. Impact: >75% decrease in case incidence 2000–2011.

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	0	0
Low transmission (0-1 cases per 1000 population)	219 000	69
Malaria-free (0 cases)	98 600	31
Total	317 600	

Parasites and vectors

Major plasmodium species: *P. falciparum* (1%), *P. vivax* (99%)
Major anopheles species: *An. albimanus, darlingi*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2009
	ITNs/LLINs distributed to all age groups	Yes	2009
IRS	IRS is recommended	Yes	–
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	N/A	–
Case management	Patients of all ages should receive diagnostic test	Yes	–
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	Yes	2010
	Pre-referral treatment with recommended medicines	No	–
	Oral artemisinin-based monotherapies are not registered	No	–

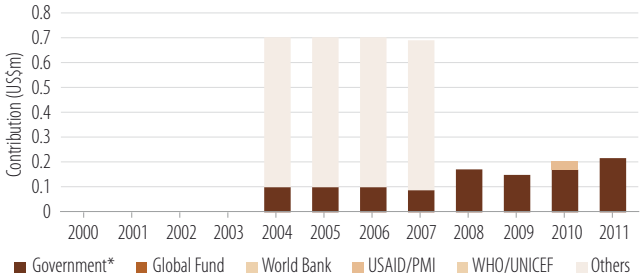
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	–	–
First-line treatment of *P. falciparum*	CQ+PQ	–
For treatment failure *of P. falciparum*	–	–
Treatment of severe malaria	–	–
Treatment of *P. vivax*	CQ+PQ	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

III. Financing

Government and external financing



* Expenditure: costs for local level, health systems, etc. not included.

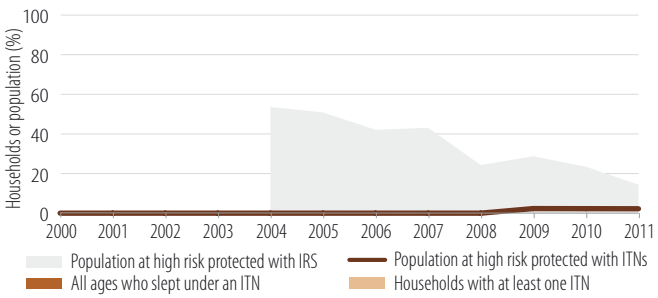
Expenditure by intervention in 2011

No data reported for 2011

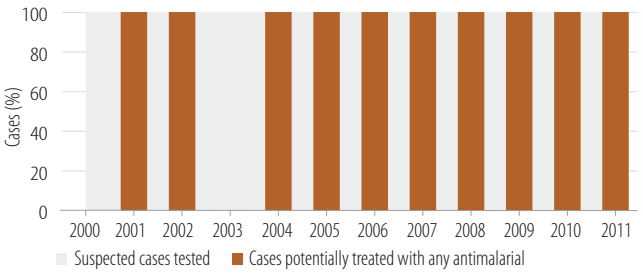
- Insecticides & spray materials
- ITNs
- Diagnostics
- Antimalarial medicines
- Monitoring and evaluation
- Human resources & technical assistance
- Management and other costs

IV. Coverage

Coverage of ITN and IRS

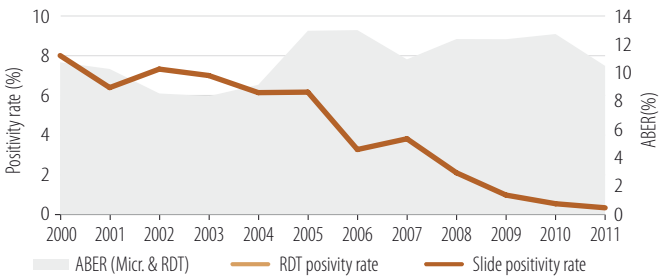


Cases tested and antimalarials delivered: Programme data (public sector)

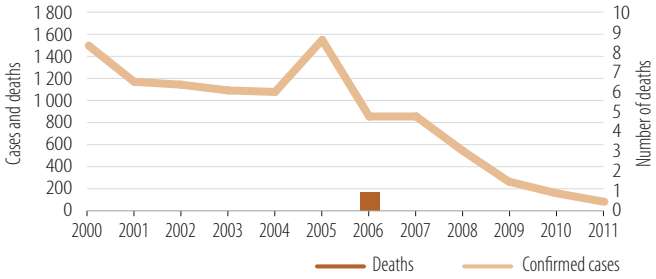


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed cases and deaths



Benin

Phase: Control. Impact: Insufficiently consistent data to assess trends.

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	9 100 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	9 100 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, funestus, nili*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2007
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	Yes	2006
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2005
Case management	Patients of all ages should receive diagnostic test	Yes	2011
	RDTs used at community level	Yes	2012
	ACT is free for all ages in public sector	No	–
	Pre-referral treatment with recommended medicines	Yes	2008
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	Yes	2008

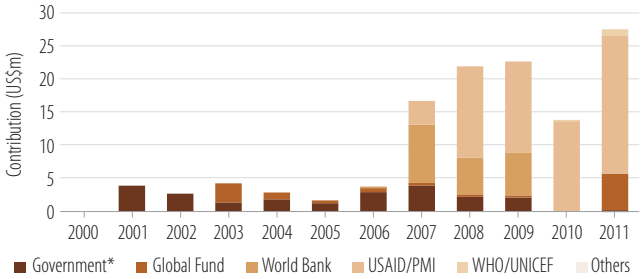
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2004
First-line treatment of *P. falciparum*	AL	2004
For treatment failure *of P. falciparum*	QN	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AL	2005-2009	5	0	0	6.5	28 days

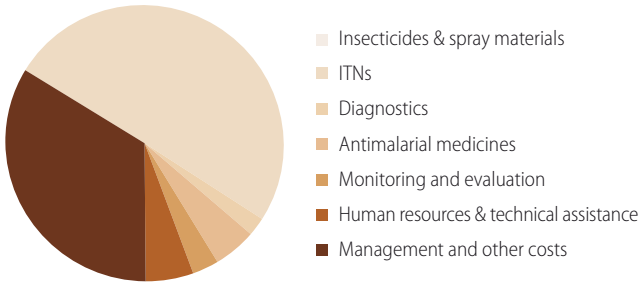
III. Financing

Government and external financing



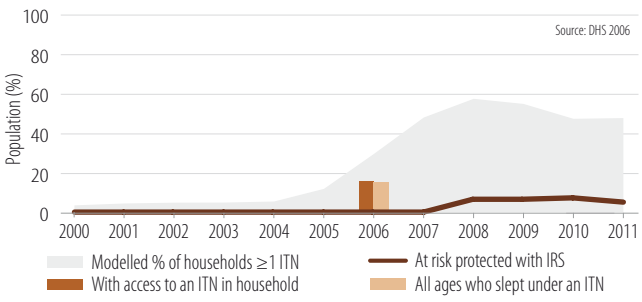
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

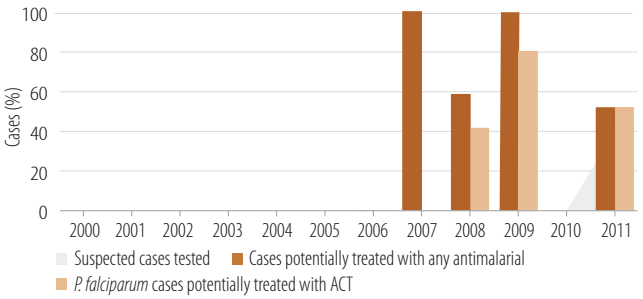


IV. Coverage

Coverage of ITN and IRS

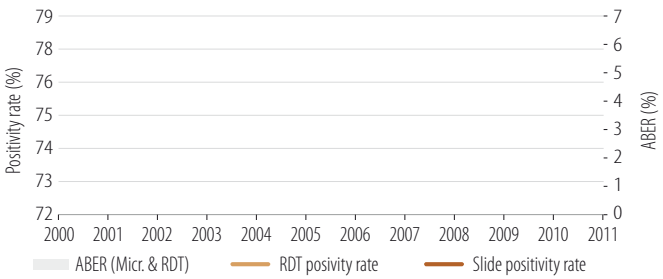


Cases tested and antimalarials delivered: Programme data (public sector)

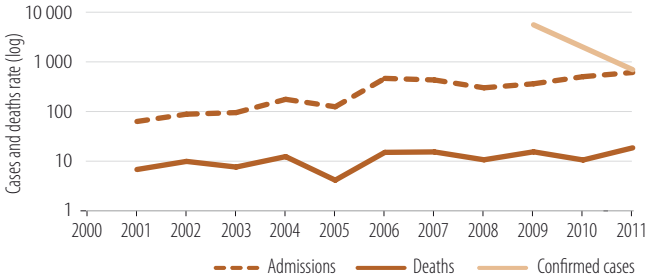


V. Impact

Malaria test positivity rate and ABER



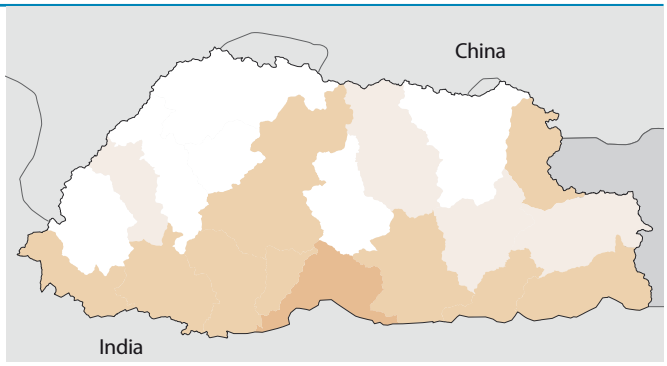
Microscopically confirmed cases, admissions and deaths (per 100 000)



Bhutan

South-East Asia Region

>75% decrease in case incidence 2000–2011



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	96 000	13
Low transmission (0-1 cases per 1000 population)	450 000	61
Malaria-free (0 cases)	192 000	26
Total	738 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (53%), *P. vivax* (47%)
Major anopheles species: *An. culicifacies, maculatus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2006
	ITNs/LLINs distributed to all age groups	Yes	2006
IRS	IRS is recommended	Yes	1964
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	NA	–
Case management	Patients of all ages should receive diagnostic test	Yes	1964
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	Yes	2006
	Pre-referral treatment with recommended medicines	No	–
	Oral artemisinin-based monotherapies are not registered	Yes	–

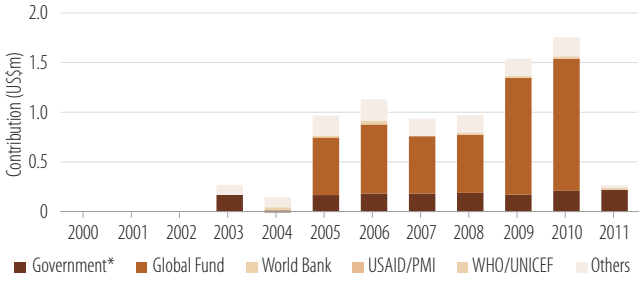
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	–
First-line treatment of *P. falciparum*	AL	2006
For treatment failure *of P. falciparum*	QN	2006
Treatment of severe malaria	AM ;QN	2006
Treatment of *P. vivax*	CQ+PQ(14d)	2006

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AL	2005-2011	22	0	0	0	28 days

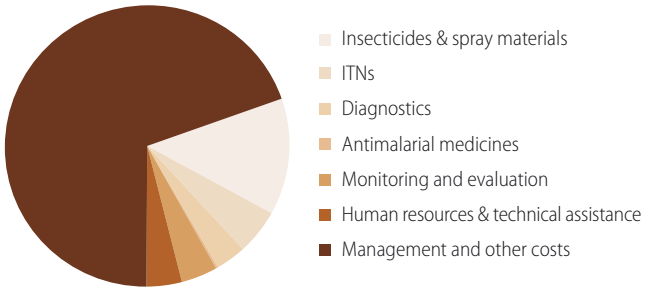
III. Financing

Government and external financing



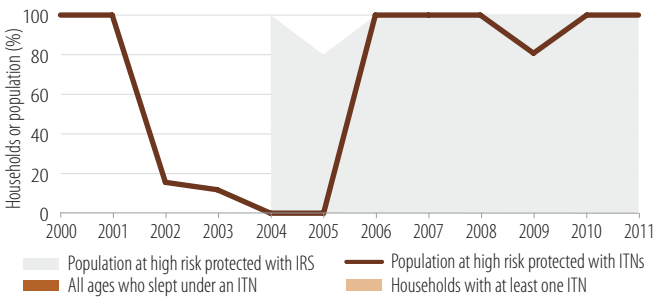
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

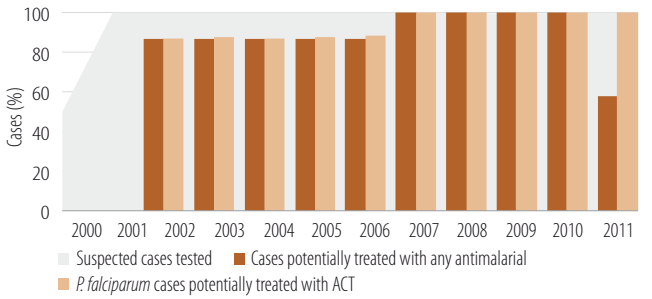


IV. Coverage

Coverage of ITN and IRS

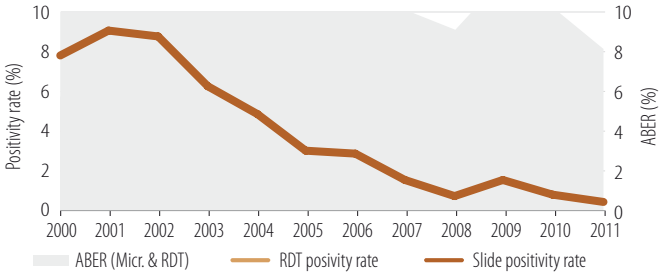


Cases tested and antimalarials delivered: Programme data (public sector)

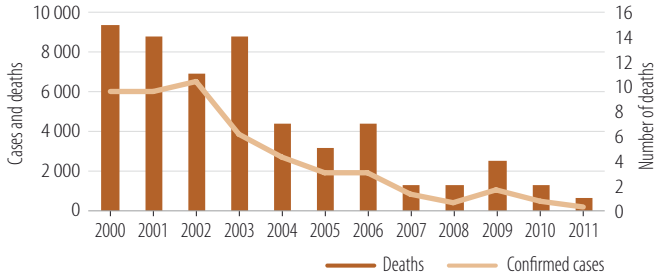


V. Impact

Malaria test positivity rate and ABER

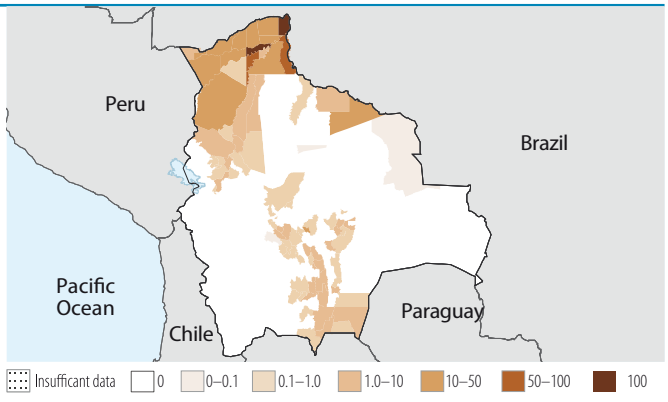


Microscopically confirmed cases and deaths



Bolivia (Plurinational State of)

Phase: Control. Impact: >75% decrease in case incidence 2000–2011.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	484 000	5
Low transmission (0-1 cases per 1000 population)	3 080 000	31
Malaria-free (0 cases)	6 530 000	65
Total	10 094 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (4%), *P. vivax* (96%)
Major anopheles species: *An. darlingi*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2008
	ITNs/LLINs distributed to all age groups	Yes	2005
IRS	IRS is recommended	Yes	1959
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	N/A	–
Case management	Patients of all ages should receive diagnostic test	Yes	2000
	RDTs used at community level	Yes	2005
	ACT is free for all ages in public sector	Yes	2003
	Pre-referral treatment with recommended medicines	No	–
	Oral artemisinin-based monotherapies are not registered	No	–

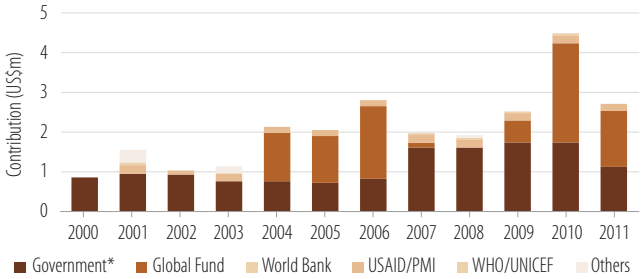
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	–
First-line treatment of *P. falciparum*	AS+MQ	2001
For treatment failure *of P. falciparum*	QN+CL	–
Treatment of severe malaria	QN	2001
Treatment of *P. vivax*	CQ+PQ	2001

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

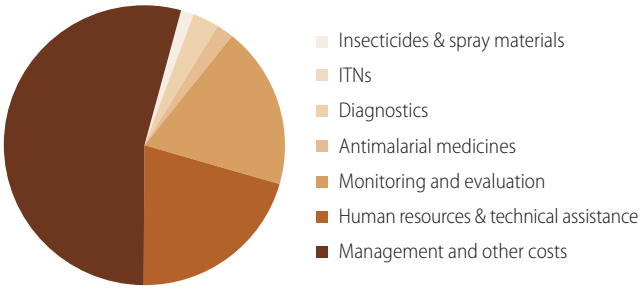
III. Financing

Government and external financing



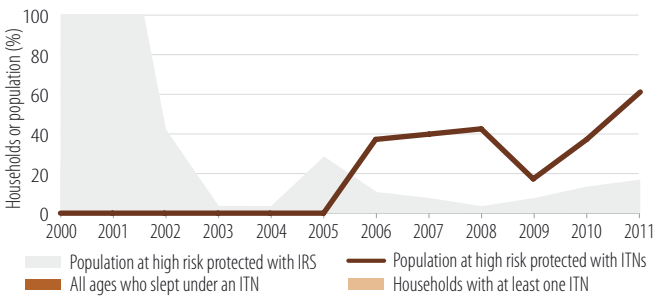
* Expenditure: costs for local level, health systems, etc. not included.

Expenditure by intervention in 2011

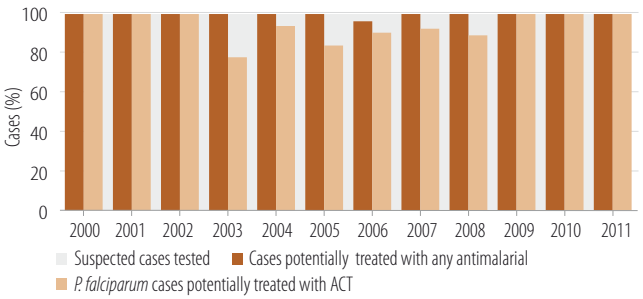


IV. Coverage

Coverage of ITN and IRS

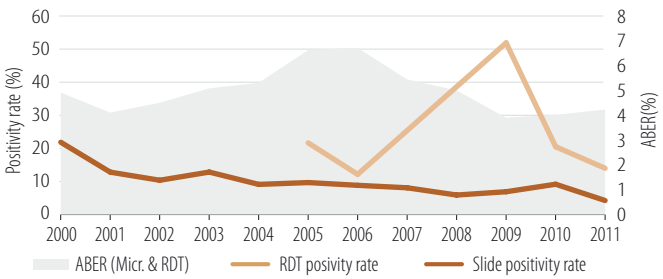


Cases tested and antimalarials delivered: Programme data (public sector)

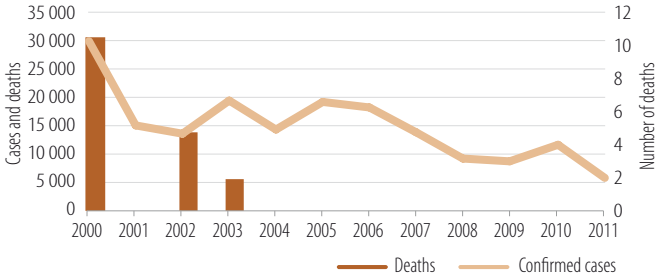


V. Impact

Malaria test positivity rate and ABER

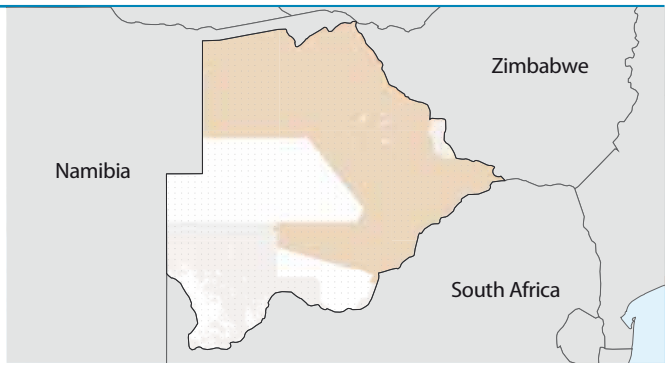


Microscopically confirmed cases and deaths



Botswana

Phase: Control. Impact: >75% decrease in case incidence 2000–2011.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	366 000	18
Low transmission (0-1 cases per 1000 population)	954 000	47
Malaria-free (0 cases)	711 000	35
Total	2 031 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, arabiensis*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2009
	ITNs/LLINs distributed to all age groups	Yes	1997
IRS	IRS is recommended	Yes	1950
	DDT is used for IRS	Yes	1950
IPT	IPT used to prevent malaria during pregnancy	No	–
Case management	Patients of all ages should receive diagnostic test	Yes	2010
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	Yes	2007
	Pre-referral treatment with recommended medicines	Yes	2007
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	No	–

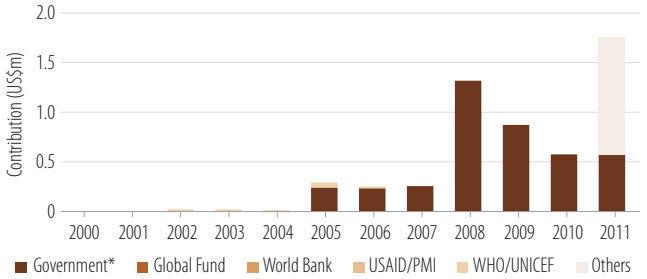
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2007
First-line treatment of *P. falciparum*	AL	2007
For treatment failure of *P. falciparum*	QN	2007
Treatment of severe malaria	QN	2007
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

III. Financing

Government and external financing



* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

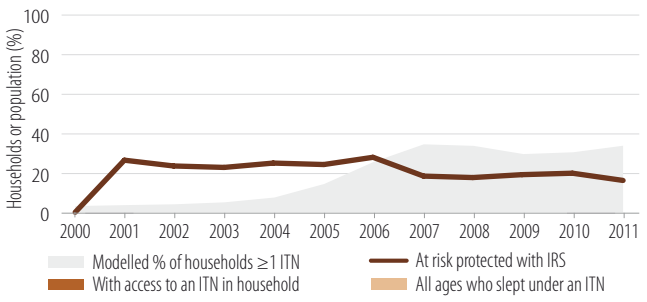
Expenditure by intervention in 2011

No data reported for 2011

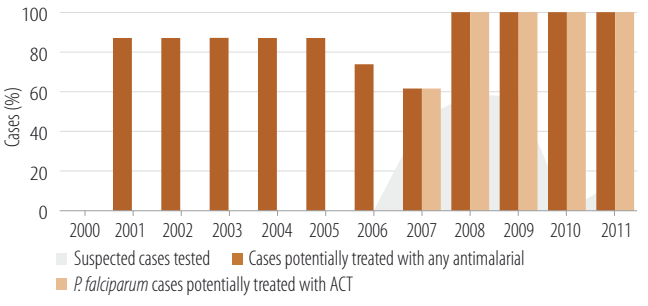
- Insecticides & spray materials
- ITNs
- Diagnostics
- Antimalarial medicines
- Monitoring and evaluation
- Human resources & technical assistance
- Management and other costs

IV. Coverage

Coverage of ITN and IRS

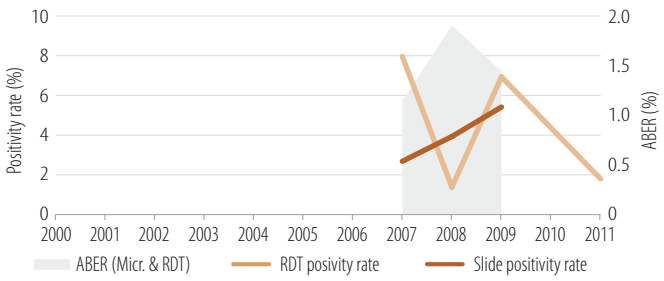


Cases tested and antimalarials delivered: Programme data (public sector)

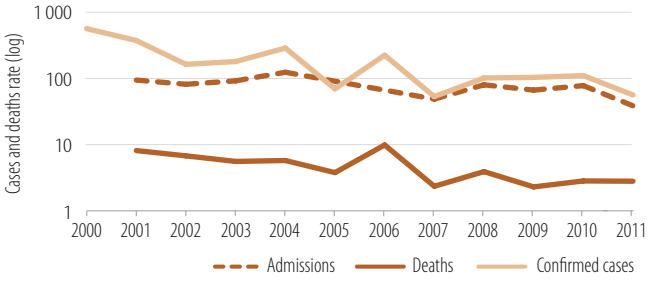


V. Impact

Malaria test positivity rate and ABER

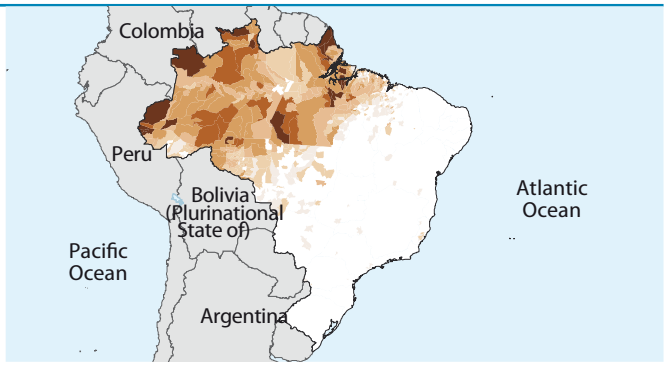


Microscopically confirmed cases, admissions and deaths (per 100 000)



Brazil

Phase: Control. Impact: 50%–75% decrease in case incidence projected 2000–2015.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	4 520 000	2
Low transmission (0-1 cases per 1000 population)	35 400 000	18
Malaria-free (0 cases)	157 000 000	80
Total	196 920 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (13%), *P. vivax* (87%)
Major anopheles species: *An. darlingi, albitarsis, aquasalis*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2007
	ITNs/LLINs distributed to all age groups	Yes	2007
IRS	IRS is recommended	Yes	1945
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	N/A	–
Case management	Patients of all ages should receive diagnostic test	Yes	1972
	RDTs used at community level	Yes	2007
	ACT is free for all ages in public sector	Yes	2006
	Pre-referral treatment with recommended medicines	Yes	2006
	Oral artemisinin-based monotherapies are not registered	Yes	2010

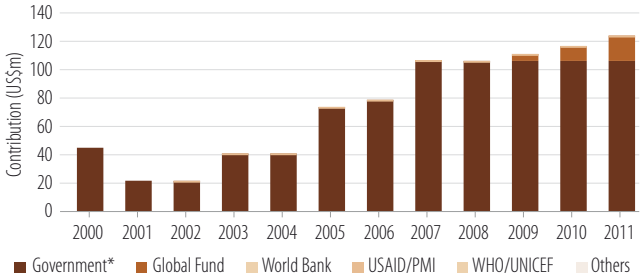
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	–
First-line treatment of *P. falciparum*	AL ;AS+MQ	2006
For treatment failure *of P. falciparum*	-	–
Treatment of severe malaria	AM ;AS ;QN	2006
Treatment of *P. vivax*	CQ+PQ	2006

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+MQ	2005–2007	3	0	0	0	42 days
AL	2005–2007	2	0	0	0	28 days

III. Financing

Government and external financing



* Expenditure: costs for local level, health systems, etc. not included.

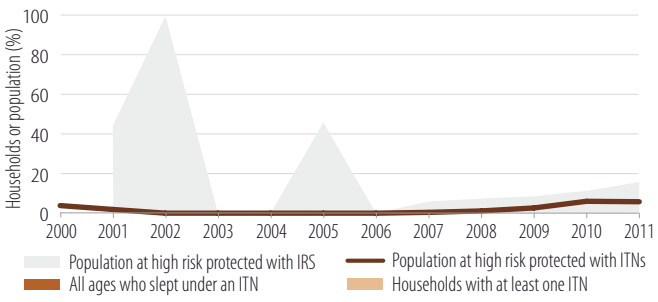
Expenditure by intervention in 2011

No data reported for 2011

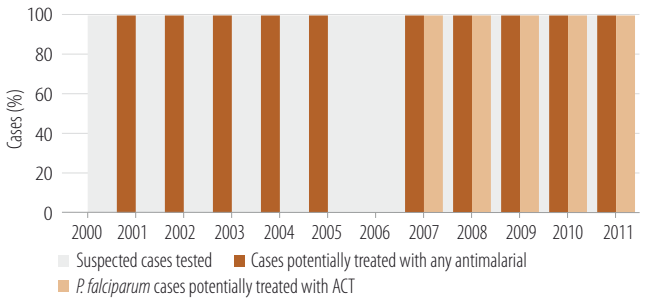
- Insecticides & spray materials
- ITNs
- Diagnostics
- Antimalarial medicines
- Monitoring and evaluation
- Human resources & technical assistance
- Management and other costs

IV. Coverage

Coverage of ITN and IRS

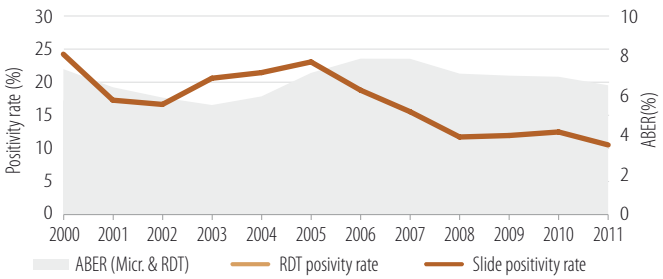


Cases tested and antimalarials delivered: Programme data (public sector)

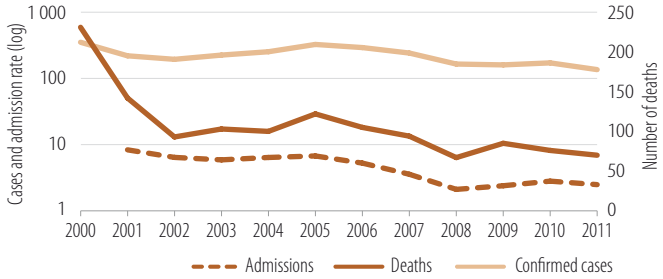


V. Impact

Malaria test positivity rate and ABER



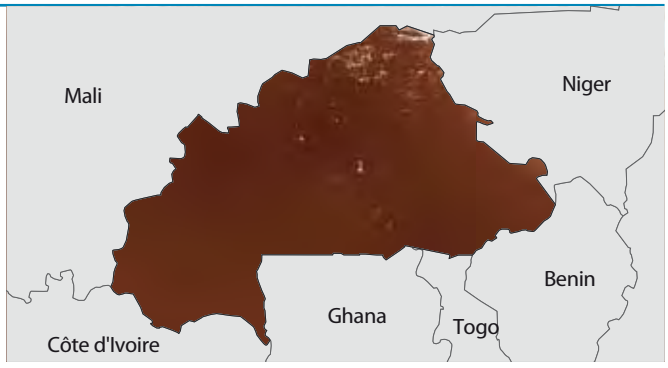
Microscopically confirmed cases, admissions (per 100 000) and deaths



Burkina Faso

African Region

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	17 000 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	17 000 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, arabiensis*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2007
	ITNs/LLINs distributed to all age groups	Yes	1998
IRS	IRS is recommended	Yes	2006
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2005
Case management	Patients of all ages should receive diagnostic test	Yes	2009
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	Yes	–
	Pre-referral treatment with recommended medicines	Yes	2005
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	Yes	2009

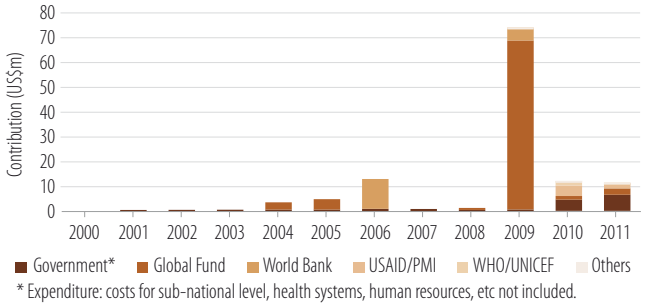
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL ;AS+AQ	2005
First-line treatment of *P. falciparum*	AL ;AS+AQ	2005
For treatment failure *of P. falciparum*	QN	–
Treatment of severe malaria	QN	–
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AL	2005-2009	6	1.9	7	12.5	28 days
AS+AQ	2006-2009	3	3.2	15.3	21.5	28 days

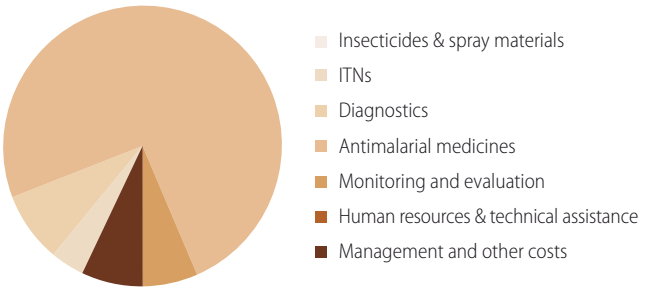
III. Financing

Government and external financing



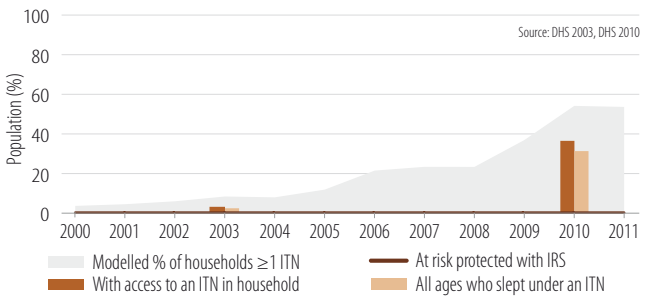
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

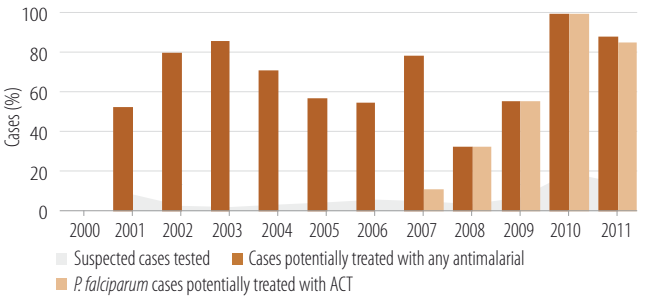


IV. Coverage

Coverage of ITN and IRS

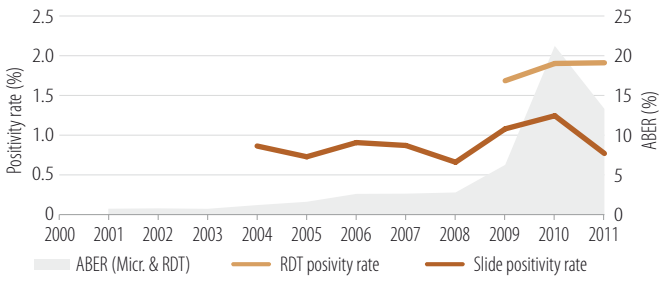


Cases tested and antimalarials delivered: Programme data (public sector)

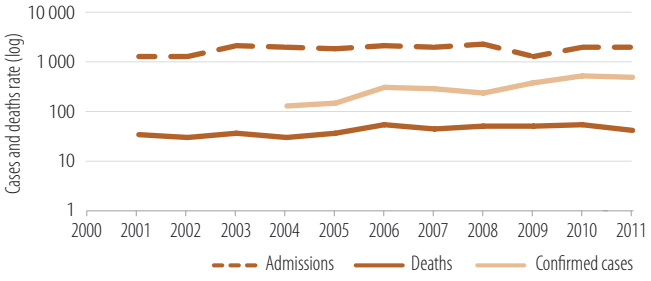


V. Impact

Malaria test positivity rate and ABER



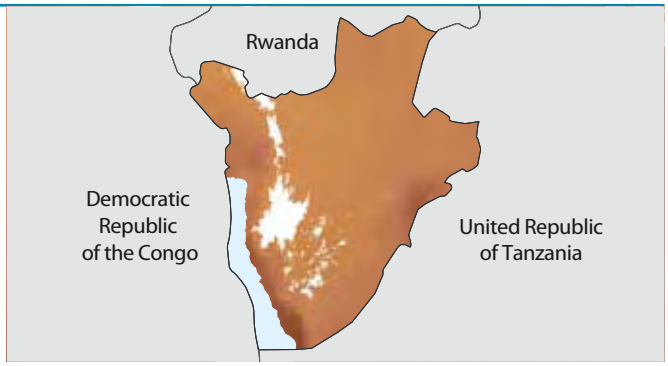
Microscopically confirmed cases, admissions and deaths (per 100 000)



Burundi

African Region

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	2 060 000	24
Low transmission (0-1 cases per 1000 population)	4 630 000	54
Malaria-free (0 cases)	1 890 000	22
Total	8 580 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, funestus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2004
	ITNs/LLINs distributed to all age groups	Yes	2009
IRS	IRS is recommended	Yes	2009
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	No	–
Case management	Patients of all ages should receive diagnostic test	Yes	2007
	RDTs used at community level	Yes	–
	ACT is free for all ages in public sector	Yes	2009
	Pre-referral treatment with recommended medicines	No	–
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	No	–

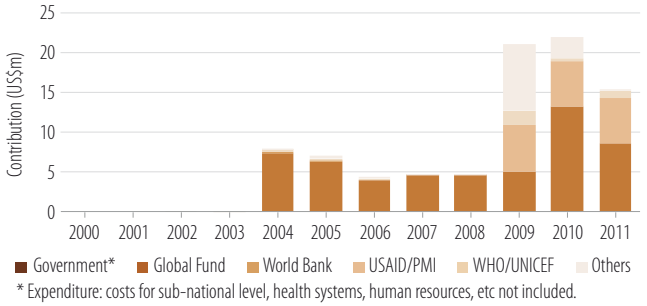
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2003
First-line treatment of *P. falciparum*	AS+AQ	2003
For treatment failure of *P. falciparum*	QN	2003
Treatment of severe malaria	QN	2003
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+AQ	2005-2006	2	2.9	5.2	7.5	28 days

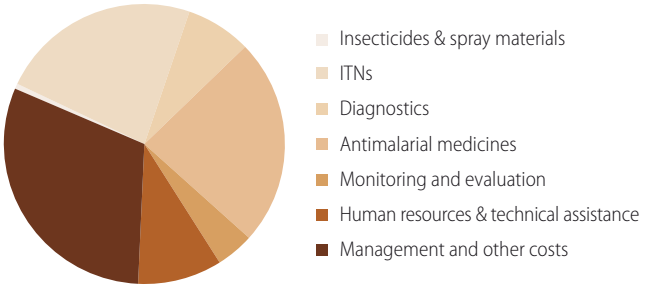
III. Financing

Government and external financing



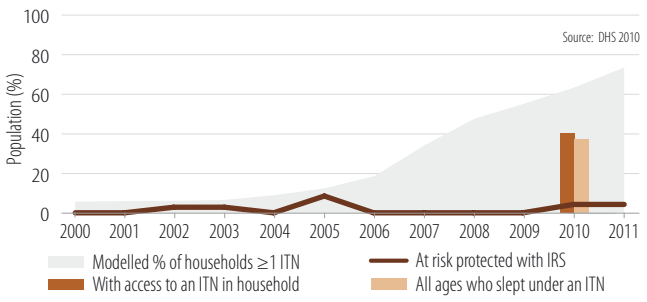
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

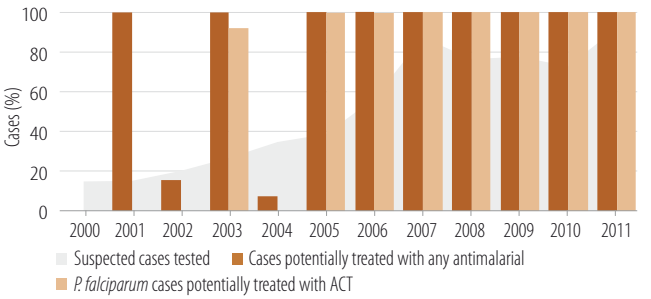


IV. Coverage

Coverage of ITN and IRS

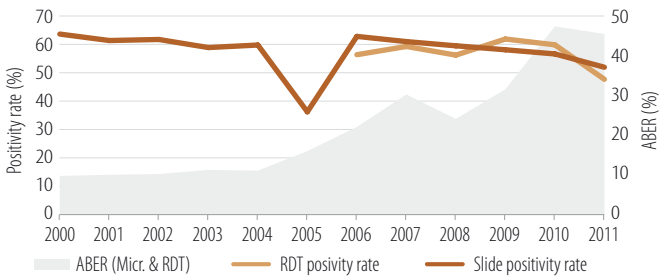


Cases tested and antimalarials delivered: Programme data (public sector)

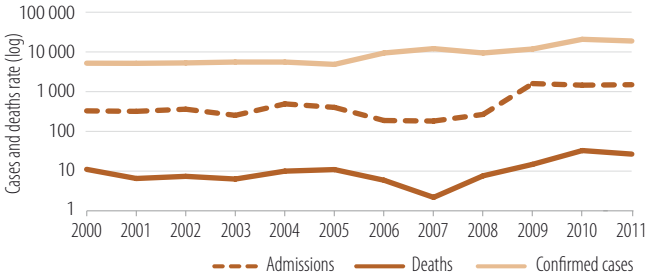


V. Impact

Malaria test positivity rate and ABER

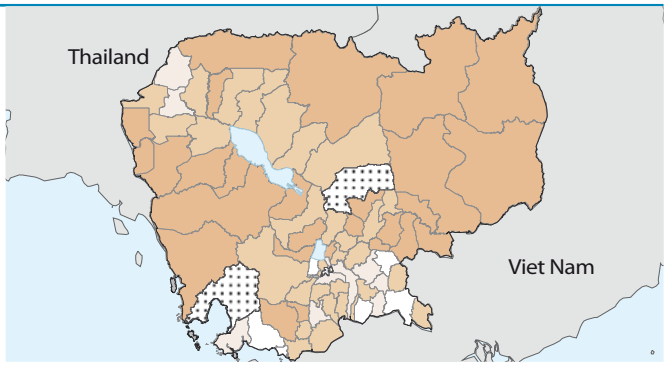


Microscopically confirmed cases, admissions and deaths (per 100 000)



Cambodia

Phase: Control. Impact: >75% decrease in case incidence 2000–2011.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	6 290 000	44
Low transmission (0-1 cases per 1000 population)	1 290 000	9
Malaria-free (0 cases)	6 720 000	47
Total	14 300 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (63%), *P. vivax* (37%)
Major anopheles species: *An. minimus, dirus, maculatus, sundaicus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2000
	ITNs/LLINs distributed to all age groups	Yes	2000
IRS	IRS is recommended	No	–
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	NA	–
Case management	Patients of all ages should receive diagnostic test	Yes	2000
	RDTs used at community level	Yes	2000
	ACT is free for all ages in public sector	Yes	2000
	Pre-referral treatment with recommended medicines	No	–
	Oral artemisinin-based monotherapies are not registered	Yes	2009

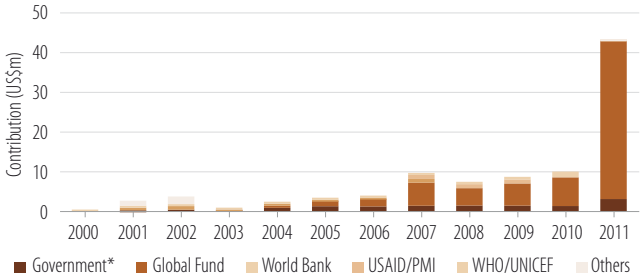
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	–
First-line treatment of *P. falciparum*	AS+MQ ;DHA-PPQ+PQ	2000
For treatment failure *of P. falciparum*	QN+T	2000
Treatment of severe malaria	AM;QN	2000
Treatment of *P. vivax*	DHA-PPQ	2011

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
DHA-PPQ	2008-2011	11	0	3.6	25	42 days

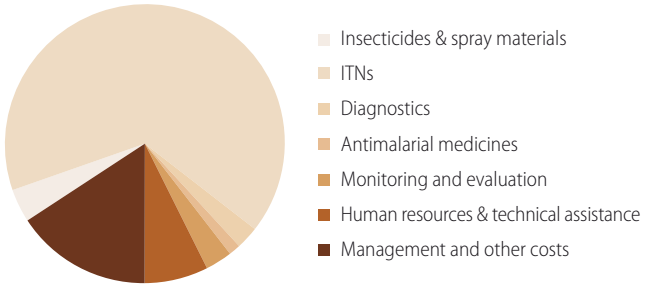
III. Financing

Government and external financing



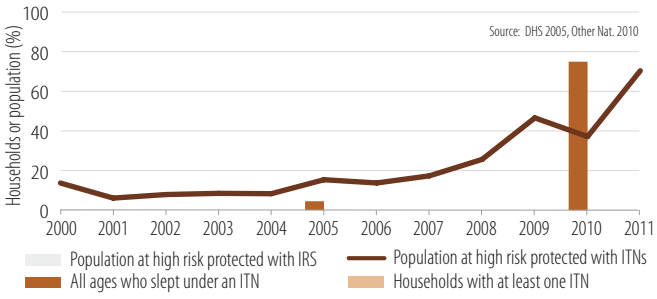
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

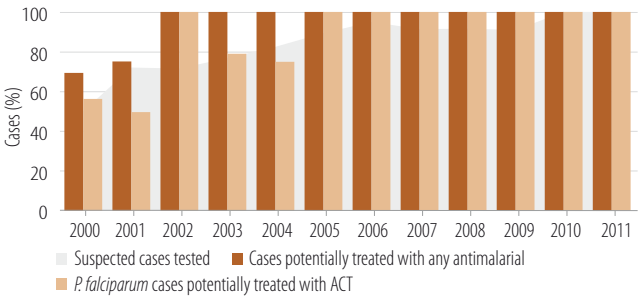


IV. Coverage

Coverage of ITN and IRS

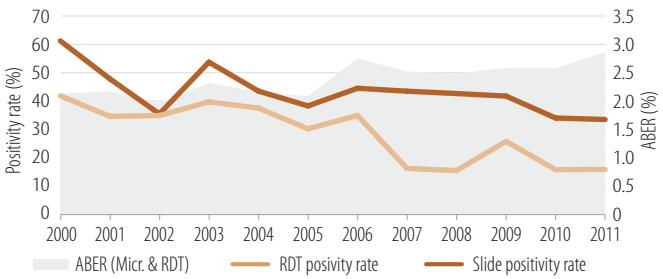


Cases tested and antimalarials delivered: Programme data (public sector)

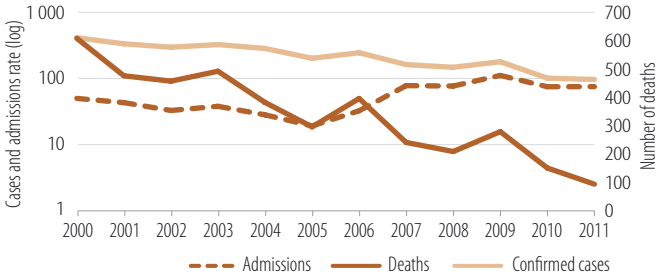


V. Impact

Malaria test positivity rate and ABER

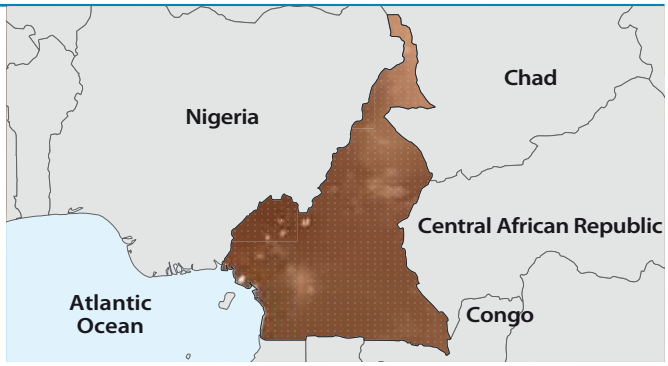


Microscopically confirmed cases, admissions (per 100 000) and deaths



Cameroon

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	14 200 000	71
Low transmission (0-1 cases per 1000 population)	5 810 000	29
Malaria-free (0 cases)	0	0
Total	20 010 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, arabiensis, funestus, moucheti*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2004
	ITNs/LLINs distributed to all age groups	Yes	2010
IRS	IRS is recommended	Yes	2007
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2004
Case management	Patients of all ages should receive diagnostic test	Yes	2010
	RDTs used at community level	Yes	2009
	ACT is free for all ages in public sector	No	–
	Pre-referral treatment with recommended medicines	Yes	2004
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	Yes	2006

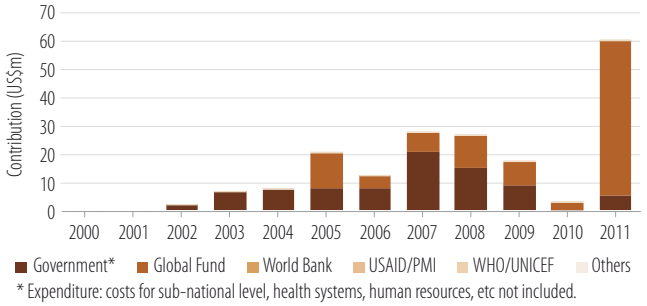
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2004
First-line treatment of *P. falciparum*	AS+AQ	2004
For treatment failure *of P. falciparum*	QN	2004
Treatment of severe malaria	AM ;QN	2004
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+AQ	2005–2009	9	0	3.7	8.7	28 days

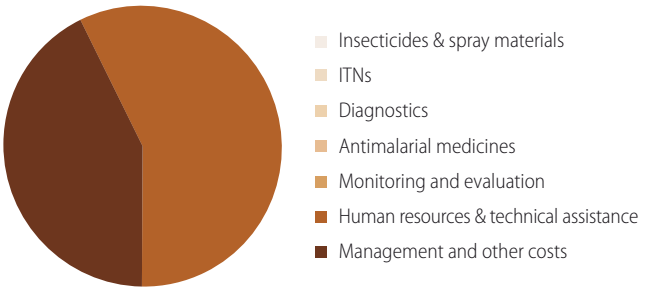
III. Financing

Government and external financing



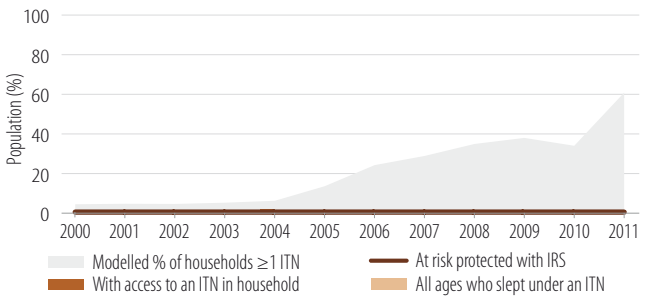
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

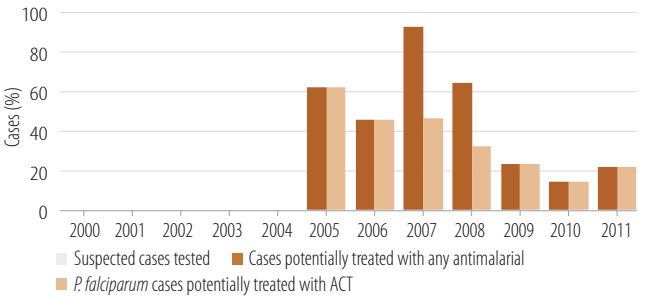


IV. Coverage

Coverage of ITN and IRS



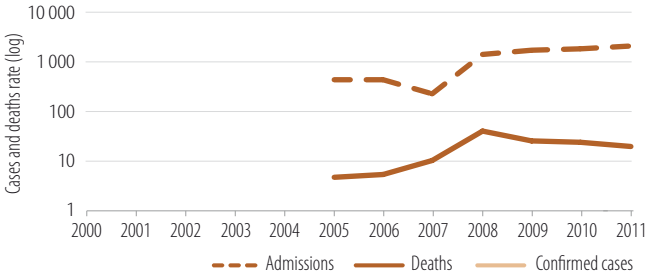
Cases tested and antimalarials delivered: Programme data (public sector)



V. Impact

Malaria test positivity rate and ABER

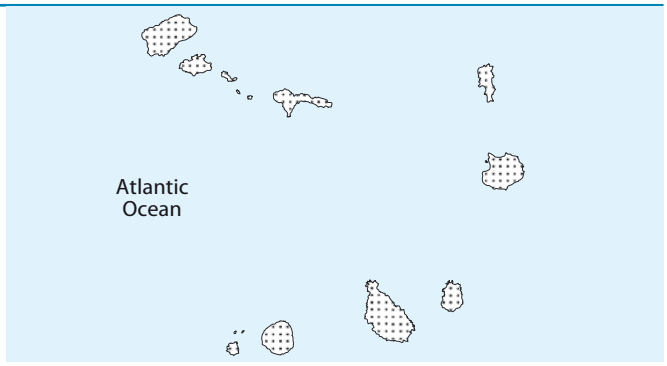
Microscopically confirmed cases, admissions and deaths (per 100 000)



Cape Verde

African Region

Phase: Pre-elimination. Impact: >75% decrease in case incidence 2000–2011.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	0	0
Low transmission (0-1 cases per 1000 population)	130 000	26
Malaria-free (0 cases)	370 000	74
Total	500 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, arabiensis*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	No	–
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	Yes	1998
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	NO	–
Case management	Patients of all ages should receive diagnostic test	Yes	1998
	RDTs used at community level	Yes	2008
	ACT is free for all ages in public sector	Yes	2008
	Pre-referral treatment with recommended medicines	No	–
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	No	–

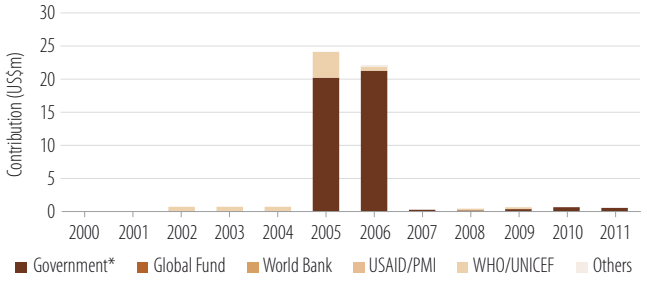
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2007
First-line treatment of *P. falciparum*	AL	2007
For treatment failure *of P. falciparum*	QN	–
Treatment of severe malaria	QN	–
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

III. Financing

Government and external financing



* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

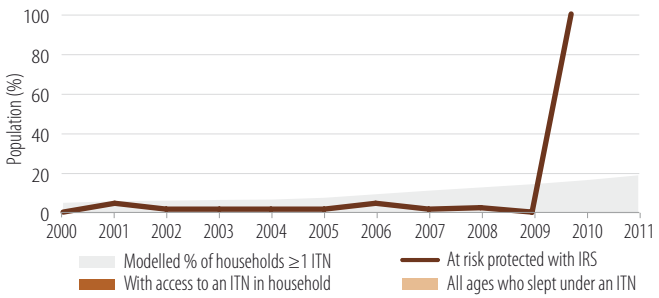
Expenditure by intervention in 2011

Data not reported for 2011

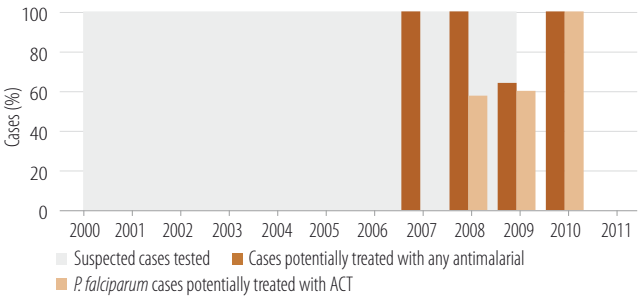
- Insecticides & spray materials
- ITNs
- Diagnostics
- Antimalarial medicines
- Monitoring and evaluation
- Human resources & technical assistance
- Management and other costs

IV. Coverage

Coverage of ITN and IRS

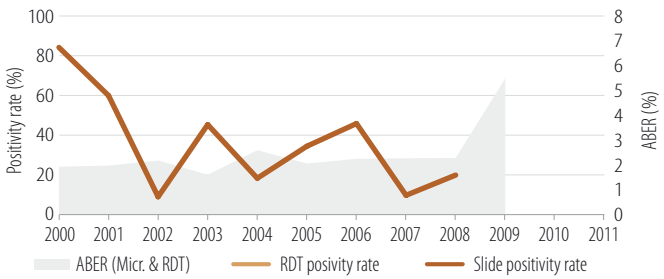


Cases tested and antimalarials delivered: Programme data (public sector)

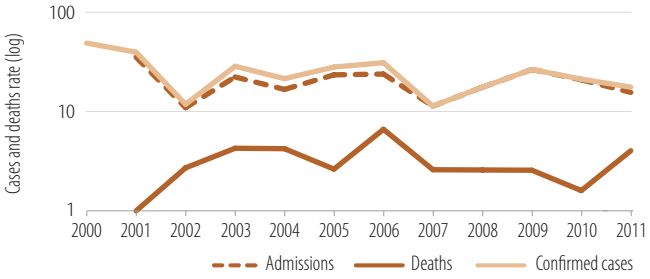


V. Impact

Malaria test positivity rate and ABER



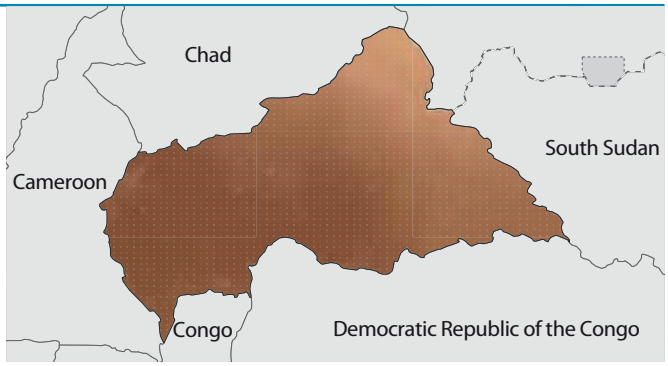
Microscopically confirmed cases, admissions and deaths (per 100 000)



Central African Republic

African Region

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	4 490 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	4 490 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, arabiensis, funestus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2006
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	No	–
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2004
Case management	Patients of all ages should receive diagnostic test	No	–
	RDTs used at community level	Yes	2008
	ACT is free for all ages in public sector	No	–
	Pre-referral treatment with recommended medicines	Yes	2008
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	Yes	2010

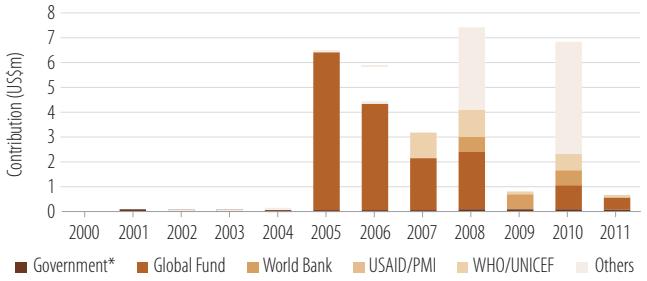
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2005
First-line treatment of *P. falciparum*	AL	–
For treatment failure *of P. falciparum*	QN	–
Treatment of severe malaria	AM ;QN	2005
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

III. Financing

Government and external financing



* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

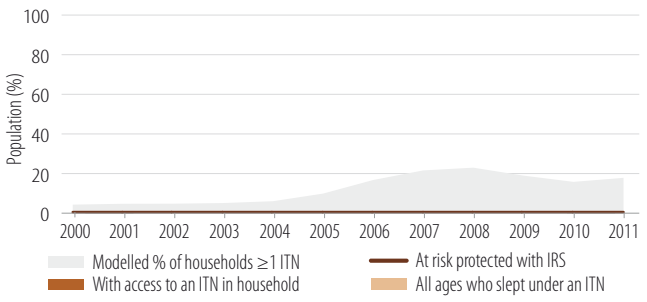
Expenditure by intervention in 2011

Data not reported for 2011

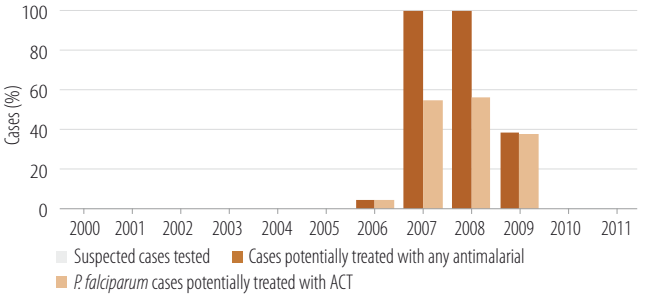
- Insecticides & spray materials
- ITNs
- Diagnostics
- Antimalarial medicines
- Monitoring and evaluation
- Human resources & technical assistance
- Management and other costs

IV. Coverage

Coverage of ITN and IRS

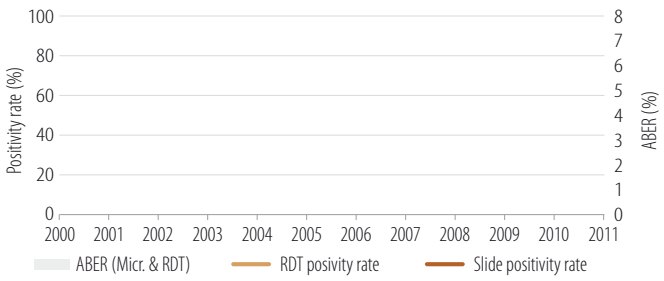


Cases tested and antimalarials delivered: Programme data (public sector)

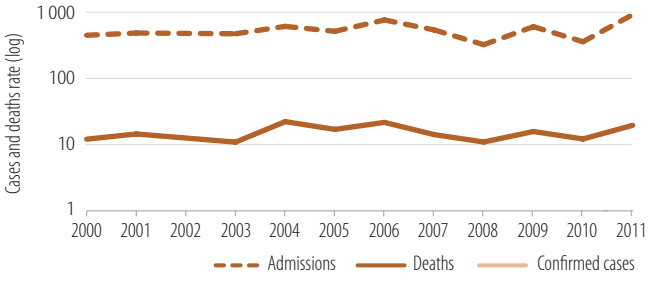


V. Impact

Malaria test positivity rate and ABER

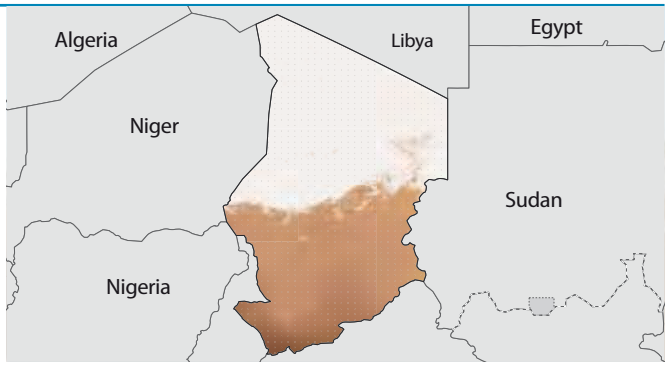


Microscopically confirmed cases, admissions and deaths (per 100 000)



Chad

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	9 220 000	80
Low transmission (0-1 cases per 1000 population)	2 190 000	19
Malaria-free (0 cases)	115 000	1
Total	11 525 000	

Parasites and vectors	
Major plasmodium species:	*P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species:	*An. gambiae, arabiensis, funestus, nili*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2003
	ITNs/LLINs distributed to all age groups	Yes	2011
IRS	IRS is recommended	Yes	–
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2004
Case management	Patients of all ages should receive diagnostic test	Yes	–
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	Yes	–
	Pre-referral treatment with recommended medicines	Yes	–
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	No	–

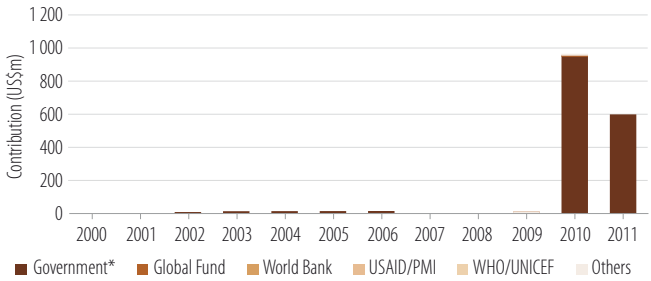
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL ;AS+AQ	–
First-line treatment of *P. falciparum*	AL ;AS+AQ	–
For treatment failure *of P. falciparum*	QN	–
Treatment of severe malaria	AM ;QN	–
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+AQ	2009-2009	2	0	0	0	28 days

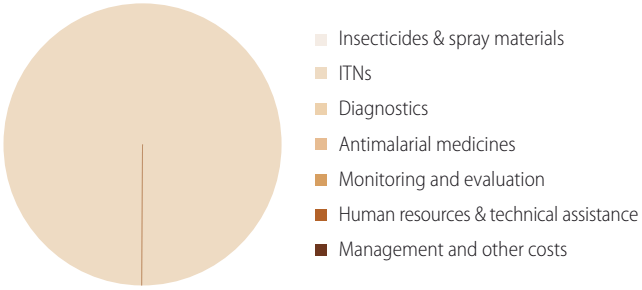
III. Financing

Government and external financing



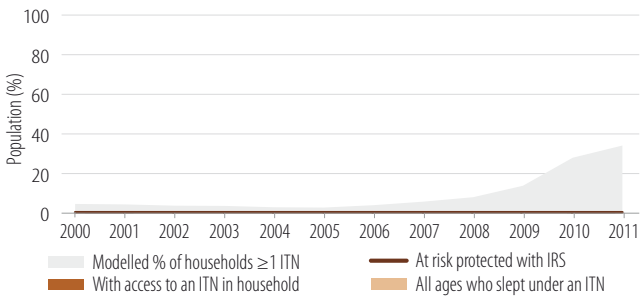
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

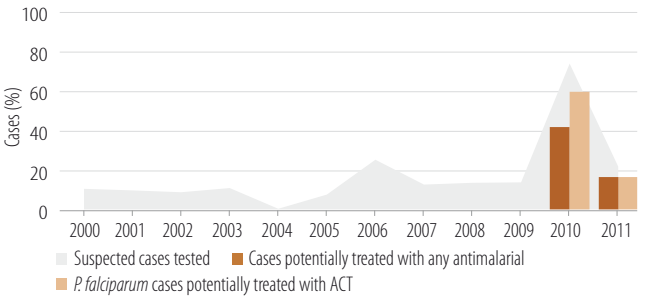


IV. Coverage

Coverage of ITN and IRS

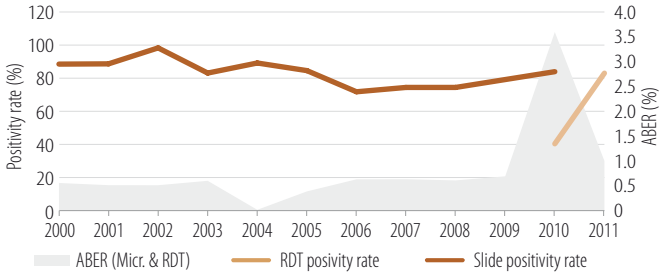


Cases tested and antimalarials delivered: Programme data (public sector)

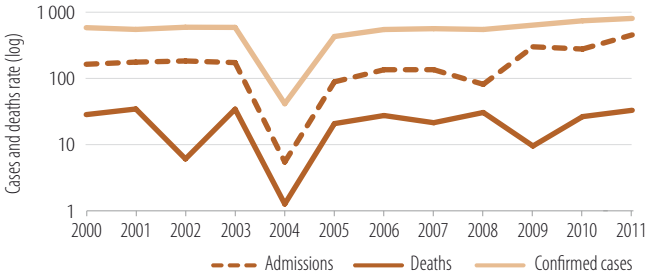


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed cases, admissions and deaths (per 100 000)



China

Phase: Control. Impact: >75% decrease in case incidence 2000–2011.

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	13 500 000	1
Low transmission (0-1 cases per 1000 population)	674 000 000	50
Malaria-free (0 cases)	660 000 000	49
Total	1 347 500 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (43%), *P. vivax* (57%)
Major anopheles species: *An. minimus, sinensis, anthropophagus, dirus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2003
	ITNs/LLINs distributed to all age groups	Yes	2000
IRS	IRS is recommended	Yes	2000
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	NA	–
Case management	Patients of all ages should receive diagnostic test	Yes	2000
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	Yes	2006
	Pre-referral treatment with recommended medicines	No	–
	Oral artemisinin-based monotherapies are not registered	Yes	2006

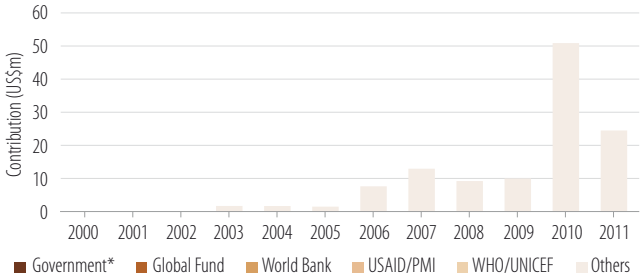
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	–
First-line treatment of *P. falciparum*	ART+NQ ;ART-PPQ ;AS+AQ ;DHA-PPQ	2000
For treatment failure *of P. falciparum*	–	2000
Treatment of severe malaria	AM ;AS ;PYR	2000
Treatment of *P. vivax*	CQ+PQ(8d)	2000

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
DHA-PPQ	2009–2011	4	0	0	0	28 days

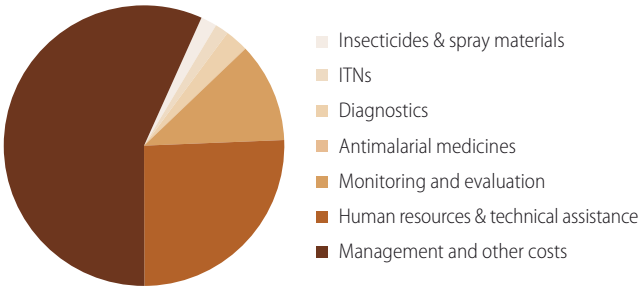
III. Financing

Government and external financing



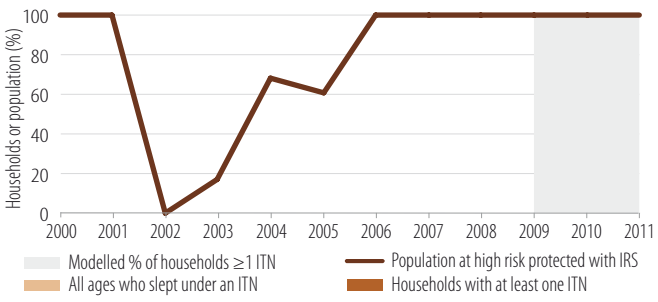
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

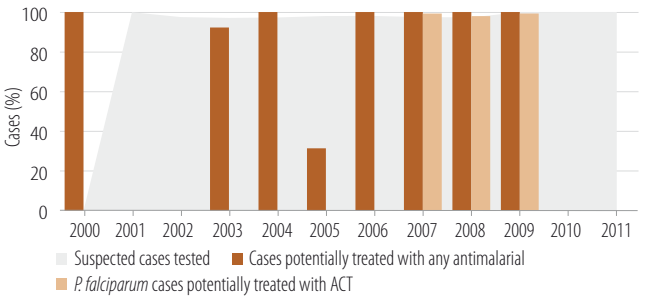


IV. Coverage

Coverage of ITN and IRS

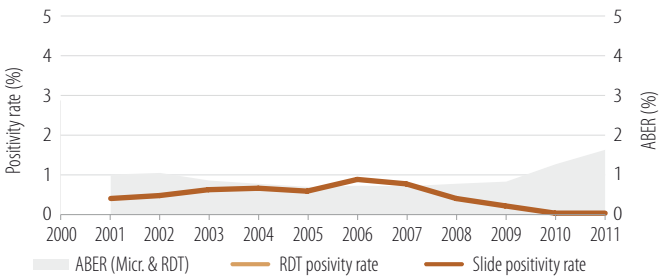


Cases tested and antimalarials delivered: Programme data (public sector)

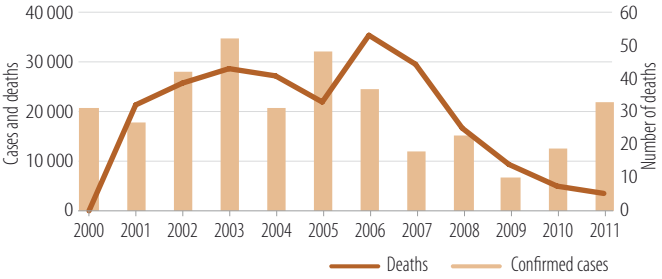


V. Impact

Malaria test positivity rate and ABER

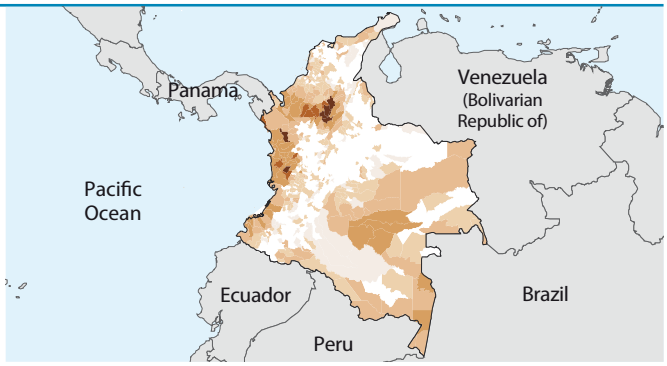


Microscopically confirmed cases and deaths



Colombia

Phase: Control. Impact: >75% decrease in case incidence projected 2000–2015.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	6 950 000	15
Low transmission (0-1 cases per 1000 population)	3 610 000	8
Malaria-free (0 cases)	36 400 000	78
Total	46 960 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (26%), *P. vivax* (74%)
Major anopheles species: *An. albimanus, darlingi, nunestovari, neivai, pseudopunctipenis*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2005
	ITNs/LLINs distributed to all age groups	Yes	2005
IRS	IRS is recommended	Yes	1958
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	N/A	–
Case management	Patients of all ages should receive diagnostic test	Yes	1984
	RDTs used at community level	Yes	2007
	ACT is free for all ages in public sector	Yes	2008
	Pre-referral treatment with recommended medicines	Yes	–
	Oral artemisinin-based monotherapies are not registered	No	–

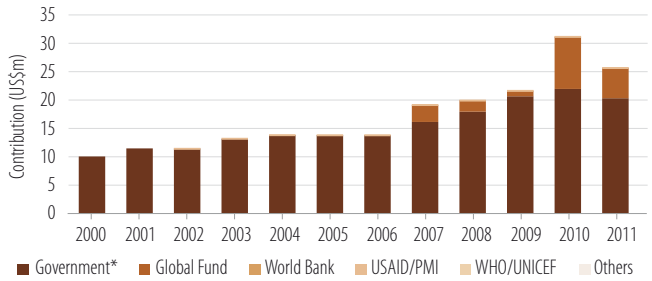
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	–	–
First-line treatment of *P. falciparum*	AS+MQ	2006
For treatment failure *of P. falciparum*	QN(3d)+CL(5d)	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	CQ+PQ	1960s

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+MQ	2006-2008	4	0	0	1.9	42 days
AL	2007-2010	3	0	0	1.3	28 days

III. Financing

Government and external financing



* Expenditure: costs for local level, health systems, etc. not included.

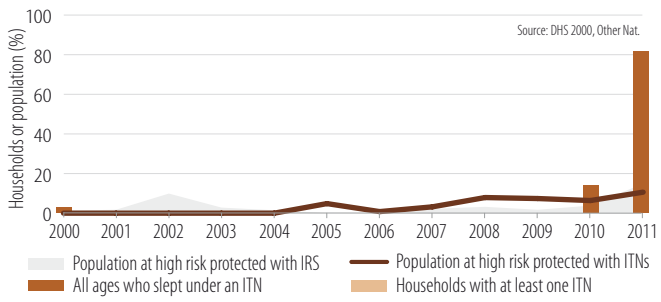
Expenditure by intervention in 2011

No data reported for 2011

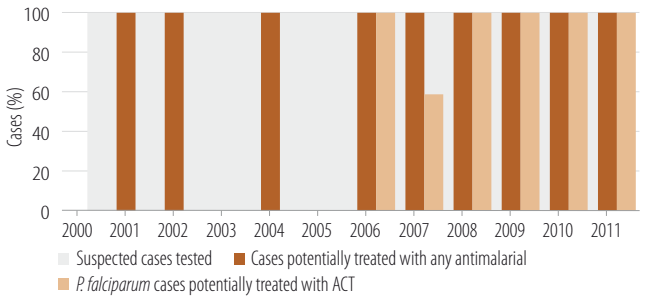
- Insecticides & spray materials
- ITNs
- Diagnostics
- Antimalarial medicines
- Monitoring and evaluation
- Human resources & technical assistance
- Management and other costs

IV. Coverage

Coverage of ITN and IRS

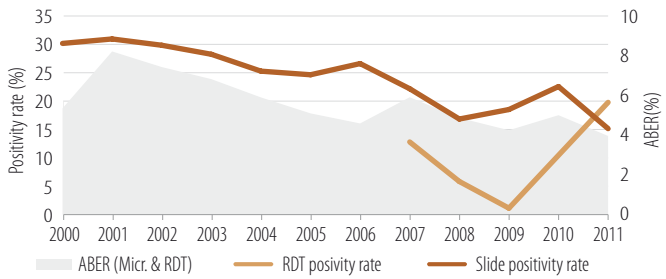


Cases tested and antimalarials delivered: Programme data (public sector)

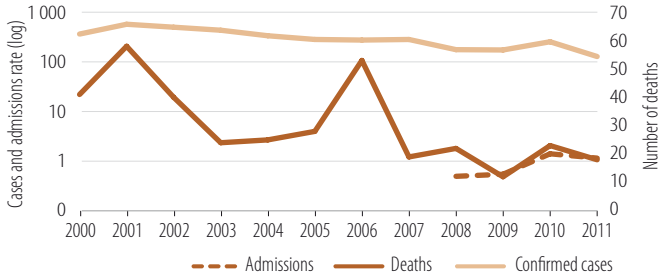


V. Impact

Malaria test positivity rate and ABER

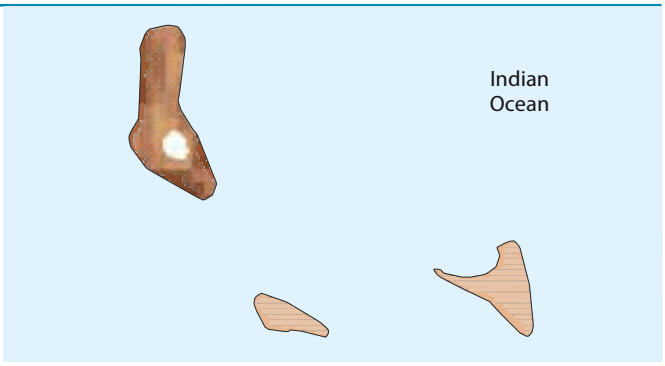


Microscopically confirmed cases, admissions (per 100 000) and deaths



Comoros

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	709 000	94
Low transmission (0-1 cases per 1000 population)	45 200	6
Malaria-free (0 cases)	0	0
Total	754 200	

Parasites and vectors

Major plasmodium species: *P. falciparum* (98%), *P. vivax* (2%)
Major anopheles species: *An. gambiae, funestus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2005
	ITNs/LLINs distributed to all age groups	Yes	2010
IRS	IRS is recommended	Yes	–
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2004
Case management	Patients of all ages should receive diagnostic test	Yes	1997
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	Yes	–
	Pre-referral treatment with recommended medicines	Yes	1997
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	Yes	2005

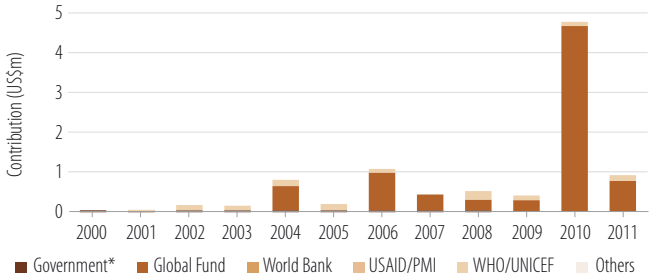
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	–
First-line treatment of *P. falciparum*	AL	–
For treatment failure of *P. falciparum*	QN	–
Treatment of severe malaria	QN	–
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AL	2006-2011	12	0	0	3.2	28 days

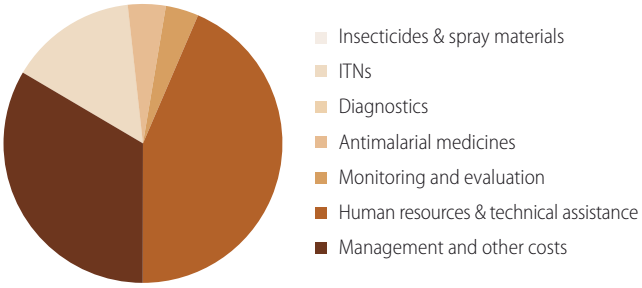
III. Financing

Government and external financing



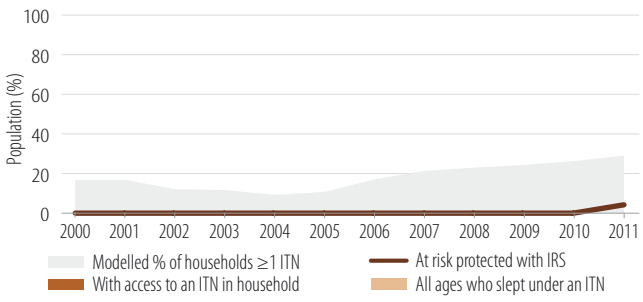
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

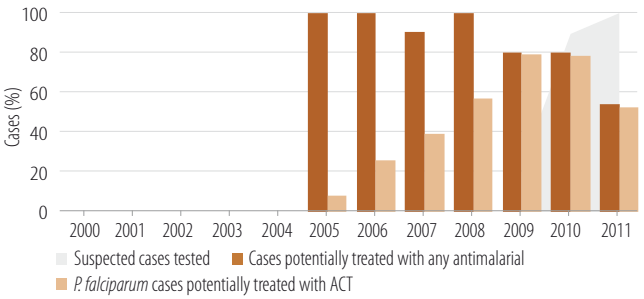


IV. Coverage

Coverage of ITN and IRS



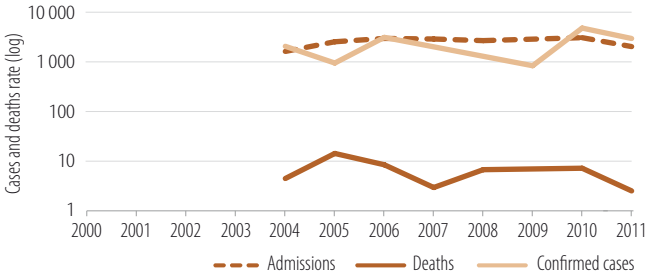
Cases tested and antimalarials delivered: Programme data (public sector)



V. Impact

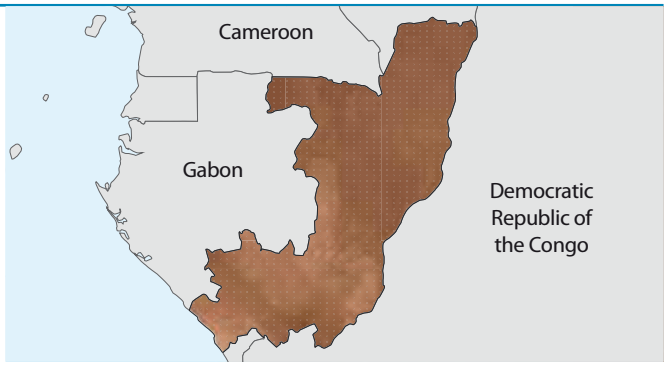
Malaria test positivity rate and ABER

Microscopically confirmed cases, admissions and deaths (per 100 000)



Congo

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	4 140 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	4 140 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, arabiensis, funestus, brochieri, coustani, hancocki, hargreavesi, melas, moucheti, moucheti, nili, paludis*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2007
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	Yes	–
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2006
Case management	Patients of all ages should receive diagnostic test	Yes	–
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	No	–
	Pre-referral treatment with recommended medicines	No	–
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	No	–

Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	–
First-line treatment of *P. falciparum*	AS+AQ	–
For treatment failure of *P. falciparum*	AL	–
Treatment of severe malaria	QN	–
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+AQ	2005-2005	1	5.6	5.6	5.6	28 days
AL	2006-2006	1	2.8	2.8	2.8	28 days

III. Financing

Government and external financing

* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

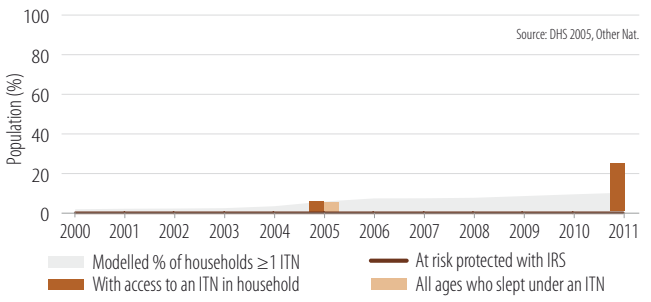
Expenditure by intervention in 2011

No data reported for 2011

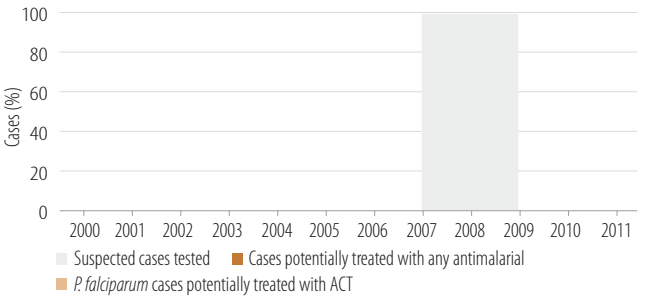
Insecticides & spray materials
ITNs
Diagnostics
Antimalarial medicines
Monitoring and evaluation
Human resources & technical assistance
Management and other costs

IV. Coverage

Coverage of ITN and IRS

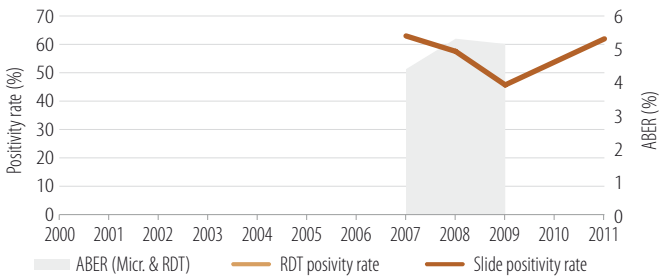


Cases tested and antimalarials delivered: Programme data (public sector)

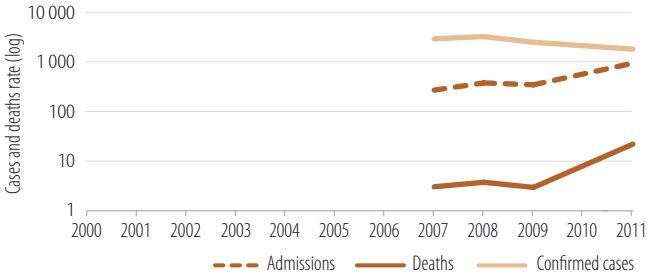


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed cases, admissions and deaths (per 100 000)



Costa Rica

Region of the Americas

Phase: Control. Impact: >75% decrease in case incidence 2000–2011.

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	47 300	1
Low transmission (0-1 cases per 1000 population)	1 610 000	34
Malaria-free (0 cases)	3 070 000	65
Total	4 727 300	

Parasites and vectors

Major plasmodium species: *P. falciparum* (24%), *P. vivax* (76%)
Major anopheles species: *An. albimanus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2009
	ITNs/LLINs distributed to all age groups	Yes	2009
IRS	IRS is recommended	Yes	1957
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	N/A	–
Case management	Patients of all ages should receive diagnostic test	No	–
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	No	–
	Pre-referral treatment with recommended medicines	–	–
	Oral artemisinin-based monotherapies are not registered	No	–

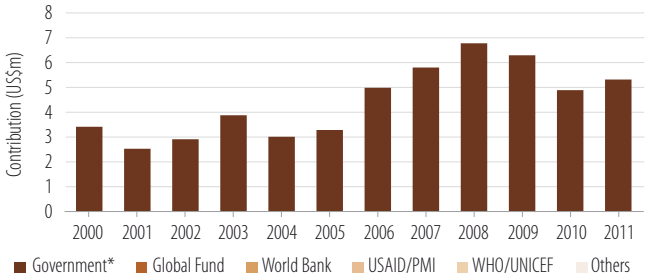
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	–	–
First-line treatment of *P. falciparum*	CQ+PQ	–
For treatment failure *of P. falciparum*	–	–
Treatment of severe malaria	–	–
Treatment of *P. vivax*	CQ+PQ	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

III. Financing

Government and external financing



* Expenditure: costs for local level, health systems, etc. not included.

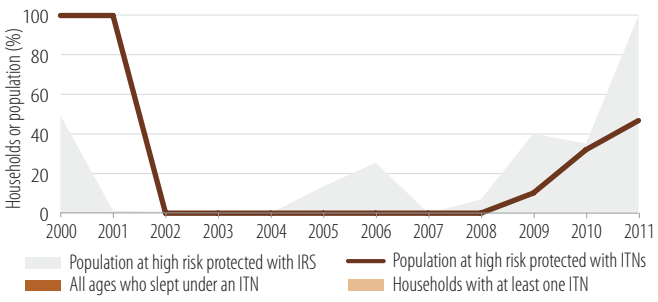
Expenditure by intervention in 2011

No data reported for 2011

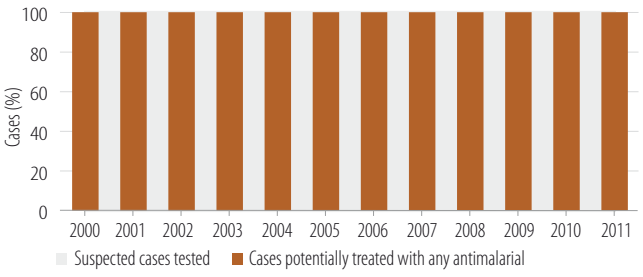
- Insecticides & spray materials
- ITNs
- Diagnostics
- Antimalarial medicines
- Monitoring and evaluation
- Human resources & technical assistance
- Management and other costs

IV. Coverage

Coverage of ITN and IRS

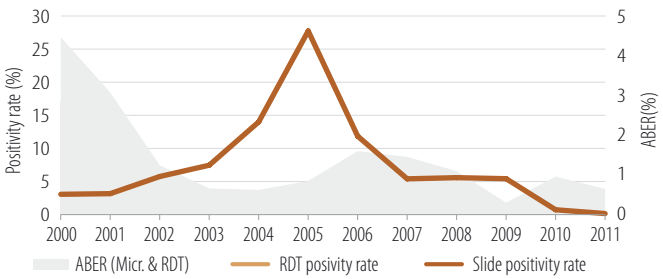


Cases tested and antimalarials delivered: Programme data (public sector)

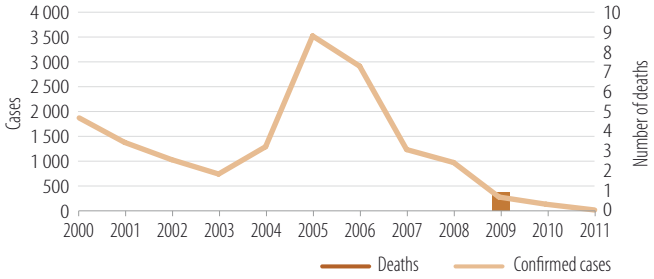


V. Impact

Malaria test positivity rate and ABER

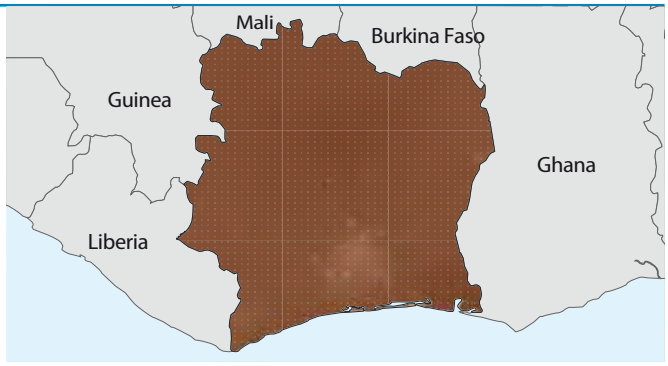


Microscopically confirmed cases and deaths



Côte d'Ivoire

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	20 200 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	20 200 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, funestus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2006
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	No	–
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2005
Case management	Patients of all ages should receive diagnostic test	Yes	–
	RDTs used at community level	Yes	–
	ACT is free for all ages in public sector	Yes	–
	Pre-referral treatment with recommended medicines	No	–
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	No	–

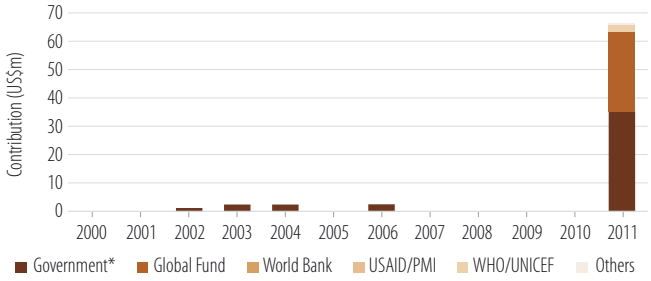
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2003
First-line treatment of *P. falciparum*	AS+AQ	2003
For treatment failure of *P. falciparum*	AL	2003
Treatment of severe malaria	QN	2003
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AL	2005–2009	4	0	2.1	7.4	28 days
AS+AQ	2008–2009	2	0	0	0	28 days

III. Financing

Government and external financing



* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

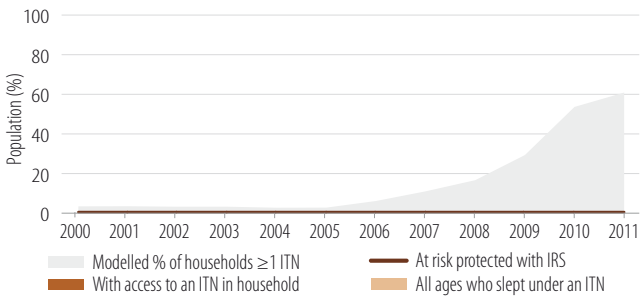
Expenditure by intervention in 2011

No data reported for 2011

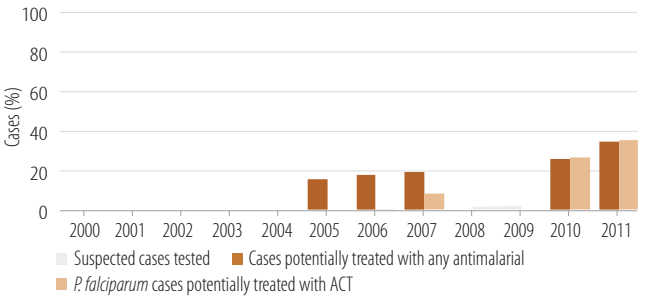
Insecticides & spray materials
ITNs
Diagnostics
Antimalarial medicines
Monitoring and evaluation
Human resources & technical assistance
Management and other costs

IV. Coverage

Coverage of ITN and IRS

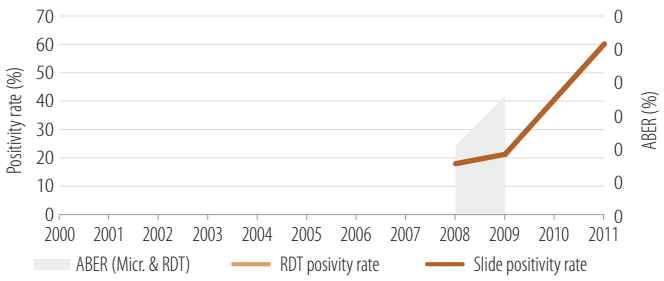


Cases tested and antimalarials delivered: Programme data (public sector)

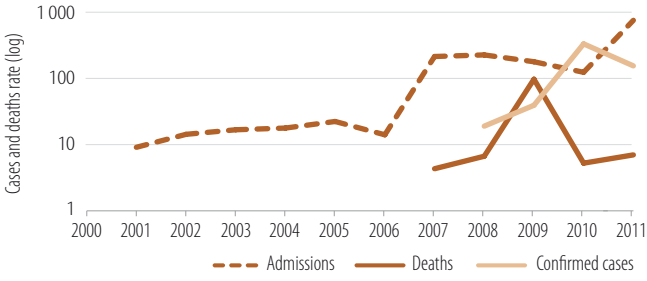


V. Impact

Malaria test positivity rate and ABER

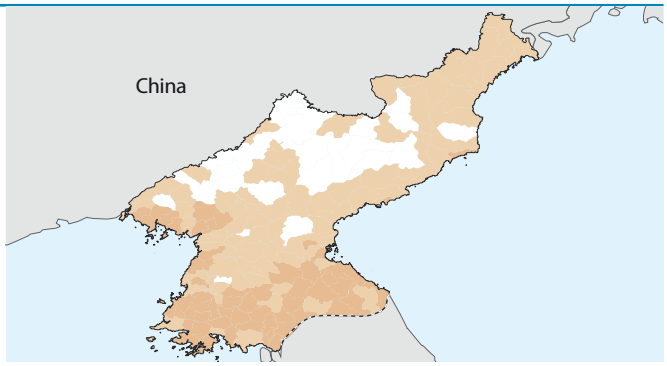


Microscopically confirmed cases, admissions and deaths (per 100 000)



Democratic People's Republic of Korea South-East Asia Region

Phase: Pre-elimination. Impact: >75% decrease in case incidence 2000–2011.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
Number of active foci	123	
Number of people living within active foci	15 200 000	62
Number of people living in malaria-free areas	9 270 000	38
Total	24 470 000	

Parasites and vectors

Major plasmodium species: *P. vivax* (100%)
Major anopheles species: *An.sinensis*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2002
	ITNs/LLINs distributed to all age groups	Yes	2002
IRS	IRS is recommended	Yes	2007
	DDT is used for IRS	No	–
Case management	Malaria diagnosis is free of charge in the public sector	Yes	1953
	Gametocidal treatment of *P.falciparum* cases	No	–
	Radical treatment of *P. vivax* cases	Yes	2000
Surveillance	Foci and case investigation undertaken	No	–
	Case reporting from private sector is mandatory	No	–

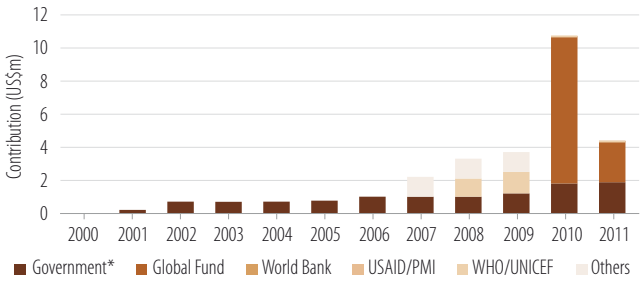
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	–
First-line treatment of *P. falciparum*	–	–
For treatment failure *of P. falciparum*	–	–
Treatment of severe malaria	–	–
Treatment of *P. vivax*	CQ+PQ(14d)	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

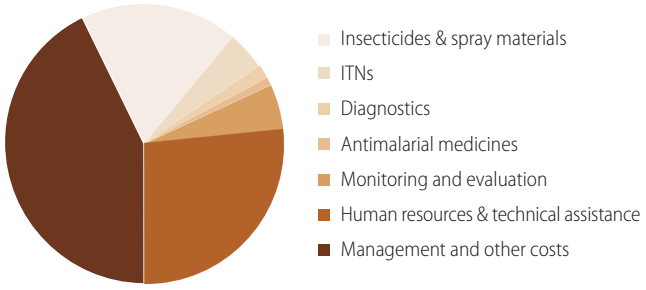
III. Financing

Government and external financing



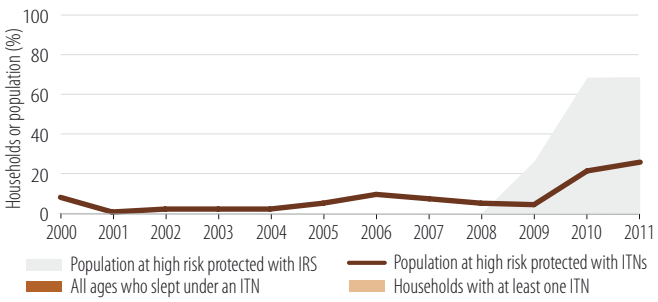
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

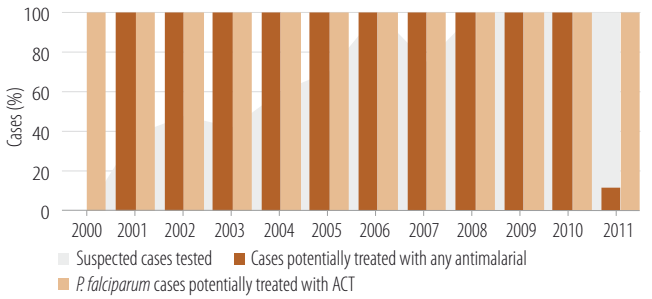


IV. Coverage

Coverage of ITN and IRS

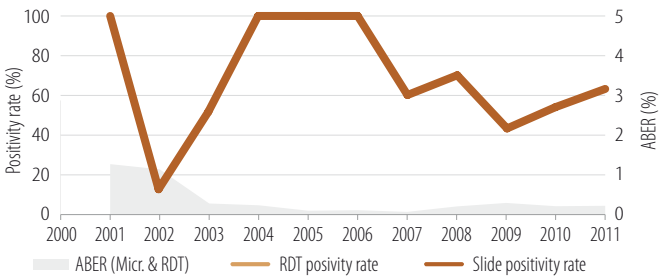


Cases tested and antimalarials delivered: Programme data (public sector)

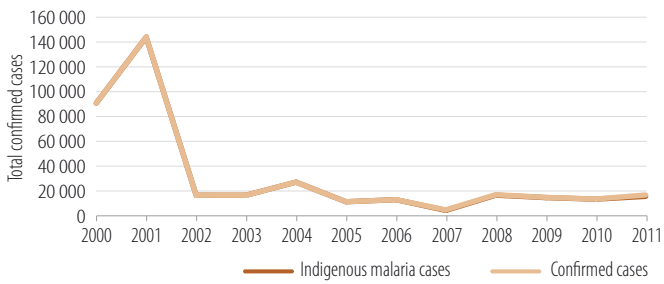


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed malaria cases and indigenous cases



Democratic Republic of the Congo

African Region

Phase: Control. Impact: Insufficiently consistent data to assess trends.

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	65 700 000	97
Low transmission (0-1 cases per 1000 population)	2 030 000	3
Malaria-free (0 cases)	0	0
Total	67 730 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, funestus, nili, moucheti*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2006
	ITNs/LLINs distributed to all age groups	Yes	2008
IRS	IRS is recommended	Yes	2007
	DDT is used for IRS	Yes	2008
IPT	IPT used to prevent malaria during pregnancy	Yes	2005
Case management	Patients of all ages should receive diagnostic test	Yes	2007
	RDTs used at community level	Yes	2008
	ACT is free for all ages in public sector	Yes	2006
	Pre-referral treatment with recommended medicines	No	–
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	No	–

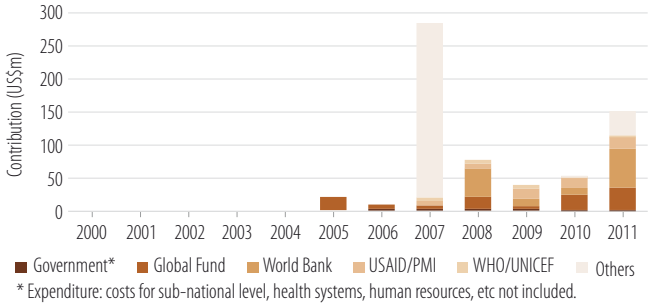
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2005
First-line treatment of *P. falciparum*	AS+AQ	2005
For treatment failure of *P. falciparum*	QN	2005
Treatment of severe malaria	QN	2005
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+AQ	2005-2009	7	0	3.7	6.9	28 days

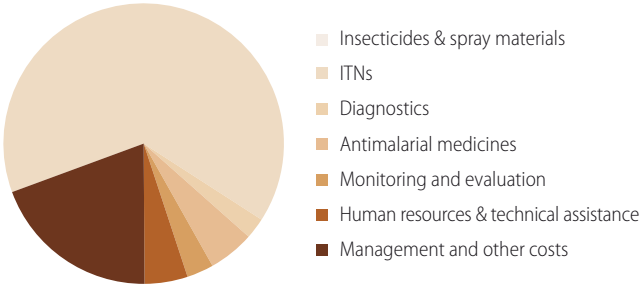
III. Financing

Government and external financing



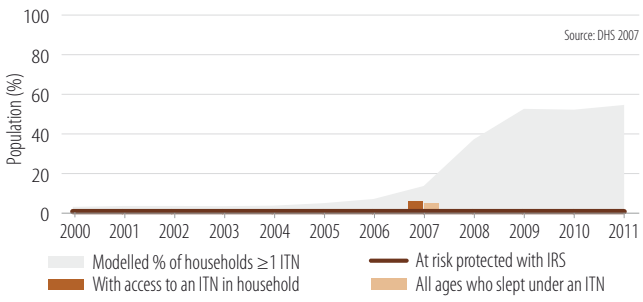
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

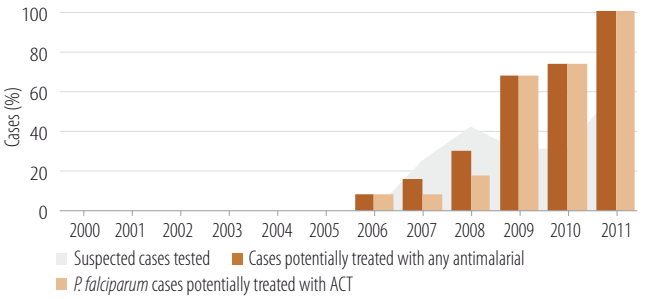


IV. Coverage

Coverage of ITN and IRS

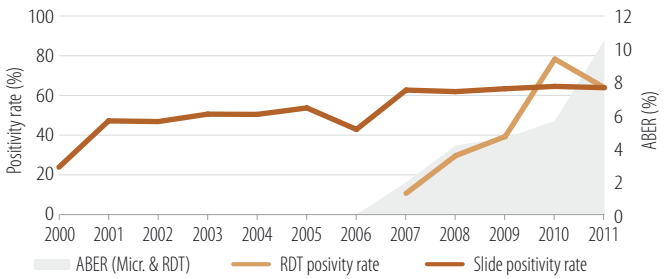


Cases tested and antimalarials delivered: Programme data (public sector)

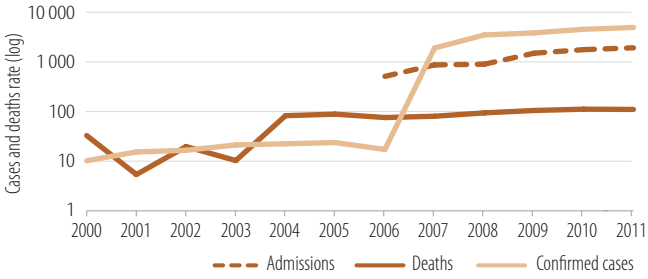


V. Impact

Malaria test positivity rate and ABER

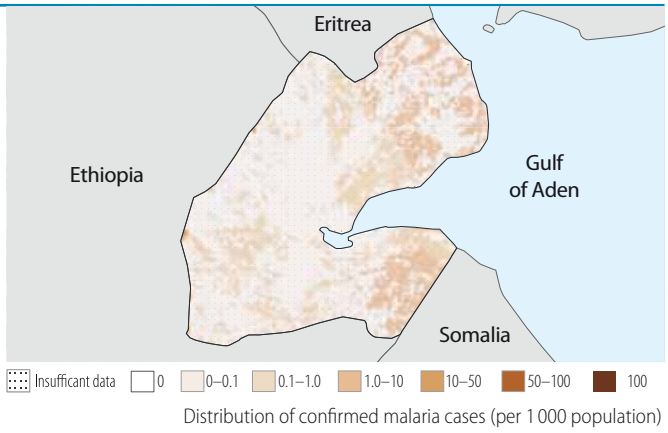


Microscopically confirmed cases, admissions and deaths (per 100 000)



Djibouti

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2010	%
High transmission (≥1 case per 1000 population)	0	0
Low transmission (0-1 cases per 1000 population)	453 000	50
Malaria-free (0 cases)	453 000	50
Total	906 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. arabiensis*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2008
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	Yes	2006
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	NA	–
Case management	Patients of all ages should receive diagnostic test	Yes	2007
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	Yes	2007
	Pre-referral treatment with recommended medicines	No	–
	Oral artemisinin-based monotherapies are not registered	No	–

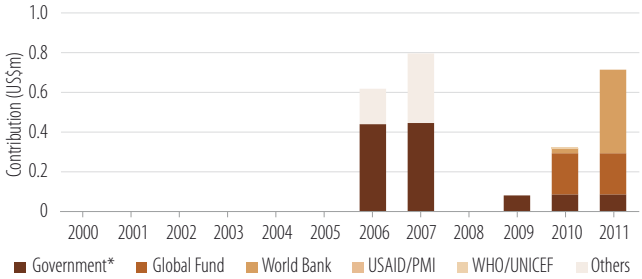
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+SP	2008
First-line treatment of *P. falciparum*	AS+SP	2008
For treatment failure *of P. falciparum*	AL	2008
Treatment of severe malaria	QN	–
Treatment of *P. vivax*	CQ+PQ(14d)	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

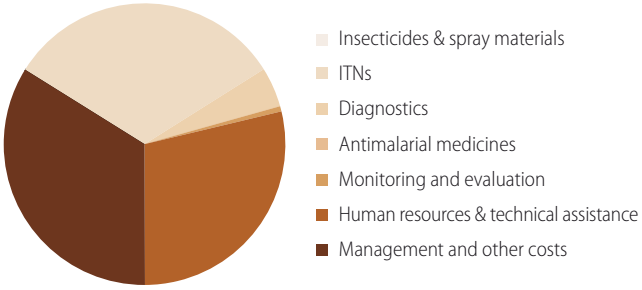
III. Financing

Government and external financing



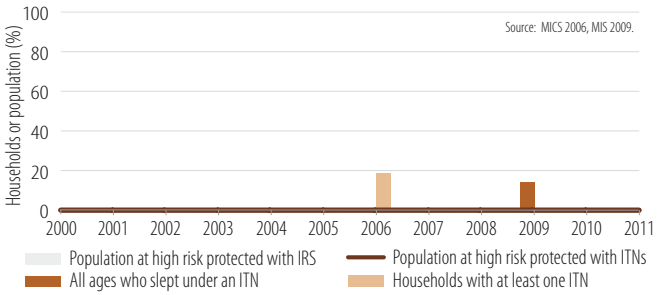
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2010

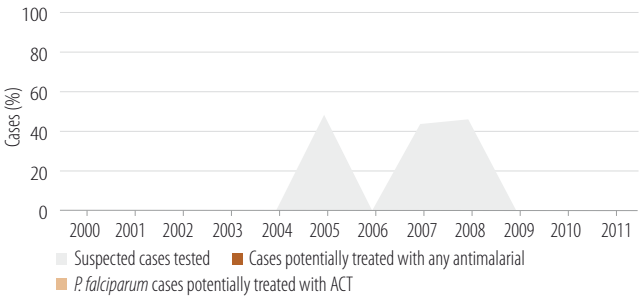


IV. Coverage

Coverage of ITN and IRS

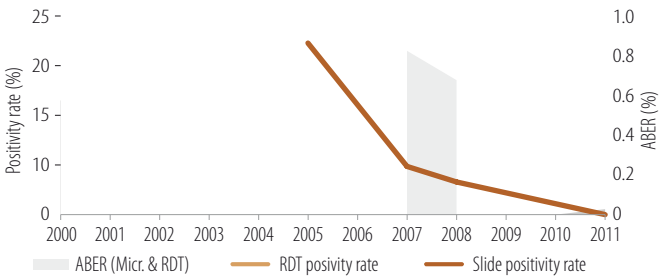


Cases tested and antimalarials delivered: Programme data (public sector)

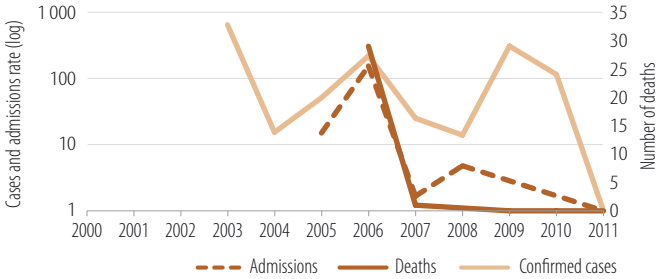


V. Impact

Malaria test positivity rate and ABER



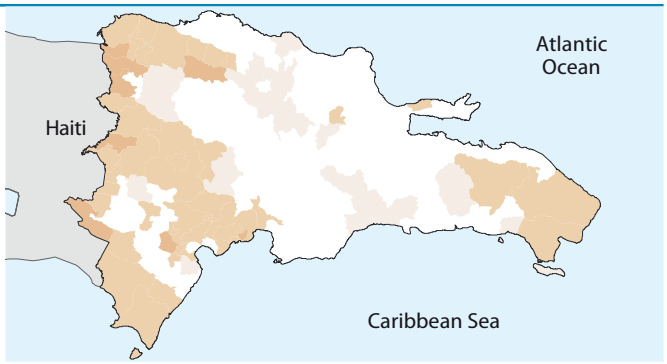
Microscopically confirmed cases, admissions (per 100 000) and deaths



Dominican Republic

Region of the Americas

Phase: Control. Impact: Increase in case incidence 2000–2015.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2010	%
High transmission (≥1 case per 1000 population)	432 000	4
Low transmission (0-1 cases per 1000 population)	8 180 000	81
Malaria-free (0 cases)	1 450 000	14
Total	10 062 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. albimanus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2008
	ITNs/LLINs distributed to all age groups	Yes	2008
IRS	IRS is recommended	Yes	1946
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	NA	–
Case management	Patients of all ages should receive diagnostic test	Yes	1964
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	No	–
	Pre-referral treatment with recommended medicines	No	–
	Oral artemisinin-based monotherapies are not registered	No	–

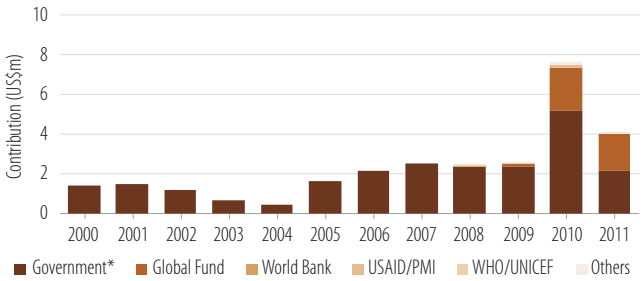
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	CQ+PQ	–
First-line treatment of *P. falciparum*	CQ+PQ(3d)	–
For treatment failure *of P. falciparum*	AS+D	–
Treatment of severe malaria	CQ ;QN	–
Treatment of *P. vivax*	CQ+PQ	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

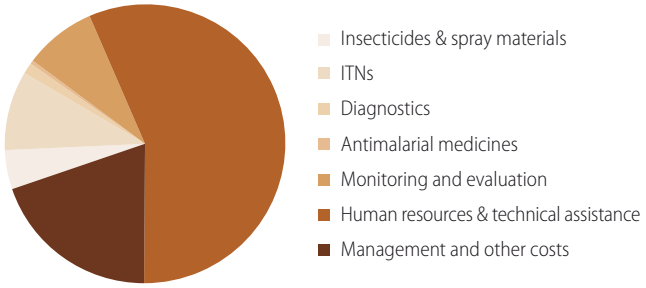
III. Financing

Government and external financing



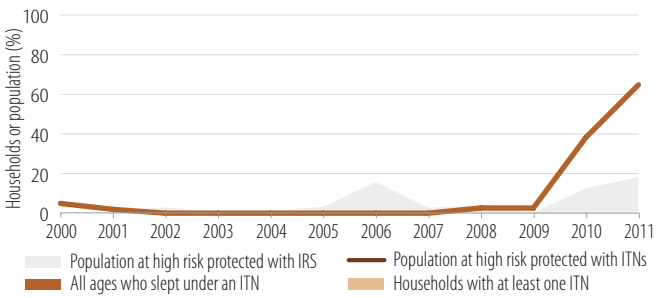
* Expenditure: costs for local level, health systems, etc. not included.

Expenditure by intervention in 2010

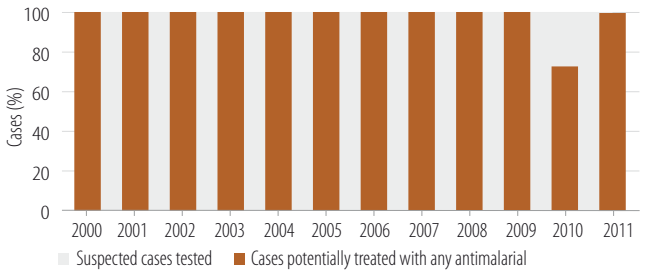


IV. Coverage

Coverage of ITN and IRS

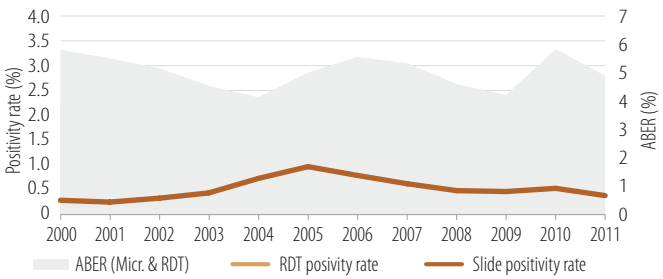


Cases tested and antimalarials delivered: Programme data (public sector)

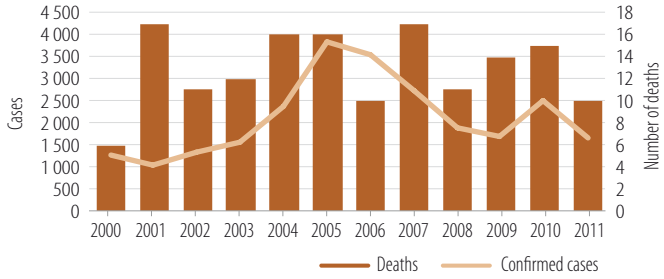


V. Impact

Malaria test positivity rate and ABER

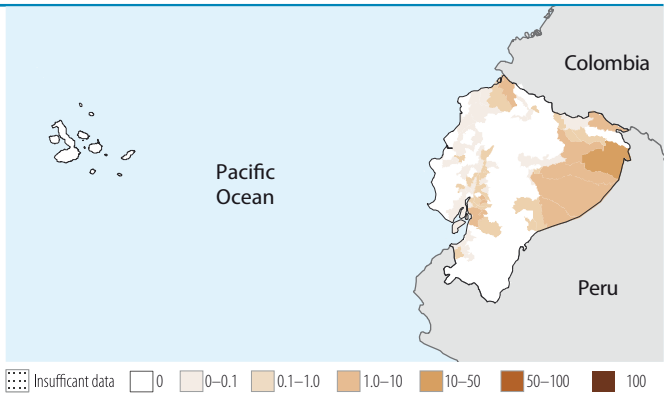


Microscopically confirmed cases and deaths



Ecuador

Phase: Control. Impact: >75% decrease in case incidence 2000–2011.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2010	%
High transmission (≥1 case per 1000 population)	220 000	2
Low transmission (0-1 cases per 1000 population)	8 650 000	59
Malaria-free (0 cases)	5 790 000	39
Total	14 660 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (24%), *P. vivax* (76%)
Major anopheles species: *An. albimanus, punctimacula, pseudopunctipennis, neivai*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2004
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	Yes	2005
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	N/A	–
Case management	Patients of all ages should receive diagnostic test	Yes	1956
	RDTs used at community level	Yes	2006
	ACT is free for all ages in public sector	Yes	2006
	Pre-referral treatment with recommended medicines	No	–
	Oral artemisinin-based monotherapies are not registered	Yes	–

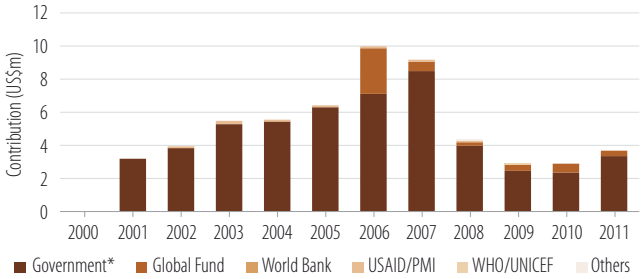
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	–
First-line treatment of *P. falciparum*	AS+SP	2004
For treatment failure *of P. falciparum*	AL	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	CQ+PQ	2004

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+SP	2005–2006	1	0	0	0	28 days

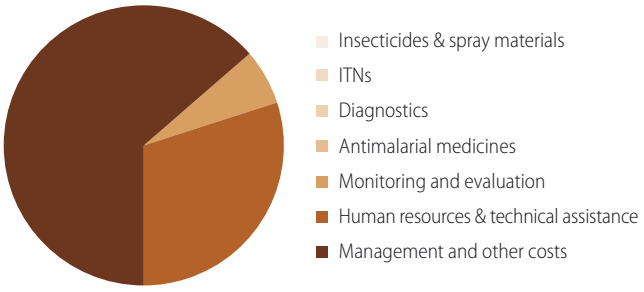
III. Financing

Government and external financing



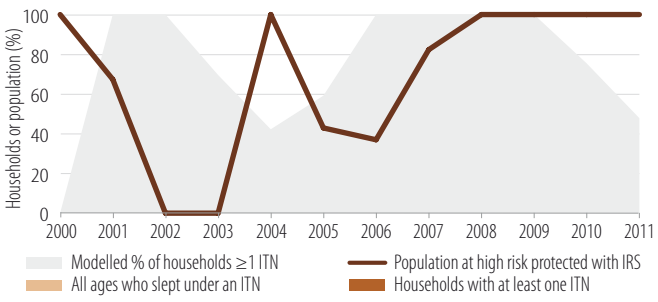
* Expenditure: costs for local level, health systems, etc. not included.

Expenditure by intervention in 2010

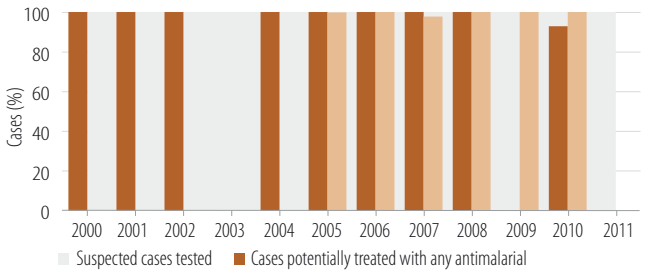


IV. Coverage

Coverage of ITN and IRS

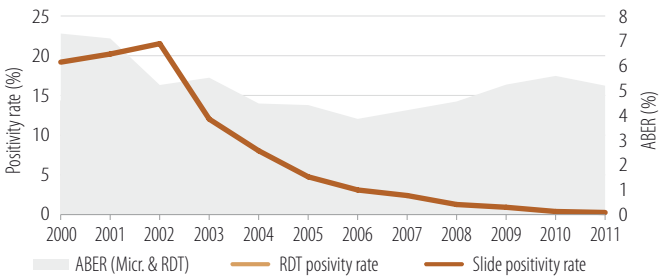


Cases tested and antimalarials delivered: Programme data (public sector)

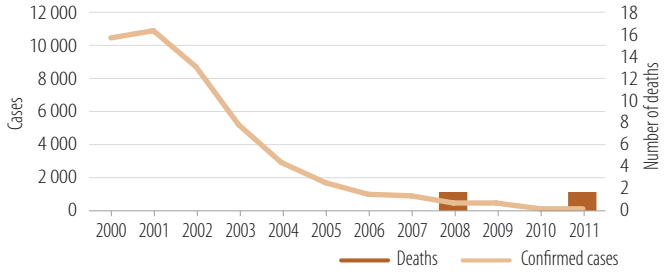


V. Impact

Malaria test positivity rate and ABER

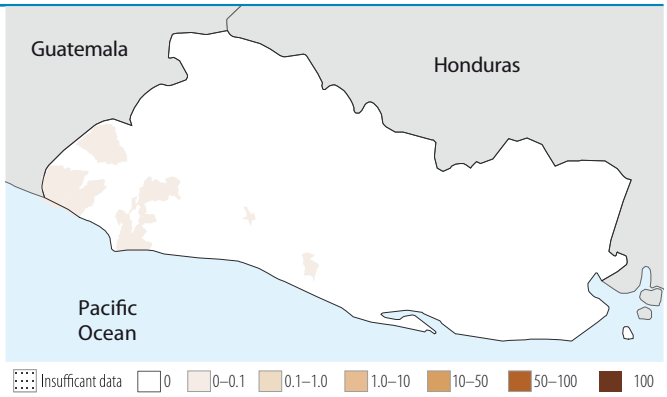


Microscopically confirmed cases and deaths



El Salvador

Phase: Pre-elimination. Impact: >75% decrease in case incidence 2000–2011.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2010	%
High transmission (≥1 case per 1000 population)	0	0
Low transmission (0-1 cases per 1000 population)	1 260 000	20
Malaria-free (0 cases)	4 960 000	80
Total	6 220 000	

Parasites and vectors

Major plasmodium species:
Major anopheles species:

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	–
	ITNs/LLINs distributed to all age groups	Yes	–
IRS	IRS is recommended	Yes	–
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	N/A	–
Case management	Patients of all ages should receive diagnostic test	Yes	2010
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	No	–
	Pre-referral treatment with recommended medicines	No	–
	Oral artemisinin-based monotherapies are not registered	No	–

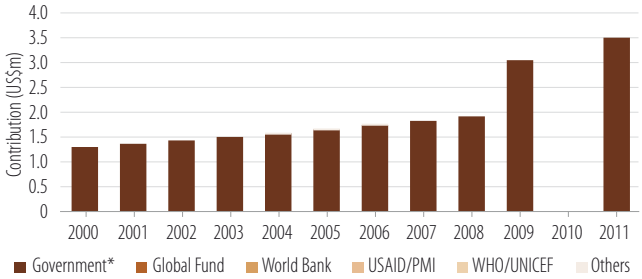
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	–	–
First-line treatment of *P. falciparum*	CQ+PQ	–
For treatment failure *of P. falciparum*	–	–
Treatment of severe malaria	–	–
Treatment of *P. vivax*	CQ+PQ	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

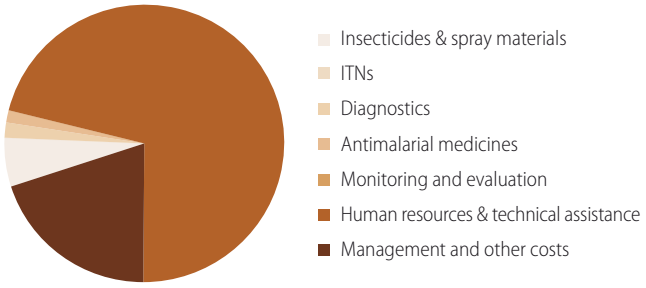
III. Financing

Government and external financing



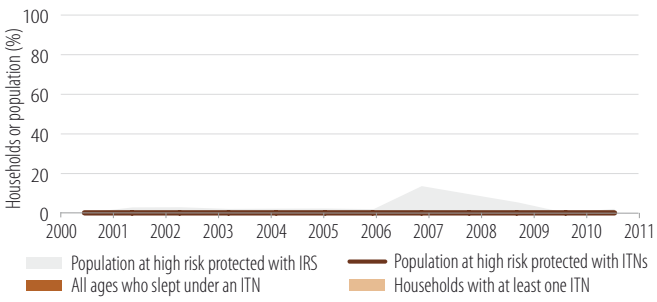
* Expenditure: costs for local level, health systems, etc. not included.

Expenditure by intervention in 2010

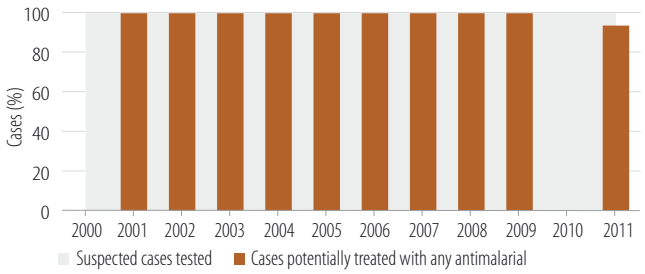


IV. Coverage

Coverage of ITN and IRS

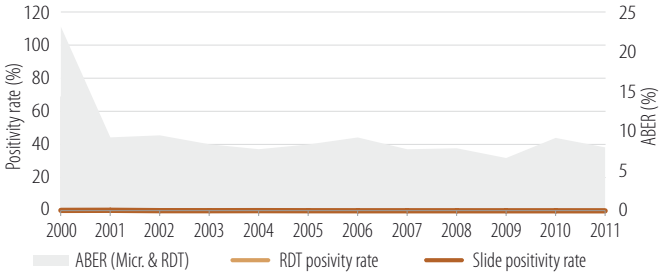


Cases tested and antimalarials delivered: Programme data (public sector)

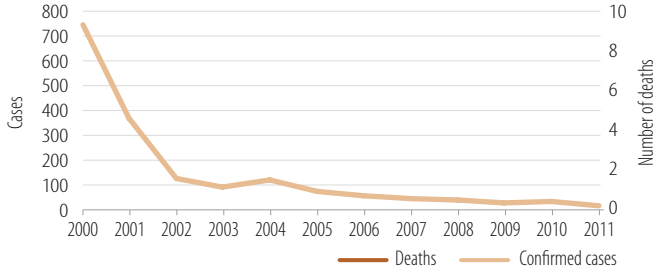


V. Impact

Malaria test positivity rate and ABER

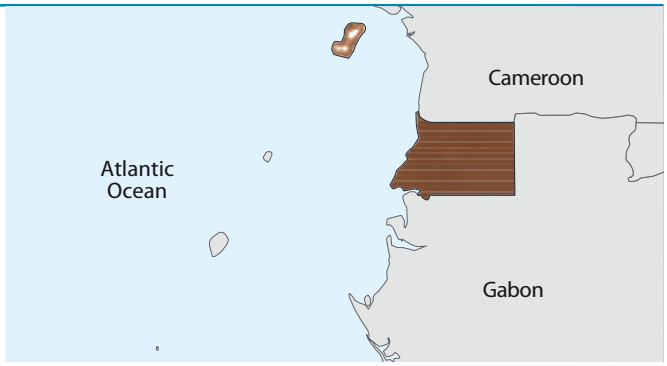


Microscopically confirmed cases and deaths



Equatorial Guinea

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	720 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	720 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, cinctus, melas*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2007
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	Yes	2005
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	–
Case management	Patients of all ages should receive diagnostic test	Yes	2005
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	Yes	2008
	Pre-referral treatment with recommended medicines	Yes	2008
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	No	–

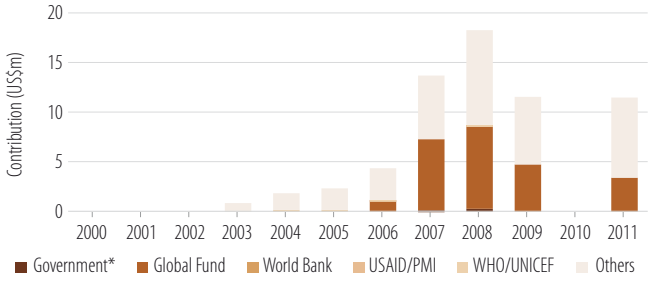
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2004
First-line treatment of *P. falciparum*	AS+AQ	2004
For treatment failure of *P. falciparum*	QN	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+AQ	2006-2006	1	3.3	3.3	3.3	28 days

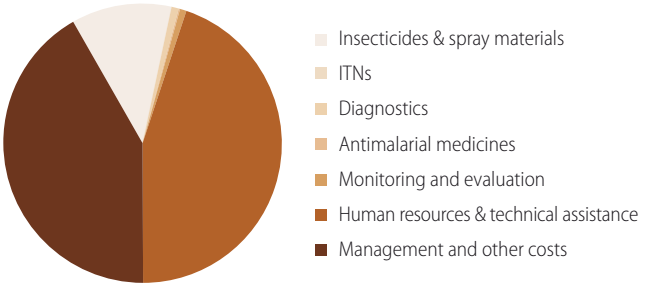
III. Financing

Government and external financing



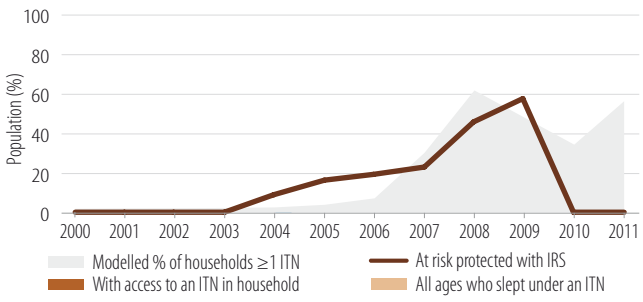
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

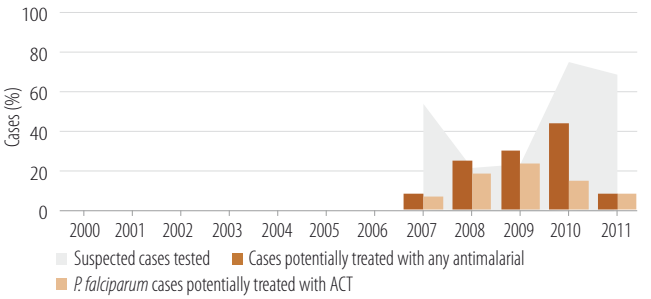


IV. Coverage

Coverage of ITN and IRS

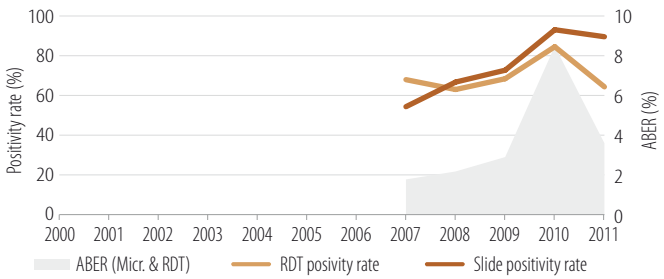


Cases tested and antimalarials delivered: Programme data (public sector)

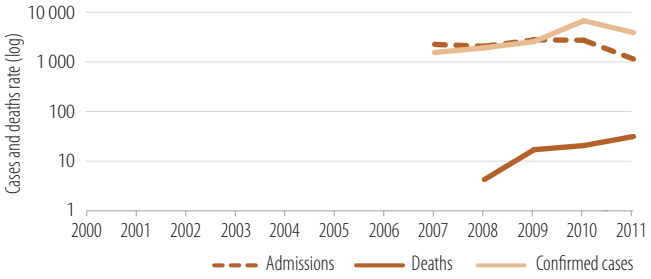


V. Impact

Malaria test positivity rate and ABER

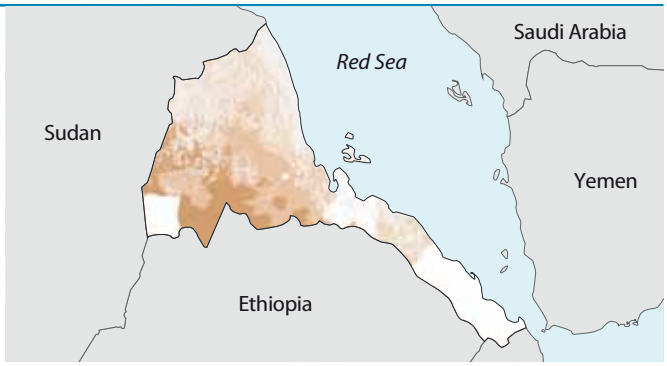


Microscopically confirmed cases, admissions and deaths (per 100 000)



Eritrea

Phase: Control. Impact: >75% decrease in admission rates projected 2000–2015.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	3 840 000	71
Low transmission (0-1 cases per 1000 population)	1 570 000	29
Malaria-free (0 cases)	0	0
Total	5 410 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (68%), *P. vivax* (32%)
Major anopheles species: *An. arabiensis*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2002
	ITNs/LLINs distributed to all age groups	Yes	2000
IRS	IRS is recommended	Yes	1995
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	No	–
Case management	Patients of all ages should receive diagnostic test	Yes	1997
	RDTs used at community level	Yes	2008
	ACT is free for all ages in public sector	Yes	2007
	Pre-referral treatment with recommended medicines	Yes	2002
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	Yes	–

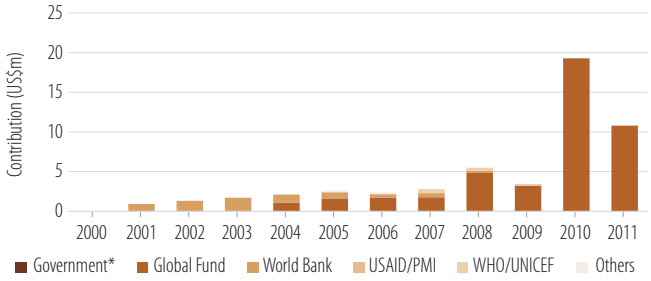
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	CQ+SP	2007
First-line treatment of *P. falciparum*	AS+AQ	2007
For treatment failure of *P. falciparum*	QN	2007
Treatment of severe malaria	QN	2007
Treatment of *P. vivax*	CQ+PQ	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+AQ	2006-2010	8	0	4.6	7.9	28 days

III. Financing

Government and external financing



* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

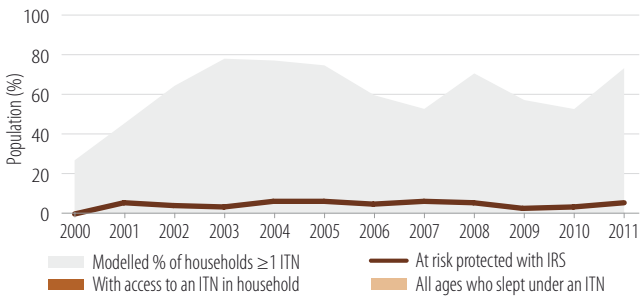
Expenditure by intervention in 2011

No data reported for 2011

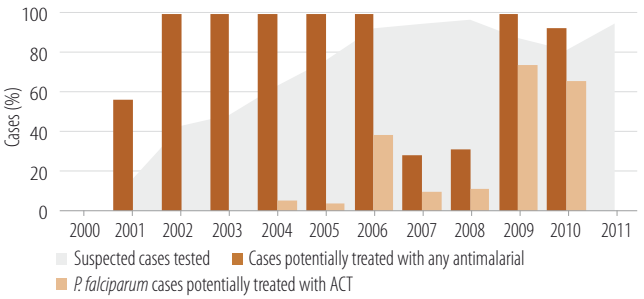
Insecticides & spray materials
ITNs
Diagnostics
Antimalarial medicines
Monitoring and evaluation
Human resources & technical assistance
Management and other costs

IV. Coverage

Coverage of ITN and IRS

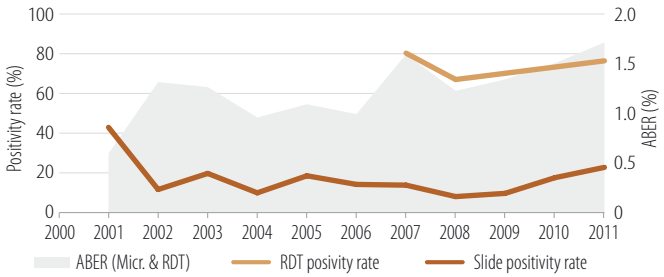


Cases tested and antimalarials delivered: Programme data (public sector)

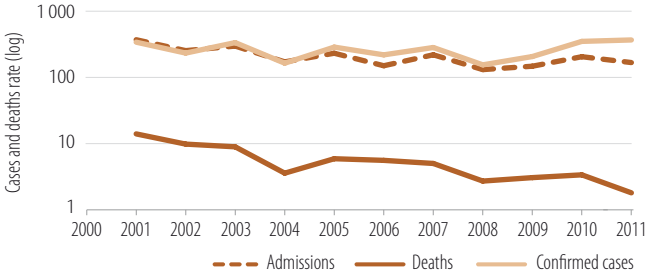


V. Impact

Malaria test positivity rate and ABER

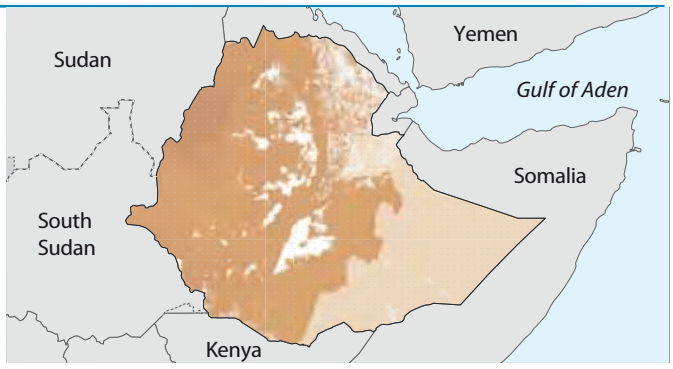


Microscopically confirmed cases, admissions and deaths (per 100 000)



Ethiopia

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	847 000	1
Low transmission (0-1 cases per 1000 population)	55 900 000	66
Malaria-free (0 cases)	28 000 000	33
Total	84 747 000	

Parasites and vectors	
Major plasmodium species:	*P. falciparum* (55%), *P. vivax* (45%)
Major anopheles species:	*An. arabiensis, funestus, pharoensis, nili*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2004
	ITNs/LLINs distributed to all age groups	Yes	2004
IRS	IRS is recommended	Yes	1960
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	No	–
Case management	Patients of all ages should receive diagnostic test	Yes	1960
	RDTs used at community level	Yes	2004
	ACT is free for all ages in public sector	Yes	2004
	Pre-referral treatment with recommended medicines	Yes	1997
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	No	–

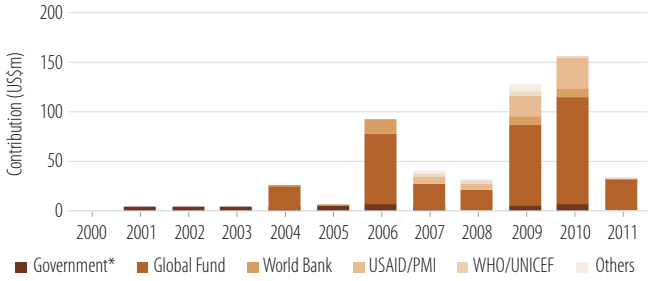
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2004
First-line treatment of *P. falciparum*	AL	2004
For treatment failure *of P. falciparum*	QN	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	CQ	2004

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AL	2003–2009	9	0	0	7.5	28 days
QN	2006–2006	1	10	10	10	28 days

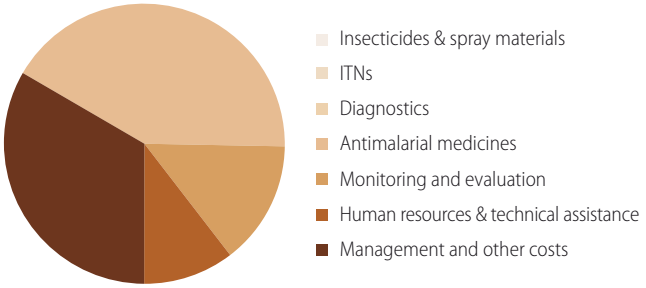
III. Financing

Government and external financing



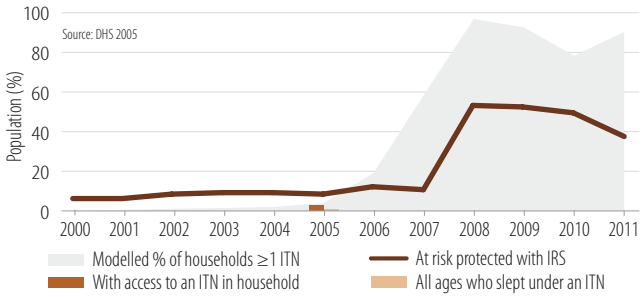
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

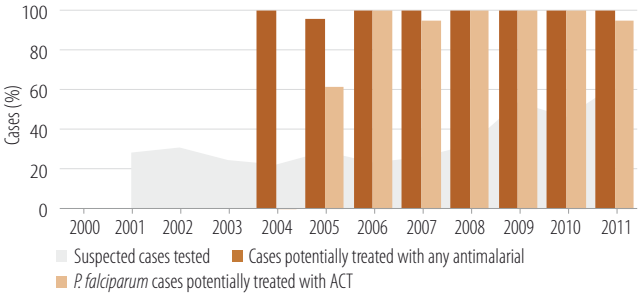


IV. Coverage

Coverage of ITN and IRS

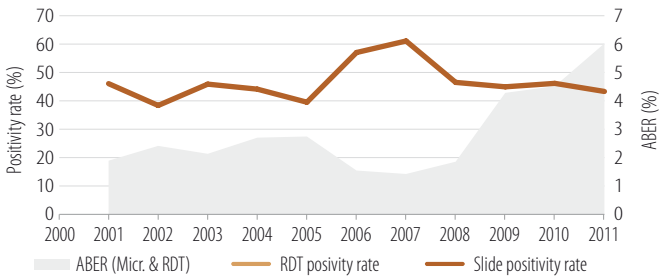


Cases tested and antimalarials delivered: Programme data (public sector)

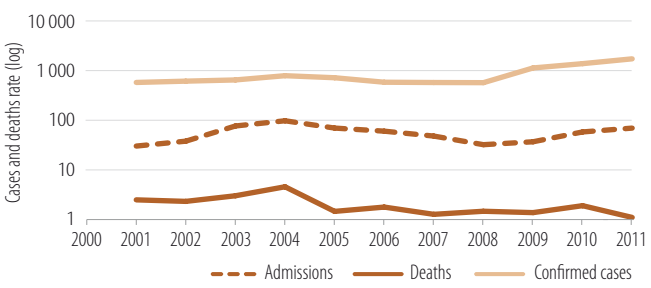


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed cases, admissions and deaths (per 100 000)



French Guiana, France

Region of the Americas

Phase: Control. Impact: >75% decrease in case incidence 2000–2011.

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2010	%
High transmission (≥1 case per 1000 population)	203 000	86
Low transmission (0-1 cases per 1000 population)	34 400	14
Malaria-free (0 cases)	0	0
Total	237 400	

Parasites and vectors

Major plasmodium species: *P. falciparum* (32%), *P. vivax* (68%)
Major anopheles species: *An. darlingi*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	No	–
	ITNs/LLINs distributed to all age groups	Yes	2005
IRS	IRS is recommended	Yes	–
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	N/A	–
Case management	Patients of all ages should receive diagnostic test	Yes	–
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	–	–
	Pre-referral treatment with recommended medicines	No	–
	Oral artemisinin-based monotherapies are not registered	–	–

Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	–
First-line treatment of *P. falciparum*	AL	–
For treatment failure *of P. falciparum*	QN+D	–
Treatment of severe malaria	–	–
Treatment of *P. vivax*	CQ+PQ	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

III. Financing

Government and external financing

* Expenditure: costs for local level, health systems, etc. not included.

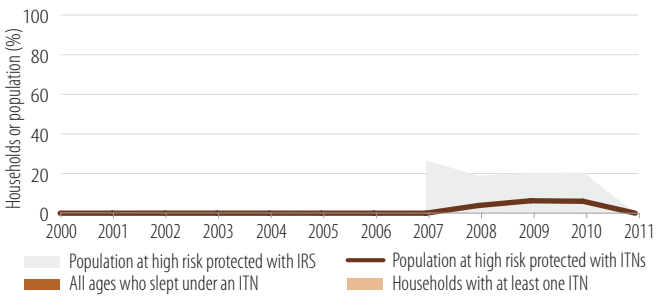
Expenditure by intervention in 2010

No data reported for 2011

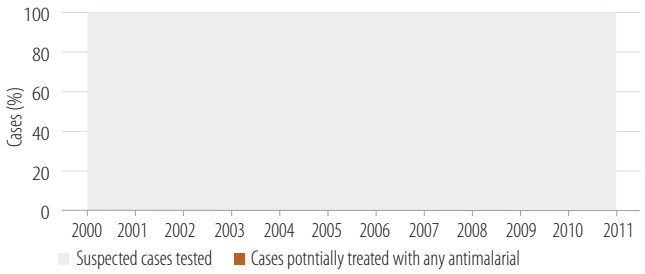
- Insecticides & spray materials
- ITNs
- Diagnostics
- Antimalarial medicines
- Monitoring and evaluation
- Human resources & technical assistance
- Management and other costs

IV. Coverage

Coverage of ITN and IRS

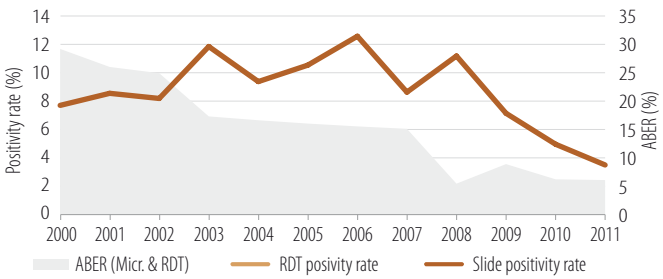


Cases tested and antimalarials delivered: Programme data (public sector)

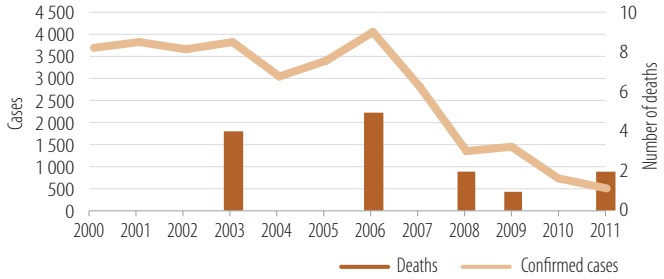


V. Impact

Malaria test positivity rate and ABER

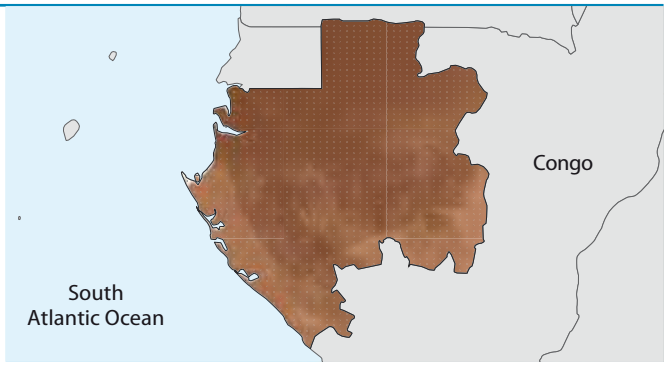


Microscopically confirmed cases and deaths



Gabon

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	1 530 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	1 530 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, funestus, melas*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2003
	ITNs/LLINs distributed to all age groups	Yes	2007
IRS	IRS is recommended	No	–
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2003
Case management	Patients of all ages should receive diagnostic test	Yes	2009
	RDTs used at community level	Yes	2010
	ACT is free for all ages in public sector	Yes	2003
	Pre-referral treatment with recommended medicines	Yes	2003
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	Yes	2003

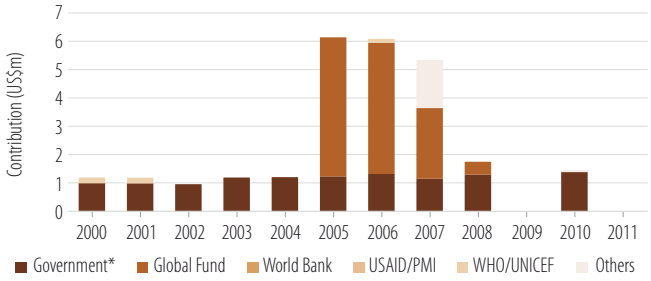
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2003
First-line treatment of *P. falciparum*	AS+AQ	2003
For treatment failure of *P. falciparum*	AL	2003
Treatment of severe malaria	QN	2003
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+AQ	2004–2005	1	13.8	13.8	13.8	28 days

III. Financing

Government and external financing



* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

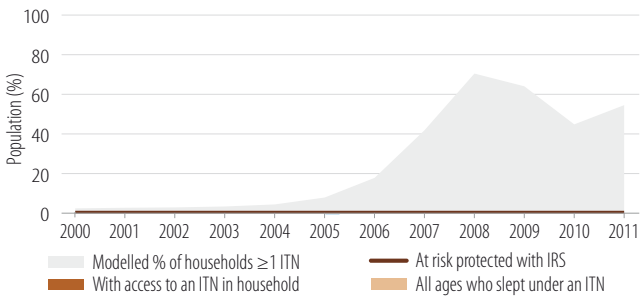
Expenditure by intervention in 2011

No data reported for 2011

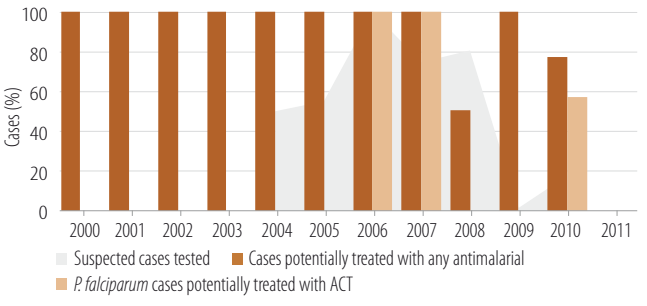
- Insecticides & spray materials
- ITNs
- Diagnostics
- Antimalarial medicines
- Monitoring and evaluation
- Human resources & technical assistance
- Management and other costs

IV. Coverage

Coverage of ITN and IRS

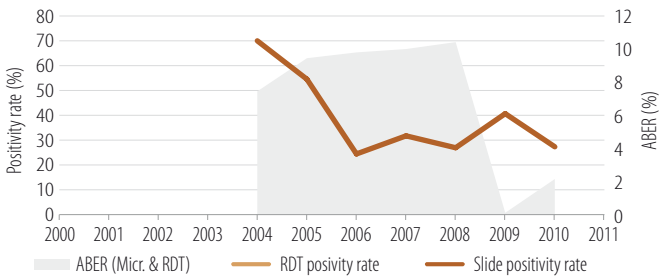


Cases tested and antimalarials delivered: Programme data (public sector)

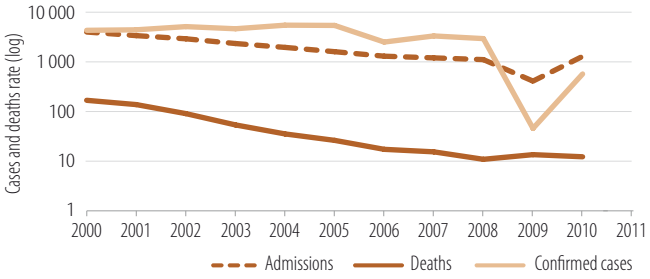


V. Impact

Malaria test positivity rate and ABER

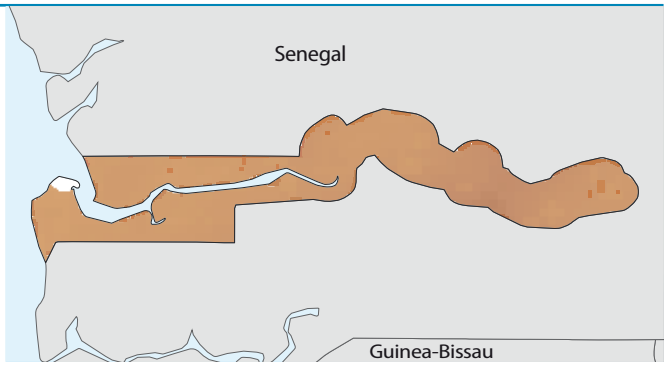


Microscopically confirmed cases, admissions and deaths (per 100 000)



Gambia

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	1 780 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	1 780 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, arabiensis, funestus, melas, pharoensis, nili*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2000
	ITNs/LLINs distributed to all age groups	Yes	1998
IRS	IRS is recommended	Yes	2008
	DDT is used for IRS	Yes	2008
IPT	IPT used to prevent malaria during pregnancy	Yes	2002
Case management	Patients of all ages should receive diagnostic test	Yes	2009
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	Yes	2008
	Pre-referral treatment with recommended medicines	Yes	1998
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	No	–

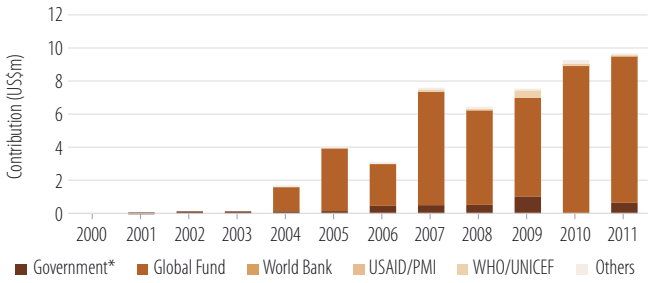
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2005
First-line treatment of *P. falciparum*	AL	2005
For treatment failure of *P. falciparum*	QN	2005
Treatment of severe malaria	QN	2005
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AL	2007-2010	4	0	2.5	11.9	28 days

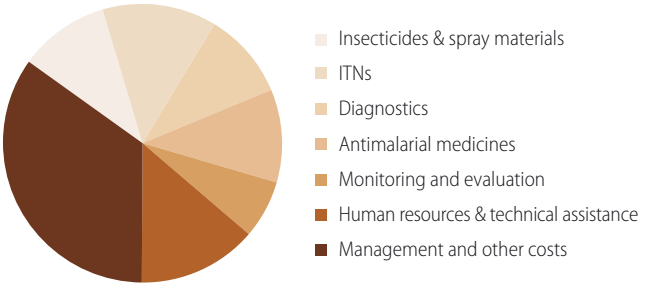
III. Financing

Government and external financing



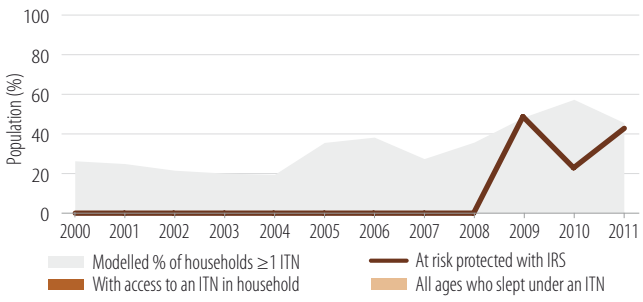
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

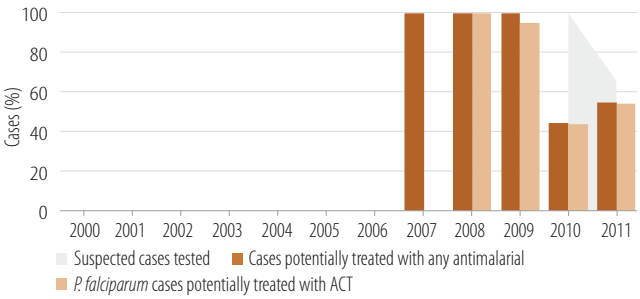


IV. Coverage

Coverage of ITN and IRS



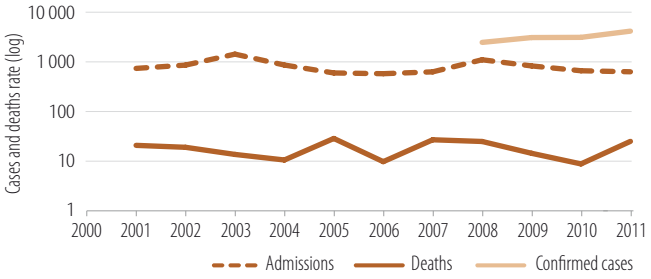
Cases tested and antimalarials delivered: Programme data (public sector)



V. Impact

Malaria test positivity rate and ABER

Microscopically confirmed cases, admissions and deaths (per 100 000)



Georgia

Phase: Elimination. Impact: >75% decrease in case incidence 2000–2011. Since 2003 malaria cases have been on the decline. In 2011 only 1 indigenous case (1st generation local transmission) was reported. The goal of national malaria elimination strategy is to eliminate P. vivax malaria by.

I. Epidemiological profile

Population (UN Population Division)	2011	%
Number of active foci	0	
Number of people living within active foci	45 000	1
Number of people living in malaria-free areas	4 280 000	99
Total	4 325 000	

Parasites and vectors	
Major plasmodium species:	*P. vivax* (0%)
Major anopheles species:	*An.sacharovi*

Distribution of confirmed malaria cases (per 1 000 population)

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	No	–
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	Yes	2000
	DDT is used for IRS	No	–
Case management	Malaria diagnosis is free of charge in the public sector	Yes	2000
	Gametocidal treatment of *P.falciparum* cases	Yes	–
	Radical treatment of *P. vivax* cases	Yes	2000
Surveillance	Foci and case investigation undertaken	Yes	2000
	Case reporting from private sector is mandatory	Yes	2000

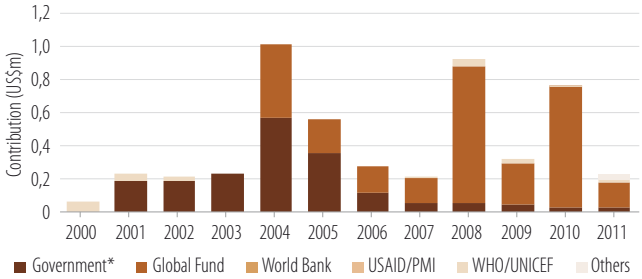
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	–	–
First-line treatment of *P. falciparum*	–	–
For treatment failure *of P. falciparum*	–	–
Treatment of severe malaria	–	–
Treatment of *P. vivax*	CQ+PQ(14d)	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

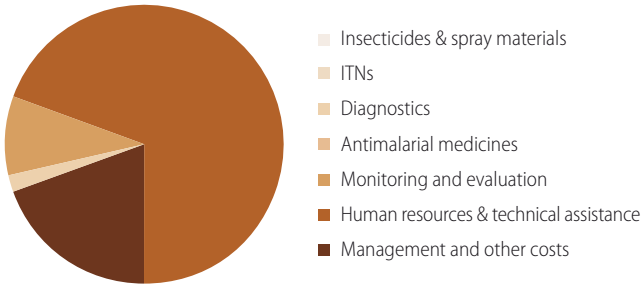
III. Financing

Government and external financing



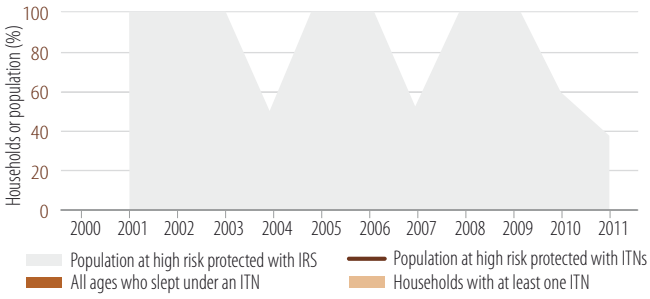
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

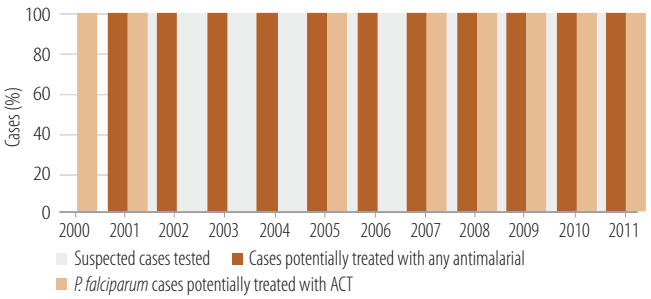


IV. Coverage

Coverage of ITN and IRS

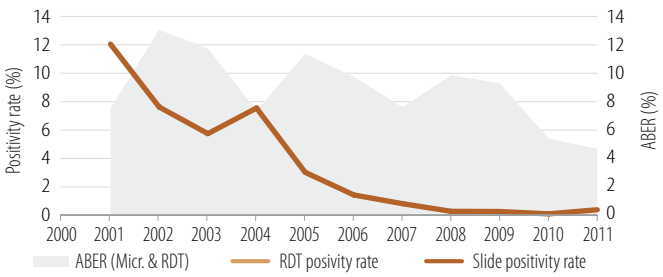


Cases tested and antimalarials delivered: Programme data (public sector)

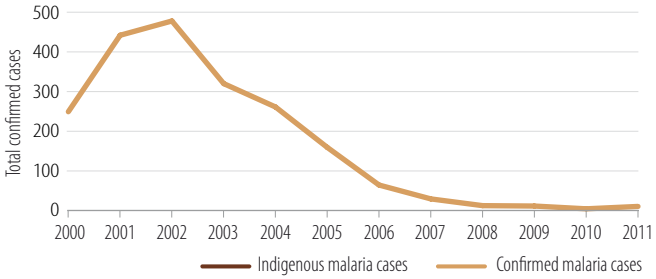


V. Impact

Malaria test positivity rate and ABER

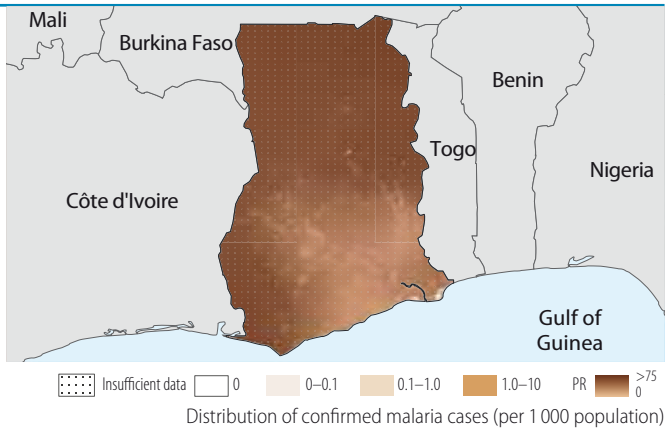


Microscopically confirmed malaria cases and indigenous cases



Ghana

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	25 000 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	25 000 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, arabiensis, funestus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2004
	ITNs/LLINs distributed to all age groups	Yes	2004
IRS	IRS is recommended	Yes	2005
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2003
Case management	Patients of all ages should receive diagnostic test	Yes	2008
	RDTs used at community level	Yes	2009
	ACT is free for all ages in public sector	No	–
	Pre-referral treatment with recommended medicines	Yes	2009
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	Yes	2010

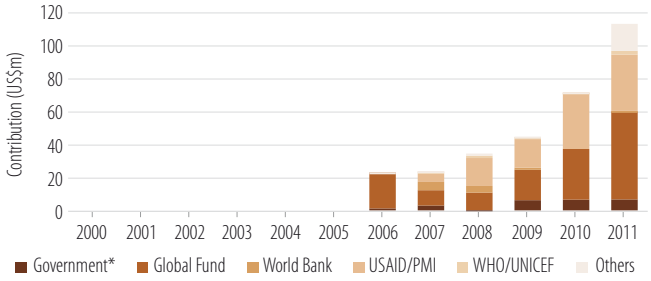
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2004
First-line treatment of *P. falciparum*	AL ;AS+AQ	2004
For treatment failure *of P. falciparum*	QN	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+AQ	2003–2006	4	0	4.3	14	28 days
AL	2003–2007	5	1.7	4	13.8	28 days

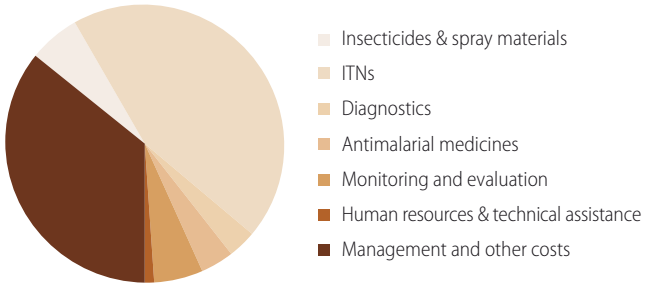
III. Financing

Government and external financing



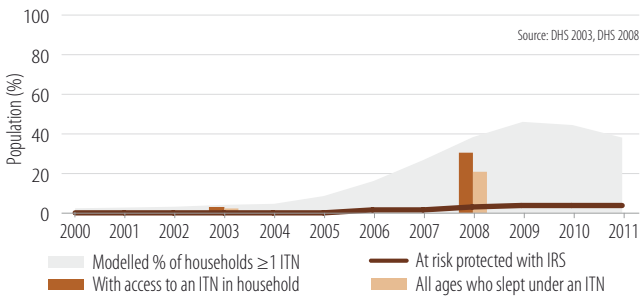
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

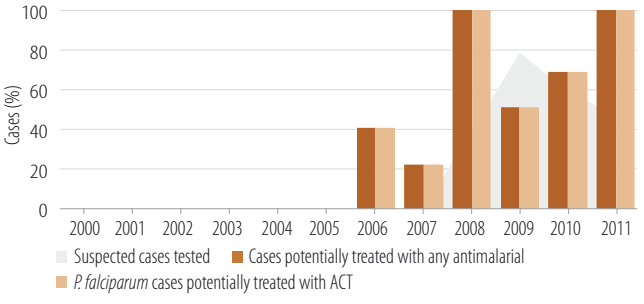


IV. Coverage

Coverage of ITN and IRS



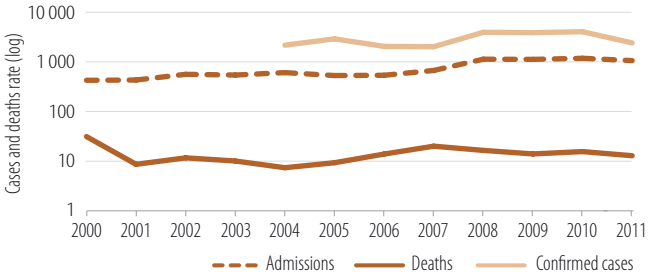
Cases tested and antimalarials delivered: Programme data (public sector)



V. Impact

Malaria test positivity rate and ABER

Microscopically confirmed cases, admissions and deaths (per 100 000)



Guatemala

Phase: Control. Impact: >75% decrease in case incidence 2000–2011.

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2010	%
High transmission (≥1 case per 1000 population)	2 210 000	15
Low transmission (0-1 cases per 1000 population)	4 500 000	31
Malaria-free (0 cases)	8 040 000	55
Total	14 750 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (1%), *P. vivax* (99%)
Major anopheles species: *An. albimanus, pseudopunctipennis, darlingi*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2006
	ITNs/LLINs distributed to all age groups	Yes	2006
IRS	IRS is recommended	No	–
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	N/A	–
Case management	Patients of all ages should receive diagnostic test	Yes	–
	RDTs used at community level	Yes	2006
	ACT is free for all ages in public sector	No	–
	Pre-referral treatment with recommended medicines	No	–
	Oral artemisinin-based monotherapies are not registered	No	–

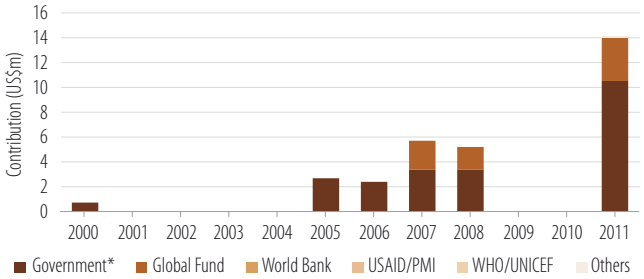
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	–
First-line treatment of *P. falciparum*	CQ+PQ	–
For treatment failure *of P. falciparum*	–	–
Treatment of severe malaria	CQ	–
Treatment of *P. vivax*	CQ+PQ	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

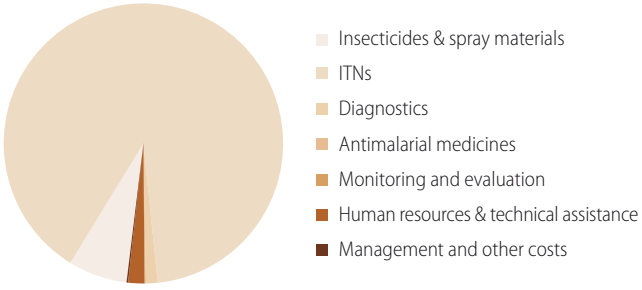
III. Financing

Government and external financing



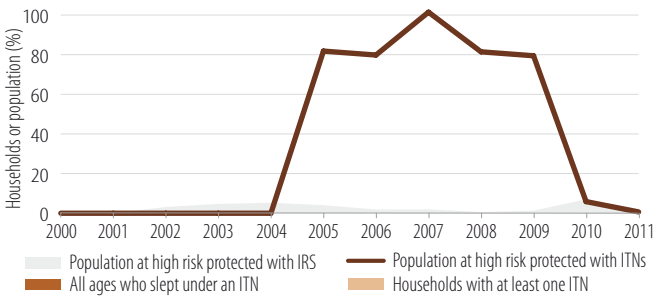
* Expenditure: costs for local level, health systems, etc. not included.

Expenditure by intervention in 2010

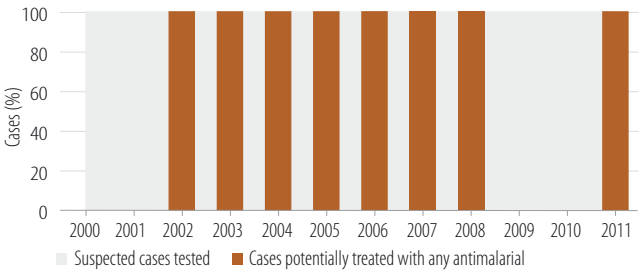


IV. Coverage

Coverage of ITN and IRS

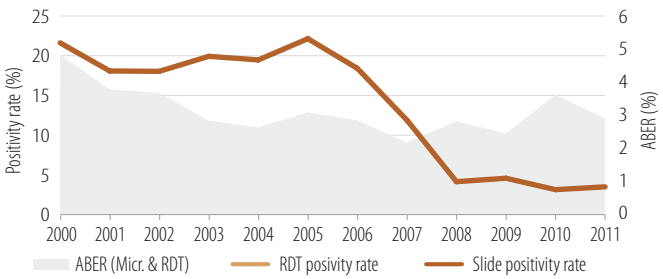


Cases tested and antimalarials delivered: Programme data (public sector)

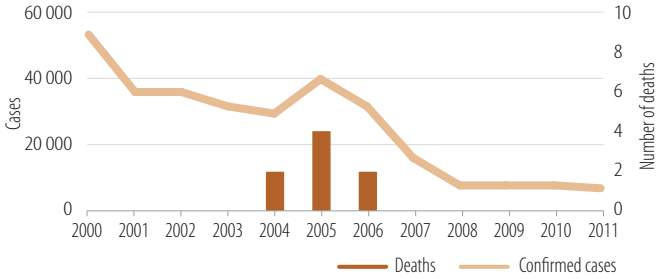


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed cases and deaths



Guinea

Phase: Control. Impact: Insufficiently consistent data to assess trends.

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	10 200 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	10 200 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, funestus, melas*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2007
	ITNs/LLINs distributed to all age groups	Yes	2009
IRS	IRS is recommended	No	–
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2008
Case management	Patients of all ages should receive diagnostic test	Yes	2010
	RDTs used at community level	Yes	2010
	ACT is free for all ages in public sector	Yes	2009
	Pre-referral treatment with recommended medicines	Yes	2010
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	No	–

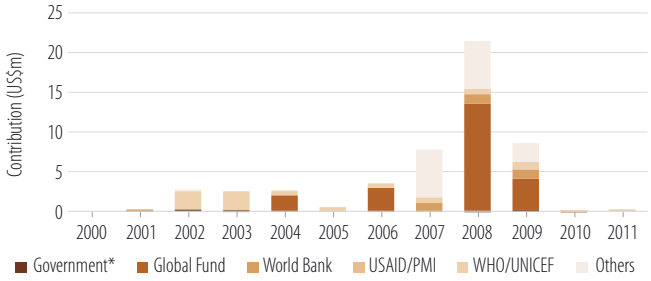
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	–
First-line treatment of *P. falciparum*	AS+AQ	–
For treatment failure of *P. falciparum*	QN	–
Treatment of severe malaria	QN	–
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+AQ	2004–2004	1	1	1	1	28 days

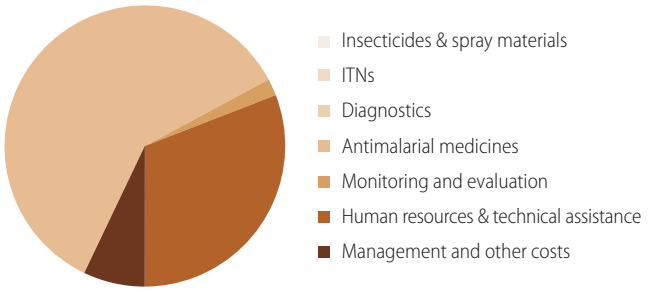
III. Financing

Government and external financing



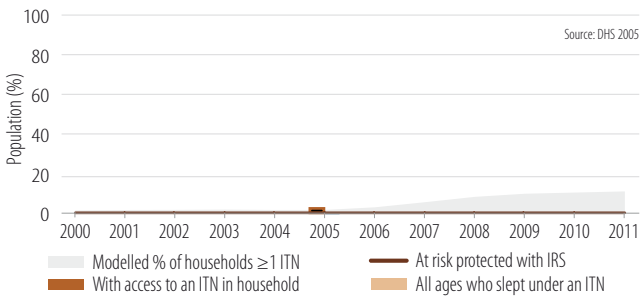
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

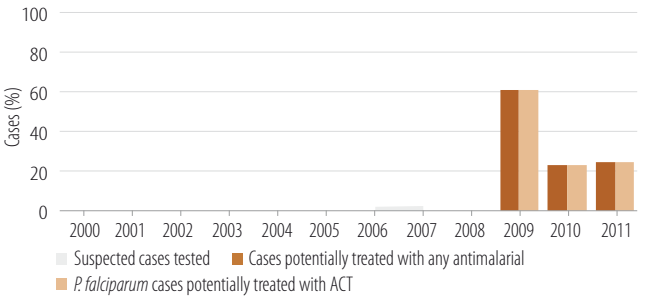


IV. Coverage

Coverage of ITN and IRS

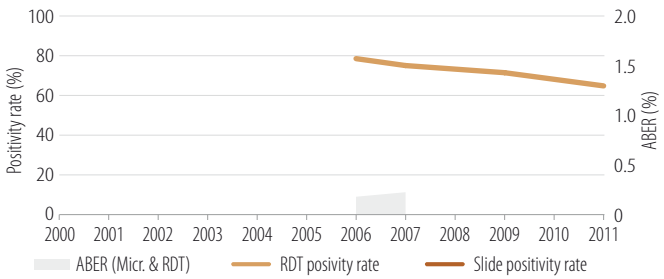


Cases tested and antimalarials delivered: Programme data (public sector)

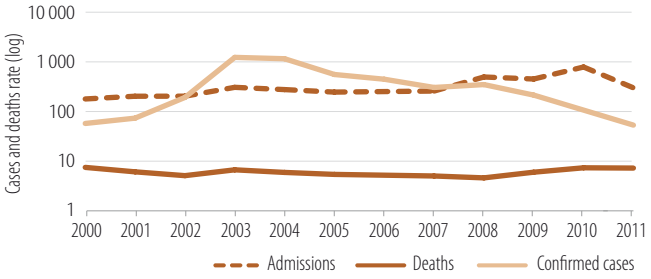


V. Impact

Malaria test positivity rate and ABER



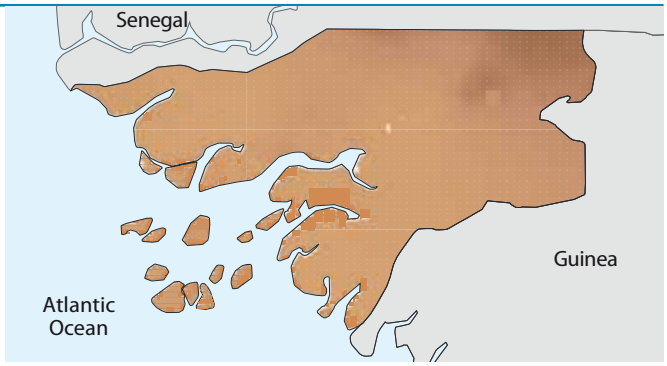
Microscopically confirmed cases, admissions and deaths (per 100 000)



Guinea-Bissau

African Region

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	1 550 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	1 550 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, arabiensis, funestus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2005
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	Yes	2006
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2005
Case management	Patients of all ages should receive diagnostic test	Yes	2008
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	No	–
	Pre-referral treatment with recommended medicines	Yes	2003
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	No	–

Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	–
First-line treatment of *P. falciparum*	AL	–
For treatment failure *of P. falciparum*	QN	–
Treatment of severe malaria	QN	–
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

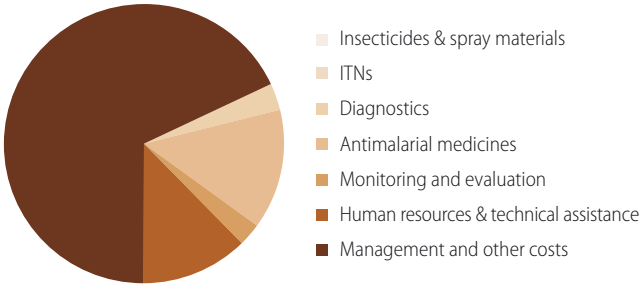
Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AL	2006-2008	1	3.6	3.6	3.6	28 days

III. Financing

Government and external financing

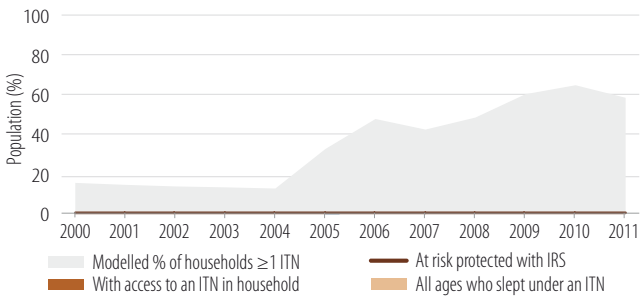
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

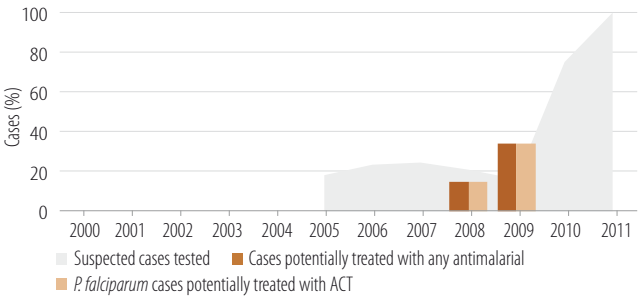


IV. Coverage

Coverage of ITN and IRS

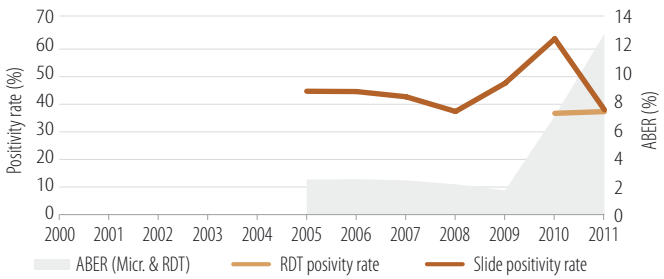


Cases tested and antimalarials delivered: Programme data (public sector)

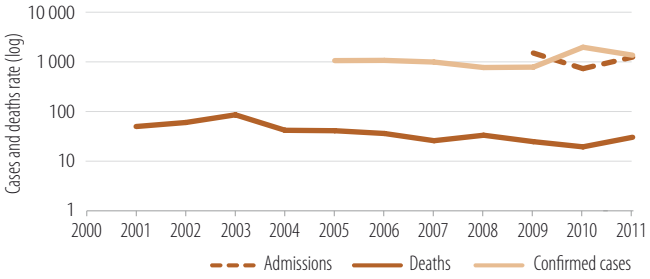


V. Impact

Malaria test positivity rate and ABER

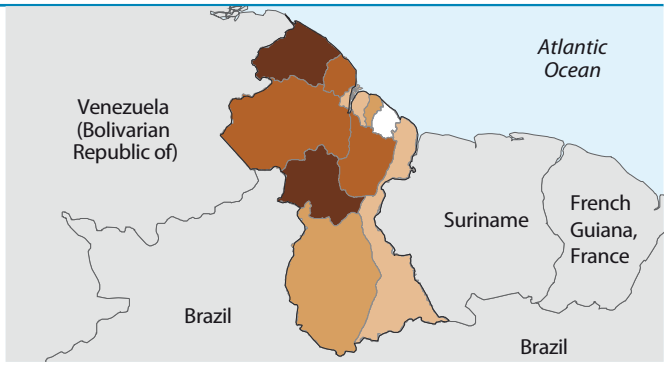


Microscopically confirmed cases, admissions and deaths (per 100 000)



Guyana

Phase: Control. Impact: Increase in case incidence 2000–2015.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2010	%
High transmission (≥1 case per 1000 population)	265 000	35
Low transmission (0-1 cases per 1000 population)	439 000	58
Malaria-free (0 cases)	52 900	7
Total	756 900	

Parasites and vectors

Major plasmodium species: *P. falciparum* (69%), *P. vivax* (31%)
Major anopheles species: *An. darlingi, aquasalis*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2005
	ITNs/LLINs distributed to all age groups	Yes	2005
IRS	IRS is recommended	No	–
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	N/A	–
Case management	Patients of all ages should receive diagnostic test	Yes	1946
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	Yes	2005
	Pre-referral treatment with recommended medicines	Yes	2005
	Oral artemisinin-based monotherapies are not registered	Yes	2004

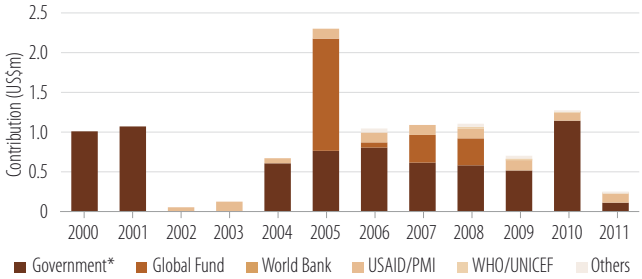
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	–	–
First-line treatment of *P. falciparum*	AL+PQ	2004
For treatment failure *of P. falciparum*	QN+T	2004
Treatment of severe malaria	–	–
Treatment of *P. vivax*	CQ+PQ	2004

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AL	2004–2008	2	0	1.6	3.2	28 days

III. Financing

Government and external financing



* Expenditure: costs for local level, health systems, etc. not included.

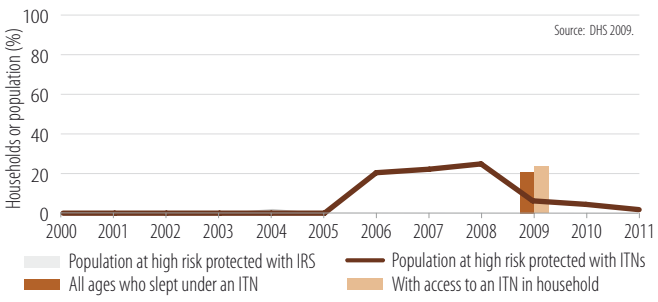
Expenditure by intervention in 2010

No data reported for 2011

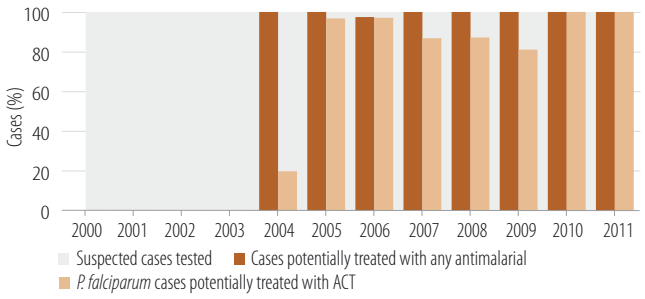
- Insecticides & spray materials
- ITNs
- Diagnostics
- Antimalarial medicines
- Monitoring and evaluation
- Human resources & technical assistance
- Management and other costs

IV. Coverage

Coverage of ITN and IRS

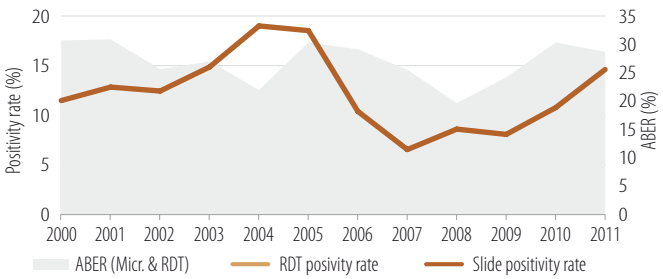


Cases tested and antimalarials delivered: Programme data (public sector)

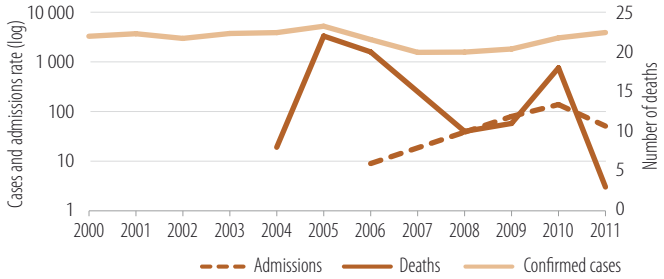


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed cases, admissions (per 100 000) and deaths



Haiti

Phase: Control. Impact: Insufficiently consistent data to assess trends.

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2010	%
High transmission (≥1 case per 1000 population)	5 370 000	53
Low transmission (0-1 cases per 1000 population)	4 760 000	47
Malaria-free (0 cases)	0	0
Total	10 130 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species:

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2011
	ITNs/LLINs distributed to all age groups	Yes	2005
IRS	IRS is recommended	Yes	–
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	N/A	–
Case management	Patients of all ages should receive diagnostic test	Yes	1988
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	Yes	–
	Pre-referral treatment with recommended medicines	No	–
	Oral artemisinin-based monotherapies are not registered	No	–

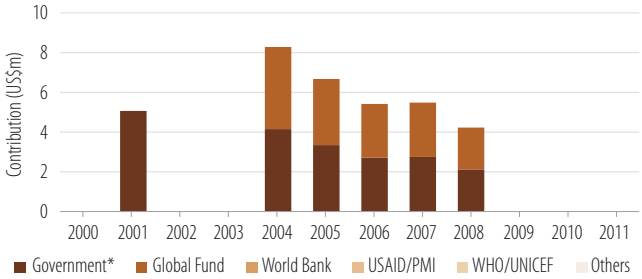
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	–	–
First-line treatment of *P. falciparum*	CQ+PQ	–
For treatment failure *of P. falciparum*	–	–
Treatment of severe malaria	–	–
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

III. Financing

Government and external financing



* Expenditure: costs for local level, health systems, etc. not included.

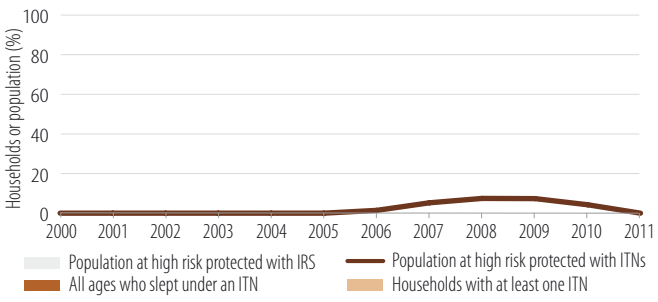
Expenditure by intervention in 2010

No data reported for 2011

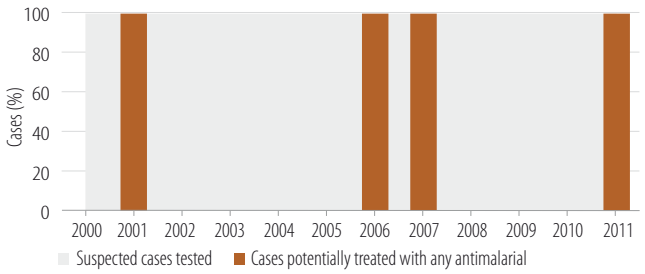
- Insecticides & spray materials
- ITNs
- Diagnostics
- Antimalarial medicines
- Monitoring and evaluation
- Human resources & technical assistance
- Management and other costs

IV. Coverage

Coverage of ITN and IRS

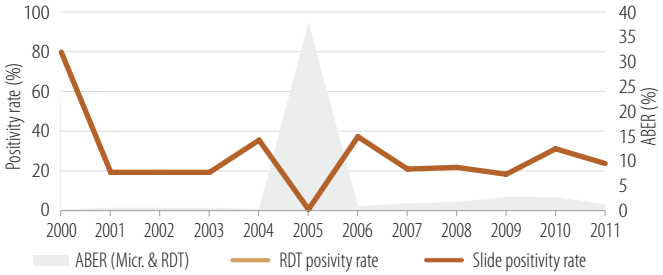


Cases tested and antimalarials delivered: Programme data (public sector)

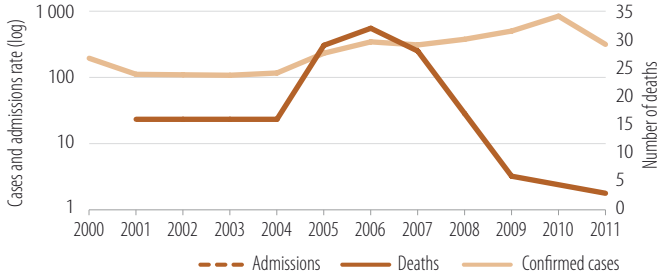


V. Impact

Malaria test positivity rate and ABER

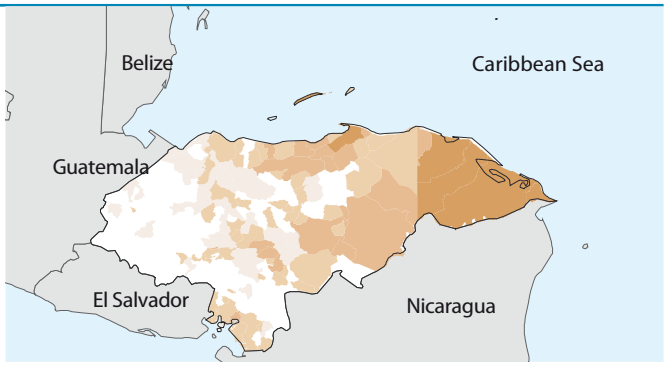


Microscopically confirmed cases, admissions (per 100 000) and deaths



Honduras

Phase: Control. Impact: >75% decrease in case incidence 2000–2011.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2010	%
High transmission (≥1 case per 1000 population)	1 090 000	14
Low transmission (0-1 cases per 1000 population)	4 560 000	59
Malaria-free (0 cases)	2 110 000	27
Total	7 760 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (8%), *P. vivax* (92%)
Major anopheles species: *An. albimanus, darlingi, pseudopunctipennis, aquasalis*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2009
	ITNs/LLINs distributed to all age groups	Yes	2009
IRS	IRS is recommended	Yes	–
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	N/A	–
Case management	Patients of all ages should receive diagnostic test	Yes	–
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	Yes	–
	Pre-referral treatment with recommended medicines	No	–
	Oral artemisinin-based monotherapies are not registered	No	–

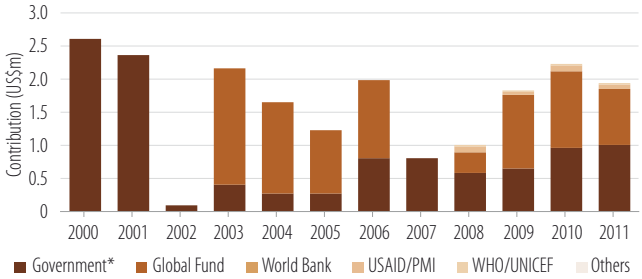
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	–	–
First-line treatment of *P. falciparum*	CQ+PQ	–
For treatment failure *of P. falciparum*	SP	2011
Treatment of severe malaria	QN	–
Treatment of *P. vivax*	CQ+PQ	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
CQ	2008–2009	1	0	0	0	28 days

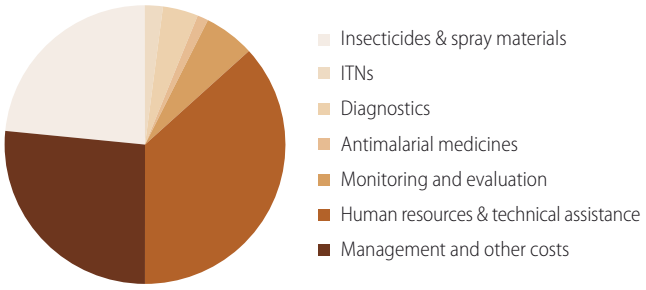
III. Financing

Government and external financing



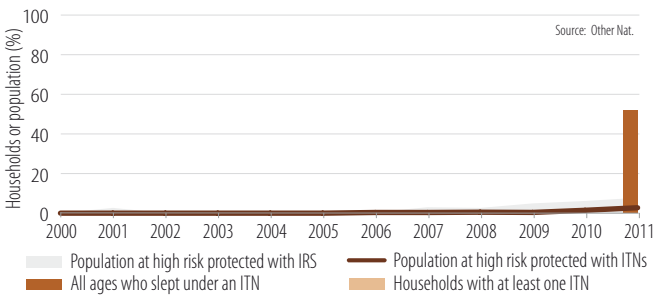
* Expenditure: costs for local level, health systems, etc. not included.

Expenditure by intervention in 2010

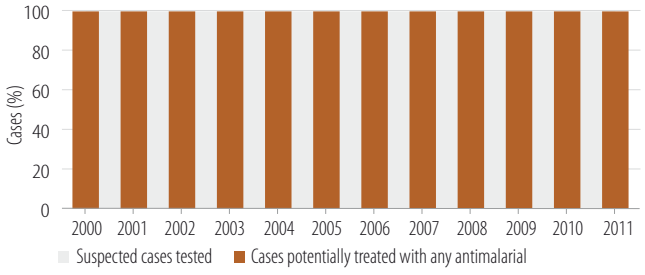


IV. Coverage

Coverage of ITN and IRS

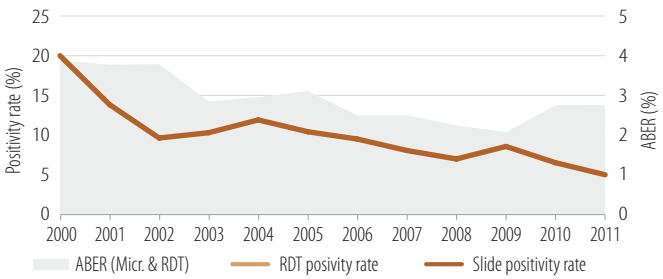


Cases tested and antimalarials delivered: Programme data (public sector)

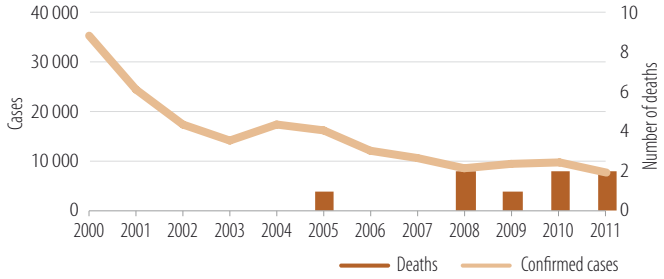


V. Impact

Malaria test positivity rate and ABER

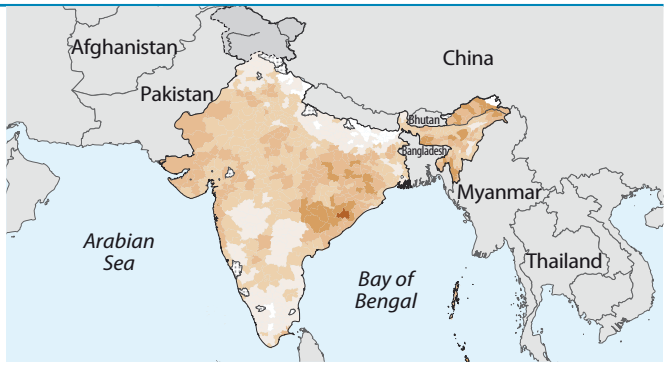


Microscopically confirmed cases and deaths



India

Phase: Control. Impact: 50%–75% decrease in case incidence projected 2000–2015.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2010	%
High transmission (≥1 case per 1000 population)	273 000 000	22
Low transmission (0-1 cases per 1000 population)	832 000 000	67
Malaria-free (0 cases)	137 000 000	11
Total	1 242 000 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (51%), *P. vivax* (49%)
Major anopheles species: *An. stephensi, culicifacies, fluviatilis, minimus, dirus, annularis*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2001
	ITNs/LLINs distributed to all age groups	Yes	2001
IRS	IRS is recommended	Yes	1953
	DDT is used for IRS	Yes	1953
IPT	IPT used to prevent malaria during pregnancy	NA	–
Case management	Patients of all ages should receive diagnostic test	Yes	1958
	RDTs used at community level	Yes	2006
	ACT is free for all ages in public sector	Yes	2006
	Pre-referral treatment with recommended medicines	Yes	1977
	Oral artemisinin-based monotherapies are not registered	Yes	2009

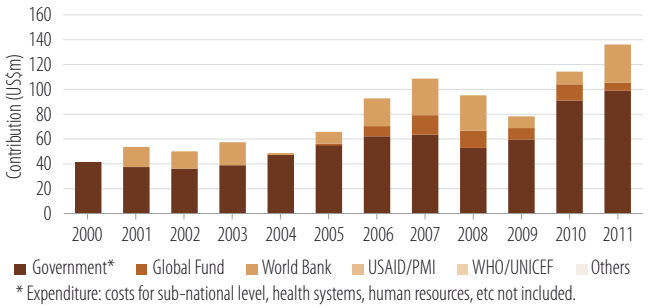
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+SP ;PQ	2007
First-line treatment of *P. falciparum*	AS+SP ;PQ	2007
For treatment failure *of P. falciparum*	QN+D ;QN+T	–
Treatment of severe malaria	AM ;AS ;QN	2007
Treatment of *P. vivax*	CQ+PQ(14d)	2007

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+SP	2005–2007	9	0	0	4	28 days

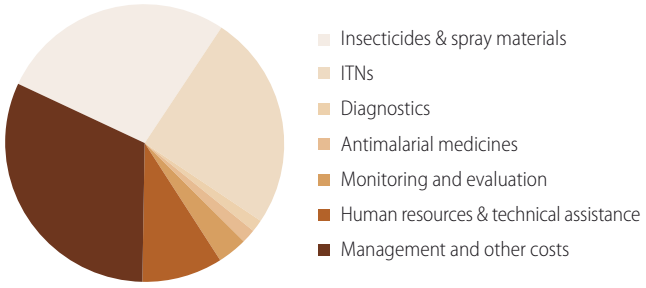
III. Financing

Government and external financing



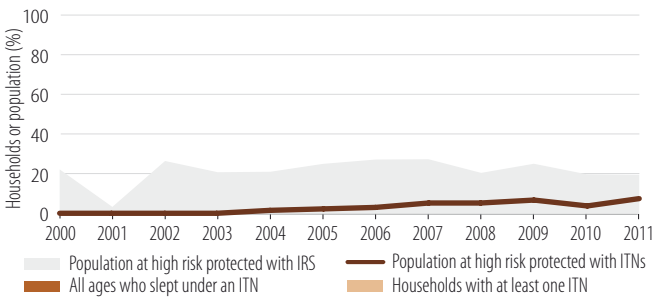
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2010

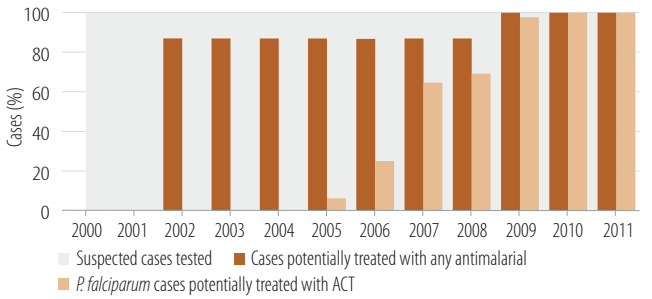


IV. Coverage

Coverage of ITN and IRS

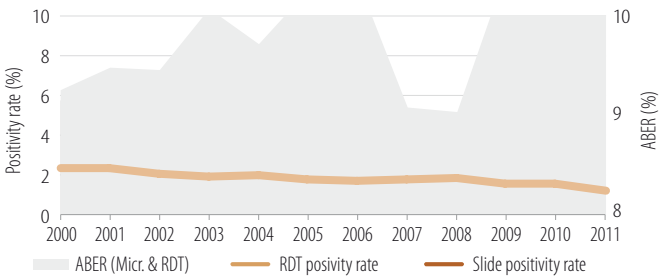


Cases tested and antimalarials delivered: Programme data (public sector)

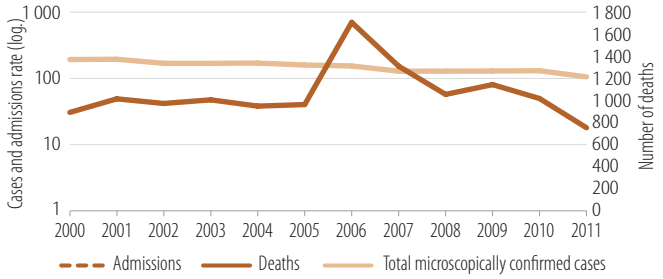


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed cases, admissions (per 100 000) and deaths



Indonesia

South-East Asia Region

Phase: Control. Impact: Insufficiently consistent data to assess trends.

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2010	%
High transmission (≥1 case per 1000 population)	41 200 000	17
Low transmission (0-1 cases per 1000 population)	107 000 000	44
Malaria-free (0 cases)	94 500 000	39
Total	242 700 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (55%), *P. vivax* (45%)
Major anopheles species: *An. sundaicus, balabacensis, maculatus, farauti, subpictus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2006
	ITNs/LLINs distributed to all age groups	Yes	–
IRS	IRS is recommended	Yes	1959
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	NA	–
Case management	Patients of all ages should receive diagnostic test	Yes	2007
	RDTs used at community level	Yes	2005
	ACT is free for all ages in public sector	Yes	2004
	Pre-referral treatment with recommended medicines	Yes	2004
	Oral artemisinin-based monotherapies are not registered	Yes	–

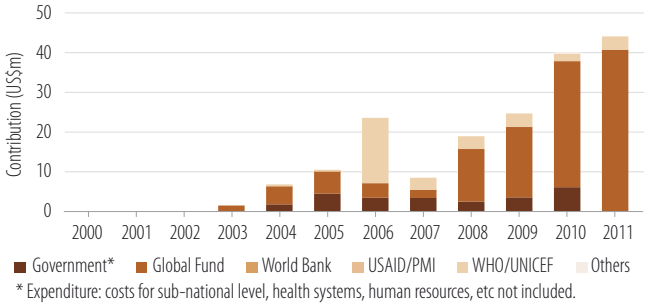
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	–
First-line treatment of *P. falciparum*	AS-AQ/DHA-PP+PQ	2008
For treatment failure *of P. falciparum*	QN+D+PQ	2004
Treatment of severe malaria	AM ;AS ;QN	2004
Treatment of *P. vivax*	AS-AQ/DHA-PP+PQ(14d)	2004

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+AQ	2003–2006	8	0	8.8	24.1	28 days
DHA+PPQ	2004–2008	3	2.7	4.1	4.8	42 days

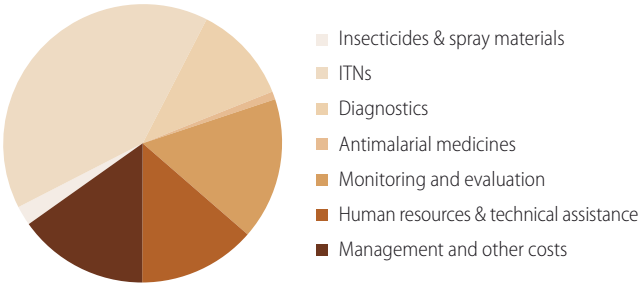
III. Financing

Government and external financing



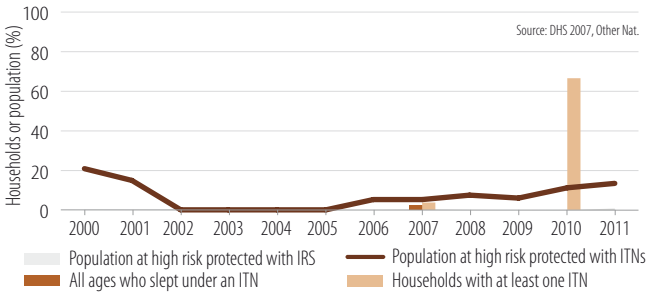
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2010

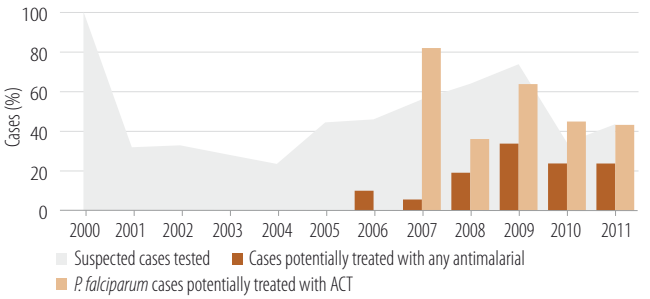


IV. Coverage

Coverage of ITN and IRS

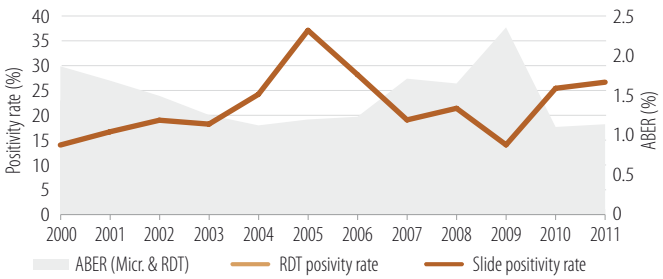


Cases tested and antimalarials delivered: Programme data (public sector)

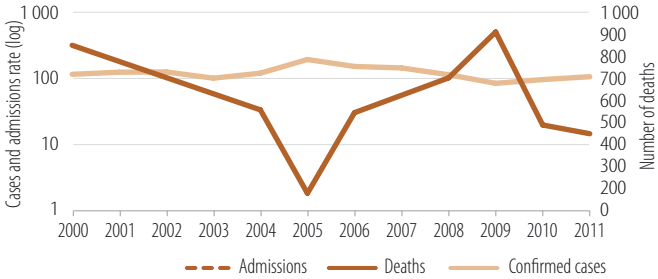


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed cases, admissions (per 100 000) and deaths



Iran (Islamic Republic of)

Phase: Pre-elimination. Impact: >75% decrease in case incidence 2000–2011.

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
Number of active foci	694	
Number of people living within active foci	999 000	
Number of people living in malaria-free areas	73 000 000	84
Total	74 000 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (12%), *P. vivax* (88%)
Major anopheles species: *An.stephensi, culicifacies, fluviatilis, Superpictus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2005
	ITNs/LLINs distributed to all age groups	No	2005
IRS	IRS is recommended	Yes	–
	DDT is used for IRS	No	–
Case management	Malaria diagnosis is free of charge in the public sector	Yes	–
	Gametocidal treatment of *P.falciparum* cases	Yes	1948
	Radical treatment of *P. vivax* cases	Yes	1948
Surveillance	Foci and case investigation undertaken	Yes	2010
	Case reporting from private sector is mandatory	Yes	1981

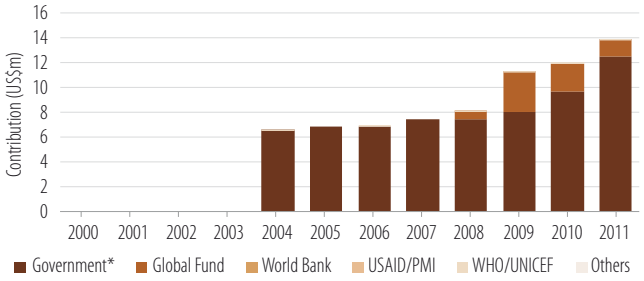
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	–
First-line treatment of *P. falciparum*	AS+SP	2006
For treatment failure *of P. falciparum*	AL	2006
Treatment of severe malaria	AS ;QN	2006
Treatment of *P. vivax*	CQ+PQ(14d)	2005

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+SP	2005-2010	8	0	0	0.5	28 days

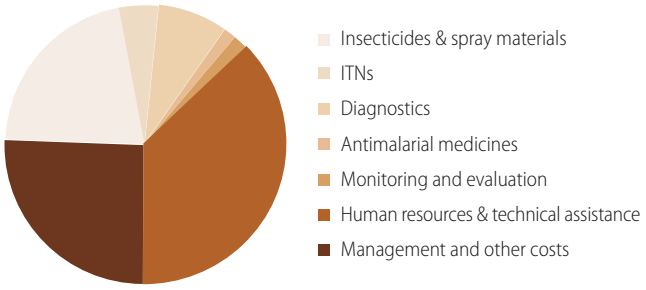
III. Financing

Government and external financing



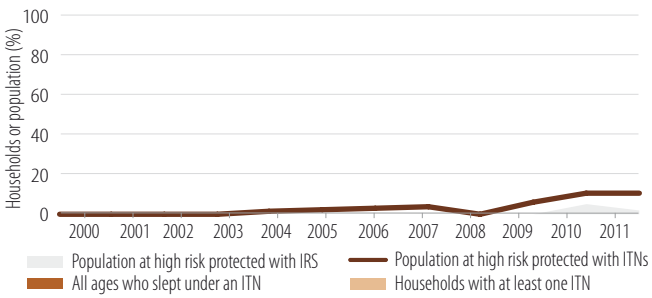
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

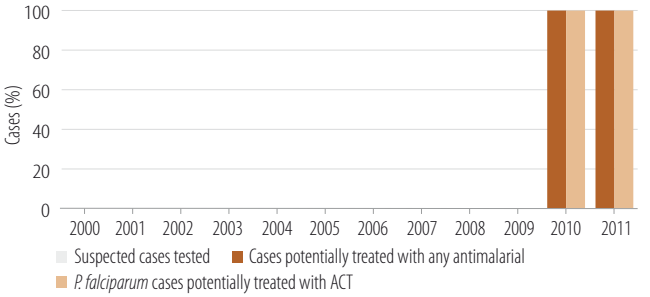


IV. Coverage

Coverage of ITN and IRS

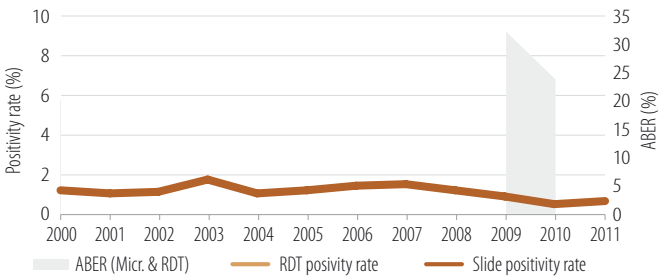


Cases tested and antimalarials delivered: Programme data (public sector)

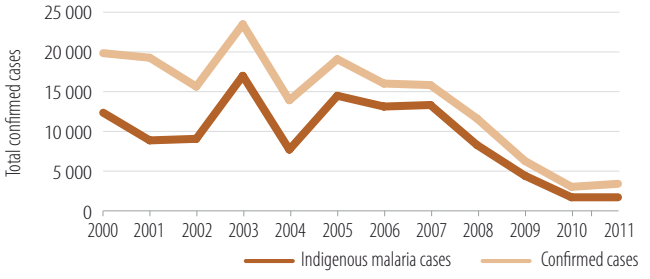


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed malaria cases and indigenous cases



Iraq

Phase: Prevention of re-introduction. Impact: >75% decrease in case incidence 2000–2011.

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
Number of active foci	0	
Number of people living within active foci	0	
Number of people living in malaria-free areas	27 600 000	100
Total	27 600 000	

Parasites and vectors

Major plasmodium species: *P. vivax* (0%)
Major anopheles species: *An.stephensi, superpictus, pulcherrimus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	No	–
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	–	–
	DDT is used for IRS	No	–
Case management	Malaria diagnosis is free of charge in the public sector	Yes	1957
	Gametocidal treatment of *P.falciparum* cases	Yes	1957
	Radical treatment of *P. vivax* cases	Yes	1957
Surveillance	Foci and case investigation undertaken	Yes	1957
	Case reporting from private sector is mandatory	Yes	1961

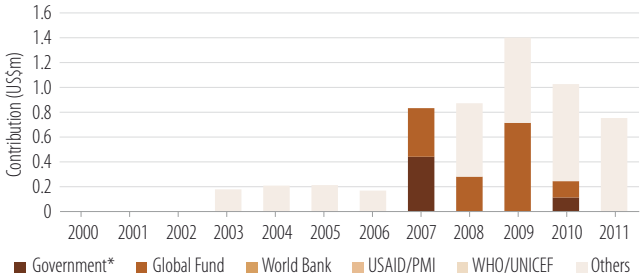
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	–
First-line treatment of *P. falciparum*	AL	2006
For treatment failure *of P. falciparum*	QN+D	2006
Treatment of severe malaria	QN	–
Treatment of *P. vivax*	CQ+PQ(14d)	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

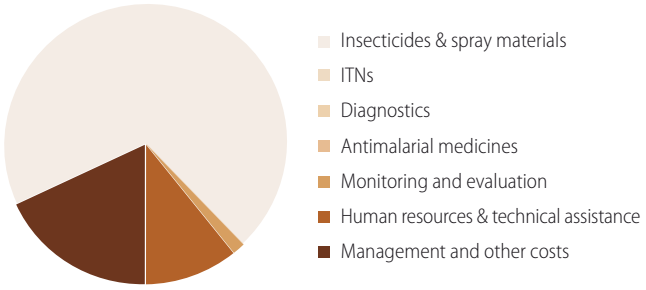
III. Financing

Government and external financing



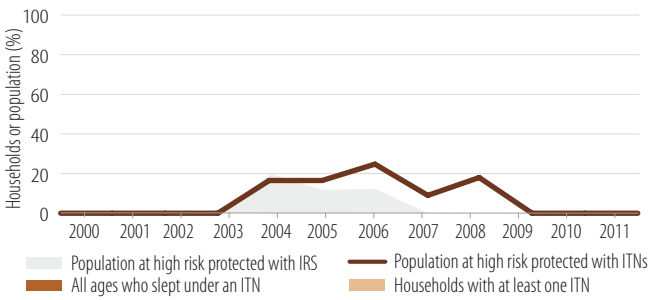
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

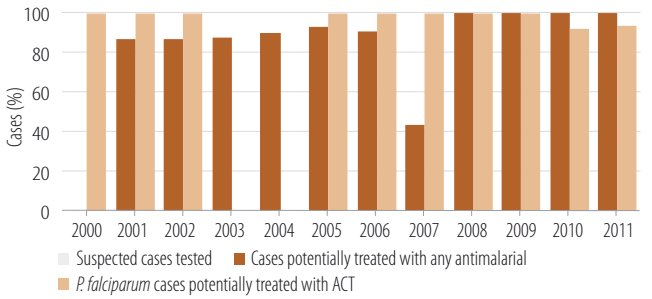


IV. Coverage

Coverage of ITN and IRS

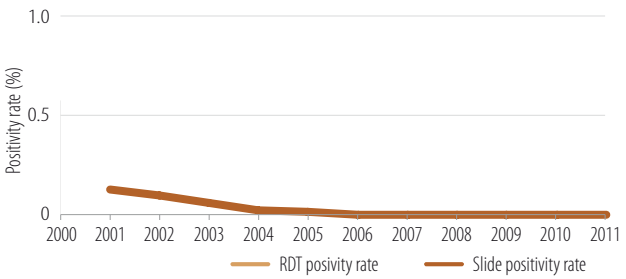


Cases tested and antimalarials delivered: Programme data (public sector)

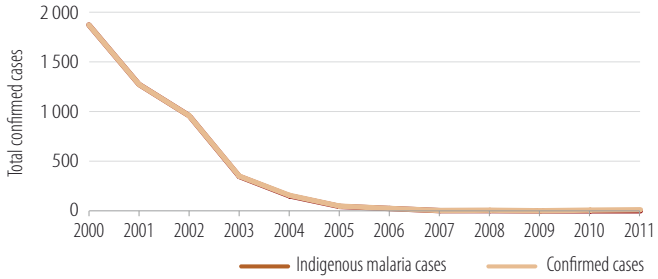


V. Impact

Malaria test positivity rate and ABER

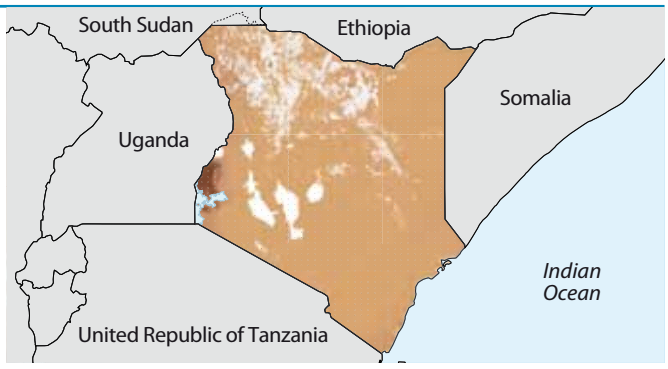


Microscopically confirmed malaria cases and indigenous cases



Kenya

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	15 000 000	36
Low transmission (0-1 cases per 1000 population)	16 600 000	40
Malaria-free (0 cases)	9 990 000	24
Total	41 590 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, arabiensis, funestus, merus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2006
	ITNs/LLINs distributed to all age groups	Yes	2010
IRS	IRS is recommended	Yes	2003
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2001
Case management	Patients of all ages should receive diagnostic test	Yes	2009
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	Yes	2006
	Pre-referral treatment with recommended medicines	Yes	2006
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	No	–

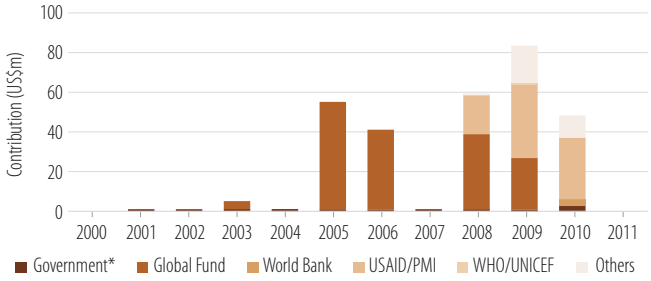
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2004
First-line treatment of *P. falciparum*	AL	2004
For treatment failure of *P. falciparum*	QN	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AL	2002–2008	12	0	2.7	6.6	28 days

III. Financing

Government and external financing



* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

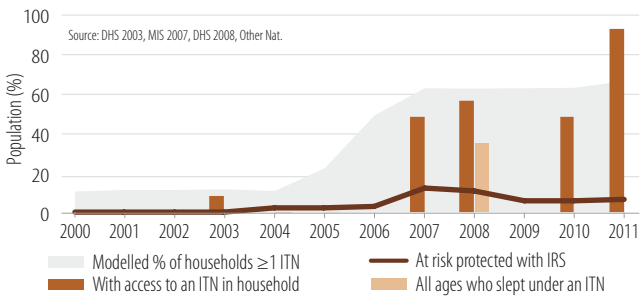
Expenditure by intervention in 2011

No data reported for 2011

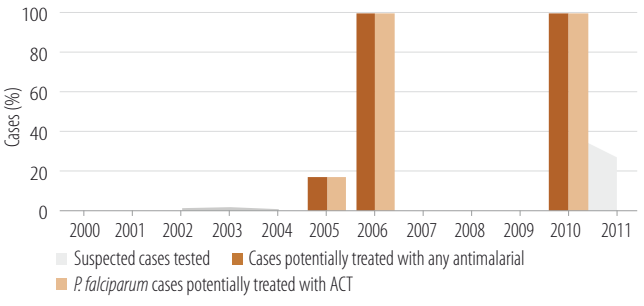
Insecticides & spray materials
ITNs
Diagnostics
Antimalarial medicines
Monitoring and evaluation
Human resources & technical assistance
Management and other costs

IV. Coverage

Coverage of ITN and IRS

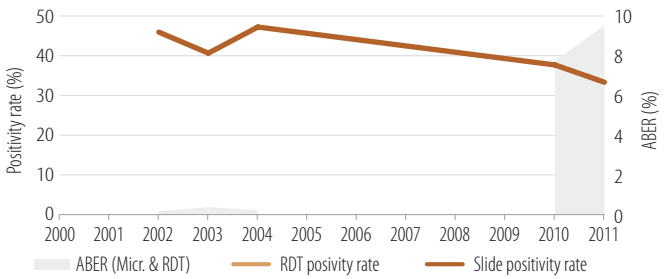


Cases tested and antimalarials delivered: Programme data (public sector)

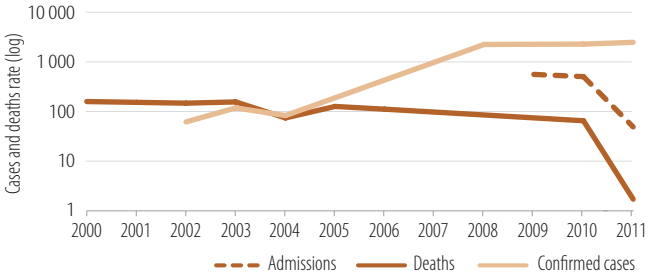


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed cases, admissions and deaths (per 100 000)



Kyrgyzstan

Phase: Elimination. Impact: >75% decrease in case incidence 2000–2011. Zero indigenous malaria cases were reported in the country in 2011. Kyrgyzstan shows strong political commitment to the Tashkent Declaration. Malaria control is supported by the government, WHO and the Global Fund.

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
Number of active foci	2	
Number of people living within active foci	22 900	
Number of people living in malaria-free areas	5 370 000	100
Total	5 392 900	

Parasites and vectors

Major plasmodium species: *P. vivax* (0%)
Major anopheles species: *An.superpictus, pulcherrimus, claviger*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2003
	ITNs/LLINs distributed to all age groups	yes	2006
IRS	IRS is recommended	–	–
	DDT is used for IRS	No	–
Case management	Malaria diagnosis is free of charge in the public sector	Yes	2002
	Gametocidal treatment of *P.falciparum* cases	Yes	2002
	Radical treatment of *P. vivax* cases	Yes	2002
Surveillance	Foci and case investigation undertaken	Yes	2002
	Case reporting from private sector is mandatory	No	–

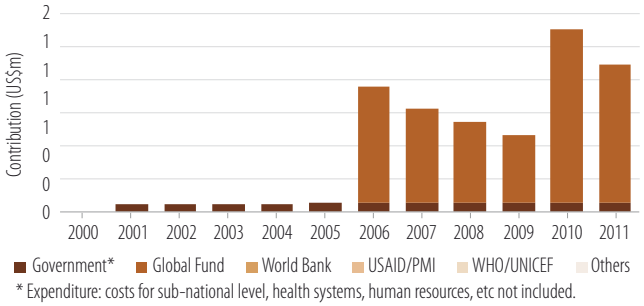
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	–	–
First-line treatment of *P. falciparum*	–	–
For treatment failure *of P. falciparum*	–	–
Treatment of severe malaria	–	–
Treatment of *P. vivax*	CQ+PQ(14d)	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

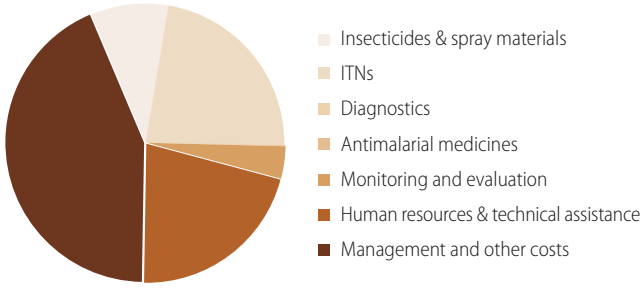
III. Financing

Government and external financing



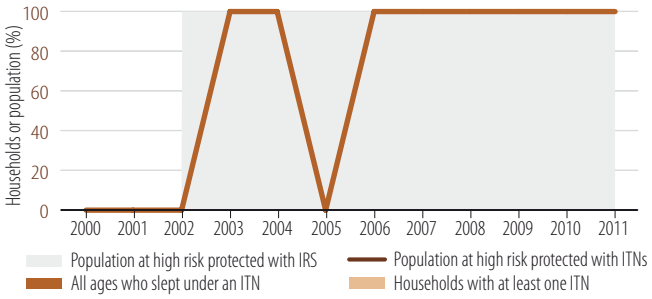
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

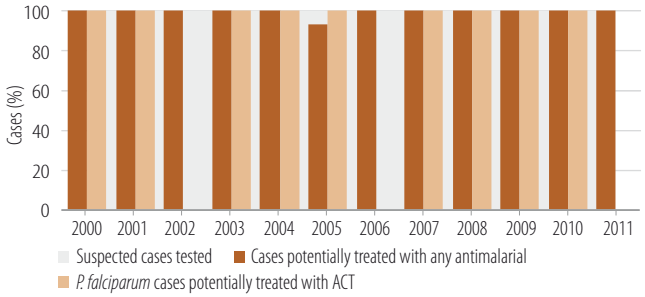


IV. Coverage

Coverage of ITN and IRS

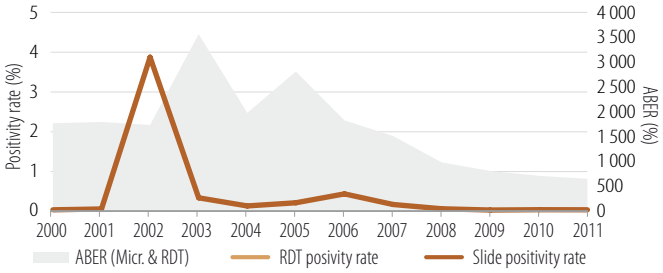


Cases tested and antimalarials delivered: Programme data (public sector)

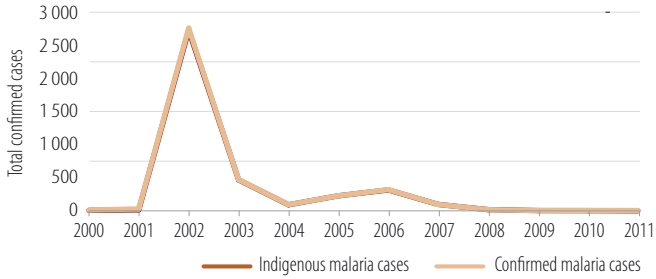


V. Impact

Malaria test positivity rate and ABER



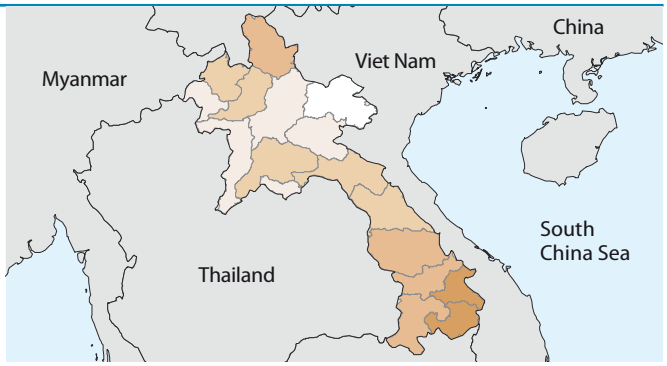
Microscopically confirmed malaria cases and indigenous cases



Lao People's Democratic Republic

Western Pacific Region

Phase: Control. Impact: >75% decrease in case incidence 2000–2011.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	2 260 000	36
Low transmission (0-1 cases per 1000 population)	1 450 000	23
Malaria-free (0 cases)	2 580 000	41
Total	6 290 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (93%), *P. vivax* (7%)
Major anopheles species: *An. minimus, dirus, maculatus, jeyporiensis*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2003
	ITNs/LLINs distributed to all age groups	Yes	2000
IRS	IRS is recommended	Yes	2010
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	NA	–
Case management	Patients of all ages should receive diagnostic test	Yes	2003
	RDTs used at community level	Yes	2005
	ACT is free for all ages in public sector	Yes	2005
	Pre-referral treatment with recommended medicines	Yes	2005
	Oral artemisinin-based monotherapies are not registered	Yes	2008

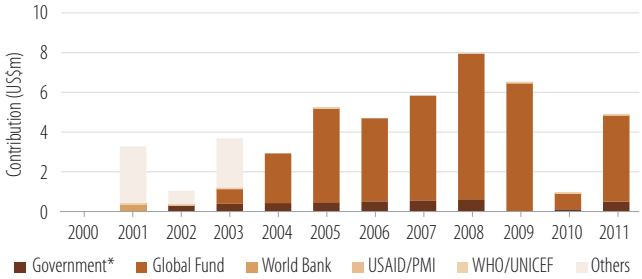
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	–
First-line treatment of *P. falciparum*	AL	2000
For treatment failure *of P. falciparum*	QN+D	2000
Treatment of severe malaria	AS+AL	2000
Treatment of *P. vivax*	CQ+PQ(14d)	2000

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AL	2007–2012	8	0	1.5	8.3	28 days

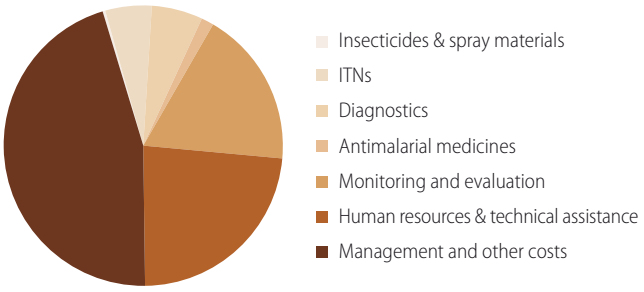
III. Financing

Government and external financing



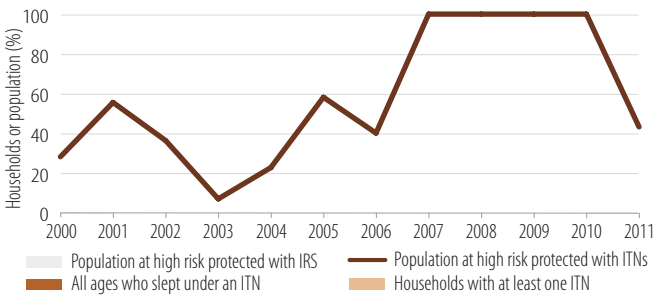
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

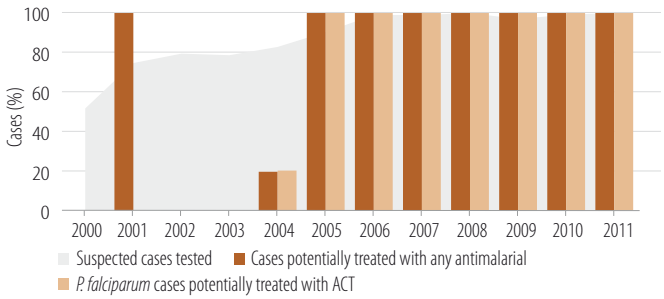


IV. Coverage

Coverage of ITN and IRS

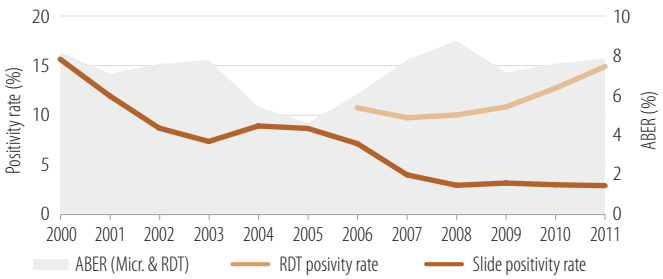


Cases tested and antimalarials delivered: Programme data (public sector)

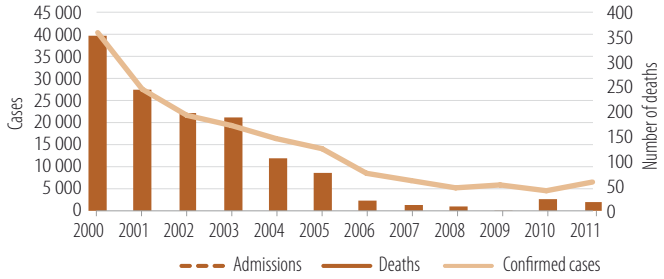


V. Impact

Malaria test positivity rate and ABER



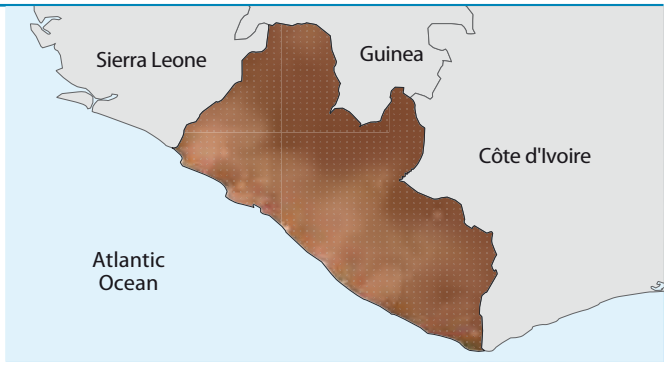
Microscopically confirmed cases and deaths



Liberia

African Region

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	4 130 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	4 130 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2005
	ITNs/LLINs distributed to all age groups	Yes	2008
IRS	IRS is recommended	Yes	2009
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2001
Case management	Patients of all ages should receive diagnostic test	Yes	2005
	RDTs used at community level	Yes	–
	ACT is free for all ages in public sector	Yes	2005
	Pre-referral treatment with recommended medicines	No	–
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	Yes	–

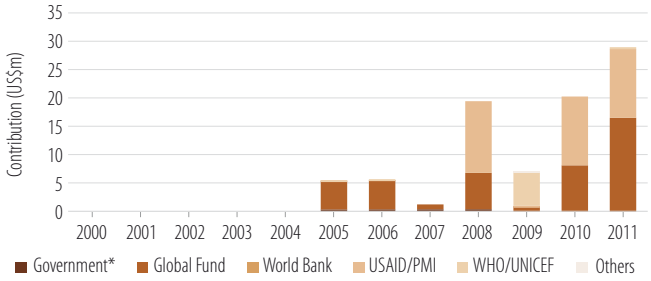
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2004
First-line treatment of *P. falciparum*	AS+AQ	2004
For treatment failure of *P. falciparum*	QN	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+AQ	2007-2007	2	0	0	0	28 days

III. Financing

Government and external financing



* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

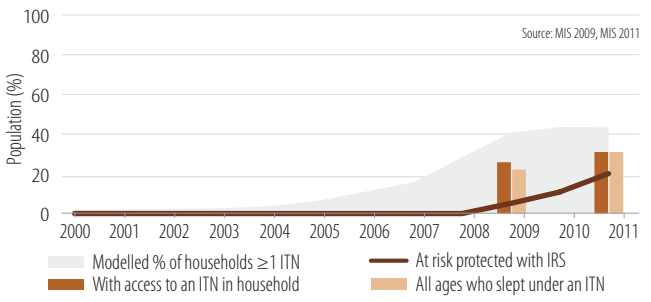
Expenditure by intervention in 2011

No data reported for 2011

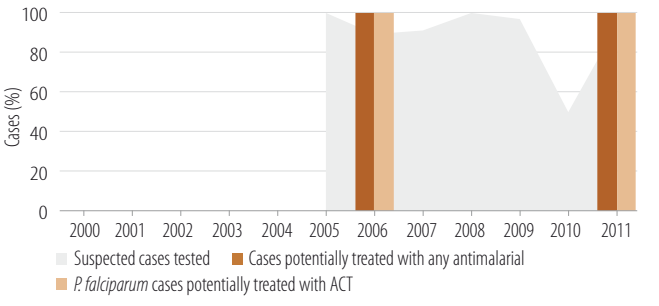
- Insecticides & spray materials
- ITNs
- Diagnostics
- Antimalarial medicines
- Monitoring and evaluation
- Human resources & technical assistance
- Management and other costs

IV. Coverage

Coverage of ITN and IRS

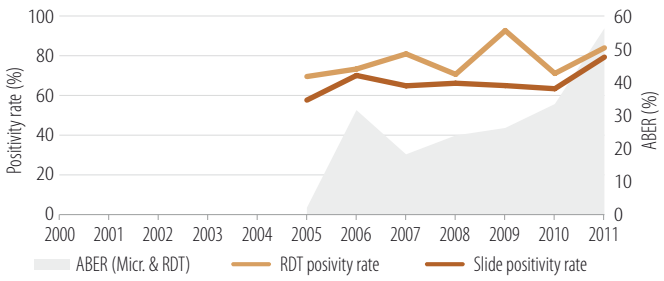


Cases tested and antimalarials delivered: Programme data (public sector)

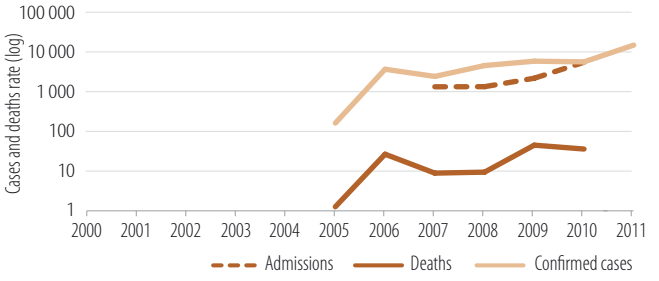


V. Impact

Malaria test positivity rate and ABER

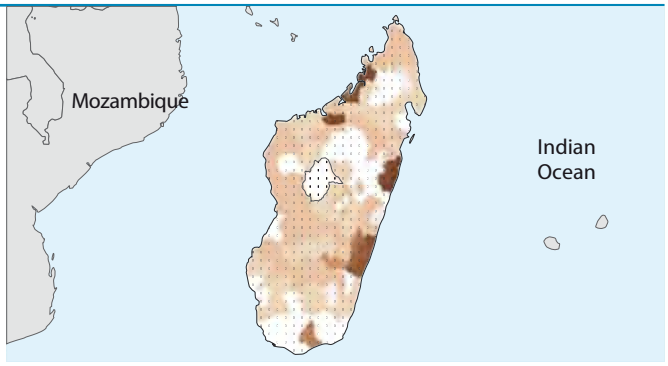


Microscopically confirmed cases, admissions and deaths (per 100 000)



Madagascar

Phase: Control. Impact: 50%–75% decrease in admission rates projected 2000–2015.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	6 390 000	30
Low transmission (0-1 cases per 1000 population)	14 900 000	70
Malaria-free (0 cases)	0	0
Total	21 290 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, arabiensis, funestus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2004
	ITNs/LLINs distributed to all age groups	Yes	2009
IRS	IRS is recommended	Yes	1993
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2006
Case management	Patients of all ages should receive diagnostic test	Yes	2006
	RDTs used at community level	Yes	2010
	ACT is free for all ages in public sector	Yes	2006
	Pre-referral treatment with recommended medicines	No	–
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	No	–

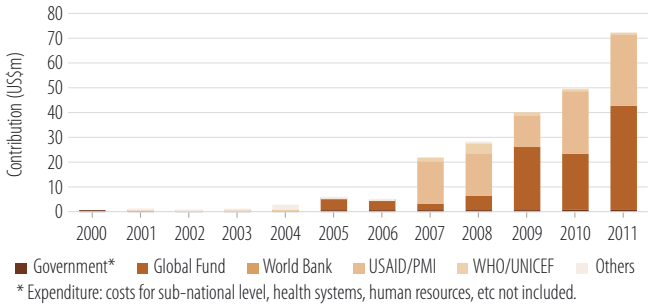
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2006
First-line treatment of *P. falciparum*	AS+AQ	2006
For treatment failure *of P. falciparum*	QN	2006
Treatment of severe malaria	QN	2006
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+AQ	2006–2007	10	0	0	8.7	28 days

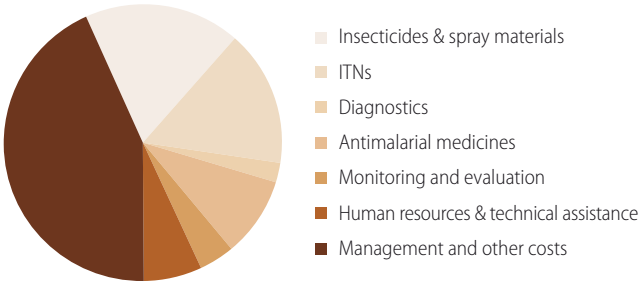
III. Financing

Government and external financing



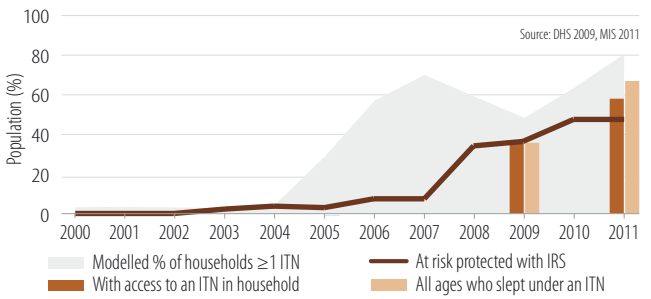
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

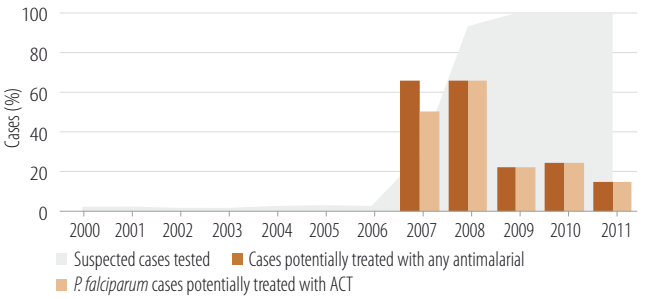


IV. Coverage

Coverage of ITN and IRS

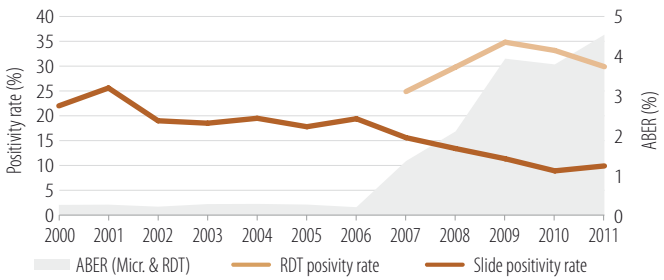


Cases tested and antimalarials delivered: Programme data (public sector)

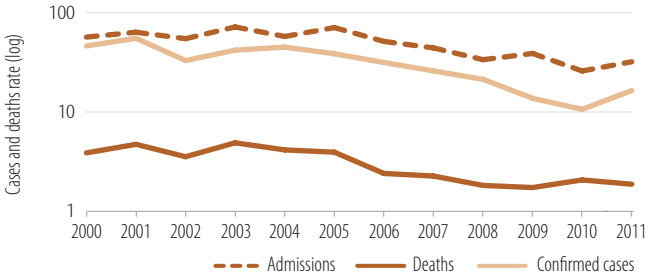


V. Impact

Malaria test positivity rate and ABER

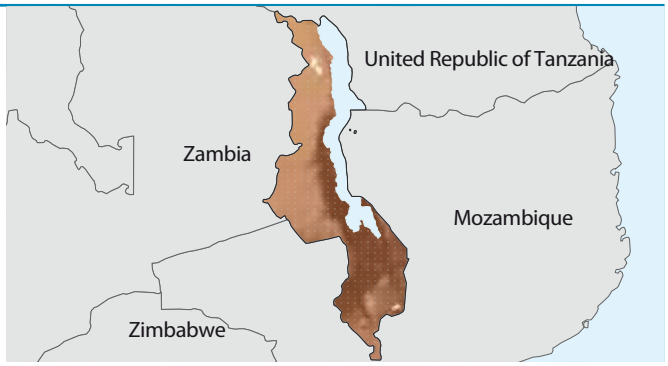


Microscopically confirmed cases, admissions and deaths (per 100 000)



Malawi

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	15 400 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	15 400 000	

Parasites and vectors	
Major plasmodium species:	*P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species:	*An. gambiae, arabiensis, funestus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2006
	ITNs/LLINs distributed to all age groups	Yes	2010
IRS	IRS is recommended	Yes	2007
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	1993
Case management	Patients of all ages should receive diagnostic test	Yes	2011
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	Yes	2007
	Pre-referral treatment with recommended medicines	Yes	2007
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	Yes	2009

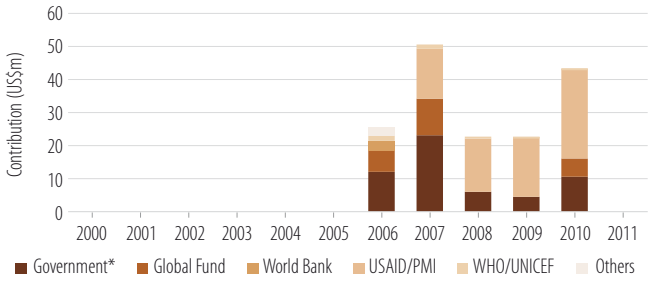
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2007
First-line treatment of *P. falciparum*	AL	2007
For treatment failure *of P. falciparum*	AS+AQ	2007
Treatment of severe malaria	QN	2007
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+AQ	2005–2005	2	0	1.8	3.6	28 days
AL	2005–2005	1	7.1	7.1	7.1	28 days

III. Financing

Government and external financing



* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

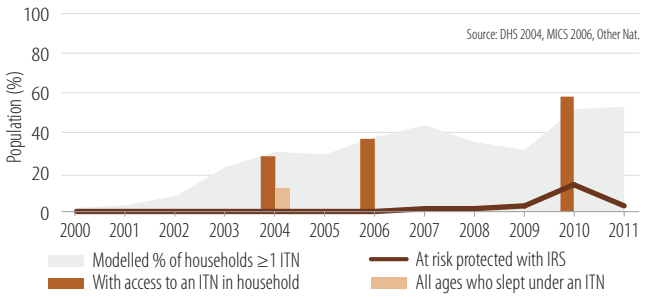
Expenditure by intervention in 2011

No data reported for 2011

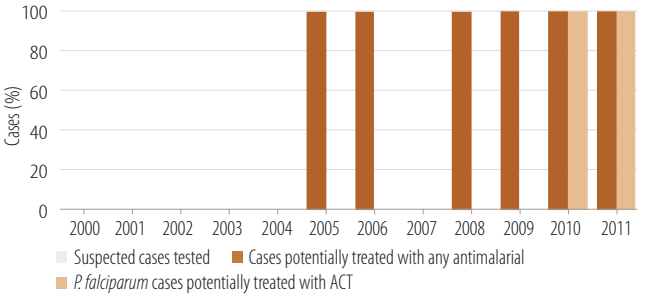
- Insecticides & spray materials
- ITNs
- Diagnostics
- Antimalarial medicines
- Monitoring and evaluation
- Human resources & technical assistance
- Management and other costs

IV. Coverage

Coverage of ITN and IRS

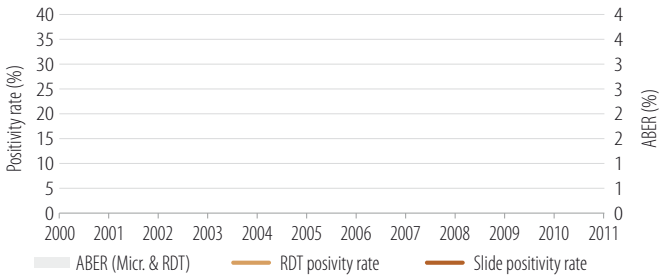


Cases tested and antimalarials delivered: Programme data (public sector)

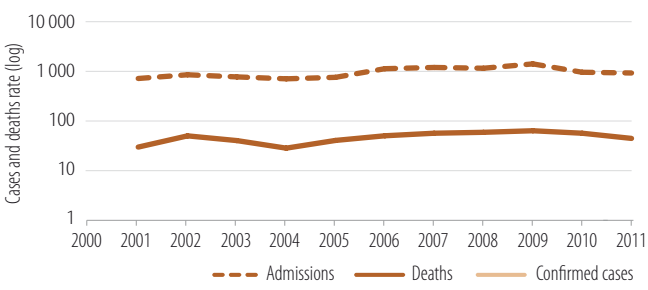


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed cases, admissions and deaths (per 100 000)



Malaysia

Phase: Pre-elimination. Impact: >75% decrease in case incidence projected 2000–2015

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
Number of active foci	3 134	
Number of people living within active foci	1 190 000	4
Number of people living in malaria-free areas	27 300 000	96
Total	28 490 000	

Parasites and vectors

Major plasmodium species: *P. falcipari* (30%), *P. vivax* (70%)
Major anopheles species: *An.donaldi, balabacensis, maculatus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	1995
	ITNs/LLINs distributed to all age groups	Yes	1995
IRS	IRS is recommended	–	–
	DDT is used for IRS	No	–
Case management	Malaria diagnosis is free of charge in the public sector	Yes	1967
	Gametocidal treatment of *P.falciparum* cases	No	–
	Radical treatment of *P. vivax* cases	Yes	–
Surveillance	Foci and case investigation undertaken	Yes	1995
	Case reporting from private sector is mandatory	Yes	1988

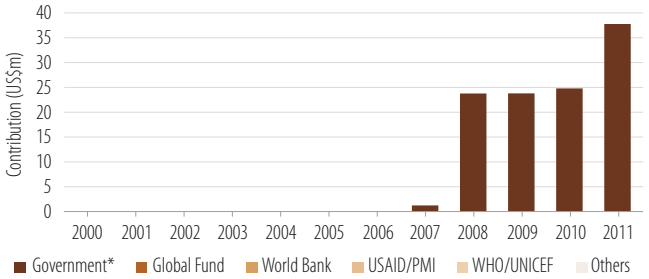
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	–	–
First-line treatment of *P. falciparum*	–AS+MQ	–
For treatment failure *of P. falciparum*	QN+T	–
Treatment of severe malaria	QN+T	–
Treatment of *P. vivax*	CQ+PQ(14d)	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

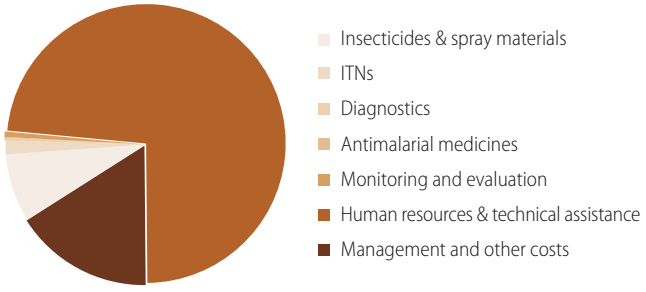
III. Financing

Government and external financing



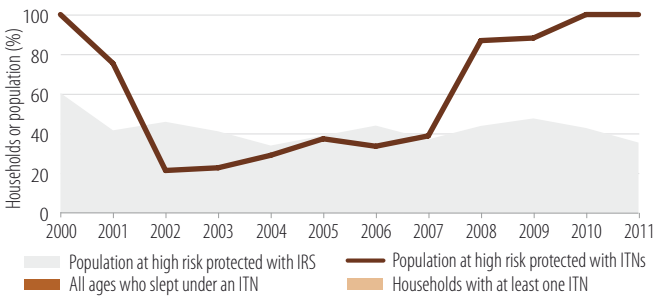
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

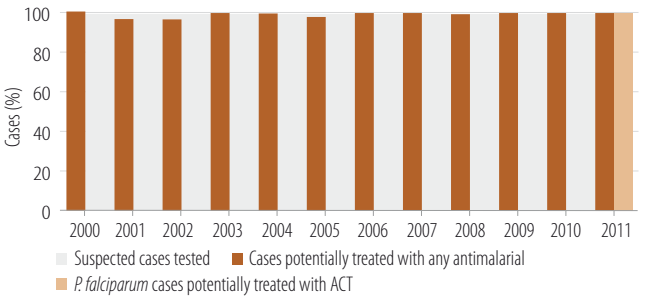


IV. Coverage

Coverage of ITN and IRS

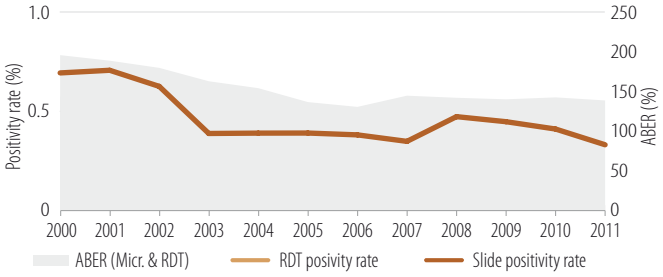


Cases tested and antimalarials delivered: Programme data (public sector)

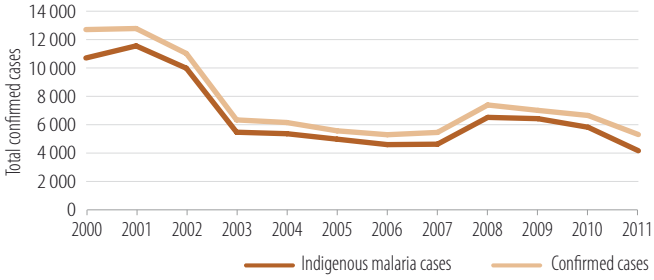


V. Impact

Malaria test positivity rate and ABER



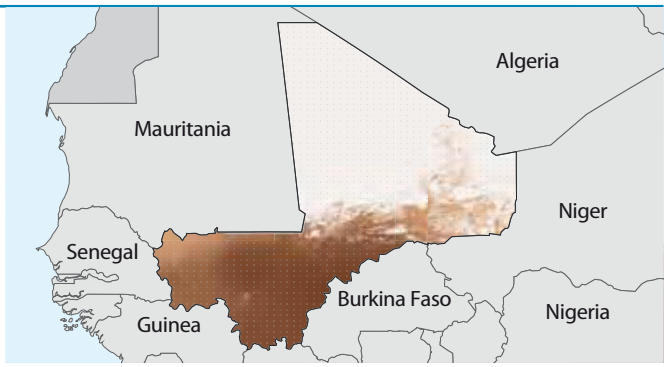
Microscopically confirmed malaria cases and indigenous cases



Mali

African Region

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	14 300 000	90
Low transmission (0-1 cases per 1000 population)	1 580 000	10
Malaria-free (0 cases)	0	0
Total	15 880 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, funestus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2005
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	Yes	2007
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2003
Case management	Patients of all ages should receive diagnostic test	Yes	2008
	RDTs used at community level	Yes	2005
	ACT is free for all ages in public sector	No	–
	Pre-referral treatment with recommended medicines	Yes	2009
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	No	–

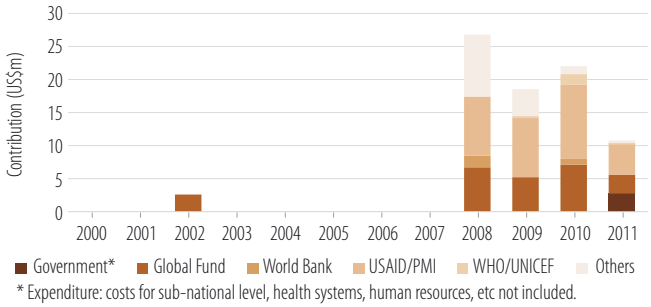
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2007
First-line treatment of *P. falciparum*	AL ;AS+AQ	2007
For treatment failure *of P. falciparum*	AL	2007
Treatment of severe malaria	QN	–
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+AQ	2002–2006	4	0	2	7.6	28 days
AL	2004–2008	6	0	3	6	28 days

III. Financing

Government and external financing



* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

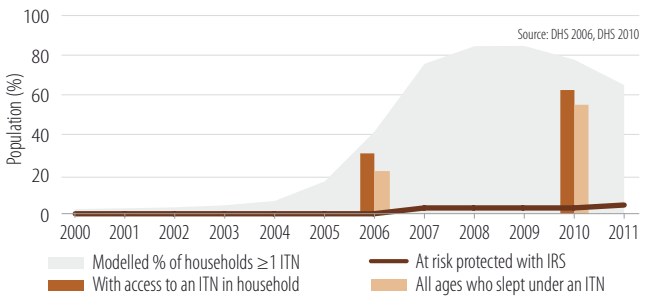
Expenditure by intervention in 2011

No data reported for 2011

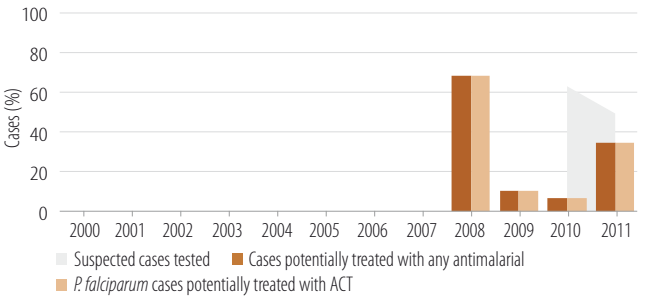
- Insecticides & spray materials
- ITNs
- Diagnostics
- Antimalarial medicines
- Monitoring and evaluation
- Human resources & technical assistance
- Management and other costs

IV. Coverage

Coverage of ITN and IRS

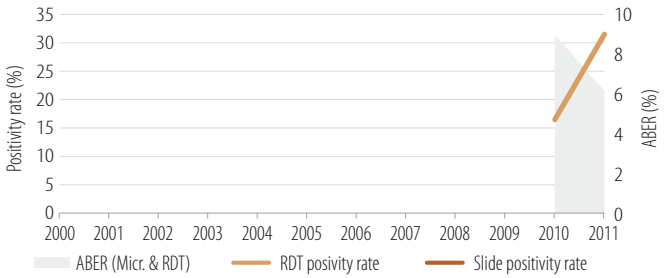


Cases tested and antimalarials delivered: Programme data (public sector)

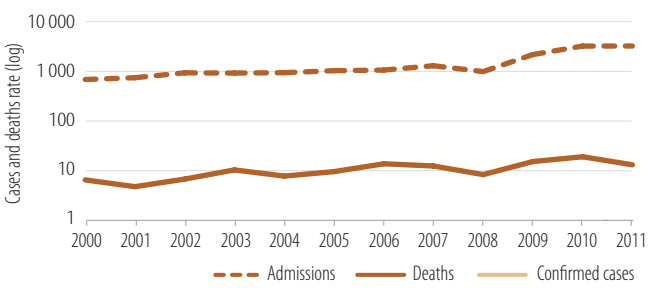


V. Impact

Malaria test positivity rate and ABER



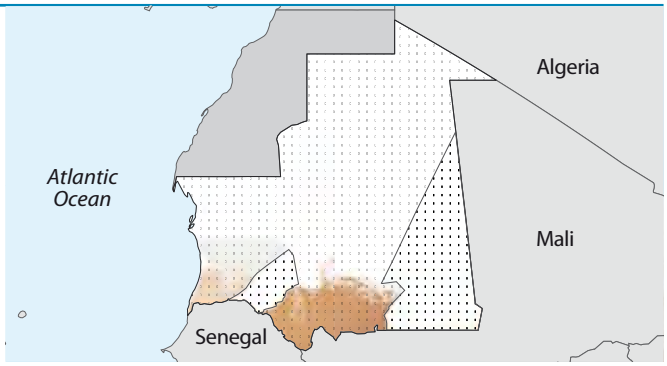
Microscopically confirmed cases, admissions and deaths (per 100 000)



Mauritania

African Region

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	2 090 000	59
Low transmission (0-1 cases per 1000 population)	1 100 000	31
Malaria-free (0 cases)	354 000	10
Total	3 544 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, arabiensis, pharoensis*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	1998
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	No	–
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2008
Case management	Patients of all ages should receive diagnostic test	Yes	2011
	RDTs used at community level	Yes	2011
	ACT is free for all ages in public sector	Yes	2009
	Pre-referral treatment with recommended medicines	No	–
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	Yes	–

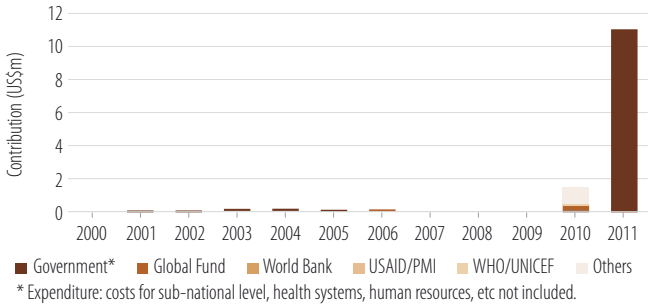
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	–
First-line treatment of *P. falciparum*	AL ;AS+AQ	–
For treatment failure *of P. falciparum*	–	–
Treatment of severe malaria	QN	–
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

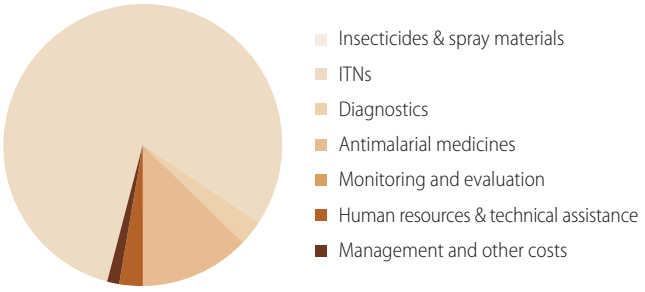
III. Financing

Government and external financing



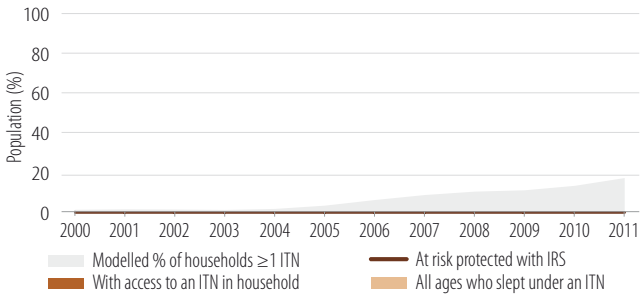
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

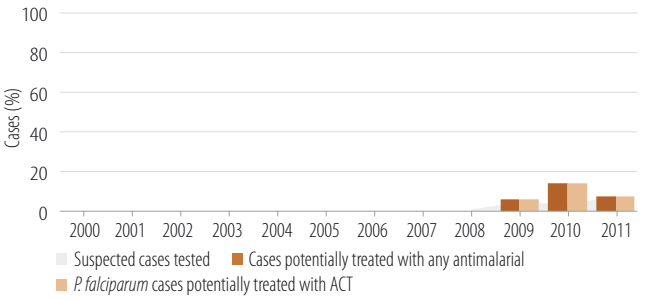


IV. Coverage

Coverage of ITN and IRS

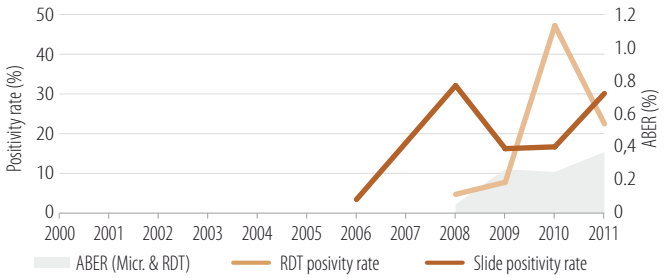


Cases tested and antimalarials delivered: Programme data (public sector)

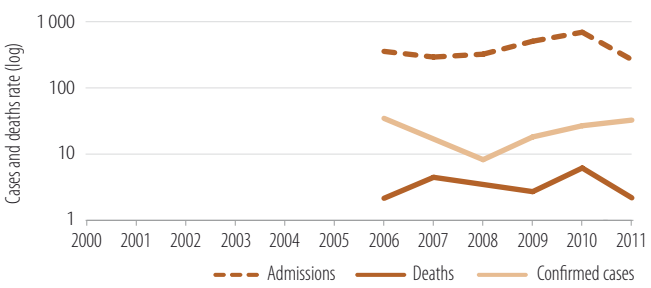


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed cases, admissions and deaths (per 100 000)



Mexico

Phase: Pre-elimination. Impact: >75% decrease in case incidence 2000–2011.

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2010	%
High transmission (≥1 case per 1000 population)	344 000	0
Low transmission (0-1 cases per 1000 population)	3 790 000	3
Malaria-free (0 cases)	111 000 000	96
Total	115 134 000	

Parasites and vectors

Major plasmodium species: *P. vivax* (100%)
Major anopheles species: *An. pseudopunctipennis, albimanus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	–
	ITNs/LLINs distributed to all age groups	Yes	2005
IRS	IRS is recommended	No	–
	DDT is used for IRS	Yes	2005
IPT	IPT used to prevent malaria during pregnancy	N/A	–
Case management	Patients of all ages should receive diagnostic test	Yes	–
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	No	–
	Pre-referral treatment with recommended medicines	No	–
	Oral artemisinin-based monotherapies are not registered	No	–

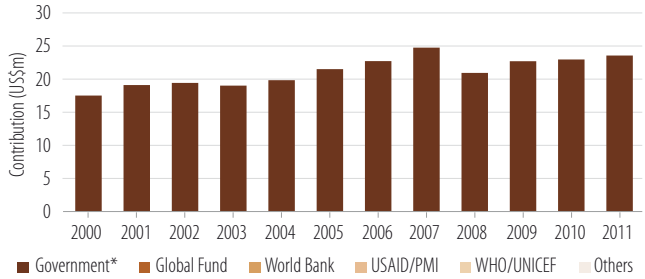
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	–	–
First-line treatment of *P. falciparum*	CQ+PQ	–
For treatment failure *of P. falciparum*	–	–
Treatment of severe malaria	–	–
Treatment of *P. vivax*	CQ+PQ	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

III. Financing

Government and external financing



* Expenditure: costs for local level, health systems, etc. not included.

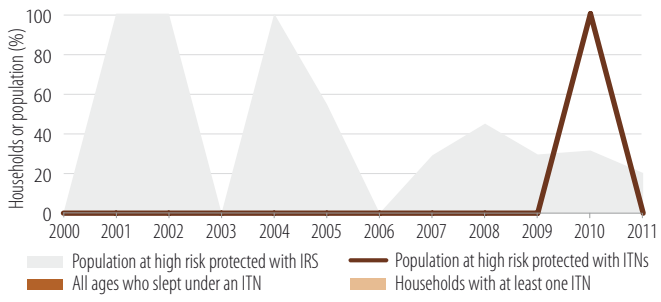
Expenditure by intervention in 2010

No data reported for 2011

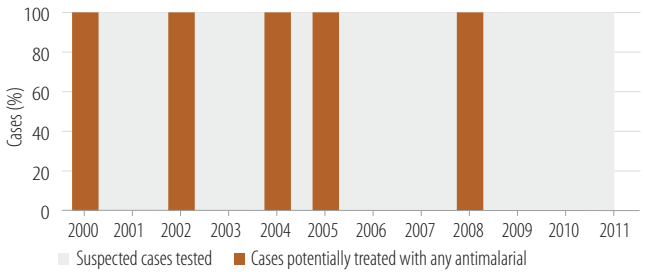
- Insecticides & spray materials
- ITNs
- Diagnostics
- Antimalarial medicines
- Monitoring and evaluation
- Human resources & technical assistance
- Management and other costs

IV. Coverage

Coverage of ITN and IRS

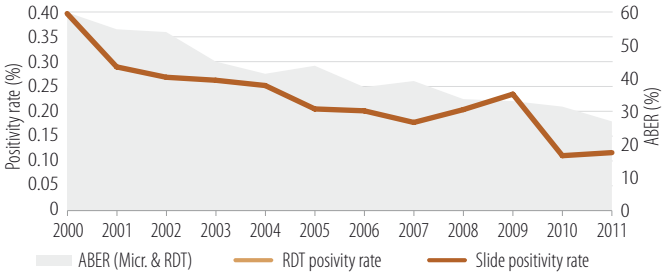


Cases tested and antimalarials delivered: Programme data (public sector)

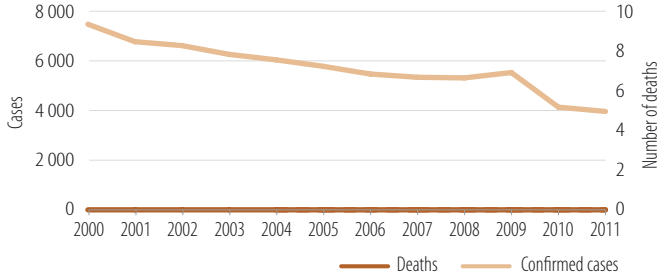


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed cases and deaths



Mozambique

Phase: Control. Impact: Insufficiently consistent data to assess trends.

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	23 900 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	23 900 000	

Parasites and vectors

Major plasmodium species:	*P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species:	*An. gambiae, arabiensis, funestus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2003
	ITNs/LLINs distributed to all age groups	Yes	2009
IRS	IRS is recommended	Yes	2003
	DDT is used for IRS	Yes	2005
IPT	IPT used to prevent malaria during pregnancy	Yes	2006
Case management	Patients of all ages should receive diagnostic test	Yes	2009
	RDTs used at community level	Yes	2007
	ACT is free for all ages in public sector	Yes	2005
	Pre-referral treatment with recommended medicines	Yes	2010
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	Yes	2010

Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2004
First-line treatment of *P. falciparum*	AL	2004
For treatment failure *of P. falciparum*	–	–
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AL	2005–2008	4	0	1.6	3.1	28 days

III. Financing

Government and external financing

* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

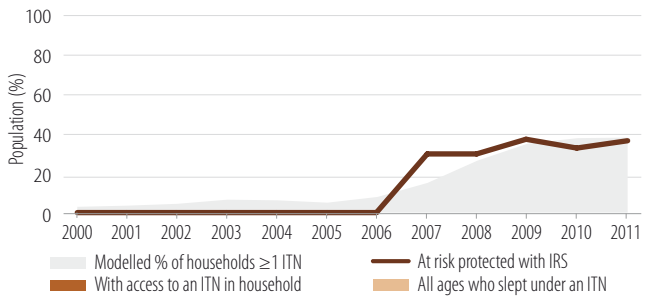
Expenditure by intervention in 2011

No data reported for 2011

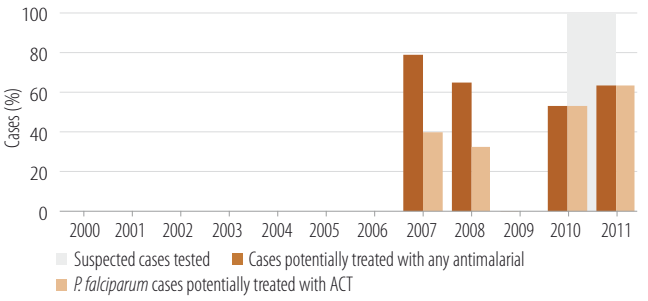
- Insecticides & spray materials
- ITNs
- Diagnostics
- Antimalarial medicines
- Monitoring and evaluation
- Human resources & technical assistance
- Management and other costs

IV. Coverage

Coverage of ITN and IRS



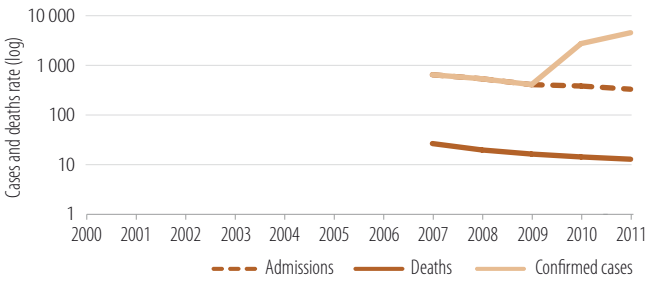
Cases tested and antimalarials delivered: Programme data (public sector)



V. Impact

Malaria test positivity rate and ABER

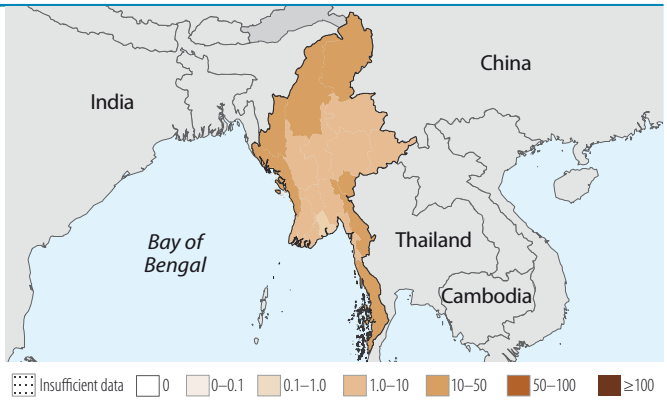
Microscopically confirmed cases, admissions and deaths (per 100 000)



Myanmar

South-East Asia Region

Phase: Control. Impact: Insufficiently consistent data to assess trends.



I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (1 case per 1000 population)	17 900 000	37
Low transmission (0-1 cases per 1000 population)	11 100 000	23
Malaria-free (0 cases)	19 300 000	40
Total	48 300 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (68%), *P. vivax* (32%)
Major anopheles species: *An. minimus, dirus, annularis, sundaicus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	–
	ITNs/LLINs distributed to all age groups	Yes	–
IRS	IRS is recommended	No	–
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	NA	–
Case management	Patients of all ages should receive diagnostic test	Yes	–
	RDTs used at community level	Yes	–
	ACT is free for all ages in public sector	Yes	–
	Pre-referral treatment with recommended medicines	Yes	–
	Oral artemisinin-based monotherapies are not registered	Yes	–

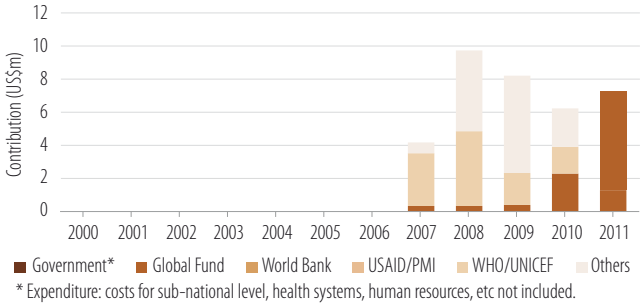
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	–	–
First-line treatment of *P. falciparum*	(AL ;AM ;AS+MQ ;DHA-PPQ)+PQ	2008
For treatment failure *of P. falciparum*	AS+D ;AS+T	2008
Treatment of severe malaria	AM ;AS ;QN	2008
Treatment of *P. vivax*	CQ+PQ(14d)	2008

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
DHA-PPQ	2005-2011	17	0	0	5	28 days
AL	2007-2011	13	0	0	5.9	28 days

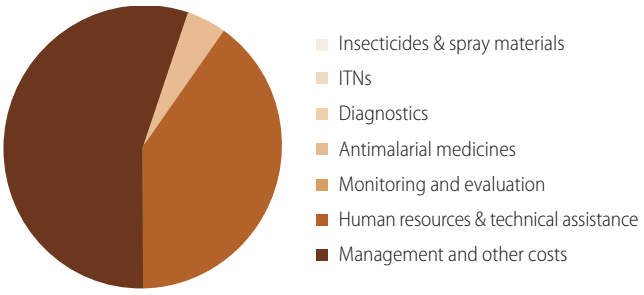
III. Financing

Government and external financing



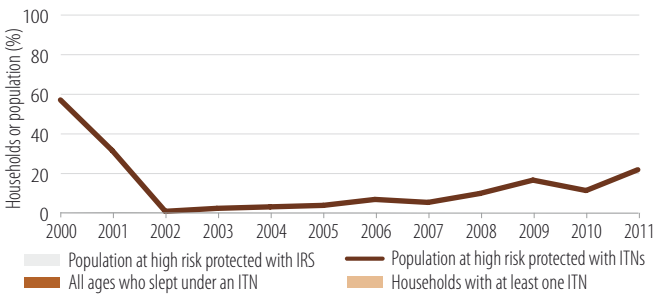
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

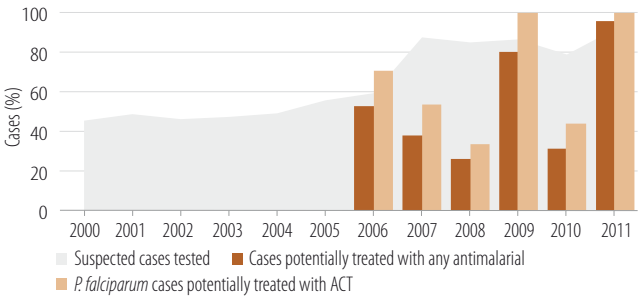


IV. Coverage

Coverage of ITN and IRS

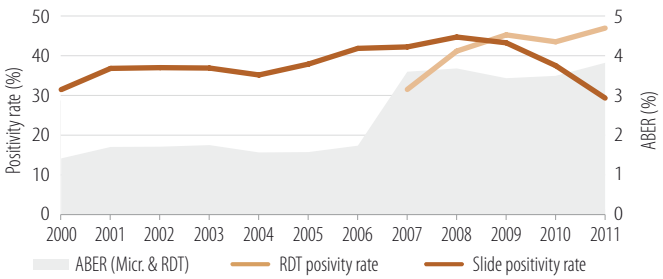


Cases tested and antimalarials delivered: Programme data (public sector)

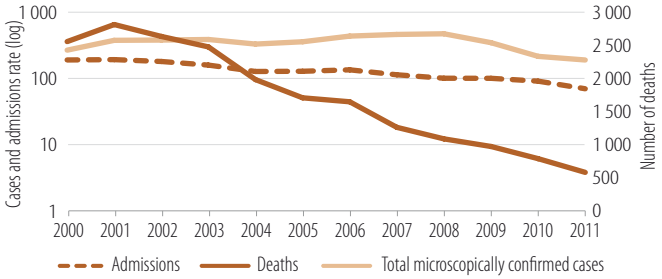


V. Impact

Malaria test positivity rate and ABER



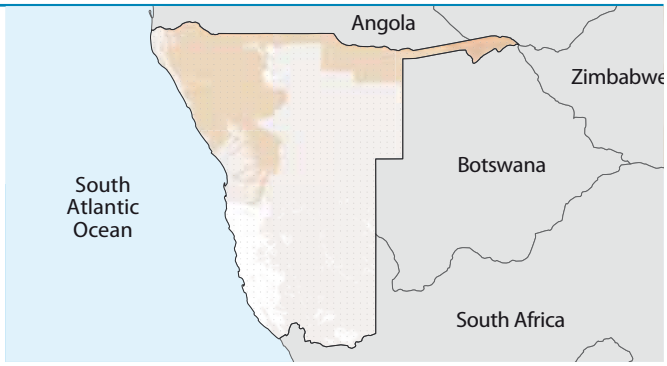
Microscopically confirmed cases, admissions (per 100 000) and deaths



Namibia

African Region

Phase: Control. Impact: >75% decrease in case incidence 2000–2011.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	1 560 000	67
Low transmission (0-1 cases per 1000 population)	116 000	5
Malaria-free (0 cases)	651 000	28
Total	2 327 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, arabiensis, funestus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	1998
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	Yes	1965
	DDT is used for IRS	Yes	1965
IPT	IPT used to prevent malaria during pregnancy	Yes	2007
Case management	Patients of all ages should receive diagnostic test	Yes	2011
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	Yes	2005
	Pre-referral treatment with recommended medicines	Yes	2005
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	No	–

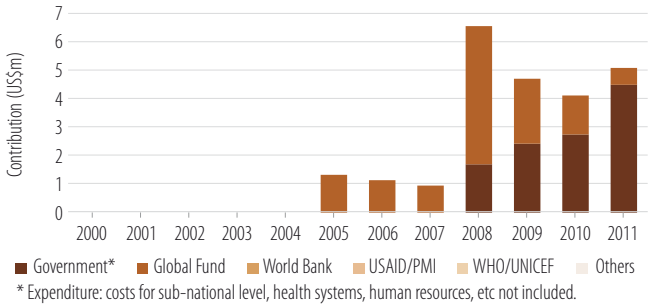
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2006
First-line treatment of *P. falciparum*	AL	2006
For treatment failure *of P. falciparum*	QN	2006
Treatment of severe malaria	QN	2006
Treatment of *P. vivax*	AL	2006

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

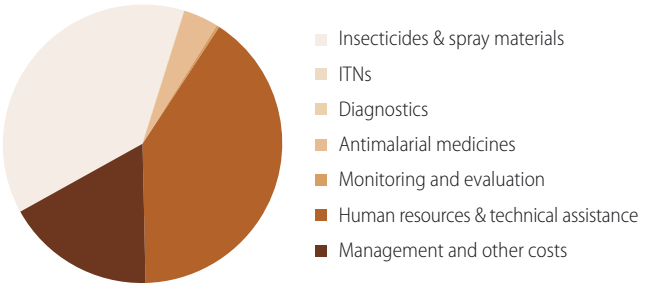
III. Financing

Government and external financing



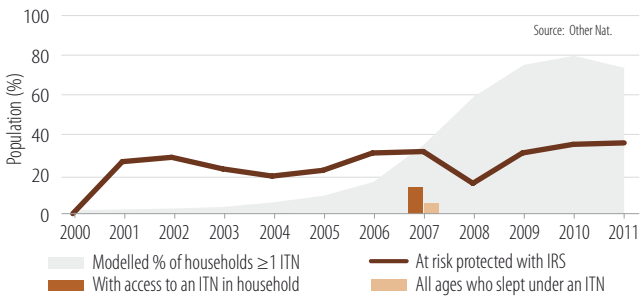
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

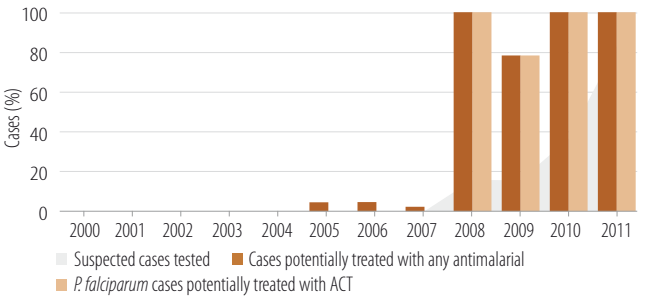


IV. Coverage

Coverage of ITN and IRS

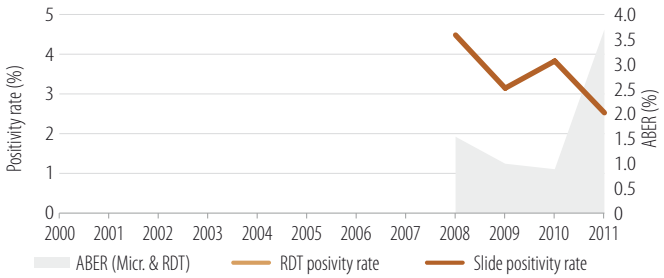


Cases tested and antimalarials delivered: Programme data (public sector)

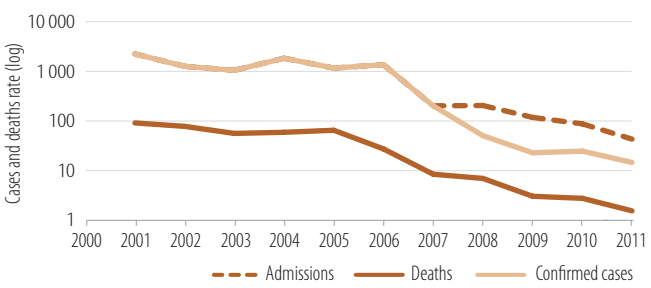


V. Impact

Malaria test positivity rate and ABER

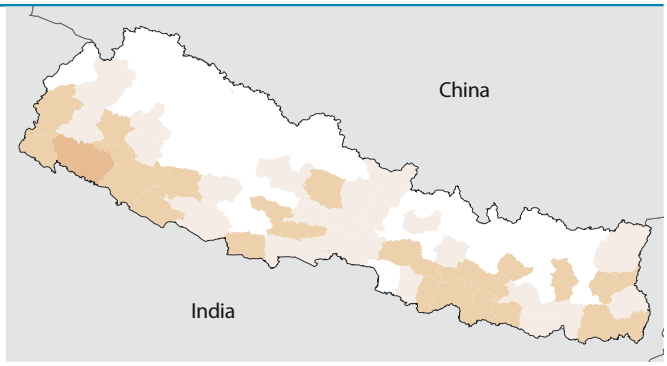


Microscopically confirmed cases, admissions and deaths (per 100 000)



Nepal

Phase: Control. Impact: >75% decrease in case incidence 2000–2011.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (1 case per 1000 population)	1 130 000	4
Low transmission (0-1 cases per 1000 population)	24 400 000	80
Malaria-free (0 cases)	5 000 000	16
Total	30 530 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (13%), *P. vivax* (84%)
Major anopheles species: *An. fluviatilis, annularis, maculatus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2007
	ITNs/LLINs distributed to all age groups	Yes	2007
IRS	IRS is recommended	Yes	1962
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	NA	–
Case management	Patients of all ages should receive diagnostic test	Yes	1962
	RDTs used at community level	Yes	2007
	ACT is free for all ages in public sector	Yes	2007
	Pre-referral treatment with recommended medicines	Yes	2009
	Oral artemisinin-based monotherapies are not registered	No	–

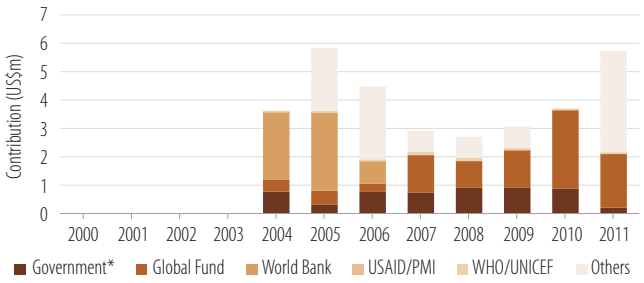
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL+PQ	2004
First-line treatment of *P. falciparum*	AL+PQ	2004
For treatment failure *of P. falciparum*	-	–
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	CQ+PQ(14d)	2004

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AL	2005-2010	8	0	0	0	28 days

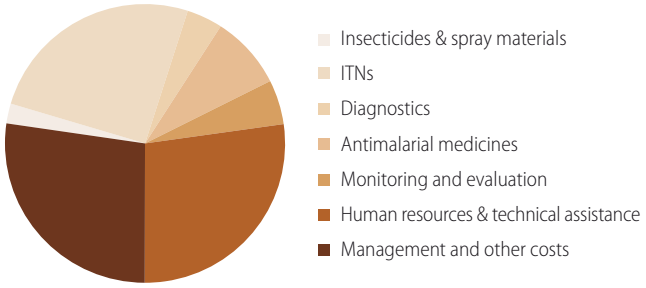
III. Financing

Government and external financing



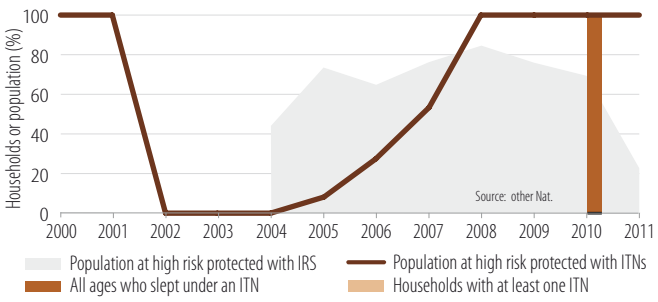
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

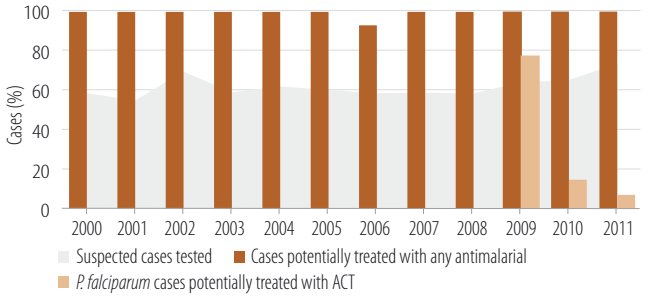


IV. Coverage

Coverage of ITN and IRS

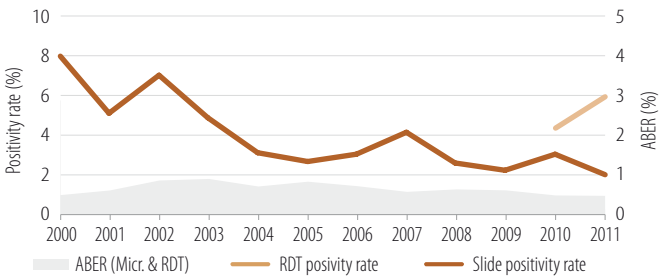


Cases tested and antimalarials delivered: Programme data (public sector)

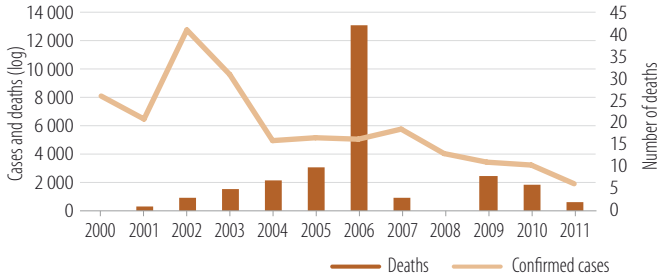


V. Impact

Malaria test positivity rate and ABER



Confirmed cases and deaths (per 100 000)



Nicaragua

Phase: Control. Impact: >75% decrease in case incidence 2000–2011.

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2010	%
High transmission (≥1 case per 1000 population)	76 300	1
Low transmission (0-1 cases per 1000 population)	2 870 000	49
Malaria-free (0 cases)	2 920 000	50
Total	5 866 300	

Parasites and vectors

Major plasmodium species: *P. falciparum* (16%), *P. vivax* (84%)
Major anopheles species: *An. albimanus, pseudopunctipennis*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2004
	ITNs/LLINs distributed to all age groups	Yes	2004
IRS	IRS is recommended	Yes	1959
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	N/A	–
Case management	Patients of all ages should receive diagnostic test	Yes	–
	RDTs used at community level	Yes	–
	ACT is free for all ages in public sector	Yes	–
	Pre-referral treatment with recommended medicines	No	–
	Oral artemisinin-based monotherapies are not registered	No	–

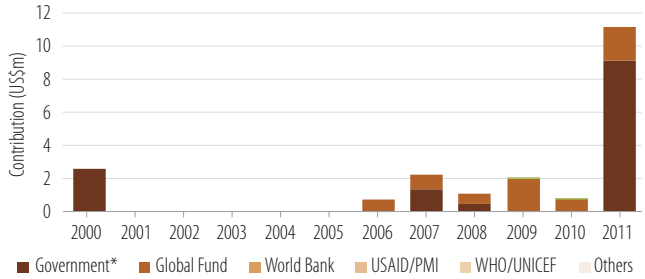
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	–	–
First-line treatment of *P. falciparum*	CQ+PQ	–
For treatment failure *of P. falciparum*	AS+MQ ;AS+SP	–
Treatment of severe malaria	QN+CL	–
Treatment of *P. vivax*	CQ+PQ	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
CQ	2005–2006	1	0	0	0	28 days

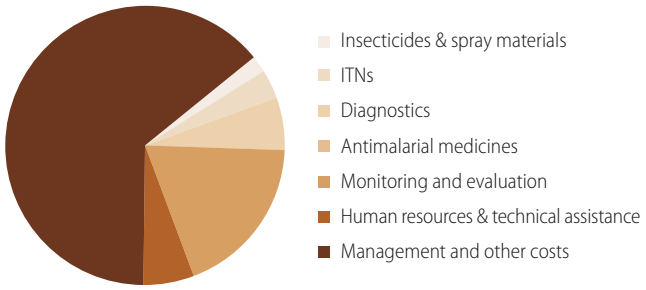
III. Financing

Government and external financing



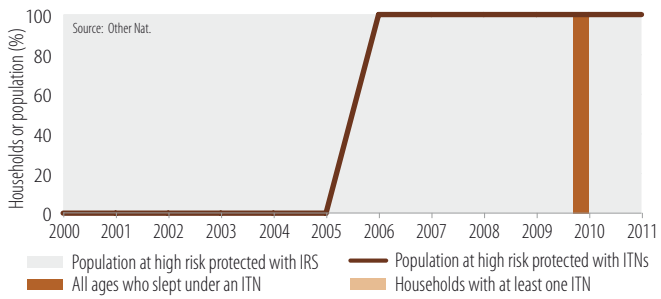
* Expenditure: costs for local level, health systems, etc. not included.

Expenditure by intervention in 2010

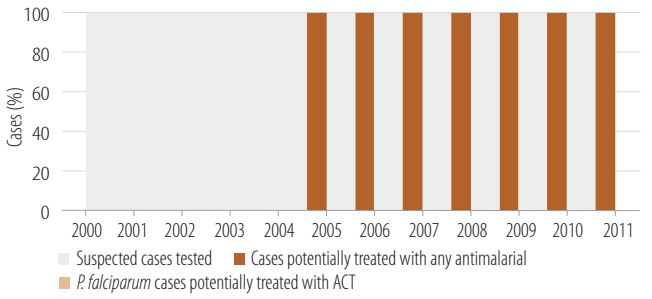


IV. Coverage

Coverage of ITN and IRS

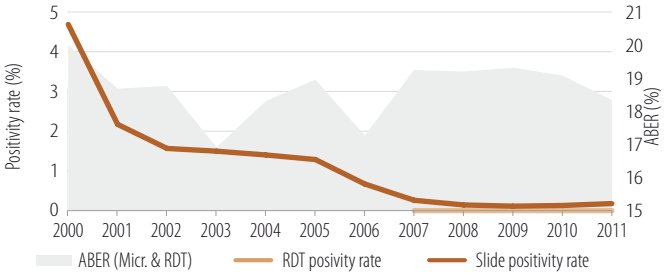


Cases tested and antimalarials delivered: Programme data (public sector)

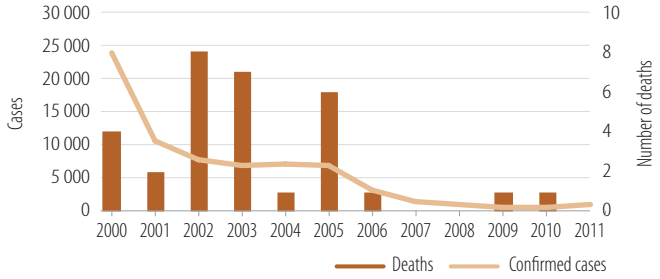


V. Impact

Malaria test positivity rate and ABER

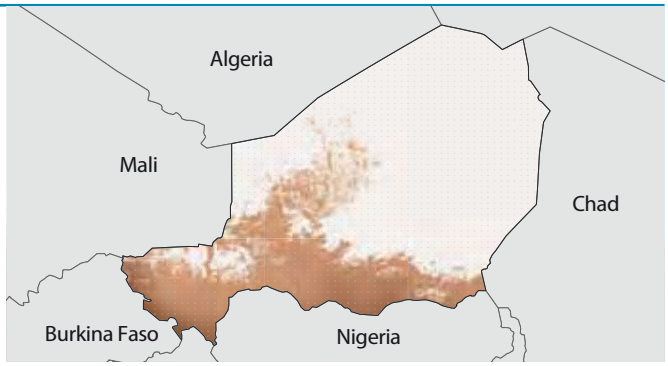


Microscopically confirmed cases and deaths



Niger

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	11 100 000	69
Low transmission (0-1 cases per 1000 population)	4 980 000	31
Malaria-free (0 cases)	0	0
Total	16 080 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, arabiensis, funestus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2005
	ITNs/LLINs distributed to all age groups	Yes	–
IRS	IRS is recommended	Yes	2003
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2005
Case management	Patients of all ages should receive diagnostic test	Yes	–
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	No	–
	Pre-referral treatment with recommended medicines	No	–
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	No	–

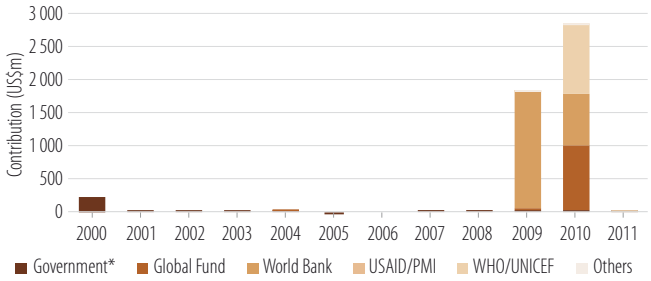
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2005
First-line treatment of *P. falciparum*	AL	2005
For treatment failure *of P. falciparum*	QN	2005
Treatment of severe malaria	QN	2005
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AL	2006–2006	1	4.4	4.4	4.4	28 days

III. Financing

Government and external financing



* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

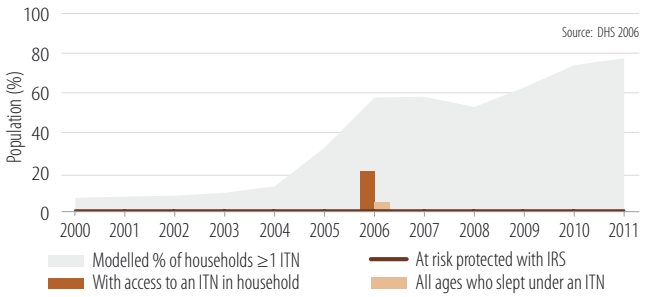
Expenditure by intervention in 2011

No data reported for 2011

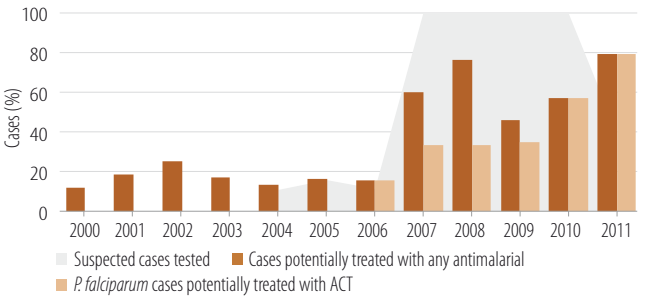
- Insecticides & spray materials
- ITNs
- Diagnostics
- Antimalarial medicines
- Monitoring and evaluation
- Human resources & technical assistance
- Management and other costs

IV. Coverage

Coverage of ITN and IRS

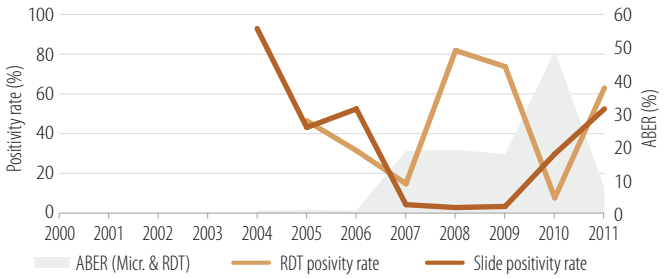


Cases tested and antimalarials delivered: Programme data (public sector)

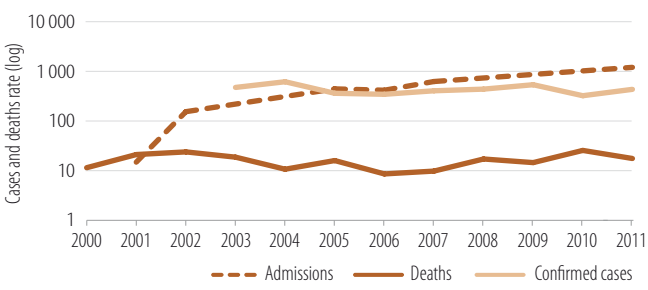


V. Impact

Malaria test positivity rate and ABER



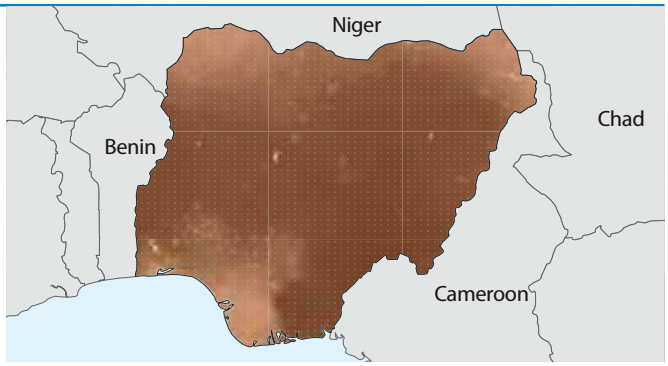
Microscopically confirmed cases, admissions and deaths (per 100 000)



Nigeria

African Region

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	162 000 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	162 000 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, arabiensis, funestus, Moucheti, melas, nili*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2001
	ITNs/LLINs distributed to all age groups	Yes	2009
IRS	IRS is recommended	Yes	2007
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2004
Case management	Patients of all ages should receive diagnostic test	Yes	2006
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	Yes	2009
	Pre-referral treatment with recommended medicines	Yes	2006
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	Yes	2009

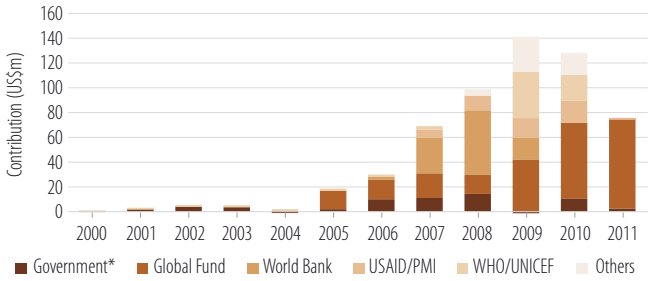
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL ;AS+AQ	2004
First-line treatment of *P. falciparum*	AL ;AS+AQ	2004
For treatment failure *of P. falciparum*	QN	2004
Treatment of severe malaria	AM ;AS ;QN	2004
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AL	2002–2007	5	0	0	2	28 days
AS+AQ	2004–2006	5	0	0	7.8	28 days

III. Financing

Government and external financing



* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

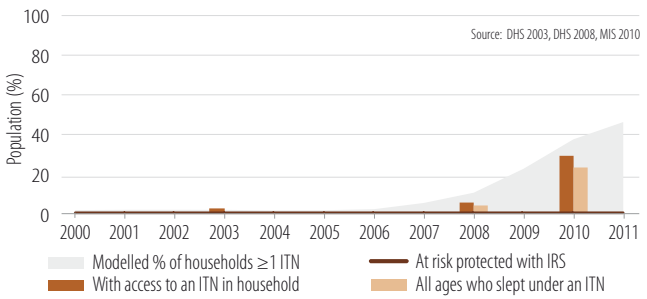
Expenditure by intervention in 2011

No data reported for 2011

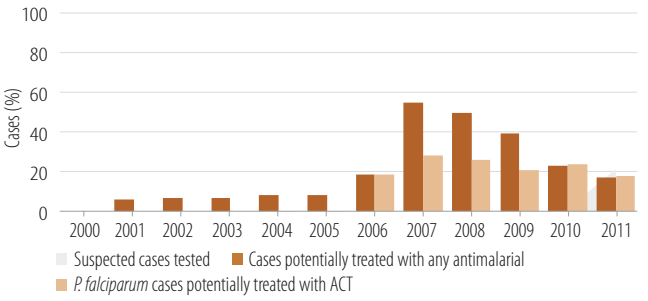
- Insecticides & spray materials
- ITNs
- Diagnostics
- Antimalarial medicines
- Monitoring and evaluation
- Human resources & technical assistance
- Management and other costs

IV. Coverage

Coverage of ITN and IRS

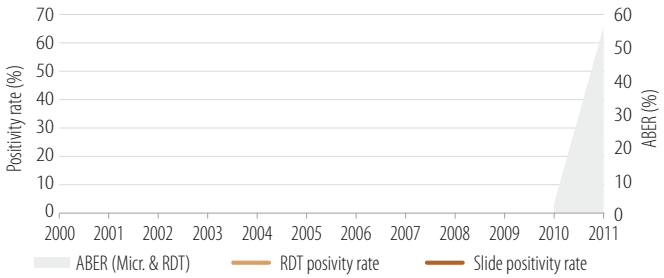


Cases tested and antimalarials delivered: Programme data (public sector)

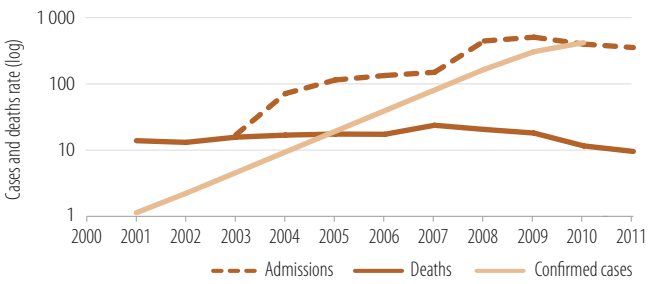


V. Impact

Malaria test positivity rate and ABER

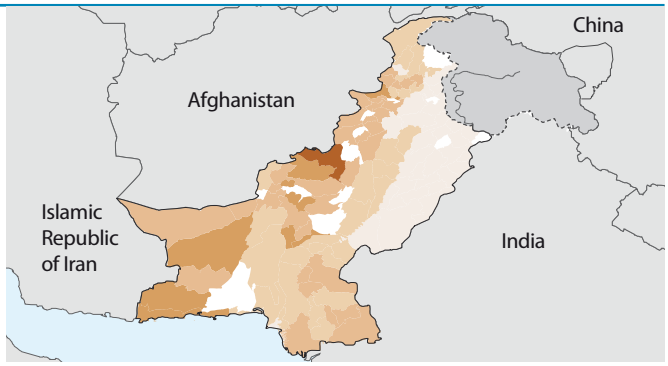


Microscopically confirmed cases, admissions and deaths (per 100 000)



Pakistan

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population), year 2010

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	26 500 000	15
Low transmission (0-1 cases per 1000 population)	148 000 000	84
Malaria-free (0 cases)	1 770 000	1
Total	176 270 000	

Parasites and vectors

Major plasmodium species: *P. falciparum (36%), P. vivax (64%)*
Major anopheles species: *An. culicifacies, stephensi*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2008
	ITNs/LLINs distributed to all age groups	Yes	2008
IRS	IRS is recommended	Yes	1961
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	NA	–
Case management	Patients of all ages should receive diagnostic test	–	–
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	Yes	2009
	Pre-referral treatment with recommended medicines	Yes	2007
	Oral artemisinin-based monotherapies are not registered	Yes	2007

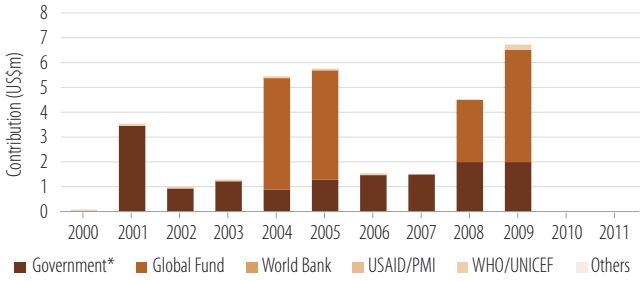
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	CQ	–
First-line treatment of *P. falciparum*	AS+SP	2007
For treatment failure *of P. falciparum*	QN	–
Treatment of severe malaria	AM ;AS ;QN	2007
Treatment of *P. vivax*	CQ+PQ(14d)	2007

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+SP	2007-2011	7	0	0	1.5	28 days

III. Financing

Government and external financing



* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

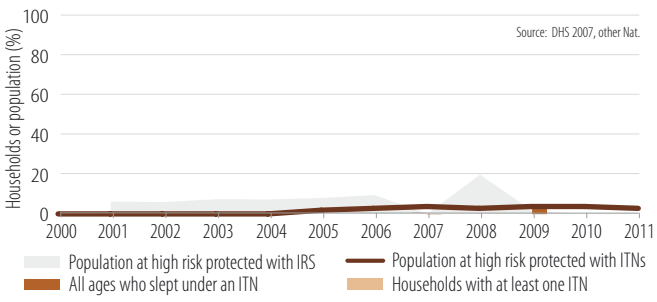
Expenditure by intervention in 2011

No data reported for 2011

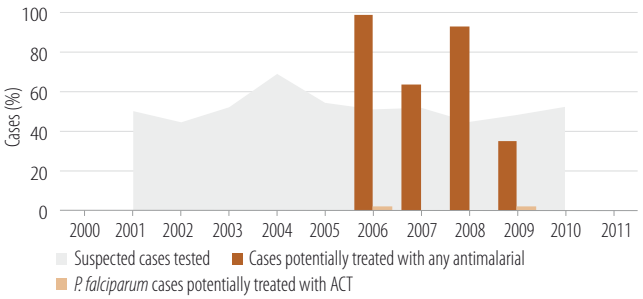
- Insecticides & spray materials
- ITNs
- Diagnostics
- Antimalarial medicines
- Monitoring and evaluation
- Human resources & technical assistance
- Management and other costs

IV. Coverage

Coverage of ITN and IRS

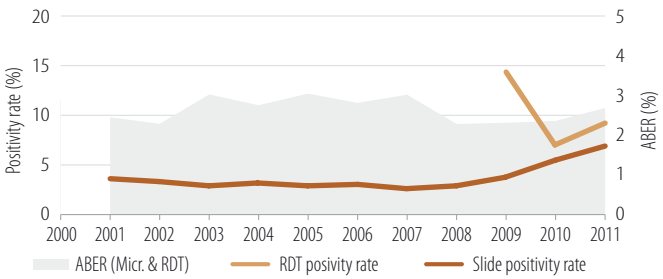


Cases tested and antimalarials delivered: Programme data (public sector)

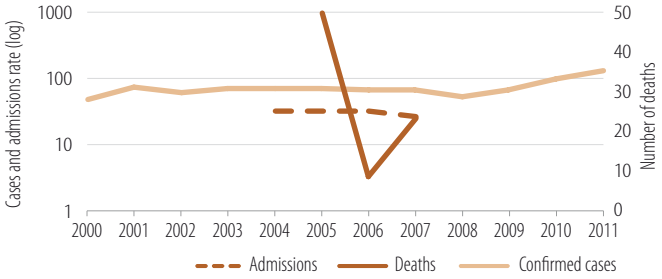


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed cases, admissions (per 100 000) and deaths



Panama

Phase: Control. Impact: >75% decrease in case incidence projected 2000–2015.

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2010	%
High transmission (≥1 case per 1000 population)	157 000	4
Low transmission (0-1 cases per 1000 population)	2 540 000	71
Malaria-free (0 cases)	871 000	24
Total	3 568 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (0%), *P. vivax* (100%)
Major anopheles species: *An. albimanus, pseudopunctipennis, punctimacula, aquasalis, darlingi*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	No	–
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	Yes	1957
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	N/A	–
Case management	Patients of all ages should receive diagnostic test	Yes	1957
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	No	–
	Pre-referral treatment with recommended medicines	No	–
	Oral artemisinin-based monotherapies are not registered	No	–

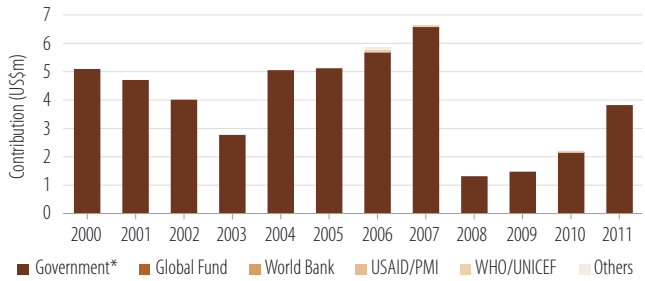
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	–	–
First-line treatment of *P. falciparum*	SP	–
For treatment failure *of P. falciparum*	SP+PQ	–
Treatment of severe malaria	MQ	–
Treatment of *P. vivax*	CQ+PQ	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

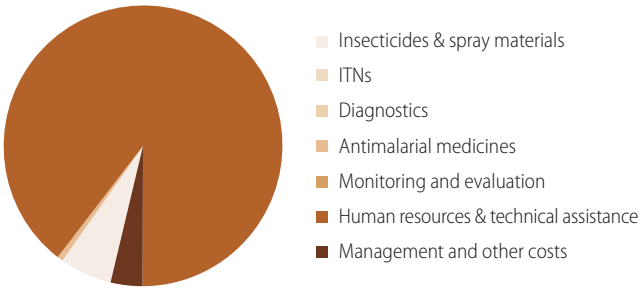
III. Financing

Government and external financing



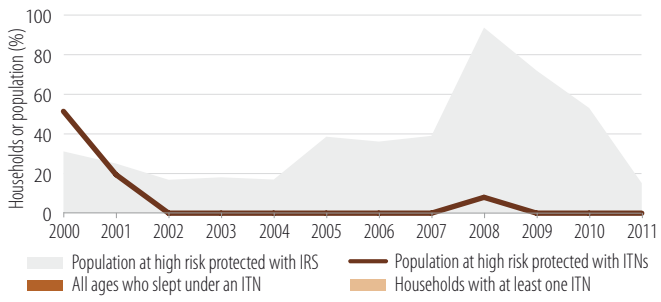
* Expenditure: costs for local level, health systems, etc. not included.

Expenditure by intervention in 2010

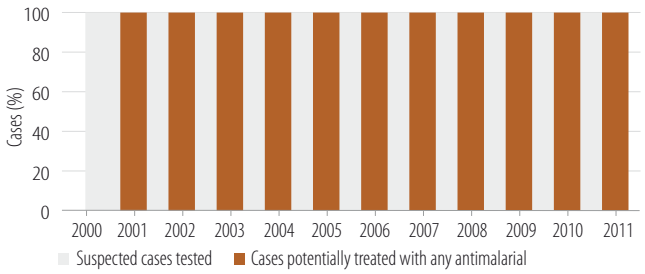


IV. Coverage

Coverage of ITN and IRS

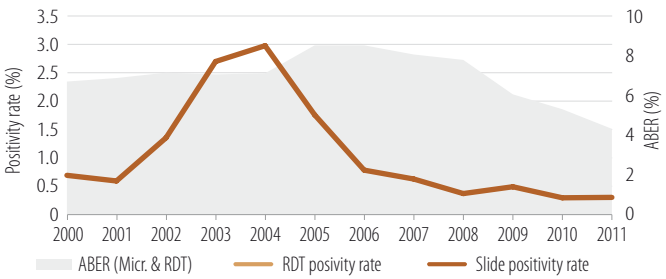


Cases tested and antimalarials delivered: Programme data (public sector)

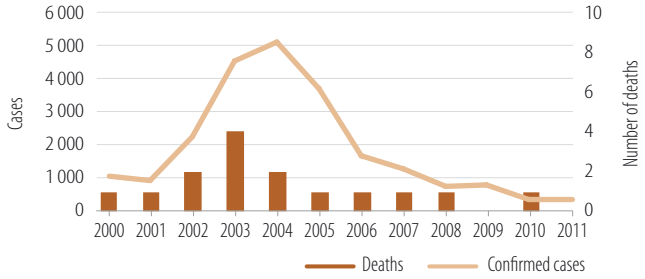


V. Impact

Malaria test positivity rate and ABER

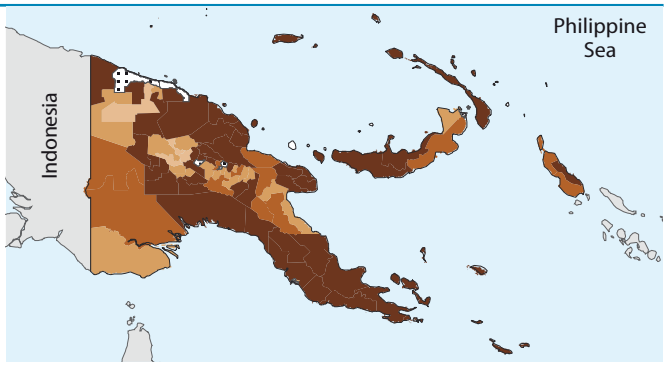


Microscopically confirmed cases and deaths



Papua New Guinea

Phase: Control. Impact: <50% decrease in case incidence projected 2000–2015.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	6 590 000	94
Low transmission (0-1 cases per 1000 population)	421 000	6
Malaria-free (0 cases)	0	0
Total	7 011 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (75%), *P. vivax* (12%)
Major anopheles species: *An. punctulatus, farauti, koliensis*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2004
	ITNs/LLINs distributed to all age groups	Yes	2005
IRS	IRS is recommended	Yes	2010
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2010
Case management	Patients of all ages should receive diagnostic test	Yes	2010
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	Yes	2010
	Pre-referral treatment with recommended medicines	Yes	2000
	Oral artemisinin-based monotherapies are not registered	No	–

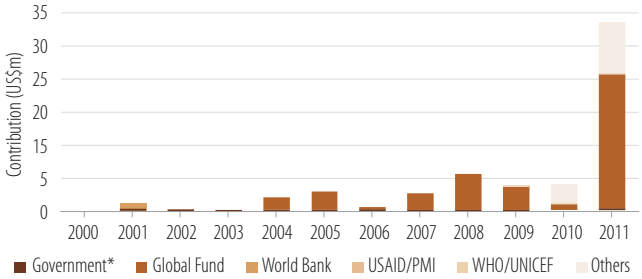
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	–
First-line treatment of *P. falciparum*	AL	2008
For treatment failure *of P. falciparum*	DHA-PPQ	2008
Treatment of severe malaria	AM ;AS	2008
Treatment of *P. vivax*	AL+PQ	2009

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
DHA-PPQ	2006–2007	1	9.9	9.9	9.9	28 days
AL	2006–2007	1	2.7	2.7	2.7	28 days

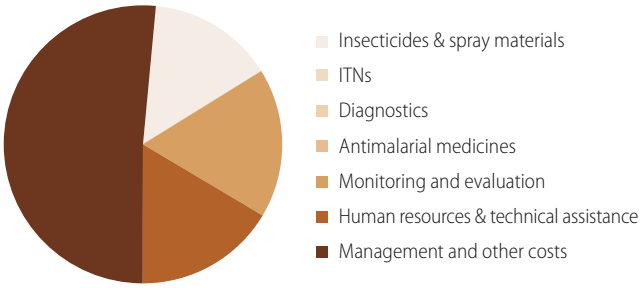
III. Financing

Government and external financing



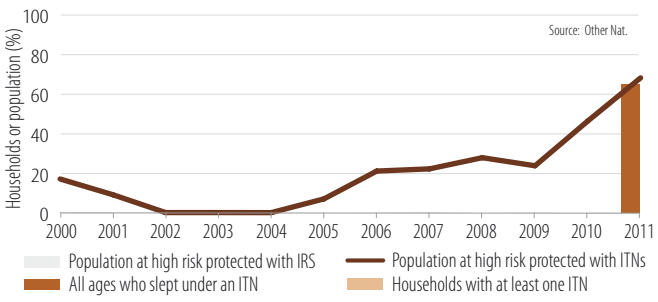
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

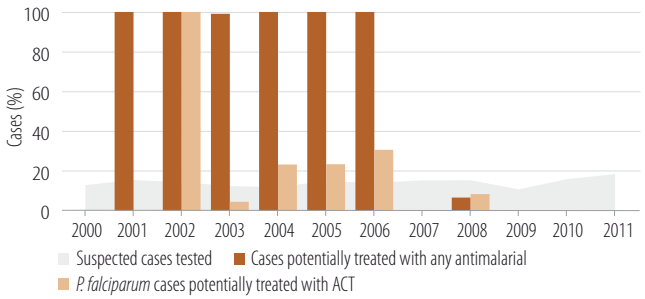


IV. Coverage

Coverage of ITN and IRS

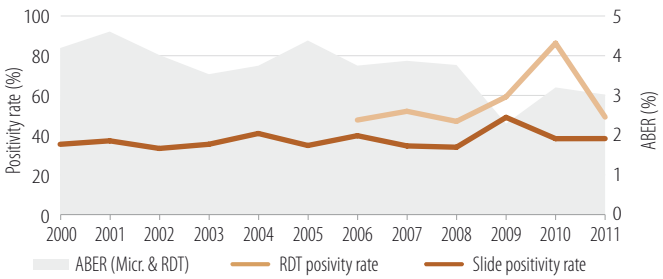


Cases tested and antimalarials delivered: Programme data (public sector)

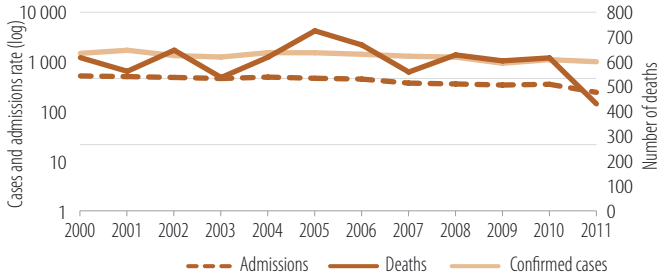


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed cases, admissions (per 100 000) and deaths



Paraguay

Phase: Pre-elimination. Impact: >75% decrease in case incidence 2000–2011.

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2010	%
High transmission (≥1 case per 1000 population)	0	0
Low transmission (0-1 cases per 1000 population)	236 000	4
Malaria-free (0 cases)	6 330 000	96
Total	6 566 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (70%), *P. vivax* (30%)
Major anopheles species: *An. darlingi, albitarsis*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	No	–
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	Yes	1957
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	N/A	–
Case management	Patients of all ages should receive diagnostic test	Yes	1957
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	Yes	2005
	Pre-referral treatment with recommended medicines	No	–
	Oral artemisinin-based monotherapies are not registered	No	–

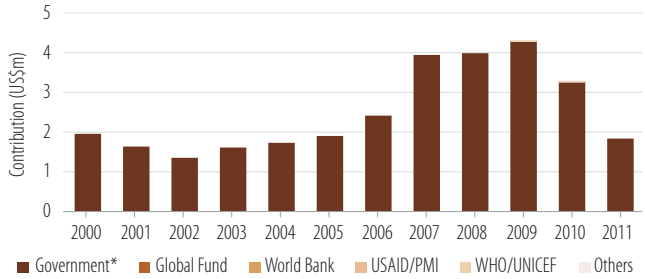
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	–	–
First-line treatment of *P. falciparum*	AL	–
For treatment failure *of P. falciparum*	–	–
Treatment of severe malaria	–	–
Treatment of *P. vivax*	CQ+PQ	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

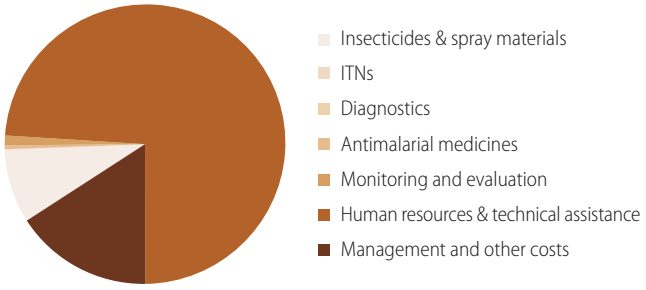
III. Financing

Government and external financing



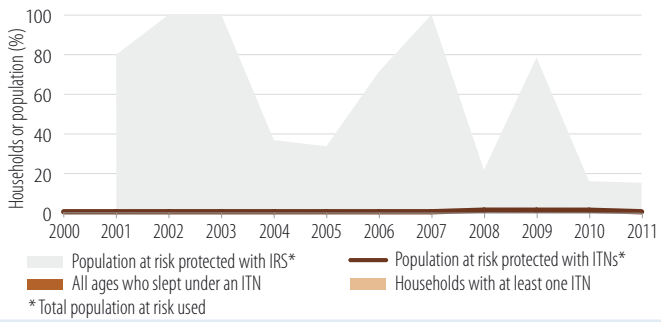
* Expenditure: costs for local level, health systems, etc. not included.

Expenditure by intervention in 2010



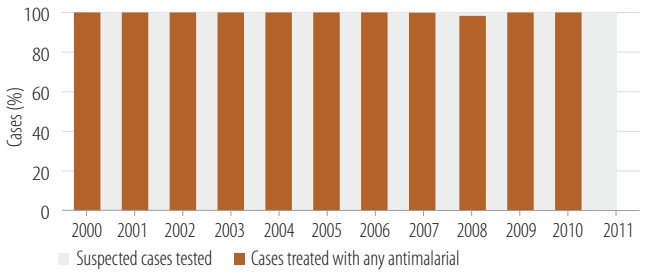
IV. Coverage

Coverage of ITN and IRS



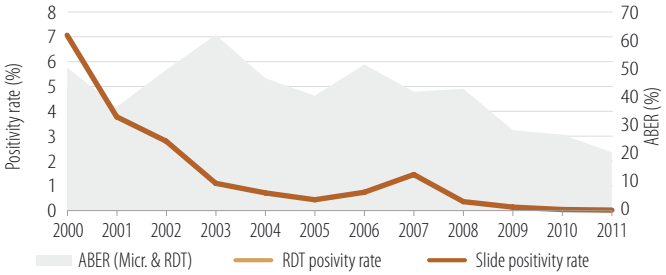
* Total population at risk used

Cases tested and antimalarials delivered: Programme data (public sector)

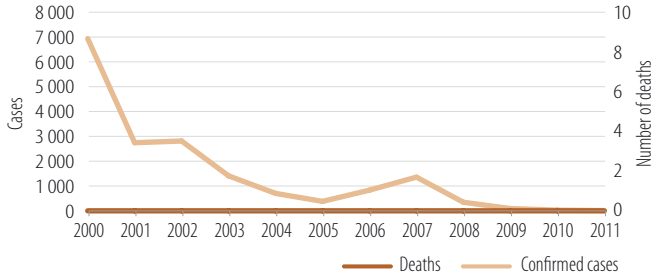


V. Impact

Malaria test positivity rate and ABER



ConfirmedMicroscopically confirmed cases and deaths



Peru

Phase: Control. Impact: >75% decrease in case incidence projected 2000–2015.

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	1 320 000	4
Low transmission (0-1 cases per 1000 population)	3 380 000	11
Malaria-free (0 cases)	24 700 000	84
Total	29 400 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (11%), *P. vivax* (89%)
Major anopheles species:

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	–
	ITNs/LLINs distributed to all age groups	Yes	–
IRS	IRS is recommended	–	–
	DDT is used for IRS	Yes	–
IPT	IPT used to prevent malaria during pregnancy	N/A	–
Case management	Patients of all ages should receive diagnostic test	Yes	–
	RDTs used at community level	Yes	–
	ACT is free for all ages in public sector	–	–
	Pre-referral treatment with recommended medicines	Yes	–
	Oral artemisinin-based monotherapies are not registered	–	–

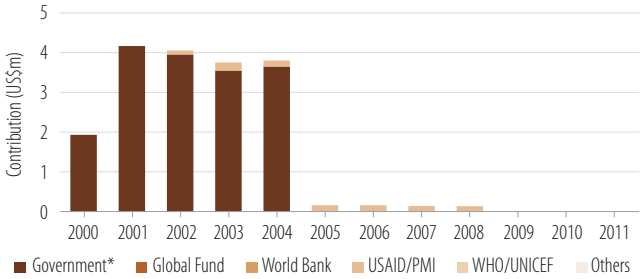
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	–
First-line treatment of *P. falciparum*	AS+MQ	–
For treatment failure *of P. falciparum*	–	–
Treatment of severe malaria	–	–
Treatment of *P. vivax*	CQ+PQ	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+MQ	2005-2006	1	1.1	1.1	1.1	28 days

III. Financing

Government and external financing



* Expenditure: costs for local level, health systems, etc. not included.

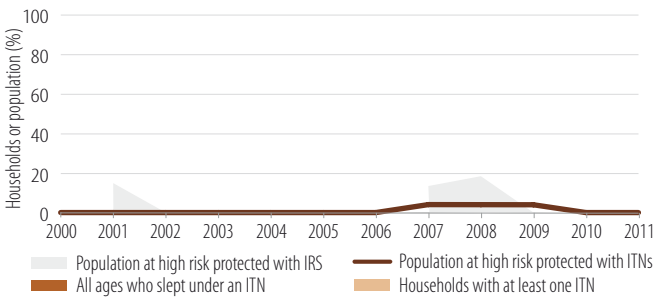
Expenditure by intervention in 2011

Data not reported for 2011

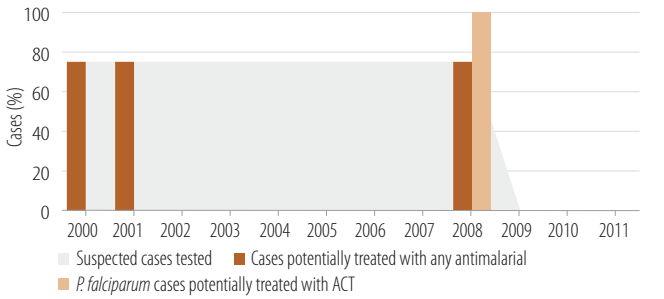
- Insecticides & spray materials
- ITNs
- Diagnostics
- Antimalarial medicines
- Monitoring and evaluation
- Human resources & technical assistance
- Management and other costs

IV. Coverage

Coverage of ITN and IRS

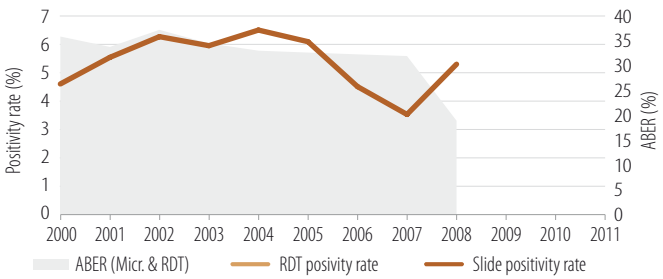


Cases tested and antimalarials delivered: Programme data (public sector)

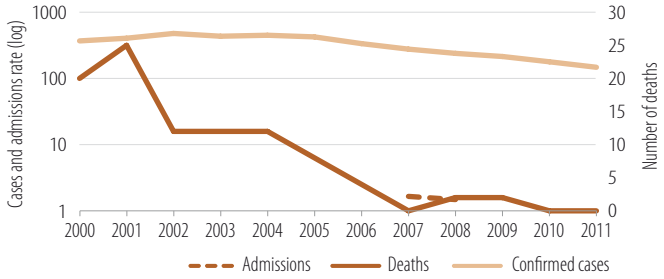


V. Impact

Malaria test positivity rate and ABER

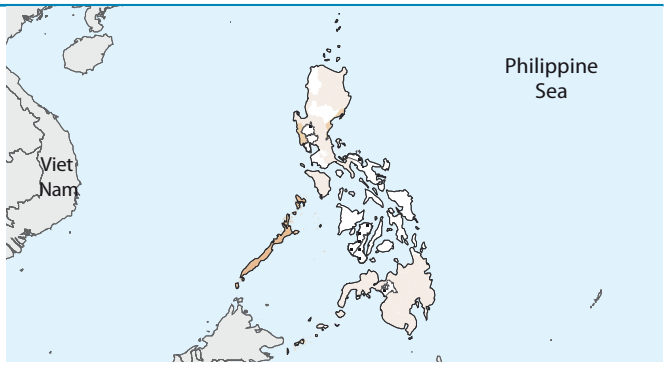


Microscopically confirmed cases, admissions (per 100 000) and deaths



Philippines

Phase: Control. Impact: >75% decrease in case incidence 2000–2011.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	6 800 000	7
Low transmission (0-1 cases per 1000 population)	68 900 000	73
Malaria-free (0 cases)	19 200 000	20
Total	94 900 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (75%), *P. vivax* (25%)
Major anopheles species: *An. flavirostris, maculatus, balabacensis, Litoralis*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2006
	ITNs/LLINs distributed to all age groups	Yes	2000
IRS	IRS is recommended	Yes	–
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	N/A	–
Case management	Patients of all ages should receive diagnostic test	Yes	2004
	RDTs used at community level	Yes	2002
	ACT is free for all ages in public sector	Yes	2003
	Pre-referral treatment with recommended medicines	Yes	2009
	Oral artemisinin-based monotherapies are not registered	No	–

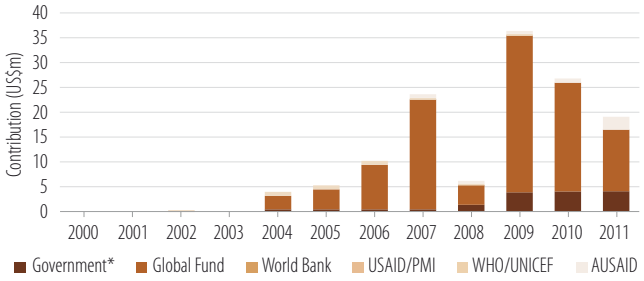
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2009
First-line treatment of *P. falciparum*	AL+PQ	2009
For treatment failure *of P. falciparum*	QN+T	2002
Treatment of severe malaria	QN+T	2002
Treatment of *P. vivax*	CQ+PQ(14d)	2002

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AL	2006-2009	4	0	0	4	28 days

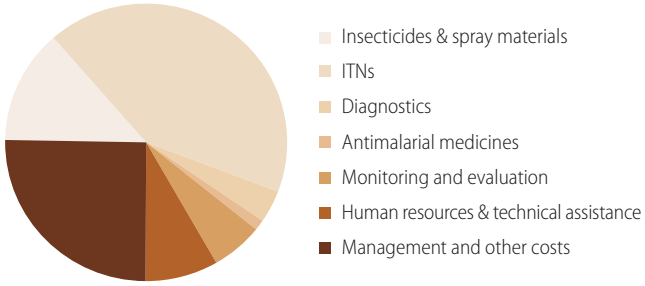
III. Financing

Government and external financing



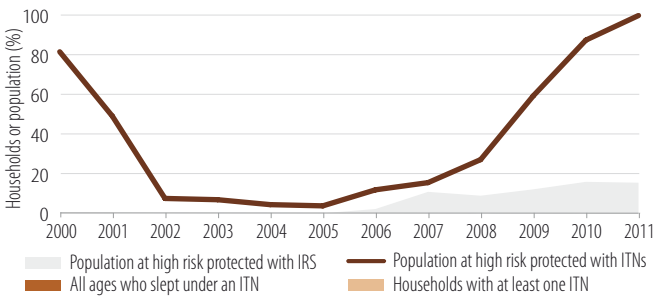
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

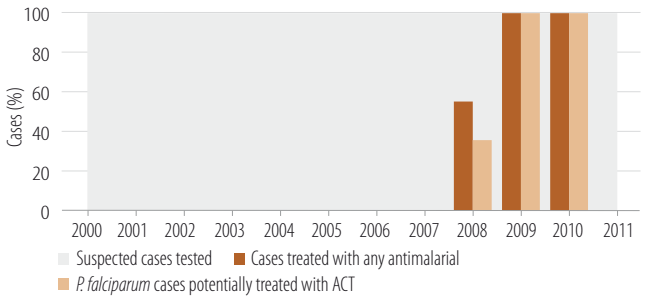


IV. Coverage

Coverage of ITN and IRS

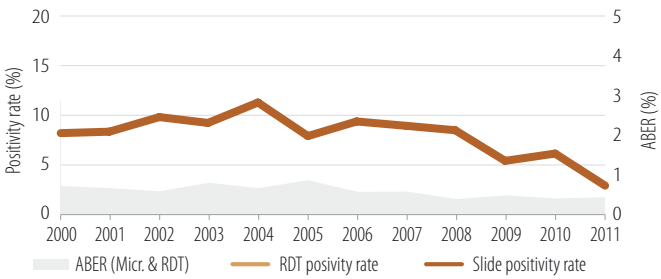


Cases tested and antimalarials delivered: Programme data (public sector)

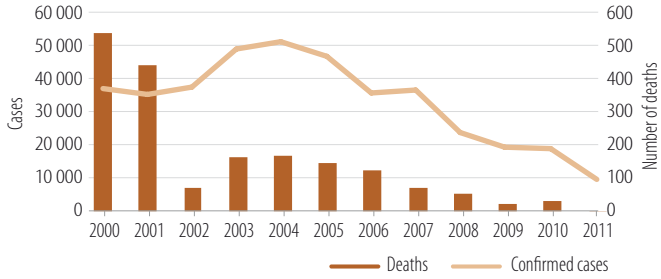


V. Impact

Malaria test positivity rate and ABER

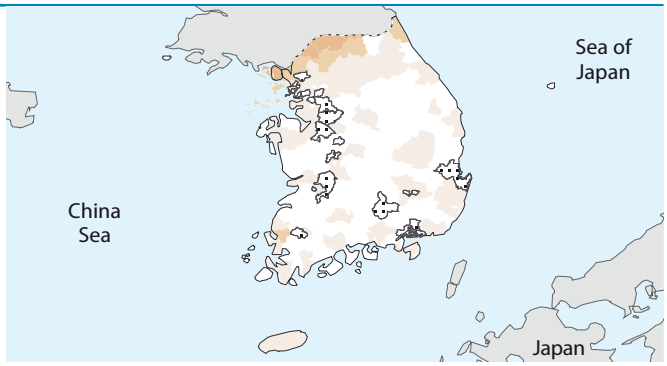


Microscopically confirmed cases and deaths



Republic of Korea

Phase: Elimination. Impact: >75% decrease in case incidence 2000–2011.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
Number of active foci	22	
Number of people living within active foci	3 670 000	8
Number of people living in malaria-free areas	44 700 000	92
Total	48 370 000	

Parasites and vectors

Major plasmodium species: *P. vivax* (97%)
Major anopheles species: *An.sinensis*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2001
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	–	–
	DDT is used for IRS	No	–
Case management	Malaria diagnosis is free of charge in the public sector	Yes	2001
	Gametocidal treatment of *P.falciparum* cases	Yes	–
	Radical treatment of *P. vivax* cases	Yes	2001
Surveillance	Foci and case investigation undertaken	Yes	2001
	Case reporting from private sector is mandatory	Yes	–

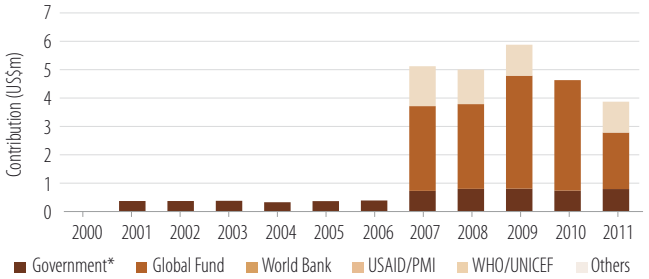
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	CQ	–
First-line treatment of *P. falciparum*	-	–
For treatment failure *of P. falciparum*	-	–
Treatment of severe malaria	-	–
Treatment of *P. vivax*	CQ+PQ(14d)	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

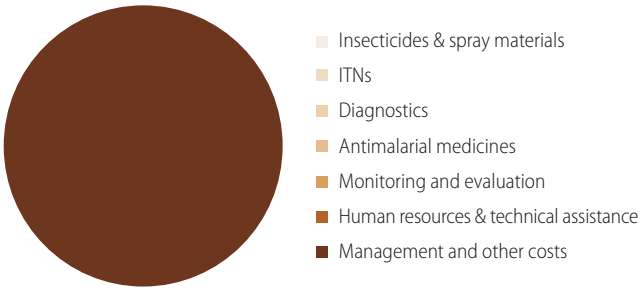
III. Financing

Government and external financing



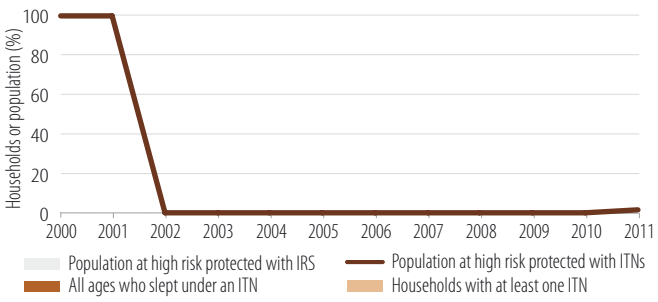
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

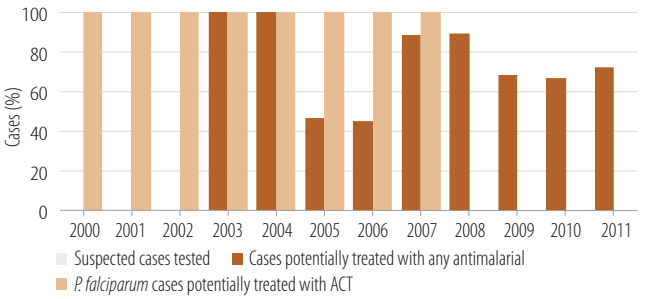


IV. Coverage

Coverage of ITN and IRS

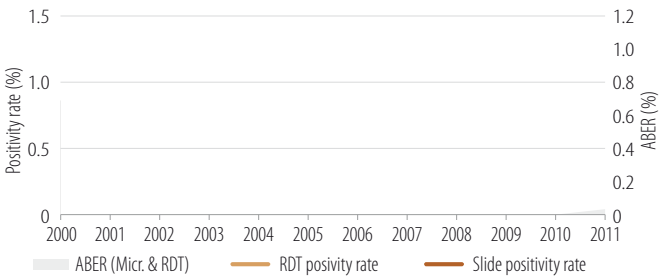


Cases tested and antimalarials delivered: Programme data (public sector)

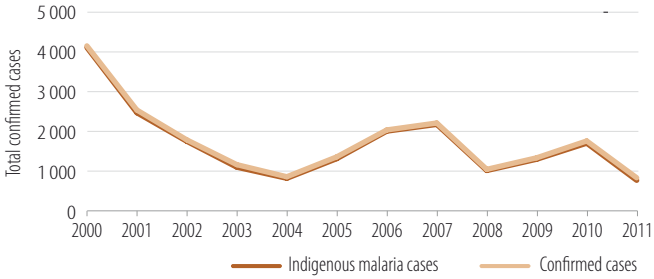


V. Impact

Malaria test positivity rate and ABER

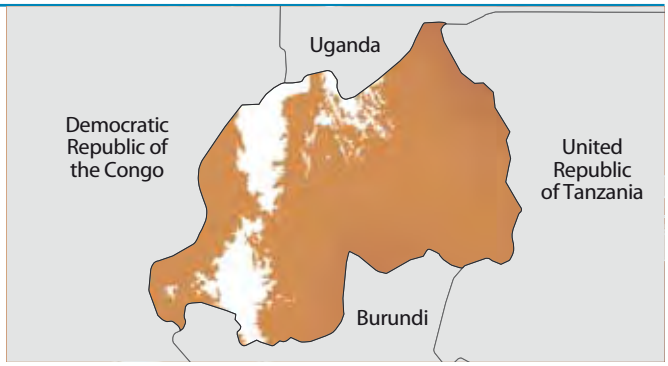


Microscopically confirmed malaria cases and indigenous cases



Rwanda

Phase: Control. Impact: >75% decrease in admission rates 2000–2011.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	10 900 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	10 900 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, arabiensis, funestus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2004
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	Yes	2009
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	No	–
Case management	Patients of all ages should receive diagnostic test	Yes	2009
	RDTs used at community level	Yes	2008
	ACT is free for all ages in public sector	No	–
	Pre-referral treatment with recommended medicines	Yes	2007
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	No	–

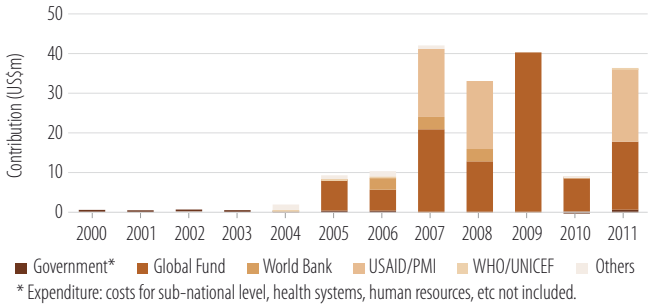
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2005
First-line treatment of *P. falciparum*	AL	2005
For treatment failure *of P. falciparum*	QN	2005
Treatment of severe malaria	AM ;QN	2005
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AL	2004–2007	3	0	1.5	6.9	28 days

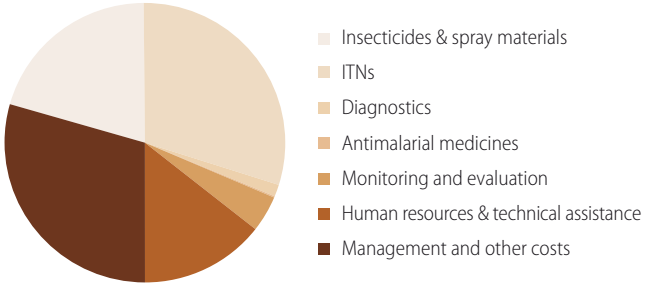
III. Financing

Government and external financing



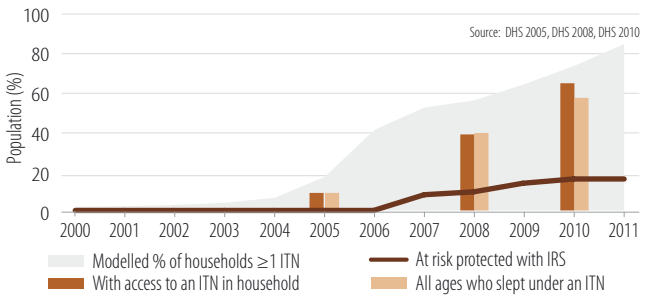
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

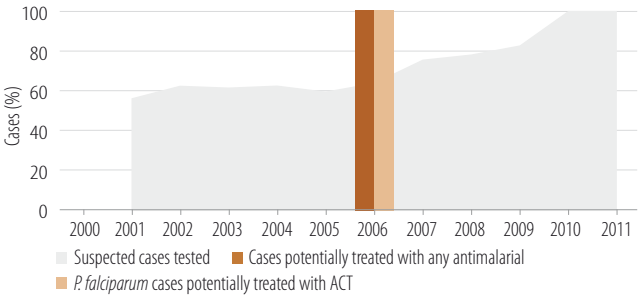


IV. Coverage

Coverage of ITN and IRS

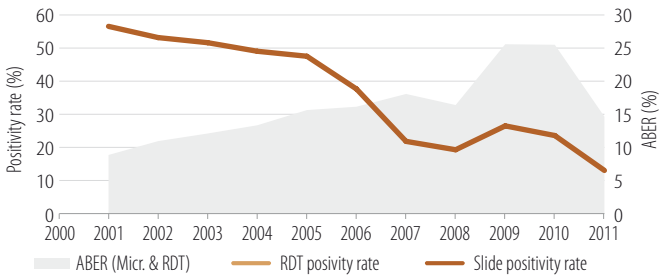


Cases tested and antimalarials delivered: Programme data (public sector)

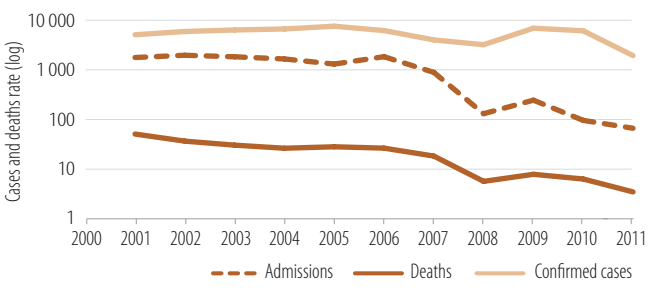


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed cases, admissions and deaths (per 100 000)



Sao Tome and Principe

African Region

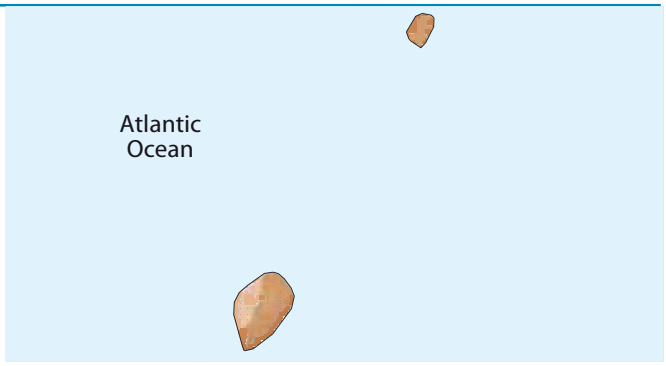
Phase: Control. Impact: >75% decrease in case incidence 2000–2011.

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	169 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	169 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae*



Distribution of confirmed malaria cases (per 1 000 population)

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2005
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	Yes	2003
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2004
Case management	Patients of all ages should receive diagnostic test	Yes	2001
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	Yes	2009
	Pre-referral treatment with recommended medicines	Yes	2004
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	No	–

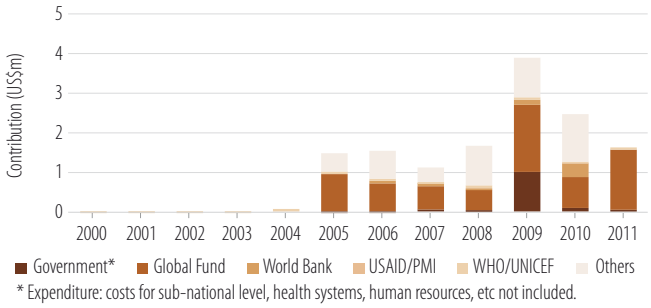
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2004
First-line treatment of *P. falciparum*	AS+AQ	2004
For treatment failure of *P. falciparum*	AL	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

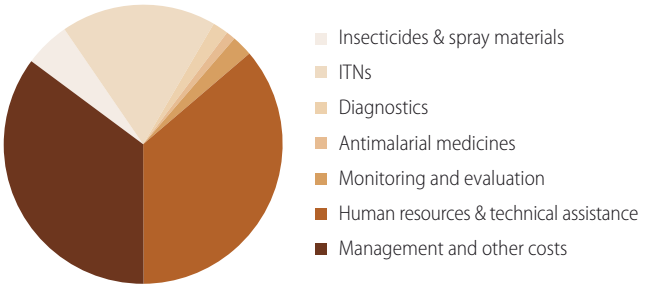
III. Financing

Government and external financing



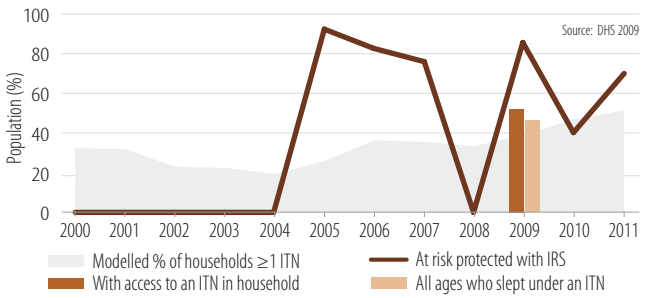
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

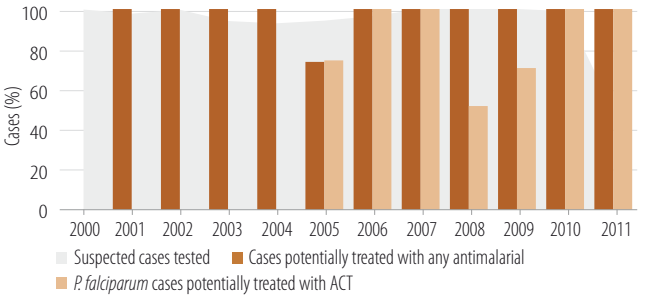


IV. Coverage

Coverage of ITN and IRS

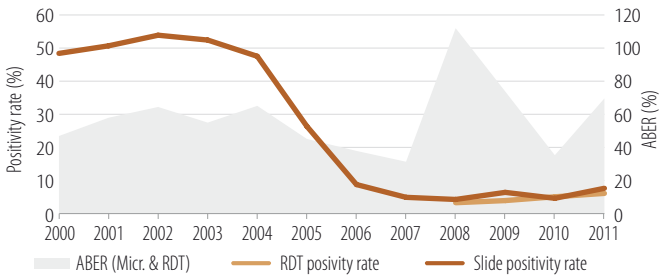


Cases tested and antimalarials delivered: Programme data (public sector)

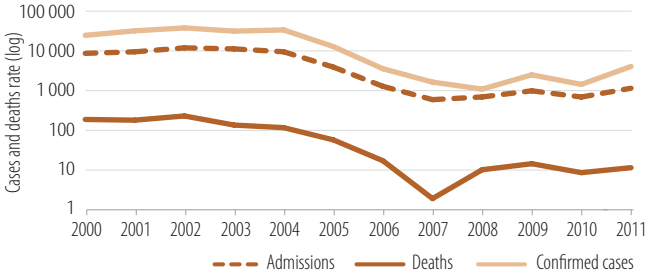


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed cases, admissions and deaths (per 100 000)



Saudi Arabia

Phase: Elimination. Impact: >75% decrease in case incidence 2000–2011.

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
Number of active foci	68	
Number of people living within active foci	–	
Number of people living in malaria-free areas	24 900 000	91
Total	27 400 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (38%), *P. vivax* (62%)
Major anopheles species: *An.arabiensis, sergentii, bacroftii, funestus, albimanus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	–
	ITNs/LLINs distributed to all age groups	Yes	–
IRS	IRS is recommended	–	–
	DDT is used for IRS	No	–
Case management	Malaria diagnosis is free of charge in the public sector	Yes	–
	Gametocidal treatment of *P.falciparum* cases	Yes	–
	Radical treatment of *P. vivax* cases	Yes	–
Surveillance	Foci and case investigation undertaken	Yes	–
	Case reporting from private sector is mandatory	Yes	–

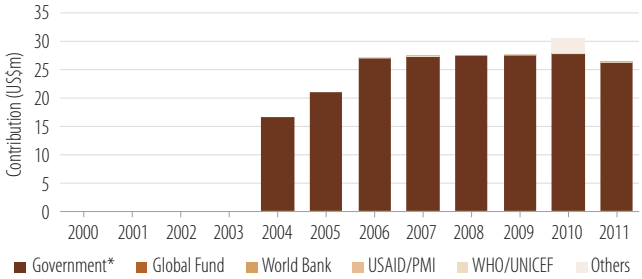
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	–
First-line treatment of *P. falciparum*	AS+SP	2007
For treatment failure *of P. falciparum*	AL	2007
Treatment of severe malaria	AM ;QN	2007
Treatment of *P. vivax*	CQ+PQ(14d)	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

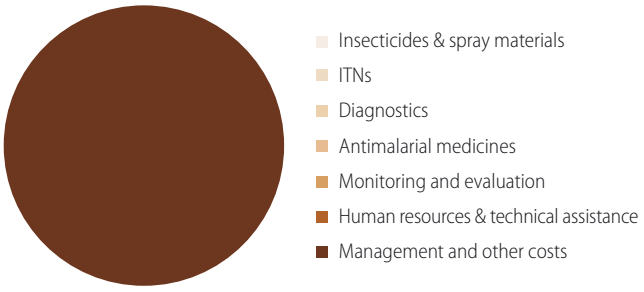
III. Financing

Government and external financing



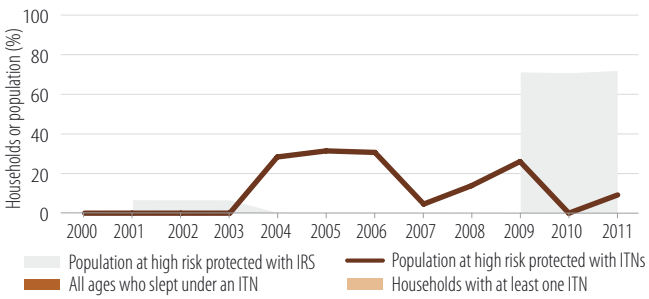
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

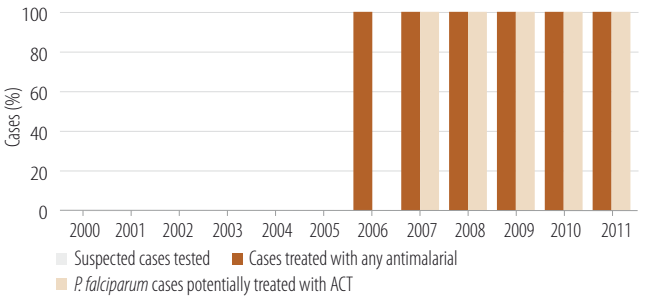


IV. Coverage

Coverage of ITN and IRS

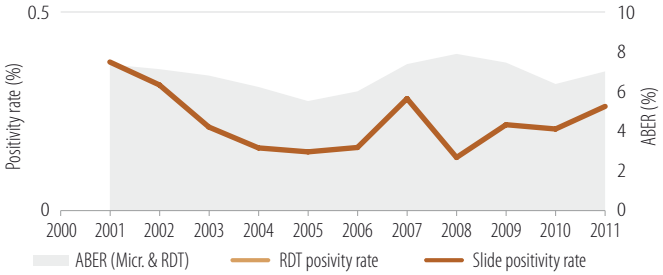


Cases tested and antimalarials delivered: Programme data (public sector)

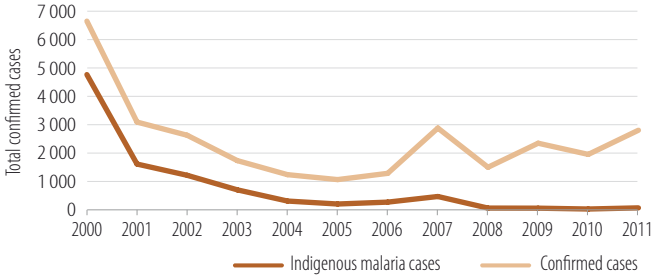


V. Impact

Malaria test positivity rate and ABER

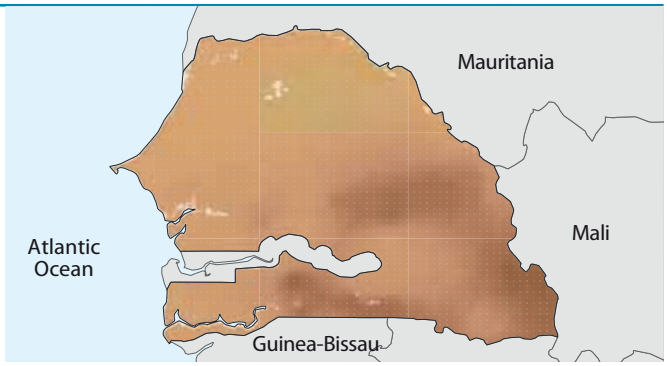


Microscopically confirmed malaria cases and indigenous cases



Senegal

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	12 300 000	96
Low transmission (0-1 cases per 1000 population)	511 000	4
Malaria-free (0 cases)	0	0
Total	12 811 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, arabiensis, funestus, pharoensis*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	1998
	ITNs/LLINs distributed to all age groups	Yes	1998
IRS	IRS is recommended	Yes	2005
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2003
Case management	Patients of all ages should receive diagnostic test	Yes	2007
	RDTs used at community level	Yes	2008
	ACT is free for all ages in public sector	Yes	2010
	Pre-referral treatment with recommended medicines	Yes	2005
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	Yes	2010

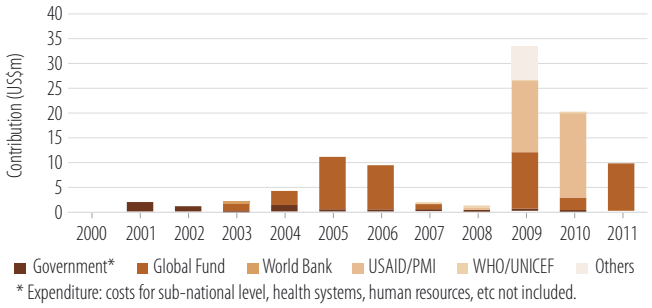
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2005
First-line treatment of *P. falciparum*	AL ;AS+AQ	2005
For treatment failure *of P. falciparum*	–	–
Treatment of severe malaria	QN	2005
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+AQ	2002–2008	7	0	0	0.5	28 days
AL	2002–2008	6	0	0.9	3.2	28 days

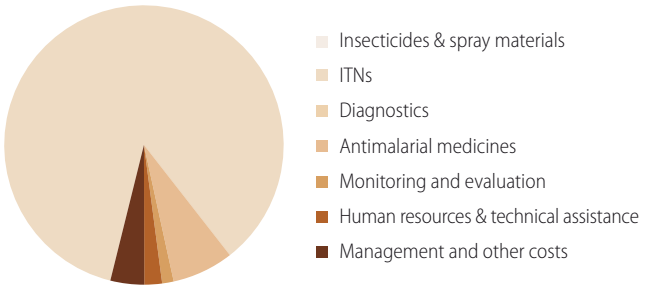
III. Financing

Government and external financing



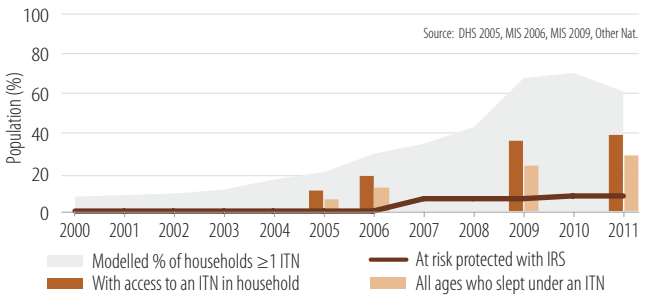
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

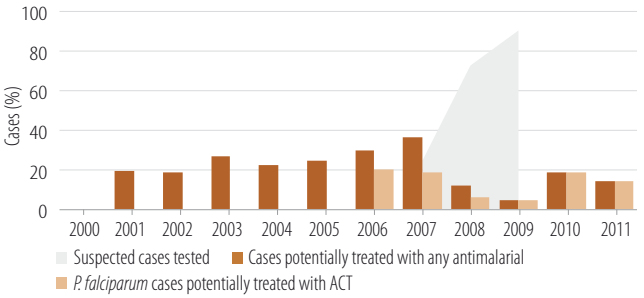


IV. Coverage

Coverage of ITN and IRS

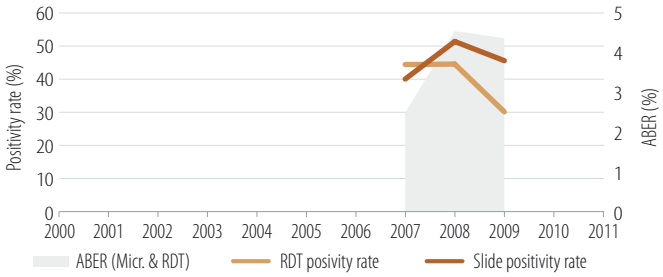


Cases tested and antimalarials delivered: Programme data (public sector)

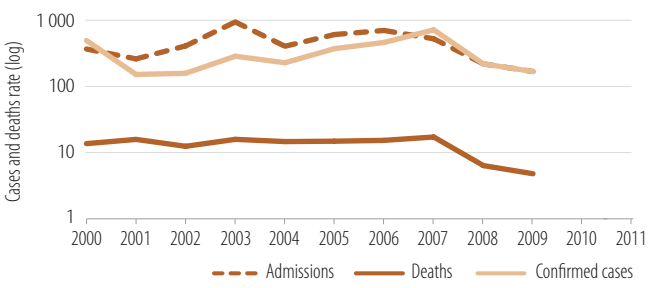


V. Impact

Malaria test positivity rate and ABER



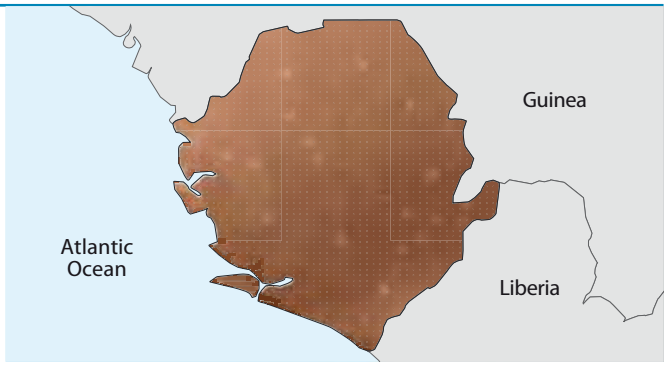
Microscopically confirmed cases, admissions and deaths (per 100 000)



Sierra Leone

African Region

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	6 000 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	6 000 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, funestus, melas*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2002
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	Yes	2010
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2005
Case management	Patients of all ages should receive diagnostic test	Yes	2010
	RDTs used at community level	Yes	2008
	ACT is free for all ages in public sector	Yes	2010
	Pre-referral treatment with recommended medicines	Yes	2010
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	No	–

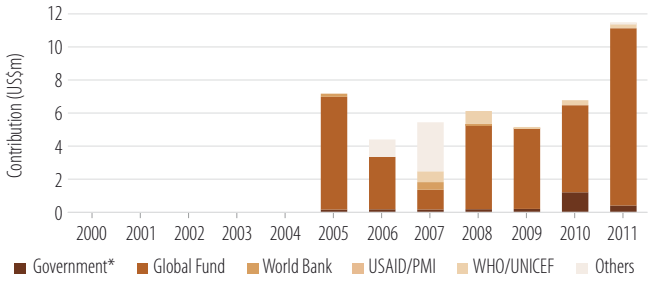
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2004
First-line treatment of *P. falciparum*	AL ;AS+AQ	2004
For treatment failure *of P. falciparum*	QN	2004
Treatment of severe malaria	AM ;QN	2004
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+AQ	2004–2004	1	27	27	27	28 days

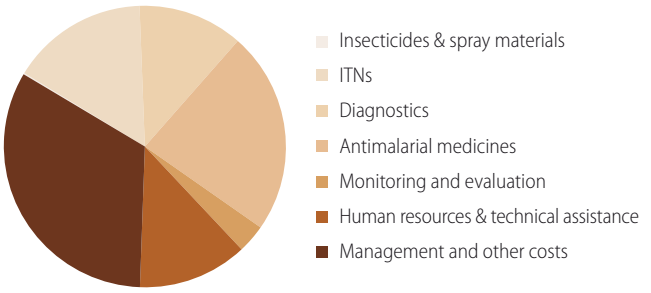
III. Financing

Government and external financing



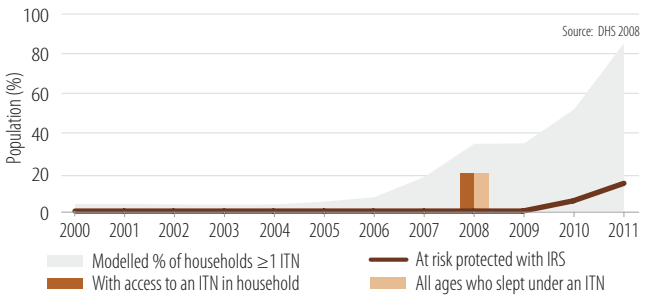
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

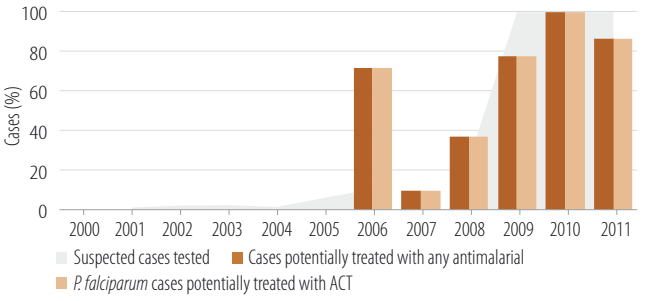


IV. Coverage

Coverage of ITN and IRS

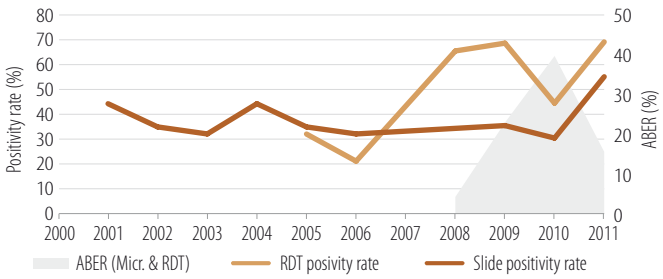


Cases tested and antimalarials delivered: Programme data (public sector)

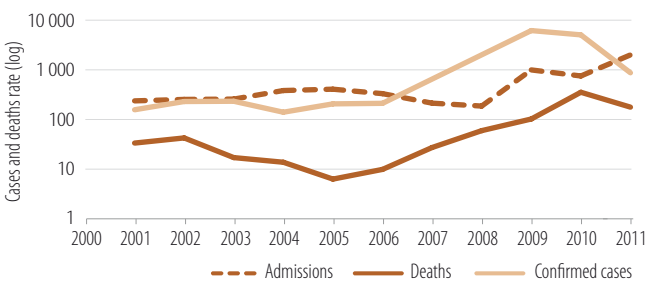


V. Impact

Malaria test positivity rate and ABER



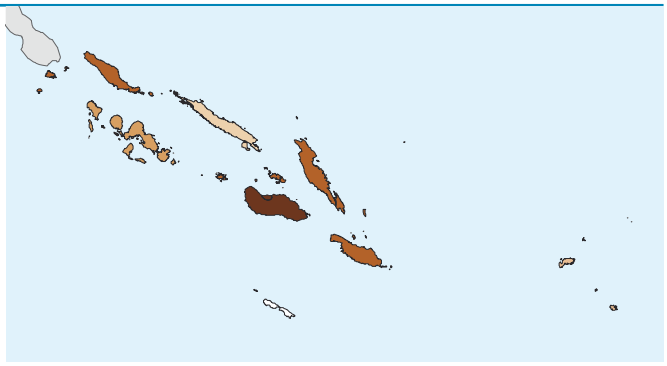
Microscopically confirmed cases, admissions and deaths (per 100 000)



Solomon Islands

Western Pacific Region

Phase: Control. Impact: >75% decrease in case incidence 2000–2011.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	547 000	99
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	5 520	1
Total	552 520	

Parasites and vectors

Major plasmodium species: *P. falciparum* (63%), *P. vivax* (37%)
Major anopheles species: *An. farauti, punctulatus, koliensis*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2009
	ITNs/LLINs distributed to all age groups	Yes	1996
IRS	IRS is recommended	Yes	–
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	N/A	–
Case management	Patients of all ages should receive diagnostic test	Yes	1968
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	Yes	2008
	Pre-referral treatment with recommended medicines	Yes	1978
	Oral artemisinin-based monotherapies are not registered	No	2009

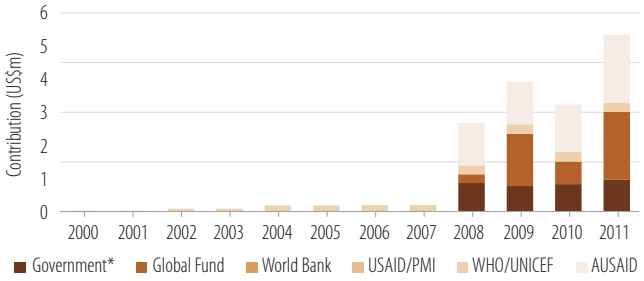
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2009
First-line treatment of *P. falciparum*	AL	2007
For treatment failure *of P. falciparum*	QN	2007
Treatment of severe malaria	AL ;AS	2007
Treatment of *P. vivax*	AL+PQ(14d)	2007

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AL	2008–2009	1	0	0	0	28 days

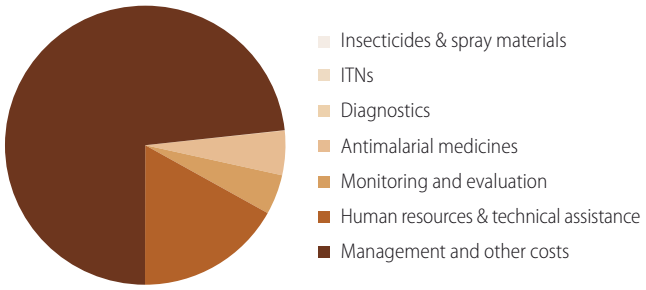
III. Financing

Government and external financing



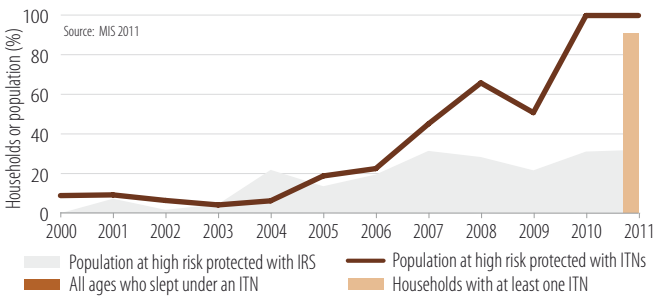
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

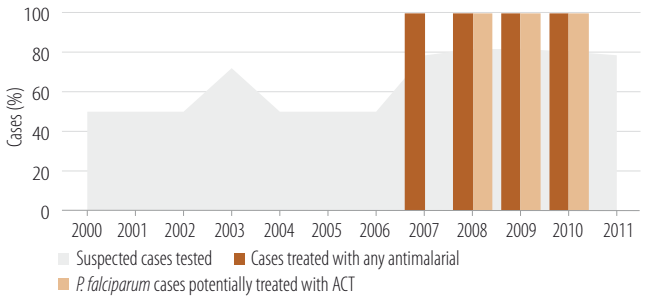


IV. Coverage

Coverage of ITN and IRS

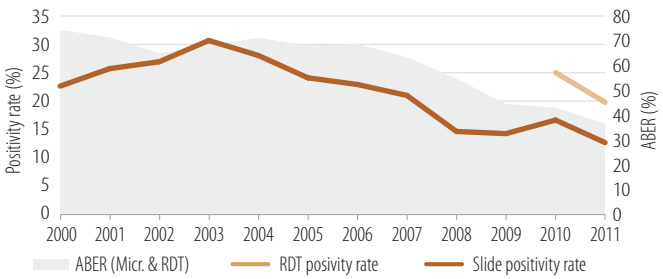


Cases tested and antimalarials delivered: Programme data (public sector)

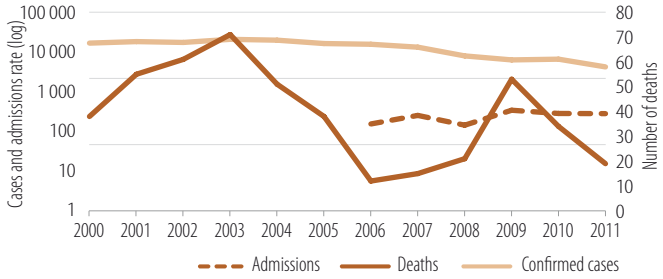


V. Impact

Malaria test positivity rate and ABER

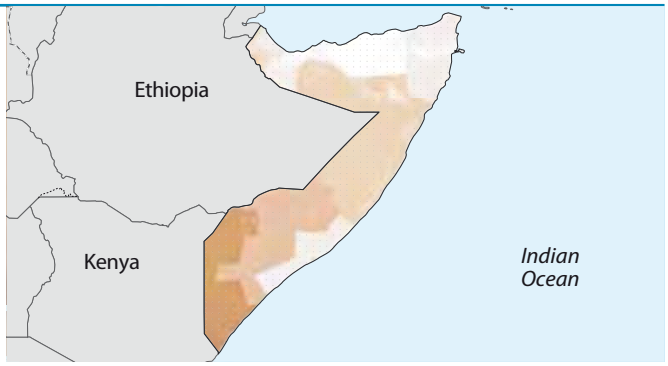


Microscopically confirmed cases, admissions (per 100 000) and deaths



Somalia

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	6 690 000	70
Low transmission (0-1 cases per 1000 population)	2 870 000	30
Malaria-free (0 cases)	0	0
Total	9 560 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. arabiensis, funestus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2005
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	Yes	2004
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2005
Case management	Patients of all ages should receive diagnostic test	Yes	2006
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	Yes	2006
	Pre-referral treatment with recommended medicines	Yes	2006
	Oral artemisinin-based monotherapies are not registered	No	–

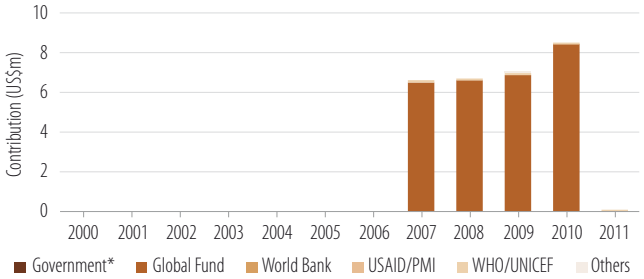
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+SP	2006
First-line treatment of *P. falciparum*	AS+SP	2006
For treatment failure *of P. falciparum*	QN	2006
Treatment of severe malaria	QN	2006
Treatment of *P. vivax*	CQ+PQ(14d)	2006

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+SP	2005-2006	2	0	0.5	1	28 days

III. Financing

Government and external financing



* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

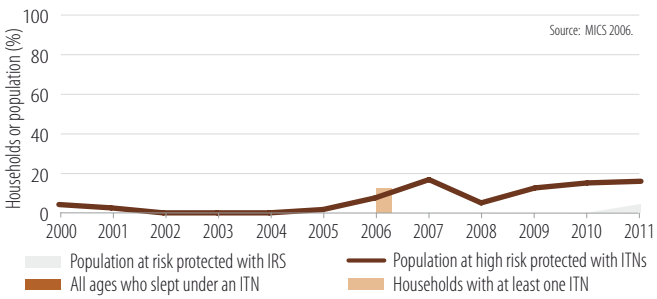
Expenditure by intervention in 2011

No data reported for 2011

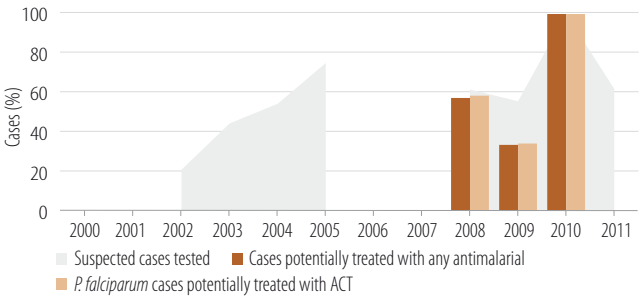
- Insecticides & spray materials
- ITNs
- Diagnostics
- Antimalarial medicines
- Monitoring and evaluation
- Human resources & technical assistance
- Management and other costs

IV. Coverage

Coverage of ITN and IRS

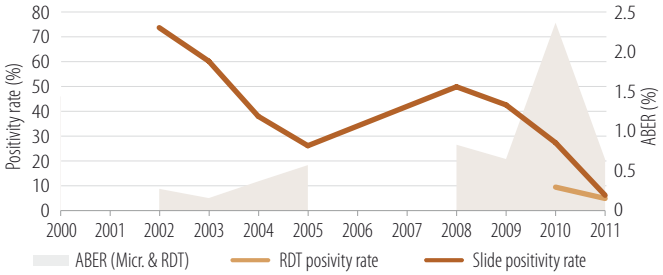


Cases tested and antimalarials delivered: Programme data (public sector)

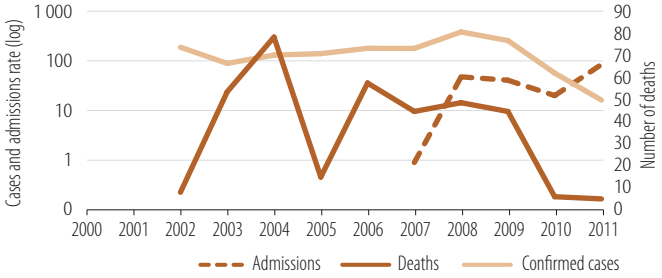


V. Impact

Malaria test positivity rate and ABER

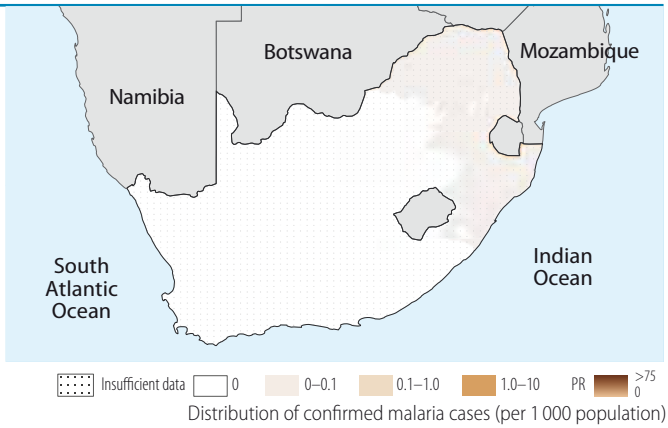


Microscopically confirmed cases, admissions (per 100 000) and deaths



South Africa

Phase: Control. Impact: >75% decrease in case incidence 2000–2011.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	2 020 000	4
Low transmission (0-1 cases per 1000 population)	3 030 000	6
Malaria-free (0 cases)	45 400 000	90
Total	50 450 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, funestus, melas*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	No	–
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	Yes	–
	DDT is used for IRS	Yes	1945
IPT	IPT used to prevent malaria during pregnancy	No	–
Case management	Patients of all ages should receive diagnostic test	Yes	–
	RDTs used at community level	Yes	–
	ACT is free for all ages in public sector	Yes	–
	Pre-referral treatment with recommended medicines	No	–
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	No	–

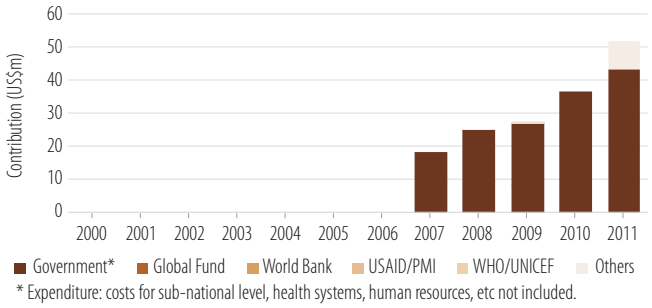
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	–	–
First-line treatment of *P. falciparum*	AL ;QN+CL ;QN+D	2001
For treatment failure *of P. falciparum*	AS ;QN	2001
Treatment of severe malaria	QN	2001
Treatment of *P. vivax*	AL+PQ CQ+PQ	2001
		–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AL	2007-2007	2	0	2.6	5.2	28 days

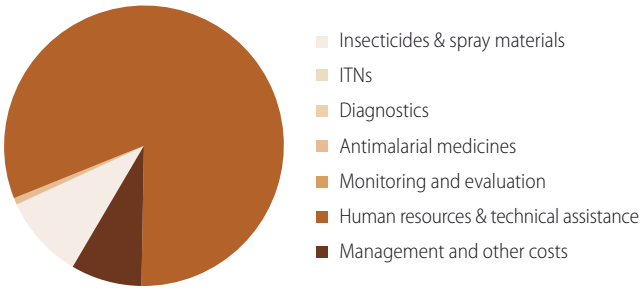
III. Financing

Government and external financing



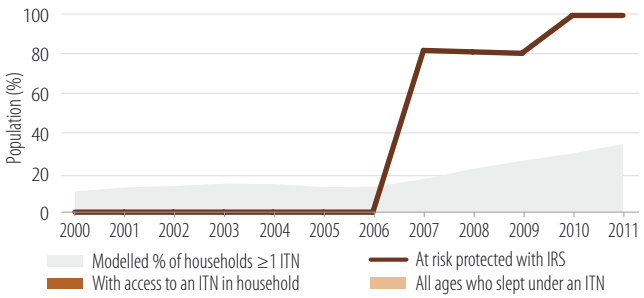
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

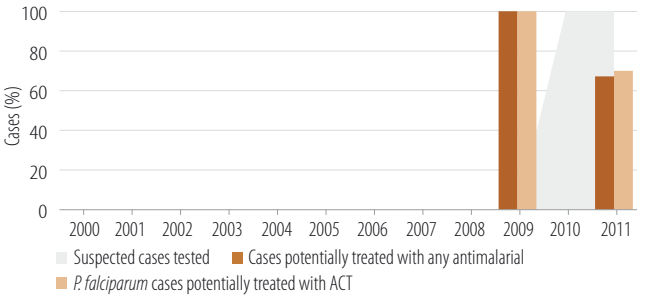


IV. Coverage

Coverage of ITN and IRS

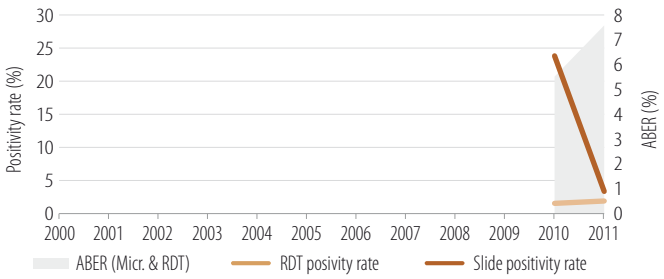


Cases tested and antimalarials delivered: Programme data (public sector)

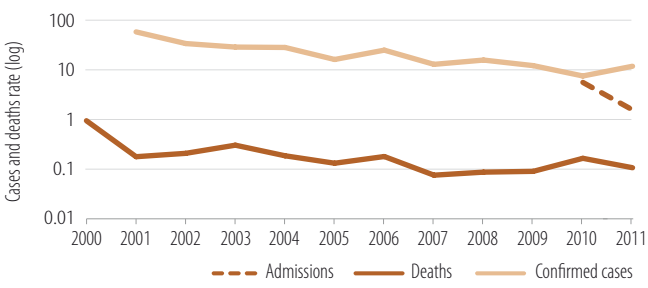


V. Impact

Malaria test positivity rate and ABER



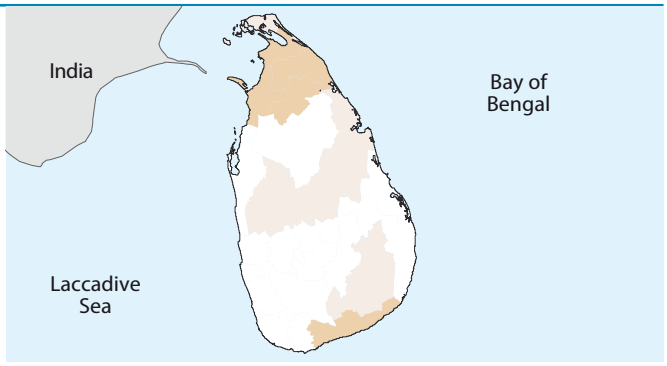
Microscopically confirmed cases, admissions and deaths (per 100 000)



Sri Lanka

South-East Asia Region

Phase: Pre-elimination. Impact: >75% decrease in case incidence 2000–2011.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
Number of active foci	46	
Number of people living within active foci	1 500 000	7
Number of people living in malaria-free areas	19 500 000	93
Total	21 000 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (4%), *P. vivax* (96%)
Major anopheles species: *An.culicifacies, subpictus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	1992
	ITNs/LLINs distributed to all age groups	Yes	2004
IRS	IRS is recommended	Yes	1945
	DDT is used for IRS	No	–
Case management	Malaria diagnosis is free of charge in the public sector	Yes	1911
	Gametocidal treatment of *P.falciparum* cases	Yes	–
	Radical treatment of *P. vivax* cases	Yes	–
Surveillance	Foci and case investigation undertaken	Yes	1958
	Case reporting from private sector is mandatory	Yes	2008

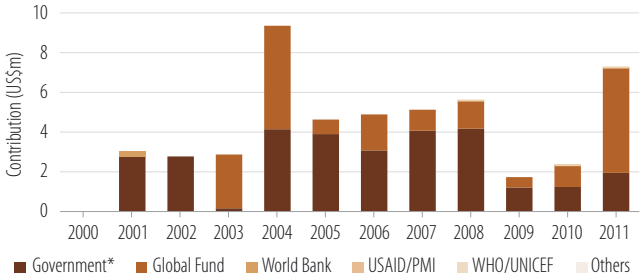
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	–
First-line treatment of *P. falciparum*	AL+PQ	2008
For treatment failure *of P. falciparum*	-	–
Treatment of severe malaria	QN	1936
Treatment of *P. vivax*	CQ+PQ(14d)	2008

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

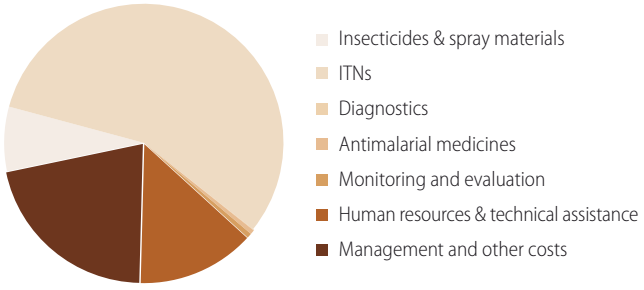
III. Financing

Government and external financing



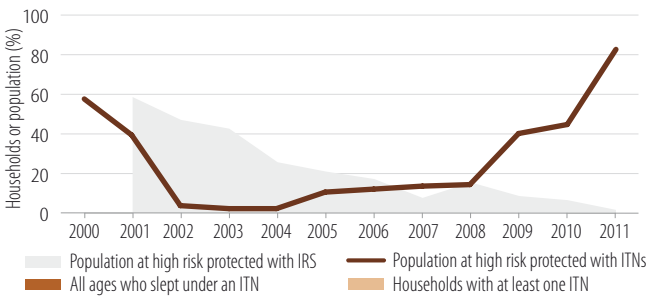
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

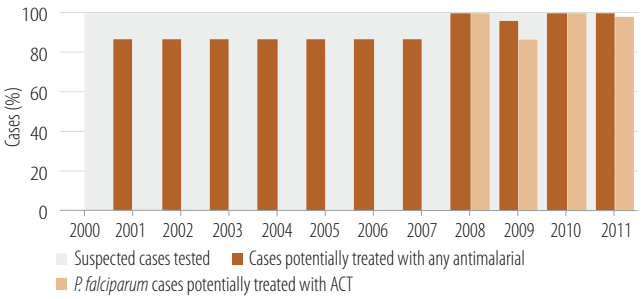


IV. Coverage

Coverage of ITN and IRS

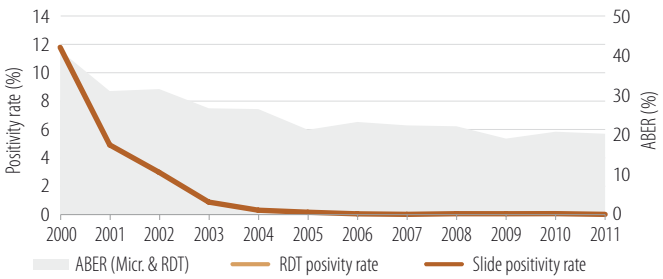


Cases tested and antimalarials delivered: Programme data (public sector)

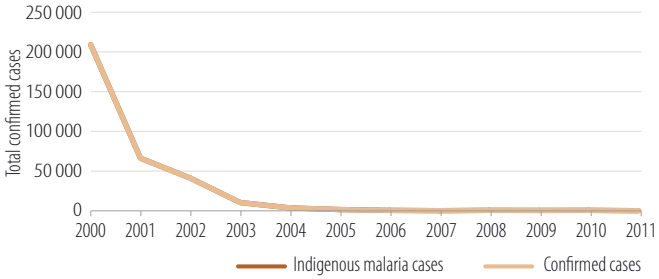


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed malaria cases and indigenous cases



South Sudan

Phase: Control. Impact: Insufficiently consistent data to assess trends.

Distribution of probable and confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	10 300 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	10 300 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (7%), *P. vivax* (93%)
Major anopheles species: *An. superpictus, stephensi, pulcherrimus, subpictus, hyrcanus, culicifacies*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2008
	ITNs/LLINs distributed to all age groups	Yes	2008
IRS	IRS is recommended	No	–
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2006
Case management	Patients of all ages should receive diagnostic test	No	–
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	Yes	2006
	Pre-referral treatment with recommended medicines	Yes	2006
	Oral artemisinin-based monotherapies are not registered	No	–

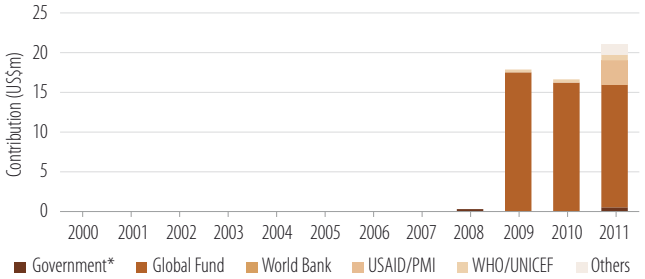
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2006
First-line treatment of *P. falciparum*	AS+AQ	2006
For treatment failure *of P. falciparum*	AL	2006
Treatment of severe malaria	AM ;AS ;QN	2004
Treatment of *P. vivax*	(AS+AQ)+PQ	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+AQ	2003–2005	2	1	3.1	5.1	28 days
AL	2004–2004	1	2.8	2.8	2.8	28 days

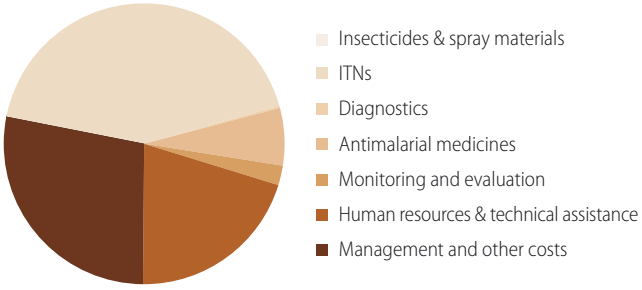
III. Financing

Government and external financing



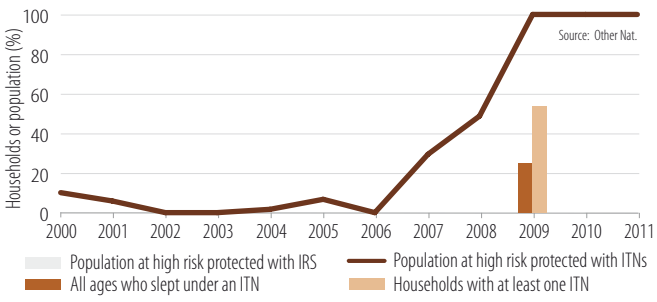
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

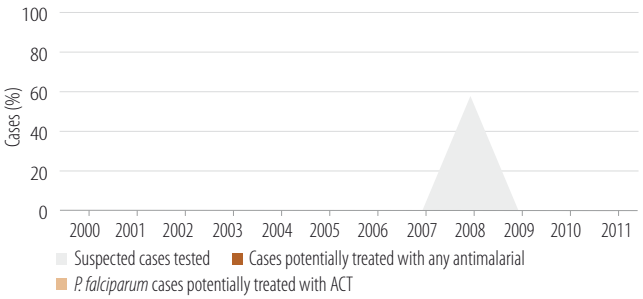


IV. Coverage

Coverage of ITN and IRS

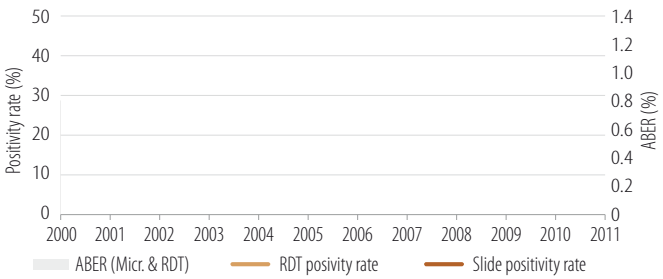


Cases tested and antimalarials delivered: Programme data (public sector)

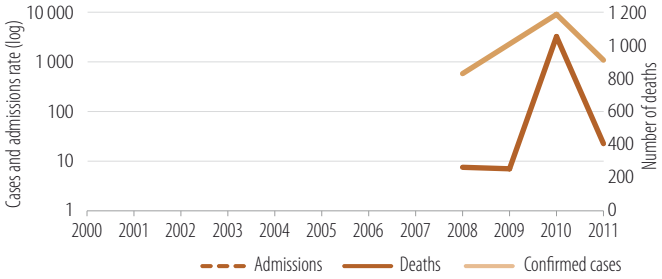


V. Impact

Malaria test positivity rate and ABER

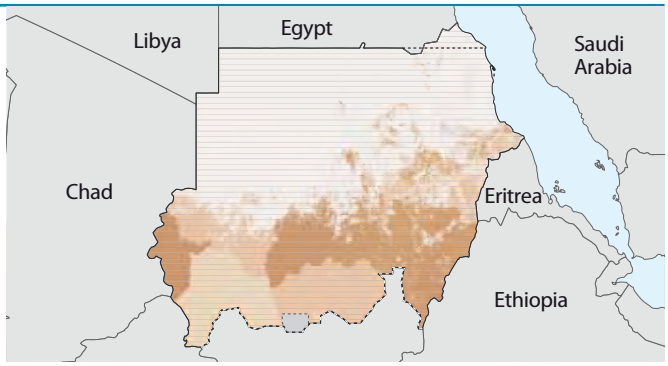


Microscopically confirmed cases, admissions (per 100 000) and deaths



Sudan

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of probable and confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	28 500 000	83
Low transmission (0-1 cases per 1000 population)	5 830 000	17
Malaria-free (0 cases)	0	0
Total	34 330 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (95%), *P. vivax* (5%)
Major anopheles species:

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2005
	ITNs/LLINs distributed to all age groups	Yes	2010
IRS	IRS is recommended	Yes	1956
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	No	–
Case management	Patients of all ages should receive diagnostic test	Yes	2009
	RDTs used at community level	Yes	2008
	ACT is free for all ages in public sector	Yes	2005
	Pre-referral treatment with recommended medicines	Yes	2004
	Oral artemisinin-based monotherapies are not registered	Yes	2004

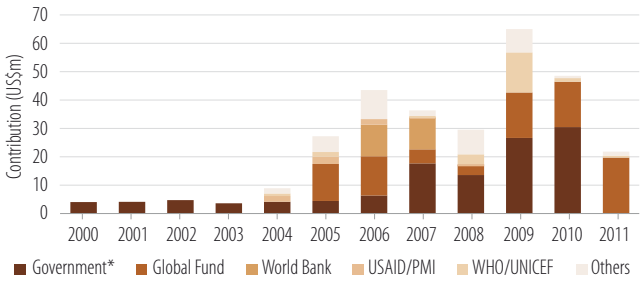
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+SP	2006
First-line treatment of *P. falciparum*	AS+SP	2006
For treatment failure *of P. falciparum*	AL	2006
Treatment of severe malaria	AM ;QN	2006
Treatment of *P. vivax*	AL	2006

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+SP	2005–2010	8	0	2	5.3	28 days
AL	2005–2010	11	0	0	4.5	28 days

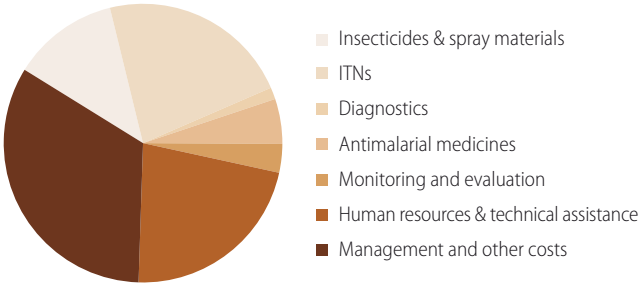
III. Financing

Government and external financing



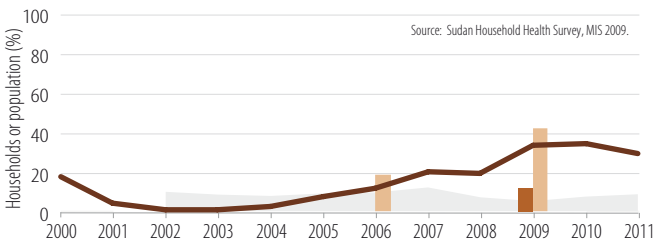
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011



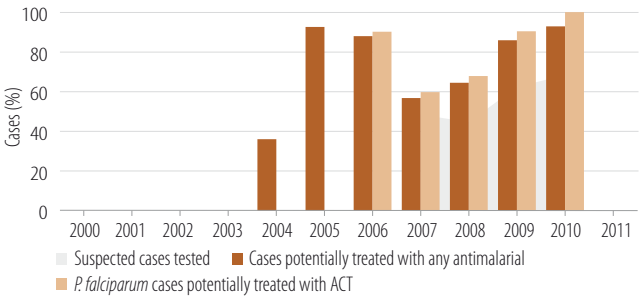
IV. Coverage

Coverage of ITN and IRS



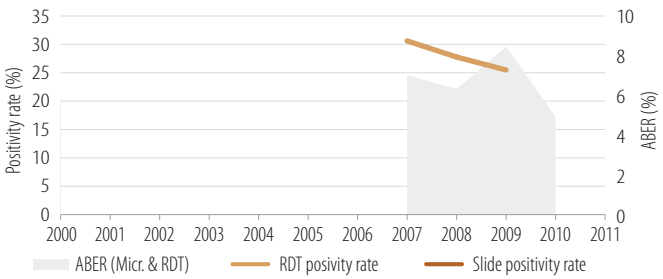
* Total population at risk used

Cases tested and antimalarials delivered: Programme data (public sector)

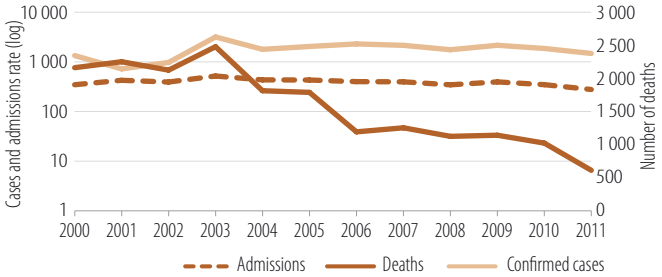


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed cases, admissions (per 100 000) and deaths



Suriname

Phase: Control. Impact: >75% decrease in case incidence 2000–2011.

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	83 100	16
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	446 000	84
Total	529 100	

Parasites and vectors

Major plasmodium species: *P. falciparum* (11%), *P. vivax* (89%)
Major anopheles species:

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2006
	ITNs/LLINs distributed to all age groups	Yes	2006
IRS	IRS is recommended	Yes	2006
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	N/A	–
Case management	Patients of all ages should receive diagnostic test	Yes	1955
	RDTs used at community level	Yes	2005
	ACT is free for all ages in public sector	Yes	–
	Pre-referral treatment with recommended medicines	Yes	–
	Oral artemisinin-based monotherapies are not registered	Yes	–

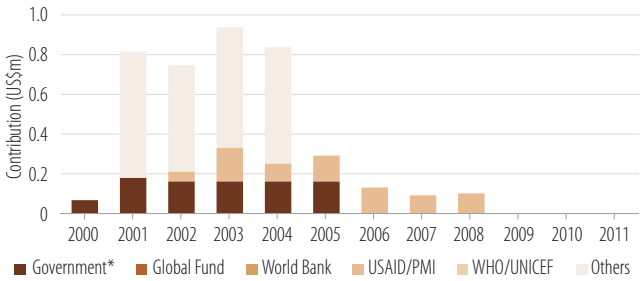
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	–
First-line treatment of *P. falciparum*	AL+PQ	–
For treatment failure *of P. falciparum*	AS+MQ	–
Treatment of severe malaria	AS	–
Treatment of *P. vivax*	CQ+PQ	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AL	2005–2011	2	0	2.4	4.7	28 days

III. Financing

Government and external financing



* Expenditure: costs for local level, health systems, etc. not included.

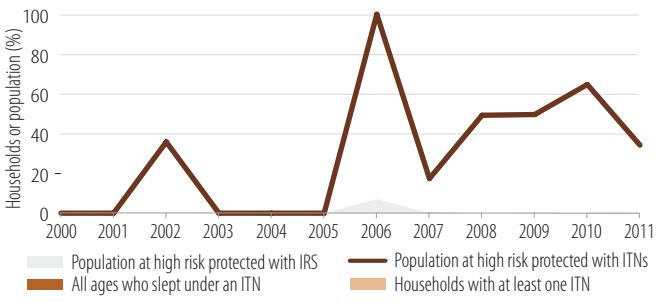
Expenditure by intervention in 2011

Data not reported for 2011

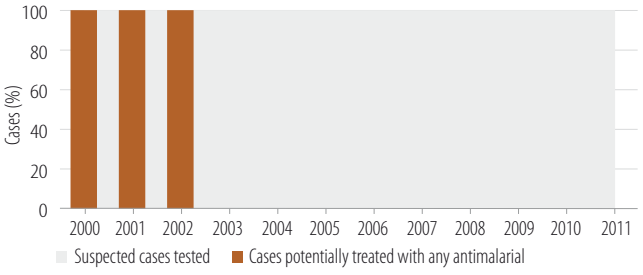
- Insecticides & spray materials
- ITNs
- Diagnostics
- Antimalarial medicines
- Monitoring and evaluation
- Human resources & technical assistance
- Management and other costs

IV. Coverage

Coverage of ITN and IRS

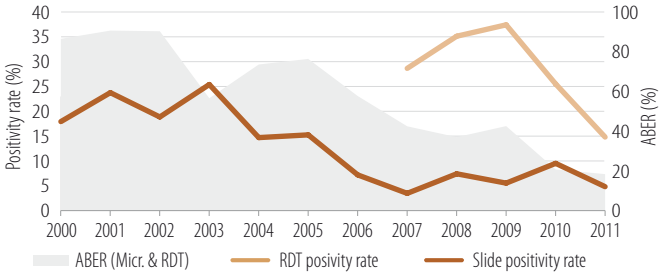


Cases tested and antimalarials delivered: Programme data (public sector)

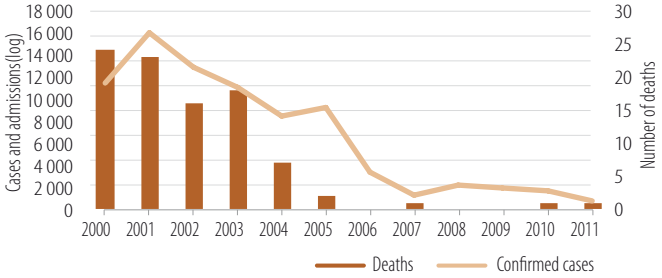


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed cases and deaths



Swaziland

Phase: Control. Impact: >75% decrease in case incidence 2000–2011.

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	0	0
Low transmission (0-1 cases per 1000 population)	337 000	28
Malaria-free (0 cases)	866 000	72
Total	1 203 000	

Parasites and vectors	
Major plasmodium species:	*P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species:	*An. gambiae, arabiensis, funestus*

Distribution of confirmed malaria cases (per 1 000 population)

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2002
	ITNs/LLINs distributed to all age groups	Yes	2010
IRS	IRS is recommended	Yes	1947
	DDT is used for IRS	Yes	1956
IPT	IPT used to prevent malaria during pregnancy	No	–
Case management	Patients of all ages should receive diagnostic test	Yes	2010
	RDTs used at community level	Yes	2010
	ACT is free for all ages in public sector	Yes	2010
	Pre-referral treatment with recommended medicines	Yes	2010
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	No	–

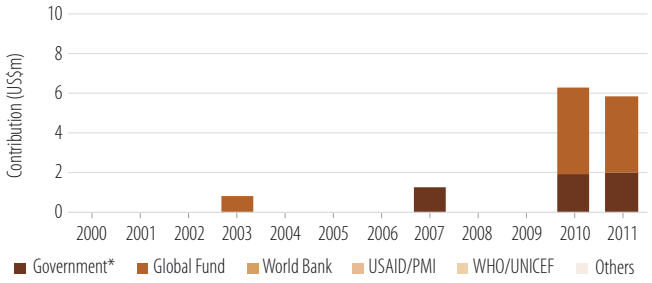
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	–	–
First-line treatment of *P. falciparum*	AL	2009
For treatment failure *of P. falciparum*	QN	2009
Treatment of severe malaria	QN	–
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

III. Financing

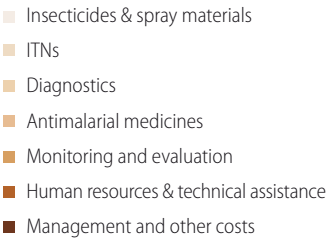
Government and external financing



* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

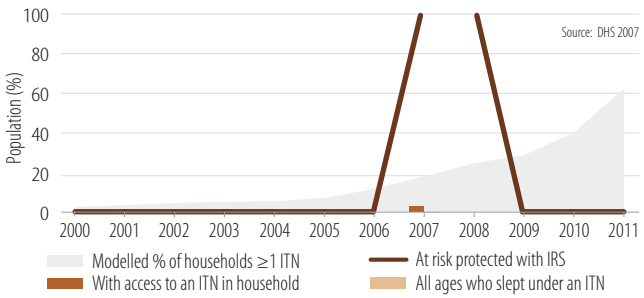
Expenditure by intervention in 2011

Data not reported for 2011

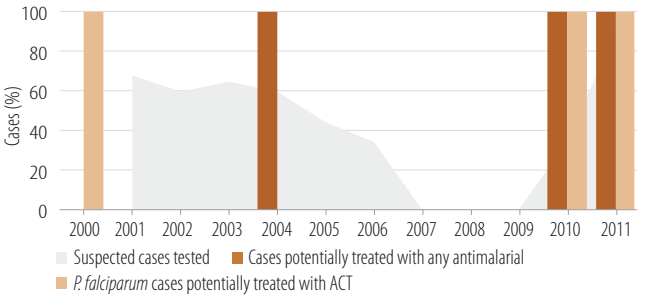


IV. Coverage

Coverage of ITN and IRS

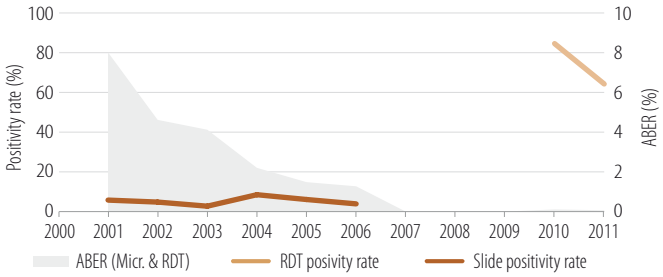


Cases tested and antimalarials delivered: Programme data (public sector)

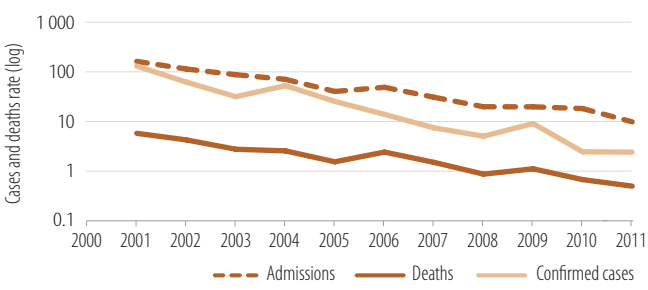


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed cases, admissions and deaths (per 100 000)



Tajikistan

European Region

Phase: Elimination. Impact: >75% decrease in case incidence 2000–2011. 53 indigenous cases reported in Tajikistan in 2011. No locally acquired P.falciparum cases registered since 2009. Malaria elimination programme aimed to interrupt P.vivax transmission by 2015 is funded by the government, the Global Fun.

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
Number of active foci	39	
Number of people living within active foci	2 790 000	38
Number of people living in malaria-free areas	4 190 000	62
Total	6 980 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (0%), *P. vivax* (100%)
Major anopheles species: *An.superpictus, pulcherrimus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2006
	ITNs/LLINs distributed to all age groups	Yes	2006
IRS	IRS is recommended	Yes	1997
	DDT is used for IRS	No	–
Case management	Malaria diagnosis is free of charge in the public sector	Yes	1997
	Gametocidal treatment of *P.falciparum* cases	Yes	2004
	Radical treatment of *P. vivax* cases	Yes	1997
Surveillance	Foci and case investigation undertaken	Yes	2007
	Case reporting from private sector is mandatory	Yes	2000

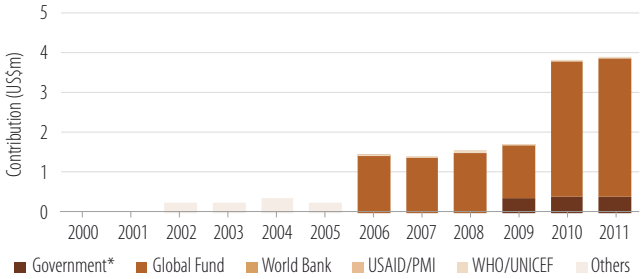
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	–
First-line treatment of *P. falciparum*	AL	2008
For treatment failure *of P. falciparum*	QN	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	CQ+PQ(14d)	2004

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
QN	2003–2003	1	0	0	0	28 days

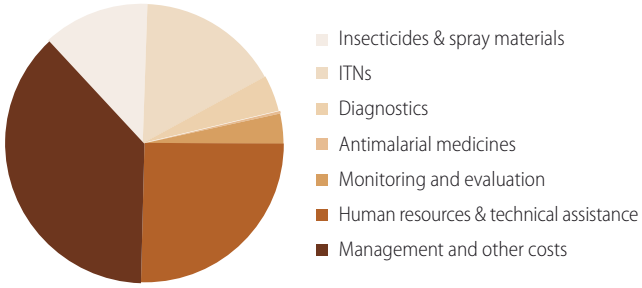
III. Financing

Government and external financing



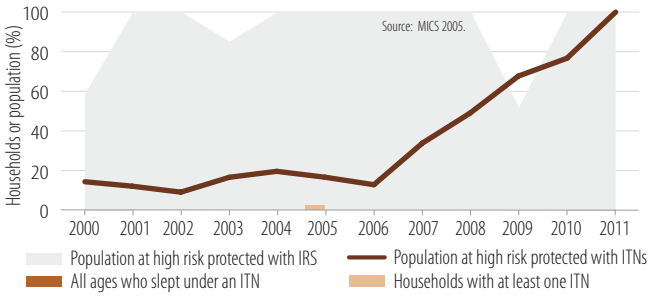
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

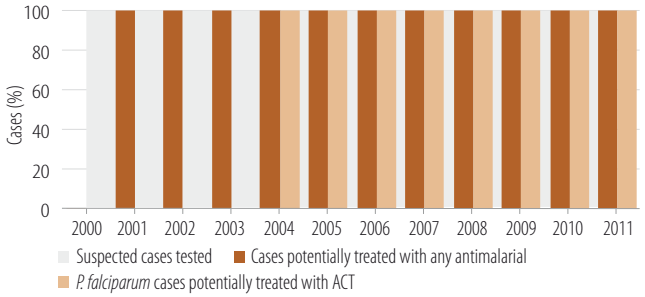


IV. Coverage

Coverage of ITN and IRS

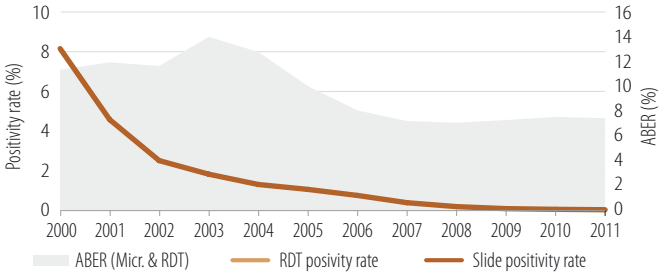


Cases tested and antimalarials delivered: Programme data (public sector)

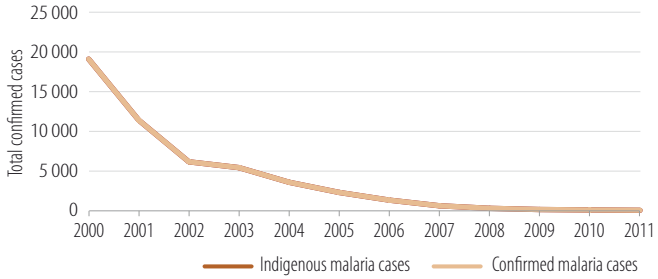


V. Impact

Malaria test positivity rate and ABER

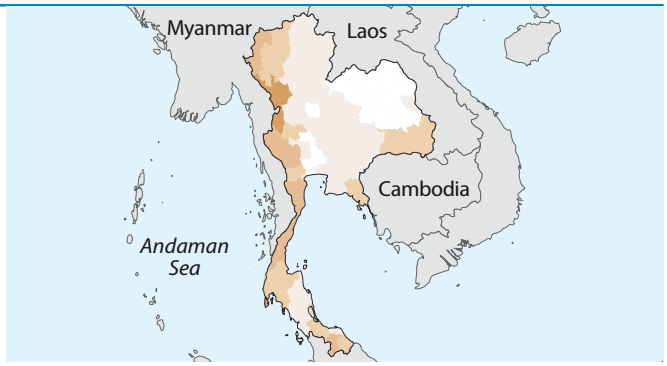


Microscopically confirmed malaria cases and indigenous cases



Thailand

Phase: Control. Impact: >75% decrease in case incidence 2000–2011.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	5 560 000	8
Low transmission (0-1 cases per 1000 population)	29 200 000	42
Malaria-free (0 cases)	34 800 000	50
Total	69 560 000	

Parasites and vectors

Major plasmodium species:	*P. falciparum* (40%), *P. vivax* (60%)
Major anopheles species:	*An. minimus, dirus, maculatus, campestris, philippinensis, sundaicus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2008
	ITNs/LLINs distributed to all age groups	Yes	2008
IRS	IRS is recommended	Yes	2003
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	N/A	–
Case management	Patients of all ages should receive diagnostic test	Yes	2003
	RDTs used at community level	Yes	2008
	ACT is free for all ages in public sector	Yes	2006
	Pre-referral treatment with recommended medicines	No	–
	Oral artemisinin-based monotherapies are not registered	No	–

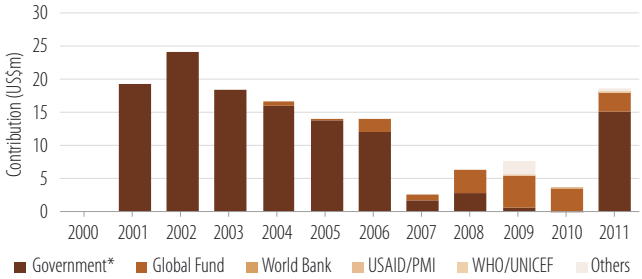
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	–
First-line treatment of *P. falciparum*	AS+MQ	–
For treatment failure *of P. falciparum*	QN+D	–
Treatment of severe malaria	AS ;QN	–
Treatment of *P. vivax*	CQ+PQ(14d)	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+MQ	2001–2009	20	0	0.5	10.4	28 days

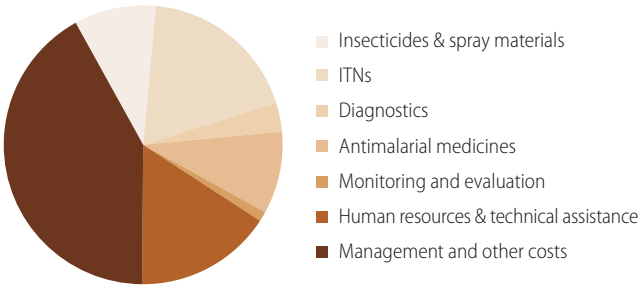
III. Financing

Government and external financing



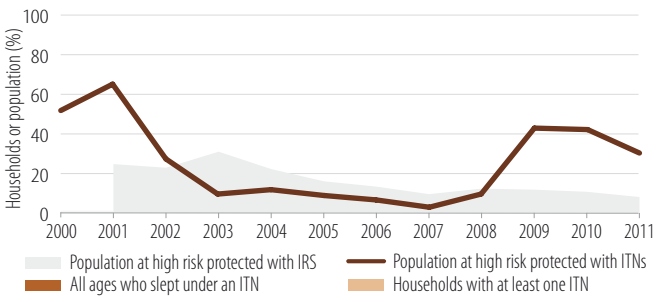
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

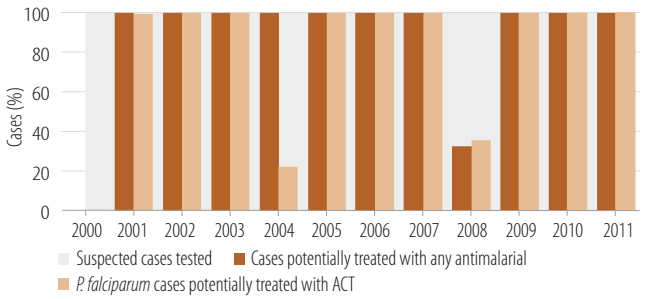


IV. Coverage

Coverage of ITN and IRS

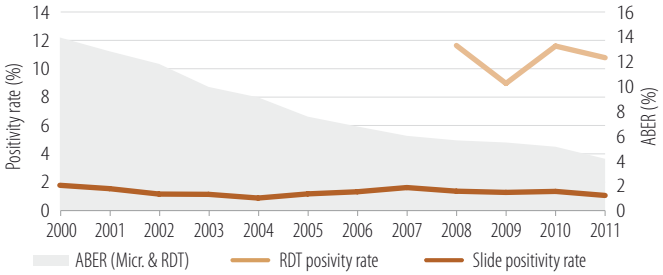


Cases tested and antimalarials delivered: Programme data (public sector)

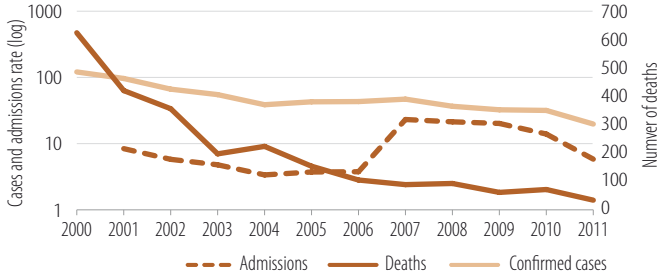


V. Impact

Malaria test positivity rate and ABER



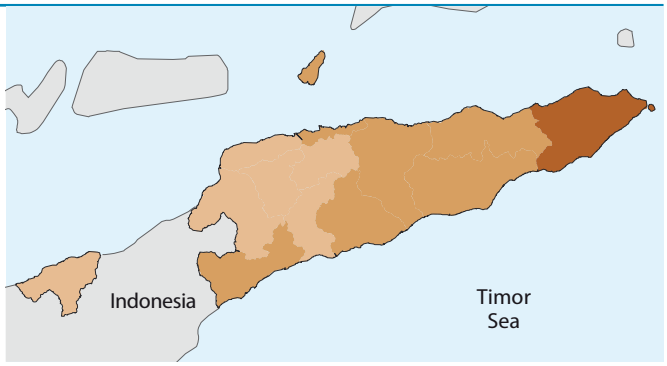
Microscopically confirmed cases, admissions (per 100 000) and deaths



Democratic Republic of Timor-Leste

South-East Asia Region

Phase: Control. Impact: >75% decrease in case incidence 2000–2011.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	888 000	77
Low transmission (0-1 cases per 1000 population)	265 000	23
Malaria-free (0 cases)	0	0
Total	1 153 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (81%), *P. vivax* (19%)
Major anopheles species: *An. subpictus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2004
	ITNs/LLINs distributed to all age groups	Yes	2004
IRS	IRS is recommended	Yes	2010
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	N/A	–
Case management	Patients of all ages should receive diagnostic test	Yes	2007
	RDTs used at community level	Yes	2009
	ACT is free for all ages in public sector	Yes	2007
	Pre-referral treatment with recommended medicines	Yes	2007
	Oral artemisinin-based monotherapies are not registered	No	–

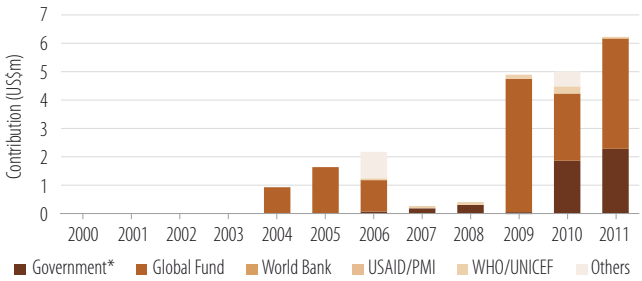
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	–
First-line treatment of *P. falciparum*	AL	–
For treatment failure *of P. falciparum*	QN+D	–
Treatment of severe malaria	AM ;QN	–
Treatment of *P. vivax*	CQ+PQ(14d)	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

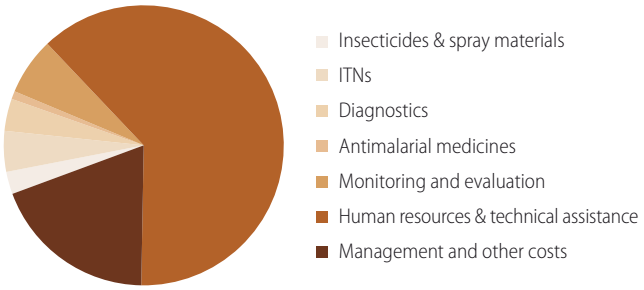
III. Financing

Government and external financing



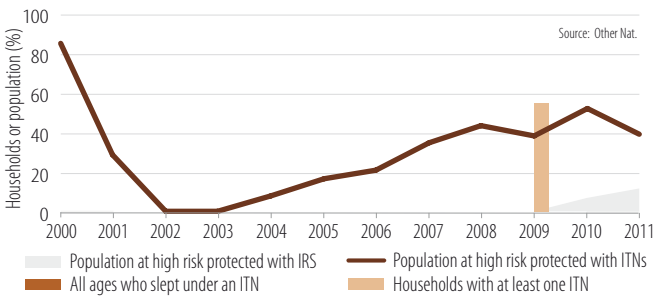
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

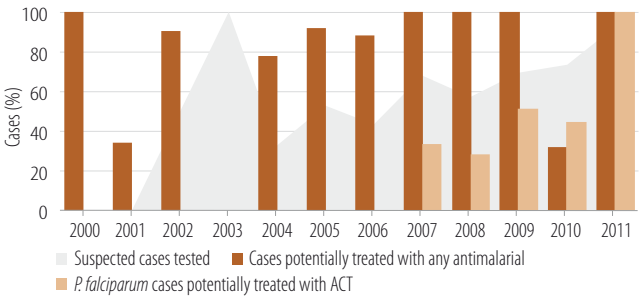


IV. Coverage

Coverage of ITN and IRS

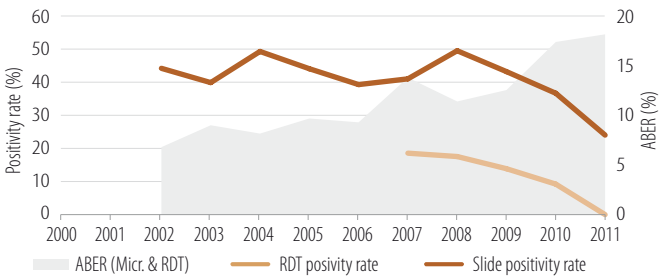


Cases tested and antimalarials delivered: Programme data (public sector)

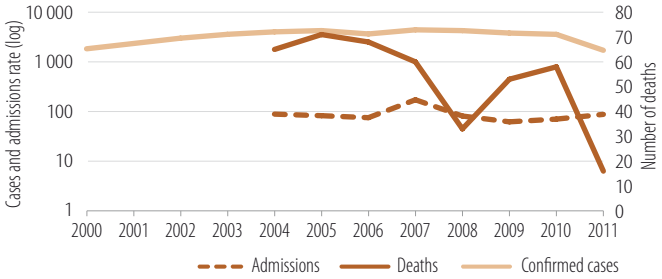


V. Impact

Malaria test positivity rate and ABER

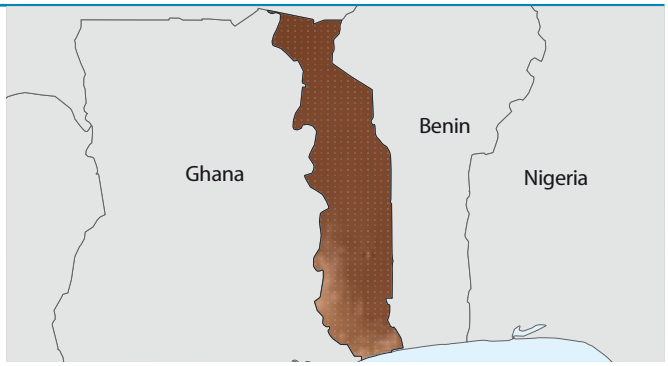


Microscopically confirmed cases, admissions (per 100 000) and deaths



Togo

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	6 150 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	6 150 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, funestus, melas*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2004
	ITNs/LLINs distributed to all age groups	Yes	2011
IRS	IRS is recommended	Yes	2011
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2003
Case management	Patients of all ages should receive diagnostic test	Yes	2010
	RDTs used at community level	Yes	2007
	ACT is free for all ages in public sector	No	–
	Pre-referral treatment with recommended medicines	No	–
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	Yes	2010

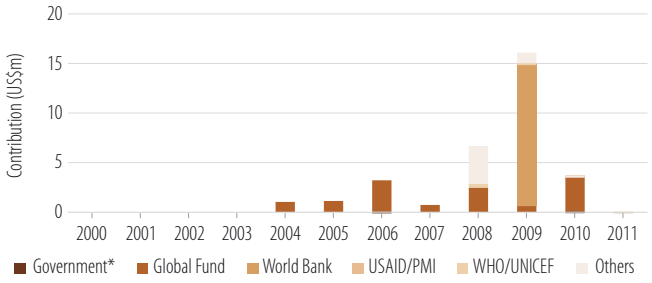
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL ;AS+AQ	–
First-line treatment of *P. falciparum*	AL ;AS+AQ	–
For treatment failure *of P. falciparum*	–	–
Treatment of severe malaria	QN	–
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+AQ	2005-2009	8	0	0	6	28 days
AL	2005-2009	8	0	0.7	4.4	28 days

III. Financing

Government and external financing



* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

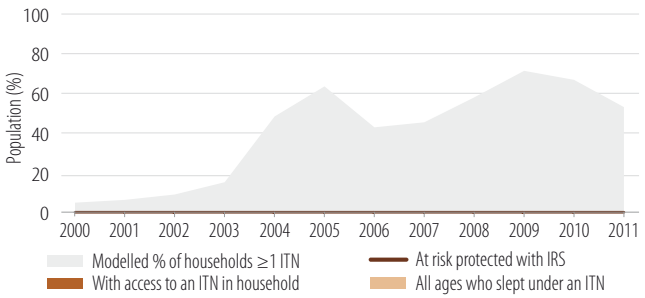
Expenditure by intervention in 2011

Data not reported for 2011

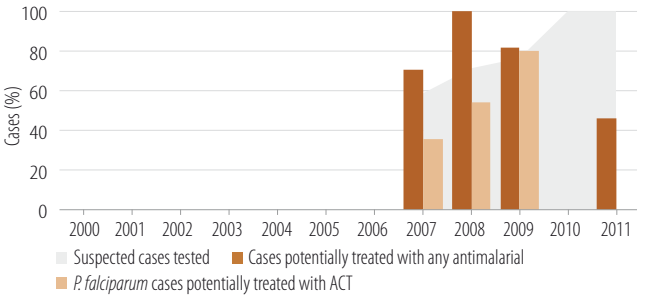
- Insecticides & spray materials
- ITNs
- Diagnostics
- Antimalarial medicines
- Monitoring and evaluation
- Human resources & technical assistance
- Management and other costs

IV. Coverage

Coverage of ITN and IRS

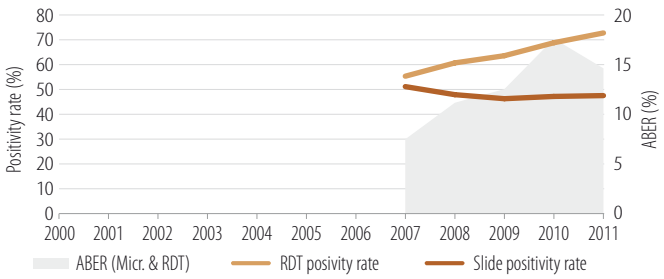


Cases tested and antimalarials delivered: Programme data (public sector)

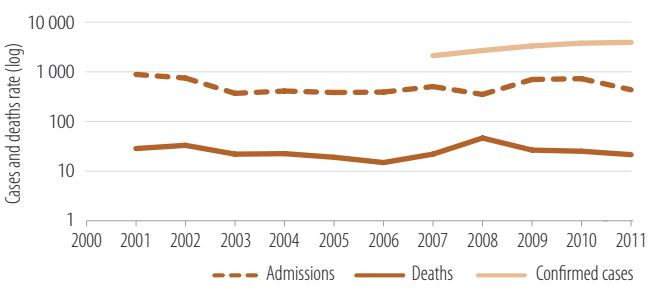


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed cases, admissions and deaths (per 100 000)



Turkey

Phase: Elimination. Impact: >75% decrease in case incidence 2000–2011. Along with imported cases 4 relapses of P. vivax were reported in the country in 2011. The national malaria elimination strategy aims for interruption of malaria transmission by 2012.

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
Number of active foci	0	
Number of people living within active foci	0	
Number of people living in malaria-free areas	73 600 000	100
Total	73 600 000	

Parasites and vectors

Major plasmodium species: *P. vivax* (0%)
Major anopheles species: *An.sacharovi, superpictus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	No	–
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	Yes	1926
	DDT is used for IRS	No	–
Case management	Malaria diagnosis is free of charge in the public sector	Yes	1926
	Gametocidal treatment of *P.falciparum* cases	Yes	–
	Radical treatment of *P. vivax* cases	Yes	1926
Surveillance	Foci and case investigation undertaken	Yes	1926
	Case reporting from private sector is mandatory	Yes	1926

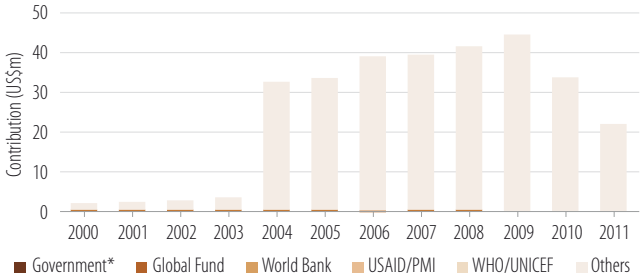
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	–
First-line treatment of *P. falciparum*	–	–
For treatment failure *of P. falciparum*	–	–
Treatment of severe malaria	–	–
Treatment of *P. vivax*	CQ+PQ(14d)	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

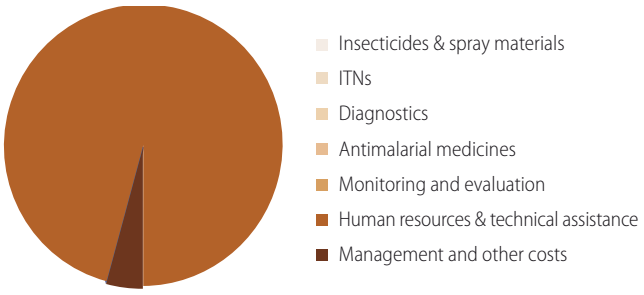
III. Financing

Government and external financing



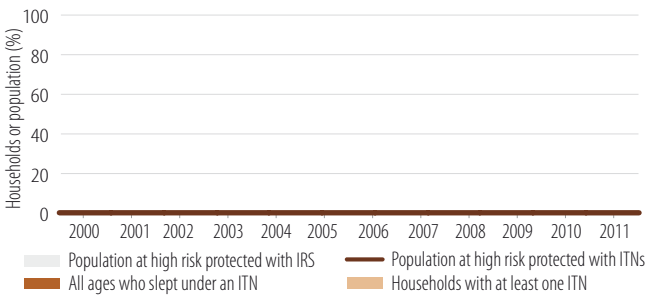
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

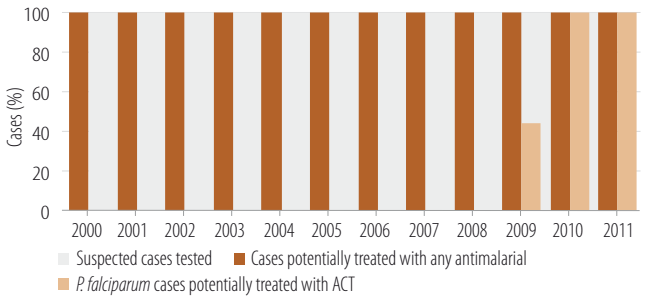


IV. Coverage

Coverage of ITN and IRS

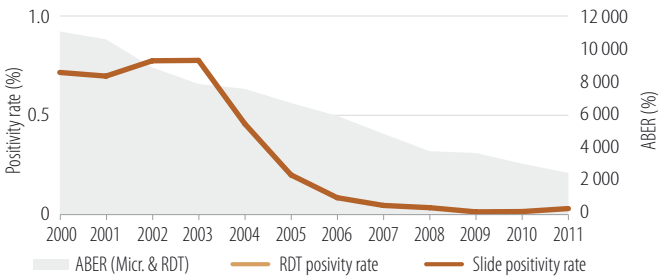


Cases tested and antimalarials delivered: Programme data (public sector)

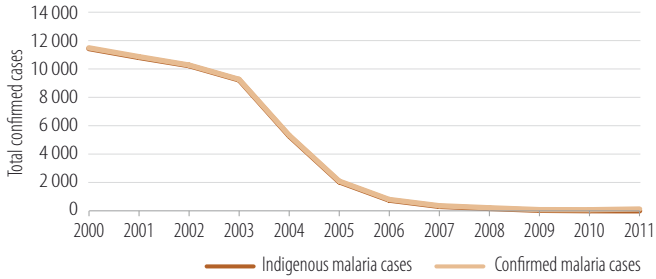


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed malaria cases and indigenous cases



Uganda

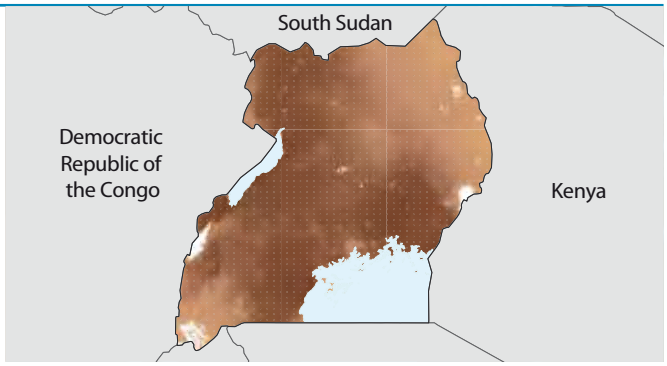
Phase: Control. Impact: Insufficiently consistent data to assess trends.

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	31 100 000	90
Low transmission (0-1 cases per 1000 population)	3 450 000	10
Malaria-free (0 cases)	0	0
Total	34 550 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, funestus*



Distribution of confirmed malaria cases (per 1 000 population)

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2006
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	Yes	2005
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2000
Case management	Patients of all ages should receive diagnostic test	Yes	1997
	RDTs used at community level	Yes	–
	ACT is free for all ages in public sector	Yes	2006
	Pre-referral treatment with recommended medicines	Yes	2002
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	Yes	2005

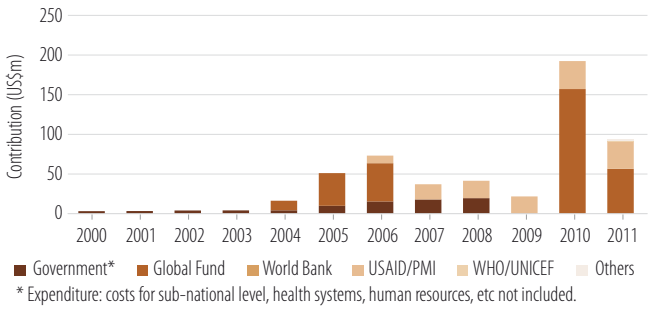
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2004
First-line treatment of *P. falciparum*	AL	2004
For treatment failure *of P. falciparum*	QN	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+AQ	2002–2008	8	0	2.3	8.9	28 days

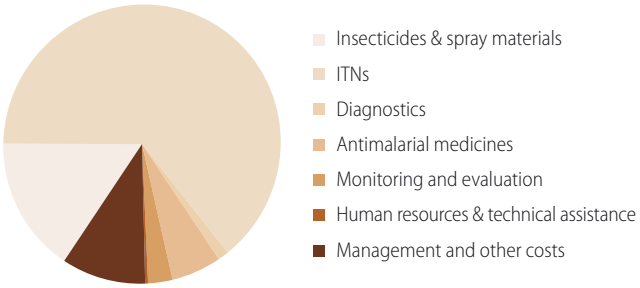
III. Financing

Government and external financing



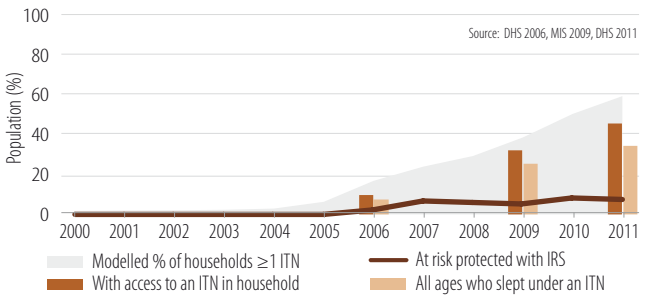
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

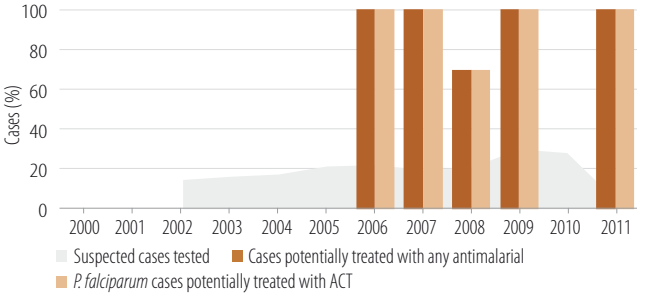


IV. Coverage

Coverage of ITN and IRS

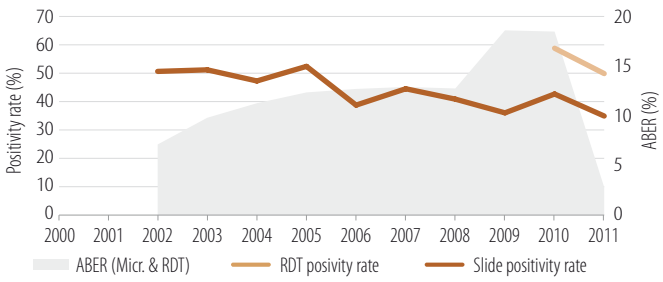


Cases tested and antimalarials delivered: Programme data (public sector)

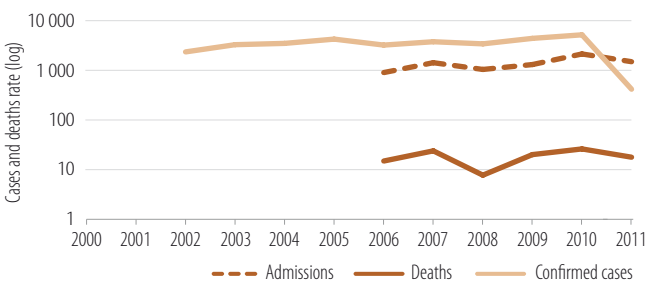


V. Impact

Malaria test positivity rate and ABER



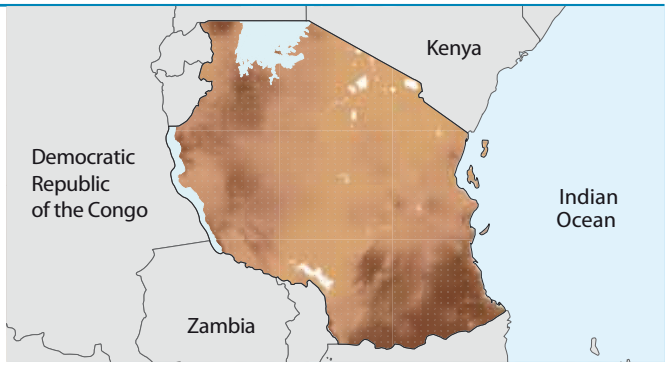
Microscopically confirmed cases, admissions and deaths (per 100 000)



United Republic of Tanzania (Mainland)

African Region

Phase: Control. Impact: Insufficiently consistent data to assess trends.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	32 900 000	73
Low transmission (0-1 cases per 1000 population)	12 200 000	27
Malaria-free (0 cases)	0	0
Total	45 100 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, arabiensis, funestus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	No	–
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	Yes	2006
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2001
Case management	Patients of all ages should receive diagnostic test	Yes	2009
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	No	–
	Pre-referral treatment with recommended medicines	Yes	2001
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	Yes	–

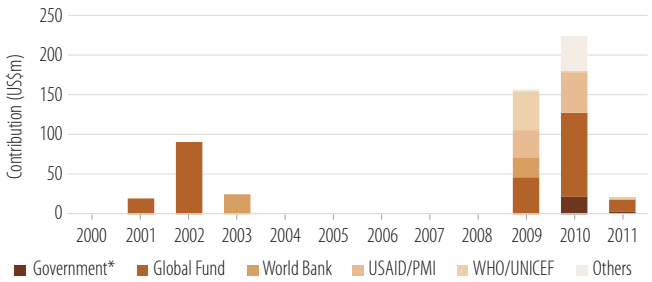
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2004
First-line treatment of *P. falciparum*	AL	2004
For treatment failure of *P. falciparum*	QN	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AL	2002–2008	8	0	2.9	8.6	28 days

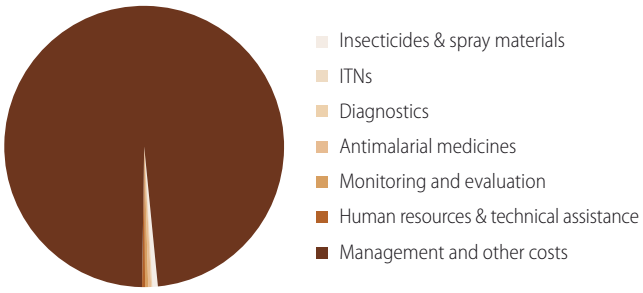
III. Financing

Government and external financing



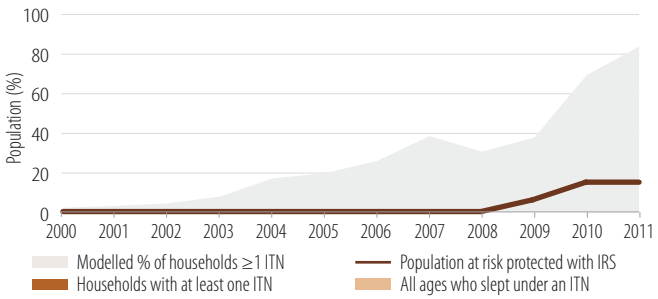
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

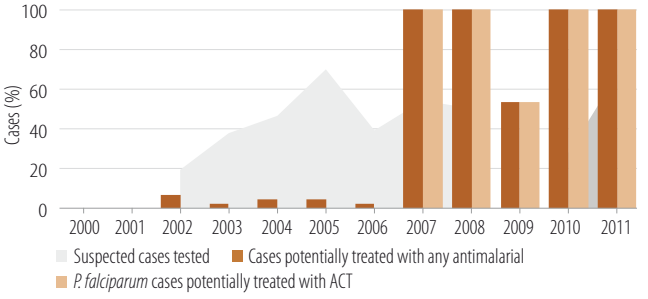


IV. Coverage

Coverage of ITN and IRS

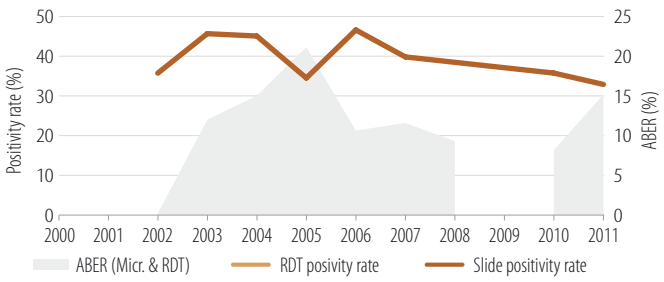


Cases tested and antimalarials delivered: Programme data (public sector)

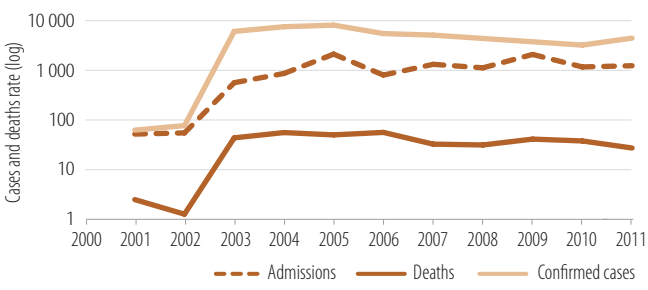


V. Impact

Malaria test positivity rate and ABER



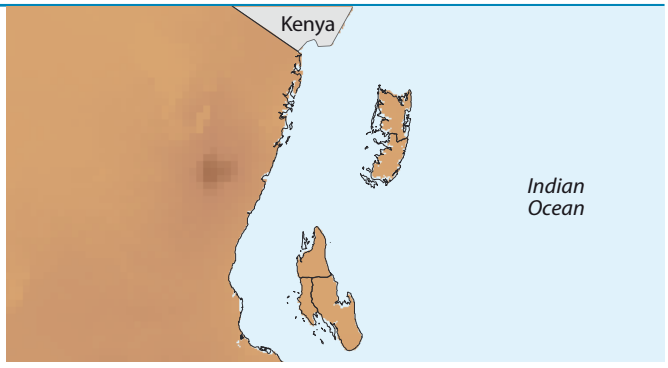
Microscopically confirmed cases, admissions and deaths (per 100 000)



United Republic of Tanzania (Zanzibar)

African Region

Phase: Control. Impact: >75% decrease in admission rates 2000–2011.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	1 400 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	1 400 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2005
	ITNs/LLINs distributed to all age groups	Yes	2008
IRS	IRS is recommended	Yes	2006
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	Yes	2004
Case management	Patients of all ages should receive diagnostic test	Yes	2006
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	No	2003
	Pre-referral treatment with recommended medicines	Yes	2004
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	Yes	2011

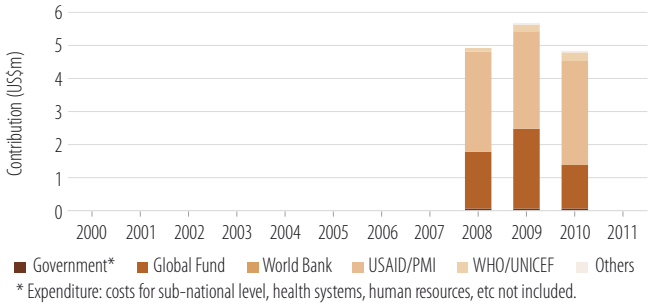
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2004
First-line treatment of *P. falciparum*	AS+AQ	2004
For treatment failure *of P. falciparum*	QN	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AL	2006-2007	1	0	0	0	42 days

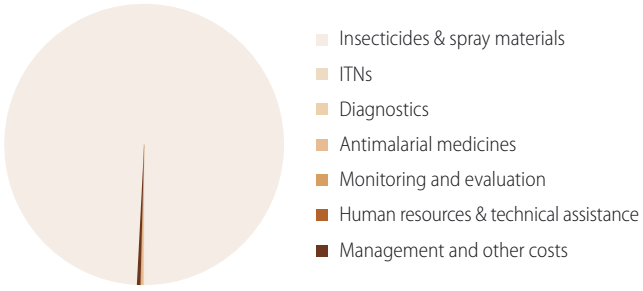
III. Financing

Government and external financing



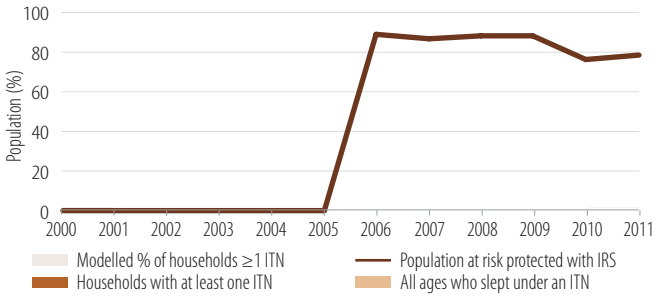
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

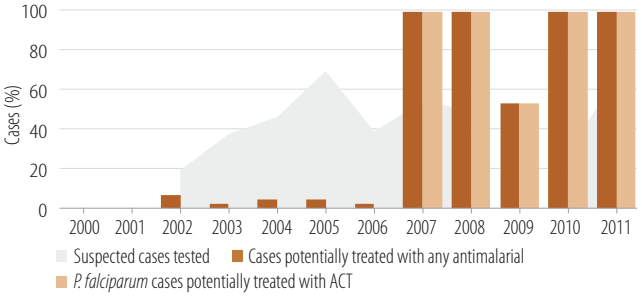


IV. Coverage

Coverage of ITN and IRS

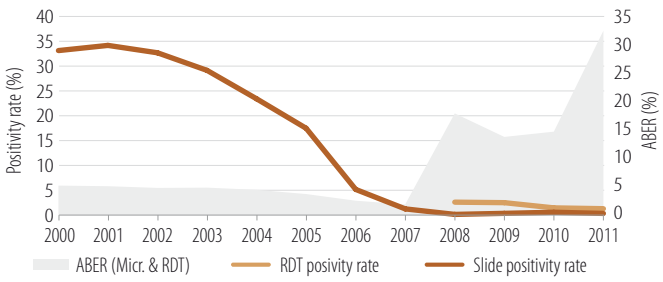


Cases tested and antimalarials delivered: Programme data (public sector)

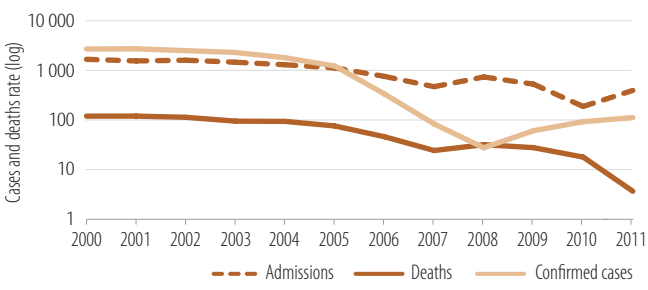


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed cases, admissions and deaths (per 100 000)



Uzbekistan

Phase: Elimination. Impact: >75% decrease in case incidence 2000–2011. Malaria transmission risk exists in the area bordering Afghanistan. No indigenous cases reported in 2011. Malaria elimination is financed mainly by the government, with supplements from the Global Fund and WHO.

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
Number of active foci	0	
Number of people living within active foci	0	
Number of people living in malaria-free areas	27 800 000	100
Total	27 800 000	

Parasites and vectors

Major plasmodium species: *P. vivax* (0%)
Major anopheles species: *An.superpictus, pulcherrimus, hyrcanus, claviger*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2005
	ITNs/LLINs distributed to all age groups	Yes	2005
IRS	IRS is recommended	Yes	1925
	DDT is used for IRS	No	–
Case management	Malaria diagnosis is free of charge in the public sector	Yes	1925
	Gametocidal treatment of *P.falciparum* cases	Yes	1939
	Radical treatment of *P. vivax* cases	Yes	1939
Surveillance	Foci and case investigation undertaken	Yes	1925
	Case reporting from private sector is mandatory	Yes	2000

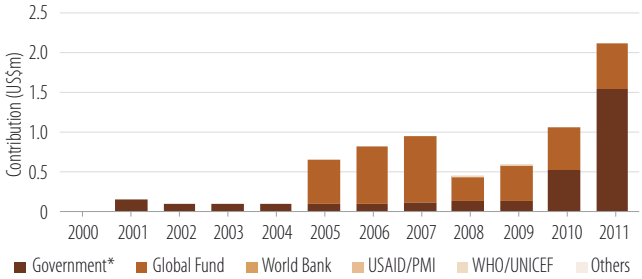
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	–
First-line treatment of *P. falciparum*	–	–
For treatment failure *of P. falciparum*	–	–
Treatment of severe malaria	–	–
Treatment of *P. vivax*	CQ+PQ(14d)	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

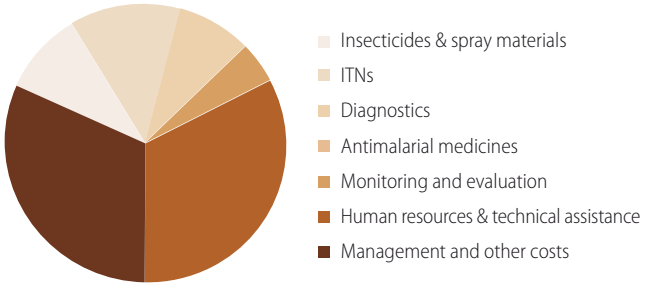
III. Financing

Government and external financing



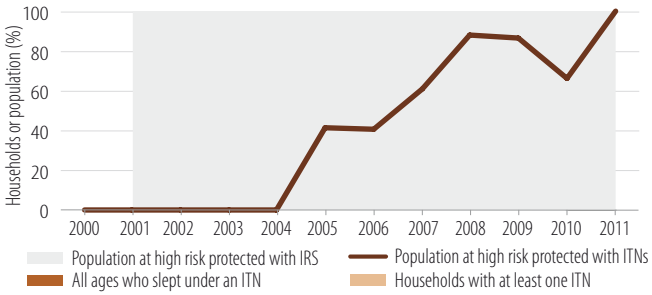
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

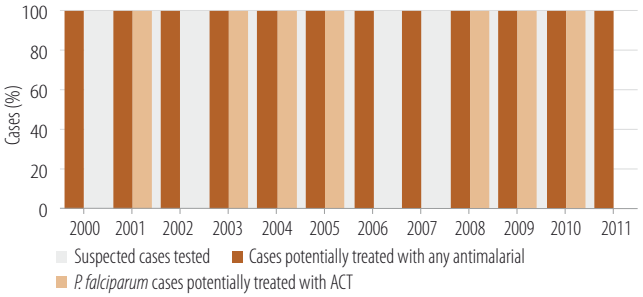


IV. Coverage

Coverage of ITN and IRS

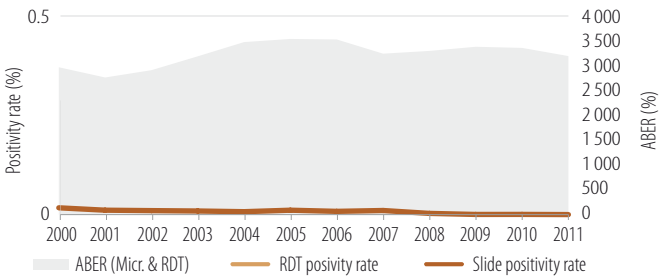


Cases tested and antimalarials delivered: Programme data (public sector)

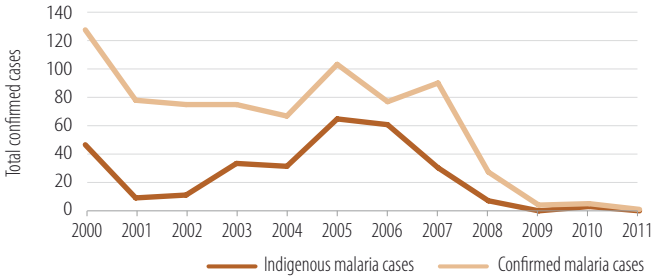


V. Impact

Malaria test positivity rate and ABER

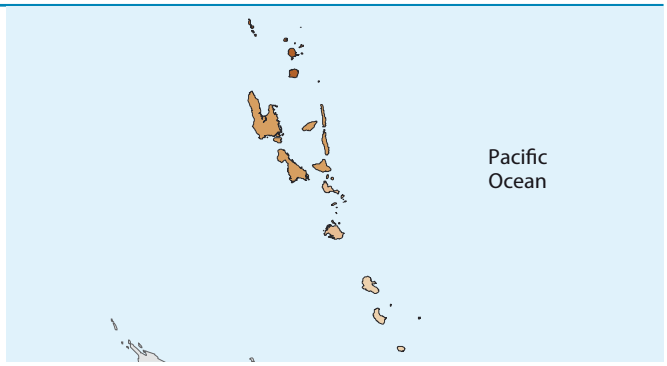


Microscopically confirmed malaria cases and indigenous cases



Vanuatu

Phase: Control. Impact: >75% decrease in case incidence 2000–2011.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	243 000	99
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	2 460	1
Total	245 460	

Parasites and vectors

Major plasmodium species: *P. falciparum* (41%), *P. vivax* (59%)
Major anopheles species: *An. farauti*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/LLINs distributed free of charge	Yes	2008
	ITNs/LLINs distributed to all age groups	Yes	1990
IRS	IRS is recommended	No	–
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	N/A	–
Case management	Patients of all ages should receive diagnostic test	Yes	2009
	RDTs used at community level	Yes	2009
	ACT is free for all ages in public sector	Yes	2009
	Pre-referral treatment with recommended medicines	Yes	2009
	Oral artemisinin-based monotherapies are not registered	No	–

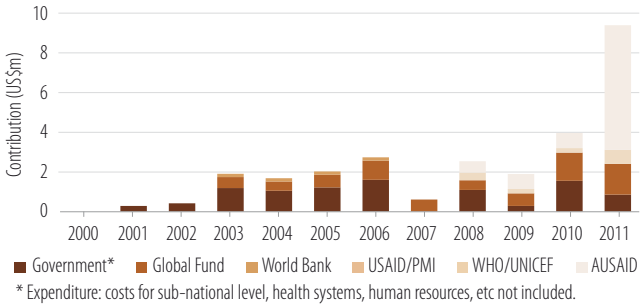
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	–
First-line treatment of *P. falciparum*	AL	2007
For treatment failure of *P. falciparum*	QN	2007
Treatment of severe malaria	QN	2007
Treatment of *P. vivax*	AL+PQ(14d)	2007

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up

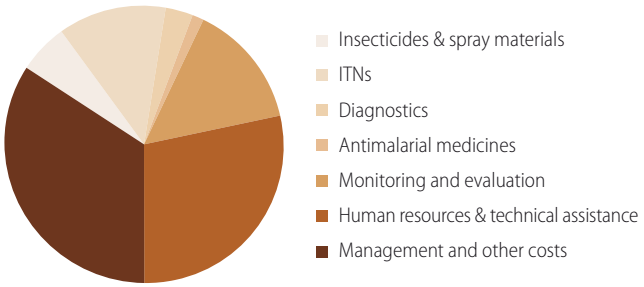
III. Financing

Government and external financing



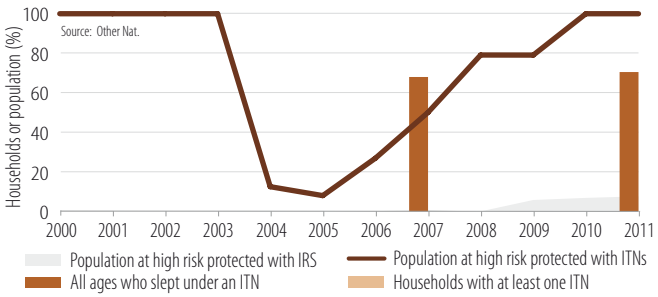
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

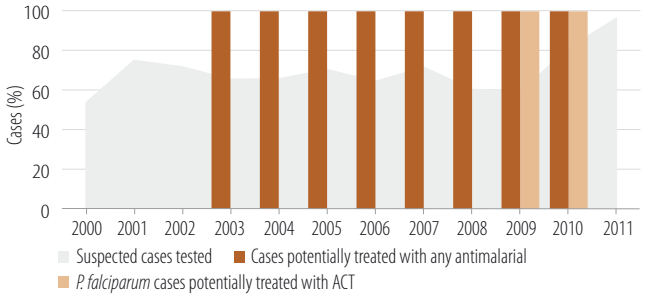


IV. Coverage

Coverage of ITN and IRS

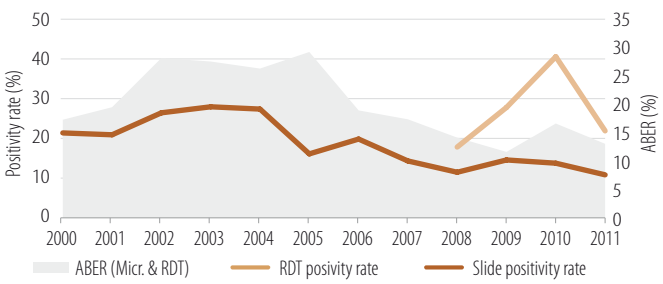


Cases tested and antimalarials delivered: Programme data (public sector)

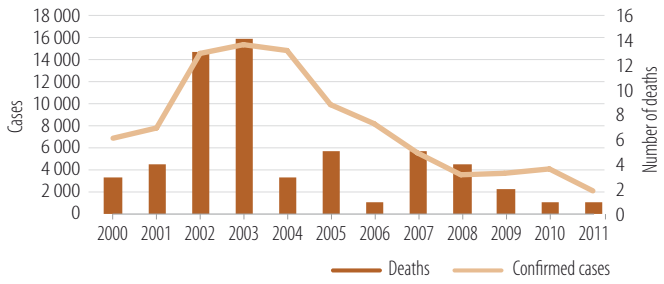


V. Impact

Malaria test positivity rate and ABER



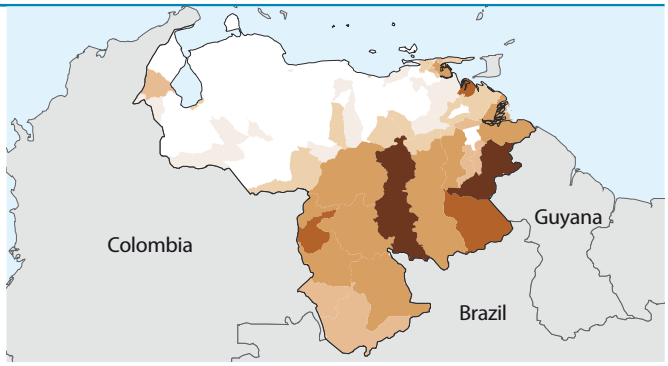
Microscopically confirmed cases and deaths



Venezuela (Bolivarian Republic of)

Region of the Americas

Phase: Control. Impact: Increase in case incidence 2000–2015.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	765 000	3
Low transmission (0-1 cases per 1000 population)	4 770 000	16
Malaria-free (0 cases)	23 900 000	81
Total	29 435 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (11%), *P. vivax* (89%)
Major anopheles species: *An. darlingi, aquasalis, nuneztovari, braziliensis, albitarsis*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2005
	ITNs/LLINs distributed to all age groups	Yes	2005
IRS	IRS is recommended	Yes	–
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	N/A	–
Case management	Patients of all ages should receive diagnostic test	Yes	1936
	RDTs used at community level	No	–
	ACT is free for all ages in public sector	Yes	2004
	Pre-referral treatment with recommended medicines	No	–
	Oral artemisinin-based monotherapies are not registered	No	–

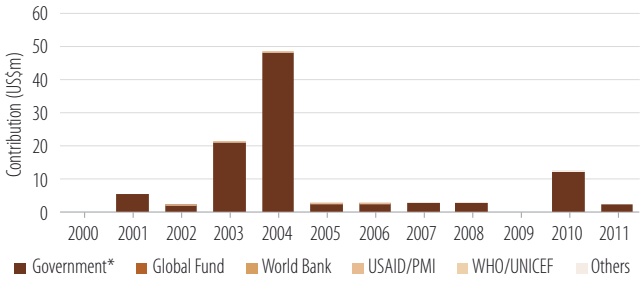
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	–	–
First-line treatment of *P. falciparum*	AS+MQ+PQ	–
For treatment failure *of P. falciparum*	QN+CL ;QN+D ;QN+T	–
Treatment of severe malaria	AM ;QN	–
Treatment of *P. vivax*	CQ+PQ	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+MQ	2004–2005	1	0	0	0	28 days

III. Financing

Government and external financing



* Expenditure: costs for local level, health systems, etc. not included.

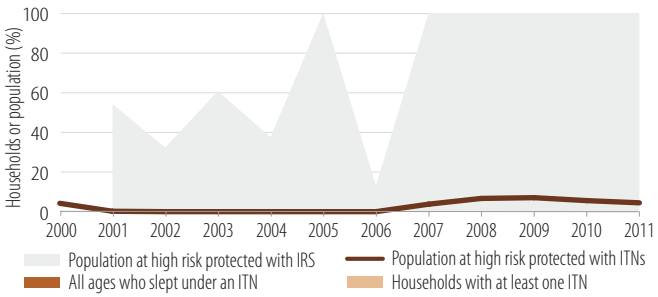
Expenditure by intervention in 2011

Data not reported for 2011

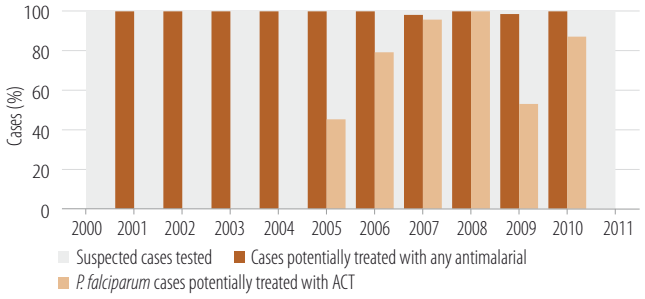
- Insecticides & spray materials
- ITNs
- Diagnostics
- Antimalarial medicines
- Monitoring and evaluation
- Human resources & technical assistance
- Management and other costs

IV. Coverage

Coverage of ITN and IRS

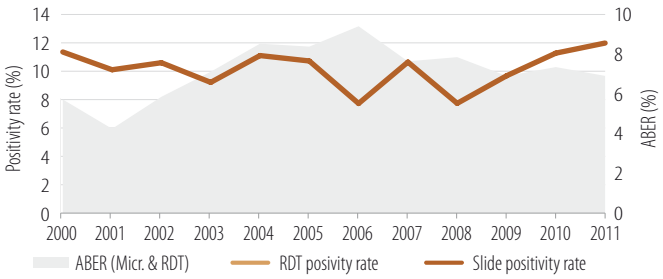


Cases tested and antimalarials delivered: Programme data (public sector)

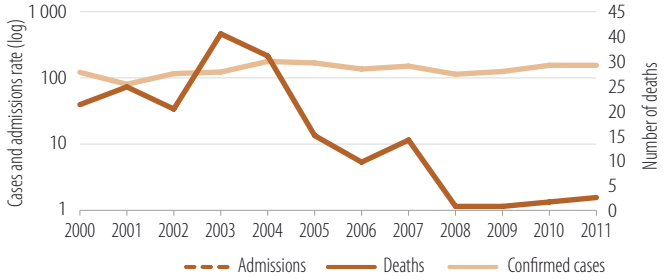


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed cases, admissions (per 100 000) and deaths



Viet Nam

Western Pacific Region

Phase: Control. Impact: >75% decrease in case incidence 2000–2011.

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	15 600 000	18
Low transmission (0-1 cases per 1000 population)	17 700 000	20
Malaria-free (0 cases)	55 500 000	63
Total	88 800 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (66%), *P. vivax* (34%)
Major anopheles species: *An. minimus, dirus, sundaicus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	1992
	ITNs/LLINs distributed to all age groups	Yes	1992
IRS	IRS is recommended	Yes	1991
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	N/A	–
Case management	Patients of all ages should receive diagnostic test	Yes	–
	RDTs used at community level	Yes	2005
	ACT is free for all ages in public sector	Yes	2000
	Pre-referral treatment with recommended medicines	Yes	1994
	Oral artemisinin-based monotherapies are not registered	No	–

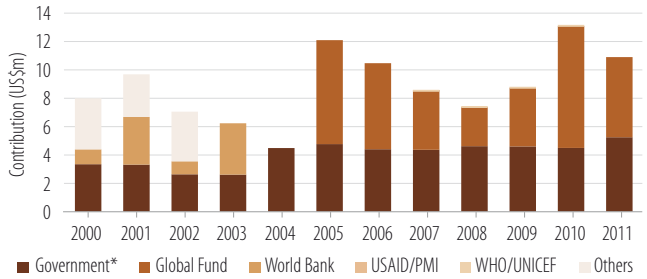
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	–
First-line treatment of *P. falciparum*	DHA-PPQ	2009
For treatment failure *of P. falciparum*	AS+MQ ;QN	2003
Treatment of severe malaria	AS ;QN	2003
Treatment of *P. vivax*	CQ+PQ(14d)	2003

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
DHA-PPQ	2001–2010	14	0	0	6.1	28 days

III. Financing

Government and external financing



* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

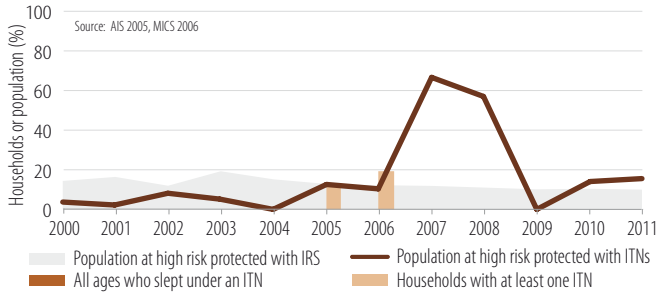
Expenditure by intervention in 2011

No data reported for 2011

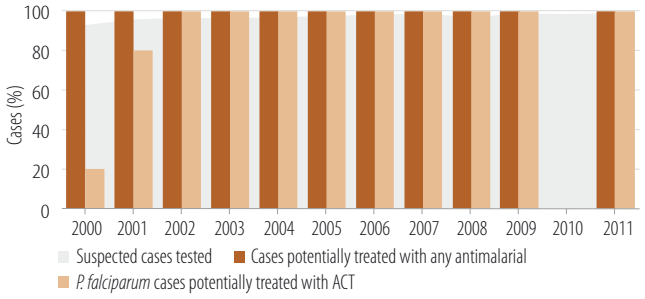
- Insecticides & spray materials
- ITNs
- Diagnostics
- Antimalarial medicines
- Monitoring and evaluation
- Human resources & technical assistance
- Management and other costs

IV. Coverage

Coverage of ITN and IRS

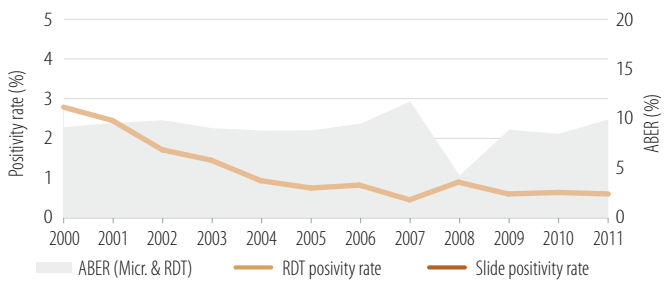


Cases tested and antimalarials delivered: Programme data (public sector)

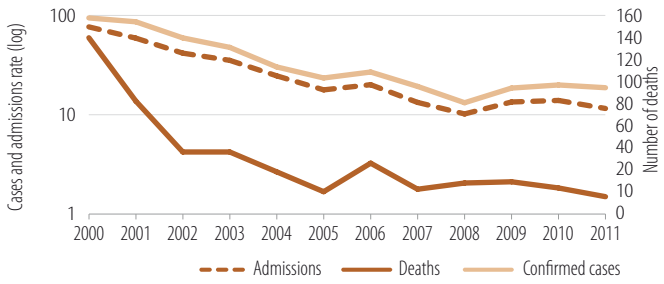


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed cases, admissions (per 100 000) and deaths



Yemen

Phase: Control. Impact: Insufficiently consistent data to assess trends.

Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	10 700 000	43
Low transmission (0-1 cases per 1000 population)	5 560 000	22
Malaria-free (0 cases)	8 500 000	34
Total	24 760 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (99%), *P. vivax* (1%)
Major anopheles species: *An. arabiensis, culicifacies, sergentii*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/ No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2002
	ITNs/LLINs distributed to all age groups	Yes	2009
IRS	IRS is recommended	Yes	2001
	DDT is used for IRS	No	–
IPT	IPT used to prevent malaria during pregnancy	No	–
Case management	Patients of all ages should receive diagnostic test	Yes	2001
	RDTs used at community level	Yes	2009
	ACT is free for all ages in public sector	Yes	2009
	Pre-referral treatment with recommended medicines	Yes	2009
	Oral artemisinin-based monotherapies are not registered	Yes	2009

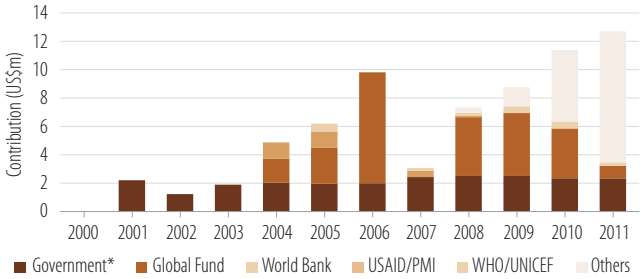
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+SP	2009
First-line treatment of *P. falciparum*	AS+SP	2009
For treatment failure *of P. falciparum*	AL	2009
Treatment of severe malaria	AM ;QN	2009
Treatment of *P. vivax*	CQ+PQ(14d)	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AS+SP	2007-2011	6	0	0	1.5	28 days

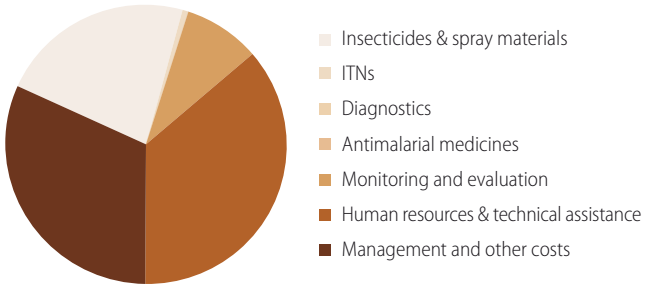
III. Financing

Government and external financing



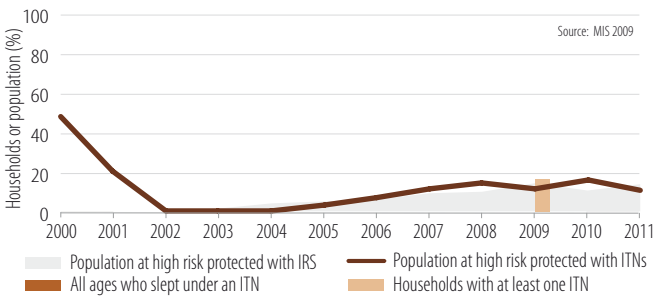
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

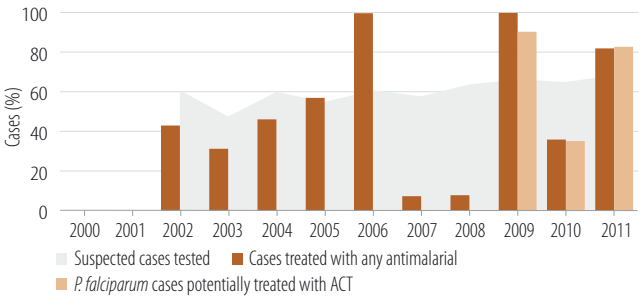


IV. Coverage

Coverage of ITN and IRS

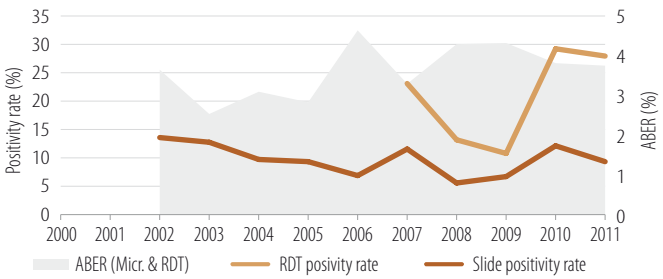


Cases tested and antimalarials delivered: Programme data (public sector)

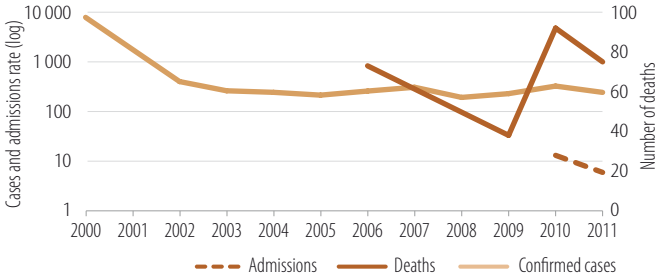


V. Impact

Malaria test positivity rate and ABER

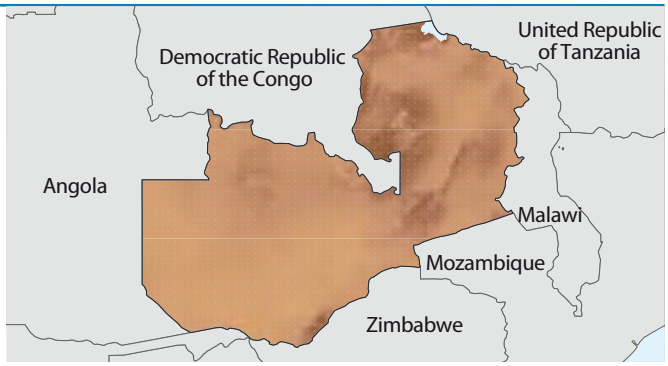


Microscopically confirmed cases, admissions (per 100 000) and deaths



Zambia

Phase: Control. Impact: 50%–75% decrease in admission rates projected 2000–2015.



Distribution of confirmed malaria cases (per 1 000 population)

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	13 500 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	13 500 000	

Parasites and vectors

Major plasmodium species:	*P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species:	*An. gambiae, arabiensis, funestus*

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	Yes	2005
	ITNs/LLINs distributed to all age groups	Yes	1998
IRS	IRS is recommended	Yes	–
	DDT is used for IRS	Yes	2001
IPT	IPT used to prevent malaria during pregnancy	Yes	2001
Case management	Patients of all ages should receive diagnostic test	Yes	2001
	RDTs used at community level	Yes	2007
	ACT is free for all ages in public sector	Yes	2003
	Pre-referral treatment with recommended medicines	Yes	1998
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	Yes	2003

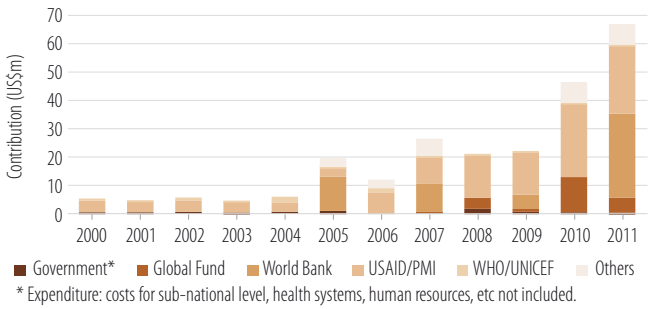
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2002
First-line treatment of *P. falciparum*	AL	2002
For treatment failure *of P. falciparum*	QN	2002
Treatment of severe malaria	QN	2002
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AL	2005-2009	9	0	0	6.7	28 days

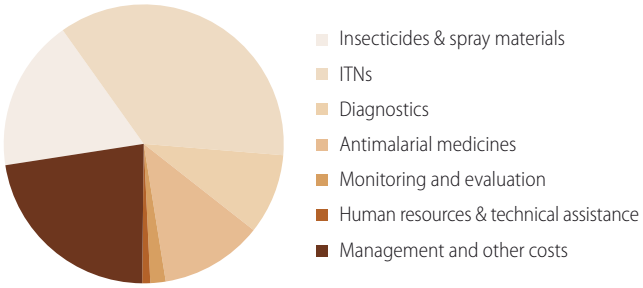
III. Financing

Government and external financing



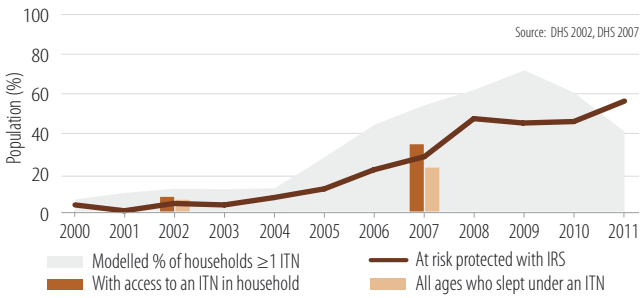
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

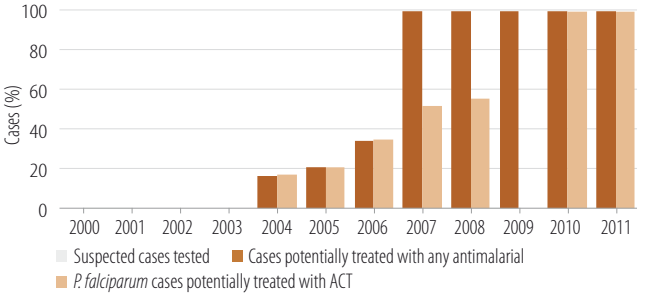


IV. Coverage

Coverage of ITN and IRS

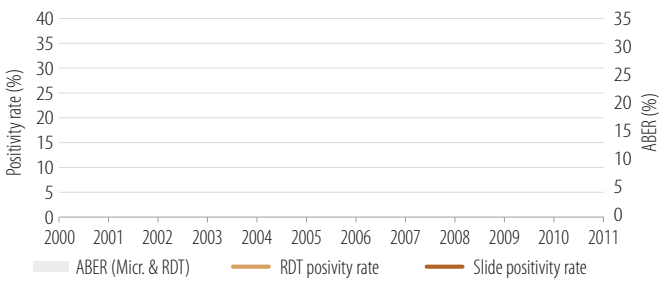


Cases tested and antimalarials delivered: Programme data (public sector)

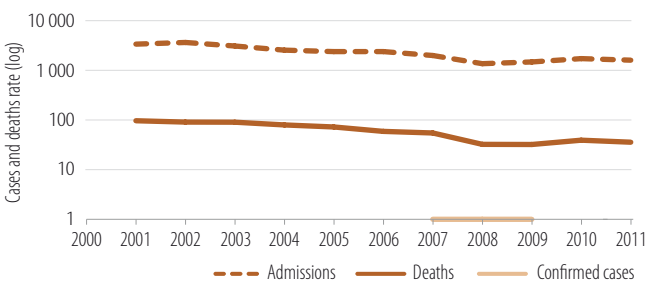


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed cases, admissions and deaths (per 100 000)



Zimbabwe

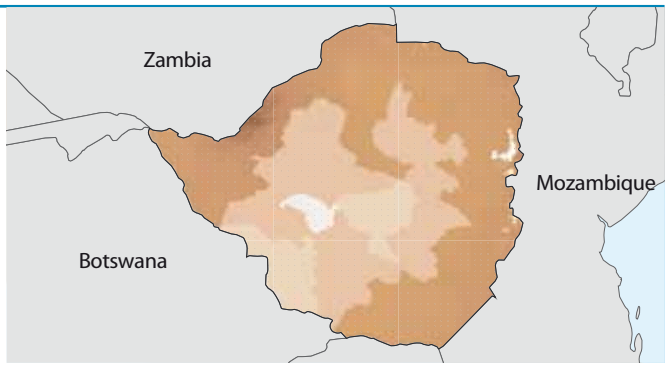
Phase: Control. Impact: Insufficiently consistent data to assess trends.

I. Epidemiological profile

Population (UN Population Division)	2011	%
High transmission (≥1 case per 1000 population)	6 380 000	50
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	6 380 000	50
Total	12 760 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax* (0%)
Major anopheles species: *An. gambiae, arabiensis, funestus*



Distribution of confirmed malaria cases (per 1 000 population)

II. Intervention policies and strategies

Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN/LLIN	ITNs/LLINs distributed free of charge	No	–
	ITNs/LLINs distributed to all age groups	No	–
IRS	IRS is recommended	Yes	1948
	DDT is used for IRS	Yes	2004
IPT	IPT used to prevent malaria during pregnancy	Yes	1997
Case management	Patients of all ages should receive diagnostic test	Yes	2008
	RDTs used at community level	Yes	–
	ACT is free for all ages in public sector	Yes	2008
	Pre-referral treatment with recommended medicines	Yes	1998
	Marketing authorization for all oral artemisinin-based monotherapies withdrawn	No	–

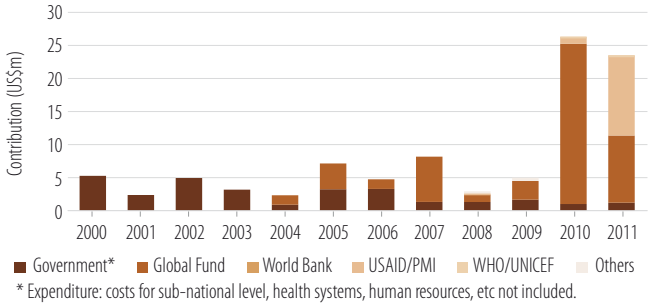
Antimalaria policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2004
First-line treatment of *P. falciparum*	AL	2004
For treatment failure *of P. falciparum*	QN	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	–	–

Therapeutic efficacy tests (clinical and parasitological failure, %)

Medicine	Year	No. of studies	Min	Median	Max	Follow-up
AL	2007–2007	3	0	0	1.9	28 days

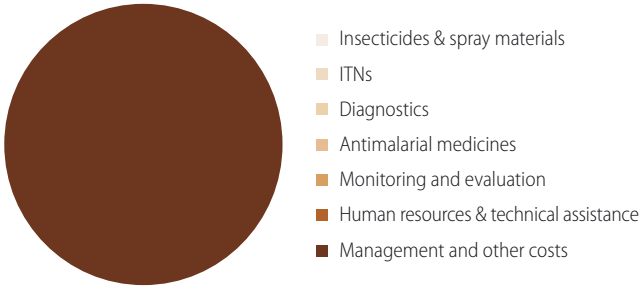
III. Financing

Government and external financing



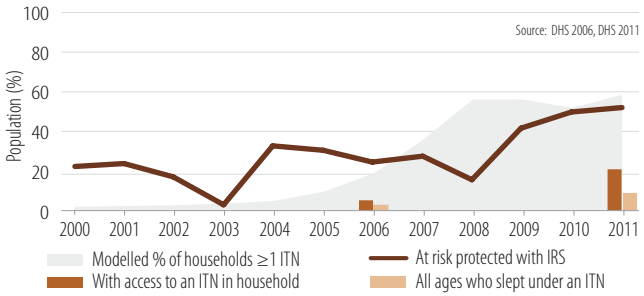
* Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2011

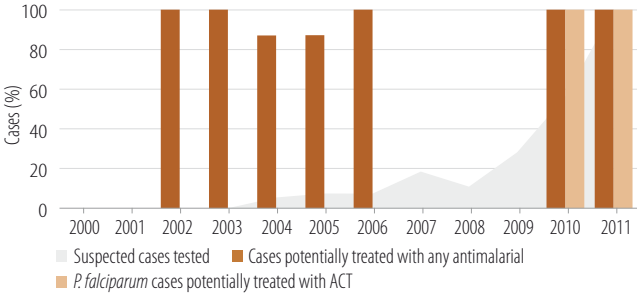


IV. Coverage

Coverage of ITN and IRS

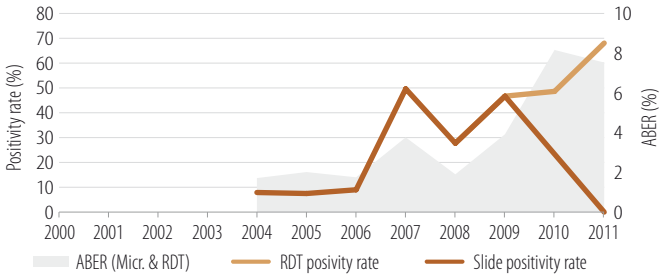


Cases tested and antimalarials delivered: Programme data (public sector)

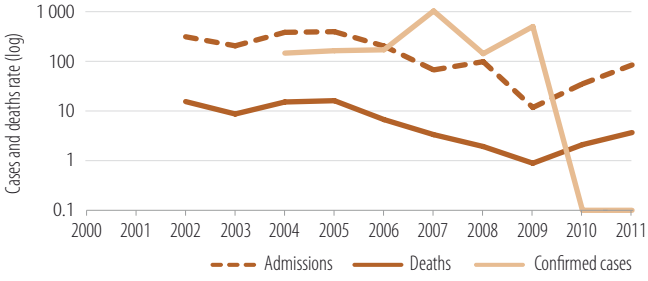


V. Impact

Malaria test positivity rate and ABER



Microscopically confirmed cases, admissions and deaths (per 100 000)



Annexes

Annex 1 – Data completeness, 2011

WHO Region	Country/area	Country classification phase[1]	Completeness score %	Population at risk %	Reported cases, admissions and deaths %	Reporting completeness %	Confirmed laboratory cases %	Cases diagnosed in community %	Active case detection %	National policies %	Interventions %	Malaria financing %	Government contribution %
African	Algeria	Elimination	82%	33%	100%	75%	97%	100%	100%	46%	71%	100%	100%
	Angola	Control	73%	100%	87%	100%	50%	–	0%	94%	100%	63%	67%
	Benin	Control	73%	33%	84%	100%	58%	–	100%	96%	79%	67%	42%
	Botswana	Control	70%	100%	38%	100%	38%	–	33%	98%	67%	54%	100%
	Burkina Faso	Control	87%	100%	91%	100%	50%	–	50%	96%	100%	100%	100%
	Burundi	Control	66%	33%	100%	100%	50%	–	0%	96%	100%	79%	33%
	Cameroon	Control	67%	33%	100%	100%	17%	–	0%	96%	85%	96%	75%
	Cape Verde	Pre-elimination	62%	100%	58%	100%	75%	0%	50%	89%	79%	38%	33%
	Central African Republic	Control	70%	100%	71%	100%	8%	–	33%	89%	49%	100%	83%
	Chad	Control	58%	100%	80%	100%	33%	–	0%	75%	64%	38%	33%
	Comoros	Control	81%	100%	64%	100%	92%	–	100%	79%	85%	71%	42%
	Congo	Control	51%	100%	67%	100%	42%	–	67%	76%	8%	0%	0%
	Côte d'Ivoire	Control	43%	33%	78%	100%	21%	–	0%	76%	54%	21%	8%
	Democratic Republic of the Congo	Control	74%	67%	100%	60%	50%	–	0%	93%	100%	100%	100%
	Equatorial Guinea	Control	44%	33%	98%	20%	63%	–	0%	93%	77%	17%	0%
	Eritrea	Control	80%	100%	93%	60%	92%	–	100%	90%	100%	83%	0%
	Ethiopia	Control	76%	100%	87%	20%	75%	–	33%	96%	90%	100%	83%
	Gabon	Control	–	–	–	–	–	–	–	–	–	–	–
	Gambia	Control	76%	100%	84%	100%	33%	–	0%	100%	100%	100%	67%
	Ghana	Control	95%	100%	100%	60%	100%	–	100%	94%	100%	100%	100%
	Guinea	Control	77%	67%	87%	100%	38%	–	33%	96%	100%	92%	83%
	Guinea-Bissau	Control	72%	33%	76%	100%	42%	–	50%	93%	77%	100%	75%
	Kenya	Control	58%	67%	49%	100%	25%	–	0%	96%	85%	58%	42%
	Liberia	Control	56%	0%	67%	20%	88%	–	100%	88%	82%	50%	8%
	Madagascar	Control	88%	100%	80%	100%	50%	–	67%	94%	100%	100%	100%
	Malawi	Control	65%	100%	80%	100%	17%	–	0%	100%	100%	50%	42%
	Mali	Control	71%	100%	67%	100%	17%	–	0%	96%	100%	100%	58%
	Mauritania	Control	56%	67%	64%	20%	50%	–	0%	81%	74%	79%	67%
	Mozambique	Control	48%	33%	73%	100%	38%	–	0%	94%	97%	0%	0%
	Namibia	Control	91%	100%	80%	100%	83%	–	100%	96%	100%	63%	100%
	Niger	Control	77%	100%	78%	100%	67%	–	17%	86%	100%	88%	58%
	Nigeria	Control	71%	67%	82%	100%	33%	–	0%	90%	77%	100%	92%
	Rwanda	Control	61%	67%	82%	100%	38%	–	0%	95%	54%	63%	50%
	Sao Tome and Principe	Control	98%	100%	100%	100%	83%	–	100%	95%	100%	100%	100%
	Senegal	Control	56%	100%	47%	20%	38%	–	50%	96%	82%	46%	25%
	Sierra Leone	Control	79%	100%	80%	100%	63%	–	67%	98%	100%	63%	42%
	South Africa	Control	75%	100%	38%	100%	63%	–	100%	85%	36%	63%	92%
	Swaziland	Control	68%	33%	76%	20%	58%	–	100%	98%	77%	71%	75%
	Togo	Control	84%	100%	100%	100%	100%	–	67%	95%	100%	67%	25%
	Uganda	Control	67%	33%	89%	100%	58%	–	67%	86%	100%	46%	25%
	United Republic of Tanzania												
	Mainland	Control	76%	100%	67%	20%	54%	–	100%	93%	100%	92%	58%
	Zanzibar	Control	86%	33%	82%	100%	100%	–	100%	96%	100%	92%	67%
	Zambia	Control	84%	100%	93%	100%	0%	–	67%	100%	100%	100%	100%
	Zimbabwe	Control	83%	67%	76%	100%	50%	–	100%	91%	87%	100%	75%
Region of the Americas	Argentina	Pre-elimination	30%	100%	17%	20%	54%	0%	17%	61%	8%	8%	17%
	Belize	Control	95%	100%	100%	100%	100%	–	100%	78%	100%	100%	75%
	Bolivia (Plurinational State of)	Control	93%	100%	100%	100%	100%	–	100%	93%	69%	100%	75%
	Brazil	Control	86%	100%	100%	20%	96%	–	100%	96%	90%	100%	75%
	Colombia	Control	62%	67%	50%	20%	96%	–	0%	86%	85%	100%	58%
	Costa Rica	Pre-elimination	67%	100%	50%	0%	100%	0%	100%	79%	87%	100%	50%
	Dominican Republic	Control	85%	100%	61%	20%	92%	–	100%	94%	100%	100%	100%
	Ecuador	Pre-elimination	74%	100%	44%	100%	79%	0%	67%	84%	64%	100%	100%
	El Salvador	Pre-elimination	73%	100%	100%	100%	96%	0%	100%	82%	41%	67%	42%

WHO Region	Country/area	Country classification phase[1]	Completeness score %	Population at risk %	Reported cases, admissions and deaths %	Reporting completeness %	Confirmed laboratory cases %	Cases diagnosed in community %	Active case detection %	National policies %	Interventions %	Malaria financing %	Government contribution %
Region of the Americas	French Guiana, France	Control	40%	67%	67%	0%	88%	–	67%	70%	5%	0%	0%
	Guatemala	Control	67%	100%	44%	0%	88%	–	100%	85%	54%	100%	33%
	Guyana	Control	88%	100%	61%	100%	100%	–	100%	91%	64%	100%	75%
	Haiti	Control	48%	100%	22%	20%	92%	–	100%	95%	5%	0%	0%
	Honduras	Control	83%	100%	33%	100%	88%	–	100%	80%	95%	100%	50%
	Mexico	Pre-elimination	85%	100%	67%	100%	100%	0%	100%	81%	100%	100%	100%
	Nicaragua	Control	77%	100%	69%	60%	100%	–	100%	83%	72%	58%	50%
	Panama	Control	88%	100%	47%	100%	100%	–	100%	79%	97%	96%	75%
	Paraguay	Pre-elimination	74%	100%	78%	60%	100%	0%	100%	97%	90%	63%	50%
	Peru	Control	22%	100%	22%	0%	50%	–	0%	26%	0%	0%	0%
	Suriname	Control	59%	67%	50%	100%	100%	–	100%	79%	36%	0%	0%
	Venezuela (Bolivarian Republic of)	Control	59%	100%	25%	0%	75%	–	100%	90%	41%	71%	25%
Eastern Mediterranean	Afghanistan	Control	82%	100%	83%	100%	83%	–	67%	100%	90%	67%	50%
	Djibouti	Control	72%	67%	64%	100%	42%	–	67%	93%	64%	75%	75%
	Iran (Islamic Republic of)	Elimination	91%	100%	100%	100%	100%	100%	100%	90%	54%	100%	67%
	Iraq	Prevention of reintroduction	91%	100%	100%	100%	100%	100%	100%	88%	100%	92%	25%
	Pakistan[2]	Control	–	–	–	–	–	–	–	–	–	–	–
	Saudi Arabia	Elimination	94%	100%	100%	100%	100%	100%	100%	66%	83%	100%	92%
	Somalia	Control	73%	100%	58%	100%	75%	–	67%	98%	100%	38%	25%
	South Sudan[3]	Control	62%	100%	78%	100%	29%	–	33%	95%	38%	50%	33%
	Sudan[3]	Control	75%	100%	100%	100%	25%	–	0%	100%	97%	100%	50%
	Yemen	Control	96%	100%	72%	100%	100%	–	100%	95%	92%	100%	100%
European	Azerbaijan	Elimination	96%	100%	100%	100%	100%	100%	100%	88%	100%	100%	75%
	Georgia	Prevention of reintroduction	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	Kyrgyzstan	Elimination	97%	100%	100%	100%	100%	100%	100%	92%	100%	100%	75%
	Tajikistan	Elimination	97%	100%	100%	100%	100%	100%	100%	90%	100%	100%	75%
	Turkey	Elimination	94%	100%	100%	100%	100%	100%	100%	100%	88%	100%	50%
	Uzbekistan	Elimination	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	92%
South-East Asia	Bangladesh	Control	78%	100%	67%	100%	88%	–	100%	89%	41%	58%	58%
	Bhutan	Pre-elimination	83%	100%	97%	100%	79%	0%	100%	90%	100%	100%	67%
	Democratic People's Republic of Korea	Pre-elimination	93%	100%	100%	100%	100%	100%	100%	96%	83%	100%	50%
	India	Control	57%	100%	17%	100%	75%	–	0%	85%	85%	67%	83%
	Indonesia	Control	78%	100%	28%	100%	92%	–	33%	80%	100%	100%	67%
	Myanmar	Control	75%	100%	100%	100%	100%	–	67%	64%	72%	46%	25%
	Nepal	Control	94%	100%	83%	100%	88%	–	100%	89%	87%	100%	100%
	Sri Lanka	Elimination	94%	100%	100%	100%	81%	100%	100%	93%	79%	100%	83%
	Thailand	Control	90%	100%	58%	100%	100%	–	100%	93%	77%	83%	100%
	Timor-Leste	Control	100%	100%	100%	100%	100%	–	100%	96%	100%	100%	100%
Western Pacific	Cambodia	Control	96%	100%	100%	100%	100%	–	100%	95%	92%	100%	75%
	China	Control	90%	100%	100%	20%	96%	–	100%	98%	100%	100%	100%
	Lao People's Democratic Republic	Control	94%	100%	100%	100%	100%	–	100%	98%	100%	100%	50%
	Malaysia	Pre-elimination	98%	100%	100%	100%	100%	100%	100%	93%	92%	100%	100%
	Papua New Guinea	Control	65%	100%	50%	100%	100%	–	0%	98%	26%	67%	42%
	Philippines	Control	88%	100%	50%	100%	100%	–	83%	93%	82%	100%	83%
	Republic of Korea	Elimination	66%	100%	100%	0%	67%	100%	0%	87%	33%	100%	75%
	Solomon Islands	Control	93%	100%	97%	60%	83%	–	100%	98%	100%	100%	100%
	Vanuatu	Control	84%	100%	86%	100%	100%	–	0%	93%	100%	100%	75%
	Viet Nam	Control	84%	100%	56%	100%	88%	–	100%	89%	77%	96%	50%

[1] Country classification as of December 2012

[2] Country did not submit a report for 2012

[3] South Sudan became a separate State on 10 July 2011 and a Member State of WHO on 27 September 2011. South Sudan and Sudan have distinct epidemiological profiles comprising high transmission and low transmission areas respectively. For this reason data up to June 2011 from the high transmission areas of Sudan (10 southern states which correspond to South Sudan) and low transmission areas (15 northern states which correspond to contemporary Sudan) are reported separately

– Question does not appear on the form for that country

Annex 2A – Recommended policies and strategies for malaria control, 2011

WHO Region	Country/area	Insecticide-treated nets			Indoor residual spraying		Treatment									Malaria in pregnancy
		ITNs/ LLINs are distributed for free	ITNs/ LLINs are distributed to all age groups	ITNs/ LLINs distributed through mass campaigns to all age groups	DDT is used for IRS	IRS is the primary vector control intervention	ACT policy adopted	Patients of all ages should get diagnostic test	Malaria diagnosis is free of charge in the public sector	RDTs used at community level	ACT is free of charge for under 5 years old in the public sector	Pre-referral treatment with quinine or artemether IM or artesunate suppositories	Malaria treatment is permitted in the private sector	Malaria treatment is free of charge in the private sector	Gametocidal treatment of *P.falciparum* cases	IPTp used to prevent malaria during pregnancy
African	Algeria	N	N	–	Y	Y	NA	–	Y	–	–	–	Y	Y	N	–
	Angola	Y	Y	Y	N	–	Y	Y	Y	N	Y	Y	–	–	–	Y
	Benin	Y	N	N	N	–	Y	Y	Y	Y	Y	Y	–	–	–	Y
	Botswana	Y	Y	Y	Y	–	Y	Y	Y	N	Y	Y	–	–	–	N
	Burkina Faso	Y	Y	Y	N	–	Y	Y	Y	N	N	Y	–	–	–	Y
	Burundi	Y	Y	Y	N	–	Y	Y	N	Y	Y	N	–	–	–	N
	Cameroon	Y	Y	Y	N	–	Y	Y	N	Y	Y	Y	–	–	–	Y
	Cape Verde	N	N	N	N	–	Y	Y	Y	Y	Y	N	–	–	–	N
	Central African Republic	Y	N	N	N	–	Y	N	N	Y	Y	Y	–	–	–	Y
	Chad	Y	Y	Y	N	–	Y	Y	Y	N	Y	Y	–	–	–	Y
	Comoros	Y	Y	Y	N	–	Y	Y	Y	N	Y	Y	–	–	–	Y
	Congo	Y	N	Y	N	–	Y	Y	N	N	Y	N	–	–	–	Y
	Côte d'Ivoire	Y	N	Y	N	–	Y	Y	Y	Y	Y	N	–	–	–	Y
	Democratic Republic of the Congo	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	–	–	–	Y
	Equatorial Guinea	Y	N	Y	N	–	Y	Y	Y	N	Y	Y	–	–	–	Y
	Eritrea	Y	Y	Y	N	–	Y	Y	Y	Y	Y	Y	–	–	–	N
	Ethiopia	Y	Y	Y	N	–	Y	Y	Y	Y	Y	Y	–	–	–	N
	Gabon	Y	Y	N	N	–	Y	Y	N	Y	Y	Y	–	–	–	Y
	Gambia	Y	Y	Y	Y	–	Y	Y	Y	N	Y	Y	–	–	–	Y
	Ghana	Y	Y	Y	N	–	Y	Y	N	Y	Y	Y	–	–	–	Y
	Guinea	Y	Y	N	N	–	Y	Y	Y	Y	Y	Y	–	–	–	Y
	Guinea-Bissau	Y	N	Y	N	–	Y	Y	Y	N	N	Y	–	–	–	Y
	Kenya	Y	Y	Y	N	–	Y	Y	Y	N	Y	Y	–	–	–	Y
	Liberia	Y	Y	Y	N	–	Y	Y	Y	Y	Y	N	–	–	–	Y
	Madagascar	Y	Y	Y	N	–	Y	Y	Y	Y	Y	N	–	–	–	Y
	Malawi	Y	Y	Y	N	–	Y	Y	N	N	Y	Y	–	–	–	Y
	Mali	Y	N	Y	N	–	Y	Y	N	Y	Y	Y	–	–	–	Y
	Mauritania	Y	N	N	N	–	Y	Y	Y	Y	Y	N	–	–	–	Y
	Mayotte	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Mozambique	Y	Y	Y	Y	–	Y	Y	Y	Y	Y	Y	–	–	–	Y
	Namibia	Y	N	N	Y	–	Y	Y	Y	N	Y	Y	–	–	–	Y
	Niger	Y	Y	N	N	–	Y	Y	Y	N	Y	N	–	–	–	Y
	Nigeria	Y	Y	Y	N	–	Y	Y	Y	N	Y	Y	–	–	–	Y
	Rwanda	Y	N	Y	N	–	Y	Y	N	Y	N	Y	–	–	–	N
	Sao Tome and Principe	Y	N	Y	N	–	Y	Y	Y	N	N	Y	–	–	–	Y
	Senegal	Y	Y	Y	N	–	Y	Y	Y	Y	Y	Y	–	–	–	Y
	Sierra Leone	Y	N	Y	N	–	Y	Y	Y	Y	Y	Y	–	–	–	Y
	South Africa	N	N	N	Y	–	Y	Y	Y	Y	Y	N	–	–	–	N
	Swaziland	Y	Y	Y	Y	–	Y	Y	Y	Y	Y	Y	–	–	–	N
	Togo	Y	Y	Y	N	–	Y	Y	N	Y	N	N	–	–	–	Y
	Uganda	Y	N	Y	N	–	Y	Y	Y	Y	Y	Y	–	–	–	Y
	United Republic of Tanzania															
	Mainland	N	N	Y	N	–	Y	Y	N	N	Y	Y	–	–	–	Y
	Zanzibar	Y	Y	Y	N	–	Y	Y	Y	N	N	Y	–	–	–	Y
	Zambia	Y	Y	Y	Y	–	Y	Y	Y	Y	N	Y	–	–	–	Y
	Zimbabwe	N	N	N	Y	–	Y	Y	Y	Y	Y	Y	–	–	–	Y
Eastern Mediterranean	Afghanistan	Y	Y	Y	N	–	Y	Y	Y	Y	N	Y	–	–	–	NA
	Djibouti	Y	N	N	N	–	Y	Y	Y	N	Y	N	–	–	–	NA
	Iran (Islamic Republic of)	Y	Y	–	N	Y	Y	–	Y	–	–	–	N	Y	Y	NA
	Pakistan	Y	Y	N	N	Y	Y	–	Y	N	Y	Y	–	–	–	NA
	Saudi Arabia	Y	Y	–	N	Y	Y	–	Y	–	–	–	N	N	Y	NA
	Somalia	Y	N	Y	N	–	Y	Y	Y	N	Y	Y	–	–	–	Y
	South Sudan	Y	Y	Y	N	–	Y	N	Y	N	Y	Y	–	–	–	Y
	Sudan	Y	Y	Y	N	–	Y	Y	N	Y	Y	Y	–	–	–	N
	Yemen	Y	Y	Y	N	–	Y	Y	Y	Y	Y	Y	–	–	–	NA

WHO Region	Country/area	Insecticide-treated nets			Indoor residual spraying		Treatment									Malaria in pregnancy
		ITNs/ LLINs are distributed for free	ITNs/ LLINs are distributed to all age groups	ITNs/ LLINs distributed through mass campaigns to all age groups	DDT is used for IRS	IRS is the primary vector control intervention	ACT policy adopted	Patients of all ages should get diagnostic test	Malaria diagnosis is free of charge in the public sector	RDTs used at community level	ACT is free of charge for under 5 years old in the public sector	Pre-referral treatment with quinine or artemether IM or artesunate suppositories	Malaria treatment is permitted in the private sector	Malaria treatment is free of charge in the private sector	Gametocidal treatment of *P.falciparum* cases	IPTp used to prevent malaria during pregnancy
European	Azerbaijan	Y	N	–	N	Y	NA	–	Y	–	–	–	N	–	–	NA
	Kyrgyzstan	Y	Y	–	N	Y	–	–	Y	–	–	–	N	N	Y	NA
	Tajikistan	Y	Y	–	N	Y	Y	–	Y	–	–	–	N	–	Y	NA
	Turkey	N	N	–	N	Y	NA	–	Y	–	–	–	N	N	Y	NA
	Uzbekistan	Y	Y	–	N	Y	–	–	Y	–	–	–	N	N	Y	NA
Region of the Americas	Argentina	N	N	N	N	–	NA	Y	Y	N	–	–	–	–	–	NA
	Belize	Y	Y	Y	N	–	NA	Y	Y	N	N	N	–	–	–	NA
	Bolivia (Plurinational State of)	Y	Y	Y	N	–	Y	Y	Y	Y	Y	N	–	–	–	NA
	Brazil	Y	Y	Y	N	–	Y	Y	Y	Y	Y	Y	–	–	–	NA
	Colombia	Y	Y	Y	N	–	Y	Y	Y	Y	Y	Y	–	–	–	NA
	Costa Rica	Y	Y	Y	N	–	NA	N	Y	N	–	–	–	–	–	NA
	Dominican Republic	Y	Y	Y	N	–	N	Y	Y	N	N	N	–	–	–	NA
	Ecuador	Y	N	Y	N	–	Y	Y	Y	Y	Y	N	–	–	–	NA
	El Salvador	Y	Y	N	N	–	NA	Y	N	N	N	N	–	–	–	NA
	French Guiana	N	Y	Y	N	N	NA	Y	–	N	N	N	N	N	–	NA
	Guatemala	Y	Y	Y	N	–	NA	Y	Y	Y	N	N	–	–	–	NA
	Guyana	Y	Y	Y	N	–	Y	Y	Y	N	Y	Y	–	–	–	NA
	Haiti	Y	Y	Y	N	–	NA	Y	Y	N	Y	N	–	–	–	NA
	Honduras	Y	Y	Y	N	–	NA	Y	Y	N	Y	N	–	–	–	NA
	Mexico	Y	Y	–	Y	–	NA	Y	Y	N	N	N	–	–	–	NA
	Nicaragua	Y	Y	N	N	–	NA	Y	Y	Y	Y	N	–	–	–	NA
	Panama	N	N	N	N	–	NA	Y	Y	N	N	N	–	–	–	NA
	Paraguay	N	N	N	N	–	N	Y	Y	N	Y	N	–	–	–	NA
	Peru	Y	Y	Y	Y	–	Y	Y	–	Y	–	Y	–	–	–	NA
	Suriname	Y	Y	Y	N	–	Y	Y	Y	Y	Y	Y	–	–	–	NA
	Venezuela (Bolivarian Republic of)	Y	Y	Y	N	–	Y	Y	Y	N	Y	N	–	–	–	NA
South-East Asia	Bangladesh	Y	Y	Y	N	–	Y	Y	Y	Y	Y	Y	–	–	N	NA
	Bhutan	Y	Y	Y	N	–	Y	Y	Y	N	N	N	–	–	Y	NA
	Democratic People's Republic of Korea	Y	Y	–	N	Y	NA	–	Y	–	–	–	N	N	N	NA
	India	Y	Y	N	Y	–	Y	Y	Y	Y	Y	Y	–	–	Y	NA
	Indonesia	Y	Y	Y	N	–	Y	Y	Y	Y	Y	Y	–	–	Y	NA
	Myanmar	Y	Y	Y	N	–	Y	Y	Y	Y	Y	Y	Y	N	Y	NA
	Nepal	Y	Y	Y	N	–	Y	Y	Y	Y	Y	Y	–	–	N	NA
	Sri Lanka	Y	Y	–	N	Y	Y	–	Y	–	–	–	Y	N	Y	NA
	Thailand	Y	Y	Y	N	–	Y	Y	Y	Y	Y	N	–	–	Y	NA
	Timor-Leste	Y	Y	Y	N	–	Y	Y	Y	Y	Y	Y	–	–	N	NA
Western Pacific	Cambodia	Y	Y	Y	N	–	Y	Y	Y	Y	N	N	–	–	–	NA
	China	Y	Y	Y	N	–	Y	Y	N	N	Y	N	–	–	–	NA
	Lao People's Democratic Republic	Y	Y	Y	N	–	Y	Y	Y	Y	Y	Y	–	–	–	NA
	Malaysia	Y	Y	–	N	N	Y	–	Y	–	–	–	Y	N	N	NA
	Papua New Guinea	Y	Y	Y	N	–	Y	Y	Y	N	Y	Y	–	–	–	Y
	Philippines	Y	Y	Y	N	–	Y	Y	Y	Y	Y	Y	–	–	–	NA
	Republic of Korea	Y	N	–	N	Y	NA	–	Y	–	–	–	Y	N	Y	NA
	Solomon Islands	Y	Y	Y	N	–	Y	Y	Y	N	Y	Y	–	–	–	NA
	Vanuatu	Y	Y	Y	N	–	Y	Y	Y	Y	Y	Y	–	–	–	NA
	Viet Nam	Y	Y	Y	N	–	Y	Y	Y	Y	Y	Y	–	–	–	NA
	Philippines	Y	Y	Y	N	–	Y	Y	Y	Y	Y	Y	–	–	–	NA
	Republic of Korea	Y	N	–	N	Y	NA	–	Y	–	–	–	Y	N	Y	NA
	Solomon Islands	Y	Y	Y	N	–	Y	Y	Y	N	Y	Y	–	–	–	NA
	Vanuatu	Y	Y	Y	N	–	Y	Y	Y	Y	Y	Y	–	–	–	NA
	Viet Nam	Y	Y	Y	N	–	Y	Y	Y	Y	Y	Y	–	–	–	NA

(Y) = Actually implemented
(N) = Not implemented
(–) = Question not answered or not applicable

Annex 2B – Antimalarial drug policy, 2011

WHO Region	Country/area	*P. falciparum*				*P.vivax*
		Uncomplicated unconfirmed	Uncomplicated confirmed	Severe	Prevention during pregnancy	Treatment
African	Algeria	-	-	-	–	CQ
	Angola	AL	AL	QN	SP(IPT)	–
	Benin	AL	AL	QN	SP(IPT)	–
	Botswana	AL	AL	QN	CQ+PG	–
	Burkina Faso	AL;AS+AQ	AL;AS+AQ	QN	SP(IPT)	–
	Burundi	AS+AQ	AS+AQ	QN	–	–
	Cameroon	AS+AQ	AS+AQ	AM;QN	SP(IPT)	–
	Cape Verde	AL	AL	QN	CQ	–
	Central African Republic	AL	AL	AM;QN	SP(IPT)	–
	Chad	AL;AS+AQ	AL;AS+AQ	AM;QN	SP(IPT)	–
	Comoros	AL	AL	QN	SP(IPT)	–
	Congo	AS+AQ	AS+AQ	QN	SP(IPT)	–
	Côte d'Ivoire	AS+AQ	AS+AQ	QN	SP(IPT)	–
	Democratic Republic of the Congo	AS+AQ	AS+AQ	QN	SP(IPT)	–
	Equatorial Guinea	AS+AQ	AS+AQ	QN	–	–
	Eritrea	CQ+SP	AS+AQ	QN	–	CQ+PQ
	Ethiopia	AL	AL	QN	–	CQ
	Gabon	AS+AQ	AS+AQ	QN	SP(IPT)	–
	Gambia	AL	AL	QN	SP(IPT)	–
	Ghana	AS+AQ	AL;AS+AQ	QN	SP(IPT)	–
	Guinea	AS+AQ	AS+AQ	QN	SP(IPT)	–
	Guinea-Bissau	AL	AL	QN	SP(IPT)	–
	Kenya	AL	AL	QN	SP(IPT)	–
	Liberia	AS+AQ	AS+AQ	QN	SP(IPT)	–
	Madagascar	AS+AQ	AS+AQ	QN	SP(IPT)	–
	Malawi	AL	AL	QN	SP(IPT)	–
	Mali	AS+AQ	AL;AS+AQ	QN	SP(IPT)	–
	Mauritania	AS+AQ	AL;AS+AQ	QN	–	–
	Mozambique	AL	AL	QN	SP(IPT)	–
	Namibia	AL	AL	QN	SP(IPT)	AL
	Niger	AL	AL	QN	SP(IPT)	–
	Nigeria	AL;AS+AQ	AL;AS+AQ	AM;AS;QN	SP(IPT)	–
	Rwanda	AL	AL	AM;QN	SP(IPT)	–
	Sao Tome and Principe	AS+AQ	AS+AQ	QN	SP(IPT)	–
	Senegal	AS+AQ	AL;AS+AQ	QN	SP(IPT)	–
	Sierra Leone	AS+AQ	AL;AS+AQ	AM;QN	SP(IPT)	–
	South Africa	-	AL;QN+CL;QN+D	QN	CQ+PG	AL+PQ;CQ+PQ
	Swaziland	-	AL	QN	CQ+PG	–
	Togo	AL;AS+AQ	AL;AS+AQ	QN	SP(IPT)	–
	Uganda	AL	AL	QN	SP(IPT)	–
	United Republic of Tanzania					
	Mainland	AL	AL	QN	SP(IPT)	–
	Zanzibar	AS+AQ	AS+AQ	QN	SP(IPT)	–
	Zambia	AL	AL	QN	SP(IPT)	–
	Zimbabwe	AL	AL	QN	SP(IPT)	–
Eastern Mediterranean	Afghanistan	CQ	AS+SP	AM;CL;QN	–	CQ+PQ(14d)
	Djibouti	AS+SP	AS+SP	QN	–	CQ+PQ(14d)
	Iran (Islamic Republic of)	-	AS+SP	AS;QN	–	CQ+PQ(14d)
	Pakistan	CQ	AS+SP	AM;AS;QN	–	CQ+PQ(14d)
	Saudi Arabia	-	AS+SP	AM;QN	–	CQ+PQ(14d)
	Somalia	AS+SP	AS+SP	QN	SP(IPT)	CQ+PQ(14d)
	South Sudan	AS+AQ	AS+AQ	AM;AS;QN	SP(IPT)	AS+AQ+PQ
	Sudan	AS+SP	AS+SP	AM;QN	SP(IPT)	AL
	Yemen	AS+SP	AS+SP	AM;QN	–	CQ+PQ(14d)

WHO Region	Country/area	*P. falciparum*				*P.vivax*
		Uncomplicated unconfirmed	Uncomplicated confirmed	Severe	Prevention during pregnancy	Treatment
European	Azerbaijan	AS+SP	AS+SP	AS;QN	–	CQ+PQ(14d)
	Kyrgyzstan	-	-	-	–	CQ+PQ(14d)
	Tajikistan	-	AL	QN	–	CQ+PQ(14d)
	Turkey	-	-	-	–	CQ+PQ(14d)
	Uzbekistan	-	-	-	–	CQ+PQ(14d)
Region of the Americas	Argentina	-	-		–	CQ+PQ
	Belize	-	CQ+PQ	-	–	CQ+PQ
	Bolivia (Plurinational State of)	-	AS+MQ	QN	–	CQ+PQ
	Brazil	-	AL;AS+MQ	AM;AS;QN	–	CQ+PQ
	Colombia	-	AS+MQ	QN	–	CQ+PQ
	Costa Rica	-	CQ+PQ	-	–	CQ+PQ
	Dominican Republic	CQ+PQ	CQ+PQ(3d)	CQ;QN	–	CQ+PQ
	Ecuador	-	AS+SP	QN	–	CQ+PQ
	El Salvador	-	CQ+PQ	-	–	CQ+PQ
	French Guiana, France	-	AL	-	–	CQ+PQ
	Guatemala	-	CQ+PQ	CQ	–	CQ+PQ
	Guyana	-	AL+PQ	-	–	CQ+PQ
	Haiti	-	CQ+PQ	-	–	–
	Honduras	-	CQ+PQ	QN	–	CQ+PQ
	Mexico	-	CQ+PQ	-	–	CQ+PQ
	Nicaragua	-	CQ+PQ	QN+CL	–	CQ+PQ
	Panama	-	SP	MQ	–	CQ+PQ
	Paraguay	-	AL	-	–	CQ+PQ
	Peru	-	AS+MQ	-	–	CQ+PQ
	Suriname	-	AL+PQ	AS	–	CQ+PQ
	Venezuela (Bolivarian Republic of)	-	AS+MQ+PQ	AM;QN	–	CQ+PQ
South-East Asia	Bangladesh	-	AL	AM;QN	–	CQ+PQ(14d)
	Bhutan	-	AL	AM;QN	–	CQ+PQ(14d)
	Democratic People's Republic of Korea	-	-	-	–	CQ+PQ(14d)
	India	AS+SP+PQ	AS+SP+PQ	AM;AS;QN	–	CQ+PQ(14d)
	Indonesia	-	AS-AQ/DHA-PP+PQ	AM;AS;QN	–	AS–AQ/DHA–PP+PQ(14d)
	Myanmar	-	AL;AM;AS+MQ;DHA-PPQ;PQ	AM;AS;QN	–	CQ+PQ(14d)
	Nepal	AL+PQ	AL+PQ	QN	–	CQ+PQ(14d)
	Sri Lanka	-	AL+PQ	QN	–	CQ+PQ(14d)
	Thailand	-	AS+MQ	AS;QN	–	CQ+PQ(14d)
	Timor-Leste	-	AL	AM;AS;QN	–	CQ+PQ(14d)
Western Pacific	Cambodia	-	AS+MQ;DHA-PPQ+PQ	AM;QN	–	DHA–PPQ
	China	-	ART+NQ;ART-PPQ;AS+AQ;DHA-PPQ	AM;AS;PYR	–	CQ+PQ(8d)
	Lao People's Democratic Republic	-	AL	AS+AL	SP(IPT)	CQ+PQ(14d)
	Malaysia	-	AS+MQ	QN+T	–	CQ+PQ(14d)
	Papua New Guinea	-	AL	AM;AS	SP(IPT)	AL+PQ
	Philippines	AL	AL+PQ	QN+T	SP(IPT)	CQ+PQ(14d)
	Republic of Korea	CQ	-	-	–	CQ+PQ(14d)
	Solomon Islands	AL	AL	AL;AS	CQ	AL+PQ(14d)
	Vanuatu	-	AL	QN	CQ(weekly)	AL+PQ(14d)
	Viet Nam	-	DHA-PPQ	AS;QN	CQ(weekly)	CQ+PQ(14d)

AL=Artemether-lumefantrine
AM=Artemether
AQ=Amodiaquine
ART=Artemisinin
AS=Artesunate
CL=Clindamycline
CQ=Chloroquine
D=Doxycycline
DHA=Dihydroartemisinin
MQ=Mefloquine
NQ=Naphroquine
PG=Proguanil
PPQ=Piperaquine
PQ=Primaquine
PYR=Pyronaridine
QN=Quinine
SP=Sulphadoxine-pyrimethamine
T=Tetracycline

Annex 3 – Funding for malaria control, 2009–2011

WHO Region	Country/area	Year	Contributions reported by donors				Contributions reported by countries								
			Global Fund[1]	PMI[2]/USAID	The World Bank[3]	DFID[3]	Government	Global Fund	The World Bank	PMI/USAID	Other bilaterals	WHO	UNICEF	Other contributions[5]	European Union
African	Algeria	2009	–	–	–	–	17 126 365	0	–	–	0	12 000	–	–	–
		2010	–	–	–	–	32 321 720	0	–	–	0	10 000	–	–	–
		2011	–	–	–	–	31 477 010	0	–	–	0	17 000	–	–	–
	Angola	2009	9 614 770	22 900 000	261 722	–	–	17 950 321	–	18 925 000	–	–	–	–	–
		2010	11 200 000	34 300 000	240 569	–	15 676 687 [4]	13 873 496	–	18 700 000	–	439 000	–	–	–
		2011	–	30 600 000	–	–	66 637 986 [4]	–	–	30 175 000	–	–	–	–	–
	Benin	2009	214 400	18 100 000	1 829 615	–	2 042 222	327 593	6 527 000	13 800 000	–	–	–	–	–
		2010	21 700 000	20 600 000	597 208	–	–	–	–	13 800 000	–	–	105 893	–	–
		2011	5 469 898	18 400 000	–	–	200 000 [4]	5 552 686	0	21 000 000	–	660 000	248 540	0	–
	Botswana	2009	–	–	–	–	876 647	–	–	–	–	–	–	–	–
		2010	–	–	–	–	709 607	–	–	–	–	–	–	–	–
		2011	–	–	–	–	2 250 933	–	–	–	1 171 250	–	–	–	–
	Burkina Faso	2009	14 800 000	6 000 000	4 170 093	–	554 094	67 991 119	5 073 238	0	33 879	108 966	75 895	–	–
		2010	43 800 000	5 997 000	1 880 016	–	4 508 617	1 458 620	0	4 210 524	64 530	16 940	1 816 055	0	–
		2011	10 500 000	4 491 000	–	–	6 482 938	2 546 429	0	2 072 216	34 903	99 027	140 253	0	–
	Burundi	2009	4 532 059	6 000 000	–	1 455 842	–	5 185 632	–	6 000 000	8 856 727	45 003	1 817 914	–	–
		2010	15 500 000	5 997 000	–	–	–	13 625 189	–	6 000 000	2 720 000	12 771	387 300	–	–
		2011	6 149 217	4 491 000	–	–	147 422 [4]	8 661 526	–	5 988 000	–	266 540	708 425	94 000	–
	Cameroon	2009	9 610 844	–	–	–	8 545 999 [4]	8 529 662	0	0	0	300 000	–	0	–
		2010	1 635 796	–	–	–	975 590 [4]	1 573 566	–	–	–	264 625	34 981	–	–
		2011	66 200 000	–	–	–	5 150 943 [4]	55 336 850	0	0	–	313 300	–	0	–
	Cape Verde	2009	–	–	–	–	451 098 [4]	0	0	0	–	74 327	178 043	–	–
		2010	–	–	–	–	707 795 [4]	–	–	–	–	–	–	–	–
		2011	–	–	–	–	604 871 [4]	–	–	–	–	–	–	–	–
	Central African Republic	2009	–	–	–	–	42 000	0	600 000	0	0	100 000	10 000	0	–
		2010	962 051	–	–	–	34 000	962 050	600 000	0	4 500 000	100 000	550 000	0	–
		2011	723 324	–	–	–	34 000 [4]	481 345	0	0	–	100 000	–	0	–
	Chad	2009	4 644 509	–	–	–	–	5 262 314	–	–	–	77 083	–	3 958	–
		2010	22 700 000	–	–	–	1 876 683	5 215 000	–	–	–	–	–	13 145	–
		2011	4 208 387	–	–	–	1 180 322 [4]	–	–	–	–	–	–	–	–
	Comoros	2009	232 885	–	–	–	24 158 [4]	290 612	–	–	–	104 000	11 656	–	–
		2010	4 256 900	–	–	–	–	4 610 020	0	0	–	104 000	–	–	–
		2011	1 053 404	–	–	–	114 215 [4]	773 425	0	0	–	137 000	–	0	–
	Congo	2010	11 900 000	–	–	–	–	–	–	–	–	–	–	–	–
		2011	1 262 613	–	–	–	–	–	–	–	–	–	–	–	–
	Côte d'Ivoire	2009	16 200 000	–	–	–	–	–	–	–	–	–	–	–	–
		2010	58 300 000	–	–	–	–	–	–	–	–	–	–	–	–
		2011	14 300 000	–	–	–	34 964 064 [4]	27 941 028	–	–	307 748	2 605 303	69 012	–	–
	Democratic Republic of the Congo	2009	70 900 000	16 200 000	10 900 000	–	2 000 000	4 071 980	11 101 283	15 580 000	–	86 895	5 365 009	–	–
		2010	44 300 000	22 200 000	11 800 000	–	296 443	23 044 824	10 262 916	15 580 000	596 182	–	2 271 712	–	–
		2011	2 106 190	34 700 000	–	–	296 443	33 775 293	58 805 836	18 000 000	36 765 988	–	2 389 964	–	–
	Equatorial Guinea	2009	3 445 774	–	–	–	–	4 756 207	–	–	–	–	–	6 787 000	–
		2010	5 371 664	–	–	–	–	–	–	–	–	–	–	–	–
		2011	2 599 520	–	–	–	–	3 425 062	–	–	8 047 523	–	–	–	–
	Eritrea	2009	206 600	–	349 947	–	–	3 312 520	0	0	0	–	105 000	0	–
		2010	21 400 000	–	165 641	–	–	19 155 845	0	0	0	0	0	0	–
		2011	4 908 106	–	–	–	–	10 722 859	0	0	0	0	0	0	–
	Ethiopia	2009	121 000 000	22 500 000	–	–	3 456 244	81 586 570	10 090 000	19 700 000	0	280 000	5 000 000	7 624 294	–
		2010	28 300 000	33 500 000	–	–	6 144 036	107 128 416	9 900 000	31 000 000	0	210 960	1 297 858	0	–
		2011	51 900 000	41 400 000	–	–	–	32 231 572	–	–	–	171 357	27 243	–	–
	Gabon	2009	3 891 808	–	–	–	–	–	–	–	–	–	–	–	–
		2010	871 083	–	–	–	1 400 769	–	–	–	45 000	–	–	–	–
	Gambia	2009	5 921 546	–	–	–	1 025 550 [4]	5 921 546	0	0	100 000	380 500	65 000	0	–
		2010	8 960 101	–	–	–	529 610	8 960 101	0	0	250 000	–	2 143	0	–
		2011	7 119 980	–	–	–	613 412	8 835 940	0	0	89 000	40 000	4 800	0	–
	Ghana	2009	27 000 000	21 500 000	708 817	–	6 214 286	18 363 180	1 283 389	17 300 000	0	290 000	939 300	300 000	–
		2010	30 600 000	33 000 000	655 112	15 600 000	6 533 333	30 649 705	0	34 000 000	0	150 000	101 053	98 733	–
		2011	–	30 400 000	–	–	6 663 582	53 169 328	400 000	34 000 000	250 000	300 000	2 000 000	16 100 000	–

WHO Region	Country/area	Year	Contributions reported by donors				Contributions reported by countries								
			Global Fund[1]	PMI[2]/USAID	The World Bank[3]	DFID[3]	Government	Global Fund	The World Bank	PMI/USAID	Other bilaterals	WHO	UNICEF	Other contributions[5]	European Union
African	Guinea	2009	–	–	–	–	154 564	3 914 541	1 181 250	–	–	109 000	819 553	2 375 040	–
		2010	12 400 000	2 495 000	–	–	3 948	0	0	0	0	51 500	–	0	–
		2011	–	9 985 000	–	–	–	–	–	–	–	49 500	–	–	–
	Guinea-Bissau	2009	1 644 833	–	–	–	8 000	1 279 343	0	0	0	100 000	486 579	0	–
		2010	6 965 345	–	–	–	203 464 [4]	6 809 770	0	0	0	100 000	425 541	0	–
		2011	2 922 931	–	–	–	155 929 [4]	1 070 641	0	0	99 750	68 000	7 238	0	–
	Kenya	2009	26 400 000	24 800 000	–	19 900 000	822 742 [4]	25 921 567	–	37 652 822	17 975 039	87 584	30 000	500 000	–
		2010	39 100 000	39 100 000	–	11 300 000	2 741 417 [4]	–	3 400 000	30 829 000	–	–	–	11 131 200	–
		2011	12 200 000	36 400 000	–	–	–	–	–	–	–	–	–	–	–
	Liberia	2009	345 575	13 400 000	–	–	–	990 100	–	61 375	50 000	5 786 287	226 743	–	–
		2010	8 229 609	16 800 000	–	–	–	8 118 208	–	12 000 000	–	–	–	–	–
		2011	5 198 534	13 000 000	–	–	–	16 400 946	–	12 000 000	–	19 675	304 750	–	–
	Madagascar	2009	12 100 000	21 400 000	–	–	19 000	25 329 554	0	12 753 000	0	100 532	1 103 644	0	–
		2010	54 500 000	33 100 000	–	–	110 504	22 463 047	0	25 200 000	578 000	418 861	523 000	0	–
		2011	18 400 000	28 300 000	–	–	90 900	41 763 464	0	28 742 000	0	153 000	546 283	0	–
	Malawi	2009	3 721 540	20 800 000	–	–	4 482 759 [4]	–	–	18 000 000	–	50 000	50 000	–	–
		2010	5 492 126	27 900 000	–	–	8 453 947	5 492 126	–	27 000 000	–	70 000	50 000	–	–
		2011	45 000 000	25 700 000	–	–	–	–	–	–	–	–	–	–	–
	Mali	2009	–	21 300 000	–	–	–	5 214 224	–	8 932 000	965 774	292 000	–	3 116 725	–
		2010	4 330 851	31 600 000	–	–	–	7 120 975	847 617	11 184 211	291 162	50 535	1 575 926	894 577	–
		2011	–	27 000 000	–	–	2 737 186 [4]	2 858 296	0	4 737 692	–	92 000	0	319 404	–
	Mauritania	2009	541 854	–	–	–	–	–	–	–	–	–	–	–	–
		2010	500 223	–	–	–	33 941	350 000	0	0	0	1 000	25 000	1 000 000	–
		2011	–	–	–	–	11 000 000	0	0	0	–	–	–	0	–
	Mozambique	2009	520 865	38 800 000	–	2 573 946	–	–	–	–	–	–	–	–	–
		2010	23 000 000	39 100 000	46 600	1 378 107	–	–	–	–	–	–	–	–	–
		2011	7 683 006	29 400 000	–	–	–	–	–	–	–	–	–	–	–
	Namibia	2009	3 797 710	–	–	–	2 411 088	2 267 472	–	–	–	–	–	–	–
		2010	1 165 287	–	–	–	2 731 460	1 362 347	–	–	–	–	–	–	–
		2011	1 298 393	–	–	–	4 466 719	589 694	–	–	–	–	–	–	–
	Niger	2009	17 500 000	–	843 430	–	900 000 [4]	28 057 121	1 521 676	0	194 428	15 000	840 196	–	–
		2010	2 964 287	–	1 047 934	–	700 000 [4]	1 912 819	1 519 122	0	556 900	4 500	2 082 527	4 672	–
		2011	3 300 846	–	–	–	400 000 [4]	–	–	–	–	4 500	–	–	–
	Nigeria	2009	224 000 000	17 400 000	67 900 000	9 768 276	200 000	42 019 322	17 500 000	16 000 000	18 210 725	306 321	37 247 310	10 229 555	–
		2010	1 056 110	25 400 000	30 900 000	18 200 000	6 493 506	61 357 535	–	18 000 000	–	–	20 750 000	17 678 415	–
		2011	29 900 000	43 500 000	–	–	2 493 181	73 332 766	–	43 000	–	–	–	–	–
	Rwanda	2009	42 500 000	16 700 000	–	–	–	40 117 815	–	–	–	0	–	–	–
		2010	20 500 000	18 200 000	–	–	318 991	8 710 956	–	–	117 807	45 000	–	–	–
		2011	17 000 000	18 700 000	–	–	793 995	17 011 613	–	18 250 000	–	53 761	120 000	–	–
	Sao Tome and Principe	2009	75 857	–	17 716	–	303 802	1 699 172	126 000	0	1 717	59 965	5 000	1 000 000	–
		2010	1 060 100	–	4 030	–	74 583	782 254	350 000	0	30 315	38 163	3 000	1 172 611	–
		2011	1 571 589	–	–	–	52 941	1 521 822	0	0	0	54 428	3 000	0	–
	Senegal	2009	14 300 000	18 700 000	–	–	449 813	11 436 555	–	14 512 634	6 793 567	288 302	–	–	–
		2010	2 507 790	26 400 000	–	–	155 764	2 531 265	–	17 329 326	–	97 987	–	–	–
		2011	1 118 536	24 500 000	–	–	–	9 620 506	–	–	–	–	–	–	–
	Sierra Leone	2009	2 794 509	–	–	–	198 586 [4]	4 884 763	–	–	–	26 413	19 673	–	–
		2010	799 743	–	–	7 528 957	1 198 629 [4]	5 241 344	–	–	–	137 255	165 625	–	–
		2011	13 800 000	–	–	–	404 235 [4]	10 669 010	–	–	10 478	43 261	286 406	–	–
	South Africa	2009	–	–	–	–	27 142 857 [4]	–	–	–	–	100 000	–	50 000	–
		2010	–	–	–	–	25 064 907	–	–	–	–	0	–	–	–
		2011	–	–	–	–	13 162 365	–	–	–	8 571 428	–	–	–	–
	Swaziland	2009	2 607 294	–	–	–	–	–	0	0	0	0	0	0	–
		2010	1 377 144	–	–	–	964 009	2 197 637	0	0	0	0	0	0	–
		2011	–	–	–	–	1 002 947	1 924 448	0	0	0	0	0	0	–
	Togo	2009	4 525 903	–	–	–	–	592 434	14 197 371	0	954 226	3 261	92 523	92 378	–
		2010	8 447 243	–	–	–	77 778 [4]	3 565 262	–	–	2 688	1 489	–	–	–
		2011	21 000 000	–	–	–	–	–	–	–	14 090	23 832	8 674	–	–

Annex 3 – Funding, 2000–2011 (continued)

WHO Region	Country/area	Year	Contributions reported by donors				Contributions reported by countries								
			Global Fund[1]	PMI[2]/USAID	The World Bank[3]	DFID[3]	Government	Global Fund	The World Bank	PMI/USAID	Other bilaterals	WHO	UNICEF	Other contributions[5]	European Union
African	Uganda	2009	41 000 000	34 000 000	–	407 279	–	–	–	21 600 000	–	–	–	–	–
		2010	31 100 000	39 400 000	–	–	–	155 963 673	–	35 000 000	–	–	–	–	–
		2011	9 465 369	34 600 000	–	–	–	56 141 986	–	34 366 813	40 000	317 816	2 545 396	–	–
	United Republic of Tanzania[6]	2009	–	59 900 000	–	1 249 609	616 085 000	46 300 000	25 000 000	34 000 000	1 000 000	50 000 000	–	–	–
		2010	–	57 600 000	–	2 333 036	–	–	–	–	–	–	–	–	–
		2011	–	47 400 000	–	–	–	–	–	–	–	–	–	–	–
	Mainland	2009	58 600 000	–	–	–	340 000 000 [4]	46 300 000	25 000 000	34 000 000	1 000 000	50 000 000	–	–	–
		2010	50 400 000	–	–	–	21 830 362	105 217 601	–	52 000 000	43 401 000	300 000	139 313	–	–
		2011	42 500 000	–	–	–	260 823	17 701 499	0	75 000	–	70 000	0	–	–
	Zanzibar	2009	1 397 265	–	–	–	29 333	2 401 665	0	2 937 375	0	30 000	198 000	21 564	–
		2010	1 530 146	–	–	–	29 267	1 311 590	0	3 133 000	0	67 743	221 000	19 372	–
		2011	1 363 902	–	–	–	–	–	–	–	–	–	–	–	–
	Zambia	2009	8 510 296	17 400 000	255 409	–	848 745	986 834	5 000 000	14 700 000	–	398 000	212 570	–	–
		2010	2 445 409	25 200 000	338 407	8 602 317	414 580	12 335 725	0	25 600 000	–	380 000	100 000	7 200 000	–
		2011	8 005 486	24 400 000	–	–	279 788	5 282 152	29 401 235	24 000 000	–	130 000	75 000	7 215 019	–
	Zimbabwe	2009	35 400 000	750 000	–	383 755	1 650 000	2 800 000	–	0	500 000	–	–	–	–
		2010	18 500 000	2 994 250	–	–	1 000 000	24 000 000	0	1 000 000	0	79 000	25 000	0	–
		2011	25 800 000	12 500 000	–	–	1 200 000	10 063 628	–	12 000 000	0	0	18 250	–	–
Region of the Americas	Argentina	2010	–	–	–	–	1 082 700 [4]	–	–	–	–	–	–	–	–
		2011	–	–	–	–	1 082 700 [4]	–	–	–	–	–	–	–	–
	Belize	2009	–	–	–	–	148 621 [4]	0	0	0	0	–	0	0	–
		2010	–	–	–	–	169 184 [4]	0	0	32 000	0	–	0	0	–
		2011	–	–	–	–	215 224 [4]	0	0	–	0	–	0	0	–
	Bolivia (Plurinational State of)	2009	2 116 856	–	–	–	1 699 130	550 000	0	200 000	0	0	25 000	0	–
		2010	1 773 184	–	–	–	1 700 145	2 482 576	0	200 000	0	0	50 000	0	–
		2011	1 525 890	–	–	–	1 110 097	1 400 635	0	177 000	0	0	0	0	–
	Brazil	2009	4 858 206	–	–	–	106 000 000 [4]	4 884 938	0	65 000	0	0	0	0	–
		2010	5 509 723	–	–	–	106 000 000 [4]	10 361 470	0	227 000	0	0	0	0	–
		2011	7 641 225	–	–	–	106 000 000 [4]	17 851 837	0	30 000	0	0	0	0	–
	Colombia	2009	–	–	–	–	20 500 000 [4]	1 000 000	0	120 000	0	–	0	0	0
		2010	10 800 000	–	–	–	21 788 036 [4]	9 175 784	0	120 000	0	–	0	0	0
		2011	4 615 661	–	–	–	20 157 754 [4]	5 347 470	0	120 000	0	0	0	0	–
	Costa Rica	2009	–	–	–	–	6 240 000 [4]	0	0	0	0	0	0	0	–
		2010	–	–	–	–	4 845 000 [4]	0	0	0	0	0	0	0	–
		2011	–	–	–	–	5 270 000 [4]	0	0	0	0	0	0	0	–
	Dominican Republic	2009	1 396 348	–	–	–	208 995	185 772	0	0	14 503	58 538	0	0	–
		2010	1 207 483	–	–	–	217 761	2 126 483	0	0	150 031	0	0	0	–
		2011	1 423 587	–	–	–	1 615 387	1 823 682	0	0	46 155	0	0	0	–
	Ecuador	2009	–	–	–	–	2 428 604	400 000	0	–	0	80 000	0	0	–
		2010	2 701 041	–	–	–	2 290 771	531 945	–	–	–	–	–	–	–
		2011	1 939 571	–	–	–	2 375 335	327 863	0	0	0	0	0	0	–
	El Salvador	2009	–	–	–	–	3 057 500	0	0	–	0	0	0	–	–
		2010	–	–	–	–	0 [4]	–	–	–	–	–	–	–	–
		2011	–	–	–	–	3 513 000	0	0	0	0	–	0	0	–
	Guatemala	2009	1 343 648	–	–	–	–	0	0	0	0	0	0	0	–
		2010	–498 947*	–	–	–	–	0	0	0	0	0	0	0	–
		2011	8 917 396	–	–	–	10 558 243	3 596 431	0	0	25 000	0	0	0	–
	Guyana	2009	1 329 110	–	–	–	341 775	–	0	140 000	34 000	10 000	0	0	–
		2010	573 070	–	–	–	661 500	–	0	110 000	10 000	10 000	0	0	–
		2011	612 352	–	–	–	62 840	–	–	120 000	4 000	14 000	–	–	–
	Haiti	2009	1 000 764	–	–	–	–	–	–	–	–	–	–	–	–
		2010	–756 968*	–	–	–	–	–	–	–	–	–	–	–	–
		2011	18 400 000	–	–	–	–	–	–	–	–	–	–	–	–
	Honduras	2009	956 414	–	–	–	1 517 409	1 100 908	0	55 000	0	22 522	0	0	–
		2010	1 425 920	–	–	–	1 517 409	1 158 468	0	90 964	0	29 670	0	0	–
		2011	572 711	–	–	–	1 517 409	825 517	0	80 278	0	11 856	0	0	–

WHO Region	Country/area	Year	Contributions reported by donors				Contributions reported by countries								
			Global Fund[1]	PMI[2]/USAID	The World Bank[3]	DFID[3]	Government	Global Fund	The World Bank	PMI/USAID	Other bilaterals	WHO	UNICEF	Other contributions[5]	European Union
Region of the Americas	Mexico	2009	–	–	–	–	22 875 348	0	0	0	0	0	0	0	–
		2010	–	–	–	–	23 140 145	0	0	0	0	0	0	0	–
		2011	–	–	–	–	23 741 789	0	0	0	0	0	0	0	–
	Nicaragua	2009	2 505 734	–	–	–	–	2 015 344	–	–	–	–	16 173	–	–
		2010	2 086 863	–	–	–	–	731 600	0	0	–	35 000	–	0	–
		2011	2 331 302	–	–	–	9 150 000 [4]	2 032 089	–	–	–	–	–	–	–
	Panama	2009	–	–	–	–	1 459 724	0	0	0	0	0	0	0	–
		2010	–	–	–	–	2 152 435	0	0	0	0	36 640	0	0	–
		2011	–	–	–	–	3 798 322 [4]	–	–	–	–	–	–	–	–
	Paraguay	2009	–	–	–	–	4 263 661	0	–	–	–	10 000	–	–	–
		2010	–	–	–	–	3 245 670	0	0	0	0	13 000	0	0	–
		2011	–	–	–	–	1 813 409	–	–	–	–	–	–	–	–
	Suriname	2009	1 736 185	–	–	–	–	–	–	–	–	–	–	–	–
		2010	835 305	–	–	–	–	–	–	–	–	–	–	–	–
		2011	710 949	–	–	–	–	–	–	–	–	–	–	–	–
	Venezuela (Bolivarian Republic of)	2009	–	–	–	–	8 700 000 [4]	18 363 180	1 283 389	17 300 000	0	290 000	939 300	300 000	–
		2010	–	–	–	–	12 089 014 [4]	0	0	0	104 109	0	0	0	–
		2011	–	–	–	–	1 938 592 [4]	–	–	–	–	–	–	–	–
Eastern Mediterranean	Afghanistan	2009	20 900 000	–	2 851 587	–	–	6 372 330	–	–	–	1 186 740	–	–	–
		2010	3 105 472	–	1 507 012	–	–	7 928 628	–	415 335	22 813	414 619	–	–	–
		2011	1 161 128	–	–	–	–	7 535 557	–	802 371	65 236	30 000	–	–	–
	Djibouti	2009	148 961	–	–95*	–	79 442 [4]	–	–	–	–	–	–	–	–
		2010	146 471	–	–	–	84 745 [4]	206 939	26 810	0	0	2 040	2 824	0	–
		2011	112 748	–	–	–	84 745 [4]	206 939	420 117	–	–	–	–	–	–
	Iran (Islamic Republic of)	2009	374 798	–	–	–	8 000 000	3 372 294	–	–	–	25 000	–	–	–
		2010	2 226 429	–	–	–	9 690 000	2 326 659	–	–	–	13 000	–	–	–
		2011	2 350 551	–	–	–	12 500 000	1 474 935	–	–	–	12 000	–	–	–
	Pakistan	2009	6 873 870	1 250 000	–	–	500 000	4 500 000	–	–	–	215 947	–	–	–
		2010	3 390 454	3 750 000	–	–	–	–	–	500 000	–	500 000	500 000	400 000	–
		2011	1 185 971	–	–	–	–	4 496 398	–	–	–	500 000	–	481 000	–
	Saudi Arabia	2009	–	–	–	–	28 850 000	0	–	–	0	31 000	–	–	–
		2010	–	–	–	–	28 000 000	0	–	–	2 500 000	36 000	–	–	–
		2011	–	–	–	–	26 357 710	0	–	–	–	99 000	–	–	–
	Somalia	2009	1 959 263	–	–	1 157 623	–	6 863 696	–	–	81 127	101 650	–	–	–
		2010	5 223 275	–	–	–	–	8 436 831	–	–	–	65 000	–	–	–
		2011	2 594 870	–	–	–	–	–	–	–	–	82 000	–	–	–
	South Sudan[7]	2009	13 400 000	1 125 000	–	–	–	17 395 819	–	–	–	350 000	–	–	–
		2010	7 790 017	4 497 750	–	–	–	16 117 077	–	–	–	400 000	–	–	–
		2011	21 800 000	3 368 250	–	–	530 000 [4]	15 361 962	–	3 000 000	–	750 000	–	1 300 000	–
	Sudan[7]	2009	17 100 000	2 685 000	–	1 548 016	10 993 899	15 869 166	0	0	0	0	13 983 001	8 126 137	–
		2010	18 900 000	–	–	253 713	12 810 941	15 829 743	0	0	0	0	1 259 562	789 400	–
		2011	14 900 000	–	–	–	26 724 830	19 418 808	0	0	363 495	114 575	553 635	1 041 351	–
	Yemen	2009	2 421 277	–	452 767	–	1 806 742	4 401 240	0	0	1 199 999	475 000	0	126 000	–
		2010	4 301 028	–	32 100	–	1 594 698	3 482 712	0	0	4 564 902	474 037	0	446 159	–
		2011	–	–	–	–	1 012 076	880 150	–	–	9 084 589	240 000	–	80 000	–
European	Azerbaijan	2009	1 786 084	–	–	–	1 971 844	1 423 641	–	–	0	35 000	0	0	–
		2010	887 980	–	–	–	3 842 152	1 692 999	–	–	0	35 000	–	–	–
		2011	280 163	–	–	–	3 738 835	610 905	–	–	0	35 000	–	–	–
	Kyrgyzstan	2009	172 070	–	–	–	70 000	546 245	–	–	0	0	–	0	–
		2010	1 166 939	–	–	–	70 000	1 394 485	–	–	0	0	–	–	–
		2011	1 016 966	–	–	–	70 000	1 114 124	–	–	0	0	–	–	–
	Tajikistan	2009	3 905 035	–	–	–	363 439 [4]	1 332 959	–	–	0	13 000	–	–	–
		2010	1 819 594	–	–	–	393 734 [4]	3 353 900	–	–	0	13 000	–	–	–
		2011	3 305 782	–	–	–	412 825 [4]	3 403 673	–	–	0	15 000	–	–	–
	Turkey	2009	–	–	–	–	44 200 000	0	–	–	0	0	–	0	–
		2010	–	–	–	–	33 486 133	0	–	–	0	0	–	–	–
		2011	–	–	–	–	21 821 901	0	–	–	0	0	–	–	–
	Uzbekistan	2009	984 904	–	–	–	126 249	450 070	–	–	0	7 892	–	0	–
		2010	–	–	–	–	507 457	538 393	–	–	0	0	–	–	–
		2011	220 785	–	–	–	1 529 810	583 446	–	–	0	0	–	–	–

Annex 3 – Funding, 2000–2011 (continued)

WHO Region	Country/area	Year	Contributions reported by donors				Contributions reported by countries								
			Global Fund[1]	PMI[2]/USAID	The World Bank[3]	DFID[3]	Government	Global Fund	The World Bank	PMI/USAID	Other bilaterals	WHO	UNICEF	Other contributions[5]	European Union
South-East Asia	Bangladesh	2009	3 521 417	–	–	–	642 129 [4]	7 769 852	887 995	–	–	230 000	–	–	–
		2010	10 300 000	–	–	–	1 094 385 [4]	5 369 344	–	–	–	135 790	–	–	–
		2011	8 873 006	–	–	–	8 686 483 [4]	8 890 744	–	–	–	118 000	–	–	–
	Bhutan	2009	726 894	–	–	–	172 826	1 163 706	0	0	173 913	17 192	0	0	–
		2010	478 376	–	–	–	211 189	1 315 911	0	0	188 222	23 622	0	0	–
		2011	260 267	–	–	–	222 222	–	–	–	22 600	22 600	–	–	–
	Democratic People's Republic of Korea	2009	–	–	–	–	1 200 000	0	–	–	0	1 300 000	–	1 200 000	–
		2010	7 942 321	–	–	–	1 800 000	8 913 265	–	–	–	42 467	–	–	–
		2011	4 756 310	–	–	–	1 875 000	2 500 899	–	–	0	23 000	–	–	–
	India	2009	–	–	1 503 849	–	60 222 222	9 184 373	9 480 000	–	–	–	–	–	–
		2010	8 519 368	–	17 000 000	–	91 551 356	13 179 273	10 265 300	–	–	–	–	–	–
		2011	3 260 689	–	–	–	99 525 920	6 496 121	30 898 403	–	–	–	–	–	–
	Indonesia	2009	34 300 000	–	–	–	5 594 019	17 661 982	0	0	–	103 000	3 300 000	0	–
		2010	36 700 000	–	–	–	5 787 267	31 659 696	0	0	26 311	200 000	2 027 122	0	–
		2011	18 800 000	–	–	–	–	40 573 846	0	0	–	222 222	3 111 111	0	–
	Myanmar	2009	–122 330*	–	–	–	375 000	–	–	–	2 000 000	300 000	1 607 882	3 815 436	–
		2010	13 200 000	–	–	–	2 250 000	–	–	–	2 294 000	300 000	1 300 000	–	–
		2011	–	–	–	–	1 259 002	5 900 000	–	–	–	–	–	–	–
	Nepal	2009	573 709	–	–	–	907 671	1 305 661	0	0	0	88 000	0	742 500	–
		2010	9 912 218	–	–	–	869 401	2 765 680	0	0	0	46 500	0	0	–
		2011	–	–	–	–	192 361	1 907 500	0	0	0	46 500	0	3 559 305	–
	Sri Lanka	2009	6 593 558	–	–	–	1 201 268	522 431	–	–	–	–	–	–	–
		2010	5 570 521	–	–	–	1 045 455	1 117 464	–	–	–	24 321	–	–	–
		2011	4 384 546	–	–	–	1 800 000	5 316 488	–	–	–	18 000	–	–	–
	Thailand	2009	5 718 652	–	–	–	509 557	5 087 163	–	–	–	58 118	–	2 061 759	–
		2010	2 967 189	–	–	–	439 376	3 279 977	–	–	–	73 824	–	–	–
		2011	13 800 000	–	–	–	15 252 969	3 002 074	–	77 541	–	61 408	–	566 115	–
	Timor-Leste	2009	3 006 874	–	–	–	46 572	4 698 114	0	0	0	145 000	0	0	–
		2010	2 688 525	–	–	–	1 858 476	2 367 459	0	0	0	12 500	239 928	526 500	–
		2011	774 076	–	–	–	2 278 680	3 902 662	0	0	0	41 920	0	0	–
Western Pacific	Cambodia	2009	11 300 000	–	–	–	1 019 923	5 534 038	0	1 000 000	0	650 000	0	0	–
		2010	35 400 000	–	–	–	1 355 728	7 157 939	0	0	0	1 446 616	0	0	–
		2011	15 300 000	–	–	–	3 127 120	39 422 203	0	0	0	380 347	0	60 000	–
	China	2009	12 800 000	–	–	–	–	9 901 385	–	–	–	–	–	–	–
		2010	51 300 000	–	–	–	–	50 874 137	–	–	–	–	–	–	–
		2011	4 782 175	–	–	–	–	24 430 525	–	–	–	–	–	–	–
	Lao People's Democratic Republic	2009	5 252 504	–	763 133	–	–	6 424 803	0	0	0	21 300	0	0	–
		2010	2 637 721	–	610 838	–	97 690 [4]	815 252	0	0	0	45 925	0	0	–
		2011	7 010 161	–	–	–	470 764	4 326 267	0	0	–	46 000	0	0	–
	Malaysia	2009	–	–	–	–	23 823 040	0	–	–	0	0	–	0	–
		2010	–	–	–	–	24 826 273	0	–	–	0	0	–	–	–
		2011	–	–	–	–	37 844 710	0	–	–	0	0	–	–	–
	Papua New Guinea	2009	26 400 000	–	–	–	156 [4]	4 417 383	–	–	–	2 179	–	–	–
		2010	2 535 493	–	–	–	142 766	1 028 735	–	–	–	321 338	–	3 260 803	–
		2011	10 600 000	–	–	–	311 000 [4]	23 842 245	0	0	0	200 000	0	8 968 127	–
	Philippines	2009	5 636 133	–	–	–	3 439 132	31 400 000	0	0	75 000	300 000	0	516 000	–
		2010	18 800 000	–	–	–	3 930 233 [4]	21 758 417	0	0	75 000	–	0	769 000	–
		2011	1 665 107	–	–	–	3 969 519 [4]	12 322 318	0	0	75 000	–	0	2 501 000	–
	Republic of Korea	2009	–	–	–	–	798 000	4 000 000	–	–	–	1 096 000	–	–	–
		2010	–	–	–	–	729 091	3 911 600	–	–	–	–	–	–	–
		2011	–	–	–	–	785 000	2 000 000	–	–	–	1 092 172	–	–	–
	Solomon Islands	2009	–	–	–3 380*	–	276 195	628 188	0	0	0	216 674	0	750 189	–
		2010	–	–	–	–	1 531 001	1 409 315	0	0	0	225 000	0	753 085	–
		2011	–	–	–	–	840 284	1 537 685	0	0	0	697 890	0	6 229 231	–
	Vanuatu	2009	–	–	–	–	754 651	1 581 816	0	0	0	287 615	0	1 282 500	–
		2010	–	–	–	–	812 377	683 607	0	0	0	287 615	0	1 432 500	–
		2011	–	–	–	–	943 619	2 052 359	0	0	0	287 615	0	2 050 753	–
	Viet Nam	2008	8 395 846	–	774 443	–	4 599 534	2 760 895	0	0	–	70 000	0	0	–

[1] Source: The Global Fund website (malaria specific grants)
[2] Source: USAID internal database, The President's Malaria Initiative, Fifth Annual Report to Congress, April 2011; Sixth Annual Report to Congress, April 2012
[3] Source: OECD Database
[4] Budget not expenditure
[5] Other Contributions as reported by countries: NGOs, foundations, etc.
[6] Where national totals for the United Republic of Tanzania are unavailable, refer to the sum of Mainland and Zanzibar.
[7] South Sudan became a separate State on 10 July 2011 and a Member State of WHO on 27 September 2011. South Sudan and Sudan have distinct epidemiological profiles comprising high transmission and low transmission areas respectively. For this reason data up to June 2011 from the high transmission areas of Sudan (10 southern states which correspond to South Sudan) and low transmission areas (15 northern states which correspond to contemporary Sudan) are reported separately
* Negative disbursements reflect recovery of funds on behalf of the financing organization

Annex 4 – Intervention coverage estimated from routinely collected data, 2009-2011

WHO Region	Country/area	Year	No. of ITNs + LLINs sold or delivered	No. of LLINs sold or delivered	No. of ITNs sold or delivered	% of population potentially protected by ITNs delivered	Modelled % of households ≥1 ITN	No. of people protected by IRS	% IRS coverage	Any 1st-line treatment courses delivered (including ACT)	ACT treatment courses delivered	% Any antimalarial coverage[1]	% ACT coverage[2]
African	Algeria	2009	–	0	0	–	–	0	0	94	94	100	69
		2010	0	–	–	–	–	0	0	408	408	100	66
		2011	–	0	–	–	–	0	0	191	191	100	69
	Angola	2009	936 762	936 762	0	38	13	485 974	3	3 878 910	3 878 910	75	75
		2010	1 678 365	1 678 365	0	39	19	650 782	3	3 119 744	3 119 744	60	60
		2011	1 720 738	1 720 738	0	40	35	689 638	4	3 898 070	3 898 070	73	73
	Benin	2009	876 000	–	–	52	55	512 491	6	4 328 504	2 691 254	100	80
		2010	900 000	900 000	–	21	47	636 448	7	–	–	–	–
		2011	5 135 942	5 135 942	0	100	47	426 232	5	1 911 338	1 911 338	51	51
	Botswana	2009	33 760	33 760	–	10	29	236 078	18	40 867	40 867	100	100
		2010	84 000	84 000	–	21	30	250 961	19	27 593	27 593	100	100
		2011	12 000	12 000	–	18	34	207 991	16	10 149	10 149	100	100
	Burkina Faso	2009	1 103 049	1 103 049	0	21	37	0	0	3 947 012	3 947 012	56	56
		2010	6 892 018	6 892 018	0	95	54	113 163	1	7 989 808	7 989 808	100	100
		2011	774 344	774 344	0	93	53	116 708	1	5 918 783	5 703 335	89	85
	Burundi	2009	1 879 386	1 879 386	0	100	55	3 822	0	1 887 914	1 887 914	100	100
		2010	1 178 843	1 178 843	0	100	63	255 474	4	4 258 605	3 435 597	100	100
		2011	2 869 433	2 869 433	0	100	73	224 496	3	2 343 078	1 791 325	100	100
	Cameroon	2009	640 626	–	210 020	12	38	0	0	1 299 240	1 299 240	23	23
		2010	331 193	187 000	144 193	9	34	0	0	803 231	803 231	14	14
		2011	8 115 879	8 115 879	–	75	61	0	0	1 234 405	1 234 405	21	21
	Cape Verde	2009	–	–	–	–	14	–	–	64	60	64	60
		2010	0	0	0	–	16	175 060	100	4 835	3 492	100	100
		2011	0	0	0	–	19	282 265	100	–	–	–	–
	Central African Republic	2009	100 000	–	–	60	18	–	–	868 407	843 540	39	37
		2010	948 274	948 274	0	73	15	–	–	–	–	–	–
		2011	–	0	0	38	17	–	–	–	–	–	–
	Chad	2009	60 500	–	0	1	19	–	–	–	–	–	–
		2010	353 495	353 495	0	6	39	–	–	309 927	447 000	41	59
		2011	3 495 086	3 495 086	0	61	47	–	–	122 879	122 879	16	16
	Comoros	2009	61 000	–	–	20	24	–	–	170 670	170 670	80	79
		2010	259 558	259 558	–	68	26	0	0	171 090	171 090	80	78
		2011	9 896	9 896	0	64	29	31 922	4	117 620	117 620	54	53
	Congo	2009	–	–	–	–	8	–	–	–	–	–	–
		2010	–	–	–	–	9	–	–	–	–	–	–
		2011	–	–	–	–	10	–	–	–	–	–	–
	Côte d'Ivoire	2009	936 920	936 920	–	19	29	–	–	–	–	–	–
		2010	148 804	148 804	–	20	54	–	–	1 721 461	1 721 461	26	26
		2011	8 135 784	8 135 784	–	82	61	–	–	2 349 795	2 349 795	35	35
	Democratic Republic of the Congo	2009	7 853 284	7 853 284	0	43	52	94 160	0	9 208 416	9 208 416	85	85
		2010	2 275 207	2 275 207	0	43	52	98 118	0	10 315 190	10 315 190	93	93
		2011	12 033 092	12 033 092	–	59	54	96 836	0	14 379 445	14 379 445	100	100
	Equatorial Guinea	2009	11 806	–	–	65	48	393 122	58	88 989	70 057	30	24
		2010	–	–	–	18	34	–	–	150 199	49 233	44	14
		2011	2 798	2 798	–	1	56	–	–	27 319	27 319	8	8
	Eritrea	2009	669 414	270 233	399 181	20	57	124 005	2	150 000	150 000	100	74
		2010	421 916	102 918	318 998	17	53	177 762	3	285 253	285 253	93	66
		2011	1 110 284	992 779	117 505	45	73	274 143	5	–	–	–	–
	Ethiopia	2009	1 875 681	1 875 681	0	41	92	28 373 630	52	9 561 391	8 387 321	100	100
		2010	13 798 161	13 798 161	0	62	78	27 029 473	49	9 205 141	9 205 141	100	100
		2011	4 279 165	4 279 165	0	63	90	20 865 542	37	5 058 582	5 058 582	100	95
	Gabon	2009	0	0	0	1	63	–	–	2 212 759	–	100	–
		2010	0	–	0	0	44	–	–	374 573	368 175	77	57
		2011	–	–	–	–	54	–	–	–	–	–	–
	Gambia	2009	173 778	160 537	13 241	57	48	816 253	49	1 848 230	924 115	100	95
		2010	0	0	0	47	57	387 274	22	427 903	427 903	44	44
		2011	734 063	734 063	0	91	45	747 485	42	549 830	549 830	55	55
	Ghana	2009	494 523	250 000	244 523	24	46	708 103	3	4 048 655	4 048 655	51	51
		2010	1 016 900	1 016 900	0	15	44	849 620	3	5 600 000	5 600 000	69	69
		2011	4 151 906	4 151 906	0	39	38	926 699	4	14 493 253	14 493 253	100	100
	Guinea	2009	3 289 030	–	264 571	66	10	37 048	0	2 231 777	2 231 777	60	60
		2010	73 862	73 862	0	6	10	35 333	0	851 811	851 811	23	23
		2011	48 942	48 942	0	2	11	0	0	924 025	924 025	24	24
	Guinea-Bissau	2009	92 975	–	–	32	59	–	–	241 388	241 388	34	34
		2010	269 443	68 108	201 335	18	64	–	–	–	–	–	–
		2011	170 442	170 442	0	28	58	–	–	–	–	–	–
	Kenya	2009	3 276 173	2 740 673	535 500	41	62	1 470 865	5	–	–	–	–
		2010	1 176 280	1 176 280	–	37	63	1 487 083	5	18 550 714	18 550 714	100	100
		2011	9 058 461	9 058 461	0	74	66	1 832 090	6	–	–	–	–
	Liberia	2009	761 000	761 000	0	36	41	160 000	4	–	–	–	–
		2010	883 400	883 400	0	74	44	420 532	11	–	–	–	–
		2011	830 000	830 000	–	100	44	834 671	20	6 059 525	4 581 525	100	100
	Madagascar	2009	1 948 405	1 948 405	0	50	48	7 149 221	36	398 413	398 413	22	22
		2010	4 986 868	4 986 868	0	68	63	9 805 575	47	422 536	422 536	25	25
		2011	510 275	510 275	0	63	80	10 012 822	47	256 452	256 452	14	14
	Malawi	2009	3 957 000	957 000	3 000 000	28	31	288 960	2	9 942 240	–	100	–
		2010	1 529 665	1 529 665	0	42	52	2 036 430	14	7 342 770	7 202 531	100	100
		2011	1 017 405	1 037 395	0	41	53	321 919	2	7 199 048	7 202 531	100	100
	Mali	2009	1 549 800	–	0	42	84	386 074	3	441 589	441 589	10	10
		2010	1 020 074	1 020 074	0	34	77	440 815	3	294 984	294 984	6	6
		2011	4 173 156	4 173 156	0	59	65	697 512	4	1 719 974	1 719 974	35	35

WHO Region	Country/area	Year	No. of ITNs + LLINs sold or delivered	No. of LLINs sold or delivered	No. of ITNs sold or delivered	% of population potentially protected by ITNs delivered	Modelled % of households ≥1 ITN	No. of people protected by IRS	% IRS coverage	Any 1st-line treatment courses delivered (including ACT)	ACT treatment courses delivered	% Any antimalarial coverage[1]	% ACT coverage[2]
African	Mauritania	2009	200 455	–	–	14	11	–	–	49 714	49 714	6	6
		2010	872 268	872 268	0	53	13	–	–	126 162	126 162	14	14
		2011	139 690	139 690	0	57	17	–	–	64 078	64 078	7	7
	Mozambique	2009	1 292 159	1 292 159	–	39	35	8 479 828	37	213 661	–	1	–
		2010	1 525 979	1 525 979	–	38	38	7 513 172	32	7 671 350	7 671 350	53	53
		2011	3 244 164	3 244 164	–	46	38	8 532 525	36	9 391 810	9 391 810	64	64
	Namibia	2009	92 000	92 000	0	48	75	487 372	30	78 625	78 625	78	78
		2010	87 900	87 900	0	54	80	566 419	34	87 520	87 520	100	100
		2011	87 900	87 900	0	29	74	599 939	36	110 031	110 031	100	100
	Niger	2009	2 612 516	–	–	40	63	0	0	1 990 366	1 510 247	45	34
		2010	2 530 809	1 747 037	783 772	33	74	0	0	2 225 253	2 225 253	57	57
		2011	300 000	544 550	–	26	78	0	0	3 199 290	3 199 290	79	79
	Nigeria	2009	19 300 000	19 300 000	–	31	22	330 000	0	18 397 352	9 198 676	39	19
		2010	17 301 049	17 301 049	–	49	37	200 000	0	9 980 728	9 980 728	23	23
		2011	16 756 540	822 766	–	41	46	177 235	0	7 648 896	7 648 896	17	17
	Rwanda	2009	796 663	–	–	31	64	1 411 715	14	–	–	–	–
		2010	4 763 739	4 763 739	–	81	73	1 646 781	16	–	–	–	–
		2011	816 915	816 915	–	92	84	1 745 274	16	–	–	–	–
	Sao Tome and Principe	2009	34 339	28 930	0	100	39	137 394	85	9 932	4 966	100	71
		2010	47 403	47 403	0	94	47	65 442	40	6 111	6 111	100	100
		2011	4 985	4 985	0	87	51	115 610	69	11 546	11 546	100	100
	Senegal	2009	2 831 235	2 255 235	576 000	68	67	661 814	5	184 170	184 170	4	4
		2010	621 481	621 481	–	64	70	951 620	8	835 954	835 954	18	18
		2011	2 465 770	2 465 770	–	75	60	887 315	7	675 707	675 707	14	14
	Sierra Leone	2009	292 613	292 613	0	36	35	0	0	1 815 113	1 815 113	77	77
		2010	3 413 311	3 413 311	0	100	52	308 209	5	2 161 564	2 161 564	100	100
		2011	45 833	45 833	0	100	86	851 000	14	1 873 610	1 873 610	87	87
	South Africa	2009	–	–	–	–	26	4 000 000	80	10 500	10 500	100	100
		2010	–	–	–	–	30	5 000 000	100	–	–	–	–
		2011	–	–	–	–	35	5 000 000	99	7 620	7 620	67	70
	Swaziland	2009	25 000	0	0	41	29	–	–	0	0	–	–
		2010	71 336	71 336	0	50	40	–	–	3 320	3 320	100	100
		2011	47 857	47 857	0	64	63	–	–	1 750	1 750	100	100
	Togo	2009	167 590	–	359	58	71	0	0	1 087 154	1 067 694	82	80
		2010	255 111	247 263	7 848	58	67	0	0	–	–	–	–
		2011	2 548 142	2 537 528	536	81	53	0	0	659 800	–	46	–
	Uganda	2009	876 054	876 054	0	27	38	1 600 324	5	11 357 813	11 357 813	100	100
		2010	7 400 000	7 400 000	0	57	50	2 732 418	8	–	–	–	–
		2011	709 000	709 000	0	47	59	2 543 983	7	19 579 200	19 579 200	100	100
	United Republic of Tanzania	2009	15 399 754	7 629 112	7 770 642	63	37	3 391 198	8	–	–	–	–
		2010	–	–	–	35	69	–	–	–	–	–	–
		2011	–	–	–	30	90	–	–	–	–	–	–
	Mainland	2009	15 110 633	7 339 991	7 770 642	63	37	6 790 786	5	6 473 485	#VALUE!	53	53
		2010	17 738 974	17 738 974	0	100	69	6 982 247	15	6 193 074	6 193 074	100	100
		2011	17 617 891	17 617 891	0	100	83	8 636 526	15	6 960 921	6 960 921	100	100
	Zanzibar	2009	289 121	289 121	0	72	–	1 152 235	87	188 675	188 675	100	100
		2010	29 853	29 853	0	70	–	1 030 944	76	45 715	45 715	100	100
		2011	29 276	29 276	0	45	–	1 094 029	78	3 501	3 501	68	68
	Zambia	2009	1 502 712	1 502 712	0	73	72	5 638 551	44	6 284 810	–	100	–
		2010	1 058 050	1 058 050	0	52	60	5 951 303	45	6 147 359	6 147 359	100	100
		2011	3 532 137	3 532 137	0	81	40	7 542 497	56	6 957 420	6 957 420	100	100
	Zimbabwe	2009	640 557	640 557	–	35	56	2 575 116	41	–	–	–	–
		2010	1 219 309	1 219 309	0	55	52	3 090 289	49	1 213 001	1 213 001	100	100
		2011	0	0	0	52	58	3 299 058	52	2 079 657	2 079 657	100	100
Region of the Americas	Argentina	2009	–	–	–	–	–	–	–	–	–	–	–
		2010	–	–	–	–	–	–	–	72	–	100	–
		2011	–	–	–	–	–	27 308	13	–	–	–	–
	Belize	2009	2 700	2 700	0	2	–	60 168	29	256	0	100	–
		2010	0	0	0	2	–	50 121	23	150	0	100	–
		2011	0	0	0	2	–	31 363	14	79	0	100	–
	Bolivia (Plurinational State of)	2009	5 000	5 000	0	9	–	20 000	4	9 743	674	100	100
		2010	42 950	42 950	0	20	–	35 365	7	13 796	1 200	100	100
		2011	42 800	42 800	0	34	–	45 214	9	7 200	923	100	100
	Brazil	2009	37 599	37 599	0	3	–	379 733	9	490 292	159 792	100	100
		2010	94 611	94 611	0	6	–	508 667	11	515 015	78 965	100	100
		2011	13 739	13 739	0	6	–	714 128	16	445 531	114 081	100	100
	Colombia	2009	82 527	62 027	20 500	7	–	115 000	2	1 281 860	313 680	100	100
		2010	73 500	70 000	3 500	6	–	260 000	4	209 473	42 688	100	100
		2011	274 682	262 732	11 950	11	–	1 032 000	15	92 518	27 698	100	100
	Costa Rica	2009	2 603	2 303	300	10	–	18 500	40	2 620	0	100	–
		2010	6 000	6 000	0	32	–	16 400	35	1 140	0	100	–
		2011	4 000	4 000	0	47	–	48 000	100	170	0	100	–
	Dominican Republic	2009	0	0	0	3	–	1 253	0	1 643	0	100	–
		2010	83 918	83 918	0	38	–	53 057	12	2 479	3	73	–
		2011	70 437	70 437	0	64	–	78 236	18	1 608	8	100	–
	Ecuador	2009	122 429	117 200	5 229	100	–	334 006	100	10 000	10 000	100	100
		2010	68 860	68 860	0	100	–	163 572	75	1 753	500	93	100
		2011	30 022	30 022	0	100	–	105 234	48	–	–	–	–
	El Salvador	2009	–	–	–	–	–	65 775	5	20	0	100	–
		2010	–	–	–	–	–	–	–	–	–	–	–
		2011	0	0	0	–	–	26 167	2	15	–	94	–

Annex 4 – Intervention coverage estimated from routinely collected data, 2009-2011 (continued)

WHO Region	Country/area	Year	No. of ITNs + LLINs sold or delivered	No. of LLINs sold or delivered	No. of ITNs sold or delivered	% of population potentially protected by ITNs delivered	Modelled % of households ≥1 ITN	No. of people protected by IRS	% IRS coverage	Any 1st-line treatment courses delivered (including ACT)	ACT treatment courses delivered	% Any antimalarial coverage[1]	% ACT coverage[2]
Region of the Americas	French Guiana, France	2009	2 668	–	–	6	–	39 231	20	–	–	–	–
		2010	2 565	–	–	6	–	40 784	21	–	–	–	–
		2011	–	–	–	–	–	–	–	–	–	–	–
	Guatemala	2009	427 277	0	0	78	–	27 460	1	–	0	–	–
		2010	8 077	8 077	–	6	–	148 855	7	–	0	–	–
		2011	0	0	0	1	–	42 555	2	6 822	0	100	–
	Guyana	2009	1 068	1 068	0	6	–	0	0	13 673	6 206	100	81
		2010	0	0	0	4	–	0	0	22 935	21 376	100	100
		2011	–	–	–	1	–	–	–	29 471	28 368	100	100
	Haiti	2009	–	–	–	7	–	–	–	–	–	–	–
		2010	–	–	–	4	–	–	–	–	–	–	–
		2011	–	–	–	–	–	–	–	113 958	–	100	–
	Honduras	2009	1 325	1 325	0	0	–	51 263	5	105 459	0	100	–
		2010	6 378	6 378	0	1	–	65 187	6	93 845	1	100	–
		2011	8 798	8 798	0	3	–	83 858	8	74 533	1	100	–
	Mexico	2009	0	0	0	–	–	98 875	29	0	0	–	–
		2010	350 000	0	0	100	–	106 875	31	0	0	–	–
		2011	0	0	0	–	–	69 331	20	0	–	–	–
	Nicaragua	2009	30 000	30 000	0	100	–	327 937	100	35 430	0	100	–
		2010	22 800	22 800	0	100	–	262 373	100	59 600	–	100	–
		2011	14 300	14 300	–	100	–	200 448	100	206 511	–	100	–
	Panama	2009	0	0	0	–	–	109 497	72	2 129	0	100	–
		2010	0	0	0	–	–	82 041	53	836	0	100	–
		2011	0	0	0	–	–	23 766	15	420	0	100	–
	Paraguay	2009	0	0	0	1	–	178 635	78	91	9	100	–
		2010	0	0	0	1	–	36 035	16	27	5	100	–
		2011	0	0	0	–	–	34 736	15	–	–	–	–
	Peru	2009	–	–	–	4	–	–	–	–	–	–	–
		2010	–	–	–	–	–	–	–	–	–	–	–
		2011	–	–	–	–	–	–	–	–	–	–	–
	Suriname	2009	376	376	0	50	–	–	–	–	–	–	–
		2010	14 858	14 073	785	65	–	–	–	–	–	–	–
		2011	1 343	712	631	34	–	–	–	–	–	–	–
	Venezuela (Bolivarian Republic of)	2009	8 004	8 004	0	7	–	5 950 904	100	35 340	4 753	99	53
		2010	9 267	9 267	–	6	–	5 244 247	100	45 155	10 629	100	87
		2011	1 665	1 665	–	4	–	3 589 089	100	–	–	–	–
Eastern Mediterranean	Afghanistan	2009	317 631	317 631	0	30	–	–	–	12 277	12 277	3	48
		2010	922 956	922 956	0	40	–	–	–	–	–	–	–
		2011	3 352 326	3 352 326	0	83	–	0	0	–	–	–	–
	Djibouti	2009	65 516	57 516	8 000	83	83	–	–	–	–	–	–
		2010	28 300	28 300	0	90	68	–	–	–	–	–	–
		2011	100	100	0	34	85	–	–	–	–	–	–
	Iran (Islamic Republic of)	2009	80 000	80 000	–	7	–	–	–	–	–	–	–
		2010	120 000	120 000	–	10	–	222 470	5	11 358	7 245	100	100
		2011	60 000	60 000	–	10	–	84 484	2	5 976	3 417	100	100
	Pakistan	2009	396 341	396 341	–	4	–	350 000	1	2 294 816	34 891	35	2
		2010	–	–	–	3	–	–	–	–	–	–	–
		2011	–	–	–	3	–	–	–	–	–	–	–
	Saudi Arabia	2009	250 000	250 000	–	26	–	2 457 965	71	3 240	1 840	100	100
		2010	81 050	81 050	–	29	–	2 500 000	70	3 000	1 600	100	100
		2011	100 000	100 000	0	21	–	2 600 000	71	2 724	2 724	100	100
	Somalia	2009	473 081	473 081	0	31	20	9 100	0	72 000	72 000	33	34
		2010	131 467	131 467	0	21	20	16 261	0	95 000	95 000	100	100
		2011	210 231	210 231	0	22	21	429 514	6	–	–	–	–
	South Sudan[3]	2009	3 479 013	3 479 013	–	99	52	–	–	–	–	–	–
		2010	2 203 040	2 203 040	–	100	57	–	–	–	–	–	–
		2011	386 563	386 563	0	100	56	–	–	–	–	–	–
	Sudan	2009	3 470 931	3 470 931	0	40	40	1 685 439	6	2 379 910	2 379 910	87	91
		2010	1 166 240	1 166 240	0	41	46	2 480 360	9	2 285 901	2 339 473	94	100
		2011	882 901	882 901	0	35	45	2 947 155	10	–	–	–	–
	Yemen	2009	66 545	66 545	0	11	–	1 440 482	14	308 180	258 180	100	100
		2010	538 577	538 577	0	16	–	1 099 627	11	183 177	177 517	49	48
		2011	21 831	21 831	0	11	–	1 480 416	14	273 180	273 180	100	100
European	Azerbaijan	2009	20 000	20 000	–	17	–	123 000	59	80	0	100	100
		2010	10 000	10 000	–	26	–	1 250 000	592	54	2	100	100
		2011	10 000	10 000	–	34	–	309 162	144	10	2	100	100
	Kyrgyzstan	2009	20 000	20 000	–	2 575	–	599 800	14 300	4	0	100	100
		2010	70 000	70 000	–	4 665	–	335 000	7 892	6	0	100	100
		2011	48 600	48 600	–	5 814	–	223 000	5 197	5	0	100	–
	Russian Federation	2009	0	0	–	–	–	0	–	107	0	100	–
		2010	0	0	–	–	–	0	–	102	0	100	–
		2011	–	0	–	–	–	0	–	85	0	100	–
	Tajikistan	2009	39 637	40 556	–	67	–	119 557	52	165	1	100	100
		2010	38 778	38 778	–	76	–	814 500	100	112	1	100	100
		2011	117 041	117 041	–	100	–	644 136	100	78	5	100	100
	Turkey	2009	0	0	–	–	–	455 550	2 795	4 514	7	100	44
		2010	0	0	–	–	–	390 460	2 366	250	100	100	100
		2011	–	0	–	–	–	221 225	1 324	205	105	100	100
	Uzbekistan	2009	0	0	–	86	–	329 642	100	5	1	100	100
		2010	0	0	–	66	–	244 821	100	5	0	100	100
		2011	50 000	50 000	–	100	–	300 543	100	1	0	100	–

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South-East Asia	Bangladesh	2009	450 334	–	450 334	76	–	–	–	–	0	–	–
		2010	1 696 943	500 000	1 196 943	100	–	–	–	68 802	58 135	75	69
		2011	2 800 144	1 391 953	1 408 191	100	–	–	–	68 540	48 540	100	100
	Bhutan	2009	26 915	20 339	6 576	80	–	142 922	100	1 995	1 895	100	100
		2010	100 671	99 697	974	100	–	140 503	100	780	266	100	100
		2011	8 942	8 942	0	100	–	148 318	100	125	125	58	100
	Democratic People's Republic of Korea	2009	40 000	40 000	–	4	–	762 175	26	18 679	0	100	100
		2010	300 000	300 000	–	21	–	2 000 000	68	15 392	0	100	100
		2011	79 960	79 960	–	26	–	2 013 084	69	1 804	0	12	100
	India	2009	9 235 000	2 235 000	7 000 000	6	–	66 810 733	25	1 563 574	825 000	100	98
		2010	2 570 000	2 570 000	0	3	–	53 432 930	20	1 599 986	2 875 000	100	100
		2011	6 580 000	6 580 000	0	8	–	53 348 697	20	330 000 000	2 920 000	100	100
	Indonesia	2009	1 320 000	1 320 000	0	6	–	0	0	280 779	280 779	41	78
		2010	2 402 610	2 402 610	0	11	–	60 000	0	671 681	671 681	29	55
		2011	2 829 748	2 829 748	0	13	–	527 535	1	479 850	479 850	29	53
	Myanmar	2009	1 328 252	213 027	1 115 725	16	–	8 471	0	544 378	544 378	80	100
		2010	778 264	329 421	448 843	11	–	12 709	0	266 769	266 769	31	43
		2011	1 613 830	551 107	1 062 723	22	–	1 036	0	594 756	569 607	96	100
	Nepal	2009	359 766	359 736	0	100	–	827 240	76	123 903	18 288	100	67
		2010	438 186	438 186	0	100	–	768 350	69	150 000	3 200	100	13
		2011	934 476	934 476	0	100	–	256 070	23	71 140	612	91	6
	Sri Lanka	2009	774 000	774 000	–	40	–	409 473	9	587	29	96	87
		2010	166 600	166 600	–	45	–	314 146	7	770	34	100	100
		2011	1 274 000	1 274 000	–	82	–	80 499	2	192	17	100	98
	Thailand	2009	1 246 420	348 346	898 074	43	–	624 800	11	79 170	40 740	100	100
		2010	897 497	201 566	695 931	42	–	568 799	10	51 161	26 471	100	100
		2011	382 850	100 343	282 507	30	–	423 638	8	5 642	5 642	100	100
	Timor-Leste	2009	0	0	0	37	–	0	0	160 502	41 946	100	51
		2010	166 605	166 605	0	51	–	58 425	7	38 828	38 828	32	44
		2011	24 613	24 613	0	39	–	102 858	12	496 742	63 220	100	100
Western Pacific	Cambodia	2009	1 251 384	702 810	548 574	46	–	0	0	235 239	106 202	100	100
		2010	361 424	217 351	144 073	37	–	0	0	198 390	182 046	100	100
		2011	1 852 892	1 203 321	329 370	70	–	0	0	206 529	120 529	100	100
	China	2009	826 389	219 316	607 073	100	–	8 768 609	100	227 932	11 500	100	100
		2010	692 126	114 529	577 597	100	–	24 561 489	100	–	–	–	–
		2011	656 674	149 394	507 280	100	–	1 043 963	100	–	–	–	–
	Lao People's Democratic Republic	2009	1 237 210	72 900	1 164 310	100	–	0	0	68 903	68 903	100	100
		2010	1 356 721	230 292	1 126 429	100	–	0	0	51 425	51 425	100	100
		2011	241 935	241 935	0	43	–	0	0	56 340	56 340	100	100
	Malaysia	2009	0	216 460	–	88	–	400 007	48	7 010	–	100	–
		2010	221 911	221 911	–	100	–	365 340	43	6 650	–	100	–
		2011	260 487	260 487	–	100	–	307 769	36	5 306	2 218	100	100
	Papua New Guinea	2009	341 438	341 438	–	24	–	17 808	0	–	–	–	–
		2010	878 831	878 831	–	46	–	–	–	–	–	–	–
		2011	1 268 939	1 268 939	–	68	–	–	–	–	–	–	–
	Philippines	2009	1 441 243	1 312 503	128 740	59	–	795 995	12	28 920	28 920	100	100
		2010	1 497 791	1 437 327	60 464	88	–	1 063 275	16	36 298	36 298	100	100
		2011	142 853	3 037 404	44 228	100	–	1 052 050	15	–	–	–	–
	Republic of Korea	2009	–	–	–	–	–	–	–	1 343	–	68	–
		2010	10 000	10 000	–	1	–	–	–	1 772	–	67	–
		2011	10 000	10 000	–	1	–	–	–	838	–	72	–
	Solomon Islands	2009	14 797	14 797	0	51	–	112 454	22	590 342	295 171	100	100
		2010	314 478	314 478	0	100	–	166 053	31	271 946	271 946	100	100
		2011	46 574	46 574	0	100	–	175 265	32	–	–	–	–
	Vanuatu	2009	25 284	25 284	0	79	–	13 335	6	100 000	20 000	100	100
		2010	91 281	91 281	0	100	–	16 204	7	49 600	49 600	100	100
		2011	92 385	92 385	0	100	–	18 490	8	–	–	–	–
	Viet Nam	2009	4 025 428	0	4 025 428	–	–	1 544 329	10	811 000	323 748	100	100
		2010	1 181 438	500 000	681 438	14	–	1 602 475	10	–	–	–	–
		2011	766 606	100 000	666 606	15	–	1 555 892	10	274 852	110 576	100	100

[1] Based on estimated presumed and confirmed and any 1st-line treatment courses distributed as proxy indicator for treated cases

[2] Based on estimated presumed and confirmed cases and % of *P. falciparum* using ACT distributed as proxy indicator for treated cases

[3] South Sudan became a separate State on 9 July 2011 and a Member State of WHO on 27 September 2011. South Sudan and Sudan have distinct epidemiological profiles comprising high transmission and low transmission areas respectively. For this reason data up to June 2011 from the high transmission areas of Sudan (10 southern states which correspond to South Sudan) and low transmission areas (15 northern states which correspond to contemporary Sudan) are reported separately.

[4] The indicator No. of ITN sold or delivered includes the number of ITNs re-treated or number of re-treatment kits distributed.

Annex 5 – Household Surveys, 2007-2011

WHO Region	Country/area	Year	Source	Subgroup	% HHs that have ≥ 1 ITN	% HHs with enough ITNs for individuals who slept in the house the previous night	% population with access to an ITN in their household	% existing ITNs in HH used the previous night	% population who slept under an ITN the previous night
African	Angola	2007	MIS 2007	Total	28	4	14	67	12
		2007	MIS 2007	Urban	29	4	15	63	11
		2007	MIS 2007	Rural	26	5	14	72	13
		2011	MIS 2011	Total	35	6	19	84	19
		2011	MIS 2011	Urban	39	7	22	81	19
		2011	MIS 2011	Rural	32	5	17	86	18
	Burkina Faso	2010	DHS 2010	Total	57	17	36	82	31
		2010	DHS 2010	Urban	60	24	40	76	31
		2010	DHS 2010	Rural	56	15	35	84	31
	Burundi	2010	DHS 2010	Total	52	22	39	74	37
		2010	DHS 2010	Urban	68	28	51	85	50
		2010	DHS 2010	Rural	50	21	38	72	35
	Democratic Republic of the Congo	2007	DHS 2007	Total	9	1	4	79	4
		2007	DHS 2007	Urban	12	2	6	83	6
		2007	DHS 2007	Rural	7	1	3	75	3
		2010	MICS 2010	Total	98	-	-	-	-
		2010	MICS 2010	Urban	99	-	-	-	-
		2010	MICS 2010	Rural	98	-	-	-	-
	Ethiopia	2011	DHS 2011	Total	-	-	-	-	-
		2011	DHS 2011	Urban	-	-	-	-	-
		2011	DHS 2011	Rural	-	-	-	-	-
	Ghana	2008	DHS 2008	Total	42	16	30	63	20
		2008	DHS 2008	Urban	35	14	26	54	14
		2008	DHS 2008	Rural	48	18	34	69	25
	Kenya	2009	DHS 2009	Total	56	27	42	77	35
		2009	DHS 2009	Urban	58	38	52	80	46
		2009	DHS 2009	Rural	55	23	40	76	32
	Liberia	2007	DHS 2007	Total	-	-	-	-	-
		2007	DHS 2007	Urban	-	-	-	-	-
		2007	DHS 2007	Rural	-	-	-	-	-
		2009	MIS 2009	Total	47	10	25	76	22
		2009	MIS 2009	Urban	42	9	22	79	19
		2009	MIS 2009	Rural	52	11	28	75	24
		2011	MIS 2011	Total	50	16	31	83	31
		2011	MIS 2011	Urban	52	18	34	82	33
		2011	MIS 2011	Rural	47	13	28	84	29
	Madagascar	2009	DHS 2009	Total	57	17	35	83	36
		2009	DHS 2009	Urban	60	25	43	86	42
		2009	DHS 2009	Rural	56	15	33	82	34
		2011	MIS 2011	Total	81	31	57	88	66
		2011	MIS 2011	Urban	87	43	67	89	70
		2011	MIS 2011	Rural	80	29	56	88	66
	Malawi	2010	DHS 2010	Total	57	19	38	65	28
		2010	DHS 2010	Urban	64	29	47	72	37
		2010	DHS 2010	Rural	55	17	36	63	27
	Mali	2010	DHS 2010	Total	86	31	62	88	55
		2010	DHS 2010	Urban	87	37	62	87	54
		2010	DHS 2010	Rural	86	29	61	88	55
	Mauritania	2007	MICS 2007	Total	10	-	-	-	-
		2007	MICS 2007	Urban	12	-	-	-	-
		2007	MICS 2007	Rural	9	-	-	-	-
	Mozambique	2008	MICS 2008	Total	-	-	-	-	-
		2008	MICS 2008	Urban	-	-	-	-	-
		2008	MICS 2008	Rural	-	-	-	-	-
	Namibia	2007	DHS 2007	Total	20	6	13	43	5
		2007	DHS 2007	Urban	10	4	7	52	3
		2007	DHS 2007	Rural	29	8	17	40	7
	Nigeria	2007	MICS 2007	Total	85	-	-	-	-
		2007	MICS 2007	Urban	83	-	-	-	-
		2007	MICS 2007	Rural	88	-	-	-	-
		2008	DHS 2008	Total	8	2	5	68	3
		2008	DHS 2008	Urban	9	2	5	64	3
		2008	DHS 2008	Rural	8	2	5	70	3
		2010	MIS 2010	Total	42	14	28	77	23
		2010	MIS 2010	Urban	33	11	23	66	16
		2010	MIS 2010	Rural	45	15	30	80	25
	Rwanda	2008	DHS 2008	Total	56	15	38	84	39
		2008	DHS 2008	Urban	65	24	49	84	45
		2008	DHS 2008	Rural	54	13	36	84	38
		2010	DHS 2010	Total	82	39	64	71	57
		2010	DHS 2010	Urban	84	50	71	74	62
		2010	DHS 2010	Rural	82	37	63	71	56
	Sao Tome and Principe	2009	DHS 2009	Total	61	31	51	82	46
		2009	DHS 2009	Urban	69	38	58	90	56
		2009	DHS 2009	Rural	52	25	43	71	34
	Senegal	2009	MIS 2009	Total	60	11	35	64	22
		2009	MIS 2009	Urban	50	10	29	71	22
		2009	MIS 2009	Rural	70	12	39	60	23
		2011	DHS 2011	Total	63	15	38	69	28
		2011	DHS 2011	Urban	52	12	30	74	25
		2011	DHS 2011	Rural	73	18	45	66	31
	Sierra Leone	2008	DHS 2008	Total	37	6	19	89	19
		2008	DHS 2008	Urban	36	6	19	84	17
		2008	DHS 2008	Rural	37	5	19	92	19
	Swaziland	2007	DHS 2007	Total	4	1	2	15	0
		2007	DHS 2007	Urban	3	2	2	28	1
		2007	DHS 2007	Rural	5	1	2	11	0
		2010	MICS 2010	Total	99	-	-	-	-
		2010	MICS 2010	Urban	95	-	-	-	-
		2010	MICS 2010	Rural	100	-	-	-	-

% children <5 years who slept under an ITN the previous night	% pregnant women who slept under an ITN the previous night	% HH sprayed by IRS within last 12 months	% HH with ≥ 1 ITN for 2 pers. and/or sprayed by IRS within last 12 months	% children age 6–59 mo with hemoglobin <8g/dL	% children (6-59 months) with positive microscopy test	% children <5 years with fever in last 2 weeks for whom advice or treatment was sought	% children <5 years with fever in last 2 weeks who received ACTs among those who received any antimalarial	% children <5 years with fever in the last 2 weeks who had a finger or heel stick	% women who received IPTp during ANC visits during their last pregnancy
17	22	2	6	3	-	53	10	-	2
16	15	4	7	2	-	66	8	-	2
19	26	1	6	4	-	41	12	-	2
26	26	-	-	3	10	59	77	-	19
29	28	-	-	2	1	71	81	-	33
24	24	-	-	3	14	54	72	-	12
47	44	1	18	26	66	66	25	5	39
45	38	2	25	15	30	74	31	8	41
47	46	1	16	28	73	64	23	5	39
44	49	0	22	3	-	66	69	27	0
62	64	2	29	2	-	72	44	48	0
43	48	0	22	3	-	66	70	26	0
6	7	-	-	11	-	62	2	-	7
8	9	-	-	8	-	68	5	-	9
4	5	-	-	13	-	59	0	-	6
-	-	-	-	-	-	44	-	18	26
-	-	-	-	-	-	39	-	33	28
-	-	-	-	-	-	46	-	13	25
-	-	-	-	5	-	27	-	-	-
-	-	-	-	5	-	42	-	-	-
-	-	-	-	6	-	25	-	-	-
38	27	-	-	19	-	71	50	-	47
32	17	-	-	13	-	82	59	-	51
42	34	-	-	23	-	64	43	-	44
46	48	-	-	-	-	64	33	-	17
61	51	-	-	-	-	63	51	-	20
43	47	-	-	-	-	64	28	-	17
-	-	-	-	-	-	80	15	-	-
-	-	-	-	-	-	85	13	-	-
-	-	-	-	-	-	78	16	-	-
26	32	-	-	5	33	80	45	-	48
23	28	-	-	6	23	82	36	-	51
27	34	-	-	5	40	78	52	-	47
36	39	12	26	8	28	77	70	33	51
39	38	8	25	8	17	81	60	38	44
34	39	16	27	8	35	74	76	30	56
45	46	-	-	3	-	49	6	-	7
55	50	-	-	3	-	65	14	-	7
44	45	-	-	2	-	47	5	-	7
75	70	41	62	1	7	44	19	6	20
79	73	12	51	2	1	56	27	9	29
75	70	44	64	1	7	43	19	6	20
39	35	-	-	9	-	74	82	-	55
47	43	-	-	7	-	73	80	-	56
37	34	-	-	9	-	74	82	-	55
70	-	-	-	-	38	-	-	-	-
66	-	-	-	-	5	-	-	-	-
71	-	-	-	-	45	-	-	-	-
-	-	-	-	-	-	48	7	-	-
-	-	-	-	-	-	57	11	-	-
-	-	-	-	-	-	40	4	-	-
-	-	-	-	-	-	68	-	-	53
-	-	-	-	-	-	73	-	-	67
-	-	-	-	-	-	66	-	-	47
10	9	-	-	-	-	63	-	-	12
7	6	-	-	-	-	64	-	-	7
12	11	-	-	-	-	61	-	-	15
95	-	-	-	-	-	64	6	-	3
93	-	-	-	-	-	58	6	-	3
97	-	-	-	-	-	78	6	-	6
5	5	-	-	-	-	72	7	-	7
7	5	-	-	-	-	77	10	-	10
5	5	-	-	-	-	70	6	-	5
29	34	1	15	-	42	84	12	6	15
22	16	1	12	-	23	86	21	5	22
31	39	1	16	-	48	84	9	6	13
56	60	-	-	2	-	46	90	-	18
61	63	-	-	2	-	50	84	-	22
55	60	-	-	2	-	46	91	-	17
69	72	-	-	1	1	52	95	21	-
74	78	-	-	2	0	66	92	40	-
68	70	-	-	1	1	50	95	18	-
56	56	-	-	3	-	74	34	-	65
66	69	-	-	2	-	65	23	-	70
46	42	-	-	3	-	82	60	-	59
29	29	-	-	17	-	52	50	-	57
29	26	-	-	13	-	61	43	-	55
29	31	-	-	20	-	46	57	-	57
34	36	11	24	14	3	54	41	10	40
31	32	9	20	10	2	62	48	10	46
36	38	12	28	16	4	45	32	9	37
25	27	-	-	10	-	57	23	-	13
29	22	-	-	8	-	72	16	-	16
24	30	-	-	11	-	52	27	-	12
1	1	-	-	3	-	72	-	-	-
1	1	-	-	3	-	73	-	-	-
0	1	-	-	3	-	72	-	-	-
-	-	-	-	-	-	55	24	14	1
-	-	-	-	-	-	56	-	14	1
-	-	-	-	-	-	54	24	14	2

Annex 5 – Household Surveys, 2007-2011 (continued)

WHO Region	Country/area	Year	Source	Subgroup	% HHs that have ≥ 1 ITN	% HHs with enough ITNs for individuals who slept in the house the previous night	% population with access to an ITN in their household	% existing ITNs in HH used the previous night	% population who slept under an ITN the previous night
African	Uganda	2009	MIS 2009	Total	47	15	32	79	25
		2009	MIS 2009	Urban	46	22	37	85	30
		2009	MIS 2009	Rural	47	14	31	78	24
		2011	DHS 2011	Total	60	26	45	75	34
		2011	DHS 2011	Urban	59	37	52	81	41
		2011	DHS 2011	Rural	60	24	44	74	33
	United Republic of Tanzania	2008	DHS 2008	Total	39	13	25	70	20
		2008	DHS 2008	Urban	59	27	45	84	41
		2008	DHS 2008	Rural	33	8	20	61	14
		2010	DHS 2010	Total	64	20	47	82	43
		2010	DHS 2010	Urban	65	28	51	87	47
		2010	DHS 2010	Rural	63	17	45	80	42
	Zambia	2007	DHS 2007	Total	53	16	34	61	22
		2007	DHS 2007	Urban	53	17	34	59	21
		2007	DHS 2007	Rural	54	16	34	62	23
	Zimbabwe	2009	MICS 2009	Total	87	-	-	-	-
		2009	MICS 2009	Urban	78	-	-	-	-
		2009	MICS 2009	Rural	91	-	-	-	-
		2011	DHS 2011	Total	29	12	20	39	8
		2011	DHS 2011	Urban	23	9	16	45	7
		2011	DHS 2011	Rural	32	13	22	37	9
Region of the Americas	Bolivia (Plurinational State of)	2008	DHS 2008	Total	-	-	-	-	-
		2008	DHS 2008	Urban	-	-	-	-	-
		2008	DHS 2008	Rural	-	-	-	-	-
	Colombia	2010	DHS 2010	Total	-	-	-	-	-
		2010	DHS 2010	Urban	-	-	-	-	-
		2010	DHS 2010	Rural	-	-	-	-	-
	Dominican Republic	2007	DHS 2007	Total	-	-	-	-	-
		2007	DHS 2007	Urban	-	-	-	-	-
		2007	DHS 2007	Rural	-	-	-	-	-
	Guyana	2009	DHS 2009	Total	26	18	22	88	21
		2009	DHS 2009	Urban	13	9	11	87	10
		2009	DHS 2009	Rural	31	22	27	89	25
	Peru	2008	DHS 2008	Total	-	-	-	-	-
		2008	DHS 2008	Urban	-	-	-	-	-
		2008	DHS 2008	Rural	-	-	-	-	-
Eastern Mediterranean	Pakistan	2007	DHS 2007	Total	-	-	-	-	-
		2007	DHS 2007	Urban	-	-	-	-	-
		2007	DHS 2007	Rural	-	-	-	-	-
	Bangladesh	2007	DHS 2007	Total	-	-	-	-	-
		2007	DHS 2007	Urban	-	-	-	-	-
		2007	DHS 2007	Rural	-	-	-	-	-
South-East Asia	Indonesia	2007	DHS 2007	Total	-	-	-	-	-
		2007	DHS 2007	Urban	-	-	-	-	-
		2007	DHS 2007	Rural	-	-	-	-	-
	Nepal	2011	DHS 2011	Total	-	-	-	-	-
		2011	DHS 2011	Urban	-	-	-	-	-
		2011	DHS 2011	Rural	-	-	-	-	-
	Timor-Leste	2010	DHS 2010	Total	41	10	26	92	29
		2010	DHS 2010	Urban	51	14	33	94	37
		2010	DHS 2010	Rural	38	9	23	91	26
	Cambodia	2010	DHS 2010	Total	-	-	-	-	-
		2010	DHS 2010	Urban	-	-	-	-	-
		2010	DHS 2010	Rural	-	-	-	-	-
Western Pacific	Philippines	2008	DHS 2008	Total	-	-	-	-	-
		2008	DHS 2008	Urban	-	-	-	-	-
		2008	DHS 2008	Rural	-	-	-	-	-

DHS = Demographic and Health Survey
MICS = Multiple Indicator Cluster Survey
MIS = Malaria Indicator Survey

% children <5 years who slept under an ITN the previous night	% pregnant women who slept under an ITN the previous night	% HH sprayed by IRS within last 12 months	% HH with ≥ 1 ITN for 2 pers. and/or sprayed by IRS within last 12 months	% children age 6–59 mo with hemoglobin <8g/dL	% children (6-59 months) with positive microscopy test	% children <5 years with fever in last 2 weeks for whom advice or treatment was sought	% children <5 years with fever in last 2 weeks who received ACTs among those who received any antimalarial	% children <5 years with fever in the last 2 weeks who had a finger or heel stick	% women who received IPTp during ANC visits during their last pregnancy
32	44	-	-	10	43	83	39	-	34
32	45	-	-	3	17	69	50	-	46
32	43	-	-	11	46	85	37	-	33
42	46	8	32	5	-	85	68	26	27
48	55	6	41	2	-	93	70	53	31
41	45	8	30	5	-	84	68	23	27
25	27	-	-	8	-	75	38	-	31
47	47	-	-	9	-	87	39	-	44
20	22	-	-	7	-	72	37	-	29
62	56	61	67	6	-	85	62	-	28
61	46	76	82	6	-	89	50	-	32
62	59	56	62	6	-	84	67	-	27
28	32	-	-	-	-	72	28	-	66
29	29	-	-	-	-	74	33	-	73
27	33	-	-	-	-	71	26	-	63
91	27	-	-	-	-	52	-	-	15
85	35	-	-	-	-	46	-	-	8
94	24	-	-	-	-	53	-	-	18
10	10	19	26	4	-	44	43	7	8
10	8	5	13	4	-	44	38	5	6
9	10	26	32	4	-	44	45	8	8
-	-	-	-	7	-	56	-	-	-
-	-	-	-	7	-	65	-	-	-
-	-	-	-	7	-	47	-	-	-
-	-	-	-	-	-	60	-	-	-
-	-	-	-	-	-	62	-	-	-
-	-	-	-	-	-	55	-	-	-
-	-	-	-	-	-	72	8	-	-
-	-	-	-	-	-	72	10	-	-
-	-	-	-	-	-	71	4	-	-
24	30	-	-	2	-	67	-	-	-
12	13	-	-	2	-	67	-	-	-
28	35	-	-	2	-	67	-	-	-
-	-	-	-	2	-	74	-	-	-
-	-	-	-	2	-	77	-	-	-
-	-	-	-	3	-	72	-	-	-
-	-	-	-	-	-	82	-	-	-
-	-	-	-	-	-	84	-	-	-
-	-	-	-	-	-	81	-	-	-
-	-	-	-	-	-	72	-	-	-
-	-	-	-	-	-	76	-	-	-
-	-	-	-	-	-	72	-	-	-
-	-	-	-	-	-	91	-	-	-
-	-	-	-	-	-	93	-	-	-
-	-	-	-	-	-	90	-	-	-
-	-	-	-	2	-	72	-	-	-
-	-	-	-	2	-	81	-	-	-
-	-	-	-	2	-	70	-	-	-
41	41	-	-	1	-	73	6	-	-
50	49	-	-	1	-	78	1	-	-
38	38	-	-	1	-	71	9	-	-
-	-	-	-	3	-	83	-	-	-
-	-	-	-	1	-	87	-	-	-
-	-	-	-	3	-	82	-	-	-
-	-	-	-	-	-	49	-	-	-
-	-	-	-	-	-	53	-	-	-
-	-	-	-	-	-	46	-	-	-

Annex 6A – Reported malaria cases and deaths, 2011, and estimated cases and deaths, 2010

WHO Region	Country/area	Population				Reported malaria cases				
		UN population	At risk (low + high)	At risk (high)	Number of people living in active foci	Suspected malaria cases	Presumed and confirmed malaria cases	Malaria case definition	Mic. slides/ RDTs performed	Mic. slides/ RDTs positive
African	Algeria	35 980 193	2 518 614	0	N/A	23 948	12 165	P+C	11 974	191
	Angola	19 618 432	19 618 432	19 618 432	N/A	3 501 953	2 534 549	S	2 599 686	1 632 282
	Benin	9 099 922	9 099 922	9 099 922	N/A	1 424 335	1 283 183	S	564 120	422 968
	Botswana	2 030 738	1 319 980	365 533	N/A	1 141	1 141	P+C	167	432
	Burkina Faso	16 967 845	16 967 845	16 967 845	N/A	5 024 697	4 730 228	S	722 582	428 113
	Burundi	8 575 172	6 688 634	2 058 041	N/A	3 298 979	1 829 644	S	3 041 209	1 571 874
	Cameroon	20 030 362	20 030 362	14 221 557	N/A	1 829 266	598 492	S	1 230 774	–
	Cape Verde	500 585	130 152	0	N/A	26 508	36	P+C	26 508	36
	Central African Republic	4 486 837	4 486 837	4 486 837	N/A	221 980	221 980	S	–	–
	Chad	11 525 496	11 410 241	9 220 397	N/A	528 454	528 454	S	114 122	181 126
	Comoros	753 943	753 943	708 706	N/A	83 443	24 856	S	83 443	24 856
	Congo	4 139 748	4 139 748	4 139 748	N/A	277 263	233 633	S	114 678	71 048
	Côte d'Ivoire	20 152 894	20 152 894	20 152 894	N/A	2 588 004	2 568 152	S	49 828	29 976
	Democratic Republic of the Congo	67 757 577	67 757 577	65 724 850	N/A	9 442 144	6 865 504	S	7 138 621	4 561 981
	Equatorial Guinea	720 213	720 213	720 213	N/A	37 267	33 830	S	25 903	22 466
	Eritrea	5 415 280	5 415 280	3 844 849	N/A	97 479	39 567	P+C	92 760	34 848
	Ethiopia	84 734 262	56 771 956	847 343	N/A	5 487 972	3 549 559	P+C	3 418 719	1 480 306
	Gabon	1 534 262	1 534 262	1 534 262	N/A	–	–	S	–	–
	Gambia	1 776 103	1 776 103	1 776 103	N/A	261 967	261 967	S	172 241	261 967
	Ghana	24 965 816	24 965 816	24 965 816	N/A	4 154 261	3 240 791	S	1 954 730	1 041 260
	Guinea	10 221 808	10 221 808	10 221 808	N/A	1 189 016	1 101 975	S	182 615	95 574
	Guinea-Bissau	1 547 061	1 547 061	1 547 061	N/A	197 229	71 982	S	197 229	71 982
	Kenya	41 609 728	31 623 393	14 979 502	N/A	11 120 812	9 114 566	S	3 009 051	1 002 805
	Liberia	4 128 572	4 128 572	4 128 572	N/A	2 480 748	2 074 391	S	2 322 119	1 915 762
	Madagascar	21 315 135	21 315 135	6 394 541	N/A	774 385	224 498	S	774 385	224 498
	Malawi	15 380 888	15 380 888	15 380 888	N/A	5 338 701	5 338 701	S	700 704	304 499
	Mali	15 839 538	15 839 538	14 255 584	N/A	1 961 070	1 293 547	S	974 558	307 035
	Mauritania	3 541 540	3 187 386	2 089 509	N/A	154 003	145 186	S	11 743	2 926
	Mozambique	23 929 708	23 929 708	23 929 708	N/A	5 471 573	1 756 874	S	5 471 573	1 756 874
	Namibia	2 324 004	1 673 283	1 557 083	N/A	74 407	14 406	P+C	61 861	1 860
	Niger	16 068 994	16 068 994	11 087 606	N/A	3 157 482	2 677 186	S	1 261 172	780 876
	Nigeria	162 470 737	162 470 737	162 470 737	N/A	4 306 945	3 392 234	S	914 711	–
	Rwanda	10 942 950	10 942 950	10 942 950	N/A	1 602 271	208 858	P+C	1 602 271	208 858
	Sao Tome and Principe	168 526	168 526	168 526	N/A	6 504	6 504	P+C	117 279	8 442
	Senegal	12 767 556	12 767 556	12 256 854	N/A	–	–	S	–	–
	Sierra Leone	5 997 486	5 997 486	5 997 486	N/A	933 274	638 859	S	933 274	638 859
	South Africa	50 459 978	5 045 998	2 018 399	N/A	382 434	9 866	P+C	382 434	9 866
	Swaziland	1 203 330	336 932	0	N/A	2 471	797	P+C	2 223	549
	Togo	6 154 813	6 154 813	6 154 813	N/A	893 588	519 450	S	893 588	519 450
	Uganda	34 509 205	34 509 205	31 058 285	N/A	12 173 358	11 824 484	S	580 747	231 873
	United Republic of Tanzania									
	Mainland	45 043 077	45 043 077	32 881 446	N/A	10 160 478	5 477 469	S	6 829 281	2 146 272
	Zanzibar	1 402 987	1 402 987	1 402 987	N/A	455 718	4 489	S	455 718	4 489
	Zambia	13 474 959	13 474 959	13 474 959	N/A	4 607 908	4 607 908	S	–	–
	Zimbabwe	12 754 378	6 377 189	6 377 189	N/A	480 011	319 935	P+C	480 011	319 935
Region of the Americas	Argentina	40 764 561	203 823	0	N/A	7 872	18	C	7 872	18
	Belize	317 928	219 370	0	N/A	22 996	79	C	22 996	79
	Bolivia (Plurinational State of)	10 088 108	3 561 102	484 229	N/A	150 662	7 143	C	150 662	7 143
	Brazil	196 655 014	39 920 968	4 523 065	N/A	2 568 081	267 045	C	2 568 081	267 045
	Colombia	46 927 125	10 558 603	6 945 215	N/A	418 159	64 309	C	418 032	64 436
	Costa Rica	4 726 575	1 654 301	47 266	N/A	10 690	17	C	10 690	17
	Dominican Republic	10 056 181	8 608 091	432 416	N/A	421 405	1 616	C	421 405	1 616
	Ecuador	14 666 055	8 872 963	219 991	N/A	460 785	1 233	C	460 785	1 233
	El Salvador	6 227 491	1 264 181	0	N/A	100 883	15	C	100 883	15
	French Guiana, France	237 080	237 080	202 703	N/A	14 429	1 209	C	14 429	1 209
	Guatemala	14 757 316	6 714 579	2 213 597	N/A	195 080	6 817	C	195 080	6 817
	Guyana	756 040	703 117	264 614	N/A	201 693	29 471	C	201 693	29 471
	Haiti	10 123 787	10 123 787	5 365 607	N/A	135 136	32 048	C	135 136	32 048
	Honduras	7 754 687	5 645 412	1 085 656	N/A	155 785	7 615	C	155 785	7 615
	Mexico	114 793 341	4 132 560	344 380	N/A	1 035 424	1 124	C	1 035 424	1 124
	Nicaragua	5 869 859	2 946 669	76 308	N/A	540 404	925	C	540 404	925
	Panama	3 571 185	2 699 816	157 132	N/A	116 588	354	C	116 588	354
	Paraguay	6 568 290	236 458	0	N/A	48 611	10	C	48 611	10
	Peru	29 399 817	4 703 971	1 322 992	N/A	22 878	22 878	C	–	22 878
	Suriname	529 419	83 119	83 119	N/A	15 315	795	C	15 270	750
	Venezuela (Bolivarian Republic of)	29 436 891	5 534 136	765 359	N/A	382 303	45 824	C	382 303	45 824

Reported malaria cases				Inpatient malaria cases and deaths		Estimate, 2010							
P. falciparum	*P. vivax*	Imported cases	Cases at community level	Inpatient malaria cases	Malaria attributed deaths	Method used to calulate[1]		Cases			Deaths		
						Cases	Deaths	Lower	Point	Upper	Lower	Point	Upper
179	12	187	–	–	–	(1)	(1)	0	18	58	–	0	–
–	–	–	–	168 715	6 909	(2)	(2)	2 800 155	3 883 688	5 113 045	5 747	12 155	19 920
68 745	0	–	362 529	60 383	1 753	(2)	(2)	1 545 390	2 568 794	3 629 725	6 637	9 177	11 435
432	–	–	–	262	8	(1)	(1)	1 983	3 913	8 602	6	18	40
–	–	–	1 033 226	333 827	7 001	(2)	(2)	2 829 562	5 416 849	8 160 019	23 489	31 423	39 141
–	–	–	8 179	120 481	2 233	(2)	(2)	556 077	830 785	1 110 503	483	973	3 009
–	–	–	70 662	429 721	3 808	(2)	(2)	3 270 436	4 847 854	6 541 792	8 850	15 426	20 640
36	0	–	–	30	4	(1)	(1)	39	140	381	0	1	2
–	–	–	–	39 161	858	(2)	(2)	916 161	1 519 282	2 147 988	5 518	7 456	9 221
–	–	–	–	40 240	1 220	(2)	(2)	2 362 835	4 181 465	6 103 051	14 073	19 302	24 525
21 387	334	–	0	15 313	19	(2)	(2)	112 432	166 793	221 524	187	266	417
–	–	–	–	37 117	892	(2)	(2)	878 217	1 372 183	1 901 405	2 377	3 742	4 790
–	–	–	–	144 278	1 389	(2)	(2)	4 366 221	6 938 453	9 632 575	16 253	22 799	28 400
–	–	–	65 404	835 376	23 748	(2)	(2)	10 610 840	18 041 180	25 983 840	56 654	78 560	100 200
20 601	–	–	–	4 488	52	(2)	(2)	135 267	223 228	314 914	362	553	726
10 263	4 932	–	30 367	5 315	12	(1)	(1)	55 747	88 466	126 791	120	283	505
814 547	665 813	–	–	59 297	936	(2)	(2)	3 448 671	5 269 894	7 048 344	1 288	3 297	14 922
–	–	–	–	–	–	(2)	(2)	202 948	348 509	499 693	311	589	770
–	–	–	6 053	10 947	440	(2)	(2)	314 896	493 863	685 309	990	1 437	1 804
593 518	0	–	53 680	273 880	3 259	(2)	(2)	4 195 914	6 527 901	9 002 752	9 137	12 575	15 979
5 450	–	–	–	30 717	743	(2)	(2)	2 248 858	3 840 853	5 538 043	10 701	14 357	18 020
–	–	–	–	19 547	472	(2)	(2)	232 297	408 973	595 868	1 234	1 642	2 063
1 002 805	–	–	–	20 101	713	(2)	(2)	2 232 710	3 454 057	4 656 424	943	2 074	7 157
577 641	–	–	7 583	–	–	(2)	(2)	703 317	1 115 674	1 554 227	2 487	3 416	4 312
–	–	–	–	6 695	398	(1)	(1)	449 949	758 161	1 149 458	1 402	3 404	6 348
–	–	–	–	135 556	6 674	(2)	(2)	2 249 857	4 004 127	5 856 906	5 926	7 571	10 459
–	–	–	–	551 154	2 128	(2)	(2)	2 175 585	3 678 809	5 305 813	14 362	21 192	26 695
–	–	–	–	9 113	77	(2)	(2)	417 645	613 083	819 887	402	757	1 702
–	–	–	–	79 456	3 086	(2)	(2)	4 445 213	7 471 146	10 626 710	22 052	29 197	36 626
335	0	–	0	984	36	(1)	(1)	2 256	2 996	3 893	6	13	22
67 159	–	–	1 243 617	189 449	2 802	(2)	(2)	2 033 489	3 953 276	6 018 352	11 972	15 496	20 315
–	–	–	–	427 388	3 353	(2)	(2)	31 584 290	50 557 680	70 485 660	139 940	207 701	261 220
208 858	–	–	137 850	7 237	380	(2)	(2)	406 514	588 866	766 745	182	447	1 885
6 363	4	–	0	1 825	19	(2)	(2)	16 334	21 511	26 719	23	48	80
–	–	–	–	–	–	(2)	(2)	1 838 347	3 019 814	4 249 259	4 050	5 520	7 111
25 511	–	–	501 629	71 020	3 573	(2)	(2)	1 045 421	1 763 689	2 511 793	7 484	10 399	13 119
326	14	–	–	791	54	(1)	(1)	9 332	17 435	38 053	30	79	181
130	0	–	0	177	8	(1)	(1)	283	391	536	1	2	3
237 282	0	–	–	26 437	1 314	(2)	(2)	880 998	1 432 394	2 004 012	2 725	3 816	4 805
–	–	–	–	475 922	5 958	(2)	(2)	5 111 502	9 666 701	14 485 460	13 288	17 431	25 723
						(2)	(2)	5 885 216	10 170 590	14 660 130	11 659	15 183	21 490
–	–	–	–	511 254	11 799	(2)	(2)	–	–	–	–	–	–
475	0	–	–	2 252	7	(2)	(2)	–	–	–	–	–	–
–	–	–	–	191 559	4 540	(2)	(2)	1 989 172	3 303 826	4 694 007	6 783	8 821	11 479
0	–	–	0	10 004	451	(1)	(1)	1 114 302	1 720 767	2 554 427	3 306	7 746	14 014
–	18	–	–	–	0	(1)	(1)	76	85	91	0	0	0
1	78	–	0	1	0	(1)	(1)	273	642	1 064	0	0	0
214	5 877	–	–	0	0	(1)	(1)	14 609	19 897	40 191	2	4	9
32 007	231 618	–	0	4 893	70	(1)	(1)	373 782	431 794	488 117	103	198	301
14 650	44 701	–	–	541	18	(1)	(1)	133 714	190 355	251 555	76	166	276
4	13	–	0	0	0	(1)	(1)	118	132	142	0	0	0
1 614	2	–	–	–	10	(1)	(1)	3 800	4 728	5 762	7	14	23
296	937	–	–	0	1	(1)	(1)	1 985	2 222	2 398	0	1	1
3	12	–	15	2	0	(1)	(1)	25	28	30	0	0	0
154	339	–	–	94	2	–	–	1 721	2 651	6 929	1	2	5
107	6 707	–	3 614	0	0	(1)	(1)	7 688	11 843	28 316	0	0	0
15 945	9 066	–	33 516	385	3	(1)	(1)	34 978	45 637	57 636	42	87	145
32 048	0	–	0	798	3	(1)	(1)	96 538	189 471	333 090	208	568	1 194
581	7 010	–	–	–	2	(1)	(1)	14 982	21 165	28 037	3	6	11
0	1 124	–	0	0	0	(1)	(1)	1 288	1 443	1 555	0	0	0
150	775	–	0	–	0	(1)	(1)	1 035	1 298	1 581	0	1	1
1	353	–	0	13	–	(1)	(1)	437	492	530	0	0	0
6	3	–	0	9	0	(1)	(1)	28	32	34	0	0	0
2 596	20 282	–	–	–	0	(1)	(1)	56 710	77 746	105 684	15	42	90
310	382	–	78	6	1	(1)	(1)	583	795	1 502	0	1	2
9 724	34 651	–	–	–	3	(1)	(1)	35 935	58 900	130 136	9	28	72

Annex 6A – Reported malaria cases and deaths, 2011, and estimated cases and deaths, 2010 (continued)

WHO Region	Country/area	Population				Reported malaria cases				
		UN population	At risk (low + high)	At risk (high)	Number of people living in active foci	Suspected malaria cases	Presumed and confirmed malaria cases	Malaria case definition	Mic. slides/ RDTs performed	Mic. slides/ RDTs positive
Eastern Mediterranean	Afghanistan	32 358 260	24 867 323	9 917 807	N/A	936 252	482 748	P+C	531 053	77 549
	Djibouti	905 564	452 782	0	N/A	–	624	P+C	124	–
	Iran (Islamic Republic of)	74 798 599	N/A	N/A	999 401	–	3 239	C	530 470	3 239
	Iraq	32 664 942	N/A	N/A	0	–	11	C	2 097 732	11
	Pakistan	176 745 364	174 977 910	26 511 805	N/A	9 374 714	334 589	P+C	4 687 357	334 589
	Saudi Arabia	28 082 541	N/A	N/A	–	–	2 788	C	1 062 827	2 788
	Somalia	9 556 873	9 556 873	6 689 811	N/A	99 403	41 167	P+C	61 587	3 351
	South Sudan[2]	10 314 020	10 314 020	10 314 020	N/A	–	795 784	S	–	112 024
	Sudan[3]	34 318 390	34 318 390	28 484 264	N/A	–	1 246 833	P+C	–	506 806
	Yemen	24 799 880	16 298 481	10 740 828	N/A	804 940	142 147	P+C	753 203	90 410
European	Azerbaijan	9 306 023	N/A	N/A	253 726	449 168	8	C	449 168	8
	Georgia	4 329 026	N/A	N/A	45 000	2 032	6	C	2 032	6
	Kyrgyzstan	5 392 580	N/A	N/A	22 900	27 850	5	C	27 850	5
	Tajikistan	6 976 958	N/A	N/A	2 786 615	173 367	78	C	173 367	78
	Turkey	73 639 596	N/A	N/A	0	421 295	128	C	421 295	128
	Uzbekistan	27 760 267	N/A	N/A	0	886 243	1	C	886 243	1
South-East Asia	Bangladesh	150 493 658	15 591 143	4 003 131	N/A	390 102	51 773	P+C	390 102	51 773
	Bhutan	738 267	546 318	95 975	N/A	44 494	207	P+C	44 481	194
	Democratic People's Republic of Korea	24 451 285	N/A	N/A	15 180 529	26 513	16 760	P+C	26 513	16 760
	India	1 241 491 960	1 104 927 844	273 128 231	N/A	108 851 847	1 310 367	C	108 851 847	1 310 367
	Indonesia	242 325 638	147 818 639	41 195 358	N/A	2 027 949	1 322 451	P+C	962 090	256 592
	Myanmar	48 336 763	29 002 058	17 884 602	N/A	1 210 465	567 452	P+C	1 108 307	465 294
	Nepal	30 485 798	25 486 127	1 127 975	N/A	188 702	71 752	P+C	120 364	3 414
	Sri Lanka	21 045 394	N/A	N/A	1 503 461	985 060	175	C	985 060	175
	Thailand	69 518 555	34 759 278	5 561 484	N/A	1 450 885	24 897	C	1 450 885	24 897
	Timor-Leste	1 153 834	1 153 834	888 452	N/A	225 772	36 064	P+C	209 447	19 739
Western Pacific	Cambodia	14 305 183	7 581 747	6 294 281	N/A	216 712	57 423	P+C	216 712	57 423
	China	1 347 565 324	563 574 114	191 908	N/A	9 190 401	4 498	P+C	9 189 270	3 367
	Lao People's Democratic Republic	6 288 037	3 709 942	2 263 693	N/A	291 490	17 904	P+C	291 421	17 835
	Malaysia	28 859 154	N/A	N/A	1 185 947	1 600 439	5 306	C	1 600 439	5 306
	Papua New Guinea	7 013 829	7 013 829	6 592 999	N/A	1 151 343	1 025 082	S	207 189	80 928
	Philippines	94 852 030	75 676 146	6 804 602	N/A	327 060	9 552	C	327 060	9 552
	Republic of Korea	48 391 343	N/A	N/A	3 667 782	838	838	C	–	838
	Solomon Islands	552 267	546 744	546 744	N/A	254 506	80 859	P+C	200 304	26 657
	Vanuatu	245 619	243 163	243 163	N/A	32 656	5 764	P+C	31 712	4 820
	Viet Nam	88 791 996	33 290 996	15 588 193	N/A	3 312 266	45 588	P+C	3 283 290	16 612

		UN Population	At risk (low + high)	At risk (high)	Number of people living in active foci	Suspected malaria cases	Presumed and confirmed malaria cases	Mic. slides/ RDTs performed	Mic. slides/ RDTs positive
	African	854 022 638	725 866 991	591 229 839	0	106 235 447	79 381 896	49 520 612	22 319 014
	Region of the Americas	554 226 750	118 624 106	24 533 649	0	7 025 179	490 545	7 002 129	490 627
	Eastern Mediterranean	424 544 433	270 785 779	92 658 534	999 401	11 215 309	3 049 930	9 724 353	1 130 767
	European	127 404 450	–	–	3 108 241	1 959 955	226	1 959 955	226
	South-East Asia	1 830 041 152	1 359 285 241	343 885 209	16 683 990	115 401 789	3 401 898	114 149 096	2 149 205
	Western Pacific	1 636 864 782	691 636 681	38 525 584	4 853 729	16 377 711	1 252 814	15 347 397	223 338
	Total	**5 427 104 205**	**3 166 198 798**	**1 090 832 816**	**25 645 361**	**258 215 390**	**87 577 309**	**197 703 542**	**26 313 177**

C=Confirmed P=Probable S=Suspected

[1] Method 1 for cases: Adjusted data reported by countries
Method 2 for cases: Modeled relationship between malaria transmission, case incidence and intervention coverage
Method 1 for deaths: Fixed case fatality rate applied to case estimates
Method 2 for deaths: Modeled relationship between malaria transmission, malaria mortality and intervention coverage
See *World Malaria Report 2011* for more details of methods used

[2] South Sudan became a separate State on 9 July 2011 and a Member State of WHO on 27 September 2011. South Sudan and Sudan have distinct epidemiological profiles comprising high transmission and low transmission areas respectively. For this reason data up to June 2011 from the high transmission areas of Sudan (10 southern states which correspond to South Sudan) and low transmission areas (15 northern states which correspond to contemporary Sudan) are reported separately

[3] Estimates for Sudan in 2010 include only the 15 northern states now known as Sudan and the 10 southern states now South Sudan

Reported malaria cases				Inpatient malaria cases and deaths		Estimate, 2010							
P. falciparum	*P. vivax*	Imported cases	Cases at community level	Inpatient malaria cases	Malaria attributed deaths	Method used to calulate[1]		Cases			Deaths		
						Cases	Deaths	Lower	Point	Upper	Lower	Point	Upper
5 581	71 968	–	0	5 144	40	(1)	(1)	155 613	607 576	1 802 067	29	162	557
–	–	–	0	0	0	(1)	(1)	5 908	13 072	41 596	12	39	133
463	2 668	1 529	–	–	–	(1)	(1)	1 936	2 174	2 340	0	1	1
3	7	11	–	–	0	(1)	(1)	0	0	0	0	0	0
–	–	–	–	–	4	(1)	(1)	1 204 786	1 781 052	2 624 223	684	1 586	2 894
1 045	1 719	2 719	–	–	2	(1)	(1)	30	34	37	0	0	0
–	–	–	–	8 613	5	(1)	(2)	275 227	833 331	2 540 208	1 200	2 390	4 901
112 024	–	–	677 869	–	406	–	–	–	–	–	–	–	–
–	–	–	–	95 271	612	(1)	(2)	3 078 737	6 532 060	12 814 280	4 324	9 350	27 665
59 689	478	–	–	1 474	75	(1)	(1)	161 998	590 299	1 525 486	372	1 741	4 693
2	6	4	–	–	–	(1)	(1)	53	59	63	0	0	0
3	3	5	–	–	–	(1)	(1)	0	0	0	0	0	0
1	4	5	–	–	–	(1)	(1)	3	4	4	0	0	0
5	73	13	–	–	–	(1)	(1)	117	131	141	0	0	0
97	30	127	–	–	–	(1)	(1)	9	11	11	0	0	0
1	0	1	–	–	–	(1)	(1)	3	4	4	0	0	0
17 543	2 579	–	45 703	3 095	36	(1)	(1)	436 150	589 954	785 045	621	1 327	2 181
87	92	–	0	101	1	(1)	(1)	557	757	1 434	0	1	2
0	16 760	1 127	–	–	–	(1)	(1)	27 991	31 379	33 801	0	0	0
667 324	645 299	–	–	–	753	(1)	(1)	18 610 460	24 161 690	34 266 940	19 753	29 401	43 665
125 412	113 664	–	0	–	388	(1)	(1)	3 933 523	5 453 703	7 699 682	4 028	8 631	15 156
59 604	28 966	–	–	33 732	581	(1)	(1)	1 214 599	1 525 002	1 954 688	1 644	3 244	5 345
219	1 631	1 126	0	540	2	(1)	(1)	13 844	19 230	25 618	7	14	24
12	158	51	–	–	–	(1)	(1)	764	2 221	6 205	0	0	1
5 710	8 608	–	–	4 343	43	(1)	(1)	38 801	140 844	367 554	39	175	517
14 261	3 758	–	–	1 011	16	(1)	(1)	91 933	116 664	142 924	122	251	410
7 054	5 155	–	139 894	10 744	94	(1)	(1)	151 252	191 319	248 503	188	381	642
1 370	1 907	–	–	–	33	(1)	(1)	6 590	12 253	21 447	3	10	20
5 770	442	–	–	846	17	(1)	(1)	47 944	69 005	96 968	93	202	359
973	2 422	1 142	–	–	–	(1)	(1)	8 869	16 223	28 446	6	16	35
59 153	9 654	–	–	17 065	431	(1)	(1)	886 448	1 230 604	1 610 706	1 391	3 038	5 138
6 877	2 380	–	31	1 127	12	(1)	(1)	38 414	58 976	82 451	60	143	253
56	782	64	–	–	–	(1)	(1)	2 342	4 346	7 604	0	0	0
14 454	8 665	–	–	1 545	19	(1)	(1)	55 413	65 015	75 727	66	127	194
770	1 224	–	1 499	74	1	(1)	(1)	19 001	25 584	33 745	16	33	56
10 101	5 602	–	31 459	10 265	14	(1)	(1)	22 006	25 200	28 470	29	56	87

P. falciparum	*P. vivax*	Imported cases	Cases at community level	Inpatient malaria cases	Malaria attributed deaths
3 662 043	671 109	187	3 520 779	5 347 469	103 126
110 414	363 948	0	37 223	6 742	113
178 805	76 840	4 259	677 869	110 502	1 144
109	116	155	–	–	0
890 172	821 515	2 304	45 703	42 822	1 820
106 578	38 233	1 206	172 883	41 666	621
4 948 121	**1 971 761**	**8 111**	**4 454 457**	**5 549 201**	**106 824**

Estimated cases			Estimated deaths		
Lower	Point	Upper	Lower	Point	Upper
109 930 000	174 288 000	242 158 000	428 700	596 300	772 400
904 000	1 061 000	1 254 000	700	1 100	1 800
6 443 000	10 360 000	16 602 000	7 200	15 300	23 500
200	200	200	0	0	0
25 919 000	32 041 000	41 866 000	31 100	43 000	60 300
1 348 000	1 699 000	2 096 000	2 400	4 000	6 100
154 000 000	**219 000 000**	**289 000 000**	**490 000**	**660 000**	**836 000**

Annex 6B – Estimated cases and deaths by region, 2000-2010

Cases	2000	2001	2002	2003	2004
Africa	175 000 000	179 000 000	183 000 000	188 000 000	190 000 000
Americas	2 200 000	1 700 000	1 600 000	1 500 000	1 500 000
Eastern Mediterranean	10 000 000	9 200 000	9 100 000	10 400 000	7 700 000
Europe	38 000	28 000	24 000	19 000	11 000
South–East Asia	32 700 000	32 000 000	29 700 000	30 500 000	31 600 000
Western Pacific	2900000	2500000	2300000	2500000	2900000
World	**223 000 000**	**225 000 000**	**226 000 000**	**233 000 000**	**234 000 000**
Lower bound	158 000 000	157 000 000	159 000 000	163 000 000	163 000 000
Upper bound	**291 000 000**	**294 000 000**	**297 000 000**	**305 000 000**	**310 000 000**

Deaths	2000	2001	2002	2003	2004
Africa	682 000	705 000	726 000	740 000	748 000
Americas	2 100	1 900	1 300	1 400	1 500
Eastern Mediterranean	17 000	17 000	18 000	17 000	15 000
Europe	–	–	–	–	–
South–East Asia	46 000	41 000	37 000	36 000	38 000
Western Pacific	7200	6100	5400	6000	6700
World	**754 000**	**771 000**	**788 000**	**800 000**	**810 000**
Lower bound	561 000	570 000	583 000	595 000	603 000
Upper bound	**955 000**	**978 000**	**1 001 000**	**1 019 000**	**1 029 000**

2005	2006	2007	2008	2009	2010	Lower	Upper
191 000 000	189 000 000	187 000 000	182 000 000	179 000 000	174 000 000	110 000 000	242 000 000
1 700 000	1 400 000	1 200 000	900 000	1 000 000	1 100 000	900 000	1 300 000
7 900 000	8 000 000	9 800 000	10 500 000	10 800 000	10 400 000	6 400 000	16 600 000
6 000	3 000	1 000	1 000	–	–	–	–
35 900 000	29 000 000	28 400 000	29 100 000	29 000 000	32 000 000	25 900 000	41 900 000
2400000	2500000	2000000	1700000	1900000	1700000	1 300 000	2 100 000
239 000 000	**230 000 000**	**229 000 000**	**224 000 000**	**221 000 000**	**219 000 000**		
167 000 000	159 000 000	158 000 000	156 000 000	154 000 000	154 000 000		
316 000 000	**305 000 000**	**302 000 000**	**297 000 000**	**291 000 000**	**289 000 000**		

2005	2006	2007	2008	2009	2010	Lower	Upper
740 000	727 000	701 000	654 000	630 000	596 000	451 000	813 000
1 700	1 500	1 200	1 000	1 200	1 100	700	2 000
16 000	15 000	16 000	15 000	15 000	15 000	7 000	24 000
–	–	–	–	–	–	–	–
38 000	32 000	33 000	37 000	39 000	43 000	29 000	54 000
5000	5300	4500	4000	4400	4000	2 600	6 800
800 000	**781 000**	**755 000**	**711 000**	**690 000**	**660 000**		
597 000	582 000	564 000	528 000	511 000	490 000		
1 015 000	**990 000**	**956 000**	**901 000**	**873 000**	**836 000**		

Annex 6C – Reported malaria cases by method of confirmation, 1990-2011

WHO Region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997
African	Algeria	Presumed and confirmed	152	229	106	84	206	107	221	197
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Angola	Presumed and confirmed	243 673	1 143 701	782 988	722 981	667 376	156 603	–	893 232
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Benin	Presumed and confirmed	92 870	118 796	290 868	403 327	546 827	579 300	623 396	670 857
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Botswana	Presumed and confirmed	10 750	14 364	4 995	55 331	29 591	17 599	80 004	101 887
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Burkina Faso	Presumed and confirmed	496 513	448 917	420 186	502 275	472 355	501 020	582 658	672 752
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Burundi	Presumed and confirmed	92 870	568 938	773 539	828 429	831 481	932 794	974 226	670 857
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Cameroon	Presumed and confirmed	869 048	787 796	664 413	478 693	189 066	784 321	931 311	787 796
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Cape Verde	Presumed and confirmed	69	80	38	44	21	127	77	20
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Central African Republic	Presumed and confirmed	174 436	125 038	89 930	82 072	82 057	100 962	95 259	99 718
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Chad	Presumed and confirmed	212 554	246 410	229 444	234 869	278 225	293 564	278 048	343 186
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Comoros	Presumed and confirmed	–	–	–	12 012	13 860	15 707	15 509	–
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Congo	Presumed and confirmed	32 428	32 391	21 121	15 504	35 957	28 008	14 000	9 491
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Côte d'Ivoire	Presumed and confirmed	511 916	466 895	553 875	421 043	–	755 812	1 109 011	983 089
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Democratic Republic of the Congo	Presumed and confirmed	–	–	–	–	–	–	198 064	–
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Equatorial Guinea	Presumed and confirmed	25 552	22 598	25 100	17 867	14 827	12 530	–	–
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Eritrea	Presumed and confirmed	–	–	–	–	–	81 183	129 908	–
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Ethiopia	Presumed and confirmed	–	–	206 262	305 616	358 469	412 609	478 411	509 804
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–

1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
–	701	27 733	26 411	18 803	17 059	16 686	18 392	13 869	14 745	11 964	15 635	12 224	12 165
–	–	27 733	26 411	18 803	17 059	16 686	18 392	13 869	14 745	11 964	15 635	12 224	11 974
–	–	541	435	307	427	163	299	117	288	196	94	408	191
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	506	427	299	421	160	297	116	261	192	90	396	187
1 169 028	1 471 993	2 080 348	1 249 767	1 862 662	3 246 258	2 489 170	2 329 316	2 283 097	2 295 136	2 151 072	2 221 076	2 783 619	2 534 549
–	–	–	–	–	–	–	–	–	1 458 123	2 118 053	2 172 036	1 947 349	1 765 933
–	–	–	–	–	–	–	889 572	1 029 198	1 295 535	1 106 534	1 120 410	1 324 264	1 147 473
–	–	–	–	–	–	–	–	106 801	506 756	541 291	906 916	639 476	833 753
–	–	–	–	–	–	–	–	53 200	237 950	271 458	453 012	358 606	484 809
–	–	–	–	–	–	–	–	–	–	–	–	–	–
650 025	709 348	–	717 290	782 818	819 256	853 034	803 462	861 847	1 171 522	1 147 005	1 256 708	1 432 095	1 283 183
–	–	–	–	–	–	–	–	–	0	0	0	–	88 134
–	–	–	–	–	–	–	–	–	0	0	534 590	–	68 745
–	–	–	–	–	–	–	–	–	0	0	–	–	475 986
–	–	–	–	–	–	–	–	–	0	0	355 007	–	354 223
–	–	–	–	–	–	–	–	–	–	–	–	–	–
59 696	72 640	71 555	48 281	28 907	23 657	22 404	11 242	23 514	16 983	17 886	14 878	12 196	1 141
–	–	–	–	–	–	–	–	–	14 200	23 253	17 553	–	–
–	–	8 056	4 716	1 588	1 830	3 453	530	2 548	381	914	951	1 046	432
–	–	–	–	–	–	–	–	–	113	941	1 053	–	–
–	–	–	–	–	–	–	–	–	9	13	73	–	432
–	–	–	–	–	–	–	–	–	–	–	–	–	–
721 480	867 866	–	322 581	1 156 074	1 411 928	1 512 026	1 563 768	1 983 085	2 404 759	3 688 338	4 399 837	5 409 156	4 730 228
–	–	–	30 006	32 796	31 256	52 874	73 262	122 047	127 120	138 414	137 632	177 879	272 301
–	–	–	–	–	–	18 256	21 335	44 265	44 246	36 514	59 420	88 540	83 857
–	–	–	–	–	–	–	–	–	–	–	182 658	940 985	450 281
–	–	–	–	–	–	–	–	–	–	–	123 107	715 999	344 256
–	–	–	–	–	–	–	–	–	–	–	–	–	–
687 301	1 936 584	3 076 538	3 149 338	2 423 268	1 996 275	1 505 270	1 757 589	1 771 257	1 363 360	1 334 939	1 764 343	2 919 866	1 829 644
–	–	484 249	508 558	530 019	600 369	608 017	903 942	1 034 519	1 411 407	1 161 153	1 537 768	2 825 558	2 859 720
–	–	308 095	312 015	327 138	353 459	363 395	327 464	649 756	860 606	690 748	893 314	1 599 908	1 485 332
–	–	–	–	–	–	–	–	251 925	406 738	330 915	472 341	273 324	181 489
–	–	–	–	–	–	–	–	141 975	241 038	185 993	292 308	163 539	86 542
–	–	–	–	–	–	–	–	–	–	–	–	–	–
664 413	–	–	–	–	–	–	277 413	634 507	604 153	1 650 749	1 883 199	1 845 691	598 492
–	–	–	–	–	–	–	–	–	–	–	–	–	1 110 308
–	–	–	–	–	–	–	–	–	313 083	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	120 466
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
41	29	144	107	18	68	45	68	80	18	35	65	47	36
–	–	6 843	7 141	8 022	6 001	9 833	7 902	6 979	7 402	7 033	–	–	–
–	–	144	107	18	68	45	68	80	18	35	65	47	–
–	–	–	–	–	–	–	–	1 750	1 500	2 000	21 913	–	26 508
–	–	–	–	–	–	–	–	–	–	–	–	–	36
–	–	15	7	76	20	13	14	17	16	19	–	29	–
105 664	127 964	89 614	140 742	–	78 094	129 367	131 856	114 403	119 477	152 260	175 210	66 484	221 980
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
395 205	392 815	431 836	446 289	516 248	496 546	480 957	496 075	233 614	502 236	462 573	474 257	345 015	528 454
–	–	45 283	43 180	44 689	54 381	1 525	37 439	62 895	64 884	64 171	74 791	89 749	–
–	–	40 078	38 287	43 933	45 195	1 360	31 668	45 155	48 288	47 757	–	75 342	86 348
–	–	–	–	–	–	–	–	–	–	–	–	309 927	114 122
–	–	–	–	–	–	–	–	–	–	–	–	125 106	94 778
–	–	–	–	–	–	–	–	–	–	–	–	–	–
3 844	9 793	–	–	–	–	43 918	29 554	54 830	53 511	46 426	49 679	47 364	24 856
–	–	–	–	–	–	–	–	–	–	–	13 387	87 595	63 217
–	–	–	–	–	–	12 874	6 086	20 559	–	–	5 982	35 199	22 278
–	–	–	–	–	–	–	–	–	–	–	–	5 249	20 226
–	–	–	–	–	–	–	–	–	–	–	–	1 339	2 578
–	–	–	–	–	–	–	–	–	–	–	–	–	–
17 122	–	–	–	–	–	–	–	157 757	103 213	117 291	92 855	–	233 633
–	–	–	–	–	–	–	–	–	163 924	203 869	203 160	–	114 678
–	–	–	–	–	–	–	–	–	103 213	117 291	92 855	–	71 048
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	1 193 288	1 109 751	1 136 810	1 275 138	1 280 914	1 253 408	1 277 670	1 327 520	1 820 000	1 721 461	2 568 152
–	–	–	–	–	–	–	–	–	–	19 661	34 755	–	49 828
–	–	–	–	–	–	–	–	–	–	3 527	7 388	62 726	29 976
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
141 353	1 508 042	961 762	2 197 534	2 638 199	4 384 256	4 130 878	6 332 048	5 006 230	3 277 830	3 938 597	6 749 112	7 937 162	6 865 504
–	–	3 758	3 244	3 704	4 820	5 320	5 531	4 779	1 181 323	2 613 038	2 956 592	3 678 849	4 226 533
–	–	897	1 531	1 735	2 438	2 684	2 971	2 050	740 615	1 618 091	1 873 816	2 374 930	2 700 818
–	–	–	–	–	–	–	–	–	2 275	428	12 436	54 728	2 912 088
–	–	–	–	–	–	–	–	–	243	127	4 889	42 850	1 861 163
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	15 828	62 312	78 983	72 551	33 830
–	–	–	–	–	–	–	–	–	10 752	11 815	15 960	42 585	23 004
–	–	–	–	–	–	–	–	–	5 842	7 883	11 603	39 636	20 601
–	–	–	–	–	–	–	–	–	655	2 572	3 773	16 772	2 899
–	–	–	–	–	–	–	–	–	445	1 620	2 581	14 177	1 865
–	–	–	–	–	–	–	–	–	–	–	–	–	–
255 150	147 062	–	125 746	74 861	65 517	27 783	24 192	10 148	19 568	10 572	21 298	53 750	39 567
–	–	–	22 637	52 228	52 428	41 361	48 937	46 096	68 905	54 075	68 407	79 024	67 190
–	–	–	9 716	6 078	10 346	4 119	9 073	6 541	9 528	4 364	6 633	13 894	15 308
–	–	–	–	–	–	–	–	–	7 520	6 566	0	0	25 570
–	–	–	–	–	–	–	–	–	6 037	4 400	5 126	22 088	19 540
–	–	–	–	–	–	–	–	–	–	–	–	–	–
604 960	647 919	–	2 555 314	2 929 685	3 582 097	5 170 614	3 901 957	3 038 565	2 557 152	2 532 645	3 043 203	4 068 764	3 549 559
–	–	–	851 942	1 115 167	1 010 925	1 312 422	1 364 194	785 209	739 627	986 323	2 065 237	2 509 544	3 418 719
–	–	–	392 377	427 795	463 797	578 904	538 942	447 780	451 816	458 561	927 992	1 158 197	1 480 306
–	–	–	0	0	0	0	–	–	–	–	262 877	–	–
–	–	–	–	–	–	–	–	–	–	–	108 324	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–

Annex 6C – Reported malaria cases by method of confirmation, 1990-2011 (continued)

WHO Region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997
African	Gabon	Presumed and confirmed	57 450	80 247	100 629	70 928	82 245	54 849	74 310	57 450
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Gambia	Presumed and confirmed	222 538	215 414	188 035	–	299 824	135 909	266 189	325 555
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Ghana	Presumed and confirmed	1 438 713	1 372 771	1 446 947	1 697 109	1 672 709	1 928 316	2 189 860	2 227 762
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Guinea	Presumed and confirmed	21 762	17 718	–	–	607 560	600 317	772 731	802 210
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Guinea-Bissau	Presumed and confirmed	81 835	64 123	56 073	158 748	–	197 386	6 457	10 632
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Kenya	Presumed and confirmed	–	–	–	–	6 103 447	4 343 190	3 777 022	–
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Liberia	Presumed and confirmed	–	–	–	–	–	–	239 998	826 151
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Madagascar	Presumed and confirmed	–	–	–	–	–	196 358	–	–
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Malawi	Presumed and confirmed	3 870 904	–	–	4 686 201	4 736 974	–	6 183 290	2 761 269
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Mali	Presumed and confirmed	248 904	282 256	280 562	295 737	263 100	95 357	29 818	384 907
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Mauritania	Presumed and confirmed	26 903	42 112	45 687	43 892	156 080	214 478	181 204	189 571
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Mozambique	Presumed and confirmed	–	–	–	–	–	–	12 794	–
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Namibia	Presumed and confirmed	–	–	–	380 530	401 519	275 442	345 177	390 601
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Niger	Presumed and confirmed	1 162 824	808 968	865 976	726 666	806 204	778 175	1 162 824	978 855
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Nigeria	Presumed and confirmed	1 116 992	909 656	1 219 348	981 943	1 175 004	1 133 926	1 149 435	1 148 542
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Rwanda	Presumed and confirmed	1 282 012	1 331 494	1 373 247	733 203	371 550	1 391 931	1 145 759	1 331 494
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Sao Tome and Principe	Presumed and confirmed	–	–	–	–	–	51 938	47 074	47 757
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–

1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
80 247	–	127 024	132 918	157 440	166 321	170 182	176 610	33 458	93 529	77 278	112 840	159 313	–
–	–	–	–	–	–	100 107	129 513	136 916	142 406	151 137	1 623	30 299	–
–	–	50 810	53 167	62 976	58 212	70 075	70 644	33 458	45 186	40 701	660	8 276	–
–	–	–	–	–	–	–	–	–	–	–	–	2 059	–
–	–	–	–	–	–	–	–	–	–	–	–	290	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	127 899	–	481 590	620 767	540 165	395 043	329 426	427 598	439 798	508 846	479 409	116 353	261 967
–	–	–	–	–	–	–	–	–	–	–	–	290 842	172 241
–	–	–	–	–	–	–	–	–	–	39 164	50 378	52 245	71 588
–	–	–	–	–	–	–	–	–	–	–	–	123 564	–
–	–	–	–	–	–	–	–	–	–	–	–	64 108	190 379
–	–	–	–	–	–	–	–	–	–	–	–	–	–
1 745 214	2 895 079	3 349 528	3 044 844	3 140 893	3 552 896	3 416 033	3 452 969	3 511 452	3 123 147	3 050 513	1 899 544	2 642 221	3 240 791
–	–	–	–	–	–	–	–	–	0	1 100 238	2 431 048	2 031 674	1 172 838
–	–	–	–	–	–	475 441	655 093	472 255	476 484	956 359	962 599	1 029 384	624 756
–	–	–	–	–	–	–	–	–	–	143 879	468 449	247 278	781 892
–	–	–	–	–	–	–	–	–	–	138 124	141 771	42 253	416 504
–	–	–	–	–	–	–	–	–	–	–	–	–	–
817 949	807 895	816 539	851 877	850 147	731 911	876 837	850 309	834 835	888 643	657 003	812 471	1 092 554	1 101 975
–	–	–	–	–	–	–	–	–	–	–	–	–	43 549
–	–	4 800	6 238	16 561	107 925	103 069	50 452	41 228	28 646	33 405	20 932	–	5 450
–	–	–	–	–	–	–	–	16 554	21 150	–	20 866	–	139 066
–	–	–	–	–	–	–	–	12 999	15 872	–	14 909	–	90 124
–	–	–	–	–	–	–	–	–	–	–	–	–	–
2 113	197 454	246 316	202 379	194 976	162 344	187 910	166 431	128 978	120 105	128 758	143 011	85 280	71 982
–	–	–	–	–	–	–	33 721	34 862	34 384	31 083	25 379	48 799	57 698
–	–	–	–	–	–	–	14 659	15 120	14 284	11 299	11 757	30 239	21 320
–	–	–	–	–	–	–	–	–	–	–	25 000	56 455	139 531
–	–	–	–	–	–	–	–	–	–	–	–	20 152	50 662
–	–	–	–	–	–	–	–	–	–	–	–	–	–
80 718	122 792	4 216 531	3 262 931	3 295 805	5 280 498	7 513 874	9 181 224	8 926 058	9 610 691	839 904	8 123 689	4 585 712	9 114 566
–	–	–	–	43 643	96 893	59 995	–	–	–	–	–	2 384 402	3 009 051
–	–	–	–	20 049	39 383	28 328	–	–	–	839 904	–	898 531	1 002 805
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
777 754	–	–	–	–	–	–	44 875	886 543	553 774	606 952	871 560	2 263 973	2 074 391
–	–	–	–	–	–	–	8 718	165 095	123 939	238 752	327 392	335 973	728 443
–	–	–	–	–	–	–	5 025	115 677	80 373	157 920	212 657	212 927	577 641
–	–	–	–	–	–	–	57 325	880 952	508 987	635 855	676 569	998 043	1 593 676
–	–	–	–	–	–	–	39 850	645 738	411 899	449 032	626 924	709 246	1 338 121
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	1 141 474	1 367 854	1 361 475	1 576 439	2 167 873	1 426 872	1 198 195	1 063 934	578 175	116 538	215 110	202 450	224 498
–	–	31 575	33 354	27 752	37 333	39 174	37 943	29 318	30 921	30 566	23 963	24 393	34 813
–	–	6 946	8 538	5 272	6 909	7 638	6 753	5 689	4 823	4 096	2 720	2 173	3 447
–	–	–	–	–	–	–	–	–	175 595	299 000	610 035	604 114	739 572
–	–	–	–	–	–	–	–	–	43 674	89 138	212 390	200 277	221 051
–	–	–	–	–	–	–	–	–	–	–	–	–	–
2 985 659	4 193 145	3 646 212	3 823 796	2 784 001	3 358 960	2 871 098	3 688 389	4 498 949	4 786 045	5 185 082	6 183 816	6 851 108	5 338 701
–	–	–	–	–	–	–	–	–	–	–	–	–	119 996
–	–	–	–	–	–	–	–	–	–	–	–	–	50 526
–	–	–	–	–	–	–	–	–	–	–	–	–	580 708
–	–	–	–	–	–	–	–	–	–	–	–	–	253 973
–	–	–	–	–	–	–	–	–	–	–	–	–	–
12 234	530 197	546 634	612 896	723 077	809 428	1 969 214	962 706	1 022 592	1 291 853	1 045 424	1 633 423	1 018 846	1 293 547
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	1 380 178	974 558
–	–	–	–	–	–	–	–	–	–	–	–	227 482	307 035
–	–	–	–	–	–	–	–	–	–	–	–	–	–
168 131	253 513	–	243 942	224 614	318 120	224 840	223 472	158 073	222 476	199 791	167 705	238 565	145 186
–	–	–	–	–	–	–	–	31 013	–	835	3 717	5 449	3 752
–	–	–	–	–	–	–	–	1 061	–	268	603	909	1 130
–	–	–	–	–	–	–	–	–	–	720	4 338	2 299	7 991
–	–	–	–	–	–	–	–	–	–	34	337	1 085	1 796
–	–	–	–	–	–	–	–	–	–	–	–	–	–
194 024	2 336 640	–	–	–	–	–	–	–	6 155 082	4 831 491	4 310 086	1 522 577	1 756 874
–	–	–	–	–	–	–	–	–	–	–	–	1 950 933	2 504 720
–	–	–	–	–	–	–	–	–	141 663	120 259	93 874	644 568	1 093 742
–	–	–	–	–	–	–	–	–	–	–	–	2 287 536	2 966 853
–	–	–	–	–	–	–	–	–	–	–	–	878 009	663 132
–	–	–	–	–	–	–	–	–	–	–	–	–	–
353 110	429 571	–	538 512	445 803	468 259	610 799	339 204	265 595	172 024	132 130	87 402	25 889	14 406
–	–	–	–	–	–	–	–	–	–	24 361	16 059	14 522	13 262
–	–	–	41 636	23 984	20 295	36 043	23 339	27 690	4 242	1 092	505	556	335
–	–	–	–	–	–	–	–	–	–	0	0	0	48 599
–	–	–	–	–	–	–	–	–	–	0	0	0	1 525
–	–	–	–	–	–	–	–	–	–	–	–	–	–
872 925	815 895	–	1 340 142	888 345	681 783	754 934	745 428	790 817	249 027	496 858	309 675	620 058	2 677 186
–	–	–	–	–	–	81 814	107 092	87 103	1 308 896	2 229 812	2 358 156	165 514	130 658
–	–	–	–	–	56 460	76 030	46 170	–	55 628	62 243	79 066	49 285	68 529
–	–	–	–	–	–	–	21 230	12 567	1 308 896	530 910	312 802	7 426 774	1 130 514
–	–	–	–	–	–	–	9 873	3 956	193 399	434 615	230 609	570 773	712 347
–	–	–	–	–	–	–	–	–	–	–	–	–	–
2 122 663	1 965 486	2 476 608	2 253 519	2 605 381	2 608 479	3 310 229	3 532 108	3 982 372	2 969 950	2 834 174	4 295 686	3 873 463	3 392 234
–	–	–	–	–	–	–	–	–	–	–	–	–	672 185
–	–	–	150	380	–	–	–	–	–	143 079	335 201	523 513	–
–	–	–	–	–	–	–	–	–	–	–	–	45 924	242 526
–	–	–	–	–	–	–	–	–	–	–	144 644	27 674	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
1 279 581	906 552	–	1 003 793	1 073 546	1 217 405	1 303 494	1 654 246	1 429 072	946 569	772 197	1 247 583	638 669	208 858
–	–	–	748 806	951 797	1 071 519	1 201 811	1 438 603	1 523 892	1 754 196	1 640 106	2 637 468	2 708 973	1 602 271
–	–	–	423 493	506 028	553 150	589 315	683 769	573 686	382 686	316 242	698 745	638 669	208 858
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
46 026	37 026	32 149	44 034	50 953	47 830	53 991	22 370	7 293	2 421	6 258	6 182	3 346	6 504
–	–	66 076	83 045	93 882	81 372	97 836	68 819	58 672	49 298	38 583	59 228	48 366	83 355
–	–	31 975	42 086	50 586	42 656	46 486	18 139	5 146	2 421	1 647	3 798	2 233	6 373
–	–	–	–	–	–	–	–	–	–	140 478	60 649	9 989	33 924
–	–	–	–	–	–	–	–	–	–	4 611	2 384	507	2 069
–	–	–	–	–	–	–	–	–	–	–	–	–	–

Annex 6C – Reported malaria cases by method of confirmation, 1990-2011 (continued)

WHO Region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997
African	Senegal	Presumed and confirmed	–	–	–	–	450 071	628 773	–	861 276
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Sierra Leone	Presumed and confirmed	–	–	–	–	–	–	7 192	209 312
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	South Africa	Presumed and confirmed	6 822	4 693	2 872	13 285	10 289	8 750	27 035	23 121
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Swaziland	Presumed and confirmed	–	–	–	–	–	–	38 875	23 754
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Togo	Presumed and confirmed	810 509	780 825	634 166	561 328	328 488	–	352 334	366 672
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Uganda	Presumed and confirmed	–	–	2 446 659	1 470 662	2 191 277	1 431 068	–	2 317 840
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	United Republic of Tanzania	Presumed and confirmed	10 715 736	8 715 736	7 681 524	8 777 340	7 976 590	2 438 040	4 969 273	1 131 655
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Mainland	Presumed and confirmed	–	–	–	–	–	–	–	–
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Zanzibar	Presumed and confirmed	–	–	–	–	–	–	–	–
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Zambia	Presumed and confirmed	1 933 696	2 340 994	2 953 692	3 514 000	3 514 000	2 742 118	3 215 866	–
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Zimbabwe	Presumed and confirmed	662 613	581 168	420 137	877 734	324 188	761 791	1 696 192	1 849 383
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
Region of the Americas	Argentina	Presumed and confirmed	1 660	803	643	758	948	1 065	2 048	592
		Microscopy examined	22 625	16 844	13 619	11 389	14 070	12 986	12 833	9 684
		Confirmed with microscopy	1 660	803	643	758	948	1 065	2 048	592
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Bahamas	Presumed and confirmed	4	3	2	2	0	3	0	8
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	4	3	2	2	0	3	0	8
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	4	3	2	2	0	3	0	8
	Belize	Presumed and confirmed	3 033	3 317	5 341	8 586	10 411	9 413	6 605	4 014
		Microscopy examined	17 204	25 281	24 135	47 742	50 740	37 266	35 113	26 598
		Confirmed with microscopy	3 033	3 317	5 341	8 586	10 411	9 413	6 605	4 014
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Bolivia (Plurinational State of)	Presumed and confirmed	19 680	19 031	24 486	27 475	34 749	46 911	64 012	51 478
		Microscopy examined	121 743	125 509	125 414	125 721	128 580	152 748	161 077	141 804
		Confirmed with microscopy	19 680	19 031	24 486	27 475	34 749	46 911	64 012	51 478
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Brazil	Presumed and confirmed	560 396	614 431	609 860	483 367	564 406	565 727	455 194	405 051
		Microscopy examined	3 294 234	3 283 016	2 955 196	2 551 704	2 671 953	2 582 017	2 159 551	1 869 382
		Confirmed with microscopy	560 396	614 431	609 860	483 367	564 406	565 727	455 194	405 051
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Colombia	Presumed and confirmed	99 489	184 156	184 023	129 377	127 218	187 082	135 923	180 898
		Microscopy examined	496 087	740 938	736 426	656 632	572 924	667 473	461 137	583 309
		Confirmed with microscopy	99 489	184 156	184 023	129 377	127 218	187 082	135 923	180 898
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–

1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
948 823	1 145 112	1 123 377	931 682	960 478	1 414 383	1 195 402	1 346 158	1 555 310	1 002 918	443 828	222 232	–	–
–	–	–	–	–	–	–	–	–	195 487	48 324	43 026	–	–
–	–	44 959	14 261	15 261	28 272	23 171	38 746	49 366	78 278	24 830	19 614	–	–
–	–	–	–	–	–	–	–	–	90 161	487 188	485 548	–	–
–	–	–	–	–	–	–	–	–	40 054	217 096	146 319	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
249 744	409 670	460 881	445 047	500 227	516 634	352 859	224 584	148 625	653 987	851 478	646 808	934 028	638 859
–	–	–	4 985	10 605	12 298	4 985	10 605	12 298	–	471 600	770 463	718 473	46 280
–	–	–	2 206	3 702	3 945	2 206	3 702	3 945	–	154 459	273 149	218 473	25 511
–	–	–	–	–	–	–	3 452	4 675	–	235 800	544 336	1 609 455	886 994
–	–	–	–	–	–	–	1 106	987	–	154 459	373 659	715 555	613 348
–	–	–	–	–	–	–	–	–	–	–	–	–	–
26 445	51 444	64 624	26 506	15 649	13 459	13 399	7 755	14 456	6 327	7 796	6 117	8 060	9 866
–	–	–	–	–	–	–	–	–	–	–	–	15 900	178 387
–	–	–	26 506	15 649	13 459	13 399	7 755	12 098	6 327	7 796	6 072	3 787	5 986
–	–	–	–	–	–	–	–	–	–	–	–	276 669	204 047
–	–	–	–	–	–	–	–	–	–	–	–	4 273	3 880
–	–	–	–	–	–	–	–	–	–	–	3 313	4 185	–
4 410	30 420	29 374	12 854	10 129	7 203	5 140	6 066	7 807	6 338	5 881	6 624	1 722	797
–	–	–	24 123	13 997	12 564	6 754	4 587	3 985	0	0	0	0	0
–	–	–	1 395	670	342	574	279	155	84	58	106	87	130
–	–	–	–	–	–	–	–	–	–	–	1	767	2 223
–	–	–	–	–	–	–	–	–	–	–	1	181	419
–	–	–	–	–	–	–	–	–	–	–	–	–	–
368 472	412 619	–	498 826	583 872	490 256	516 942	437 662	566 450	516 640	602 908	618 842	617 101	519 450
–	–	–	–	–	–	–	–	–	231 860	321 171	420 053	478 354	502 977
–	–	–	–	–	–	–	–	–	117 720	152 724	192 966	224 087	237 305
–	–	–	–	–	–	–	–	–	188 225	318 895	314 250	575 245	390 611
–	–	–	–	–	–	–	–	–	103 390	192 138	198 372	393 014	282 145
–	–	–	–	–	–	–	–	–	–	–	–	–	–
2 845 811	3 070 800	3 552 859	5 624 032	6 993 533	8 892 642	9 736 328	8 864 473	8 797 632	10 675 641	10 184 961	9 775 318	11 084 045	11 824 484
–	–	–	–	1 100 374	1 566 474	1 859 780	2 107 011	2 238 155	2 348 373	2 397 037	3 612 418	3 705 284	385 928
–	–	–	–	557 159	801 784	879 032	1 104 310	867 398	1 045 378	979 298	1 301 337	1 581 160	134 726
–	–	–	–	–	–	–	–	–	–	–	–	64 607	194 819
–	–	–	–	–	–	–	–	–	–	–	–	37 987	97 147
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	423 967	17 734	342 969	340 478	9 059 437	8 872 075	6 211 753	8 358 110	5 769 646	3 816 868	12 755 332	10 524 480	5 481 958
–	–	53 533	53 804	123 352	4 350 487	5 579 910	8 037 619	4 167 063	4 661 982	3 887 346	60 691	3 637 659	5 656 907
–	–	17 734	38 537	42 468	1 976 614	2 502 382	2 764 049	1 928 296	1 845 917	77	211	1 277 024	1 813 179
–	–	–	–	–	–	–	–	–	–	173 311	121 248	136 123	1 628 092
–	–	–	–	–	–	–	–	–	–	4 508	3 031	1 974	337 582
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	324 584	323 495	9 043 732	8 860 139	6 204 125	8 356 525	5 769 353	3 812 283	12 752 090	10 522 142	5 477 469
–	–	–	–	71 384	4 296 588	5 528 934	7 993 977	4 136 387	4 638 471	3 830 767	–	3 573 710	5 513 619
–	–	–	20 152	25 485	1 960 909	2 490 446	2 756 421	1 926 711	1 845 624	–	–	1 276 660	1 812 704
–	–	–	–	–	–	–	–	–	–	–	–	–	1 315 662
–	–	–	–	–	–	–	–	–	–	–	–	–	333 568
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	17 734	18 385	16 983	15 705	11 936	7 628	1 585	293	4 585	3 242	2 338	4 489
–	–	53 533	53 804	51 968	53 899	50 976	43 642	30 676	23 511	56 579	60 691	63 949	143 288
–	–	17 734	18 385	16 983	15 705	11 936	7 628	1 585	293	77	211	364	475
–	–	–	–	–	–	–	–	–	–	173 311	121 248	136 123	312 430
–	–	–	–	–	–	–	–	–	–	4 508	3 031	1 974	4 014
–	–	–	–	–	–	–	–	–	–	–	–	–	–
3 399 630	3 385 616	3 337 796	3 838 402	3 760 335	4 346 172	4 078 234	4 121 356	4 731 338	4 248 295	3 080 301	2 976 395	4 229 839	4 607 908
–	–	–	–	–	–	–	–	–	0	0	0	–	–
–	–	–	–	–	–	–	–	–	0	0	0	–	–
–	–	–	–	–	–	–	–	–	0	0	0	–	–
–	–	–	–	–	–	–	–	–	0	0	0	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
1 719 960	1 804 479	–	–	–	–	1 815 470	1 494 518	1 313 458	1 154 519	1 003 846	736 897	648 965	319 935
–	–	–	–	–	–	215 576	253 280	219 344	234 730	59 132	122 133	0	10 004
–	–	–	–	–	–	33 980	37 908	39 404	116 518	16 394	57 014	0	0
–	–	–	–	–	–	–	–	–	–	59 132	122 133	513 032	470 007
–	–	–	–	–	–	–	–	–	–	16 394	57 014	249 379	319 935
–	–	–	–	–	–	–	–	–	–	–	–	–	–
339	222	440	215	125	122	115	252	212	387	106	86	72	18
9 341	8 524	7 949	6 685	5 043	3 977	3 018	3 018	6 353	6 353	5 157	–	2 547	7 872
339	222	440	215	125	122	115	252	212	387	106	86	72	18
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
21	30	2	4	1	3	2	1	49	6	14	0	1	0
–	–	22	–	–	34	17	9	546	–	35	–	27 272	–
21	30	2	4	1	3	2	1	49	6	14	–	1	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
14	21	2	4	1	3	2	1	30	5	2	–	1	–
2 614	1 855	1 486	1 162	1 134	1 084	1 066	1 549	844	845	538	256	150	79
27 000	19 395	18 559	18 173	15 480	15 480	17 358	25 119	25 755	22 134	25 550	26 051	27 366	22 996
2 614	1 855	1 486	1 162	1 134	1 084	1 066	1 549	844	845	538	256	150	79
–	–	–	–	–	–	–	–	–	–	–	–	–	0
–	–	–	–	–	–	–	–	–	–	–	–	–	0
–	–	–	–	–	–	–	–	–	–	–	–	–	–
73 913	50 037	31 469	15 765	14 276	20 343	14 910	21 442	19 725	14 610	9 748	9 743	13 769	7 143
176 023	159 618	143 990	122 933	137 509	158 299	163 307	208 021	214 616	180 316	164 826	133 614	133 463	143 272
73 913	50 037	31 469	15 765	14 276	20 343	14 910	20 142	18 995	14 610	9 748	9 234	12 252	6 108
–	–	–	–	–	–	5 000	6 000	6 000	1 500	5 000	981	7 394	7 390
–	–	–	–	–	–	–	1 300	730	–	–	509	1 517	1 035
–	–	–	–	–	–	–	–	–	–	6	–	–	–
469 982	609 594	613 241	388 303	348 259	408 886	465 004	606 067	549 469	458 652	315 746	309 316	334 618	267 045
2 089 175	2 435 451	2 562 576	2 274 610	2 118 491	2 009 414	2 194 780	2 660 539	2 959 489	2 986 381	2 726 433	2 620 787	2 713 459	2 568 081
469 982	609 594	613 241	388 303	348 259	408 886	465 004	606 067	549 469	458 652	315 746	309 316	334 618	267 045
–	–	–	–	–	–	–	–	–	0	0	90 275	–	0
–	–	–	–	–	–	–	–	–	–	–	–	–	0
–	–	–	–	–	–	–	–	–	–	–	–	–	–
190 553	66 845	144 432	231 233	204 916	180 956	142 241	121 629	120 096	128 462	80 559	79 347	117 650	64 309
–	268 355	478 820	747 079	686 635	640 453	562 681	493 562	451 240	564 755	470 381	428 004	521 342	396 861
190 553	66 845	144 432	231 233	204 916	180 956	142 241	121 629	120 096	125 262	79 230	79 252	117 637	60 121
–	–	–	–	–	–	–	–	–	25 000	22 754	8 362	–	21 171
–	–	–	–	–	–	–	–	–	3 200	1 329	95	13	4 188
–	–	–	–	–	–	–	–	–	–	58	–	–	–

Annex 6C – Reported malaria cases by method of confirmation, 1990-2011 (continued)

WHO Region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997
Region of the Americas	Costa Rica	Presumed and confirmed	1 151	3 273	6 951	5 033	4 445	4 515	5 480	4 712
		Microscopy examined	130 530	130 530	149 198	140 435	143 721	143 408	148 161	155 925
		Confirmed with microscopy	1 151	3 273	6 951	5 033	4 445	4 515	5 480	4 712
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Dominican Republic	Presumed and confirmed	356	377	698	987	1 670	1 808	1 414	816
		Microscopy examined	297 599	343 491	299 549	290 073	316 182	380 143	436 473	446 874
		Confirmed with microscopy	356	377	698	987	1 670	1 808	1 414	816
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Ecuador	Presumed and confirmed	71 670	59 400	41 089	46 859	30 006	18 128	11 914	16 365
		Microscopy examined	363 080	346 465	377 321	419 590	301 546	253 714	162 128	174 692
		Confirmed with microscopy	71 670	59 400	41 089	46 859	30 006	18 128	11 914	16 365
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	El Salvador	Presumed and confirmed	9 269	5 933	4 539	3 887	2 807	3 362	5 888	2 719
		Microscopy examined	230 246	190 540	202 446	172 624	139 587	169 267	164 491	166 895
		Confirmed with microscopy	9 269	5 933	4 539	3 887	2 807	3 362	5 888	2 719
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	French Guiana, France	Presumed and confirmed	5 909	3 573	4 072	3 974	4 241	4 711	4 724	3 195
		Microscopy examined	49 192	55 242	56 925	49 993	48 242	52 521	46 780	42 631
		Confirmed with microscopy	5 909	3 573	4 072	3 974	4 241	4 711	4 724	3 195
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Guatemala	Presumed and confirmed	41 711	57 829	57 560	41 868	22 057	24 178	20 268	32 099
		Microscopy examined	305 791	361 743	396 171	276 343	133 611	135 095	97 586	140 113
		Confirmed with microscopy	41 711	57 829	57 560	41 868	22 057	24 178	20 268	32 099
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Guyana	Presumed and confirmed	22 681	42 204	39 702	33 172	39 566	59 311	34 075	32 103
		Microscopy examined	135 260	141 046	159 108	172 469	168 127	291 370	262 526	229 710
		Confirmed with microscopy	22 681	42 204	39 702	33 172	39 566	59 311	34 075	32 103
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Haiti	Presumed and confirmed	4 806	25 511	13 457	853	23 140	–	18 877	5 870
		Microscopy examined	13 743	81 763	37 957	10 045	54 973	–	69 853	35 132
		Confirmed with microscopy	4 806	25 511	13 457	853	23 140	–	18 877	5 870
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Honduras	Presumed and confirmed	53 099	73 352	70 838	51 977	61 736	74 346	91 799	67 870
		Microscopy examined	418 513	468 811	471 950	372 180	361 776	373 364	305 167	310 815
		Confirmed with microscopy	53 099	73 352	70 838	51 977	61 736	74 346	91 799	67 870
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Jamaica	Presumed and confirmed	0	3	6	6	3	5	14	4
		Microscopy examined	281	–	–	–	–	–	206	110
		Confirmed with microscopy	0	3	6	6	3	5	14	4
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	0	3	6	6	3	5	14	4
	Mexico	Presumed and confirmed	44 513	26 565	16 170	15 793	12 864	7 423	6 293	5 046
		Microscopy examined	1 503 208	1 596 427	1 668 729	1 816 340	1 923 775	1 965 682	2 053 773	1 950 935
		Confirmed with microscopy	44 513	26 565	16 170	15 793	12 864	7 423	6 293	5 046
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Nicaragua	Presumed and confirmed	35 785	27 653	26 866	44 037	41 490	69 444	75 606	51 858
		Microscopy examined	466 558	364 786	381 715	440 891	374 348	493 399	461 989	410 132
		Confirmed with microscopy	35 785	27 653	26 866	44 037	41 490	69 444	75 606	51 858
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Panama	Presumed and confirmed	381	1 115	727	481	735	730	476	505
		Microscopy examined	315 359	336 569	308 359	278 557	237 992	222 498	188 914	193 853
		Confirmed with microscopy	381	1 115	727	481	735	730	476	505
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	147	130	10	–	–
	Paraguay	Presumed and confirmed	2 912	2 983	1 289	436	583	898	637	567
		Microscopy examined	98 417	127 807	149 523	164 146	96 885	86 664	68 151	83 104
		Confirmed with microscopy	2 912	2 983	1 289	436	583	898	637	567
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Peru	Presumed and confirmed	28 882	33 705	54 922	95 222	122 039	190 521	211 561	180 338
		Microscopy examined	90 040	109 654	123 147	158 325	295 824	833 614	1 162 230	1 299 929
		Confirmed with microscopy	28 882	33 705	54 922	95 222	122 039	190 521	211 561	180 338
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Suriname	Presumed and confirmed	1 608	1 490	1 404	6 107	4 704	6 606	16 649	11 323
		Microscopy examined	18 594	18 399	13 765	26 079	29 148	38 613	68 674	94 508
		Confirmed with microscopy	1 608	1 490	1 404	6 107	4 704	6 606	16 649	11 323
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Venezuela (Bolivarian Republic of)	Presumed and confirmed	46 679	42 826	21 416	12 539	16 311	22 501	21 852	22 400
		Microscopy examined	361 194	375 473	336 571	290 483	210 890	302 487	285 326	271 989
		Confirmed with microscopy	46 679	42 826	21 416	12 539	16 311	22 501	21 852	22 400
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–

1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
5 148	3 998	1 879	1 363	1 021	718	1 289	3 541	2 903	1 223	966	262	114	17
103 976	96 454	61 261	43 053	17 738	9 622	9 204	12 767	24 498	22 641	17 304	4 829	15 599	10 690
5 148	3 998	1 879	1 363	1 021	718	1 289	3 541	2 903	1 223	966	262	114	17
–	–	–	–	–	–	–	–	–	–	–	–	–	0
–	–	–	–	–	–	–	–	–	–	–	–	–	0
–	–	–	–	–	–	–	–	–	–	–	–	–	–
2 006	3 589	1 233	1 038	1 296	1 529	2 355	3 837	3 525	2 711	1 840	1 643	3 414	1 616
453 850	453 720	427 297	411 431	391 216	349 717	322 948	397 108	446 839	435 649	381 010	353 336	469 052	421 405
2 006	3 589	1 233	1 038	1 296	1 529	2 355	3 837	3 525	2 711	1 840	1 643	2 482	1 616
–	–	–	–	–	–	–	–	–	–	–	–	26 585	–
–	–	–	–	–	–	–	–	–	–	–	–	932	–
–	–	322	210	507	532	524	1 376	1 031	518	172	–	–	–
43 696	87 620	104 528	108 903	86 757	52 065	28 730	17 050	9 863	8 464	4 891	4 120	1 888	1 233
300 752	444 606	544 646	538 757	403 225	433 244	357 633	358 361	318 132	352 426	384 800	446 740	481 030	460 785
43 696	87 620	104 528	108 903	86 757	52 065	28 730	17 050	9 863	8 464	4 891	4 120	1 888	1 233
–	–	–	–	–	–	–	–	–	–	2 758	4 992	7 800	0
–	–	–	–	–	–	–	–	–	–	–	–	–	0
–	–	–	–	–	–	–	–	–	–	–	–	–	–
1 182	1 230	745	362	117	85	112	67	49	40	33	20	24	15
161 900	144 768	279 072	111 830	115 378	102 053	94 819	102 479	113 754	95 857	97 872	83 031	115 256	100 883
1 182	1 230	745	362	117	85	112	67	49	40	33	20	24	15
–	–	–	–	–	–	–	–	–	–	–	–	–	1
–	–	–	–	–	–	–	–	–	–	–	–	–	1
–	–	–	–	–	–	–	4	–	–	12	10	–	–
3 462	5 307	3 708	3 823	3 661	3 839	3 038	3 414	4 074	4 828	3 320	3 462	1 824	1 209
–	47 974	48 162	44 718	44 718	32 402	32 402	32 402	32 402	32 402	11 994	20 065	14 373	14 429
3 462	5 307	3 708	3 823	3 661	3 839	3 038	3 414	4 074	2 797	1 341	1 433	713	505
–	–	–	–	–	–	–	–	–	–	0	0	–	–
–	–	–	–	–	–	–	–	–	2 031	1 979	2 029	1 111	704
–	–	–	–	–	–	–	–	–	–	–	–	–	–
47 689	45 098	53 311	35 824	35 540	31 127	28 955	39 571	31 093	15 382	7 198	7 080	7 384	6 817
–	192 710	246 642	198 114	197 113	156 227	148 729	178 726	168 958	129 410	173 678	154 652	235 075	195 080
47 689	45 098	53 311	35 824	35 540	31 127	28 955	39 571	31 093	15 382	7 198	7 080	7 384	6 822
–	–	–	–	–	–	–	–	–	3 000	2 000	2 000	2 000	0
–	–	–	–	–	–	–	–	–	–	–	–	–	0
–	–	–	–	–	–	–	–	–	–	5	–	–	–
41 200	27 283	24 018	27 122	21 895	27 627	28 866	38 984	21 064	11 657	11 815	13 673	22 935	29 471
296 596	255 228	209 197	211 221	175 966	185 877	151 938	210 429	202 688	178 005	137 247	169 309	212 863	201 693
41 200	27 283	24 018	27 122	21 895	27 627	28 866	38 984	21 064	11 657	11 815	13 673	22 935	29 471
–	–	–	–	–	–	–	–	–	–	–	–	–	0
–	–	–	–	–	–	–	–	–	–	–	–	–	0
–	–	–	–	–	–	–	–	–	–	41	–	–	–
34 449	1 196	16 897	9 837	9 837	9 837	10 802	21 778	32 739	29 825	36 774	49 535	84 153	32 048
–	–	21 190	51 067	51 067	51 067	30 440	3 541 506	87 951	142 518	168 950	270 438	270 427	135 136
34 449	1 196	16 897	9 837	9 837	9 837	10 802	21 778	32 739	29 825	36 774	49 535	84 153	32 048
–	–	–	–	–	–	–	–	–	–	–	–	–	0
–	–	–	–	–	–	–	–	–	–	–	–	–	0
–	–	–	–	–	–	–	–	–	1	5	–	–	–
44 337	51 911	35 125	24 149	17 223	14 123	17 293	16 008	11 880	10 512	8 368	9 313	9 682	7 615
249 105	250 411	175 577	174 430	178 616	136 991	145 070	153 476	124 936	130 255	119 484	108 529	148 243	151 785
44 337	51 911	35 125	24 149	17 223	14 123	17 293	16 008	11 880	10 512	8 368	9 313	9 682	7 615
–	–	–	–	–	–	–	2 500	2 500	–	0	4 000	4 000	4 000
–	–	–	–	–	–	–	–	–	–	–	57	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
3	5	7	6	7	9	141	88	194	199	22	22	0	0
207	219	874	596	725	394	3 879	2 470	6 821	–	30 732	34 149	–	–
3	5	7	6	7	9	141	88	194	199	22	22	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
3	5	7	6	7	9	141	88	8	8	4	7	–	–
25 023	13 450	7 390	4 996	4 624	3 819	3 406	2 967	2 514	2 361	2 357	2 703	1 226	1 124
1 806 903	1 906 050	2 003 569	1 857 233	1 852 553	1 565 155	1 454 575	1 559 076	1 345 915	1 430 717	1 246 780	1 240 087	1 192 081	1 035 424
25 023	13 450	7 390	4 996	4 624	3 819	3 406	2 967	2 514	2 361	2 357	2 703	1 226	1 124
–	–	–	–	–	–	–	–	–	–	–	–	–	0
–	–	–	–	–	–	–	–	–	–	–	–	–	0
–	–	–	–	–	–	–	–	–	–	1 441	–	–	–
34 108	38 294	23 878	10 482	7 695	6 717	6 897	6 642	3 114	1 356	762	610	692	925
440 312	555 560	509 443	482 919	491 689	448 913	492 319	516 313	464 581	521 464	533 173	544 717	535 914	521 904
34 108	38 294	23 878	10 482	7 695	6 717	6 897	6 642	3 114	1 356	762	610	692	925
–	–	–	–	–	–	–	–	11 563	16 173	10 000	9 000	18 500	18 500
–	–	–	–	–	–	–	–	–	0	0	0	0	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
1 039	936	1 036	928	2 244	4 500	5 095	3 667	1 663	1 281	744	778	418	354
187 055	161 219	149 702	156 589	165 796	166 807	171 179	208 582	212 254	204 193	200 574	158 481	141 038	116 588
1 039	936	1 036	928	2 244	4 500	5 095	3 667	1 663	1 281	744	778	418	354
–	–	–	–	–	–	–	–	–	–	–	–	–	0
–	–	–	–	–	–	–	–	–	–	–	–	–	0
–	6	23	22	–	26	26	20	12	16	12	8	–	–
2 091	9 946	6 853	2 710	2 778	1 392	694	376	823	1 341	348	91	27	10
42 944	101 074	97 026	71 708	99 338	126 582	97 246	85 942	111 361	92 339	94 316	64 660	62 178	48 611
2 091	9 946	6 853	2 710	2 778	1 392	694	376	823	1 341	341	91	27	10
–	–	–	–	–	–	–	–	–	–	1 997	–	–	0
–	–	–	–	–	–	–	–	–	–	7	–	–	0
–	–	–	–	–	–	–	–	–	–	–	–	–	–
247 229	161 292	68 321	78 544	99 237	88 408	93 581	87 699	64 925	50 797	42 214	36 886	29 174	22 878
1 942 529	2 027 624	1 483 816	1 417 423	1 582 385	1 485 012	1 438 925	1 438 925	1 438 925	1 438 925	796 337	–	–	–
247 229	161 292	68 321	78 544	99 237	88 408	93 581	87 699	64 925	50 797	42 214	36 886	29 174	22 878
–	–	–	–	–	–	–	–	–	–	64 953	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
12 412	13 939	11 361	16 003	12 837	10 982	8 378	9 131	3 289	1 741	2 709	2 380	1 712	795
73 481	65 087	63 377	67 369	68 070	43 241	56 975	59 855	45 722	31 768	28 137	33 279	16 533	15 135
12 412	13 939	11 361	16 003	12 837	10 982	8 378	9 131	3 289	1 104	2 086	1 842	1 574	730
–	–	–	–	–	–	–	–	–	2 224	1 774	1 438	541	135
–	–	–	–	–	–	–	–	–	637	623	538	138	20
–	–	–	–	–	–	–	–	–	–	–	1 025	–	–
21 815	19 086	29 736	20 006	29 491	31 719	46 655	45 049	37 062	41 749	32 037	35 828	45 155	45 824
333 786	218 959	261 866	198 000	278 205	344 236	420 165	420 165	479 708	392 197	414 137	370 258	400 495	382 303
21 815	19 086	29 736	20 006	29 491	31 719	46 655	45 049	37 062	41 749	32 037	35 828	45 155	45 824
–	–	–	–	–	–	–	–	–	4 141	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	506	554	728	–	–

Annex 6C – Reported malaria cases by method of confirmation, 1990-2011 (continued)

WHO Region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997
Eastern Mediterranean	Afghanistan	Presumed and confirmed	317 479	297 605	–	123 425	88 302	186 912	303 955	202 767
		Microscopy examined	735 624	768 685	–	431 353	626 338	602 320	364 948	527 181
		Confirmed with microscopy	317 479	297 605	–	123 425	31 606	186 912	78 279	189 898
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Djibouti	Presumed and confirmed	3 237	7 338	7 468	4 166	6 140	5 982	6 105	4 314
		Microscopy examined	11 463	26 758	28 636	–	25 366	–	–	–
		Confirmed with microscopy	3 237	7 335	7 468	–	6 140	–	–	4 314
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Egypt[2]	Presumed and confirmed	75	24	16	17	527	322	25	11
		Microscopy examined	1 145 251	1 213 769	1 183 608	562 096	1 052 433	–	1 090 924	1 052 658
		Confirmed with microscopy	75	24	16	17	495	–	23	11
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	0	0	0	0	32	9	2	7
	Iran (Islamic Republic of)	Presumed and confirmed	77 470	96 340	76 971	64 581	51 089	67 532	56 362	38 684
		Microscopy examined	2 226 412	2 699 845	3 227 770	3 959 288	4 074 869	–	3 556 000	3 244 334
		Confirmed with microscopy	77 470	96 340	76 971	64 581	51 089	67 532	56 362	38 677
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	6 701	8 431	12 024	8 162	7 052	–	–	18 852
	Iraq	Presumed and confirmed	3 924	1 764	5 752	49 863	98 243	98 705	49 840	13 959
		Microscopy examined	–	941 988	1 166 378	–	1 553 231	–	1 650 864	1 480 948
		Confirmed with microscopy	3 924	1 764	5 752	–	98 243	–	31 737	9 594
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	20	42	–	21	6	4	29
	Morocco[1]	Presumed and confirmed	837	494	405	198	206	197	102	125
		Microscopy examined	1 347 400	982 321	898 625	761 837	724 364	1 047 890	461 605	461 802
		Confirmed with microscopy	837	494	405	198	206	197	102	125
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	51	89	54	63	50	31	49	49
	Oman	Presumed and confirmed	32 720	19 274	14 827	16 873	7 215	1 801	1 265	1 026
		Microscopy examined	270 748	250 447	211 887	251 630	295 194	464 091	531 123	485 184
		Confirmed with microscopy	32 720	19 274	14 827	16 873	7 215	1 801	1 265	1 026
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	2 800	637	662	897
	Pakistan	Presumed and confirmed	79 689	66 586	99 015	92 634	108 586	111 836	98 035	77 480
		Microscopy examined	2 608 398	271 586	2 668 997	2 615 771	2 796 528	–	2 711 179	2 914 056
		Confirmed with microscopy	79 689	66 586	99 015	92 634	108 586	111 836	98 035	77 480
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Saudi Arabia	Presumed and confirmed	15 666	9 962	19 623	18 380	10 032	18 751	21 007	20 631
		Microscopy examined	682 649	570 551	601 847	–	697 960	727 703	–	–
		Confirmed with microscopy	15 666	9 962	19 623	18 380	10 032	18 751	21 007	20 631
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	634	830	1 204	–	3 405	3 089	5 786	2 939
	Somalia	Presumed and confirmed	–	–	–	3 049	–	–	–	–
		Microscopy examined	–	–	–	6 467	–	–	–	–
		Confirmed with microscopy	–	–	–	3 049	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	South Sudan	Presumed and confirmed	–	–	–	–	–	–	–	–
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Sudan	Presumed and confirmed	7 508 704	6 947 787	9 326 944	9 867 778	8 562 205	6 347 143	4 595 092	4 065 460
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	330 136	321 969	1 167 847	923 374	664 491	656 978	30 217	446 949
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Syrian Arab Republic[2]	Presumed and confirmed	107	54	456	966	583	626	345	130
		Microscopy examined	–	–	–	–	97 436	–	84 496	68 154
		Confirmed with microscopy	107	54	456	966	583	626	345	130
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	39	43	37	–	49	44	65	47
	Yemen	Presumed and confirmed	11 384	12 717	29 320	31 262	37 201	500 000	416 246	1 394 495
		Microscopy examined	80 986	103 700	126 580	172 403	160 687	–	–	7 821 530
		Confirmed with microscopy	11 384	12 717	29 320	31 262	37 201	500 000	416 246	682 153
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
European	Armenia[1]	Presumed and confirmed	0	0	0	0	196	502	347	841
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	0	0	0	0	196	502	347	841
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	0	0	0	0	0	0	0	0
		Imported cases	0	0	0	–	195	502	198	274
	Azerbaijan	Presumed and confirmed	24	113	27	23	667	2 840	13 135	9 911
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	24	113	27	23	667	2 840	13 135	9 911
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	0	0	0	0	0	0	0	0
		Imported cases	–	–	–	–	–	–	–	–
	Georgia	Presumed and confirmed	1	2	1	0	1	1	7	1
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	1	2	1	0	1	1	7	1
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	0	0	0	0	0	0	0	0
		Imported cases	1	2	1	0	1	1	4	1

1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
288 070	395 581	203 911	364 243	626 839	585 602	273 377	326 694	414 407	456 490	467 123	390 729	392 463	482 748
–	463 032	257 429	–	–	–	248 946	338 253	460 908	504 856	549 494	521 817	524 523	531 053
272 115	162 531	94 475	–	415 356	360 940	242 022	116 444	86 129	92 202	81 574	64 880	69 397	77 549
–	–	–	–	–	–	–	–	–	–	–	–	–	0
–	–	–	–	–	–	–	–	–	–	–	–	–	0
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5 920	6 140	4 667	4 312	5 021	5 036	2 142	2 469	6 457	4 694	3 528	2 686	3 962	624
–	–	–	–	–	–	–	1 913	–	3 461	2 896	–	–	124
–	–	–	–	–	5 036	122	413	1 796	210	119	2 686	1 019	–
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13	61	17	11	10	45	43	23	29	30	80	94	85	116
–	–	1 155 904	1 357 223	1 041 767	–	–	–	–	23 402	34 880	41 344	664 294	–
13	61	17	11	10	45	43	23	29	30	80	94	85	116
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–	–	–	–	–	–	–	–	–	–	–	–	–	–
13	61	17	11	10	45	43	23	29	30	80	94	85	116
32 951	23 110	19 716	19 303	15 558	23 562	13 821	18 966	15 909	15 712	11 460	6 122	3 031	3 239
–	2 014 963	1 732 778	1 867 500	1 416 693	1 358 262	1 326 108	1 674 895	1 131 261	1 074 196	966 150	744 586	614 817	530 470
32 951	23 110	19 716	19 303	15 558	23 562	13 821	18 966	15 909	15 712	11 460	6 122	3 031	3 239
–	–	–	–	–	–	–	–	–	–	–	–	–	–
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11 558	7 253	7 422	10 379	6 436	6 502	6 219	4 570	2 782	2 434	3 111	1 645	1 184	1 529
9 684	4 138	1 860	1 265	952	347	155	47	24	3	6	1	7	11
–	–	–	997 812	1 072 587	681 070	913 400	944 163	970 000	844 859	1 105 054	1 493 143	1 849 930	2 097 732
9 684	4 138	1 860	1 265	952	347	155	47	24	3	6	1	7	11
–	–	–	–	–	–	–	10 824	–	–	–	–	–	–
–	–	–	–	–	–	–	0	–	–	–	–	–	0
–	–	–	–	–	3	5	3	1	1	4	1	7	11
121	60	59	59	107	73	56	100	83	75	142	145	218	312
421 946	376 920	277 671	335 723	345 173	405 800	405 601	–	–	367 705	292 826	290 566	232 598	–
121	60	56	59	107	73	56	100	83	75	142	145	218	312
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
53	43	56	59	88	69	55	100	83	75	142	145	215	311
1 093	901	694	635	590	740	615	544	443	705	965	898	1 193	1 532
438 166	496 067	494 884	521 552	495 826	409 532	326 127	258 981	242 635	244 346	245 113	234 803	226 009	267 353
1 093	901	694	635	590	740	615	544	443	705	965	898	1 193	1 532
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979	872	688	633	584	734	615	544	443	701	957	898	1 169	1 519
73 516	91 774	3 337 054	3 577 845	4 238 778	4 210 611	1 958 350	4 022 823	4 314 637	4 553 732	4 658 701	4 242 032	4 281 356	334 589
3 187 814	3 440 986	–	3 572 425	3 399 524	4 577 037	4 243 108	4 776 274	4 490 577	4 905 561	3 775 793	3 655 272	3 771 671	4 168 648
73 516	91 774	82 526	125 292	107 666	125 152	126 719	127 826	124 910	128 570	104 454	132 688	199 755	287 592
–	–	–	–	–	–	–	–	–	–	–	243 521	276 949	518 709
–	–	–	–	–	–	–	–	–	–	–	34 891	19 420	46 997
–	–	–	–	–	2 592	1 101	290	1 149	190	120	–	–	–
40 796	13 166	6 608	3 074	2 612	1 724	1 232	1 059	1 278	2 864	1 491	2 333	1 941	2 788
795 135	–	–	821 860	825 443	819 869	780 392	715 878	804 087	1 015 781	1 114 841	1 078 745	944 723	1 062 827
40 796	13 166	6 608	3 074	2 612	1 724	1 232	1 059	1 278	2 864	1 491	2 333	1 941	2 788
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
4 657	3 067	1 872	1 471	1 402	1 024	924	855	1 008	2 397	1 430	2 275	1 912	2 719
–	9 055	10 364	10 364	96 922	23 349	36 732	28 404	49 092	50 444	82 980	72 362	24 553	41 167
–	–	–	–	21 350	12 578	30 127	47 882	–	–	73 985	59 181	20 593	26 351
–	–	–	–	15 732	7 571	11 436	12 516	16 430	16 675	36 905	25 202	5 629	1 627
–	–	–	–	–	–	–	–	–	–	–	–	200 105	35 236
–	–	–	–	–	–	–	–	–	–	–	–	18 924	1 724
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	237 712	462 056	646 673	515 958	337 582	116 473	101 008	136 492	325 634	900 283	795 784
–	–	–	–	–	–	–	–	–	–	116 555	–	–	–
–	–	–	–	–	–	–	–	–	–	52 011	–	900 283	112 024
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
5 062 000	4 215 308	4 332 827	3 985 702	3 054 400	3 084 320	2 083 711	2 515 693	2 117 514	3 040 181	3 073 996	2 361 188	1 465 496	1 246 833
–	–	–	–	–	–	–	–	–	2 243 981	2 050 354	2 791 156	–	–
821 199	594 927	368 557	203 491	280 550	933 267	537 899	628 417	721 233	686 908	569 296	711 462	625 365	506 806
–	–	–	–	–	–	–	–	–	–	–	–	1 653 300	–
–	–	–	–	–	–	–	–	–	–	–	–	95 192	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
60	43	42	79	27	24	13	28	34	37	51	39	23	48
–	–	–	–	–	–	–	–	–	68 000	–	25 751	19 151	25 109
60	43	42	79	27	24	13	28	34	37	51	39	23	48
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	0
46	38	36	16	12	22	12	28	34	37	51	39	23	48
–	2 781 640	1 394 495	–	187 159	265 032	158 561	200 560	217 270	223 299	158 608	138 579	198 963	142 147
–	–	–	–	556 143	398 472	501 747	472 970	799 747	585 015	781 318	797 621	645 463	645 093
–	2 781 640	1 394 495	–	75 508	50 811	48 756	44 150	55 000	67 607	43 545	53 445	78 269	60 207
–	–	–	–	–	–	–	–	–	303	5 015	18 566	97 289	108 110
–	–	–	–	–	–	–	–	–	70	661	2 001	28 428	30 203
–	–	–	–	–	–	–	–	–	–	–	–	–	–
1 156	616	141	79	52	29	47	7	0	1	1	0	1	0
–	–	356	174	165	126	220	209	230	658	30 761	31 467	31 026	–
1 156	616	141	79	52	29	47	7	0	1	1	0	1	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
0	0	–	–	–	–	–	–	–	–	–	–	–	–
614	287	85	48	36	21	41	4	0	1	1	0	1	–
5 175	2 315	1 526	1 058	506	482	386	242	143	110	73	80	52	8
–	–	527 688	536 260	507 252	536 822	545 145	515 144	498 697	465 033	408 780	451 436	456 652	449 168
5 175	2 315	1 526	1 058	506	482	386	242	143	110	73	80	52	8
–	–	–	–	–	–	–	–	–	–	–	–	–	–
0	0	–	–	–	–	–	–	–	–	–	–	–	–
0	4	0	3	1	2	0	0	2	2	1	2	2	4
16	51	245	438	474	316	257	155	60	25	8	7	0	6
–	–	–	3 574	6 145	5 457	3 365	5 169	4 400	3 400	4 398	4 120	2 368	2 032
16	51	245	438	474	316	257	155	60	25	8	7	0	6
–	–	–	–	–	–	–	–	–	–	–	–	–	–
0	0	–	–	–	–	–	–	–	–	–	–	–	–
2	16	1	1	1	8	3	1	2	1	2	6	0	5

Annex 6C – Reported malaria cases by method of confirmation, 1990-2011 (continued)

WHO Region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997
European	Kyrgyzstan	Presumed and confirmed	1	1	2	0	6	3	26	13
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	1	1	2	0	6	3	26	13
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	0	0	0	0	0	0	0	0
		Imported cases	1	1	2	0	6	3	25	13
	Russian Federation	Presumed and confirmed	216	169	160	209	335	425	611	831
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	216	169	160	209	335	425	611	831
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	0	0	0	0	0	0	0	0
		Imported cases	209	169	160	195	359	421	601	798
	Tajikistan	Presumed and confirmed	0	0	0	0	0	0	0	0
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Turkey	Presumed and confirmed	0	0	0	0	0	0	0	0
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	5	5	11	4	24	342	250	80
	Turkmenistan[1]	Presumed and confirmed	1	17	11	3	9	10	14	14
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	1	17	11	3	9	10	14	14
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	1	4	6	2	8	10	11	10
	Uzbekistan	Presumed and confirmed	28	12	25	36	21	27	51	52
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	28	12	25	36	21	27	51	52
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	25	11	25	36	21	27	51	52
South-East Asia	Bangladesh	Presumed and confirmed	–	–	–	–	–	–	–	–
		Microscopy examined	2 444 415	2 081 137	1 919 349	1 635 589	1 661 701	1 461 556	1 112 563	955 542
		Confirmed with microscopy	53 875	63 575	115 660	125 402	166 564	152 729	100 783	68 594
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Bhutan	Presumed and confirmed	–	–	–	–	–	–	–	–
		Microscopy examined	33 973	67 699	73 986	78 260	97 415	83 889	76 019	68 153
		Confirmed with microscopy	9 497	22 126	28 900	28 116	38 901	23 195	15 696	9 029
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Democratic People's Republic of Korea	Presumed and confirmed	0	0	0	0	0	0	0	0
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	India	Presumed and confirmed	2 018 783	2 117 460	2 125 826	2 207 431	2 511 453	2 988 231	3 035 588	2 660 057
		Microscopy examined	74 420 000	75 158 681	79 011 151	77 941 025	82 179 407	85 133 349	91 536 450	89 445 561
		Confirmed with microscopy	2 018 783	2 117 460	2 125 826	2 207 431	2 511 453	2 988 231	3 035 588	2 660 057
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Indonesia	Presumed and confirmed	1 484 496	1 631 710	1 431 284	1 337 373	1 698 040	1 510 425	1 747 287	1 325 633
		Microscopy examined	7 365 250	7 586 249	7 501 500	6 152 901	4 801 009	2 795 718	3 377 083	2 815 193
		Confirmed with microscopy	175 049	140 352	110 004	146 339	146 376	143 363	179 878	131 084
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Myanmar	Presumed and confirmed	989 042	939 257	789 672	702 239	701 043	656 547	664 507	568 262
		Microscopy examined	–	1 147 570	1 038 248	898 237	734 087	600 252	486 616	427 288
		Confirmed with microscopy	133 049	126 967	125 710	117 068	111 672	100 448	96 203	112 500
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Nepal	Presumed and confirmed	–	–	–	–	–	–	–	160 253
		Microscopy examined	847 484	781 543	724 068	596 689	430 801	338 189	204 355	126 774
		Confirmed with microscopy	22 856	29 135	23 234	16 380	9 884	9 718	9 020	8 557
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Sri Lanka	Presumed and confirmed	287 384	400 263	399 349	363 197	273 502	142 294	184 319	218 550
		Microscopy examined	1 220 699	1 398 002	1 558 660	1 503 902	1 370 369	1 098 105	1 288 990	1 331 641
		Confirmed with microscopy	287 384	400 263	399 349	363 197	273 502	142 294	184 319	218 550
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Thailand	Presumed and confirmed	273 880	198 383	168 370	115 220	102 119	82 743	87 622	97 540
		Microscopy examined	7 273 320	6 793 221	5 575 282	4 850 123	4 756 284	4 569 108	4 318 788	4 068 474
		Confirmed with microscopy	273 880	198 383	168 370	115 220	102 119	82 743	87 622	97 540
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Timor-Leste	Presumed and confirmed	–	–	–	–	–	–	–	–
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
Western Pacific	Cambodia	Presumed and confirmed	123 796	102 930	91 000	99 200	85 012	76 923	74 883	88 029
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–

1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
11	5	12	28	2 743	468	93	226	318	96	18	4	6	5
–	–	70 500	72 020	69 807	144 070	79 895	114 316	74 729	62 444	40 833	33 983	30 190	27 850
11	5	12	28	2 743	468	93	226	318	96	18	4	6	5
–	–	–	–	–	–	–	–	–	–	–	–	–	–
0	0	–	–	–	–	–	–	–	–	–	–	–	–
6	5	5	13	31	3	2	0	4	0	0	0	3	5
1 081	792	795	898	642	533	382	205	143	122	96	107	102	85
–	–	–	–	–	–	–	–	–	35 784	28 340	27 382	33 024	28 311
1 081	792	795	898	642	533	382	205	143	122	96	107	102	85
–	–	–	–	–	–	–	–	–	–	–	–	–	–
0	0	–	–	–	–	–	–	–	–	–	–	–	–
1 018	715	752	764	503	461	382	165	132	112	88	107	101	83
0	0	19 064	11 387	6 160	5 428	3 588	2 309	1 344	635	318	165	112	78
–	–	233 785	248 565	244 632	296 123	272 743	216 197	175 894	159 232	158 068	165 266	173 523	173 367
–	–	19 064	11 387	6 160	5 428	3 588	2 309	1 344	635	318	165	112	78
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	0	0	0	1	1	7	4	1	1	13
0	0	11 432	10 812	10 224	9 222	5 302	2 084	796	358	215	84	78	128
–	–	1 597 290	1 550 521	1 320 010	1 187 814	1 158 673	1 042 509	934 839	775 502	616 570	606 875	507 841	421 295
–	–	11 432	10 812	10 224	9 222	5 302	2 084	796	358	215	84	78	128
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
62	55	51	54	40	40	50	48	45	45	49	46	69	127
137	49	24	8	18	7	3	1	1	0	1	0	0	0
–	–	50 105	50 075	59 834	72 643	71 377	56 982	58 673	65 666	75 524	94 237	81 784	–
137	49	24	8	18	7	3	1	1	0	1	0	0	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
22	39	6	3	3	1	0	0	1	0	1	0	0	–
74	85	126	77	74	74	66	102	76	89	27	4	5	1
–	–	735 164	691 500	735 164	812 543	893 187	917 843	924 534	858 968	883 807	916 839	921 364	886 243
74	85	126	77	74	74	66	102	76	89	27	4	5	1
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
74	78	80	68	63	41	35	38	16	59	20	4	2	1
–	–	437 838	320 010	313 859	489 377	386 555	290 418	164 159	59 866	168 885	79 853	91 227	51 773
437 928	378 921	360 300	250 258	275 987	245 258	185 215	220 025	209 991	266 938	336 505	397 148	461 262	270 253
60 023	63 723	55 599	54 216	62 269	54 654	58 894	48 121	32 857	58 659	50 004	25 203	20 519	20 232
–	–	–	–	–	–	–	–	–	3 199	106 001	156 639	152 936	119 849
–	–	–	–	–	–	–	–	–	1 207	34 686	38 670	35 354	31 541
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	450	1 421	487	207
62 033	77 461	76 445	65 974	74 696	61 246	54 892	60 152	66 079	51 446	47 268	62 341	54 709	44 481
7 693	12 237	5 935	5 982	6 511	3 806	2 670	1 825	1 868	793	329	972	436	194
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
2 100	15 362	204 428	300 000	241 192	60 559	33 803	11 507	12 983	4 795	16 989	14 845	13 520	16 760
–	–	–	143 674	129 889	32 083	–	–	12 983	7 985	24 299	34 818	25 147	26 513
2 100	15 362	90 582	143 674	16 578	16 538	27 090	11 315	12 983	4 795	16 989	14 845	13 520	16 760
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	450	378	213	127	1 127
2 222 748	2 284 713	2 031 790	2 085 484	1 841 227	1 869 403	1 915 363	1 816 569	1 785 109	1 508 927	1 532 497	1 563 574	1 599 986	1 310 367
89 380 937	88 333 965	86 790 375	90 389 019	91 617 725	99 136 143	97 111 526	104 120 792	106 606 703	86 355 000	86 734 579	103 396 076	108 679 429	–
2 222 748	2 284 713	2 031 790	2 085 484	1 841 227	1 869 403	1 915 363	1 816 569	1 785 109	1 508 927	1 532 497	1 563 574	1 599 986	–
–	–	–	–	–	–	–	–	–	8 500 000	9 000 000	9 100 000	10 600 000	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
1 708 020	1 243 213	1 432 178	2 776 477	2 416 039	2 554 223	3 016 262	1 445 831	1 320 581	1 140 423	746 120	544 470	1 849 062	1 322 451
2 102 828	1 867 488	1 752 763	1 604 573	1 440 320	1 224 232	1 109 801	1 178 457	1 233 334	1 750 000	1 243 744	1 420 795	903 607	–
179 970	138 002	245 612	267 592	273 793	223 074	268 852	437 323	347 597	333 792	266 277	199 577	229 819	–
–	–	–	–	–	–	–	19 164	12 990	–	462 249	1 040 633	260 798	–
–	–	–	–	–	–	–	–	–	–	–	72 914	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
548 066	592 878	581 560	661 463	721 739	716 806	602 888	516 041	538 110	520 887	634 280	591 492	693 124	567 452
450 000	379 795	381 610	463 194	467 871	481 201	432 581	437 387	485 251	512 862	499 296	381 424	275 374	312 689
104 753	121 376	120 083	170 502	173 096	177 530	152 070	165 737	203 071	216 510	223 174	164 965	103 285	91 752
–	–	–	–	–	–	–	–	–	499 725	543 941	599 216	729 878	795 618
–	–	–	–	–	–	–	–	–	157 448	223 899	271 103	317 523	373 542
–	–	–	–	–	–	–	–	–	–	–	–	–	–
175 879	132 044	48 686	146 351	133 431	196 605	140 687	178 056	166 474	135 809	153 331	123 903	96 383	71 752
178 265	135 814	100 063	126 962	183 519	196 223	158 044	188 930	166 476	135 809	153 331	150 230	102 977	95 011
8 498	8 959	7 981	6 396	12 750	9 506	4 895	5 050	4 969	5 621	3 888	3 335	3 115	1 910
–	–	–	–	–	–	–	–	–	–	–	–	17 887	25 353
–	–	–	–	–	–	–	–	–	–	–	–	779	1 504
–	–	–	1 198	1 280	1 132	805	641	618	880	660	610	1 102	1 126
211 691	264 549	210 039	66 522	41 411	10 510	3 720	1 640	591	198	670	558	684	175
1 338 146	1 569 352	1 781 372	1 353 386	1 390 850	1 192 259	1 198 181	974 672	1 076 121	1 047 104	1 047 104	909 632	1 001 107	985 060
211 691	264 549	210 039	66 522	41 411	10 510	3 720	1 640	591	198	670	558	684	175
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	21	27	52	51
131 055	125 379	78 561	63 528	44 555	37 355	26 690	29 782	30 294	33 178	28 569	29 462	32 480	24 897
4 217 716	4 461 075	4 403 739	4 100 778	3 819 773	3 256 939	3 012 710	2 524 788	2 280 070	2 041 733	1 910 982	1 816 383	1 695 980	1 354 215
131 055	125 379	78 561	63 528	44 555	37 355	26 690	29 782	30 294	33 178	26 150	23 327	22 969	14 478
–	–	–	–	–	–	–	–	–	–	20 786	68 437	81 997	96 670
–	–	–	–	–	–	–	–	–	–	2 419	6 135	9 511	10 419
–	–	–	–	–	–	–	–	–	–	–	–	–	–
10 332	–	15 212	83 049	86 684	33 411	202 662	130 679	164 413	121 905	143 594	108 434	119 072	36 064
–	–	–	–	60 311	83 785	79 459	97 781	96 485	114 283	92 870	96 828	109 806	82 175
–	–	15 212	–	26 651	33 411	39 164	43 093	37 896	46 869	45 973	41 824	40 250	19 739
–	–	–	–	–	–	–	–	–	32 027	30 134	41 132	85 643	127 272
–	–	–	–	–	–	–	–	–	5 944	5 287	5 703	7 887	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
58 874	64 679	203 164	110 161	100 194	119 712	91 855	67 036	89 109	59 848	58 887	83 777	49 356	57 423
–	–	122 555	121 691	108 967	106 330	99 593	88 991	94 460	135 731	130 995	96 886	90 175	86 526
–	–	51 320	42 150	38 048	42 234	37 389	26 914	33 010	22 081	20 347	24 999	14 277	13 792
–	–	18 167	23 928	24 954	54 024	51 359	58 791	102 590	46 989	51 036	94 788	103 035	130 186
–	–	11 122	11 451	8 854	29 031	22 356	22 522	45 686	20 437	21 777	39 596	35 079	43 631
–	–	–	–	–	–	–	–	–	–	–	–	–	–

Annex 6C – Reported malaria cases by method of confirmation, 1990-2011 (continued)

WHO Region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997
Western Pacific	China	Presumed and confirmed	117 359	101 600	74 000	59 000	62 000	47 118	33 382	26 800
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Lao People's Democratic Republic	Presumed and confirmed	22 044	41 048	38 500	41 787	52 601	52 021	77 894	72 190
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Malaysia	Presumed and confirmed	50 500	39 189	36 853	39 890	58 958	59 208	51 921	26 649
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Papua New Guinea	Presumed and confirmed	104 900	86 500	86 500	66 797	65 000	99 000	71 013	38 105
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Philippines	Presumed and confirmed	86 200	86 400	95 778	64 944	61 959	56 852	40 545	42 005
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Republic of Korea	Presumed and confirmed	0	0	0	1	20	107	396	1 724
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Solomon Islands	Presumed and confirmed	116 500	141 400	153 359	126 123	131 687	118 521	84 795	68 125
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Vanuatu	Presumed and confirmed	28 805	19 466	13 330	10 469	3 771	8 318	5 654	6 099
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	28 805	19 466	13 330	10 469	3 771	8 318	5 654	6 099
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–
	Viet Nam	Presumed and confirmed	123 796	187 994	225 928	156 069	140 120	100 116	84 625	65 859
		Microscopy examined	–	–	–	–	–	–	–	–
		Confirmed with microscopy	–	–	–	–	–	–	–	–
		RDT Examined	–	–	–	–	–	–	–	–
		Confirmed with RDT	–	–	–	–	–	–	–	–
		Imported cases	–	–	–	–	–	–	–	–

Regional Summary (Probable and confimed malaria cases)	African	15 707 308	12 808 592	16 096 895	20 292 113	27 014 847	21 642 318	28 431 539	22 877 000
	Region of the Americas	1 055 674	1 229 533	1 186 061	1 012 796	1 126 129	1 298 688	1 191 309	1 079 831
	Eastern Mediterranean	8 051 292	7 459 945	9 580 797	10 273 192	8 970 329	7 339 807	5 548 379	5 819 082
	European	271	314	226	271	1 235	3 808	14 191	11 663
	South-East Asia	5 053 585	5 287 073	4 914 501	4 725 460	5 286 157	5 380 240	5 719 323	5 030 295
	Western Pacific	773 900	806 527	815 248	664 280	661 128	618 184	525 108	435 585
	Total	**30 642 030**	**27 591 984**	**32 593 728**	**36 968 112**	**43 059 825**	**36 283 045**	**41 429 849**	**35 253 456**

Cases reported before 2000 can be probable and confirmed or only confirmed cases depending on the country

[1] Armenia, Morocco and Turkmenistan are certified malaria free countries, but are included in this listing for historical purposes

[2] There is no local transmission

1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
27 090	26 797	0	26 945	172 200	169 828	145 676	100 106	116 260	133 699	135 467	14 598	7 855	4 498
–	–	–	5 391 809	5 641 752	4 635 132	4 212 559	3 814 715	3 995 227	3 958 190	4 316 976	4 637 168	7 115 784	9 189 270
–	–	–	21 237	25 520	28 491	27 197	21 936	35 383	29 304	16 650	9 287	4 990	3 367
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	556	621	1 714	2 632	2 097	1 192	780	–	–	–
39 031	28 050	279 903	103 983	85 192	88 657	53 808	30 359	20 468	20 364	19 347	22 800	23 047	17 904
–	–	256 273	226 399	245 916	256 534	181 259	156 954	113 165	159 002	168 027	173 459	150 512	213 578
–	–	40 106	27 076	21 420	18 894	16 183	13 615	8 093	6 371	4 965	5 508	4 524	6 226
–	–	–	–	–	–	–	–	95 676	113 694	143 368	84 511	127 790	77 843
–	–	–	–	–	–	–	–	10 289	11 087	14 382	9 166	16 276	11 609
–	–	–	–	–	–	–	–	–	–	–	–	–	–
13 491	11 106	12 705	12 780	11 019	6 338	6 154	5 569	5 294	5 456	7 390	7 010	6 650	5 306
–	–	1 832 802	1 808 759	1 761 721	1 632 024	1 577 387	1 425 997	1 388 267	1 565 033	1 562 148	1 565 982	1 619 074	1 600 439
–	–	12 705	12 780	11 019	6 338	6 154	5 569	5 294	5 456	7 390	7 010	6 650	5 306
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	2 002	1 224	1 038	868	788	588	697	829	873	584	831	1 142
20 900	18 564	1 606 187	1 483 293	1 435 941	1 518 179	1 736 565	1 614 143	1 536 399	1 458 055	1 444 654	1 355 668	1 254 181	1 025 082
–	–	225 535	254 266	227 387	205 103	222 903	267 132	223 464	239 956	240 686	128 335	198 742	184 466
–	–	79 839	94 484	75 748	72 620	91 055	92 957	88 817	82 979	81 657	62 845	75 985	70 603
–	–	–	–	–	–	–	–	10 756	7 643	5 955	25 150	20 820	22 723
–	–	–	–	–	–	–	–	5 121	3 976	2 795	14 913	17 971	10 325
–	–	–	–	–	–	–	–	–	–	–	–	–	–
50 709	37 061	36 596	34 968	37 005	48 441	50 850	46 342	35 405	36 235	23 655	19 316	18 560	9 552
–	–	444 668	418 182	377 340	526 874	446 104	581 871	378 535	403 415	278 652	352 006	301 031	327 060
–	–	36 596	34 787	37 005	48 441	50 850	46 342	35 405	36 235	23 655	19 316	18 560	9 552
–	–	–	–	–	–	–	12 125	18 171	4 839	–	–	–	0
–	–	–	–	–	–	–	–	–	–	–	–	–	0
–	–	–	–	–	–	–	–	–	1	2	–	–	–
3 992	3 621	4 183	2 556	1 799	1 171	864	1 369	2 051	2 227	1 052	1 345	1 772	838
–	–	4 183	2 556	1 799	1 171	–	–	–	–	–	–	–	–
–	–	4 183	2 556	1 799	1 171	864	1 369	2 051	2 227	1 052	1 345	1 772	838
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	41	68	36	64	38	45	30	35	29	36	56	64
72 808	63 169	368 913	373 838	353 114	208 364	412 251	393 288	403 892	150 126	102 140	84 078	95 006	80 859
–	–	300 806	297 345	278 178	300 591	321 954	316 898	328 555	311 447	276 639	231 221	212 329	182 847
–	–	68 107	76 493	74 936	92 227	90 297	76 390	75 337	65 404	40 535	33 002	35 373	23 202
–	–	–	–	–	–	–	–	–	–	–	0	17 300	17 457
–	–	–	–	–	–	–	–	–	–	–	0	4 331	3 455
–	–	–	–	–	–	–	–	–	–	–	–	–	–
6 181	5 152	33 779	19 493	35 151	43 386	42 008	34 912	30 067	20 215	24 279	22 271	16 831	5 764
–	–	31 668	36 576	54 234	54 524	53 524	61 092	40 625	38 214	30 267	24 813	29 180	19 183
6 181	5 152	6 768	7 647	14 339	15 240	14 653	9 834	8 055	5 471	3 473	3 615	4 013	2 077
–	–	–	–	–	–	–	–	–	–	0	2 065	10 246	12 529
–	–	–	–	–	–	–	–	–	–	0	574	4 156	2 743
–	–	–	–	–	–	–	–	–	–	–	–	–	–
72 091	75 102	274 910	188 122	151 961	135 989	108 350	84 473	74 766	59 601	51 668	49 186	54 297	45 588
–	–	2 682 862	2 821 440	2 856 539	2 738 600	2 694 854	2 728 481	2 842 429	3 634 060	1 297 365	2 829 516	2 760 119	2 791 917
–	–	74 316	68 699	47 807	38 790	24 909	19 496	22 637	16 389	11 355	16 130	17 515	16 612
–	–	–	10 000	94 000	0	–	0	130 000	78 294	72 087	44 647	7 017	491 373
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–

26 576 925	34 963 534	32 151 570	43 091 654	45 338 182	64 110 279	69 328 489	68 240 133	70 901 016	72 034 781	60 139 248	82 704 095	82 716 062	79 381 896
1 304 311	1 212 763	1 181 096	982 778	904 971	899 890	909 625	1 050 809	921 169	788 429	563 109	567 154	676 082	490 545
5 514 224	7 540 977	9 312 314	8 204 604	8 691 031	8 847 138	5 044 766	7 454 992	7 253 650	8 449 274	8 595 623	7 542 842	7 273 574	3 051 938
7 650	3 913	33 365	24 785	20 893	16 559	10 124	5 331	2 881	1 436	757	451	356	311
5 009 891	4 658 138	5 040 292	6 502 884	5 840 137	5 968 249	6 328 630	4 420 523	4 182 714	3 525 988	3 425 385	3 058 012	4 496 025	3 401 898
365 167	333 301	2 820 340	2 356 139	2 383 576	2 340 065	2 648 381	2 377 597	2 313 711	1 945 826	1 868 539	1 660 049	1 527 555	1 252 814
38 778 168	**48 712 626**	**50 538 977**	**61 162 844**	**63 178 790**	**82 182 180**	**84 270 015**	**83 549 385**	**85 575 141**	**86 745 734**	**74 592 660**	**95 532 603**	**96 689 654**	**87 579 402**

Annex 6D – Reported malaria cases by species, 1990-2011

WHO Region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997
African	Algeria	Suspected	152	229	106	84	206	107	221	197
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Angola	Suspected	243 673	1 143 701	782 988	722 981	667 376	156 603	–	893 232
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Benin	Suspected	92 870	118 796	290 868	403 327	546 827	579 300	623 396	670 857
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Botswana	Suspected	10 750	14 364	4 995	55 331	29 591	17 599	80 004	101 887
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Burkina Faso	Suspected	496 513	448 917	420 186	502 275	472 355	501 020	582 658	672 752
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Burundi	Suspected	92 870	568 938	773 539	828 429	831 481	932 794	974 226	670 857
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Cameroon	Suspected	869 048	787 796	664 413	478 693	189 066	784 321	931 311	787 796
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Cape Verde	Suspected	69	80	38	44	21	127	77	20
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Central African Republic	Suspected	174 436	125 038	89 930	82 072	82 057	100 962	95 259	99 718
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Chad	Suspected	212 554	246 410	229 444	234 869	278 225	293 564	278 048	343 186
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Comoros	Suspected	–	–	–	12 012	13 860	15 707	15 509	–
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Congo	Suspected	32 428	32 391	21 121	15 504	35 957	28 008	14 000	9 491
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Côte d'Ivoire	Suspected	511 916	466 895	553 875	421 043	–	755 812	1 109 011	983 089
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Democratic Republic of the Congo	Suspected	–	–	–	–	–	–	198 064	–
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Equatorial Guinea	Suspected	25 552	22 598	25 100	17 867	14 827	12 530	–	–
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Eritrea	Suspected	–	–	–	–	–	81 183	129 908	–
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Ethiopia	Suspected	–	–	206 262	305 616	358 469	412 609	478 411	509 804
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Gabon	Suspected	57 450	80 247	100 629	70 928	82 245	54 849	74 310	57 450
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Gambia	Suspected	222 538	215 414	188 035	–	299 824	135 909	266 189	325 555
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Ghana	Suspected	1 438 713	1 372 771	1 446 947	1 697 109	1 672 709	1 928 316	2 189 860	2 227 762
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Guinea	Suspected	21 762	17 718	–	–	607 560	600 317	772 731	802 210
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Guinea-Bissau	Suspected	81 835	64 123	56 073	158 748	–	197 386	6 457	10 632
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Kenya	Suspected	–	–	–	–	6 103 447	4 343 190	3 777 022	–
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Liberia	Suspected	–	–	–	–	–	–	239 998	826 151
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–

1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
–	701	27 733	26 411	18 803	17 059	16 686	18 392	13 869	14 745	11 964	15 635	12 224	23 948
–	–	261	247	188	313	71	242	91	261	185	88	401	179
–	–	277	181	116	111	92	57	24	24	10	6	4	12
–	–	–	–	–	–	–	–	–	–	0	0	3	0
1 169 028	1 471 993	2 080 348	1 249 767	1 862 662	3 246 258	2 489 170	2 329 316	2 283 097	2 726 530	3 432 424	3 726 606	3 687 574	3 501 953
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
650 025	709 348	–	717 290	782 818	819 256	853 034	803 462	861 847	1 171 522	1 147 005	1 256 708	1 432 095	1 424 335
–	–	–	–	–	–	–	–	–	–	–	534 590	–	68 745
–	–	–	–	–	–	–	–	–	–	–	0	–	0
–	–	–	–	–	–	–	–	–	–	–	0	–	0
59 696	72 640	71 555	48 281	28 907	23 657	22 404	11 242	23 514	30 906	41 153	32 460	12 196	1 141
–	–	–	–	–	–	–	–	–	381	914	951	1 046	432
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
721 480	867 866	–	352 587	1 188 870	1 443 184	1 546 644	1 615 695	2 060 867	2 487 633	3 790 238	4 537 600	5 723 481	5 024 697
–	–	–	–	–	–	–	–	–	–	–	–	–	–
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687 301	1 936 584	3 252 692	3 345 881	2 626 149	2 243 185	1 749 892	2 334 067	2 265 970	2 079 861	1 950 266	2 588 830	4 255 301	3 298 979
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664 413	–	–	–	–	–	–	277 413	634 507	604 153	1 650 749	1 883 199	1 845 691	1 829 266
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
41	29	6 843	7 141	8 022	6 001	9 833	7 902	8 729	8 902	9 033	21 913	47	26 508
–	–	144	107	18	68	45	68	80	18	35	65	47	36
–	–	0	0	0	0	0	0	0	0	0	0	0	0
–	–	–	–	–	–	–	–	–	0	0	0	0	0
105 664	127 964	89 614	140 742	–	78 094	129 367	131 856	114 403	119 477	152 260	175 210	66 484	221 980
–	–	–	–	–	–	–	–	–	–	–	–	–	–
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395 205	392 815	437 041	451 182	517 004	505 732	481 122	501 846	251 354	518 832	478 987	549 048	544 243	528 454
–	–	20 977	19 520	21 959	21 532	665	14 770	21 354	24 282	24 015	–	–	–
–	–	19 101	18 767	21 974	23 663	695	16 898	23 801	24 006	23 742	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
3 844	9 793	–	–	–	–	43 918	29 554	54 830	53 511	46 426	57 084	103 670	83 443
–	–	–	–	–	–	–	–	–	–	–	5 771	33 791	21 387
–	–	–	–	–	–	–	–	–	–	–	79	528	334
–	–	–	–	–	–	–	–	–	–	–	132	880	557
17 122	–	–	–	–	–	–	–	157 757	163 924	203 869	203 160	–	277 263
–	–	–	–	–	–	–	–	–	103 213	117 291	92 855	–	–
–	–	–	–	–	–	–	–	–	0	0	0	–	–
–	–	–	–	–	–	–	–	–	0	0	0	–	–
–	–	–	1 193 288	1 109 751	1 136 810	1 275 138	1 280 914	1 253 408	1 277 670	1 343 654	1 847 367	1 721 461	2 588 004
–	–	–	–	–	–	–	–	–	–	–	–	–	–
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141 353	1 508 042	964 623	2 199 247	2 640 168	4 386 638	4 133 514	6 334 608	5 008 959	3 720 570	4 933 845	7 839 435	9 252 959	9 442 144
–	–	889	1 517	1 727	2 418	2 659	2 844	2 043	1 642	1 196	–	–	–
–	–	–	–	–	6	7	110	3	7	27	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	20 948	67 196	84 532	78 095	37 267
–	–	–	–	–	–	–	–	–	5 842	7 883	11 603	39 636	20 601
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
255 150	147 062	–	138 667	121 011	107 599	65 025	64 056	49 703	80 428	62 449	77 946	96 792	97 479
–	–	–	8 994	5 335	8 998	3 480	7 506	5 750	3 006	1 519	3 358	9 785	10 263
–	–	–	722	743	1 348	639	1 567	791	6 508	2 832	3 244	3 989	4 932
–	–	–	–	–	–	–	–	–	0	0	0	57	19
604 960	647 919	–	3 014 879	3 617 057	4 129 225	5 904 132	4 727 209	3 375 994	2 844 963	3 060 407	4 335 001	5 420 111	5 487 972
–	–	–	233 218	262 623	291 403	396 621	374 335	293 326	269 514	274 657	594 751	732 776	814 547
–	–	–	157 625	164 772	171 388	178 676	158 658	149 020	171 710	173 300	287 114	390 252	665 813
–	–	–	–	–	–	–	–	–	–	–	0	0	–
80 247	–	127 024	132 918	157 440	166 321	200 214	235 479	136 916	190 749	187 714	113 803	183 105	–
–	–	50 810	53 167	62 976	58 212	70 075	70 644	33 458	45 186	40 701	187	2 157	–
–	–	–	–	–	–	–	–	–	–	–	23	720	–
–	–	–	–	–	–	–	–	–	–	–	0	2 015	–
–	127 899	–	481 590	620 767	540 165	395 043	329 426	427 598	439 798	508 846	479 409	414 406	261 967
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
1 745 214	2 895 079	3 349 528	3 044 844	3 140 893	3 552 896	3 416 033	3 452 969	3 511 452	3 123 147	3 200 147	3 694 671	3 849 536	4 154 261
–	–	–	–	–	–	–	–	–	457 424	918 105	924 095	926 447	593 518
–	–	–	–	–	–	–	–	–	0	0	0	0	0
–	–	–	–	–	–	–	–	–	19 060	38 254	38 504	102 937	31 238
817 949	807 895	816 539	851 877	850 147	731 911	876 837	850 309	834 835	888 643	657 003	812 471	1 092 554	1 189 016
–	–	4 800	6 238	16 561	4 378	103 069	50 452	41 228	28 646	33 405	20 932	–	5 450
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
2 113	197 454	246 316	202 379	194 976	162 344	187 910	185 493	148 720	140 205	148 542	156 633	140 143	197 229
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
80 718	122 792	4 216 531	3 262 931	3 319 399	5 338 008	7 545 541	9 181 224	8 926 058	9 610 691	–	8 123 689	6 071 583	11 120 812
–	–	–	–	–	39 383	28 328	–	–	–	839 904	–	898 531	1 002 805
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
777 754	–	–	–	–	–	–	66 043	1 171 175	694 428	874 607	1 035 940	2 675 816	2 480 748
–	–	–	–	–	–	–	44 875	761 095	80 373	157 920	212 657	212 927	577 641
–	–	–	–	–	–	–	–	–	0	0	0	0	–
–	–	–	–	–	–	–	–	–	0	0	0	0	–

Annex 6D – Reported malaria cases by species, 1990-2011 (continued)

WHO Region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997
African	Madagascar	Suspected	–	–	–	–	–	196 358	–	–
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Malawi	Suspected	3 870 904	–	–	4 686 201	4 736 974	–	6 183 290	2 761 269
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Mali	Suspected	248 904	282 256	280 562	295 737	263 100	95 357	29 818	384 907
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Mauritania	Suspected	26 903	42 112	45 687	43 892	156 080	214 478	181 204	189 571
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Mozambique	Suspected	–	–	–	–	–	–	12 794	–
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Namibia	Suspected	–	–	–	380 530	401 519	275 442	345 177	390 601
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Niger	Suspected	1 162 824	808 968	865 976	726 666	806 204	778 175	1 162 824	978 855
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Nigeria	Suspected	1 116 992	909 656	1 219 348	981 943	1 175 004	1 133 926	1 149 435	1 148 542
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Rwanda	Suspected	1 282 012	1 331 494	1 373 247	733 203	371 550	1 391 931	1 145 759	1 331 494
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Sao Tome and Principe	Suspected	–	–	–	–	–	51 938	47 074	47 757
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Senegal	Suspected	–	–	–	–	450 071	628 773	–	861 276
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Sierra Leone	Suspected	–	–	–	–	–	–	7 192	209 312
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	South Africa	Suspected	6 822	4 693	2 872	13 285	10 289	8 750	27 035	23 121
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Swaziland	Suspected	–	–	–	–	–	–	38 875	23 754
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Togo	Suspected	810 509	780 825	634 166	561 328	328 488	–	352 334	366 672
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Uganda	Suspected	–	–	2 446 659	1 470 662	2 191 277	1 431 068	–	2 317 840
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	United Republic of Tanzania[3]	Suspected	10 715 736	8 715 736	7 681 524	8 777 340	7 976 590	2 438 040	4 969 273	1 131 655
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Mainland	Suspected	–	–	–	–	–	–	–	–
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Zanzibar	Suspected	–	–	–	–	–	–	–	–
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Zambia	Suspected	1 933 696	2 340 994	2 953 692	3 514 000	3 514 000	2 742 118	3 215 866	–
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Zimbabwe	Suspected	662 613	581 168	420 137	877 734	324 188	761 791	1 696 192	1 849 383
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
Region of the Americas	Argentina	Suspected	22 625	16 844	13 619	11 389	14 070	12 986	12 833	9 684
		No Pf	1	3	0	1	1	0	0	0
		No Pv	1 659	800	643	757	947	1 065	2 048	592
		No Other	0	0	0	0	0	0	0	0
	Bahamas	Suspected	4	3	2	2	0	3	0	8
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Belize	Suspected	17 204	25 281	24 135	47 742	50 740	37 266	35 113	26 598
		No Pf	40	131	165	251	420	475	455	126
		No Pv	2 987	3 181	5 175	8 332	9 991	8 938	6 150	3 887
		No Other	6	5	1	0	0	0	0	0

1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
–	1 141 474	1 392 483	1 386 291	1 598 919	2 198 297	1 458 408	1 229 385	1 087 563	736 194	352 870	633 998	628 507	774 385
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
2 985 659	4 193 145	3 646 212	3 823 796	2 784 001	3 358 960	2 871 098	3 688 389	4 498 949	4 786 045	5 185 082	6 183 816	6 851 108	5 338 701
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
12 234	530 197	546 634	612 896	723 077	809 428	1 969 214	962 706	1 022 592	1 291 853	1 045 424	1 633 423	2 171 542	1 961 070
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
168 131	253 513	–	243 942	224 614	318 120	224 840	223 472	188 025	222 476	201 044	174 820	244 319	154 003
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–	–	–	–	–	–	–	–	–	–	–	–	–	–
194 024	2 336 640	–	–	–	–	–	–	–	6 155 082	4 831 491	4 310 086	4 238 469	5 471 573
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
353 110	429 571	–	538 512	445 803	468 259	610 799	339 204	265 595	172 024	155 399	102 956	39 855	74 407
–	–	–	–	–	–	–	–	–	–	1 092	505	556	335
–	–	–	–	–	–	–	–	–	–	0	0	0	0
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872 925	815 895	–	1 340 142	888 345	681 783	760 718	817 707	886 531	2 617 792	2 760 722	2 670 958	7 592 288	3 157 482
–	–	–	–	–	–	53 637	74 129	44 612	54 515	60 998	77 485	39 021	67 159
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	1 113	1 245	1 581	–	–
2 122 663	1 965 486	2 476 608	2 253 519	2 605 381	2 608 479	3 310 229	3 532 108	3 982 372	2 969 950	2 834 174	4 295 686	3 873 463	4 306 945
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1 279 581	906 552	–	1 329 106	1 519 315	1 735 774	1 915 990	2 409 080	2 379 278	2 318 079	2 096 061	3 186 306	2 708 973	1 602 271
–	–	–	–	–	–	–	–	–	–	316 242	698 745	638 669	208 858
–	–	–	–	–	–	–	–	–	–	–	–	–	–
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46 026	37 026	66 250	84 993	94 249	86 546	105 341	73 050	60 819	49 298	179 061	119 877	58 961	6 504
–	–	–	–	–	–	–	–	–	–	–	–	2 219	6 363
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948 823	1 145 112	1 123 377	931 682	960 478	1 414 383	1 195 402	1 346 158	1 555 310	1 170 234	737 414	584 873	–	–
–	–	44 959	14 261	15 261	28 272	23 171	38 746	49 366	78 278	24 830	19 614	–	–
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249 744	409 670	460 881	447 826	507 130	524 987	355 638	233 833	160 666	653 987	932 819	1 314 799	2 327 928	933 274
–	–	–	2 206	3 702	3 945	2 206	3 702	3 945	–	–	273 149	218 473	25 511
–	–	–	0	0	0	0	0	0	–	–	–	–	–
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26 445	51 444	64 624	26 506	15 649	13 459	13 399	7 755	14 456	6 327	7 796	6 117	276 669	382 434
–	–	–	–	–	–	–	–	–	–	–	–	2 181	326
–	–	–	–	–	–	–	–	–	–	–	–	0	14
–	–	–	–	–	–	–	–	–	–	–	–	5	15
4 410	30 420	29 374	35 582	23 456	19 425	11 320	10 374	11 637	6 338	5 881	6 624	2 221	2 471
–	–	–	1 395	670	342	574	279	155	84	58	106	87	130
–	–	–	0	0	0	0	0	0	0	0	0	0	0
–	–	–	–	–	–	–	–	–	0	0	0	0	0
368 472	412 619	–	498 826	583 872	490 256	516 942	437 662	566 450	715 615	898 112	961 807	1 053 599	893 588
–	–	–	–	–	–	–	–	–	117 131	151 960	191 357	224 080	237 282
–	–	–	–	–	–	–	–	–	0	0	0	0	0
–	–	–	–	–	–	–	–	–	0	0	195	7	23
2 845 811	3 070 800	3 552 859	5 624 032	7 536 748	9 657 332	10 717 076	9 867 174	10 168 389	11 978 636	11 602 700	12 086 399	13 208 169	12 173 358
–	–	–	–	546 016	785 748	861 451	1 082 224	850 050	1 024 470	959 712	1 275 310	1 565 348	–
–	–	–	–	–	–	–	–	–	–	–	–	15 812	–
–	–	–	–	–	–	–	–	–	–	–	–	0	–
–	423 967	53 533	369 474	413 361	11 418 731	11 930 393	11 466 713	10 582 608	8 571 839	7 652 661	12 840 249	12 893 535	10 164 967
–	–	17 734	18 385	16 983	15 705	11 936	7 628	1 585	293	67	211	364	475
–	–	–	–	–	–	–	–	–	–	–	0	0	0
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	324 584	369 394	11 379 411	11 898 627	11 441 681	10 566 201	8 562 200	7 643 050	12 752 090	12 819 192	10 160 478
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–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	53 533	53 804	51 968	53 899	50 976	43 642	30 676	23 511	229 890	181 939	200 072	455 718
–	–	17 734	18 385	16 983	15 705	11 936	7 628	1 585	293	77	211	364	475
–	–	–	–	–	–	–	–	–	–	0	0	0	0
–	–	–	–	–	–	–	–	–	–	0	0	0	0
3 399 630	3 385 616	3 337 796	3 838 402	3 760 335	4 346 172	4 078 234	4 121 356	4 731 338	4 248 295	3 080 301	2 976 395	4 229 839	4 607 908
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1 719 960	1 804 479	–	–	–	–	1 997 066	1 709 890	1 493 398	1 272 731	1 089 322	867 135	912 618	480 011
–	–	–	–	–	–	–	–	–	–	–	–	249 379	0
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	0
9 341	8 524	7 949	6 685	5 043	3 977	3 018	3 018	6 353	6 353	5 157	86	2 547	7 872
0	0	1	0	0	0	0	1	1	2	0	0	–	–
339	222	439	215	125	122	115	251	211	385	106	86	72	18
0	0	0	0	0	0	0	0	0	0	0	–	–	–
21	30	22	4	1	34	17	9	546	6	35	0	27 272	0
–	–	–	–	–	–	2	1	–	–	13	–	–	–
–	–	–	–	–	–	0	0	–	–	0	–	–	–
–	–	–	–	–	–	0	0	–	–	1	–	–	–
27 000	19 395	18 559	18 173	15 480	15 480	17 358	25 119	25 755	22 134	25 550	26 051	27 366	22 996
222	52	20	6	0	0	6	32	10	0	0	1	0	1
2 392	1 801	1 466	1 156	1 134	1 084	1 060	1 517	834	845	540	255	149	78
0	0	–	0	0	0	2	0	0	0	0	0	0	0

Annex 6D – Reported malaria cases by species, 1990-2011 (continued)

WHO Region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997
Region of the Americas	Bolivia (Plurinational State of)	Suspected	121 743	125 509	125 414	125 721	128 580	152 748	161 077	141 804
		No Pf	652	1 103	2 757	5 375	4 833	3 374	4 252	5 381
		No Pv	19 028	17 928	21 729	22 100	29 916	43 537	59 760	46 097
		No Other	0	0	0	0	0	0	0	0
	Brazil	Suspected	3 294 234	3 283 016	2 955 196	2 551 704	2 671 953	2 582 017	2 159 551	1 869 382
		No Pf	252 191	265 597	267 054	176 379	197 009	203 402	135 132	95 084
		No Pv	308 184	348 722	342 650	289 656	367 251	361 560	318 331	296 686
		No Other	21	112	156	180	146	765	1 731	1 206
	Colombia	Suspected	496 087	740 938	736 426	656 632	572 924	667 473	461 137	583 309
		No Pf	35 490	70 868	69 274	42 508	34 070	62 687	37 315	66 261
		No Pv	63 855	113 173	114 690	86 816	93 108	124 354	98 573	114 544
		No Other	144	115	59	53	40	41	35	105
	Costa Rica	Suspected	130 530	130 530	149 198	140 435	143 721	143 408	148 161	155 925
		No Pf	5	22	16	8	3	16	65	45
		No Pv	1 146	3 251	6 935	5 025	4 442	4 499	5 415	4 667
		No Other	0	0	0	0	0	0	0	0
	Dominican Republic	Suspected	297 599	343 491	299 549	290 073	316 182	380 143	436 473	446 874
		No Pf	334	367	694	983	1 664	1 807	1 112	812
		No Pv	22	10	4	4	5	1	2	4
		No Other	0	0	0	0	1	0	0	0
	Ecuador	Suspected	363 080	346 465	377 321	419 590	301 546	253 714	162 128	174 692
		No Pf	21 871	13 868	15 970	21 646	10 241	4 738	1 886	3 091
		No Pv	49 799	45 532	25 119	25 213	19 765	13 390	10 028	13 274
		No Other	0	0	0	0	0	0	0	0
	El Salvador	Suspected	230 246	190 540	202 446	172 624	139 587	169 267	164 491	166 895
		No Pf	18	18	6	4	5	6	4	5
		No Pv	9 251	5 915	4 533	3 883	2 798	3 356	5 884	2 714
		No Other	0	0	0	0	0	0	0	0
	French Guiana, France	Suspected	49 192	55 242	56 925	49 993	48 242	52 521	46 780	42 631
		No Pf	2 607	1 745	2 796	3 154	3 809	4 137	3 980	2 349
		No Pv	3 292	1 663	1 151	720	415	545	687	715
		No Other	10	71	125	100	17	29	57	131
	Guatemala	Suspected	305 791	361 743	396 171	276 343	133 611	135 095	97 586	140 113
		No Pf	1 008	1 616	1 480	2 094	423	671	130	879
		No Pv	40 703	56 070	56 080	39 774	21 634	23 490	20 140	31 220
		No Other	0	0	0	0	0	17	0	0
	Guyana	Suspected	135 260	141 046	159 108	172 469	168 127	291 370	262 526	229 710
		No Pf	12 904	23 397	23 871	18 091	22 503	29 976	18 239	20 238
		No Pv	9 777	18 807	15 831	15 081	17 153	29 335	15 836	11 865
		No Other	0	0	0	0	0	0	0	0
	Haiti	Suspected	13 743	81 763	37 957	10 045	54 973	–	69 853	35 132
		No Pf	4 806	25 511	13 457	853	–	–	18 877	5 870
		No Pv	0	–	0	0	–	–	0	–
		No Other	0	–	0	0	–	–	0	–
	Honduras	Suspected	418 513	468 811	471 950	372 180	361 776	373 364	305 167	310 815
		No Pf	659	1 731	1 216	448	568	1 124	874	858
		No Pv	52 436	71 621	69 622	44 065	52 110	58 322	73 613	65 005
		No Other	0	0	0	0	0	0	0	0
	Jamaica	Suspected	281	3	6	6	3	5	206	110
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Mexico	Suspected	1 503 208	1 596 427	1 668 729	1 816 340	1 923 775	1 965 682	2 053 773	1 950 935
		No Pf	62	278	129	202	63	73	87	67
		No Pv	44 451	26 287	16 041	15 591	12 801	7 243	6 206	4 979
		No Other	0	0	0	0	0	0	0	0
	Nicaragua	Suspected	466 558	364 786	381 715	440 891	374 348	493 399	461 989	410 132
		No Pf	1 568	1 702	2 192	2 492	1 524	3 844	2 733	1 815
		No Pv	34 217	25 951	24 674	41 445	40 551	67 536	73 536	50 043
		No Other	0	0	0	0	0	0	0	0
	Panama	Suspected	315 359	336 569	308 359	278 557	237 992	222 498	188 914	193 853
		No Pf	105	118	113	20	18	18	25	179
		No Pv	276	997	614	461	717	712	451	326
		No Other	0	0	0	0	0	0	0	0
	Paraguay	Suspected	98 417	127 807	149 523	164 146	96 885	86 664	68 151	83 104
		No Pf	55	18	10	1	12	35	5	1
		No Pv	2 857	2 965	1 279	435	571	862	632	565
		No Other	0	0	0	0	0	1	0	1
	Peru	Suspected	90 040	109 654	123 147	158 325	295 824	833 614	1 162 230	1 299 929
		No Pf	131	187	793	9 634	21 203	37 591	50 009	53 016
		No Pv	28 693	33 502	54 129	85 504	100 801	152 868	161 375	127 287
		No Other	58	16	0	84	35	62	124	35
	Suriname	Suspected	18 594	18 399	13 765	26 079	29 148	38 613	68 674	94 508
		No Pf	1 584	1 402	1 326	5 930	4 384	6 249	14 942	9 251
		No Pv	21	33	25	84	240	256	744	1 125
		No Other	3	55	53	113	80	101	258	245
	Venezuela (Bolivarian Republic of)	Suspected	361 194	375 473	336 571	290 483	210 890	302 487	285 326	271 989
		No Pf	9 135	8 182	5 004	3 501	3 677	4 251	4 098	4 064
		No Pv	25 944	34 641	16 365	8 988	12 617	18 168	17 714	18 272
		No Other	3	3	47	50	17	82	40	64
Eastern Mediterranean	Afghanistan	Suspected	735 624	768 685	–	431 353	683 034	602 320	590 624	540 050
		No Pf	1 832	4 312	–	2 383	4 459	4 158	2 501	5 878
		No Pv	315 647	293 293	–	121 040	27 142	182 687	75 749	183 989
		No Other	0	0	–	0	0	0	0	0
	Djibouti	Suspected	11 463	26 761	28 636	–	25 366	–	–	–
		No Pf	3 072	7 165	7 296	–	6 048	–	–	–
		No Pv	165	170	172	–	92	–	–	–
		No Other	0	0	0	–	0	–	–	–

1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
176 023	159 618	143 990	122 933	137 509	158 299	168 307	214 021	220 616	181 816	169 826	134 595	140 857	150 662
11 414	7 557	2 536	808	727	793	695	1 080	1 785	1 622	836	561	773	214
62 499	42 480	28 932	14 957	13 549	17 319	14 215	19 062	17 210	12 988	8 912	8 660	11 444	5 877
0	0	0	0	0	0	0	0	0	0	0	0	0	0
2 089 175	2 435 451	2 562 576	2 274 610	2 118 491	2 009 414	2 194 780	2 660 539	2 959 489	2 986 381	2 726 433	2 711 062	2 713 459	2 568 081
105 945	121 228	131 616	81 333	80 188	88 174	110 422	155 169	145 858	93 591	49 358	47 831	47 406	32 007
345 820	473 437	478 212	306 396	267 245	320 378	354 366	450 687	403 383	364 912	266 300	258 271	283 384	231 618
1 461	888	932	574	826	298	216	211	228	149	88	112	184	142
190 553	268 355	478 820	747 079	686 635	640 453	562 681	493 562	451 240	589 755	493 135	436 366	521 342	418 159
100 890	25 389	51 730	100 242	88 972	75 730	55 158	43 472	46 147	54 509	22 392	21 442	32 900	14 650
89 663	41 137	92 702	130 991	115 944	105 226	87 083	78 157	73 949	70 753	56 838	57 111	83 255	44 701
0	319	0	0	0	0	0	0	0	0	0	0	48	16
103 976	96 454	61 261	43 053	17 738	9 622	9 204	12 767	24 498	22 641	17 304	4 829	15 599	10 690
15	15	12	1	2	14	5	3	32	11	0	1	2	4
5 133	3 983	1 867	1 362	1 008	704	1 284	3 538	2 667	1 212	966	261	112	13
0	0	0	0	0	0	0	0	0	0	0	0	0	0
453 850	453 720	427 297	411 431	391 216	349 717	322 948	397 108	446 839	435 649	381 010	353 336	495 637	421 405
1 999	3 584	1 226	1 034	1 292	1 528	2 353	3 829	3 519	2 708	1 839	1 643	2 480	1 614
7	5	7	4	4	1	2	8	6	3	1	0	2	2
0	0	0	0	0	0	0	0	0	0	0	0	0	0
300 752	444 606	544 646	538 757	403 225	433 244	357 633	358 361	318 132	352 426	387 558	451 732	488 830	460 785
21 448	50 158	48 974	37 491	20 015	10 724	5 891	2 212	1 596	1 158	396	551	258	296
22 248	37 462	55 624	71 412	66 742	41 341	22 839	14 836	8 267	7 306	4 495	3 569	1 630	937
0	0	0	0	0	0	0	0	0	0	0	0	0	0
161 900	144 768	279 072	111 830	115 378	102 053	94 819	102 479	113 754	95 857	97 872	83 031	115 256	100 883
11	9	9	2	0	2	1	2	1	2	1	1	2	3
1 171	1 221	744	360	117	83	111	65	48	38	32	19	22	12
0	0	0	0	0	0	0	0	0	0	0	0	0	0
3 462	47 974	48 162	44 718	44 718	32 402	32 402	32 402	32 402	32 402	11 994	20 065	14 373	14 429
2 658	4 567	3 051	3 166	2 547	3 080	2 437	1 777	1 847	845	406	400	203	154
552	564	657	657	954	759	600	1 637	2 227	1 804	925	1 003	492	339
210	214	214	0	160	0	0	71	27	23	10	6	5	5
47 689	192 710	246 642	198 114	197 113	156 227	148 729	178 726	168 958	132 410	175 678	156 652	237 075	195 080
1 049	1 708	1 474	1 044	1 841	1 310	852	1 062	804	196	50	50	30	107
35 355	45 284	50 171	34 772	33 695	29 817	28 103	38 641	30 289	15 182	7 148	7 024	7 163	6 707
0	0	36	0	0	0	0	48	0	0	0	0	0	0
296 596	255 228	209 197	211 221	175 966	185 877	151 938	210 429	202 688	178 005	137 247	169 309	212 863	201 693
22 799	16 144	12 324	12 831	10 599	12 970	12 226	16 438	9 818	4 677	5 741	6 206	11 244	15 945
18 401	11 139	11 694	14 291	11 296	14 654	16 141	21 255	10 560	6 712	5 927	6 029	8 402	9 066
0	0	0	0	0	3	446	1 291	686	267	147	102	132	96
34 449	1 196	21 190	51 067	51 067	51 067	30 440	3 541 506	87 951	142 518	168 950	270 438	270 427	135 136
34 449	1 196	16 897	9 837	9 837	9 837	10 802	21 778	32 739	29 824	36 768	49 535	84 153	32 048
0	0	0	0	0	0	0	0	0	1	6	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
249 105	250 411	175 577	174 430	178 616	136 991	145 070	155 976	127 436	130 255	119 484	112 529	152 243	155 785
1 067	1 264	1 446	938	606	540	868	999	768	813	610	1 283	873	581
41 912	45 520	33 679	23 211	16 617	13 583	16 425	15 009	11 112	9 700	7 758	7 931	8 699	7 010
0	0	0	0	0	0	0	0	0	0	0	0	0	0
207	219	874	596	725	394	3 879	2 470	6 821	199	30 732	34 149	0	0
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–	–	–	1	–	–	–	–	–	–	–	1	–	–
1 806 903	1 906 050	2 003 569	1 857 233	1 852 553	1 565 155	1 454 575	1 559 076	1 345 915	1 430 717	1 246 780	1 240 087	1 192 081	1 035 424
159	96	131	69	19	44	49	22	16	4	0	1	0	0
24 864	13 354	7 259	4 927	4 605	3 775	3 357	2 945	2 498	2 357	2 357	2 702	1 226	1 124
0	0	0	0	0	0	0	0	0	0	0	0	0	0
440 312	555 560	509 443	482 919	491 689	448 913	492 319	516 313	476 144	537 637	543 173	553 717	554 414	540 404
3 193	1 812	1 369	1 194	995	1 213	1 200	1 114	336	106	61	93	154	150
30 716	36 635	22 645	9 304	6 700	5 525	5 699	5 498	2 784	1 250	701	517	538	775
0	0	0	0	0	0	0	0	0	0	0	0	0	0
187 055	161 219	149 702	156 589	165 796	166 807	171 179	208 582	212 254	204 193	200 574	158 481	141 038	116 588
125	40	45	39	337	627	882	766	62	48	4	3	20	1
914	896	991	889	1 907	3 873	4 213	2 901	1 601	1 233	740	775	398	353
0	0	0	0	0	0	0	0	0	0	0	0	0	0
42 944	101 074	97 026	71 708	99 338	126 582	97 246	85 942	111 361	92 339	96 313	64 660	62 178	48 611
3	2	0	4	1	4	1	0	2	2	7	10	5	6
2 087	9 944	6 853	2 706	2 777	1 388	693	376	821	1 337	333	81	22	3
1	0	0	0	0	0	0	0	0	0	0	0	0	0
1 942 529	2 027 624	1 483 816	1 417 423	1 582 385	1 485 012	1 438 925	1 438 925	1 438 925	1 438 925	861 290	36 886	29 337	22 878
84 289	67 215	20 618	17 687	21 174	19 154	20 905	15 058	8 437	7 766	4 487	3 910	2 296	2 596
162 695	94 077	47 690	61 680	78 000	66 588	72 676	72 611	56 488	43 031	33 895	32 976	26 872	20 282
79	0	13	11	10	13	0	–	–	–	–	0	0	0
73 481	65 087	63 377	67 369	68 070	43 241	56 975	59 855	45 722	33 992	29 911	34 717	17 074	15 315
10 193	11 685	10 648	13 217	9 752	8 782	6 738	6 931	2 331	547	838	832	638	310
1 699	1 371	1 673	1 229	1 648	1 047	915	1 611	733	509	639	895	817	382
520	883	811	1 549	1 388	0	726	589	225	14	17	18	36	17
333 786	218 959	261 866	198 000	278 205	344 236	420 165	420 165	479 708	396 338	414 137	370 258	400 495	382 303
5 248	3 531	5 491	2 774	2 572	5 562	4 620	6 026	6 928	8 077	5 021	7 739	10 629	9 724
15 733	15 548	24 829	17 224	26 907	26 111	41 972	38 985	30 111	33 621	26 437	27 002	32 710	34 651
65	7	1	8	12	46	63	38	23	51	579	1 087	60	6
–	696 082	366 865	–	–	–	280 301	548 503	789 186	869 144	935 043	847 666	–	936 252
13 665	9 131	5 115	–	84 528	44 243	12 789	5 917	6 216	6 283	4 355	4 026	6 142	5 581
–	153 253	89 240	–	330 083	316 697	229 233	110 527	79 913	85 919	77 219	60 854	63 255	71 968
–	0	–	–	0	0	0	0	0	0	0	0	0	0
–	–	–	–	–	–	–	3 969	–	7 945	6 305	–	–	–
–	–	–	–	–	–	–	413	1 796	210	119	–	1 019	–
–	–	–	–	–	–	–	0	0	0	0	–	0	–
–	–	–	–	–	–	–	0	0	0	0	–	0	–

Annex 6D – Reported malaria cases by species, 1990-2011 (continued)

WHO Region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997
Eastern Mediterranean	Egypt[2]	Suspected	–	–	–	–	–	–	–	–
		No Pf	69	19	10	13	475	–	21	9
		No Pv	6	5	6	4	20	–	–	2
		No Other	0	0	0	0	0	–	–	0
	Iran (Islamic Republic of)	Suspected	–	–	–	–	–	–	–	–
		No Pf	36 313	45 035	26 542	25 900	19 451	–	12 121	8 698
		No Pv	40 600	50 253	49 310	37 917	–	–	–	–
		No Other	4	8	8	18	–	–	–	–
	Iraq	Suspected	–	–	–	–	–	–	–	–
		No Pf	–	6	7	–	21	–	–	12
		No Pv	–	1 758	5 745	–	98 222	–	–	9 582
		No Other	–	0	0	–	0	–	–	0
	Oman	Suspected	–	–	–	–	–	–	–	–
		No Pf	30 907	17 817	13 958	16 149	6 543	1 282	754	552
		No Pv	1 777	1 426	845	694	669	513	500	469
		No Other	1	4	0	0	0	6	11	5
	Pakistan	Suspected	2 608 398	271 586	2 668 997	2 615 771	2 796 528	–	2 711 179	2 914 056
		No Pf	43 106	26 860	53 310	40 821	49 759	–	46 645	25 255
		No Pv	36 514	39 658	45 591	51 707	–	–	–	–
		No Other	0	0	0	0	–	–	–	–
	Saudi Arabia	Suspected	–	–	–	–	–	–	–	–
		No Pf	14 943	8 575	17 340	–	7 814	16 537	–	–
		No Pv	420	1 302	2 182	–	–	–	–	–
		No Other	303	80	101	–	–	–	–	–
	Somalia	Suspected	–	–	–	6 467	–	–	–	–
		No Pf	–	–	–	2 880	–	–	–	–
		No Pv	–	–	–	52	–	–	–	–
		No Other	–	–	–	103	–	–	–	–
	South Sudan	Suspected	–	–	–	–	–	–	–	–
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Sudan	Suspected	–	–	–	–	–	–	–	–
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Syrian Arab Republic[2]	Suspected	–	–	–	–	97 436	–	84 496	68 154
		No Pf	–	24	15	–	–	–	27	19
		No Pv	–	26	438	–	145	–	–	–
		No Other	–	3	2	–	–	–	–	–
	Yemen	Suspected	80 986	103 700	126 580	172 403	160 687	–	–	8 533 872
		No Pf	11 170	12 345	–	–	34 735	–	–	553 937
		No Pv	178	318	–	–	–	–	–	–
		No Other	36	52	–	–	–	–	–	–
European	Armenia[1]	Suspected	0	0	0	0	196	502	347	841
		No Pf	0	0	0	0	0	0	0	0
		No Pv	0	0	0	0	196	502	347	841
		No Other	0	0	0	0	0	0	0	0
	Azerbaijan	Suspected	24	113	27	23	667	2 840	13 135	9 911
		No Pf	0	0	0	0	0	0	0	0
		No Pv	24	113	27	23	667	2 840	13 135	9 911
		No Other	0	0	0	0	0	0	0	0
	Georgia	Suspected	1	2	1	0	1	1	7	1
		No Pf	0	0	0	0	0	0	0	0
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Kyrgyzstan	Suspected	1	1	2	0	6	3	26	13
		No Pf	0	0	0	0	0	0	0	1
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Russian Federation	Suspected	216	169	160	209	335	425	611	831
		No Pf	136	109	–	85	86	69	80	97
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Tajikistan	Suspected	175	294	404	619	2 411	6 103	16 561	29 794
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Turkey	Suspected	8 680	12 218	18 676	47 210	84 345	82 096	60 884	35 456
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Turkmenistan[1]	Suspected	1	17	11	3	9	10	14	14
		No Pf	0	0	0	0	0	0	0	0
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Uzbekistan	Suspected	28	12	25	36	21	27	51	52
		No Pf	0	3	9	6	2	0	2	0
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
South-East Asia	Bangladesh	Suspected	53 875	63 578	115 660	125 402	166 564	152 729	100 864	68 594
		No Pf	34 061	30 282	51 775	54 973	81 015	75 860	54 278	42 342
		No Pv	19 814	33 293	63 885	70 429	85 549	76 869	46 505	26 252
		No Other	–	–	–	–	–	–	–	–
	Bhutan	Suspected	9 497	22 126	28 900	28 116	39 852	23 188	15 696	9 029
		No Pf	4 231	13 138	14 092	12 943	16 474	7 540	6 026	3 614
		No Pv	5 266	8 988	14 808	15 173	22 427	15 655	9 670	5 415
		No Other	–	–	–	–	–	–	–	–

1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	17	9	8	44	39	23	27	28	76	81	82	–
–	–	0	–	2	1	4	0	2	2	4	13	3	–
–	–	0	–	0	0	0	0	0	0	0	0	0	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
4 523	3 247	2 546	2 158	2 382	4 475	1 380	2 219	1 199	1 266	938	485	339	463
28 416	–	–	17 145	13 176	19 087	12 441	16 747	14 710	14 322	10 337	5 485	2 610	2 668
12	–	–	0	0	0	0	0	0	0	0	0	0	0
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	1	1	0	0	0	1	0	2	3
–	–	–	–	–	346	154	47	24	3	5	1	4	7
–	–	–	–	–	0	0	0	0	0	0	0	0	0
–	–	–	–	–	–	–	–	–	–	–	–	–	–
523	456	316	283	266	299	158	153	100	93	94	160	140	109
551	416	366	336	315	428	449	385	341	602	870	718	1 039	1 423
19	29	12	16	9	13	8	6	2	2	1	2	3	0
3 187 814	3 440 986	–	7 024 978	7 530 636	8 662 496	6 074 739	8 671 271	8 680 304	9 330 723	8 330 040	7 973 246	8 110 801	9 374 714
24 910	30 347	–	41 771	32 591	39 944	32 761	42 056	37 837	39 856	24 550	37 079	73 857	–
–	–	–	83 504	75 046	85 176	93 385	85 748	86 999	88 699	79 868	95 604	143 136	–
–	–	–	0	0	–	538	0	–	15	36	0	0	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
38 661	–	–	2 360	1 999	1 234	867	798	984	2 349	833	1 649	883	1 045
–	–	–	678	567	462	352	254	280	515	658	672	1 023	1 719
–	–	–	28	42	28	13	6	12	0	0	12	24	19
–	–	–	–	102 540	28 356	55 423	63 770	–	–	120 060	106 341	220 698	99 403
–	–	–	–	15 732	7 571	11 436	12 516	16 430	16 058	36 167	24 698	5 629	–
–	–	–	–	0	0	0	0	0	617	738	504	0	–
–	–	–	–	0	0	0	0	0	0	0	0	0	–
–	–	–	–	–	–	–	–	–	–	201 036	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	112 024
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	4 597 254	4 555 054	4 440 882	2 398 239	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	17	27	35	46	38	22	37
–	–	–	–	–	–	–	–	–	–	–	1	0	9
–	–	–	–	–	–	–	–	–	–	–	0	0	0
–	–	–	–	667 794	612 693	611 552	629 380	962 017	740 940	900 735	899 320	835 018	804 940
–	–	–	–	73 667	47 782	47 306	42 627	53 887	64 991	42 702	52 836	77 271	59 689
–	–	–	–	1 659	1 474	1 297	1 442	1 019	2 339	745	589	966	478
–	–	–	–	122	–	7	27	10	0	4	3	2	33
1 156	616	356	174	165	126	220	209	230	658	30 761	31 467	31 026	0
0	4	1	0	0	4	2	0	0	1	1	0	1	–
1 156	616	140	79	52	25	45	7	0	0	0	0	0	–
0	0	0	0	0	0	0	0	0	0	0	0	0	–
5 175	2 315	527 688	536 260	507 252	536 822	545 145	515 144	498 697	465 033	408 780	451 436	456 652	449 168
0	3	0	1	0	0	0	0	0	1	1	0	2	2
5 175	2 315	1 526	1 056	506	482	386	242	143	109	72	80	50	6
0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	51	245	3 574	6 145	5 457	3 365	5 169	4 400	3 400	4 398	4 120	2 368	2 032
0	0	0	0	1	2	1	0	1	0	1	5	0	3
–	–	245	438	473	314	255	155	59	24	7	1	0	3
–	–	0	0	0	0	0	0	0	1	0	1	0	0
11	5	70 500	72 020	69 807	144 070	79 895	114 316	74 729	62 444	40 833	33 983	30 190	27 850
0	0	0	0	1	0	0	0	1	0	0	0	0	1
–	–	12	28	2 742	468	93	226	318	96	18	4	6	4
–	–	0	0	0	0	0	0	0	0	0	0	0	0
1 081	792	795	898	642	533	382	205	143	35 784	28 340	27 382	33 024	28 311
–	63	60	–	48	51	43	31	41	42	47	62	60	39
–	–	–	–	–	–	–	–	–	76	46	40	34	40
–	–	–	–	–	–	–	–	–	4	3	5	5	6
19 351	13 493	233 785	248 565	244 632	296 123	272 743	216 197	175 894	159 232	158 068	165 266	173 523	173 367
–	–	831	826	509	252	151	81	28	7	2	1	1	5
–	–	18 233	10 561	5 651	5 176	3 437	2 228	1 316	628	316	164	111	73
–	–	0	0	0	0	0	0	0	0	0	0	0	0
36 842	20 963	1 597 290	1 550 521	1 320 010	1 187 814	1 158 673	1 042 509	934 839	775 502	616 570	606 875	507 841	421 295
–	–	7	11	12	12	13	32	29	29	23	16	49	97
–	–	11 424	10 799	10 209	9 209	5 289	2 052	767	329	191	65	28	30
–	–	1	2	3	1	0	0	0	0	1	3	0	1
137	49	50 105	50 075	59 834	72 643	71 377	56 982	58 673	65 666	75 524	94 237	81 784	0
0	0	–	–	0	0	0	0	0	0	0	0	0	–
–	–	24	8	18	7	3	1	1	0	1	0	0	–
–	–	0	0	0	0	0	0	0	0	0	0	0	–
74	85	735 164	691 500	735 164	812 543	893 187	917 843	924 534	858 968	883 807	916 839	921 364	886 243
–	3	1	0	1	0	0	0	3	2	0	1	0	1
–	–	125	77	72	74	66	102	73	87	27	3	5	0
–	–	0	0	1	0	0	0	0	0	0	0	0	0
437 928	386 153	437 838	516 052	527 577	679 981	512 876	462 322	341 293	270 137	526 701	569 767	649 552	390 102
42 222	44 363	39 475	39 274	46 418	41 356	46 402	37 679	24 828	44 910	34 920	18 242	52 012	17 543
17 801	19 360	16 124	14 942	15 851	13 298	12 492	10 442	8 029	13 063	14 409	6 853	3 824	2 579
–	–	–	–	–	–	–	–	–	–	–	–	–	–
7 693	12 237	152 890	65 974	74 696	61 246	54 892	60 152	66 079	51 446	47 389	62 790	54 760	44 494
3 985	6 531	2 738	2 915	3 207	1 518	966	853	772	288	136	559	140	87
3 708	5 706	3 197	2 805	3 015	2 126	1 580	871	963	414	148	413	261	92
–	–	–	–	–	–	–	–	–	0	0	0	0	0

Annex 6D – Reported malaria cases by species, 1990-2011 (continued)

WHO Region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997
South-East Asia	Democratic People's Republic of Korea	Suspected	0	0	0	0	0	0	0	0
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	India	Suspected	2 018 783	2 117 460	2 125 826	2 207 431	2 511 453	2 988 231	3 035 588	2 660 057
		No Pf	752 118	918 488	876 246	852 763	990 508	1 173 599	1 179 561	1 007 366
		No Pv	1 266 665	1 198 972	1 249 580	1 354 668	1 520 945	1 814 632	1 856 027	1 652 691
		No Other	–	–	–	–	–	–	–	–
	Indonesia	Suspected	1 484 496	1 631 710	1 431 284	1 337 373	1 698 040	1 510 425	1 747 287	1 325 633
		No Pf	8 544	7 544	6 888	11 433	9 646	2 967	6 178	7 490
		No Pv	166 505	132 808	103 116	134 906	136 730	140 396	173 700	123 594
		No Other	–	–	–	–	–	–	–	–
	Myanmar	Suspected	989 042	1 959 860	1 702 210	1 483 408	1 323 458	1 156 351	1 054 920	883 050
		No Pf	112 928	107 079	106 695	100 570	95 791	83 397	78 910	72 753
		No Pv	20 112	19 877	19 006	16 154	15 832	17 051	17 293	15 853
		No Other	–	–	–	–	–	–	–	–
	Nepal	Suspected	847 491	781 543	725 068	596 689	430 801	338 189	204 355	160 253
		No Pf	1 853	5 066	2 954	1 609	1 200	844	951	252
		No Pv	21 003	24 069	20 280	14 771	8 684	8 868	8 069	6 307
		No Other	–	–	–	–	–	–	–	–
	Sri Lanka	Suspected	287 384	400 263	399 349	363 197	273 502	142 294	184 319	218 550
		No Pf	57 736	76 541	82 655	77 970	47 638	119 056	44 957	54 694
		No Pv	223 245	323 722	316 694	285 227	225 864	23 238	139 362	163 856
		No Other	–	–	–	–	–	–	–	–
	Thailand	Suspected	273 880	198 383	168 370	115 220	102 119	82 743	87 622	97 540
		No Pf	173 265	122 730	97 389	68 270	57 073	45 268	46 550	48 318
		No Pv	99 369	87 136	70 981	46 950	45 046	37 475	41 072	49 222
		No Other	–	–	–	–	–	–	–	–
	Timor-Leste	Suspected	–	–	–	–	–	–	–	–
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
Western Pacific	Cambodia	Suspected	123 796	102 930	91 000	99 200	85 012	76 923	74 883	88 029
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	China	Suspected	117 359	101 600	74 000	59 000	62 000	47 118	33 382	26 800
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Lao People's Democratic Republic	Suspected	22 044	41 048	38 500	41 787	52 601	52 021	77 894	72 190
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Malaysia	Suspected	50 500	39 189	36 853	39 890	58 958	59 208	51 921	26 649
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Papua New Guinea	Suspected	104 900	86 500	86 500	66 797	65 000	99 000	71 013	38 105
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Philippines	Suspected	86 200	86 400	95 778	64 944	61 959	56 852	40 545	42 005
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Republic of Korea	Suspected	0	0	0	1	20	107	396	1 724
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Solomon Islands	Suspected	116 500	141 400	153 359	126 123	131 687	118 521	84 795	68 125
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Vanuatu	Suspected	28 805	19 466	13 330	10 469	3 771	8 318	5 654	6 099
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–
	Viet Nam	Suspected	123 796	187 994	225 928	156 069	140 120	100 116	84 625	65 859
		No Pf	–	–	–	–	–	–	–	–
		No Pv	–	–	–	–	–	–	–	–
		No Other	–	–	–	–	–	–	–	–

Suspected cases are calculated by adding "Examined cases" to "Probable cases"
Probable cases are calculated by subtracting "Confirmed cases" from "Probable and Confirmed cases"
[1] Armenia, Morocco and Turkmenistan are certified malaria free countries, but are included in this listing for historical purposes
[2] There is no local transmission
[3] Where national totals for the United Republic of Tanzania are unavailable, refer to the sum of Mainland and Zanzibar

1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
2 100	15 362	204 428	372 875	272 037	76 104	45 066	16 094	12 983	10 626	24 299	34 818	25 147	26 513
–	–	–	0	0	0	0	0	0	0	0	0	0	0
–	–	–	115 615	98 852	16 538	15 827	6 728	6 913	4 795	16 989	14 845	13 520	16 760
–	–	–	–	–	–	–	–	–	0	0	0	0	0
2 222 748	2 284 713	86 790 375	90 389 019	91 617 725	99 136 143	97 111 526	104 120 792	106 606 703	94 855 000	95 734 579	112 496 076	119 279 429	108 851 847
1 030 159	1 141 359	1 047 218	1 005 236	897 446	857 101	890 152	805 077	840 360	741 076	775 523	839 877	834 364	667 324
1 192 589	1 143 354	984 572	1 080 248	943 781	1 012 302	1 025 211	1 011 492	944 769	767 851	750 687	723 697	765 622	645 299
–	–	–	–	–	–	–	–	–	–	–	–	–	–
1 708 020	1 243 213	1 432 178	4 113 458	3 582 566	3 555 381	3 857 211	2 206 129	2 219 308	2 556 631	2 185 836	2 733 407	2 783 648	2 027 949
10 866	21 003	89 289	85 596	98 430	81 591	98 729	127 594	160 147	–	127 813	95 557	110 037	125 412
169 104	116 999	156 323	190 608	190 048	161 180	145 868	147 543	177 006	159 179	125 150	93 801	108 263	113 664
–	–	–	–	–	–	–	–	–	–	0	240	705	1 172
893 313	851 297	843 087	954 155	1 016 514	1 020 477	883 399	787 691	820 290	1 159 516	1 230 444	1 136 064	1 277 568	1 210 465
85 658	98 261	95 499	130 029	133 187	138 178	114 523	124 644	149 399	148 010	167 562	121 636	70 941	59 604
19 052	20 419	21 802	35 783	35 030	35 151	34 045	37 014	50 667	53 351	52 256	40 167	29 944	28 966
–	124	252	941	864	867	501	638	453	433	288	319	346	162
175 879	132 044	197 075	266 917	304 200	383 322	293 836	361 936	327 981	265 997	302 774	270 798	213 353	188 702
776	1 089	560	428	2 165	1 195	743	1 181	1 358	1 295	792	575	550	219
8 119	8 610	7 056	6 216	10 621	8 200	3 892	5 691	3 932	3 870	3 096	2 760	2 349	1 631
–	–	–	–	–	–	–	–	–	–	–	–	0	0
211 691	264 549	1 781 372	1 353 386	1 390 850	1 192 259	1 198 181	974 672	1 076 121	1 047 104	1 047 104	909 632	1 001 107	985 060
42 396	63 878	59 650	10 600	4 848	1 273	549	134	27	7	46	21	6	12
169 295	200 671	150 389	55 922	36 563	9 237	3 171	1 506	564	191	623	529	668	158
–	–	–	–	–	–	–	–	–	–	–	–	–	–
131 055	125 379	78 561	4 100 778	3 819 773	3 256 939	3 012 710	2 524 788	2 280 070	2 041 733	1 931 768	1 884 820	1 777 977	1 450 885
69 063	64 433	43 717	29 061	20 389	19 024	13 371	14 670	14 124	16 557	12 108	9 486	9 401	5 710
61 992	60 946	37 975	34 467	24 166	18 331	13 319	14 921	15 991	16 495	13 886	13 616	13 401	8 608
–	–	47	40	40	32	29	59	35	16	10	23	20	13
10 332	–	15 212	83 049	120 344	83 785	242 957	185 367	223 002	215 402	215 338	198 867	266 384	225 772
–	–	–	–	26 651	33 411	39 164	43 093	37 896	34 174	34 406	29 252	28 350	14 261
–	–	–	–	11 148	15 392	16 158	15 523	13 477	12 544	11 295	12 160	11 432	3 758
–	–	–	–	–	–	–	–	–	0	0	0	0	0
58 874	64 679	281 444	202 179	187 213	208 801	183 062	165 382	207 463	200 050	198 794	210 856	193 210	216 712
–	–	46 150	37 105	33 010	36 338	31 129	17 482	24 779	16 518	15 095	17 442	8 213	7 054
–	–	4 505	4 408	4 386	5 179	5 709	9 004	7 551	4 987	4 625	6 362	4 794	5 155
–	–	–	–	–	–	–	–	–	–	–	0	0	0
27 090	26 797	0	5 397 517	5 788 432	4 776 469	4 331 038	3 892 885	4 076 104	4 062 585	4 435 793	4 642 479	7 118 649	9 190 401
–	–	–	3 732	5 753	3 497	3 879	3 588	2 808	1 613	1 222	948	1 269	1 370
–	–	–	17 295	19 581	24 852	23 138	18 187	32 345	27 550	15 323	8 214	3 675	1 907
–	–	–	–	–	–	–	–	–	141	105	125	20	50
39 031	28 050	496 070	303 306	309 688	326 297	218 884	173 698	210 927	275 602	311 395	266 096	280 549	291 490
–	–	38 271	25 851	20 696	18 307	15 648	13 106	18 058	6 171	4 697	5 328	4 393	5 770
–	–	1 689	1 204	712	574	491	473	316	193	247	176	122	442
–	–	–	–	–	–	–	–	–	7	21	0	1	14
13 491	11 106	1 832 802	1 808 759	1 761 721	1 632 024	1 577 387	1 425 997	1 388 267	1 565 033	1 562 148	1 565 982	1 619 074	1 600 439
–	–	6 000	5 643	5 486	2 756	2 496	2 222	1 790	1 778	2 268	1 885	1 681	973
–	–	5 953	6 315	4 921	3 127	3 167	2 729	2 774	2 862	3 820	3 379	3 812	2 422
–	–	–	–	–	–	–	–	–	615	1 011	1 502	984	1 758
20 900	18 564	1 751 883	1 643 075	1 587 580	1 650 662	1 868 413	1 788 318	1 676 681	1 618 699	1 606 843	1 431 395	1 379 787	1 151 343
–	–	63 591	74 117	58 403	54 653	63 053	62 926	56 917	60 168	60 000	48 681	56 735	59 153
–	–	14 721	18 113	14 187	14 055	18 730	22 833	22 744	16 239	16 806	11 472	13 171	9 654
–	–	–	–	–	–	–	–	–	2 787	1 444	1 024	1 990	632
50 709	37 061	444 668	418 363	377 340	526 874	446 104	593 996	396 706	408 254	278 652	352 006	301 031	327 060
–	–	25 912	18 006	22 831	32 948	29 018	20 033	24 515	8 789	11 807	13 933	11 824	6 877
–	–	–	–	–	–	–	6 482	8 839	3 622	4 806	4 951	2 885	2 380
–	–	–	–	–	–	–	–	–	17	197	262	175	127
3 992	3 621	4 183	2 556	1 799	1 171	864	1 369	2 051	2 227	1 052	1 345	1 772	838
–	–	–	–	–	–	–	–	–	–	11	26	51	56
–	–	–	–	–	–	–	–	–	2 227	1 052	1 319	1 721	782
–	–	–	–	–	–	–	–	–	–	–	–	–	–
72 808	63 169	601 612	594 690	556 356	416 728	643 908	633 796	657 110	396 169	338 244	282 297	284 931	254 506
–	–	46 703	50 806	50 090	64 910	64 449	54 001	54 441	48 612	29 492	19 580	22 892	14 454
–	–	21 322	25 649	24 822	27 399	25 927	22 515	20 971	16 653	11 173	8 544	12 281	8 665
–	–	–	–	–	–	–	–	–	139	84	–	–	0
6 181	5 152	58 679	48 422	75 046	82 670	80 879	86 170	62 637	52 958	52 420	44 960	48 088	32 656
–	–	3 226	3 402	7 016	8 406	6 999	3 817	3 522	2 424	1 579	1 802	1 545	770
–	–	2 972	4 236	7 210	6 582	6 350	4 453	4 405	2 987	1 850	1 632	2 265	1 224
–	–	–	–	–	–	–	–	–	0	0	4	10	2
72 091	75 102	2 883 456	2 950 863	3 054 693	2 835 799	2 778 295	2 793 458	3 024 558	3 755 566	1 409 765	2 907 219	2 803 918	3 312 266
–	–	57 605	52 173	36 583	29 435	19 023	14 231	17 911	11 470	8 901	12 719	12 763	10 101
–	–	15 935	15 898	10 846	9 004	5 681	5 102	4 497	4 737	2 348	3 206	4 466	5 602
–	–	–	–	–	–	–	–	–	0	0	0	0	0

Annex 6E – Reported malaria deaths, 1990–2011

WHO Region	Country/area	1990	1991	1992	1993	1994	1995	1996	1997	1998
African	Algeria	–	–	–	–	–	–	–	–	2
	Angola	–	–	–	–	–	–	–	–	–
	Benin	–	–	–	–	–	–	–	–	682
	Botswana	–	–	–	–	–	–	–	141	23
	Burkina Faso	–	–	–	–	–	–	–	–	2 624
	Burundi	–	–	–	–	–	–	–	–	–
	Cameroon	–	–	–	–	–	–	–	–	–
	Cape Verde	–	–	–	–	–	–	–	–	–
	Central African Republic	–	–	–	–	–	–	–	–	374
	Chad	–	–	–	–	–	–	–	–	–
	Comoros	–	–	–	–	–	–	–	–	–
	Congo	–	–	–	–	–	–	–	–	–
	Côte d'Ivoire	–	–	–	–	–	–	–	–	1 337
	Democratic Republic of the Congo	–	–	–	–	–	–	–	–	–
	Equatorial Guinea	–	–	–	–	–	–	–	–	–
	Eritrea	–	–	–	–	–	–	–	–	404
	Ethiopia	–	–	–	–	–	–	–	–	–
	Gabon	–	–	–	–	–	–	–	–	–
	Gambia	–	–	–	–	–	–	–	–	–
	Ghana	–	–	–	–	–	–	–	–	2 798
	Guinea	–	–	–	–	–	–	–	–	13
	Guinea-Bissau	–	–	–	–	–	–	–	–	–
	Kenya	–	–	–	–	–	–	–	–	665
	Liberia	–	–	–	–	–	–	–	–	–
	Madagascar	–	–	–	–	–	–	–	–	–
	Malawi	57 649	–	–	–	–	–	–	35 982	–
	Mali	–	–	–	–	–	–	–	–	–
	Mauritania	–	–	–	–	–	–	–	–	279
	Mozambique	–	–	–	–	–	–	–	–	896
	Namibia	–	–	–	–	–	250	469	547	404
	Niger	–	–	–	–	–	–	–	1 018	1 823
	Nigeria	2 284	1 947	1 068	710	1 686	3 268	4 773	4 603	6 197
	Rwanda	–	–	–	–	–	–	–	–	2 736
	Sao Tome and Principe	–	–	–	–	–	–	–	–	154
	Senegal	–	–	–	–	–	–	–	1 205	1 029
	Sierra Leone	–	–	–	–	–	–	–	–	–
	South Africa	35	19	14	45	12	44	163	104	198
	Swaziland	–	–	–	–	–	–	–	–	109
	Togo	–	–	–	–	–	–	–	–	475
	Uganda	–	–	–	–	–	–	–	–	–
	United Republic of Tanzania[3]	–	–	–	–	–	–	–	–	–
	Mainland	–	–	–	–	–	–	–	–	–
	Zanzibar	–	–	–	–	–	–	–	–	–
	Zambia	4 863	4 998	3 315	4 689	5 775	–	–	–	–
	Zimbabwe	–	–	–	–	–	–	–	1 192	1 248
Region of the Americas	Argentina	0	–	–	–	–	–	–	–	0
	Bahamas	0	0	0	0	0	0	0	0	0
	Belize	0	0	0	–	–	–	–	–	0
	Bolivia (Plurinational State of)	7	2	–	–	29	–	14	21	27
	Brazil	–	–	–	–	413	–	–	90	156
	Colombia	176	181	138	100	75	62	16	16	33
	Costa Rica	0	0	0	–	–	0	2	–	0
	Dominican Republic	2	0	7	–	11	14	5	5	14
	Ecuador	0	0	0	–	67	–	–	18	16
	El Salvador	0	0	–	–	–	–	–	–	0
	French Guiana, France	8	2	2	–	–	–	–	–	2
	Guatemala	180	127	–	–	–	–	–	0	9
	Guyana	–	4	14	–	150	–	–	32	34
	Haiti	–	101	–	–	–	–	61	–	25
	Honduras	–	–	–	–	–	–	–	–	0
	Jamaica	0	0	0	0	0	0	0	0	0
	Mexico	39	–	–	–	–	–	1	–	0
	Nicaragua	21	47	23	–	10	16	–	11	21
	Panama	1	1	1	0	0	0	0	0	0
	Paraguay	1	0	0	–	–	–	–	–	0
	Peru	–	–	–	–	39	39	46	59	52
	Suriname	1	4	–	10	20	20	14	10	7
	Venezuela (Bolivarian Republic of)	–	38	48	2	17	–	–	40	26
Eastern Mediterranean	Afghanistan	–	–	–	–	22	–	–	–	–
	Djibouti	–	–	–	–	–	–	8	–	–
	Egypt[2]	–	–	–	–	0	–	–	–	–
	Iran (Islamic Republic of)	–	–	–	–	–	–	–	22	–
	Iraq	–	–	–	–	–	–	–	–	–
	Oman	–	–	–	–	1	2	2	–	–
	Pakistan	–	–	–	–	–	–	–	–	–
	Saudi Arabia	–	–	–	–	–	–	–	6	28
	Somalia	–	–	–	–	–	–	–	–	–
	South Sudan	–	–	–	–	–	–	–	–	–
	Sudan	1 434	1 898	1 935	2 404	2 464	2 759	1 944	1 825	1 958
	Syrian Arab Republic[2]	–	–	–	–	–	–	–	–	–
	Yemen	–	–	–	–	–	–	–	–	–

1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
6	2	1	–	–	–	–	–	–	–	0	1	–
25 572	9 510	9 473	14 434	38 598	12 459	13 768	10 220	9 812	9 465	10 530	8 114	6 909
544	–	468	707	560	944	322	1 226	1 290	918	1 375	964	1 753
49	–	29	23	18	19	11	40	6	12	6	8	8
2 808	–	4 233	4 032	4 860	4 205	5 224	8 083	6 472	7 834	7 982	9 024	7 001
–	691	417	483	425	689	776	434	167	595	1 183	2 677	2 233
–	–	–	–	–	–	836	930	1 811	7 673	4 943	4 536	3 808
–	–	0	2	4	4	2	8	2	2	2	1	4
484	439	535	–	417	859	668	865	578	456	667	526	858
–	712	957	98	1 021	13	558	837	617	1 018	221	886	1 220
50	–	–	–	–	28	92	56	20	47	–	53	19
–	–	–	–	–	–	–	–	113	143	116	–	892
974	–	–	–	–	–	–	–	797	1 249	18 156	1 023	1 389
–	3 856	416	2 152	989	13 613	15 322	12 970	14 372	17 940	21 168	23 476	23 748
–	–	–	–	–	–	–	–	–	4	23	30	52
169	–	133	86	79	24	49	47	42	19	23	27	12
–	–	1 681	1 607	2 138	3 327	1 086	1 357	991	1 169	1 121	1 581	936
–	2 016	1 693	1 141	692	466	353	238	216	156	197	182	–
–	–	275	259	192	153	426	150	424	403	240	151	440
2 826	6 108	1 717	2 376	2 103	1 575	2 037	3 125	4 622	3 889	3 378	3 859	3 259
13	626	517	440	586	528	490	–	472	441	586	735	743
–	–	635	780	1 137	565	565	507	370	487	369	296	472
1 545	48 767	48 286	47 697	51 842	25 403	44 328	40 079	–	–	–	26 017	713
–	–	–	–	–	–	41	877	310	345	1 706	1 422	–
640	591	742	575	817	715	699	441	428	355	348	427	398
4 747	–	3 355	5 775	4 767	3 457	5 070	6 464	7 486	8 048	8 915	8 206	6 674
583	748	562	826	1 309	1 012	1 285	1 914	1 782	1 227	2 331	3 006	2 128
525	–	–	–	–	–	–	67	142	–	91	211	77
1 189	–	–	–	–	–	–	–	5 816	4 424	3 747	3 354	3 086
531	–	1 728	1 504	1 106	1 185	1 325	571	181	152	68	63	36
2 165	1 244	2 366	2 769	2 248	1 333	2 060	1 150	1 358	2 461	2 159	3 929	2 802
4 123	–	4 317	4 092	5 343	6 032	6 494	6 586	10 289	8 677	7 522	4 238	3 353
1 881	–	4 275	3 167	2 679	2 362	2 581	2 486	1 772	566	809	670	380
–	254	248	321	193	169	85	26	3	16	23	14	19
1 235	1 275	1 515	1 226	1 602	1 524	1 587	1 678	1 935	741	574	–	–
–	–	328	461	157	126	50	90	324	871	1 734	8 188	3 573
406	424	81	96	142	88	63	87	37	43	45	83	54
149	–	62	46	30	28	17	27	17	10	13	8	8
766	–	1 394	1 661	1 130	1 183	1 024	819	1 236	2 663	1 556	1 507	1 314
–	–	–	–	–	–	–	4 252	7 003	2 372	6 296	8 431	5 958
–	379	1 228	815	15 251	19 859	18 322	20 962	12 593	12 497	16 776	15 867	11 806
–	–	838	441	14 943	19 547	18 075	20 825	12 529	12 405	16 696	15 819	11 799
–	379	390	374	308	312	247	137	64	92	80	48	7
8 580	–	9 369	9 021	9 178	8 289	7 737	6 484	6 183	3 781	3 862	4 834	4 540
1 139	–	–	1 844	1 044	1 809	1 916	802	401	232	108	255	451
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	–
0	0	0	0	–	0	0	1	0	0	0	0	0
15	11	0	5	2	0	0	0	0	0	0	0	0
193	231	142	93	103	100	122	105	94	67	85	76	70
12	41	58	40	24	25	28	53	19	22	12	23	18
0	0	0	0	0	0	0	0	0	0	1	0	0
13	6	17	11	12	16	16	10	17	11	14	15	10
16	0	0	0	0	0	0	0	0	1	0	0	1
–	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	4	0	0	5	5	2	1	0	2
0	0	0	0	0	2	4	2	3	0	0	0	0
–	–	–	–	–	8	22	20	10	10	11	18	3
–	–	16	16	16	16	29	32	28	17	6	–	3
0	0	0	0	0	0	1	0	0	2	1	2	2
0	0	0	0	0	0	0	0	0	0	0	0	–
0	0	0	0	0	0	0	0	0	0	0	0	0
11	4	2	8	7	1	6	1	0	0	0	0	0
0	1	1	2	4	2	1	1	1	1	0	1	–
1	0	0	0	0	0	0	0	0	0	0	0	0
49	20	25	12	–	12	–	–	0	2	2	0	0
–	24	23	16	18	7	2	0	1	0	0	1	1
2	24	28	23	40	35	17	11	16	1	1	2	3
–	–	–	–	–	–	0	–	25	46	32	22	40
–	–	–	–	–	–	–	29	1	–	0	0	0
–	–	–	–	–	–	–	0	0	2	2	2	–
3	4	2	2	5	1	1	1	3	3	–	–	–
–	–	–	–	–	–	0	0	0	0	0	0	0
–	–	–	–	–	–	0	0	0	2	2	0	–
–	–	–	–	–	–	52	9	24	–	–	–	4
–	–	0	0	0	0	0	0	2	0	0	0	2
–	–	–	8	54	79	15	58	45	49	45	6	5
–	–	–	–	–	–	–	–	–	263	254	1 053	406
2 622	2 162	2 252	2 125	2 479	1 814	1 789	1 193	1 254	1 125	1 142	1 023	612
–	–	–	–	–	–	2	2	1	1	1	0	0
–	–	–	–	–	–	–	73	–	–	38	92	75

Annex 6E – Reported malaria deaths, 1990–2011 (continued)

WHO Region	Country/area	1990	1991	1992	1993	1994	1995	1996	1997	1998
European	Armenia	–	–	–	–	–	–	–	–	0
	Azerbaijan	0	0	0	0	0	0	0	0	0
	Georgia	0	0	0	0	0	0	0	0	–
	Kyrgyzstan	0	0	0	0	0	0	0	0	0
	Russian Federation	1	1	4	1	3	2	3	4	3
	Tajikistan	–	–	–	–	–	–	–	7	0
	Turkey	0	0	0	0	0	0	0	0	0
	Turkmenistan[1]	0	0	0	0	0	0	0	0	0
	Uzbekistan	0	1	0	1	0	0	0	0	0
South-East Asia	Bangladesh	50	132	402	382	1 278	1 393	794	469	528
	Bhutan	2	36	49	62	48	39	25	14	17
	Democratic People's Republic of Korea	–	–	–	–	–	–	–	–	–
	India	353	421	422	354	1 122	1 151	2 803	879	666
	Indonesia	–	–	–	–	–	–	148	199	45
	Myanmar	5 127	5 231	4 739	4 219	4 380	3 744	3 424	2 943	3 182
	Nepal	–	–	–	–	0	0	15	2	7
	Sri Lanka	14	19	9	7	50	5	26	61	115
	Thailand	1 287	1 747	1 050	997	908	856	826	764	688
	Timor-Leste	–	–	–	–	–	–	–	–	–
Western Pacific	Cambodia	1 020	1 163	1 408	1 100	1 009	614	745	811	621
	China	35	–	52	19	43	34	30	46	24
	Lao People's Democratic Republic	372	457	438	418	609	620	608	606	427
	Malaysia	43	–	25	23	28	35	40	25	27
	Papua New Guinea	457	–	500	448	281	415	514	390	651
	Philippines	913	924	864	811	784	643	536	514	561
	Republic of Korea	0	0	0	0	0	0	0	0	0
	Solomon Islands	33	46	33	40	49	51	30	27	33
	Vanuatu	32	32	26	13	8	12	8	1	9
	Viet Nam	3 340	4 646	2 632	1 026	604	348	203	152	183
Regional summary	African	67 115	6 964	4 397	6 154	7 473	3 562	10 178	49 395	30 821
	Region of the Americas	436	507	233	112	831	151	159	302	422
	Eastern Mediterranean	1 434	1 898	1 935	2 404	2 487	2 761	1 954	1 853	1 986
	European	1	2	4	2	3	2	3	11	3
	South-East Asia	6 833	7 586	6 671	6 021	7 786	7 188	8 061	5 331	5 248
	Western Pacific	6 245	7 268	5 978	3 898	3 415	2 772	2 714	2 572	2 536
	Total	**82 064**	**24 225**	**19 218**	**18 591**	**21 995**	**16 436**	**23 069**	**59 464**	**41 016**

Less than 18% of countries reporting in Africa during 1990-1999

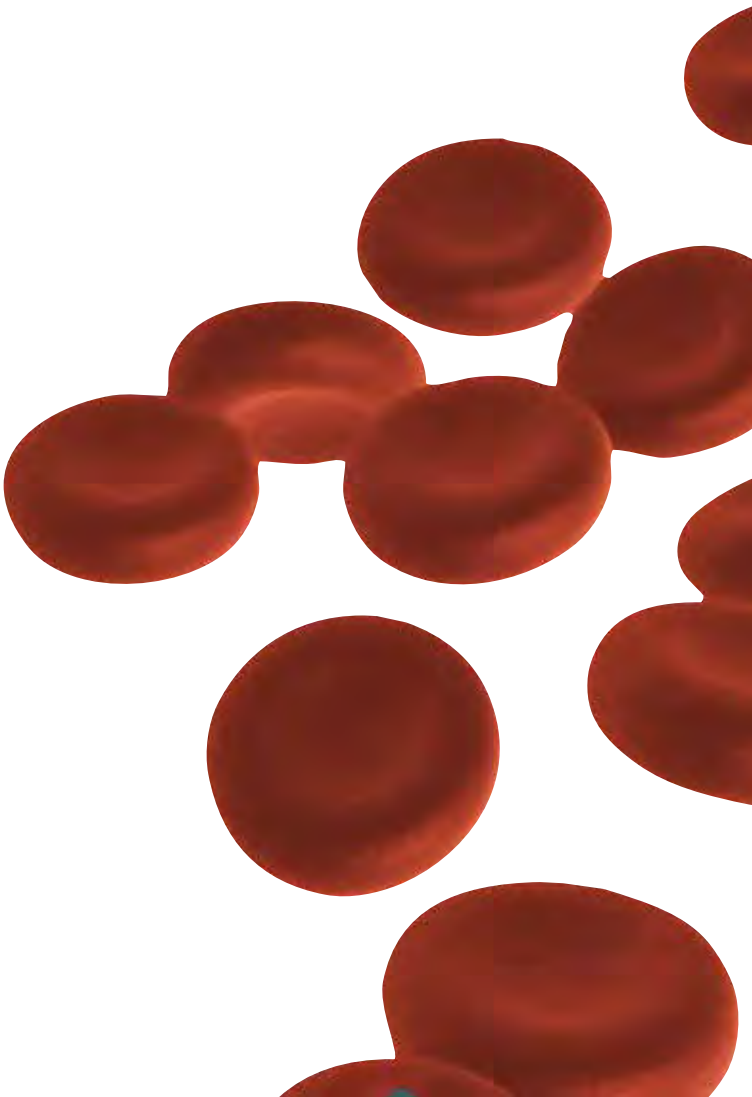
Deaths reported before 2000 can be probable and confirmed or only confirmed deaths depending on the country

[1] Armenia, Morocco and Turkmenistan are certified malaria free countries, but are included in this listing for historical purposes

[2] There is no local malaria transmission

[3] Where national totals for the United Republic of Tanzania are unavailable, refer to the sum of Mainland and Zanzibar

1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
0	–	0	0	0	0	0	0	0	0	0	–	–
0	0	0	0	0	0	0	0	0	0	0	–	–
0	–	0	0	0	0	0	0	0	0	0	0	–
0	0	0	0	0	0	0	0	0	0	0	0	–
3	2	3	2	4	5	3	4	2	2	1	0	–
–	–	0	0	0	0	0	0	0	0	0	0	–
0	0	0	0	0	0	0	0	1	3	1	0	–
0	0	0	0	0	0	0	0	0	0	0	0	–
0	0	0	0	0	0	0	0	1	0	0	0	–
552	484	470	598	574	505	501	508	228	154	47	37	36
16	15	14	11	14	7	5	7	2	2	4	2	1
–	–	–	–	–	–	–	–	–	0	0	0	–
1 048	892	1 015	973	1 006	949	963	1 708	1 311	1 055	1 144	1 018	753
–	833	–	–	–	508	88	494	–	669	900	432	388
3 331	2 556	2 814	2 634	2 476	1 982	1 707	1 647	1 261	1 087	972	788	581
–	–	1	3	5	7	10	42	3	–	8	6	2
–	77	52	30	4	1	0	1	1	0	0	0	–
740	625	424	361	204	230	161	113	97	101	70	80	43
–	–	–	–	–	65	71	68	60	33	53	58	16
891	608	476	457	492	382	296	396	241	209	279	151	94
52	31	27	42	52	31	48	37	18	23	10	19	33
338	350	242	195	187	105	77	21	14	11	5	24	17
21	35	46	38	21	35	33	21	18	30	26	13	–
567	617	562	647	537	619	725	668	559	628	604	616	431
755	536	439	71	162	167	145	124	73	56	24	30	12
0	0	0	0	0	0	0	0	1	0	0	–	–
23	38	55	61	71	51	38	12	15	21	53	34	19
4	3	4	13	14	3	5	1	5	4	2	1	1
190	142	91	50	50	34	18	41	20	25	26	21	14
73 053	77 642	103 036	110 516	152 657	114 045	137 269	136 955	102 490	103 401	130 969	148 880	103 126
317	362	312	226	230	224	248	241	194	138	134	138	113
2 625	2 166	2 254	2 135	2 538	1 894	1 859	1 365	1 355	1 491	1 516	2 198	1 144
3	2	3	2	4	5	3	4	4	5	2	0	0
5 687	5 482	4 790	4 610	4 283	4 254	3 506	4 588	2 963	3 101	3 198	2 421	1 820
2 841	2 360	1 942	1 574	1 586	1 427	1 385	1 321	964	1 007	1 029	909	621
84 526	**88 014**	**112 337**	**119 063**	**161 298**	**121 849**	**144 270**	**144 474**	**107 970**	**109 143**	**136 848**	**154 546**	**106 824**



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