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WHO Global Malaria Programme

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Foreword

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Director-General
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The findings in the *World Malaria Report 2011* show that we are making significant and durable progress in battling a major public health problem. Coverage of at-risk populations with malaria prevention and control measures increased again in 2010, and resulted in a further decline in estimated malaria cases and deaths. And the malaria map continues to shrink. In 2011, I was pleased to be able to certify Armenia as being free of malaria, a tribute to this country's excellent surveillance and response capacity and attention to the public health basics. In a world starved of good news, these are welcome developments.

But worrisome signs suggest that progress might slow, especially in view of projected decreases in the funding needed to finance universal access to life-saving malaria prevention and control measure. International funding for malaria appears to have peaked at US$ 2 billion, well short of the US$ 5 to 6 billion that are required. While new commitments, such as those from the United Kingdom, have been indispensable for maintaining our current gains, they are not sufficient to achieve the goals that the global malaria community has set. In endemic countries, domestic spending on malaria often remains inadequate. The implications of these funding shortfalls are far reaching, as success in malaria control is crucial for achievement of the health-related Millennium Development Goals, especially in Africa.

The next few years will be critical in the fight against malaria. We know from experience how fragile our gains are. While the distribution of hundreds of millions of long-lasting insecticidal mosquito nets over the past several years has been a remarkable achievement that has saved hundreds of thousands of lives, those nets now (or will soon) need replacing. Data in this report show that the vast majority of distributed nets are used, and that the primary barrier to universal coverage remains access. It is our responsibility to ensure that these and other life-saving commodities reach all who need them – before our hard-won progress slips away. Achieving this will require leadership at global, national, and local levels. It will also require innovation. If the mosquito nets can be made more durable, giving them a life of five years instead of three, the strain on fragile health systems could be greatly reduced, the risk of resurgences in malaria could be minimized, and hundreds of millions of dollars could be saved.

Parasite resistance to antimalarial medicines remains a real and ever-present danger to our continued success. While efforts to contain artemisinin resistance on the Cambodia–Thailand border appear to have dramatically reduced the burden of malaria due to *Plasmodium falciparum*, and the problem currently remains confined to the Mekong region, we are now seeing early evidence of artemisinin resistance in Myanmar and Viet Nam. There is an urgent need to develop an Asia-wide framework to ensure sustained and coordinated action against this public health threat, while at the same time continuing to press for the withdrawal from the market of oral artemisinin monotherapies, which are one of the major factors fostering the emergence and spread of artemisinin resistance. These monotherapies are still widely available despite repeated calls for action from the World Health Assembly.

One way to curb the continued emergence and spread of antimalarial drug resistance is to ensure that all patients with suspected malaria receive a diagnostic test, and that only those with confirmed *Plasmodium* infection receive antimalarial treatment. While we still have a long way to go, this report demonstrates continued progress with regard to diagnostic testing in Africa, and a doubling in the number of rapid diagnostic tests supplied by manufacturers, to 88 million in 2010, as well as notable increases in product performance.

To add to our list of worries, the threat of insecticide resistance appears to be growing rapidly. Currently, we are highly dependent on the pyrethroids, as they are the only class of insecticides used on insecticide-treated mosquito nets. Resistance to pyrethroids has now been identified in a wide variety of settings, many of those in the most highly malaria-endemic countries of Africa. In response to this threat, and as requested by the World Health Assembly, WHO is currently working with a wide variety of stakeholders to develop a Global Plan for Insecticide Resistance Management in malaria vectors, which will be released in early 2012.

In the face of economic uncertainties and potential threats from parasite resistance to antimalarial medicines and mosquito resistance to insecticides, we must remain determined. If we take full advantage of the malaria prevention and control tools we have today, while mitigating potential threats through constant vigilance and timely response, then we will sustain and extend the remarkable gains that have been made. The citizens of malaria-endemic countries are all counting on us. We must not let them down.

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Abbreviations

ABER	Annual blood examination rate
ACD	Active case detection
ACT	Artemisinin-based combination therapy
AIDS	Acquired immunodeficiency syndrome
ALMA	African Leaders Malaria Alliance
AMI	Amazon Malaria Initiative
AMFm	Affordable Medicine Facility malaria
AMP	Alliance for Malaria Prevention
CCM	Community case management
CDC	US Centers for Disease Control and Prevention
CHAI	Clinton Health Access Initiative
CRESIB	Barcelona Centre for International Health Research
DDT	Dichloro-diphenyl-trichloroethane
DFID	The United Kingdom Department for International Development
DHS	Demographic and health survey
DTP	Diphteria, tetanus, pertussis
FIND	Foundation for Innovative New Diagnostics
G-20	Group of 20 nations
G6PD	Glucose-6-phosphate dehydrogenase
GHG USF	Global Health Group, University of San Francisco
Global Fund	The Global Fund to fight Aids Tuberculosis and Malaria
GMAP	Global malaria action plan
GMP	Global Malaria Programme, WHO
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
IAEG	Inter-Agency and Expert Group on MDG Indicators
iCCM	Integrated community case management
IDA	International Development Association
IEC	Information, education and communication
IHME	Institute for Health Metrics and Evaluation
IM	Intramuscular
IPT_i	Intermittent preventive treatment in infants
IPT_p	Intermittent preventive treatment in pregnancy
IRS	Indoor residual spraying
ITN	Insecticide-treated mosquito net
Kdr	Knock-down resistance
LSM	Larval Source Management
LLIN	Long-lasting insecticidal net
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
MVI	Malaria Vaccine Initiative
NGO	Nongovernmental organization
NMCP	National malaria control programme
ODA	Official development assistance
OECD	Organisation for Economic Co-operation and Development
OP	Organophosphate
PATH	Program for Appropriate Technology in Health
PCD	Passive case detection
PDS	Panel detection score
PMI	The US President's Malaria Initiative
PQR	The Global Fund's Price and Quality Reporting
QA	Quality assurance
RAVREDA	Amazon Network for the Surveillance of Antimalarial Drug Resistance
R4D	Results for Development
RBM	Roll Back Malaria
RDT	Rapid diagnostic test
RH	Relative humidity
SAGE	WHO Strategic Advisory Group of Experts on Immunization
SMC	Seasonal malaria chemoprevention
SPR	Slide positivity rate
TEG	Technical expert group
TDR	Special Programme for Research and Training in Tropical Diseases
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 Report*
WHA	World Health Assembly
WHO	World Health Organization
WHOPES	WHO Pesticide Evaluation Scheme

Abbreviations of antimalarial medicines

AQ	Amodiaquine
AL	Artemether-lumefantrine
AM	Artemether
ART	Artemisinin
AS	Artesunate
CL	Clindamycin
CQ	Chloroquine
D	Doxycycline
DHA	Dihydroartemisinin
MQ	Mefloquine
NQ	Naphroquine
PG	Proguanil
PPQ	Piperaquine
PQ	Primaquine
PYR	Pyronaridine
QN	Quinine
SP	Sulfadoxine-pyrimethamine
T	Tetracycline
(d)	Days on treatment course

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 2011* summarizes information received from 106 malaria-endemic countries and other sources and updates the analyses presented in the 2010 report. It highlights continued progress made towards meeting the international targets for malaria control set for 2010 and 2015.

International funding for malaria control has continued to rise, to a peak of US$ 2 billion in 2011. The amounts committed to malaria, while substantial, still fall short of the resources required to reach malaria control targets, estimated at more than US$ 5 billion per year for the years 2010–2015. Moreover, funding is projected to remain at these levels or decrease before 2015 unless new sources of funds are identified.

The financing provided for malaria control has enabled endemic countries to greatly increase access to insecticide-treated mosquito nets (ITNs); the percentage of households owning at least one ITN in sub-Saharan Africa is estimated to have risen from 3% in 2000 to 50% in 2011 while the percentage protected by indoor residual spraying (IRS) rose from less than 5% in 2005 to 11% in 2010. Household surveys indicate that 96% of persons with access to an ITN within the household actually use it. The number of rapid diagnostic tests (RDTs) and artemisinin-based combination therapies (ACTs) procured is increasing, and the percentage of reported suspected cases receiving a parasitological test has also increased, from 67% globally in 2005 to 76% in 2010, with the largest increase in sub-Saharan Africa. Despite this significant progress, however, more work is needed before the target of universal access is attained.

Reductions in reported malaria cases of more than 50% have been recorded between 2000 and 2010 in 43 of the 99 countries with ongoing transmission, while downward trends of 25%–50% were seen in 8 other countries. There were an estimated 216 million episodes of malaria in 2010, of which approximately 81%, or 174 million cases, were in the African Region. There were an estimated 655 000 malaria deaths in 2010, of which 91% were in Africa. Approximately 86% of malaria deaths globally were of children under 5 years of age. The estimated incidence of malaria globally has reduced by 17% since 2000 and malaria-specific mortality rates by 26%. These rates of decline are lower than internationally agreed targets for 2010 (reductions of 50%) but nonetheless, they represent a major achievement.

Resistance to artemisinins – a vital component of drugs used in the treatment of *P. falciparum* malaria – has been reported in a growing number of countries in South-East Asia. Resistance to pyrethroids, the insecticides used in ITNs – and most commonly used in IRS – has been reported in 27 countries in Africa and 41 countries worldwide. Unless properly managed, such resistance potentially threatens future progress in malaria control.

Internationally agreed targets and goals for malaria control

The year 2010 was an important milestone on the way to achievement of internationally agreed goals and targets for malaria control. In the light of progress made by 2010, targets for the Global Malaria Action Plan (GMAP) of the Roll Back Malaria Partnership were updated in June 2011.

1. The year 2010 was the date set to achieve universal coverage for all populations at risk of malaria using locally appropriate interventions for prevention and case management, and to reduce the malaria burden by at least 50% compared to the levels in the year 2000.

2. In the light of progress made by 2010, the Roll Back Malaria (RBM) targets were updated in June 2011. The targets are now to: (i) reduce global malaria deaths to near zero by end-2015; (ii) reduce global malaria cases by 75% from 2000 levels by end-2015; and (iii) eliminate malaria by end-2015 in 10 new countries since 2008, including in the WHO European Region. These targets will be met by: achieving and sustaining universal access to, and utilization of, preventive measures; achieving universal access to case management in the public and private sectors and in the community (including appropriate referral); and accelerating the development of surveillance systems.

Financing malaria control

The funds committed to malaria control from international sources are expected to peak in 2011 at US$ 2 billion and remain substantially lower than the resources required to achieve global targets, estimated at > US$ 5 billion for the years 2010–2015.

3. International funding is expected to peak in at US$ 2 billion 2011. From 2012 to 2013 it is projected to remain relatively stable, but then decrease to US$ 1.5 billion in 2015. A reduction in commitments from the Global Fund is partly offset by increased commitments from the United Kingdom's Department for International Development (DFID) of up to US$ 800 million by 2015. Information on domestic government funding for malaria control is less complete. Available information suggests that domestic funding is generally less than US$ 1 per person at risk and represents a small proportion of the total financing of malaria control in the most highly endemic countries.

4. Cost savings within vector control programmes may be possible but are likely to be modest, for several reasons: (i) the price of an ITN, which represents the largest component of the cost of ITN programmes, has decreased by 29% between 2007 and 2011, but the reductions may not be maintained if manufacturers cut their manufacturing capacity; (ii) large purchasers usually obtain the lowest prices, leaving little room for efficiencies through improved procurement; (iii) the costs of the two main strategies for delivering ITNs, via mass campaigns or health services, are similar and typically comprise only 5%–10% of the total cost of delivery; moreover delivery costs may increase when programmes need to deliver only to households requiring replacement nets rather than to all households; (v) there is scope for reducing the cost per person protected by IRS by expanding IRS programmes, but the cost per person

protected per year is US$ 2.62 in large programmes, compared to approximately US$ 1.39 for ITNs.

5. Expenditure on treatment is expected to decrease as parasitological testing is expanded to all suspected cases of malaria. With current prices of RDTs and ACTs (US$ 0.50 for RDT and US$ 1.40 for AL), and perfect compliance with test results, savings on commodities could amount to US$ 68 million in the public sector in the WHO African Region. However, expanding the use of RDTs may not lead to overall cost savings because of the possible added costs due to increased staff time to perform tests, establishing quality control systems, alternative therapies for patients with negative test results, and the start-up costs of changing malaria case management policy. Any additional costs would need to be balanced against the improved quality of care provided to patients, better health outcomes, the potential reduction in the risk of emergence and spread of antimalarial drug resistance, and improved malaria surveillance.

6. Improved malaria control should result in lower numbers of malaria cases and lead to reductions in the cost of treating patients; attainment of universal access to ITNs in the WHO African Region in 2015 could reduce the number malaria cases attending public health facilities by 31 million to 48 million. The savings on commodities alone (ACTs and RDTs) would amount to more than US$ 59 million per year in the African Region. However the full potential of these savings will not be realized if all fever cases are treated presumptively as malaria, without confirmation by a diagnostic test.

7. Potentially large savings could be made through new technologies. The development and deployment of ITNs lasting 5 years could reduce the total number of ITNs required between 2011 and 2020 from 1.25 billion to 750 million. If the unit cost of delivering both types of ITNs were similar, at US$ 7.66, a total of US$ 3.8 billion could be saved from a financing requirement of US$ 9.6 billion. The price of RDTs has fallen by 11%–15% annually from 2008 to 2010. The development of still cheaper tests could lead to considerable cost reductions; even if RDTs were used for only half the suspected malaria cases attending public health facilities in the WHO African Region, halving the price from the current US$ 0.50 to US$ 0.25 would save US$ 45 million per year.

8. Malaria programmes accounted for approximately 8% of Official Development Assistance (ODA) for health and population in 2009, increasing from 3% in 2005. Overall financing for health and population remained stable between 2008 and 2009, and is likely to do so thereafter. Given stable total funding, and that malaria programmes already receive a significant proportion of health and population financing, further increases in malaria funding within health sector financing may be unlikely.

9. There appears to be scope for domestic governments to invest more in malaria control. If just 1% of total domestic spending were made available for malaria control, 75 of the 99 countries with ongoing malaria transmission could raise enough to provide each person at risk with access to an ITN. Global economic growth has allowed many malaria-endemic countries to increase total domestic government spending; more than 42 countries increased per capita spending by US$ 1000 between 2000 and 2010.

10. Innovative financing mechanisms are in the early stages of development. Taxes on bonds and derivatives transactions may offer the greatest potential for revenue generation – estimated in excess of US$ 250 billion – but their suggested uses go beyond malaria control. Taxes on airline journeys currently raise more than US$ 200 million for health development and their extension to additional countries could generate significant additional funds. Other country-specific schemes, such as tourist taxes, may offer opportunities to raise funds for control programmes in malaria-endemic countries.

Progress in vector control

Coverage with ITNs and IRS has increased rapidly in some countries of sub-Saharan Africa, with household ITN ownership reaching 50% by mid-2011 and IRS protecting 11% of the population at risk. Resistance to pyrethroids has been detected in 27 countries in sub-Saharan Africa.

Insecticide-treated mosquito nets

11. In 2010, 27 countries in the African Region and 42 in other WHO Regions had adopted the WHO recommendation to provide ITNs for *all* persons at risk for malaria, not only pregnant women and children; this represents an increase of 4 countries since 2009. A total of 82 countries, of which 38 are in the African Region, distribute ITNs free of charge.

12. The number of ITNs delivered by manufacturers increased dramatically from 5.6 million in 2004 to 145 million in 2010 in sub-Saharan Africa. The numbers procured between 2008 and 2010 (294 million) were sufficient to cover 73% of the 800 million persons at risk, but this does not take into account delays in delivering ITNs in countries or loss of ITNs after delivery to households.

13. The number of ITNs supplied by manufacturers in 2011 appears to have decreased to approximately 100 million. This is partly because some countries have made substantial progress towards achieving universal access to ITNs in 2010 and are not yet scheduled to reorder ITNs, but also because some countries are still not expanding programmes to a sufficient scale.

14. Using a model that takes into account the number of ITNs supplied by manufacturers, the number of ITNs delivered by national malaria control programmes (NMCPs), and household survey data, the percentage of households owning at least one ITN in sub-Saharan Africa is estimated to have risen from 3% in 2000 to 50% in 2011. Considerably more work is required to ensure that ITNs reach all households where they are needed.

15. Analysis of recent household surveys indicates that approximately 96% of persons with access to an ITN within the household actually use it, suggesting that the main constraint to enabling persons at risk of malaria to sleep under an ITN remains the insufficient availability of nets.

16. The rapid scale-up of ITN distribution in Africa is an enormous public health achievement, but also presents a formidable

challenge for the future in ensuring that the levels of coverage are maintained. There is uncertainty over the extent to which ITN effectiveness decays over time, but the lifespan of a long-lasting insecticidal net (LLIN) is currently estimated to be 3 years. Nets delivered in 2007 and 2008 are therefore now due for replacement, soon to be followed by those delivered in 2009 and 2010.

Indoor residual spraying

17. IRS with WHO-approved chemicals (including DDT) remains one of the main interventions for reducing and interrupting malaria transmission through vector control in all epidemiological settings. In 2010, 73 countries, including 36 in the African Region, recommended IRS for malaria control and 13 countries reported using DDT for IRS.

18. A total of 185 million people were protected by IRS in 2010, representing 6% of the global population at risk. The number of people protected by IRS in the African Region increased from 10 million in 2005 to 78 million in 2010; including all countries in sub-Saharan Africa 81 million people were protected, which corresponds to protection for 11% of the population at risk. In other WHO Regions the number of people protected by IRS is generally stable.

Insecticide resistance

19. Monitoring of insecticide resistance is a necessary element of any medium-scale or large-scale deployment of an insecticidal intervention. In 2010, 78 countries reported that they were carrying out insecticide resistance monitoring.

20. Current methods of malaria control are highly dependent on a single class of insecticides, the pyrethroids, which is the only insecticide class used for ITNs and accounts for approximately 77% of IRS in terms of spray area covered. The widespread use of a single class of insecticide increases the risk that mosquitoes will develop resistance to it. This risk is of particular concern in sub-Saharan Africa, where insecticidal vector control is being deployed with unprecedented levels of coverage. Resistance to pyrethroids has been reported in 27 countries in sub-Saharan Africa; the point at which this reduces the effectiveness of vector control is still uncertain, and may depend on the locally identified resistance mechanism. As requested by the World Health Assembly, WHO is currently working with a wide variety of stakeholders to develop a Global Plan for Insecticide Resistance Management in malaria vectors, to be released in early 2012.

Progress on chemoprevention

The percentage of pregnant women who received two doses of IPTp during pregnancy in ranged from 4% to 68%.

21. 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. A total of 35 of 45 sub-Saharan African countries had adopted IPT for pregnant women (IPTp) as national policy by the end of 2010. Papua New Guinea, in the Western Pacific Region, also adopted this policy in 2009.

22. In the 21 high-burden countries in the African Region which have adopted IPTp as national policy, data reported by NMCPs indicate that the percentage of women attending antenatal clinics who received the second dose of IPTp in 2010 was 55% (inter-quartile range 47% – 61%).

23. In 13 countries in the African Region for which household survey data were available for 2008–2010, the percentage of women who received two doses of IPTp during pregnancy in ranged from 4% in Namibia to 68% in Zambia; the weighted average remained low, at 24%, primarily due to low coverage in Nigeria and the Democratic Republic of Congo.

24. 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 sulfadoxine-pyramethamine (SP), to be provided through immunization services at defined intervals corresponding to routine vaccination schedules. No country has yet adopted a national policy of IPT for infants (IPTi) since its recommendation in 2009.

Progress in diagnostic testing and malaria treatment

The number of RDTs and ACTs procured is increasing, and the percentage of reported suspected cases receiving a parasitological test has also increased, from 67% globally in 2005 to 73% in 2009. Many cases still are treated presumptively without a parasitological diagnosis.

Diagnostic testing

25. Prompt parasitological confirmation by microscopy or RDT is recommended for all patients with suspected malaria, before treatment is started. In 2010, 37 of 43 malaria-endemic countries in the African Region and 53 of 63 endemic countries in other WHO Regions reported having adopted a policy of providing parasitological diagnosis for all age groups, an increase of 4 countries in the African Region since 2009, and 8 elsewhere.

26. The number of RDTs supplied by manufacturers increased from 45 million in 2008 to 88 million in 2010. Product testing has shown an improvement in test quality over time, and proportionally more high quality tests are being procured over time; nearly 90% of RDTs procured in 2011 had panel detection scores of more than 75%, compared with only 23% of RDTs procured in 2007.

27. The percentage of reported suspected malaria cases receiving a parasitological test has increased between 2005 and 2010, particularly in the African Region (from 26% to 45%), Eastern Mediterranean Region (60% to 91%) and South-East Asia

Region excluding India (from 58% to 95%). Low rates persist in the majority of African countries: in 21 out of 42 countries which reported on testing, the percentage of cases tested was less than 20%.

28. Data from a limited number of countries suggest that both microscopy and RDTs are less widely available in the private sector than in the public sector. A total of 48 countries report deployment of RDTs at the community level and 11 million patients were tested through such programmes in 2010.

Treatment

29. Confirmed cases of uncomplicated *P. falciparum* malaria should be treated with an ACT. In 2011, 84 countries and territories had adopted ACT for first-line treatment of *P. falciparum* malaria, representing an increase from 77 countries in 2010. *P. vivax* malaria should be treated with chloroquine where this drug 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.

30. The number of ACT treatment courses procured by the public sector increased greatly from 11.2 million in 2005 to 76 million in 2006, and reached 181 million in 2010. A total of 35 million treatments were estimated to have been procured by the private sector in 2010. Total ACT demand is projected to reach 287 million treatment courses in 2011, an increase of 32% over that in 2010. The main driver of this increase is the almost 10-fold increase in subsidized private sales through the AMFm.

31. A limited number of recent household surveys undertaken between 2008 and 2010 suggest that febrile patients attending public health facilities are more likely to receive an ACT than those attending private facilities, but this may change in 2011 for those countries participating in the AMFm pilot programme.

32. In the African Region in 2010, the number of ACTs distributed by NMCPs was more than twice the total number of tests (microscopy + RDTs) carried out in 2010, indicating that many patients continue to receive ACTs without confirmatory diagnostic testing.

Drug resistance

33. WHO recommends that oral artemisinin-based monotherapies be withdrawn from the market and replaced with ACTs. By November 2011, 25 countries were still allowing the marketing of these products (no change from 2010) and 28 pharmaceutical companies were marketing them (down from 39 in 2010). Most of the countries that still allow the marketing of monotherapies are in the African Region, while most of the manufacturers are in India.

34. Therapeutic efficacy studies remain the gold standard for guiding drug policy and should be undertaken at least every 2 years. Efficacy studies of first-line or second-line antimalarial treatments were completed in 31 of 75 countries where *P. falciparum* efficacy studies are possible (in 17 countries efficacy studies are impractical because of low malaria incidence, and 15 countries are endemic for *P. vivax* only). A further 12 had planned to conduct studies in 2010 or 2011. Efficacy studies were last conducted more than three years ago in 32 countries.

35. Suspected resistance to artemisinins has now been identified in four countries in the Greater Mekong subregion: Cambodia, Myanmar, Thailand and Viet Nam. Containment efforts have shown that a reduction in malaria incidence, a key component of the overall containment plan to halt the spread of resistant parasites, can be achieved. Despite the observed changes in parasite sensitivity to artemisinins, the clinical and parasitological efficacy of ACTs remains high in most settings. However, high treatment failure rates to several ACTs, in particular to dihydroartemisinin-piperaquine which is one of the newest ACTs, has already been identified in Pailin province in Cambodia. This highlights the need for vigilance not only to protect the efficacy of artemisinins, but also the partner medicines in the drug combinations.

36. In 2011 WHO published the *Global Plan for Artemisinin Resistance Containment* (GPARC), which recommends five key activities for successful management of artemisinin resistance: stop the spread of resistant parasites; increase monitoring and surveillance to evaluate the threat of artemisinin resistance; improve access to diagnostics and rational treatment with ACTs; invest in research related to artemisinin resistance; and motivate action and mobilize resources.

Impact of malaria control

A growing number of countries have recorded decreases in the number of confirmed cases of malaria and/ or reported admissions and deaths since 2000. Global control efforts have resulted in a reduction in the incidence of malaria and malaria-specific mortality rates.

37. A total of 8 countries and one area in the WHO African Region showed > 50% reduction in either confirmed malaria cases or malaria admissions and deaths in recent years (Algeria, Botswana, Cape Verde, Namibia, Rwanda, Sao Tome and Principe, South Africa, Swaziland, and Zanzibar, United Republic of Tanzania). Eritrea, Ethiopia, Senegal and Zambia showed reductions of 25%–50%. In all countries, the decreases are associated with intense malaria control interventions.

38. The increases in malaria cases observed in Rwanda and in Sao Tome and Principe in 2009 (two countries that had previously reported reductions) were reversed after intensification of control measures. This highlights the need to build systems for effective surveillance of malaria and to rigorously maintain control programmes even when cases have been reduced substantially. According to available information, increases in cases and deaths observed in Zambia in 2009 have not yet been reversed.

39. While substantial decreases in the numbers of malaria cases are observed in countries with well developed surveillance systems, it is much more difficult to detect such changes in countries where surveillance systems are weaker, particularly in the more populous countries of Central and West Africa. In

countries which are expanding the use of microscopy and RDTs the numbers of confirmed cases have risen, reflecting changes in diagnostic practice and concealing the underlying trends in malaria incidence. More detailed investigation of trends in malaria cases and changes in diagnostic practice is needed to obtain a more accurate picture of the real changes in malaria incidence.

40. In other WHO Regions, the number of reported cases of confirmed malaria decreased by more than 50% in 35 of the 53 countries with ongoing transmission between 2000 and 2010 and downward trends of 25%–50% were seen in 4 other countries. In 2010, the European Region reported only 176 indigenous cases. The number of cases continued to fall least in countries with the highest incidence rates, indicating that greater attention should be given to countries which harbour most of the malaria burden outside Africa.

41. There were 8 countries in the pre-elimination stage of malaria control in 2011 and 9 countries are implementing elimination programmes nationwide (8 having entered the elimination phase in 2008). A further 8 countries (Bahamas, Egypt, Georgia, Iraq, Jamaica, Oman, Russian Federation, and Syrian Arab Republic) have interrupted transmission and are in the prevention of reintroduction phase. Armenia was certified as free of malaria by the WHO Director-General in 2011.

42. An estimated 3.3 billion people were at risk of malaria in 2010. Of this total, 2.1 billion were at low risk (< 1 reported case per 1000 population), 94% of whom were living in geographic regions other than the WHO African Region. The 1.2 billion at high risk (> 1 case per 1000 population) were living mostly in the WHO African (47%) and South-East Asia Regions (37%).

43. There were an estimated 216 million episodes of malaria in 2010, with a wide uncertainty interval (5th–95th centiles) from 149 million to 274 million cases. Approximately 81%, or 174 million (113–239 million) cases, were in the African Region, with the South-East Asian Region accounting for another 13%.

44. There were an estimated 655 000 (537 000 – 907 000) malaria deaths in 2010, of which 91% (596 000, range 468 000 – 837 000) were in the African Region. Approximately 86% of malaria deaths globally were of children under 5 years of age.

45. The estimated incidence of malaria has fallen by 17% globally between 2000 and 2010. Larger percentage reductions are seen in the European (99.5%),American (60%) and Western Pacific regions (38%). Malaria specific mortality rates have fallen by 25% between 2000 and 2010 with the largest percentage reductions seen in the European (99%), American (55%), Western Pacific (42%) and African Regions (33%).

46. Estimates of malaria incidence are based, in part, on the numbers of cases reported by NMCPs. These case reports are far from complete in most countries. A total of 24 million confirmed malaria cases was reported by NMCPs in 2010, or 11% of the estimated global case incidence.

Avant-propos

Dr Margaret Chan
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Les conclusions du *Rapport 2011 sur le paludisme dans le monde* confirment les progrès significatifs et durables que nous réalisons dans notre combat face à un problème majeur de santé publique. La couverture des populations à risque par des mesures de prévention et de lutte antipalustre a connu un nouvel essor en 2010, ce qui a accentué le déclin des cas estimés et des décès imputables au paludisme. Parallèlement, les zones affectées par le paludisme à travers le monde ne cessent de rétrécir. En 2011, j'ai eu le plaisir de certifier l'Arménie exempte de paludisme, en reconnaissance de l'excellente capacité de surveillance et d'intervention de ce pays, ainsi qu'à l'attention portée à l'échelle nationale aux aspects fondamentaux de la santé publique. Dans un monde où les bonnes nouvelles sont rares, nous devons nous féliciter de ces avancées.

Certains signes inquiétants laissent toutefois présager un ralentissement des progrès, surtout si l'on se réfère aux projections concernant les diminutions à prévoir en matière de fonds disponibles pour financer l'accès universel aux mesures vitales de prévention et de lutte contre le paludisme. Dans ce domaine, les financements internationaux ont culminé à US $2 milliards, bien en deçà des US $5 à 6 milliards nécessaires. Même si les engagements pris récemment s'avèrent indispensables pour maintenir nos progrès actuels, à l'image de l'engagement du Royaume-Uni, ils restent insuffisants pour atteindre les objectifs que la communauté antipaludique mondiale s'est fixés. Dans les pays endémiques, les dépenses intérieures consacrées à la lutte contre la maladie demeurent inadaptées. Ces déficits de financement sont lourds de conséquences, dans la mesure où le succès de la lutte contre le paludisme est crucial pour la réalisation des Objectifs du Millénaire pour le Développement (OMD) touchant à la santé, notamment en Afrique.

Les quelques années à venir vont s'avérer déterminantes dans la lutte contre le paludisme. Nous savons d'expérience à quel point les progrès que nous obtenons sont fragiles. La distribution de centaines de millions de moustiquaires imprégnées d'insecticide longue durée constitue une réussite remarquable de ces dernières années, qui a permis de sauver des centaines de milliers de vies. Pourtant, ces moustiquaires doivent désormais être remplacées ou le devront très bientôt. Les données figurant dans ce rapport prouvent que la grande majorité des moustiquaires distribuées sont utilisées et que le principal obstacle à la couverture universelle reste l'accès. Il est de notre responsabilité de nous assurer que ces produits de nature à sauver des vies, ainsi que d'autres, parviennent à tous ceux qui en ont besoin, avant que les progrès accomplis non sans mal ne soient balayés d'un trait. Réussir exigera un leadership fort au niveau local, national et mondial, mais aussi l'esprit d'innovation. Il suffirait de pouvoir conserver les moustiquaires plus longtemps, en leur assurant une durée de vie de cinq ans au lieu de trois, pour alléger très nettement la charge pesant sur les systèmes de santé déjà fragiles, réduire les risques de résurgence du paludisme et économiser des centaines de millions de dollars.

La résistance des parasites aux médicaments antipaludiques représente un danger bien réel et toujours présent pour notre réussite à venir. Même si les efforts déployés pour contenir la résistance aux artémisinines semblent avoir permis de réduire de manière considérable le fardeau du paludisme dû à *Plasmodium falciparum* sur la frontière entre le Cambodge et la Thaïlande, en confinant le problème dans la région du Mékong, nous notons à l'heure actuelle les premières indications de résistance aux artémisinines au Myanmar et au Viet Nam. Il est urgent de mettre en place un cadre général à l'échelle du continent asiatique afin de garantir une action soutenue et coordonnée face à cette menace de santé publique, tout en maintenant la pression pour le retrait du marché des monothérapies à base d'artémisinine par voie orale, qui représentent l'un des principaux facteurs favorisant l'apparition et l'extension de la résistance aux artémisinines. Ces monothérapies sont toujours largement répandues malgré les demandes répétées de l'Assemblée mondiale de la Santé.

Un des moyens d'enrayer l'apparition et l'extension incessantes de la résistance aux médicaments antipaludiques est de veiller à ce que tous les patients suspectés d'être infectés subissent un test de diagnostic et que seuls les patients souffrant d'une infection confirmée à *Plasmodium* reçoivent un traitement antipaludique. Même si nous avons encore un long chemin à parcourir, ce rapport témoigne des progrès continus accomplis en matière d'utilisation des tests de diagnostic en Afrique et précise que le nombre de tests de diagnostic rapide fournis par les fabricants a été multiplié par deux pour atteindre 88 millions en 2010. Il illustre également les améliorations notables observées en termes de performance des produits.

Pour ajouter à nos préoccupations, la menace d'une résistance aux insecticides semble se développer rapidement. Il faut dire que nous dépendons en grande partie d'une seule classe d'insecticides, les pyréthrinoïdes, utilisés pour imprégner les moustiquaires. La résistance aux pyréthrinoïdes est désormais une réalité identifiée dans des zones très diverses, plusieurs étant situées dans les pays d'endémie palustre les plus affectés d'Afrique. En réponse à cette menace et à la demande de l'Assemblée mondiale de la Santé, l'OMS travaille actuellement en collaboration avec un grand nombre de parties prenantes à l'élaboration d'un plan mondial de gestion de la résistance aux insecticides chez les vecteurs du paludisme, dont la publication est prévue pour début 2012.

Face aux incertitudes économiques ainsi qu'aux menaces potentielles découlant de la résistance des parasites aux antipaludiques et de la résistance des moustiques aux insecticides, notre détermination doit rester inébranlable. Si nous exploitons pleinement les outils de prévention et de lutte contre le paludisme dont nous disposons aujourd'hui, et que nous mettons tout en œuvre pour atténuer les menaces potentielles en restant constamment vigilants et en réagissant à temps, nous serons en mesure de consolider et d'étendre les succès remarquables que nous avons déjà remportés. Tous les citoyens vivant dans des pays d'endémie palustre comptent sur nous. Nous ne devons pas les décevoir.

Résumé et points essentiels

Le *Rapport 2011 sur le paludisme dans le monde* récapitule les informations communiquées par 106 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 2010 et à souligner les progrès réguliers accomplis dans le but de contribuer au respect des objectifs internationaux fixés à l'horizon 2010 et 2015 en ce qui concerne la lutte contre le paludisme.

Les financements internationaux débloqués pour lutter contre le paludisme n'ont cessé d'augmenter pour culminer à US $2 milliards en 2011. Bien que conséquentes, les sommes affectées sont encore bien en deçà des ressources nécessaires à l'atteinte des cibles définies en matière de lutte antipaludique, lesquelles sont estimées à plus de US $5 milliards par an pour la période 2010–2015. En l'absence de nouvelles sources de financement, il est à prévoir que les fonds mis à disposition stagnent ou diminuent d'ici 2015.

Grâce aux fonds affectés à la lutte contre le paludisme, les pays endémiques ont eu la possibilité d'optimiser très largement l'accès aux moustiquaires imprégnées d'insecticide (MII). D'ailleurs, les estimations du pourcentage de ménages possédant au moins une MII en Afrique subsaharienne sont passées de 3 % en 2000 à 50 % en 2011. Parallèlement, le pourcentage des pulvérisations intradomiciliaires d'insecticides à effet rémanent (PID) a évolué entre 2005 et 2010 de moins de 5 % à 11 %.

Les enquêtes auprès des ménages indiquent que 96 % des personnes ayant accès à une MII au sein d'un foyer l'utilisent effectivement. 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 suspectés signalés soumis à un examen parasitologique, il est passé de 67 % en 2005 dans le monde entier à 76 % en 2010, avec la plus forte hausse enregistrée en Afrique subsaharienne. En dépit de ces progrès considérables, il va falloir redoubler d'efforts avant de pouvoir concrétiser la cible de l'accès universel.

Entre 2000 et 2010, des réductions de plus de 50 % des cas de paludisme signalés ont été enregistrées dans 43 des 99 pays touchés par la transmission, alors que 8 autres pays ont affiché des tendances à la baisse de 25 à 50 %. Les estimations font état de 216 millions d'épisodes palustres en 2010, dont 81 % dans la région Afrique de l'OMS, soit 174 millions de cas. Le nombre des décès dus au paludisme est estimé à 655 000 pour l'année 2010, dont 91 % en Afrique. À l'échelle mondiale, 86 % des décès imputables au paludisme ont frappé des enfants de moins de 5 ans. Par ailleurs, l'incidence estimée du paludisme a réduit de 17 % depuis 2000 et les taux de mortalité spécifiquement dus au paludisme ont diminué de 26 %. Ces replis sont inférieurs aux cibles approuvées à l'échelon international pour 2010 (réductions de 50 %). Néanmoins, ils sont le reflet de progrès majeurs.

Une certaine résistance aux artémisinines, un composant essentiel des médicaments utilisés dans le traitement du paludisme à *P. falciparum*, a été notée dans un nombre croissant de pays d'Asie du Sud-Est. De plus, une résistance aux pyréthroïdes, les insecticides imprégnant les MII et couramment utilisés pour les PID, a été observée dans 27 pays d'Afrique et 41 pays dans le monde. Faute d'une gestion convenable, ces résistances pourraient venir menacer les progrès à venir dans la lutte contre le paludisme.

Objectifs et cibles convenus à l'échelle internationale pour la lutte contre le paludisme

L'année 2010 a marqué une étape importante vers l'atteinte des objectifs et des cibles approuvés au niveau international dans le domaine de la lutte contre le paludisme. Les cibles définies dans le Plan d'action mondial contre le paludisme (GMAP) du Partenariat RBM (« Faire reculer le paludisme ») ont été actualisées en juin 2011 à la lumière des progrès réalisés en 2010.

1. L'année 2010 correspond à la date qui avait été fixée pour atteindre la couverture universelle pour toutes les populations à risque grâce à des interventions de prévention et de gestion des cas adaptées aux conditions locales, ainsi que pour réduire d'au moins 50 % le fardeau du paludisme par rapport au niveau enregistré en 2000.
2. Les cibles fixées par le Partenariat RBM ont été actualisées en juin 2011 au vu des progrès réalisés en 2010. Désormais, ces cibles sont redéfinies comme suit : (i) réduire pratiquement à zéro le nombre de décès dus au paludisme dans le monde d'ici fin 2015 ; (ii) réduire de 75 % (par rapport à l'an 2000) le nombre de cas de paludisme dans le monde d'ici fin 2015 ; (iii) éliminer le paludisme d'ici 2015 dans dix pays supplémentaires (par rapport à 2008) et dans la région Europe de l'OMS. Ces cibles seront atteintes en se conformant aux étapes suivantes : atteindre et maintenir l'accès et l'utilisation universels des mesures de prévention ; atteindre la couverture universelle en matière de prise en charge des cas dans le secteur privé ou public, ainsi qu'en matière de prise en charge communautaire (y compris l'orientation appropriée vers des services spécialisés) ; accélérer le développement des systèmes de surveillance.

Financement de la lutte antipaludique

Il est prévu que les fonds affectés à la lutte antipaludique en provenance de sources de financement internationales culminent à US $2 milliards en 2011, mais ils restent sensiblement inférieurs aux ressources nécessaires pour atteindre les cibles fixées au niveau mondial, ressources évaluées à plus de US $5 milliards par an pour la période 2010–2015.

3. On s'attend en 2011 à un pic des fonds internationaux débloqués, à hauteur de US $2 milliards. Ce montant devrait rester relativement stable de 2012 à 2013, puis chuter à US $1,5 milliard en 2015. Le recul des engagements du Fonds mondial est partiellement compensé par les engagements à la hausse du Département britannique pour le développement international (DFID), d'un montant de US $800 millions d'ici 2015. En revanche, les informations sur les financements accordés par les gouvernements nationaux pour lutter contre le paludisme sont beaucoup moins complètes. Les renseignements disponibles semblent indiquer que le financement intérieur est généralement inférieur à US $1 par personne à risque et qu'il représente une faible part du financement total de la lutte antipaludique dans les pays endémiques les plus touchés.

4. Il devrait être possible de réaliser des économies dans le cadre des programmes de lutte antivectorielle, mais il est vraisemblable qu'elles soient modestes pour de multiples raisons : (i) le prix d'une MII, à savoir la composante la plus importante du coût des programmes basés sur les MII, a baissé de 29 % entre 2007 et 2011, mais ces réductions risquent de ne pas être maintenues si les fabricants diminuent leur capacité de production ; (ii) les gros acheteurs obtiennent en général les prix les plus bas, ce qui laisse peu de marge pour les gains d'efficacité à tirer d'un approvisionnement optimisé ; (iii) les coûts des deux principales stratégies de distribution des MII, via des campagnes de masse ou des services de santé, sont identiques et ne comprennent que 5 à 10 % du coût total de la distribution ; les coûts de distribution peuvent également augmenter si les programmes se limitent à fournir uniquement des moustiquaires de remplacement aux ménages qui en ont besoin plutôt qu'à livrer tous les ménages ; (iv) l'extension des programmes basés sur les PID dégage une marge de réduction du coût par personne protégée par PID, mais il est à noter qu'une personne protégée nécessite US $2,62 par an dans le cadre de programmes d'envergure, en comparaison des quelque US $1,39 pour les MII.

5. Les dépenses afférentes aux traitements vont réduire au fur et à mesure que tous les cas de paludisme suspectés seront soumis à des examens parasitologiques. Au vu des prix actuels des TDR et des CTA (US $0,50 par TDR et US $1,40 pour l'AL), ainsi que de la compatibilité parfaite des résultats des tests, les économies à réaliser sur les produits pourraient atteindre US $68 millions pour l'ensemble du secteur public de la région Afrique de l'OMS. Toutefois, la généralisation de l'emploi des TDR risque de ne pas se traduire par des économies globales du fait des surcoûts éventuels liés aux effectifs plus importants nécessaires pour mener à bien les tests, à la mise en place de systèmes de contrôle de qualité, aux thérapies alternatives à prévoir pour les patients dont les résultats des tests sont négatifs et aux frais de lancement de nouvelles politiques de gestion des cas de paludisme. Il conviendrait que tous les coûts supplémentaires soient contrebalancés par une qualité supérieure des soins dispensés aux patients, de meilleurs résultats en matière de santé, une réduction potentielle du risque d'apparition et d'extension de la résistance aux médicaments antipaludiques, et une surveillance optimisée du paludisme.

6. L'amélioration de la lutte contre le paludisme devrait permettre de limiter les nombres de cas et de réduire les coûts liés au traitement des patients. Si l'accès universel aux MII est effectivement garanti dans la région Afrique de l'OMS d'ici 2015, le nombre de cas de paludisme traités par les établissements de soins publics devrait baisser de 31 millions pour plafonner à 48 millions. Rien que les économies réalisées sur les produits (CTA et TDR) devraient alors s'élever à plus de US $59 millions par an dans la région Afrique. Cependant, ces économies n'atteindront jamais leur plein potentiel si tous les cas de fièvre continuent à être traités par présomption comme des cas de paludisme, sans confirmation au moyen d'un test de diagnostic.

7. Les nouvelles technologies devraient également permettre de dégager des économies substantielles. Le développement et le déploiement de MII d'une durée de 5 ans pourraient faire passer le nombre total de MII nécessaires de 1,25 milliards à 750 millions entre 2011 et 2020. À prix unitaire identique pour la distribution de ces deux types de MII, soit US $7,66, il serait possible d'économiser au total US $3,8 milliards sur un besoin en financement de US $9,6 milliards. Le prix des TDR a chuté chaque année de 11 à 15 % entre 2008 et 2010. Le développement de tests encore moins chers pourrait réduire les coûts de façon considérable. Même si les TDR n'étaient utilisés que dans la moitié des cas suspectés traités par les établissements de soins publics dans la région Afrique de l'OMS, la réduction de moitié du prix actuel de US $0,50 à US $0,25 se traduirait par une économie de US $45 millions par an.

8. Les programmes de lutte contre le paludisme représentaient environ 8 % de l'aide publique au développement (APD) accordée à la santé et à la population en 2009, soit une augmentation de 3 % par rapport à 2005. Le financement global affecté à la santé et à la population est resté stable entre 2008 et 2009. Il a de grandes chances de se maintenir dans les années à venir. Compte tenu de la stabilité du financement total, ainsi que de la part importante déjà affectée aux programmes de lutte contre le paludisme sur les financements en matière de santé et de population, il est peu probable que des fonds supplémentaires soient débloqués pour lutter contre le paludisme dans le contexte actuel du financement du secteur de la santé.

9. Il semble que les gouvernements nationaux disposent encore d'une certaine marge leur permettant d'investir davantage dans la lutte contre le paludisme. Si seulement 1 % du total des dépenses nationales était affecté à la lutte antipaludique, 75 des 99 pays affichant encore des taux de transmission pourraient recueillir suffisamment d'argent pour offrir à chaque personne à risque l'accès à une MII. Grâce à la croissance économique mondiale, de nombreux pays d'endémie palustre ont pu engager à l'échelon national un budget bien plus important dans ce domaine. Entre 2000 et 2010, plus de 42 pays ont d'ailleurs augmenté leurs dépenses de US $1 000 par habitant.

10. Le développement de mécanismes de financement innovants en est à ses premiers stades. Au chapitre des revenus, les impôts sur les obligations et les transactions sur instruments dérivés risquent d'offrir le potentiel le plus intéressant, étant estimés à plus de US $250 milliards, mais leurs usages suggérés ne se limitent pas à la lutte contre le paludisme. Les taxes sur les billets d'avion permettent à l'heure actuelle de collecter plus de US $200 millions pour le développement de la santé. Leur adoption par de nouveaux pays pourrait être à l'origine de fonds supplémentaires non négligeables.

    D'autres programmes spécifiques à certains pays, comme les taxes de séjour, pourraient fournir l'occasion de lever des fonds pour les programmes de lutte dans les pays endémiques.

Progrès réalisés dans la lutte antivectorielle

La couverture en MII et PID s'est rapidement étendue dans certains pays d'Afrique subsaharienne, avec 50 % des ménages possédant une MII à mi-2011 et 11 % de la population à risque protégés par PID. Toutefois, une résistance aux pyréthroïdes a été observée dans 27 pays d'Afrique subsaharienne.

Moustiquaires imprégnées d'insecticide

11. Dès 2010, 27 pays de la région Afrique et 42 pays situés dans d'autres régions de l'OMS avaient adopté les recommandations de l'Organisation préconisant la fourniture de MII à *toutes* les personnes exposées au paludisme et pas seulement aux femmes enceintes et aux enfants, soit 4 pays de plus qu'en 2009. Au total, 82 pays, dont 38 dans la région Afrique, distribuent gratuitement des MII.

12. Le nombre de MII livrées par les fabricants en Afrique subsaharienne a considérablement augmenté et est passé de 5,6 millions en 2004 à 145 millions en 2010. Les volumes fournis entre 2008 et 2010 (294 millions) suffisaient à couvrir 73 % des 800 millions de personnes à risque, mais ces chiffres ne tiennent pas compte de retards de livraison des MII dans certains pays ou de la perte des MII après leur distribution dans les foyers.

13. En 2011, le nombre des MII livrées par les fabricants semble avoir diminué pour se limiter à près de 100 millions, ce qui s'explique par le fait que certains pays ont enregistré des progrès considérables vers l'accès universel aux MII en 2010 et qu'ils n'ont pas encore prévu de commander de nouvelles MII, mais aussi par le fait que d'autres pays n'ont pas encore mis en œuvre les programmes de lutte antipaludique à une échelle suffisante.

14. Selon les estimations obtenues à partir d'un modèle tenant compte du nombre des MII fournies par les fabricants, du nombre des MII distribuées par les programmes nationaux de lutte contre le paludisme (PNLP) et des données provenant des enquêtes auprès des ménages, le pourcentage de ménages possédant au moins une MII en Afrique subsaharienne est passé de 3 % en 2000 à 50 % en 2011. Il reste encore beaucoup à faire pour s'assurer que les MII parviennent bien à tous les ménages qui ont besoin.

15. L'analyse des enquêtes récentes auprès des ménages indique que près de 96 % des personnes ayant accès à une MII au sein du foyer l'utilisent réellement, ce qui laisse penser que le principal obstacle empêchant les personnes exposées au paludisme de dormir sous une MII se résume à la disponibilité insuffisante des moustiquaires.

16. Même si l'intensification de la distribution des MII en Afrique représente un immense exploit sur le plan de la santé publique, elle n'en constitue pas moins un formidable défi pour l'avenir, s'agissant du maintien de tels niveaux de couverture. Il règne une certaine incertitude au sujet de l'altération de l'efficacité d'une MII au fil du temps. Pour autant, la durée de vie d'une moustiquaire imprégnée d'insecticide longue durée (MILD) est actuellement estimée à 3 ans. Les moustiquaires distribuées en 2007 et 2008 doivent donc désormais être remplacées, bientôt suivies par les MII fournies en 2009 et 2010.

Pulvérisations intradomiciliaires d'insecticides à effet rémanent

17. Les pulvérisations intradomiciliaires (PID) à l'aide d'insecticides à effet rémanent agréés par l'OMS (y compris le DDT) constituent encore l'une des principales interventions de lutte antivectorielle destinées à réduire ou interrompre la transmission du paludisme dans tous les contextes épidémiologiques. En 2010, 73 pays, dont 36 dans la région Afrique, recommandaient les PID pour lutter contre le paludisme et 13 de ces pays avaient recours au DDT pour ces opérations.

18. En 2010, 185 millions de personnes ont été protégées par PID, ce qui représente 6 % de la population mondiale exposée au risque de contracter le paludisme. Dans toute la région Afrique, le nombre de personnes protégées par PID a augmenté, passant de 10 millions en 2005 à 78 millions en 2010. En tenant compte des pays d'Afrique subsaharienne, 81 millions de personnes ont été protégées, soit 11 % de la population à risque. Le nombre de personnes protégées par PID est généralement stable dans les autres régions de l'OMS.

Résistance aux insecticides

19. Le suivi de la résistance aux insecticides est une composante indispensable au déploiement à moyenne ou grande échelle de la moindre intervention basée sur des insecticides. En 2010, 78 pays ont signalé avoir organisé un suivi de la résistance aux insecticides.

20. Les méthodes actuelles de lutte antipaludique dépendent en très grande partie d'une seule classe d'insecticides, les pyréthroïdes, qui sont à ce jour les seuls composés servant à imprégner les MII et qui représentent 77 % des PID si l'on considère les zones couvertes par les pulvérisations. En généralisant l'usage d'une seule et unique classe d'insecticides, on accroît le risque de voir apparaître une résistance chez les moustiques. Ce risque est particulièrement préoccupant en Afrique, où la lutte antivectorielle au moyen d'insecticides est actuellement menée avec des niveaux de couverture sans précédent. Une résistance aux pyréthroïdes a été observée dans 27 pays d'Afrique subsaharienne. Le moment où l'efficacité de la lutte antivectorielle s'en trouvera affectée reste incertain et risque de varier en fonction du mécanisme de résistance identifié à l'échelle locale. À la demande de l'Assemblée mondiale de la Santé, l'OMS travaille actuellement en collaboration avec un grand nombre de parties prenantes à l'élaboration d'un plan mondial de gestion de la résistance aux insecticides chez les vecteurs du paludisme, dont la publication est prévue pour début 2012.

Progrès réalisés en matière de chimioprévention

Le pourcentage de femmes enceintes ayant reçu deux doses de TPIp durant leur grossesse oscille entre 4 et 68 %.

21. Un traitement préventif intermittent (TPI) est recommandé pour les groupes de population vivant dans des zones où le taux de transmission reste élevé et qui sont particulièrement exposés au risque d'une infection à *Plasmodium* ou à ses conséquences, notamment les femmes enceintes et les nourrissons. Sur les 45 pays formant l'Afrique subsaharienne, 35 ont adopté dès fin 2010 le TPI pour les femmes enceintes (TPIp) comme politique nationale. Dans la région Pacifique occidental, la Papouasie-Nouvelle-Guinée avait également adopté cette politique en 2009.

22. Dans les 21 pays de la région Afrique accablés par le très lourd fardeau du paludisme, qui ont adopté le TPIp en tant que politique nationale, les données collectées par le biais des PNLP indiquent que le pourcentage de femmes se présentant dans des établissements de soins prénataux et ayant reçu une seconde dose de TPIp a atteint 55 % en 2010 (écart interquartile de 47 à 61 %).

23. Sur les 13 pays de la région Afrique disposant de données provenant d'enquêtes auprès des ménages sur la période 2008–2010, le pourcentage de femmes ayant reçu deux doses de TPIp durant leur grossesse varie de 4 % en Namibie à 68 % en Zambie. Une fois pondérée, la moyenne affiche 24 %, ce qui reste bas et s'explique principalement par les faibles taux de couverture au Nigéria et en République démocratique du Congo.

24. 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, devraient recevoir 3 doses de sulfadoxine-pyriméthamine (SP) administrées par les services de vaccination selon des intervalles définis correspondant aux calendriers de vaccination systématique. Aucun pays n'a pour l'instant fait du TPI un élément de sa politique nationale dans le cas des nourrissons depuis sa recommandation en 2009.

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

Les achats de TDR et de CTA sont en augmentation. Quant au pourcentage des cas suspectés et notifiés qui sont soumis à un examen parasitologique, il est passé de 67 % en 2005 à 73 % en 2009 à l'échelon mondial. Pourtant, de nombreux cas sont encore traités par présomption, sans aucun diagnostic parasitologique préalable.

Tests de diagnostic

25. Il est recommandé de procéder à une confirmation parasitologique rapide du diagnostic (par examen microscopique ou TDR) avant d'administrer le moindre traitement antipaludique à tous les patients suspectés d'être infectés. En 2010, 37 des 43 pays endémiques de la région Afrique et 53 des 63 pays endémiques des autres régions de l'OMS ont signalé avoir adopté une politique visant à promouvoir le diagnostic parasitologique pour toutes les tranches d'âge, ce qui représente 4 pays de plus qu'en 2009 pour la région Afrique et 8 pays de plus ailleurs dans le monde.

26. Le nombre des TDR fournis par les fabricants est passé de 45 millions en 2008 à 88 millions en 2010. Les essais effectués sur ces produits prouvent l'amélioration de la qualité des tests au fil du temps. D'ailleurs, proportionnellement, les tests achetés à l'heure actuelle sont de bien meilleure qualité. Près de 90 % des TDR achetés en 2011 ont affiché des scores de détection de plus de 75 %, alors que seulement 23 % des TDR achetés en 2007 enregistraient de tels résultats.

27. La proportion des cas suspects notifiés soumis à un examen parasitologique a augmenté entre 2005 et 2010, notamment dans les régions Afrique (de 26 à 45 %), Méditerranée orientale (de 60 à 91 %) et Asie du Sud-Est, Inde non comprise (de 58 à 95 %). Cette proportion reste faible dans la plupart des pays africains : dans 21 des 42 pays qui ont communiqué des informations sur cet examen, le pourcentage des cas testés était inférieur à 20 %.

28. D'après les données fournies par un nombre limité de pays, il semblerait que les examens microscopiques et les TDR soient beaucoup moins répandus dans le secteur privé que dans le secteur public. Au total, 48 pays ont signalé le déploiement des TDR au niveau communautaire et 11 millions de patients ont ainsi été testés dans le cadre de divers programmes en 2010.

Traitement

29. Les cas confirmés de paludisme simple à *P. falciparum* doivent être traités au moyen d'une CTA. En 2011, 84 pays et territoires ont adopté la CTA en traitement de première intention pour le paludisme à *P. falciparum*, soit 77 pays de plus juste en 2010. 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.

30. Le nombre de traitements par CTA achetés par le secteur public a très largement augmenté et est passé de 11,2 millions en 2005 à 76 millions en 2006. Il a atteint 181 millions en 2010. Parallèlement, on estime que le secteur privé a acquis en 2010 un total de 35 millions de traitements. Selon les projections, la demande totale en CTA va atteindre 287 millions de traitements en 2011, soit une augmentation de 32 % par rapport à 2010. Le facteur principal de cette hausse est la multiplication par dix des ventes privées subventionnées par le Dispositif pour des médicaments abordables pour le paludisme (DMAp).

31. Dans un petit nombre d'enquêtes récentes auprès des ménages menées entre 2008 et 2010, les données suggèrent que les patients fébriles se présentant dans des établissements de soins publics ont plus de chances de recevoir une CTA que les sujets traités par des établissements privés. Toutefois, cette tendance risque d'évoluer en 2011 dans les pays participant au programme pilote du DMAp.

32. Dans la région Afrique, le nombre de CTA distribuées en 2010 par les PNLP a été plus de deux fois supérieur au nombre total de tests (examens microscopiques et TDR) effectués en 2010, ce qui signifie que de nombreux patients se voient encore prescrire des CTA sans subir aucun test de confirmation du diagnostic.

Résistance aux médicaments

33. L'OMS recommande de retirer du marché les monothérapies à base d'artémisinine par voie orale et de les remplacer par des CTA. En novembre 2011, 25 pays autorisaient encore la commercialisation de ces produits (aucun changement par rapport à 2010) et 28 compagnies pharmaceutiques les distribuaient (une baisse par rapport aux 39 compagnies de 2010). 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.

34. Les études relatives à l'efficacité thérapeutique restent la norme de référence pour orienter les politiques sur les médicaments. Elles doivent être réalisées au moins une fois tous les 2 ans. Des études d'efficacité au sujet des traitements antipaludiques de première ou de seconde intention ont été effectuées dans 31 des 75 pays où étudier l'efficacité de ce type de médicaments face à *P. falciparum* est possible (ces études sont impossibles dans 17 pays du fait de la faible incidence du paludisme et 15 pays présentent une endémie uniquement liée à *P. vivax*). Douze autres pays avaient prévu d'organiser des études d'efficacité en 2010 ou 2011. Toutefois, ces mêmes études datent de plus de trois ans dans 32 pays.

35. 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. Les efforts déployés pour contenir le phénomène prouvent qu'il est possible de réduire l'incidence du paludisme, un élément essentiel du plan global d'enrayement de la résistance en vue de stopper la propagation des parasites résistants. Malgré les changements observés dans la sensibilité des plasmodies

aux artémisinines, les CTA demeurent d'une grande efficacité clinique et parasitologique dans la plupart des régions. Toutefois, on a relevé des taux élevés d'échec au traitement dans le cas de plusieurs CTA, en particulier avec l'une des plus récentes, l'association dihydroartémisinine-piperaquine, dans la province de Pailin au Cambodge. Tout ceci souligne la nécessité d'une vigilance importante pour préserver non seulement l'efficacité des artémisinines, mais aussi des autres médicaments utilisés sous forme de combinaisons thérapeutiques.

36. En 2011, l'OMS a publié le *Plan mondial pour prévenir la résistance aux artémisinines*, qui recommande d'agir sur cinq fronts pour endiguer avec succès la résistance aux artémisinines : arrêter la propagation des parasites résistants ; accroître le contrôle et la surveillance pour évaluer la menace de la résistance aux artémisinines ; améliorer l'accès aux tests de diagnostic du paludisme et à un traitement rationnel par des CTA ; investir dans la recherche sur la résistance aux artémisinines ; favoriser l'action et mobiliser des ressources.

Impact de la lutte antipaludique

Depuis 2000, de plus en plus de pays enregistrent une baisse du nombre de cas confirmés de paludisme et/ou des nombres d'hospitalisations et de décès signalés. Les efforts déployés au niveau mondial pour lutter contre le paludisme ont entraîné une réduction de l'incidence et des taux de mortalité spécifiquement dus à cette maladie.

37. Ces dernières années, 8 pays et 1 territoire de la région Afrique de l'OMS ont enregistré un recul de plus de 50 % des cas confirmés ou des hospitalisations et des décès imputables au paludisme (Afrique du Sud, Algérie, Botswana, Cap-Vert, Namibie, Rwanda, Sao Tomé-et-Principe, Swaziland et Zanzibar en République-Unie de Tanzanie). L'Érythrée, l'Éthiopie, le Sénégal et la Zambie ont affiché des réductions comprises entre 25 et 50 %. Dans tous ces pays, ce recul est lié à d'énergiques interventions de lutte antipaludique.

38. L'augmentation des nombres de cas de paludisme observés en 2009 au Rwanda et en Sao Tomé-et-Principe (deux pays qui avaient précédemment signalé des baisses) a été inversée suite à l'intensification des mesures de lutte antipaludique. Ces deux cas mettent en évidence la nécessité d'instaurer des systèmes assurant une surveillance efficace du paludisme et de maintenir avec rigueur les programmes de lutte, même si le nombre de cas a sensiblement reculé. Selon les informations disponibles, la tendance à la hausse des nombres de cas et de décès enregistrés en Zambie en 2009 n'a pas encore été inversée.

39. Même si les pays dotés de systèmes de surveillance bien établis enregistrent des diminutions substantielles des nombres de cas de paludisme, la détection de telles évolutions s'avère bien plus compliquée dans les pays où les systèmes de surveillance sont moins fiables, notamment dans les pays les plus peuplés d'Afrique centrale et occidentale. D'ailleurs, les pays encourageant l'usage des examens microscopiques et des TDR ont vu les nombres de cas confirmés augmenter, ce qui reflète les changements dans les pratiques de diagnostic et masque les tendances de fond en termes d'incidence du paludisme. Il va donc falloir enquêter de manière plus approfondie sur les tendances relatives aux cas de paludisme et aux changements dans les pratiques de diagnostic pour obtenir une image plus précise de l'évolution réelle de l'incidence de la maladie.

40. Dans les autres régions de l'OMS, le nombre signalé de cas confirmés a reculé de plus de 50 % entre 2000 et 2010 dans 35 des 53 pays touchés par la transmission. Une tendance à la baisse de l'ordre de 25 à 50 % a été observée dans 4 autres pays. En 2010, la région Europe n'a notifié que 176 cas indigènes. Le recul du nombre de cas s'est poursuivi, mais a ralenti dans les pays affichant les plus forts taux d'incidence, ce qui prouve la nécessité de concentrer davantage d'efforts sur les pays qui portent la majeure partie du fardeau du paludisme en dehors de l'Afrique.

41. En 2011, 8 pays se trouvaient en phase de pré-élimination et 9 mettaient en œuvre des programmes d'élimination à l'échelon national (8 étant entrés en phase d'élimination dès 2008). Huit autres pays (Bahamas, Égypte, Fédération de Russie, Géorgie, Iraq, Jamaïque, Oman et République arabe syrienne) ont interrompu la transmission et sont actuellement en phase de prévention de la réintroduction du paludisme. L'Arménie a été certifiée exempte de paludisme par le Directeur général de l'OMS en 2011.

42. Selon les estimations, le paludisme menaçait quelque 3,3 milliards de personnes en 2010. Sur ce nombre, 2,1 milliards étaient exposés à un risque faible de contracter la maladie (moins d'un cas signalé pour 1 000 personnes à risque), 94 % vivant en dehors de la région Afrique de l'OMS. Les 1,2 milliards exposés à un risque élevé d'infection (plus d'un cas pour 1 000 personnes à risque) vivaient pour la plupart dans les régions Afrique (47 %) et Asie du Sud-Est (37 %) de l'OMS.

43. Les estimations font état de 216 millions d'épisodes de paludisme en 2010, avec un large intervalle d'incertitude (du 5 au 95^{e} centile) allant de 149 à 274 millions de cas. Près de 81 %, soit 174 millions de cas (entre 113 et 239 millions), ont eu lieu dans la région Afrique. Quant à la région Asie du Sud-Est, elle représente 13 % supplémentaires.

44. En 2010, les décès associés au paludisme sont estimés à 655 000 (entre 537 000 et 907 000), dont 91 % (soit 596 000 dans un intervalle compris entre 468 000 et 837 000) dans la région Afrique. À l'échelle mondiale, 86 % des décès imputables au paludisme ont concerné des enfants de moins de 5 ans.

45. L'incidence estimée du paludisme a réduit de 17 % dans le monde entre 2000 et 2010. Les pourcentages de réduction les plus importants ont été enregistrés dans les régions Europe (99,5 %), Amérique (60 %) et Pacifique occidental (38 %). Les taux de mortalité dus au paludisme ont chuté de 25 % entre 2000 et 2010. Les pourcentages de réduction les plus importants ont encore une fois été enregistrés dans les régions Europe (99 %), Amérique (55 %) et Pacifique occidental (42 %), mais aussi en Afrique (33 %).

46. Les estimations relatives à l'incidence du paludisme sont basées, pour partie, sur les nombres de cas signalés dans le cadre des PNLP. Toutefois, les rapports remis au sujet des cas par la majeure partie des pays sont loin d'être complets. Au total, 24 millions de cas confirmés ont été signalés par les PNLP en 2010, soit 11 % de l'incidence estimée des cas dans le monde.

Prefacio

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Los datos del *Informe mundial sobre el paludismo 2011* permiten demostrar que se están consiguiendo avances significativos y sostenibles en la lucha contra uno de los mayores problemas de salud pública. En 2010, gracias a un nuevo incremento en la cobertura de las poblaciones en riesgo a través de medidas tanto de prevención como de control del paludismo se ha acentuado el descenso de casos de paludismo y de muertes debidas a esta enfermedad. El mapa del paludismo continúa reduciéndose. En 2011, he tenido el honor de certificar que Armenia se encuentra libre de paludismo, gracias a una capacidad de vigilancia y respuesta, así como una atención a las necesidades básicas de salud pública excelentes. En un mundo sediento de buenas noticias, estas son evoluciones muy positivas.

No obstante, señales inquietantes indican que dicho avance podría frenarse, sobre todo teniendo en cuenta las reducciones previstas en los fondos destinados a financiar el acceso universal a las medidas de prevención y control del paludismo. La financiación internacional para luchar contra la enfermedad parece haber alcanzado su punto máximo en 2.000 millones de dólares, muy inferior a los 5.000-6.000 millones requeridos. Pese a que nuevos compromisos, como los del Reino Unido, han sido indispensables para conservar el progreso actual, no bastan para alcanzar las metas que la comunidad mundial de lucha antipalúdica ha establecido. El gasto interno asignado al paludismo a menudo sigue siendo insuficiente en los países endémicos. El déficit de financiación tiene consecuencias importantes, ya que el éxito en el control del paludismo es crucial para alcanzar las metas relacionadas con la salud de los Objetivos de Desarrollo del Milenio, particularmente en África.

Los próximos años serán fundamentales en la lucha contra el paludismo. La experiencia nos ha enseñado lo frágiles que pueden ser los avances. La distribución de redes mosquiteras tratadas con insecticida de larga duración durante los últimos años constituye un logro notable que ha salvado cientos de miles de vidas, pero es (o será pronto) necesario reemplazar estas redes. Los datos del presente informe señalan que la gran mayoría de las redes mosquiteras se utilizan efectivamente y que el principal obstáculo para conseguir la cobertura universal sigue siendo el acceso a las mismas. De nosotros depende garantizar que éste y otros artículos que permiten salvar vidas lleguen a todos los que los necesitan, antes de que desaparezcan los avances que hemos alcanzado tan difícilmente. Necesitaremos un liderazgo a escala mundial, nacional y local, así como soluciones innovadoras. En caso de que se consiguiera fabricar redes mosquiteras más duraderas, con una vida útil de cinco años en vez de tres, se podría reducir considerablemente la presión sobre sistemas de salud frágiles, se minimizarían los riesgos de resurgencia y se ahorrarían cientos de millones de dólares.

La resistencia del parásito a los fármacos antipalúdicos sigue siendo un peligro real y siempre presente para los avances conseguidos hasta ahora. Los esfuerzos realizados para contener la resistencia a la artemisinina en la frontera entre Camboya y Tailandia parecen haber reducido drásticamente la presión de la malaria debida a *Plasmodium falciparum*, y el problema sigue limitándose a la región del Mekong, pero se ha detectado evidencia de resistencia a la artemisinina en Birmania y Vietnam. Existe una necesidad urgente de desarrollar un marco a escala de Asia para garantizar una acción sostenida y coordinada en contra de dicha amenaza para la salud pública, junto con una labor de presión para conseguir que se retiren del mercado las monoterapias de artemisinina oral, uno de los principales elementos que fomenta la emergencia y la propagación de la resistencia a dicho fármaco. Estas monoterapias siguen estando ampliamente disponibles a pesar de los llamamientos repetidos de la Asamblea Mundial de la Salud.

Un medio para contener la emergencia y la propagación de la resistencia a los fármacos antipalúdicos consiste en proporcionar pruebas de diagnóstico a todos los pacientes con sospecha clínica de paludismo y que se administre el tratamiento antipalúdico únicamente a quienes tengan confirmada la infección de *Plasmodium*. Queda mucho camino por recorrer, pero el presente informe registra avances continuados en relación con las pruebas de diagnóstico en África y la duplicación del número de pruebas de diagnóstico rápido suministradas por los fabricantes (88 millones en 2010), así como mejoras notables en la eficacia de los productos.

Otra grave preocupación concierne al rápido aumento de la resistencia a los insecticidas. Actualmente, somos muy dependientes de los piretroides, ya que son el único tipo de insecticidas que se utilizan para tratar las redes mosquiteras. La resistencia a los piretroides se ha identificado en una gran variedad de entornos, muchos de los cuales se encuentran en países de África donde el paludismo registra el mayor grado de endemismo. En respuesta a dicha amenaza y tal como lo propuso la Asamblea Mundial de la Salud, la OMS trabaja actualmente junto con una gran variedad de actores para desarrollar un plan mundial de gestión de la resistencia a los insecticidas en vectores del paludismo, que se lanzará a principios de 2012.

Ante las perspectivas de incertidumbre económica y las amenazas potenciales de la resistencia tanto del parásito a los fármacos antipalúdicos como del mosquito a los insecticidas, no debemos perder nuestra determinación. Si aprovechamos al máximo las herramientas actuales de prevención y de control del paludismo, a la vez que reducimos los riesgos potenciales mediante una vigilancia constante y una respuesta oportuna, conservaremos y ampliaremos los progresos realizados hasta ahora. Los habitantes de los países con paludismo endémico cuentan con nosotros. No podemos defraudarlos.

Resumen y puntos esenciales

El *Informe mundial sobre el paludismo 2011* resume la información procedente de 106 países con paludismo endémico y de otras fuentes, y actualiza los análisis presentados en el informe de 2010. Asimismo, destaca los avances constantes en el logro de los objetivos internacionales para el control del paludismo fijados para 2010 y 2015.

La financiación internacional para el control de la enfermedad ha seguido aumentando hasta llegar a un máximo de 2.000 millones de dólares en 2011. Los importes destinados a la lucha antipalúdica, pese a serconsiderables, están aún lejos de cubrir los recursos necesarios para alcanzar los objetivos en cuanto al control de la enfermedad, que se estiman en más de 5.000 millones de dólares anuales para el periodo 2010-2015. Además, se prevé un estancamiento o incluso un descenso de la financiación antes de 2015, a no ser que se identifiquen nuevas fuentes.

Los fondos dedicados al control del paludismo han permitido a los países endémicos aumentar considerablemente el acceso a redes mosquiteras tratadas con insecticida. Se estima que el porcentaje de hogares que cuentan con al menos una mosquitera tratada en el África subsahariana ha aumentado del 3% en el año 2000 al 50% en 2011, en tanto que el porcentaje de familias protegidas por la fumigación intradomiciliaria con insecticidas de acción residual ha pasado de menos del 5% en 2005 al 11% en 2010. Las encuestas domiciliarias indican que el 96% de las personas que cuenta con una red mosquitera tratada con insecticida en el hogar la utiliza habitualmente. El número de pruebas de diagnóstico rápido (PDR) y la administración de terapias combinadas con artemisinina (TCA) van en aumento. El porcentaje de casos con sospecha clínica de paludismo sometidos a pruebas parasitológicas también ha crecido a escala mundial, al pasar del 67% en 2005 al 76% en 2010, registrando el mayor incremento en el África subsahariana. Pese a estos avances considerables, aún queda un largo trecho para alcanzar el objetivo del acceso universal.

Entre el año 2000 y 2010, en 43 de los 99 países con transmisión se ha registrado una reducción de casos de paludismo de más del 50%, mientras que en otros 8 países se han visto tendencias a la baja del 25% al 50%. Se calcula que en 2010 se produjeron unos 216 millones de casos de paludismo, de los que aproximadamente el 81% (174 millones de casos), se registraron en la Región de África. Se estima que en 2010 las muertes por esta enfermedad fueron 655.000, el 91% de ellas en África. Aproximadamente el 86% de muertes en todo el mundo correspondieron a niños menores de 5 años de edad. La incidencia estimada del paludismo en todo el mundo se ha reducido en un 17% desde el año 2000, y el índice de mortalidad de esta enfermedad en un 26%. Estos porcentajes de reducción son inferiores a los objetivos acordados internacionalmente para 2010 (del 50%), pero representan un logro muy importante.

En un número creciente de países del sudeste asiático se ha observado la resistencia a la artemisinina, un componente fundamental de los fármacos utilizados en el tratamiento del paludismo producido por *P. falciparum*. Se ha informado igualmente de resistencia a los piretroides –insecticidas utilizados en el tratamiento de las redes mosquiteras y los más usados para la fumigación intradomiciliaria– en 27 países africanos y en 41 de todo el mundo. Si no se gestiona de un modo adecuado, esta resistencia constituye una amenaza potencial para futuros avances en el control del paludismo.

Metas y objetivos acordados internacionalmente para el control del paludismo

El año 2010 constituyó un hito en el camino hacia el logro de las metas y objetivos acordados internacionalmente con vistas al control del paludismo. A la luz de los avances conseguidos en 2010, en junio de 2011 se actualizaron los objetivos del Plan de Acción Mundial contra el Paludismo de la Alianza para Hacer Retroceder el Paludismo.

1. El año 2010 era la fecha en la que se debía alcanzar la cobertura universal para todas las poblaciones en riesgo de contraer el paludismo, mediante intervenciones adaptadas al contexto local y destinadas a la prevención y gestión de los casos, y se había previsto reducir la incidencia de la enfermedaden por lo menos un 50% en comparación con los niveles del año 2000.
2. A la luz de los avances conseguidos en 2010, en junio de 2011 se actualizaron los objetivos de la Alianza para Hacer Retroceder el Paludismo (Roll Back Malaria). Actualmente, los objetivos son: (i) reducir el índice mundial de mortalidad del paludismo a casi cero a finales de 2015; (ii) disminuir para finales de 2015 los casos de la enfermedad en todo el mundo en un 75% respecto a los datos del año 2000, y (iii) eliminar el paludismo, para finales de 2015, en 10 nuevos países desde 2008, incluida la región europea de la OMS. Estos objetivos se alcanzarán mediante el logro y mantenimiento del acceso universal a medidas preventivas, el acceso universal a la gestión de los casos en los sectores público y privado y en la comunidad (incluida la derivación al servicio sanitario adecuado), y una mayor celeridad en el desarrollo de los sistemas de vigilancia.

Financiación del control del paludismo

Se prevé que los fondos destinados al control del paludismo procedentes de fuentes internacionales alcancen en 2011 un máximo de 2.000 millones de dólares, con lo que seguirán siendo considerablemente más bajos que los recursos necesarios para alcanzar los objetivos mundiales, valorados en más de 5.000 millones de dólares para el periodo 2010-2015.

3. Se prevé que en 2011 la financiación internacional sea como máximo de 2.000 millones de dólares. Se cree que entre 2012 y 2013 se mantendrá relativamente estable, pero luego disminuirá hasta 1.500 millones de dólares en 2015. La reducción del importe comprometido por el Fondo Mundial se verá compensada en parte por el Departamento para el Desarrollo Internacional del Reino Unido, que incrementará su contribución hasta 800 millones de dólares para 2015. La información sobre la financiación de los gobiernos nacionales

para el control del paludismo es menos detallada. Los datos disponibles dan a entender que la financiación de ámbito nacional suele ser inferior a un dólar por persona en situación de riesgo y representa una pequeña proporción de la totalidad de fondos necesarios para el control del paludismo en los países más endémicos.

4. El ahorro en los programas de control del vector es factible, pero lo más probable es que sea modesto por varias razones: (i) el precio de una red mosquitera tratada con insecticida, que representa el componente más importante de estos programas, ha bajado en un 29% entre 2007 y 2011, pero estas reducciones tal vez no se podrán mantener si los fabricantes disminuyen las capacidades de producción; (ii) con las compras de grandes cantidades se suelen obtener precios más bajos, lo que deja poco margen para buscar el ahorro a través de una mejor gestión de las contrataciones; (iii) los gastos de las dos principales estrategias para la distribución de redes mosquiteras tratadas con insecticida –campañas masivas o servicios sanitarios– son parecidos y, por lo general, representan sólo entre el 5% y el 10% del costo total de la distribución; (iv) por otra parte, estos costes pueden aumentar cuando los programas no deben atender a todos los hogares, sino sólo a aquellos en los que hay que sustituir la red mosquitera; (v) se puede reducir el coste por persona de la protección por fumigación intradomiciliaria con insecticidas residuales si se amplía la cobertura de estos programas, pero el coste por persona protegida por fumigación intradomiciliaria es de 2,62 dólares en programas de gran cobertura, mientras que en el caso de las redes mosquiteras tratadas es solo de 1,39 dólares aproximadamente.

5. Se prevé una disminución de los gastos de tratamiento a medida que las pruebas parasitológicas se vayan aplicando a todos los casos sospechosos de paludismo. Con los precios actuales de las PDR y las TCA (0,50 dólares para las PDR y 1,40 dólares para la arteméter-lumefantrina), y el estricto cumplimiento de los resultados de la prueba, el ahorro en materias primas podría llegar a 68 millones de dólares en el sector público de la región africana de la OMS. Sin embargo, puede que la extensión de las PDR no se traduzca en un ahorro global de los costes debido a posibles gastos adicionales atribuibles al aumento de horario del personal para realizar las pruebas, la implantación de sistemas de control de calidad, las terapias alternativas para los pacientes cuyas pruebas den un resultado negativo y los costes de la introducción de cambios para gestionar los casos de paludismo. Habría que sopesar, por un lado, cualquier gasto adicional y, por otro, la mejora de la calidad de la atención prestada a los pacientes, mejores resultados en materia de salud, la reducción potencial del riesgo de aparición y propagación de la farmacorresistencia, así como la mejora de la vigilancia del paludismo.

6. Un mejor control del paludismo debe dar lugar a un menor número de casos y comportar una rebaja del precio del tratamiento de los pacientes; el acceso universal a las redes mosquiteras tratadas con insecticida en la región africana de la OMS en 2015 podría reducir entre 31 y 48 millones el número de casos de paludismo que acuden a centros de salud pública. El ahorro de materias primas por sí solo (TCA y PDR) ascendería a más de 59 millones de dólares anuales en la región africana de la OMS. No obstante, el potencial de dichos ahorros solo se materializará si, en lugar de tratar como paludismo cualquier caso de fiebre, se confirma previamente mediante una prueba diagnóstica.

7. Se podrían conseguir ahorros considerables a través de las nuevas tecnologías. La producción y distribución de redes mosquiteras tratadas con insecticida que tuvieran una duración de 5 años podría reducir de 1.250 millones a 750 millones el número de redes mosquiteras necesarias para el periodo entre 2011 y 2020. Si el precio unitario de los dos tipos de redes mosquiteras fuese parecido (7,66 dólares) se podrían ahorrar 3.800 millones de dólares de un total de 9.600 millones, que son los fondos necesarios actualmente. El precio de las PDR ha bajado anualmente entre un 11% y un 15% de 2008 a 2010. La producción de pruebas aún más baratas podría traducirse en una reducción de costes considerable; incluso en el caso de que las PDR se aplicaran solo en la mitad de los casos de sospecha de paludismo que acuden a los centros sanitarios públicos de la región africana de la OMS, reducir a la mitad el precio –pasar de los actuales 0,50 dólares a 0,25– comportaría un ahorro de 45 millones de dólares al año.

8. En 2009, los programas contra el paludismo representaron aproximadamente el 8% de la ayuda oficial al desarrollo para la salud y la población, lo que implica un aumento respecto al 3% de 2005. La financiación total para la salud y la población se mantuvo estable entre 2008 y 2009 y es probable que siga así. Dada la estabilidad de la financiación global, y dado que los programas contra el paludismo ya reciben una proporción considerable de fondos para la salud y la población, es poco probable que aumenten los fondos para la lucha contra el paludismo en el sector público.

9. Existe la posibilidad de que los gobiernos nacionales inviertan más en el control del paludismo. Solo con que se invirtiera el 1% del gasto público total en el control de esta enfermedad, 75 de los 99 países con transmisión del paludismo podrían obtener suficiente dinero para facilitar a toda la población de riesgo el acceso a una red mosquitera tratada con insecticida. El crecimiento económico global ha permitido a muchos países con paludismo endémico aumentar el gasto público total; entre el año 2000 y 2010, más de 42 países han incrementado el gasto per cápita en 1.000 dólares.

10. Existe una serie de mecanismos de financiación muy innovadores que se hallan en una fase inicial. Los impuestos sobre bonos y operaciones con derivados pueden brindar el mayor potencial de generación de ingresos –estimados en más de 250.000 millones de dólares–, pero se pueden aplicar a cuestiones que van más allá del control del paludismo. De los impuestos sobre pasajes aéreos se recaudan en la actualidad más de 200 millones de dólares para proyectos sanitarios, y su extensión a otros países podría generar fondos adicionales considerables. Otros planes específicos de cada país, como la tasa turística, pueden constituir oportunidades para recaudar fondos destinados a los programas de control en países con paludismo endémico.

Avances en el control del vector

La cobertura mediante redes mosquiteras tratadas con insecticida y fumigación intradomiciliaria con insecticidas residuales ha aumentado rápidamente en algunos países del África subsahariana, con un 50% de hogares que, a mediados de 2011, disponían de una red mosquitera propia, y con un 11% de la población de riesgo protegida por fumigación intradomiciliaria. En 27 países del África subsahariana se ha detectado resistencia a los piretroides.

Redes mosquiteras tratadas con insecticida

11. En 2010, 27 países de la región africana y 42 de otras regiones de la OMS seguían la recomendación de la OMS de suministrar redes mosquiteras tratadas con insecticida a *toda* la población de riesgo, no solo a mujeres embarazadas y niños, lo que representa un aumento de 4 países desde 2009. Un total de 82 países, 38 de los cuales se encuentran en la región africana, distribuyen estas redes mosquiteras de forma gratuita.

12. En el África subsahariana, el número de redes mosquiteras tratadas con insecticida distribuidas por los fabricantes aumentó espectacularmente de los 5,6 millones en 2004 a los 145 millones en 2010. La cantidad de unidades distribuidas entre 2008 y 2010 (294 millones) fue suficiente para cubrir el 73% de los 800 millones de personas en situación de riesgo, pero estas cifras no tienen en cuenta los retrasos en la entrega de las redes mosquiteras en los distintos países o la pérdida de las mismas una vez entregadas.

13. El número de redes mosquiteras tratadas con insecticida suministradas por los fabricantes en 2011 parece haber descendido hasta aproximadamente 100 millones. Ello se debe, en parte, a que algunos países han logrado, en 2010, progresos sustanciales en cuanto al acceso universal a estas redes mosquiteras y todavía no prevén hacer nuevos pedidos, y también a que algunos países aún no han ampliado lo suficiente la cobertura de sus programas.

14. Partiendo de un modelo que tiene en cuenta el número de redes mosquiteras tratadas con insecticida suministradas por los fabricantes, el número de estas redes distribuidas por los programas nacionales de control del paludismoy los datos de las encuestas domiciliarias, se calcula que el porcentaje de hogares del África subsahariana que posee al menos una red mosquitera tratada ha aumentado del 3% en el año 2000 al 50% en 2011. Es necesario redoblar los esfuerzos para garantizar que estas redes mosquiteras lleguen a todos los hogares que lo requieran.

15. El análisis de las encuestas domiciliarias recientes indica que aproximadamente el 96% de las personas que cuenta con una red mosquitera tratada con insecticida en el hogar la utiliza habitualmente, lo que da a entender que la insuficiencia de estas redes sigue siendo el principal obstáculo para que todas las personas en situación de riesgo de contraer el paludismo duerman protegidas por una red mosquitera tratada con insecticida.

16. El rápido aumento de la distribución de redes mosquiteras tratadas con insecticida en África representa un éxito considerable en materia de salud pública, pero garantizar el mantenimiento de esos niveles de cobertura también representa un reto importante para el futuro. No se sabe a ciencia cierta cuál es la pérdida de eficacia de estas redes mosquiteras con el tiempo, pero la vida útil de una red mosquitera tratada con insecticida de larga duración se estima actualmente en 3 años. Por lo tanto, las redes mosquiteras distribuidas en 2007 y 2008 deben reemplazarse ahora, y muy pronto las distribuidas en 2009 y 2010.

Fumigación intradomiciliaria con insecticidas residuales

17. La fumigación intradomiciliaria con productos químicos aprobados por la OMS (incluido el DDT) sigue siendo una de las principales intervenciones para reducir e interrumpir la transmisión del paludismo a través del control del vector en todos los contextos epidemiológicos. En 2010, 73 países, 36 de ellos en la región africana, recomendaron la fumigación intradomiciliaria con insecticidas residuales para el control del paludismo, y 13 países dijeron utilizar para ello el DDT.

18. En 2010, la fumigación intradomiciliaria con insecticidas residuales protegió a un total de 185 millones de personas, que representan el 6% de la población mundial de riesgo. El número de personas protegidas por la fumigación intradomiciliaria en la región africana aumentó de los 10 millones en 2005 a los 78 millones en 2010. Si incluimos todos los países del África subsahariana, el número de personas protegidas fue de 81 millones, lo que corresponde al 11% de la población de riesgo. En otras regiones de la OMS el número de personas protegidas por la fumigación intradomiciliaria suele ser estable.

Resistencia a los insecticidas

19. El seguimiento de la resistencia a los insecticidas es un elemento necesario para cualquier intervención con insecticidas a mediana o gran escala. En 2010, 78 países comunicaron que efectuaban un seguimiento de la resistencia a los insecticidas.

20. Los métodos actuales de control del paludismo están muy vinculados a una sola clase de insecticidas, los piretroides, que son los utilizados para tratar las redes mosquiteras y representan aproximadamente el 77% de la fumigación intradomiciliaria en lo que se refiere al área cubierta. El uso generalizado de una sola clase de insecticida aumenta el riesgo de que los mosquitos desarrollen una resistencia al mismo. Dicho riesgo es especialmente preocupante en el África subsahariana, donde el control del vector con insecticidas ha alcanzado un grado de cobertura sin precedentes. Se ha registrado resistencia a los piretroides en 27 países del África subsahariana, pero se desconoce hasta qué punto esto reduce la eficacia del control del vector, algo que puede depender del mecanismo de resistencia identificado a escala local. Conforme a lo propuesto por la Asamblea Mundial de la Salud, la OMS colabora con una gran variedad de actores para desarrollar un plan mundial de gestión de la resistencia a los insecticidas en los vectores del paludismo, que se lanzará a principios de 2012.

Avances en quimioprevención

El porcentaje de mujeres embarazadas que recibieron dos dosis de tratamiento preventivo intermitente (TPI) durante el embarazo osciló entre el 4% y el 68%.

21. El tratamiento preventivo intermitente (TPI) se recomienda para los grupos de población que se encuentran en zonas de alta transmisión y son especialmente vulnerables a la infección por *Plasmodium* y a sus consecuencias, sobre todo mujeres embarazadas y niños. A finales de 2010, un total de 35 de los 45 países africanos subsaharianos habían adoptado el TPI para mujeres embarazadas como medida sanitaria de ámbito nacional. Papúa Nueva Guinea, de la región del Pacífico occidental, también adoptó esta medida en 2009.

22. En los 21 países africanos con elevada incidencia de paludismo que han adoptado el TPI para embarazadas como medida sanitaria de ámbito nacional, los datos recogidos por los programas nacionales de control del paludismo indican que el porcentaje de mujeres que acudieron a dispensarios prenatales

y recibieron la segunda dosis de TPI en 2010 fue del 55% (rango intercuartil: 47-61%).

23. En 13 países de la región africana sobre los que se cuenta con datos de encuestas domiciliarias para el período 2008-2010, el porcentaje de mujeres que recibieron dos dosis de TPI durante el embarazo osciló entre el 4% en Namibia y el 68% en Zambia; la media ponderada se mantuvo baja, en un 24%, debido principalmente a la baja cobertura en Nigeria y la República Democrática del Congo.

24. Todos los bebés con riesgo de infección por *P. falciparum* de los países del África subsahariana con moderada o alta transmisión de paludismo deben recibir 3 dosis de sulfadoxina-pirimetamina (SP), que tienen que administrar los servicios de vacunación a intervalos fijos, correspondientes a los calendarios de vacunación. Ningún país ha adoptado aún el TPI para los bebés como medida sanitaria de ámbito nacional desde que se recomendó en 2009.

Avances en el diagnóstico y el tratamiento del paludismo

El número de pruebas de diagnóstico rápido (PDR) y de terapias combinadas con artemisinina (TCA) administradas va en aumento y también ha crecido el porcentaje de casos sospechosos que han sido objeto de una prueba parasitológica, que han pasado del 67% en 2005 al 73% en 2009. Aún se registran muchos casos de tratamiento presuntivo, sin diagnóstico parasitológico.

Pruebas de diagnóstico

25. Antes de iniciar el tratamiento, se recomienda una pronta confirmación parasitológica por microscopía o PDR para todos los pacientes con sospecha de paludismo. En 2010, 37 de los 43 países de la región africana con paludismo endémico y 53 de los 63 países endémicos de otras regiones de la OMS comunicaron que habían adoptado medidas para aplicar el diagnóstico parasitológico a todos los grupos de edad, con un aumento de 4 países en la región africana desde 2009, y 8 en otras zonas.

26. El número de PDR suministradas por los fabricantes pasó de 45 millones en 2008 a 88 millones en 2010. Las pruebas de los productos han demostrado que con el tiempo ha mejorado su calidad, y que también con el tiempo ha aumentado en la misma proporción el número de pruebas de alta calidad; casi el 90% de las PDR adquiridas en 2011 obtuvieron porcentajes de detección de más del 75% en comparación con solo el 23% de las PDR adquiridas en 2007.

27. El porcentaje de casos presuntivos de paludismo a los que se aplica una prueba parasitológica ha aumentado entre 2005 y 2010, sobre todo en la región africana (del 26% al 45%), en la región del este del Mediterráneo (del 60% al 91%) y en la región del sudeste asiático–con la excepción de la India– (del 58% al 95%). En la mayoría de países africanos los índices siguen siendo bajos: en 21 de los 42 países que informaron sobre el tema, el porcentaje de casos sometidos a pruebas fue inferior al 20%.

28. Los datos de un número limitado de países apuntan que existe menor disponibilidad de microscopía y PDR en el sector privado que en el sector público. Un total de 48 países informan del despliegue de PDR a escala comunitaria. En 2010, en el marco de estos programas, las pruebas se administraron a 11 millones de pacientes.

Tratamiento

29. Los casos confirmados de paludismo por *P. falciparum* sin complicaciones se deben tratar con terapias combinadas con artemisinina (TCA). En 2011, 84 países y territorios adoptaron las TCA como tratamiento de primera elección para el paludismo por *P. falciparum*, lo que representa un aumento respecto a los 77 países en 2009. El paludismo por *P. vivax* se debe tratar con cloroquina allí donde dicho fármaco sea eficaz, o con una TCA adecuada en las zonas donde *P. vivax* sea resistente a la cloroquina. El tratamiento del paludismo por *P. vivax* debe combinarse con la administración de primaquina durante 14 días para prevenir una recaída.

30. El número de tratamientos a base de TCA adquiridos por el sector público aumentó considerablemente: pasó de 11,2 millones en 2005 a 76 millones en 2006, y llegó a 181 millones en 2010. Se calcula que en 2010 el sector privado compró un total de 35 millones de tratamientos. La demanda total de tratamientos a base deTCA alcanzará previsiblemente la cifra de 287 millones en 2011 –un aumento del 32% con respecto a 2010. El principal motivo de dicho aumento es el incremento de las ventas privadas subvencionadas a través del servicio de medicamentos asequibles para el paludismo (AMFm), que se han multiplicado por 10.

31. Encuestas domiciliarias llevadas a cabo entre 2008 y 2010 apuntan que los pacientes febriles que acuden a centros públicos de salud son más propensos a recibir una TCA que los que acuden a centros privados, pero esto puede cambiar en 2011 en los países que participan en el programa piloto del servicio de medicamentos asequibles para el paludismo (AMFm).

32. En 2010, el número de TCA distribuidas por los programas nacionales de control del paludismo en la región africana representó más del doble del total de pruebas (microscopía + PDR) llevadas a cabo ese año, lo que indica que muchos pacientes siguen recibiendo TCA sin pruebas de diagnóstico confirmatorias.

Resistencia a los medicamentos

33. La OMS recomienda que las monoterapias orales a base de artemisinina se retiren del mercado y se sustituyan por TCA. En noviembre de 2011, en 25 países se seguía permitiendo la comercialización de dichos productos (sin cambios desde 2010) y 28 compañías farmacéuticas los comercializaban (frente a las 39 de 2010). La mayoría de países que aún permiten la comercialización de monoterapias pertenecen a la región africana, en tanto que casi todos los fabricantes se encuentran en la India.

34. Los estudios de eficacia terapéutica, que siguen siendo el criterio de referencia para orientar la política farmacológica, deben llevarse a cabo por lo menos cada 2 años. Se han efectuado estudios de eficacia de tratamientos antipalúdicos de primera o segunda opción en 31 de los 75 países en los que se pueden hacer para *P. falciparum* (en 17 países los estudios de eficacia son poco viables debido a la baja incidencia del paludismo, y 15 países son endémicos solamente de *P. vivax*). Otros 12

países tenían previsto llevar a cabo estudios en 2010 o 2011. Los últimos estudios de eficacia realizados tuvieron lugar hace más de tres años en 32 países.

35. Se han descubierto indicios de resistencia a las artemisininas en cuatro países de la subregión del Gran Mekong: Camboya, Myanmar, Tailandia y Viet Nam. Los esfuerzos de contención han demostrado que es posible reducir la incidencia del paludismo, un componente clave del plan global de contención para detener la propagación de parásitos resistentes. Pese a los cambios observados en la sensibilidad de los parásitos a las artemisininas, la eficacia clínica y parasitológica de las TCA sigue siendo alta en la mayoría de contextos. No obstante, en la provincia de Pailin (Camboya) se han registrado elevados índices de fracaso del tratamiento con varias TCA, en especial la dihidroartemisinina-piperaquina, que es una de las TCA más nuevas. Ello pone de relieve que la vigilancia es necesaria para proteger la eficacia no solo de las artemisininas, sino también de los medicamentos asociados en las combinaciones de fármacos.

36. En 2011, la OMS publicó el *Plan mundial para la contención de la resistencia a la artemisinina*, que recomienda cinco actuaciones clave para gestionar con éxito la resistencia a la artemisinina: detener la propagación de parásitos resistentes, incrementar el control y la vigilancia para evaluar la amenaza de la resistencia a la artemisinina, mejorar el acceso a los diagnósticos y a un tratamiento racional a base de TCA, invertir en investigación sobre la resistencia a la artemisinina, así como motivar para la acción y movilizar recursos.

Impacto del control del paludismo

En un número creciente de países han descendido los casos confirmados de paludismo y/o ingresos y muertes desde el año 2000. Los esfuerzos para controlar la enfermedad a escala mundial se han traducido en la reducción de la incidencia del paludismo y los índices de mortalidad relacionados con éste.

37. En un total de 8 países y una zona de la región africana de la OMS, se registró un descenso superior al 50% en casos confirmados de paludismo o de ingresos y muertes en estos últimos años (Argelia, Botsuana, Cabo Verde, Namibia, Ruanda, Santo Tomé y Príncipe, Sudáfrica, Suazilandia, y Zanzíbar – República Unida de Tanzania). En Eritrea, Etiopía, Senegal y Zambia se registró una reducción del 25% al 50%. En todos los países, los descensos están relacionados con intervenciones intensas para el control del paludismo.

38. El aumentode casos de paludismo observados en Ruanda y en Santo Tomé y Príncipe en 2009 (dos países en los que anteriormente se habían registrado descensos) se revirtieron tras intensificar las medidas de control. Esto subraya la necesidad de diseñar sistemas que permitan vigilar con eficacia el paludismo y mantener con rigor los programas de control, aun cuando los casos se hayan reducido sustancialmente. Según la información disponible, el aumento de casos y muertes observados en Zambia en 2009 aún no se ha revertido.

39. En tanto que en países con sistemas de vigilancia eficaces se observa una disminución considerable del número de casos de paludismo, es mucho más difícil detectar esos cambios en países con sistemas de vigilancia más precarios, sobre todo en los países más poblados del África central y occidental. En los países en los que está creciendo el uso de la microscopía y las PDR el número de casos confirmados ha aumentado, lo que refleja cambios en las prácticas de diagnóstico y oculta las tendencias subyacentes en la incidencia del paludismo. Se requiere una investigación más detallada de las tendencias en los casos de paludismo y de las variaciones en las prácticas diagnósticas para obtener una imagen más precisa de los cambios reales en la incidencia de la enfermedad.

40. En otras regiones de la OMS, entre el año 2000 y 2010, el número de casos confirmados de paludismo disminuyó en más del 50% en 35 de los 53 países con transmisión continua, y en otros 4 países se observó una tendencia a la baja del 25% al 50%. En 2010, la región europea informó de solo 176 casos autóctonos. Los países con mayores porcentajes de incidencia siguen siendo los lugares donde ha bajado menos el número de casos, lo que indica que se debe prestar mayor atención a los países no africanos donde se producen más casos de paludismo.

41. Ocho países participaron en la etapa de pre-eliminación del paludismo en 2011 y nueve están aplicando programas de eliminación a escala nacional (ocho entraron en la fase de eliminación en 2008). En otros ocho países (Bahamas, Egipto, Georgia, Irak, Jamaica, Omán, la Federación de Rusia y la República Árabe Siria) se ha interrumpido la transmisión y se encuentran en la fase de prevención de la reintroducción. En 2011, la directora general de la OMS certificó que Armenia se encuentra libre de paludismo.

42. Se calcula que 3.300 millones de personas estaban en riesgo de contraer el paludismo en 2010. De ese total, 2.100 millones estaban en situación de bajo riesgo (<1 caso registrado por 1.000 habitantes), de los cuales el 94% vivía en zonas geográficas no pertenecientes a la región africana de la OMS. Los 1.200 millones de alto riesgo (>1 caso por cada 1.000 habitantes) vivían principalmente en la región africana (47%) y la del sudeste asiático de la OMS (37%).

43. Se calcula que en 2010 se registraron 216 millones de casos de paludismo, con un amplio intervalo de incertidumbre (centiles de 5 a 95) de 149 millones a 274 millones de casos. Aproximadamente el 81% – 174 millones (113-239 millones) – de casos se produjeron en la región africana, en tanto que el 13% correspondía al sudeste asiático.

44. Se calcula que en 2010 se registraron 655.000 (537.000-907.000) muertes por paludismo, el 91% de ellas (596.000, rango de 468.000-837.000) en la región africana. Aproximadamente el 86% de muertes por paludismo en todo el mundo fueron de niños menores de 5 años.

45. Entre el año 2000 y 2010, la incidencia estimada del paludismo ha descendido en un 17% a escala mundial. Se observan mayores reducciones en las regiones europea (99,5%), americana (60%) y del Pacífico Occidental (38%). Los índices de mortalidad por paludismo han disminuido en un 25% entre el año 2000 y 2010, con las mayores reducciones en las regiones europea (99%), americana (55%), del Pacífico Occidental (42%) y de África (33%).

46. Los cálculos sobre la incidencia del paludismo se basan, en parte, en el número de casos notificados por los programas nacionales de control del paludismo. Los informes de la mayoría de países distan de ser exhaustivos. En 2010, los programas nacionales de control del paludismo confirmaron un total de 24 millones de casos –el 11% de la incidencia estimada a escala mundial.

Chapter 1

Introduction

This report summarizes the current status of malaria in the world. It reviews progress towards internationally agreed targets and goals, describes trends in funding, and documents the increasing coverage of interventions and their impact. Data from 106 malaria-endemic countries and territories are analysed up to 2010, the year established by the international community to attain universal coverage of preventive and case management interventions for all populations at risk of malaria, and reduce the global malaria burden by 50% from the levels in 2000. Additionally, it includes country-specific information in the form of 99 country profiles for countries and territories with ongoing malaria transmission, complemented by 6 annexes, which provide detailed information about progress in global malaria control and elimination.

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, and it predominates in Africa. *P. vivax* is less dangerous but more widespread, and the other three species are found much less frequently. Malaria is transmitted to humans by the bite of infected female mosquitoes of more than 30 anopheline species. An estimated 3.3 billion people were at risk of malaria in 2010, although of all geographical regions, populations living in sub-Saharan Africa have the highest risk of acquiring malaria; in 2010 81% of cases and 91% of deaths are estimated to have occurred in the WHO African Region, with children under five years of age and pregnant women being most severely affected.

Malaria is an entirely preventable and treatable disease, provided that 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 keep independent score of global progress; (iii) to develop approaches for capacity building, systems strengthening and surveillance; and (iv) to identify threats to malaria control and elimination, as well as new opportunities for action.

The World Malaria Report sets out a critical analysis and interpretation of data provided by national malaria control programmes (NMCPs) in endemic countries. Standard reporting forms were sent in March 2011 to 99 countries and territories with ongoing malaria transmission (80 countries in the control phase, and 19 countries in the pre-elimination and elimination phases). 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 to GMP by month and by WHO Region.

TABLE 1.1

Percentage of reporting forms received by month and by WHO Region, 2011

WHO REGION	July	August	September	October	November	Total countries
African		84%	91%	91%	91%	43
Americas	48%	76%	81%	86%	90%	21
South-East Asia	33%	100%	100%	100%	100%	10
European	100%	100%	100%	100%	100%	6
Eastern Mediterranean	22%	89%	89%	89%	89%	9
Western Pacifc	80%	90%	100%	100%	100%	10
TOTAL	**30%**	**86%**	**91%**	**92%**	**93%**	**99**

Source: NMCP data.

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 was also received from ACT Watch on the proportion of treatment outlets that have diagnostic facilities and antimalarial medicines in stock, and on antimalarial prices and sales volumes. Information on malaria financing was obtained from the OECD database on foreign aid flows and directly from the Global Fund and the US President's Malaria Initiative (PMI).

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 ACT Watch, the African Leaders Malaria Alliance (ALMA), the Clinton Health Access Initiative (CHAI), the Institute of Health Metrics and Evaluation (IHME), Johns Hopkins University, US Centers for Disease Control and Prevention (CDC), the Global Fund, MEASURE / DHS, Tulane University, 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. They also include country examples to illustrate more general assessments within each chapter.

Chapter 2 summarizes internationally agreed goals for global malaria control and the policies and strategies recommended by WHO to achieve them. It then discusses the indicators recommended by WHO, and other agencies, for monitoring progress towards targets.

Chapter 3 reviews the resource requirements for meeting global malaria control targets and recent trends in international and domestic financing. It considers the scope for potential cost savings and the prospects of mobilizing increased funding for malaria control.

Chapter 4 considers the policies that national programmes have adopted for vector control implementation and the progress made towards universal access to ITNs and IRS. It also addresses the increasingly important issue 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 reports 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. It reviews the adoption of policies and implementation of programmes for improving access to effective treatment for malaria. The latest trends in drug resistance and efforts to contain artemisinin resistance on the Cambodia-Thailand border are also considered, as well as the progress made in withdrawing oral artemisinin-based monotherapies from the market.

Chapter 7 summarizes the trends in numbers of malaria cases and assesses the evidence that malaria control activities have had an impact on malaria disease burden in each WHO Region. It also provides an update on malaria elimination and on imported malaria, and concludes by presenting estimates of the number of cases and deaths by WHO Region and worldwide for the period 2000–2010.

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

During 2010 there were 99 countries and territories with ongoing malaria transmission and 7 countries in the prevention of reintroduction phase, making a total of 106 countries in which malaria is considered endemic. In July 2011, South Sudan became an independent state, increasing the number of countries and territories with ongoing transmission to 100 and total endemic countries and territories to 107. In October 2011, Armenia was certified free of malaria by WHO, reducing the number of malaria-endemic countries and territories to 106. As 2010 is the latest year for which most data are available, results for South Sudan and Sudan are reported as from a single country. However in the country profiles and annexes, data from high-transmission and low transmission areas are reported separately.

Chapter 2

Goals, targets, policies and strategies for malaria control and elimination

This chapter summarizes the internationally agreed goals for malaria control and the policies and strategies recommended by WHO to achieve them. It has four sections: (i) goals and targets; (ii) policies and strategies; (iii) malaria elimination; and (iv) indicators to track progress.

2.1 Goals and targets for malaria control and elimination

The year 2010 was an important milestone on the way to achievement of internationally agreed goals and targets for malaria control. It was the date set by the World Health Assembly in 2005 to ensure that at least 80% of those at risk of, or suffering from, malaria would benefit from major preventive and curative interventions, in order to reduce the malaria burden by at least 50% compared to the levels in 2000 (*1*). In 2008, the UN Secretary General set a more ambitious objective: to halt malaria deaths by ensuring universal coverage of malaria interventions by 2010. The aim was to make indoor residual spraying (IRS) and long-lasting insecticidal nets (LLINs) available to all people at risk of malaria, especially children and pregnant women in Africa, and for all public health facilities to be able to provide reliable diagnosis and effective treatment for malaria (*2*). Also in 2008, and aligned with these targets, the Global Malaria Action Plan (GMAP) was launched by the Roll Back Malaria Partnership (RBM) as a blueprint for the control, elimination and eventual eradication of malaria, setting as its objective the reduction of the number of preventable malaria deaths worldwide to near zero by 2015 (*3*).

In the light of progress made by 2010, RBM updated the GMAP targets in June 2011. Maintaining an overall vision of a "malaria-free world" (*4*), the targets are now to: (i) reduce global malaria deaths to near zero by end-2015[1], (ii) reduce global malaria cases by 75% from 2000 levels by end-2015, and (iii) eliminate malaria by end-2015 in 10 new countries since 2008, including in the WHO European Region (*5*) (**Table 2.1**). These targets will be met by: achieving and sustaining universal access to and utilization of preventive measures; achieving universal access to case management in the public and private sectors and in the community (including appropriate referral); and accelerating the development of surveillance systems.

Achievement of these objectives and targets are based on a number of critical assumptions:

- Sufficient and timely domestic and international funding is available to accomplish and sustain scale-up of the interventions needed to meet the objectives, targets and milestones.
- Scale-up of preventive measures and greater access to diagnostic testing and treatment through the public and private sectors and community case management, along with referral when needed, are sufficient to allow effective treatment of all cases of confirmed malaria.
- Political commitment to sustain malaria control interventions and high-quality surveillance – including the elimination of malaria where that is technically, operationally, and financially feasible – continues even as malaria cases and deaths decline significantly.
- Access to vulnerable populations and the safety and security of health workers are maintained to ensure surveillance, outbreak response, and delivery of diagnostic, treatment, and preventive interventions to populations in fragile and conflict-affected states.

Acknowledging that 'business as usual' will not be enough for achieving the agreed goals, the World Health Assembly in May 2011 urged Member States, WHO, and international partners to undertake a series of actions to sustain the gains that have been made in decreasing the burden of malaria and reducing transmission – among others, to take immediate action to combat resistance to artemisinin-based medicines and resistance to insecticides (*6*).

The deadline for achieving the RBM objective coincides with that of the Millennium Development Goals (MDGs). Malaria control forms part of MDG 6 – to have halted and begun to reverse the incidence of malaria and other major diseases by 2015. Given that malaria accounted for 8% of deaths in children under 5 years of age globally in 2008 and 16% of deaths in children under 5 in Africa (*7*), it is also central to MDG 4 – achieving a two-thirds reduction in the mortality rate among children under 5 years of age between 1990 and 2015. 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) (*8*).

1 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.

TABLE 2.1
Goals and targets for malaria control

Targets for 2005	Targets for 2010	Targets for 2015
	Reduce global malaria deaths from 2000 levels by 50% *(3)*	Reduce global malaria deaths to near zero *(5)*
	Reduce global malaria cases from 2000 levels by 50% *(3)*	Reduce global malaria deaths from 2000 levels by 75% *(1)*
		Reduce global malaria cases from 2000 levels by 75% *(1,5)*
		MDG 6: Have halted and begun to reverse the incidence of malaria and other major diseases *(8)*
At least 60% of those at risk of malaria particularly pregnant women and children under five years of age, benefit from the most suitable combination of personal and community protective measures *(9)* At least 60% of all pregnant women who are at risk of malaria, especially those in their first pregnancies, have access to chemoprophylaxis or presumptive intermittent treatment *(9)*	Achieve universal coverage for all populations at risk of malaria using locally appropriate interventions for prevention and case management *(3)* 80% of people at risk from malaria are protected, thanks to locally appropriate vector control methods such as insecticide-treated nets (ITNs), and, where appropriate, indoor residual spraying (IRS) and, in some settings, other environmental and biological measures *(1, 10)* At least 80% of pregnant women receive intermittent preventive treatment in areas where malaria transmission is stable *(1, 10)*	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 *(5)* 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 *(5)*
At least 60% of those suffering from malaria have prompt access to and are able to use correct, affordable and appropriate treatment within 24 hours of the onset of symptoms *(9)*	80% of malaria patients are diagnosed and treated with effective antimalarial medicines, e.g. artemisinin-based combination therapy (ACT) within one day of the onset of illness *(1, 10)*	Achieve universal access to case management in the public sector: By end 2013, 100% of suspected cases receive a malaria diagnostic test and 100% of confirmed cases receive treatment with appropriate and effective antimalarial drugs *(5)* Achieve universal access to case management, or appropriate referral, in the private sector: By end 2015, 100% of suspected cases receive a malaria diagnostic test and 100% of confirmed cases receive treatment with appropriate and effective antimalarial drugs *(5)* 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 *(5)*
		Accelerate development of surveillance systems: By end 2015, all districts are capable of reporting monthly numbers of suspected malaria cases, number of cases from all public health facilities, or a consistent sample of them *(5)*

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

The two most powerful and most broadly applied interventions are long-lasting insecticidal nets (LLINs) and indoor residual spraying (IRS). These interventions work by reducing human-vector contact and by reducing the lifespan of female 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). Personal protection operates by preventing contact between the mosquito and the person under the net. The wider effect occurs when the insecticide in the net actually kills the mosquitoes that touch it, therefore affecting the vector population and lowering the overall intensity of transmission in the targeted area. However, the protective effect of ITNs for people sleeping outside the net within the same household is less than for those sleeping under the net (*11*). Therefore, since 2007, WHO has recommended universal coverage with ITNs (preferably LLINs), rather than a pre-determined number per household.

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 (*12*). 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 (e.g. > 80%) in targeted communities are treated (*13*).

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 and district levels. As well as practical experience in the delivery of vector

BOX 2.1

New or updated plans, policies and guidelines in 2011

Global plan for artemisinin resistance containment. Geneva, World Health Organization, 2011. http://www.who.int/malaria/publications/atoz/artemisinin_resistance_containment_2011.pdf

Consideration of mass drug administration for the containment of artemisinin-resistant malaria in the Greater Mekong subregion: report of a consensus meeting, 27–28 September 2010, Geneva, Switzerland. Geneva, World Health Organization, 2011. http://whqlibdoc.who.int/publications/2011/9789241501644_eng.pdf

Good practices for selecting and procuring rapid diagnostic tests for malaria. Geneva, World Health Organization, 2011. http://whqlibdoc.who.int/publications/2011/9789241501125_eng.pdf

The technical basis for coordinated action against insecticide resistance: preserving the effectiveness of modern malaria vector control: meeting report. Geneva, World Health Organization, 2011. http://whqlibdoc.who.int/publications/2011/9789241501095_eng.pdf

The use of DDT in malaria vector control. WHO Position Statement. Geneva, World Health Organization, 2011. whqlibdoc.who.int/hq/2011/WHO_HTM_GMP_2011_eng.pdf

Universal access to malaria diagnostic testing: an operational manual. Geneva, World Health Organization, 2011. http://whqlibdoc.who.int/publications/2011/9789241502092_eng.pdf

Guidelines for monitoring the durability of long-lasting insecticidal mosquito nets under operational conditions. Geneva, World Health Organization, 2011. http://whqlibdoc.who.int/publications/2011/9789241501705_eng.pdf

WHO recommended long-lasting insecticidal mosquito nets. Geneva, WHO Pesticides Evaluation Scheme (WHOPES), World Health Organization, 2011. http://www.who.int/whopes/Long_lasting_insecticidal_nets_Jul_2011.pdf

Report of the fourteenth WHOPES working group meeting. Geneva, World Health Organization, 2011. http://whqlibdoc.who.int/publications/2011/9789241502160_eng.pdf

Global Fund proposal development: WHO Policy brief. Geneva, World Health Organization, 2011. www.who.int/malaria/publications/atoz/malaria_gf_proposal_dev_who_policy_brief_201106.pdf

Intermittent preventive treatment for infants using sulfadoxine-pyrimethamine (SP-IPTi) for malaria control in Africa: Implementation Field Guide. WHO Global Malaria Programme (GMP) and Department of Immunization, Vaccines and Biologicals (IVB) and UNICEF. Geneva, World Health Organization, 2011. http://whqlibdoc.who.int/hq/2011/WHO_IVB_11.07_eng.pdf

Methods and techniques for assessing exposure to antimalarial drugs in clinical field studies. Geneva, World Health Organization. 2011. *http://whqlibdoc.who.int/publications/2011/9789241502061_eng.pdf*

A system to improve Value for Money in LLIN procurement through market competition based on cost per year of effective coverage. Concept Note. Geneva, World Health Organization, 2011. http://www.who.int/malaria/publications/atoz/gmpllin_effective_coverage_concept_note.pdf

The role of larval source management for malaria control, with particular reference to Africa. Geneva, World Health Organization. *In press*

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.

WHO recommendations for 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, ITNs should be made available to all people at risk, i.e. "universal access" (*14*). 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 one LLIN should be distributed for every two persons. At the household level, the distribution of one LLIN for every two 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 "one LLIN for every two people" at household level requires an overall ratio, for procurement purposes, of 1 LLIN for every 1.8 people in the target population (*13*).
2. LLINs should be provided either free of charge or be highly subsidized. Cost should not be a barrier to making them available to all people at risk of malaria, especially those at greatest risk such as young children and pregnant women (*14*).
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 means 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. In malaria-risk areas, ensuring that these routine systems have the sustained LLINs stocks needed to provide an LLIN to all pregnant women receiving antenatal care, and to all infants receiving routine immunization, should be given as much priority as repeated campaigns (*14*).

4. In order to be protected, households 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 (*14*).

5. Only LLINs recommended by the WHO Pesticide Evaluation Scheme (WHOPES) should be procured by national malaria control programmes and partners for malaria control. At present there are 12 recommended products (*15*, *16*, *17*). 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 (*18*). Independent quality control of products (including insecticides) should be undertaken before shipment, to ensure that sub-standard products are not delivered to countries. The supplier of pesticide should bear the cost of analysis, including for samples to be sent to an accredited or recognized laboratory for analysis for countries that do not have national quality control laboratories (*19*).

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 non-governmental organizations) should make efforts to monitor LLIN durability in the local setting, using standard methods published in 2011 (*20*). 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 (*21*).

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 both the equipment and the quality of application must be scrupulously maintained.

8. Currently 12 insecticides belonging to 4 chemical classes are recommended by WHOPES for IRS (*22*). 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 WHO guidelines and recommendations are followed and until locally appropriate, cost-effective alternatives are available for a sustainable transition from DDT (*23*).

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 source control including environmental management. However, larval control is appropriate and advisable only in a minority of settings, where mosquito breeding sites are few, fixed, 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 (*13*). Currently 8 compounds and formulations for mosquito larval control are recommended by WHOPES for Larval Source Management (LSM). In Africa, larviciding interventions are most likely to be appropriate in urban settings, and are unlikely to be cost-effective in most rural settings (*24*).

2.2.2 Insecticide resistance

11. 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 epidemiological 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, without waiting for signs of the presence of resistance or of control failure.

- A substantial intensification of resistance monitoring is needed, using both bioasssay (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 national malaria control programme within three 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.

12. Currently, there is heavy reliance on pyrethroids for malaria vector control especially in the form of LLINs. The preservation of pyrethroid susceptibility in target vector populations is therefore an overwhelming 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 an LLIN in the same room; this combination is therefore recommended as a means of insecticide resistance management (*25*). Second, there is observational 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 (*26*). Such evidence, is limited and collection of data from a wide variety of settings is needed. 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.

WHO is currently developing a *Global Plan for Insecticide Resistance Management in malaria vectors* (GPIRM) through extensive consultation with a wide variety of stakeholders; it will be released in early 2012.

2.2.3 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 reduce the frequency and duration of malaria infection during pregnancy and its negative impact on the fetus; and
- to curtail the transmission of malaria by reducing the human parasite reservoir.

The 2nd edition of the WHO *Guidelines for the treatment of malaria* was published in March 2010 (*27*). The current WHO recommendations for diagnosis and treatment are as follows:

1. Prompt parasitological confirmation by 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.[1] 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, in whom another diagnosis must be sought and treated accordingly;
   - avoidance of antimalarial medicine use in parasite-negative patients, thereby reducing side effects, drug interactions and selection pressure for drug resistance, and potentially resulting in financial savings;
   - better public trust in the efficacy of artemisinin-based combination therapy (ACT) when it is used only to treat confirmed malaria cases; and
   - better public trust in diagnosis and treatment of non-malaria causes of febrile illness.
2. Uncomplicated *P. falciparum* malaria should be treated with an ACT. In addition to an ACT, a single dose of primaquine is recommended for treatment of *P. falciparum* malaria as an anti-gametocyte medicine (particularly as a component of a pre-elimination or an elimination programme), subject to consideration of the risks of haemolysis in patients with glucose-6-dehydrogenase (G6PD) deficiency.
3. *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 treatment of *P.vivax* malaria in order to prevent relapses, subject to consideration of the risk of haemolysis in patients with G6PD deficiency.
4. The 5 ACTs currently recommended for use 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 efficacy of the combination in the country or area of intended use.
5. Artemisinin and its derivatives should not be used as oral monotherapies for the treatment of uncomplicated malaria as poor adherence to the required 7 days of treatment results in partial clearance of malaria parasites which will promote resistance to this critically important class of antimalarials.
6. Severe malaria should be treated with a parenteral 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 treatment. Options available for pre-referral treatment are: artesunate (rectal), quinine (IM), artesunate (IM) or artemether (IM).
7. 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. The introduction of parasitological testing of malaria allows the identification of non-malaria febrile illnesses, which also need appropriate care, notably pneumonia and other causes of childhood mortality. The successful implementation of community case management therefore requires diagnosis and treatment for other frequent causes of febrile disease. This new strategy is termed integrated community case management (iCCM) of childhood illness.

2.2.4 Intermittent preventive treatment

Intermittent preventive treatment 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 the recipients are parasitaemic, with the objective of reducing the malaria burden in the target population.

1. *Intermittent preventive treatment in pregnancy (IPTp):* All pregnant women at risk of *P. falciparum* infection in countries in sub-Saharan Africa with stable malaria transmission, should receive at least 2 doses of sulfadoxine-pyrimethamine (SP), given at the first and second scheduled antenatal care visits (at least one month apart) after "quickening" (the first noted movement of the fetus). The doses of SP should be taken under direct observation during the antenatal visits (*28*).
2. *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 DTP2, DTP3 and measles immunization through the routine immunization programme (*29*, *30*).

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

2.2.5 Resistance to antimalarial drugs

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.

Therapeutic drug efficacy studies allow measurement of the clinical and parasitological efficacy of medicines and the detection of subtle changes in treatment outcome when monitored consistently over time. Therapeutic drug efficacy studies are considered the gold standard for determining antimalarial drug efficacy, and their results are the primary data used by national malaria control programmes to revise the 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.

BOX 2.2
The *Global Plan for Artemisinin Resistance Containment* (GPARC)

The *Global Plan for Artemisinin Resistance Containment* (GPARC) was released in January 2011, in response to the emergence of artemisinin resistance in the Greater Mekong subregion. The goal of the GPARC is to protect ACTs as an effective treatment for *P. falciparum* malaria by defining priorities for the containment and prevention of artemisinin resistance. 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 sentinel sites every 24 months in order to detect changes in their therapeutic efficacy (*31*).
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; and removal from the market of oral artemisinin-based monotherapies as well as substandard and counterfeit antimalarial medicines.
4. **Invest in artemisinin resistance-related research.** Research is important to improve understanding of resistance and the ability to manage it. Priority should be given to research in five disciplines should be a priority: 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.

The GPARC defines three tiers based on the evidence of artemisinin resistance. Each endemic country should evaluate its level of risk and apply the GPARC recommendations accordingly.

Tier 1: Areas with credible evidence of artemisinin resistance. The recommended response for tier 1 areas is a combination of intensified malaria control and tools for elimination including: parasitological diagnosis for all patients with suspected malaria; a full course of quality-assured ACTs plus primaquine for confirmed cases; vector control to lower transmission and minimize the spread of resistant parasites; and launch of specific activities to contain or eliminate resistant parasites such as intensified monitoring of therapeutic efficacy near current foci to track the spread of artemisinin resistance; enforcement to eliminate use of oral artemisinin-based monotherapies and substandard and counterfeit antimalarial medicines; programmes to reach mobile and migrant populations with adequate prevention, diagnosis and treatment; and epidemiological or transmission-reduction tools.

Tier 2: Areas with significant inflow of mobile and migrant populations from tier 1 areas or shared borders with tier 1 areas. As in tier 1 areas, the recommendations largely mirror those for malaria control. The specific recommendations for tier 2 areas are: intensify and accelerate malaria control activities; implement specific measures to manage the potential spread of resistant parasites from tier 1 areas, including programmes to reach mobile and migrant populations; launch of activities specific for the prevention of resistance, in particular intensified monitoring of therapeutic efficacy to track the spread of artemisinin resistance; and education and enforcement to eliminate the use of oral artemisinin-based monotherapies and substandard and counterfeit antimalarial medicines.

Tier 3: *P. falciparum* endemic areas which have no evidence of artemisinin resistance and have limited contact with tier 1 areas. In tier 3, the main objective is to prevent the emergence of artemisinin resistance in implementation and scale-up of effective control measures, including: increasing access to parasitological diagnosis; improving access to quality-assured ACTs for confirmed cases; increasing coverage with vector control to limit malaria transmission; monitoring the therapeutic efficacy of first- and second-line treatments every 24 months; introducing or enforcing actions to eliminate the use of oral artemisinin-based monotherapies or poor-quality drugs.

For more details see
http://www.who.int/malaria/publications/atoz/artemisinin_resistance_containment_2011.pdf

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 (*31*). WHO has also developed a guideline on genotyping malaria parasites to distinguish between reinfection and recrudescence, which is necessary as part of the therapeutic efficacy testing (*32*). The following recommendations are drawn from the 2009 edition of *Methods for surveillance of antimalarial drug efficacy* (*31*).

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 (defined as the sum of the patients presenting with early treatment failure, late clinical failure or late parasitological failure) rate 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 (*27*).

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 (*33*) and on methods for assessing exposure to antimalarial drugs (*34*).

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 (*35*). Resistance to artemisinins has been confirmed in the Greater Mekong subregion. Neither the mechanism of artemisinin resistance, nor a molecular marker to screen for it, has yet been identified. The 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)[1].

Following the confirmation of artemisinin resistance, the *Global Plan for Artemisinin Resistance* (GPARC) was developed *(35)*, outlining the necessary actions to contain and prevent resistance to artemisinins (see **Box 2.2**).

2.3 Malaria elimination

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: (*36, 37*)

1. In areas of high, stable transmission, where a marked reduction in malaria transmission has been achieved (as may be indicated by slide positivity rates of less than 5%[2]), a 'consolidation period' should be introduced, in which (i) control interventions are sustained, even in the face of limited disease; (ii) health services adapt to the new clinical and epidemiological situation with a lower case load and reduced levels of immunity; and (iii) surveillance systems are strengthened to allow rapid response to new cases. This transformation phase precedes a decision to re-orient programmes towards elimination.
2. Countries with low, unstable transmission (as may be indicated by less than 1 case per 1000 population per year should be encouraged to proceed to malaria elimination, with falciparum elimination preceding vivax elimination where these species co-exist. 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 to certify that they are malaria-free.

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

2 These milestones should be adjusted for each country and situation, keeping in mind the resources available for notification, investigation and follow-up of malaria cases.

4. Failure to sustain malaria control will result in a resurgence of malaria, as has happened in the past, and must be avoided. Therefore, public and government commitment to intensified malaria control and elimination needs to be sustained, even when the malaria burden has been greatly reduced.

5. Because malaria control today relies heavily on a limited number of tools, in particular artemisinin derivatives and pyrethroids, which could potentially become less effective because of resistance, the development of new tools is a necessary priority, particularly for vector control and other preventive measures, diagnostic testing, treatment and surveillance.

BOX 2.3
Definitions (*37*)

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

Malaria elimination: the interruption of local mosquito-borne malaria transmission; 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 elimination: the official recognition 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. Intervention measures are no longer needed once eradication has been achieved.

2.4 Indicators

The UN Inter-agency and Expert Group on MDG Indicators has established the following indicators for malaria (*8*):

6.6 Incidence and death rates associated with malaria

6.7 Proportion of children under 5 years sleeping under insecticide-treated bednets

6.8 Proportion of children under 5 years with fever who are treated with appropriate antimalarial medicines.

As policies and strategies for malaria control have evolved over the last decade, standard indicators have been adapted to reflect the latest recommendations. For example, indicator 6.7 has been expanded to consider also the proportion of the population of all age groups that sleep under ITNs (*38*). Similarly, indicator 6.8 does not reflect current policy recommendations to provide a parasitological test for all fever cases.

Table 2.2 summarizes 28 indicators recommended by WHO for use by national malaria programmes to measure coverage with malaria control interventions (ITNs, IRS, IPTp, diagnosis and treatment) and their epidemiological impact. The selection of indicators draws upon: the Abuja Declaration in 2000 (*9*), the resolution of the World Health Assembly in 2005 (*1*), the RBM *Global Malaria Action Plan* (*3*), the work of the RBM Monitoring and Evaluation Reference Group (MERG) (*39*)[1],previous editions of the *World Malaria Report* (*38*, *40*, *41*) and guidelines on *Universal Access to Malaria Diagnostic Testing* (*42*). Of the 28 indicators, 17 are derived from routine information systems and would typically be available for monitoring on a monthly basis. Not all indicators are applicable to every epidemiological setting and individual programmes would use only a sub-set of the 17 routine indicators. The remaining 10 indicators are derived from household surveys and, while these would not normally be available every year for every country, they provide complementary information for programme assessment.

The *major changes* from the indicator list in the *World Malaria Report 2010* are: (i) the addition of an indicator on *the proportion of households with at least one ITN for every two people;* (ii) the case management indicator of the proportion of malaria cases receiving appropriate treatment is modified to focus solely on cases with a positive test result, so that the indicator is now *the proportion of confirmed malaria cases receiving first-line antimalarial treatment;* (iii) the addition of an indicator, *the proportion of all antimalarial medicines that are recommended as first-line therapies.*

2.5 Policy development

In 2011 the WHO Global Malaria Programme embarked on a review and re-design of its policy-setting process so that it is more responsive to a rapidly evolving malaria landscape. The result is the establishment of the Malaria Policy Advisory Committee (MPAC), which will provide independent advice to WHO regarding policy recommendations to control and eliminate malaria (*43*).

The MPAC will advise WHO specifically on: 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; engagement of WHO in malaria-related initiatives; major issues and challenges for achieving global malaria goals; and the identification of priority activities to address identified challenges. The MPAC is scheduled to become operative during the first quarter of 2012.

1 Updated guidelines on indicators from household surveys are being developed by RBM MERG and are due to be issued in 2012.

TABLE 2.2

Malaria indicators, targets and sources of data

Trends in malaria cases and deaths

Impact measure	Indicator	Numerator	Denominator	Break-down	Data source	Target
Malaria cases						
	1.1 Confirmed malaria cases (microscopy or RDT) per 1000 persons per year [a]	Confirmed malaria cases per year x 1000	Population	All ages, < 5, male, female, PCD, ACD	Routine surveillance system or HMIS	Reduction of cases per 1000 of ≥ 50% by 2010, and ≥ 75% by 2015 in comparison with 2000
	1.2 Inpatient malaria cases per 1000 persons per year [b]	No. of inpatient malaria cases per year x 1000	Population	All ages, < 5, male, female	Routine surveillance system or HMIS	
	In low transmission / elimination settings:					
	1.3 Number of active foci reported per year	Number of active foci reported per year	None	None	Routine surveillance system	
	1.4 Number of cases by classification	Number of cases by classification	None	Local (introduced, indigenous, relapsing), imported, induced	Routine surveillance system	
Malaria transmission						
	1.5 Malaria test positivity rate	No. of laboratory-confirmed malaria cases	No of suspected malaria cases with parasite-based test	Microscopy, RDT, P.*f*, P.*v*, PCD, ACD	Routine surveillance system or HMIS	No target set. Indicates level of control [c]
	In high-transmission areas:					
	1.6 Proportion of children aged 6-59 months with evidence of malaria infection	*Number of children aged 6-59 months with malaria infection detected by microscopy or RDT*	*Total number of children aged 6-59 months tested for malaria parasites by microscopy or RDT*		*Household survey*	
Malaria deaths						
	1.7 Inpatient malaria deaths per 1000 persons per year	No. of inpatient malaria deaths per year (< 5 years or total) x 1000	Population	All ages, < 5, male, female, pregnant women	Routine surveillance system or HMIS	Reduction in deaths per 1000 of ≥ 50% by 2010, and ≥ 75% by 2015 in comparison with 2000 [d]
	1.8 Malaria-specific deaths per 1000 persons per year	*No. of malaria deaths per year x 1000*	*Population*	*All ages, < 5, male, female, pregnant women*	*Verbal autopsy (surveys), complete or sample vital registration systems*	*Reduction in deaths per 1000 of ≥ 50% by 2010, and ≥ 75% by 2015 in comparison with 2000* [d]
	In high-transmission areas:					
	1.9 All-cause under 5 mortality rate (5q0)	*No. of deaths in children < 5 years from all causes x 1000*	*Number of live births*		*Household surveys, complete or sample vital registration systems*	*No specific malaria target set*

Coverage with interventions

Control strategy	Indicator	Numerator	Denominator	Break-down	Data source	Target
Vector control						
	2.1 Proportion of population at risk potentially covered by nets distributed [e]	No. of persons with ITN from no. of ITNs distributed [e]	No. of persons at risk of malaria		Routine data on commodities distributed	≥ 80%
	2.2 Proportion of targeted risk group receiving ITN	No. of ITNs distributed to risk groups	No. of persons in risk groups targeted for receiving ITN	Pregnant women attending antenatal clinics, children attending immunization clinics, migrant workers	Routine data on commodities distributed	≥ 80%
	2.3 Proportion of households with at least one ITN	Number of households surveyed with at least one ITN	Total number of households surveyed		Household survey	
	2.4 Proportion of households with at least one ITN for every two people	Number of households surveyed with at least one ITN for every two people	Total number of households surveyed		Household survey	
	2.5 Proportion of individuals with access to an ITN in a household [f]	Number of individuals with access to an ITN in a household [f]	Total number of individuals who slept in surveyed households the previous night		Household survey	
	2.6 Proportion of individuals who slept under an ITN the previous night	Number of individuals who slept under an ITN the previous night	Total number of individuals who slept in surveyed households the previous night	All ages, < 5, pregnant women	Household survey	≥ 80%
	2.7 Percentage of population at risk protected by IRS	No. of persons protected by IRS	No. of persons at risk for malaria		Routine data from national malaria control programme	No target set. Indicates contribution of IRS to overall malaria control
	2.8 Households sprayed with insecticide among those targeted	No. of households sprayed in 1 year according to national guidelines	No. of households targeted according to national guidelines		Routine data from national malaria control programme	100%
	2.9 Proportion of households with at least one ITN and/or sprayed by IRS in the last 12 months.	*Number of households that have at least one ITN and/or have been sprayed by IRS in the last 12 months.*	*Total number of households surveyed*		*Household survey*	
Diagnosis and treatment						
	2.10 Percentage of all suspected malaria cases that receive parasitiological test [g]	No. of all suspected malaria cases that receive parasitological test [g]	No. of all suspected malaria cases		Routine surveillance system or HMIS	≥ 90%
	2.11 Proportion of children under 5 years old with fever in the last 2 weeks who had a finger or heel stick	*Number of children under 5 years old who had a fever in the previous 2 weeks who had a finger/heel stick*	*Total number of children under 5 years old who had a fever in the previous 2 weeks*		*Household survey*	
	2.12 Percentage of confirmed malaria cases receiving first-line antimalarial treatment according to national policy [h]	No. of confirmed malaria cases receiving first-line antimalarial treatment at health facility [h]	No. of confirmed malaria cases at health facility [h]	P.f, P.v.	Routine surveillance system, HMIS or special studies	100%
	2.13 Proportion of first-line treatments among children under five years old with fever in the last two weeks who received any antimalarial medicines [i]	*Number of children under five years old with fever in the last two weeks receiving recommended first-line treatment* [i]	*Number of children under five years old with fever in the last two weeks receiving antimalarial medicine* [i]	*P.f, P.v.*	*Household survey*	*100%*
	In high-transmission areas:					
	2.14 Pregnant women who received two doses of intermittent preventive therapy	No. of pregnant women who received two doses of intermittent preventive therapy	No. of pregnant women who made at least one antenatal care visit in 1 year		Routine data from HMIS	≥ 80%
	2.15 Proportion of women who received intermittent preventive treatment for malaria during ANC visits during their last pregnancy	*Number of women who received two or more doses of a recommended antimalarial drug treatment during ANC visits to prevent malaria during their last pregnancy that led to a live birth within the last 2 years*	*Total number of women surveyed who delivered a live baby within the last 2 years*		*Household survey*	≥ 80%

Management systems

System	Indicator	Numerator	Denominator	Break-down	Data source	Target
Supplies						
	3.1 Proportion of health facilities without stock-outs of key commodities by month	Number of health facilities without stock-outs of key commodities by month	No. of health facilities	ACTs, RDTs, ITNs	Routine reporting system or HMIS	100%
Reporting						
	3.2 Annual blood examination rate	No. of all suspected malaria cases that receive parasitological test	Population	ACD, PCD	Routine surveillance system or HMIS	
	3.3 Completeness of monthly health facility reports [j]	No. of health facility reports received each month [j]	No. of health facility reports expected each month	Commodities distributed, stock-outs, outpatient cases, inpatient cases	Routine surveillance system or HMIS	> 90%
	In low transmission / elimination settings:					
	3.4 Proportion of private facilities reporting to national malaria surveillance system [k]	Number of private facilities in areas at risk for malaria reporting to national malaria surveillance system [k]	Number of private facilities in areas at risk for malaria		Routine surveillance system	

From references *36-42*. Indicators derived from household surveys are in italics.

RDT, rapid diagnostic test; MDG, Millennium Development Goal; ITN, insecticide-treated net; IRS, indoor residual spraying; ACD active case detection; PCD passive case detection

a Use only if > 90% of suspected cases have examination for parasites (microscopy or RDT).

b Marker for severe malaria.

c Malaria test positivity rate < 5% during the malaria season is considered as an indicator of readiness for transition from control stage to pre-elimination stage.

d An updated RBM target was adopted in 2011: "near zero malaria deaths" by 2015. This target is more ambitious than the target of 75% reduction in malaria deaths by 2015.

e This indicator is estimated from the number of LLINs or ITNs distributed by ministries of health and partners. LLINs are assumed to protect for 3 years and conventional ITNs or retreated nets for 1 year. A single net is assumed to protect two persons. Hence the number of people potentially covered is the 2 * (number of LLINs delivered in last three years + number of conventional ITNs and retreatments delivered in last year). This indicator measures distribution and not hanging or use.

f This indicator is estimated from the number of ITNs available in each household. Each net is assumed to protect two persons. Thus a household with 5 residents will require 3 ITNs.

g Parasitological tests include microscopy and RDT.

h Per WHO recommendations all suspected cases should be given a diagnostic test and only treated with an antimalarial if they test positive for *Plasmodium.*

i Comments h apply to indicator 2.12 also. The intention is to treat all persons with an appropriate antimalarial medicine; however, children are at greatest risk, especially in areas of high transmission and many household surveys do not ask about antimalarial treatment over age 5 years. In areas of low transmission, it is recognized that this indicator may be less useful.

j This indicator can vary depending on data collection forms and reporting channels. For example, the inpatient data channel may be separate from the outpatient data channel, or the commodities and disease surveillance data channels may be combined.

k Facilities should report even if they have zero cases.

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Table 2.1

Chapter 3

Financing malaria control

This chapter reviews (i) recent trends in international and domestic financing in relation to global malaria control and elimination targets, (ii) how funds have been spent on the different interventions, (iii) the scope for cost savings, and (iv) prospects for mobilizing additional resources.

3.1 Resource requirements

Global resource requirements for malaria control were estimated in the 2008 Global Malaria Action Plan to exceed US$ 5 billion per year between 2010 and 2015 and US$ 4.75 billion between 2020 and 2025 *(1)*[1]. The reduced amounts in the later years are primarily due to a projected reduction in the need for diagnostic testing and treatment as malaria becomes better controlled, as has been observed in several low transmission countries over the past decade. However, it is possible that future needs for diagnostic testing will not be reduced substantially in the near term; in countries that currently have high rates of malaria transmission, fever cases may still require parasitological testing even if malaria has been well controlled, for as long as there is a continuing risk of malaria transmission.

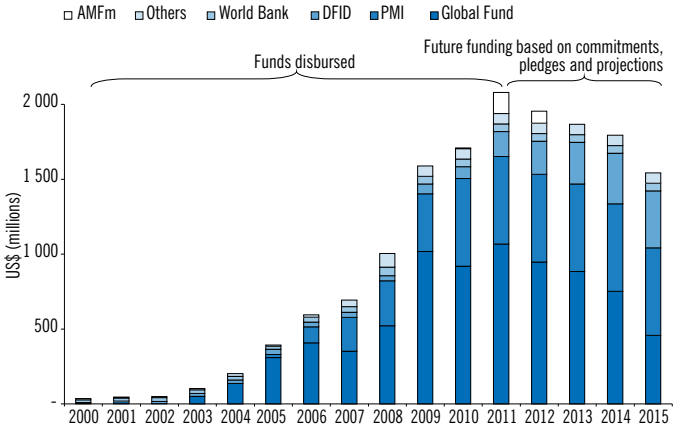
3.2 International financing of malaria control

International disbursements to malaria-endemic countries have increased vastly over the past decade but appear to have peaked in 2011, at US$ 2 billion (**Fig.3.1**). The Global Fund remains the single largest source of funding for malaria control globally, with a peak in disbursements over 2009–2011, reflecting the larger Round 8 and Round 9 Global Fund grants approved in 2008 and 2009, respectively. DFID, PMI, the World Bank and other donors accounted for 49% of total disbursed funding in the year 2010. PMI contributions rose from US$ 385 million in 2009 to US$ 585 million in 2010.

With the exception of the Global Fund, information on disbursements is not available for years after 2010. To assess trends in the funds available for malaria control between 2011 and 2015, it is necessary to examine formal commitments made by funding agencies or, if data are not available, to examine pledges or to make projections regarding the funds that could be available according to information on financing trends (see **Box 3.1** for a description of the difference between pledges, commitments, disbursements and expenditures).

For the Global Fund, actual disbursements are shown up to October 2011; disbursements expected in the following years are estimated from the remaining resources in existing grants, including approved Round 10 proposals, allocated to the remainder of 2011 and 2012 and future years according to the number of days remaining in grants. On 22 November 2011 the Global Fund announced that the Round 11 of grant applications would be cancelled owing to lower than expected revenues (*3*). The next opportunity for countries to apply for new grants will be for 2014 onwards, but the amounts available are not yet known. A transitional funding mechanism has been established to ensure continuity of services for grants that end before 2014. Savings from phase 2 renewals will also be sought. In particular, Group of 20 (G-20) upper middle income countries with less than an extreme disease burden will no longer be eligible for renewals of grants[2].

Figure 3.1 Past and projected international funding for malaria control



Source: Global Fund: Actual disbursements to October 2011, then resources remaining in existing grants, with 20% efficiency savings, allocated to the remainder of 2011 and future years according to the number of days remaining in grants. PMI: appropriation for 2012 onwards set to 2011 levels. DFID: Average of amounts in country operational plans (lower case scenario) and total of US$ 500,000 in 2015 excluding Global Fund and other contributions (upper case scenario). World Bank and others: funding beyond 2009 assumed to remain at 2009 levels. AMFm: Actual disbursements in 2011 up to September then remaining resources allocated to 2011 and 2012 according to the rate of spending to date. Note that the graph excludes funding of AMFm beyond 2012 and possible new round of Global Fund in 2014, owing to uncertainty over future resourcing of these mechanisms.

1 Kiszewski et al (*2*) estimated that between US$ 3.5 billion and US$ 5.6 billion would be required per year between 2006 and 2015, but used a slightly different basis for calculation, e.g. not budgeting for the use of RDTs in children under five years of age in Africa.

2 Brazil had already announced at the 21st RBM board meeting that it would decline to accept funds for Phase 2 of its Round 8 malaria grant.

Future PMI funding is assumed to be held at 2011 levels of US$ 620 million. United Kingdom direct bilateral funding available to endemic countries for malaria control is projected to increase from US$ 66 million in 2009 to US$ 260 million in 2015[1] (*4*). For the World Bank together with other agencies, future funding is assumed to remain at 2009 levels, the latest year for which data are available, at US$ 51 million. AMFm disbursements in 2011 up to September totalled US$ 105 million; the remainder of the initial AMFm budget of US$ 216 million has been allocated to 2011 and 2012 according to the rate of spending to date. Future AMFm funding is uncertain and has been excluded from the graph.

This analysis suggests that international funding for malaria control will reach its highest ever levels in 2011 at US$ 2 billion, of which the Global Fund accounts for approximately 50%. Funding will then remain relatively stable until 2013 largely as a result of increased financing from DFID. However, without further rounds from the Global Fund, it will decrease to US$ 1.5 billion in 2015. Such analysis is relatively optimistic, since in the absence of firm information, it does not project decreases in funding from PMI, World Bank or other sources. As well as reduced amounts of funding, the nature of malaria financing could change as the bilateral programmes of DFID and PMI dominate funding for malaria control in 2015. Such bilateral support is concentrated in the highest burden countries in Africa. Countries outside Africa may find it increasingly difficult to attract international funding for malaria control.

1 This excludes support to the Global Fund and UNITAID and indirect funding for malaria through direct budget and sector support and maternal, newborn and child health programme support.

3.3 Domestic financing of malaria control

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

A total of 68 countries submitted data on domestic government and international malaria expenditures for 2010. **Figure 3.2** shows a breakdown of malaria expenditures per person at risk for countries in each WHO Region which submitted more complete data. While data are only shown for 18 of the countries, they illustrate that total spending per person at risk for malaria varies from just a few cents per person at risk to more than US$ 10. Total spending per person at risk is higher in countries approaching elimination, while contributions from domestic governments appear to be relatively small in countries with high malaria transmission, generally less than US$ 1 per person at risk. Only in countries with relatively low malaria transmission are domestic government malaria expenditures more than international expenditure. While it is not yet possible to ascertain total global domestic government malaria spending from the data available, it seems likely to be substantially less than that of international spending, which was less than US$ 2 billion in 2010 (**Fig. 3.1**). Consequently, total funds available for malaria control fall short of the US$ 5 billion identified in the Global Malaria Action Plan as being necessary for effective malaria control.

BOX 3.1
Types of financial information and sources of data

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. A commitment should normally be formalized in writing and backed by sufficient funds. Commitments indicate the level of priority given to malaria control but the amounts of money finally disbursed or spent may differ from the amount committed because disbursements or expenditures can be reduced if problems arise during programme implementation.

Information on commitments was obtained from several sources. The Global Fund provides information on grant awards and funds committed on its web site.[1] The US President's Malaria Initiative (PMI) and the United Kingdom Department for International Development (DFID) provide information on commitments in their country operational plans.[2,3] Information on commitments made by other donor organizations was obtained from the Organisation for Economic Co-operation and Development (OECD) which maintains a database on foreign aid flows.[4] The OECD database only provides information until 2009, hence commitments by the organizations represented (principally the World Bank, the governments of Japan, and UNICEF) were assumed to remain at 2009 levels in 2010 and 2011.

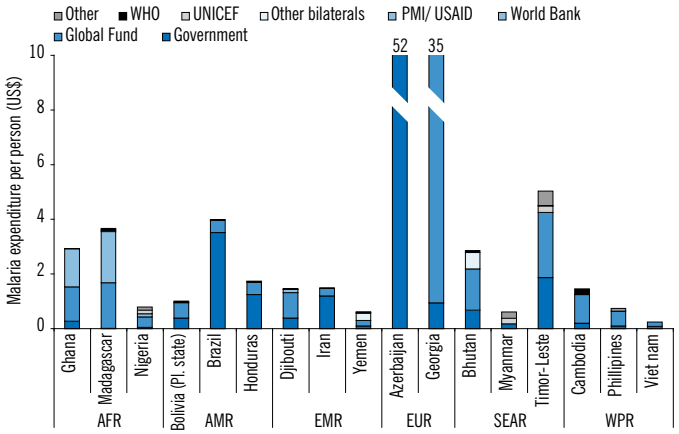
Disbursement: A disbursement is the transfer of funds which places resources at the disposal of a government or other implementing agencies. The Global Fund[1] produces reports detailing disbursements for specific grants up to 2010. Information on disbursements from other sources was obtained from the OECD database, which contains information for the years 2004–2009. Because data for 2010 were not available, levels of disbursement in 2010 were assumed to be equal to those in 2009.

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

Information on disbursements often lags behind information on commitments by one year or more and information on expenditures may be delayed for longer. This is because of the time required to transfer money (often in instalments) or make expenditures as well as the need to report after transactions have been completed. Also auditing is often required before official release of expenditure data. Information on disbursements provides a more accurate picture of the amount of money going into malaria control than information on commitments and it is typically more complete than expenditures.

[1] http://www.theglobalfund.org/en/commitmentsdisbursements/
[2] http://www.pmi.gov/countries/mops/index.html
[3] http://www.dfid.gov.uk/What-we-do/Publications/?p=O
[4] http://stats.oecd.org/qwids/

Figure 3.2 Malaria expenditure per person at risk by source of funding



Source: NMCP data

3.4 Categories of expenditure by source of funds

Figure 3.3 shows how funding from different sources is spent. The proportion of national government spending on different activities was calculated from the 42 reports with a breakdown of government expenditures for 2010 submitted by NMCPs to WHO, with each country weighted equally (rather than by total expenditures). Information on Global Fund expenditures was obtained from the fund's enhanced financial reporting system for 2010. Information on planned PMI expenditures was obtained from country operational plans for 2011.

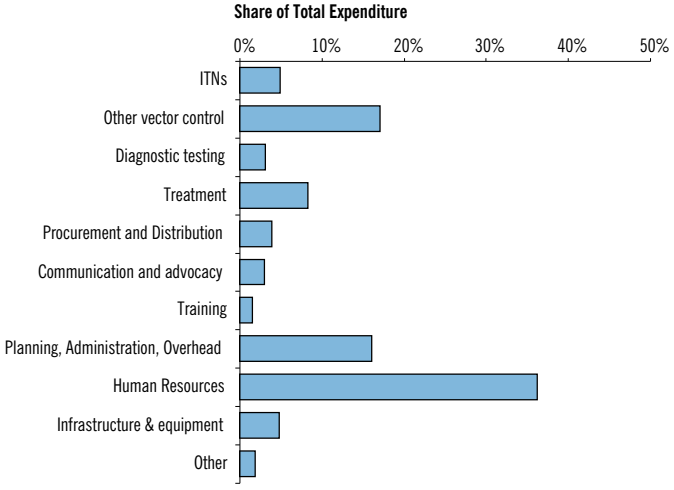
National government expenditure for malaria is generally focused on human resources (36%), IRS (17%) and programme management (16%), although this varies by WHO Region, with proportionally more spent on human resources in the American and South-East Asian Regions (72% and 74% respectively) compared to 22% in the African Region. The majority of Global Fund resources are used for ITNs (43%), antimalarial treatment (21%), programme management (12%) and diagnostic testing (3%). PMI funds are allocated primarily for ITNs (35%), IRS (25%), treatment (20%) and diagnostic testing (7%).

3.5 Potential Savings

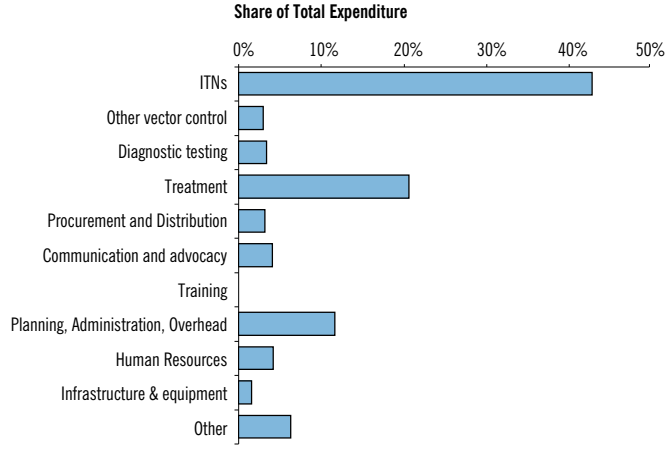
The fact that current funding for malaria programmes falls short of the amount required to achieve universal access to malaria interventions implies that funding needs to be increased from existing levels and/or that malaria control programmes should seek cost savings so that more can be done with existing funds. Larger cost savings are likely to be achieved by focusing on elements that account for the largest proportion of expenditures in malaria control programmes, i.e. ITNs, IRS, diagnosis and treatment. This section draws on findings of the Results for Development Institute's LLIN Market Dynamics Project and work by the Clinton Health Access Initiative (CHAI) on value for money in malaria programming(5).

Figure 3.3 Use of funds from different sources

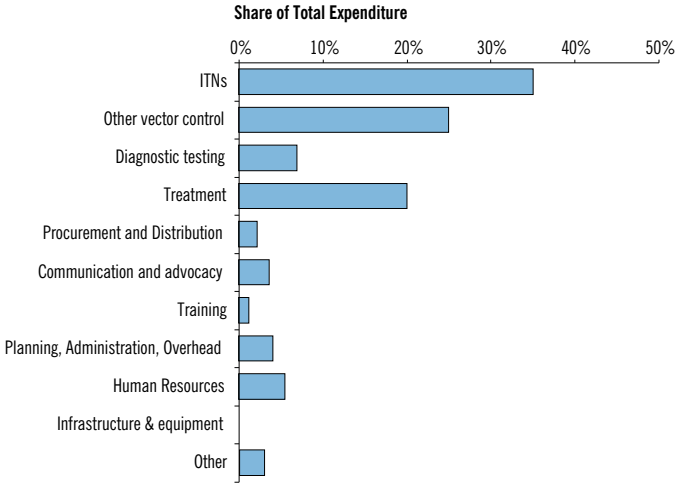
a) Government 2010



b) The Global Fund 2010



c) PMI Operational Plans 2011

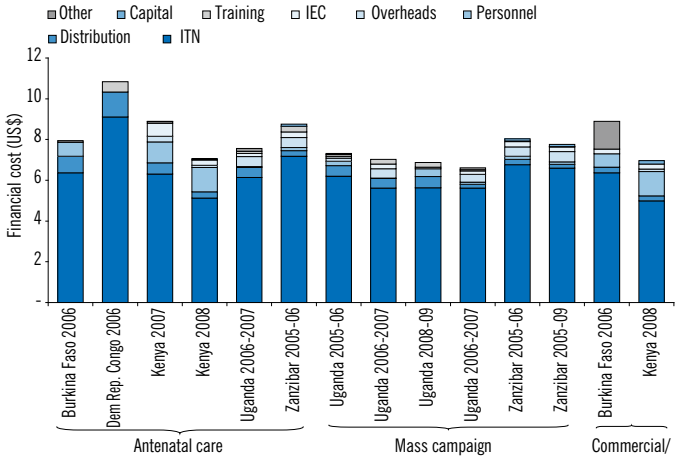


Source: NMCP data, GF enhanced financial reporting system, PMI operational plans.

3.5.1 Vector control

ITN prices: ITNs, or more specifically LLINs, account for the largest share of most malaria programme expenditures. The median cost of delivering a LLIN in studies conducted since 2005 was US$ 7.66 (range US$ 6.61–US$ 10.84). Most of the cost (70%–85%) is accounted for by the cost of the LLIN, including shipping and insurance costs (**Fig.3.4**).

Figure 3.4 Breakdown of costs to deliver an LLIN



Source: Financial costs of delivering an LLIN derived from (6) Burkina Faso, (7) Democratic Republic of the Congo, (8) Kenya, (9, 10) Uganda and (11) Zanzibar, United Republic of Tanzania.

Historical LLIN pricing data from the Global Fund's Price and Quality Reporting[1] (PQR) database shows a downward pricing trend since 2007. The average price of the most widely procured 180x190x150cm net, which accounted for 47% of purchases in 2009–2010, fell by 22% between 2007 and 2010, and by an additional 9% in the first half of 2011(**Fig.3.5**).

This decreasing price trend is likely to be due to a combination of several factors: a dramatic increase in LLIN purchases, from 17 million in Africa in 2007 to 145 million in 2010; increased market competition, with the number of WHOPES-recommended suppliers increasing from three in 2007 to ten in 2011; and most recently, excess production capacity after the scale-up in 2010 to meet universal coverage targets. The most recent decreases may or may not be maintained if manufacturers cut manufacturing capacity.

Analysis conducted by CHAI suggests that the savings achievable by accessing lower prices in the market are modest, because large purchasers are already obtaining the lowest prices. If all countries were able to access the lowest price reported to the PQR database for the net types that they purchased, total expenditure would fall by only 11%. However, value for money depends not only on the cost of nets, and it may be more cost effective to pay more for a more durable net that is likely to last longer in the field, or for a type of net that may be more popular with the local population, and therefore increase net usage.

ITN delivery costs: Distribution costs, which include warehousing and transportation, typically comprise approximately 5%–10% of the total cost of delivery (**Fig.3.4**). A review has suggested that mass campaigns have the lowest median cost per net delivered, with continuous distribution through routine health services slightly behind, and continuous retail and community-based strategies being 50%–100% more expensive (*12*). While the cost of delivering an ITN may be modest for the two most commonly used strategies (through mass campaigns or health services) the strategy chosen to identify recipients may offer an opportunity for savings. Some programmes deliver a fixed number of ITNs per household in a mass campaign, such as two nets per household, rather than providing them according to the number of people in the household. Such a strategy could not only fail to provide sufficient ITNs to all of the population at risk, but would provide more nets than needed for households of only one or two people and lead to significant wastage if the extra nets were not shared with neighbours who have insufficient nets (**Fig.3.6**). In a country the size of Nigeria the number of excess ITNs delivered to households with just one or two residents would be more than 10 million nets costing at least US$ 60 million.

ITN coverage begins to fall even in the first year after a campaign as a result of loss, damage, and population growth, so that regular top-ups are necessary (*12*). Mass campaigns to replace nets at regular intervals would be wasteful, as older but still effective nets would be replaced. ITNs can be delivered through antenatal and immunization clinics, but some households without a birth in a year would not be covered, while it is also possible that ITNs would be supplied to families which had already received an ITN through other channels (e.g. an ITN supplied at both antenatal and immunization clinics). Ideally, nets would be replaced continuously as they wear out, but a practical strategy for identifying the need for replacement nets at the household level has not been fully developed, and administrative costs may be high. There is an urgent need to devise ways of efficiently targeting households in need of nets.

Spatial targeting of ITNs: Malaria transmission is heterogeneous, particularly outside Africa, and cost savings might be achieved by focusing vector control only on areas above a specific threshold of transmission intensity[2]. However, evidence suggests that the levels of vector control coverage required to suppress malaria in low transmission areas are lower than in high transmission areas (*13*). While it is possible that some populations in areas of very low transmission may not derive substantial benefits from ITNs (*14*), precise knowledge of the levels of risk and the required levels of coverage for effective control in different epidemiological settings is lacking, and suspending vector control or aiming for partial coverage targets could put some populations at heightened risk of malaria. Hence, the scope for cost savings by better spatial targeting currently appears to be limited. More knowledge is needed on the extent to which universal coverage of vector control measures is required in areas of very low transmission, and where they could be replaced by intensified case detection and response.

Increasing the lifespan of ITNs: Although manufacturers state that nets may last for more than three years, in practice net lifespan varies widely (*15, 16*). With ITNs that last three years, approximately 1.25 billion ITNs will be required to ensure that all people at risk of malaria in Africa have access to an ITN between 2011 and 2020, whereas only 750 million ITNs would be required for ITNs that last five years. If the unit cost of delivering both types of ITNs were similar, at US$ 7.66 (as described above, **Fig.3.4**), US$ 3.8 billion could be saved from a total ITN financing requirement of US$ 9.6 billion. However, the savings would depend on the strategy for replacing nets. Moreover, the distribution of net life is as important as the average value, because net distribution mechanisms must replace nets that fail before the end of the average net lifespan and, ideally, avoid replacing nets that last longer than expected. Additionally, with

1 http://www.theglobalfund.org/en/procurement/pqr/

2 At present there is little evidence that substantial vector control resources are spent on areas with no malaria risk.

increasing concerns about pyrethroid resistance, caution is needed regarding the implications of more durable nets. It will be important to consider whether a more durable net should also have resistance-breaking or resistance management insecticidal properties.

WHO has developed guidelines on measuring ITN durability, and has recommended that procurement decisions should be based on the cost per year of protection, not simply on the cost per net (*16, 17*). While retrospective data on existing nets is being gathered, the guidelines emphasize the importance of prospective data gathering on ITN durability in order to establish whether the LLIN product procured by a country for large-scale distribution is indeed the best for that particular local setting, and should be purchased again, or whether a different product would give better value for money in the next round of procurement. Prospective data gathering involves comparing up to six different products, including the one or more products that are already in large-scale use in that setting, together with some selected alternatives (e.g. some of those that were not selected in the last tender). The median lifespan of each product (i.e. the time at which 50% had been lost) could then be divided into the quoted offer price for each product in a tender, to produce an estimate of the cost-per-year of effective coverage. In this way, price can be considered in the tender process as 'per year of expected coverage' rather than 'per net', while the other tender criteria (such as delivery conditions) can retain their respective weightings relative to price.

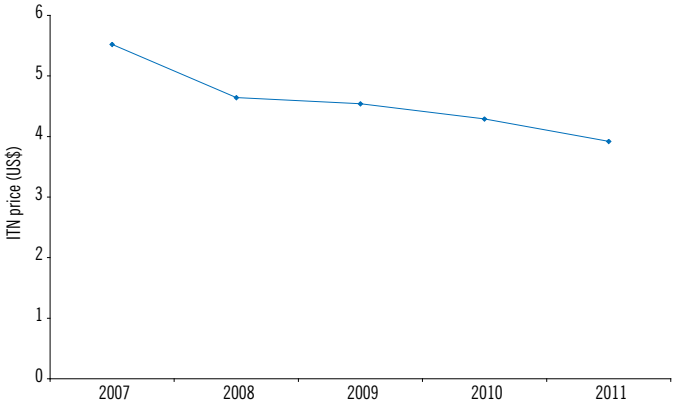
Once protocols for measuring the life of nets are implemented in the field, and the results considered in tenders, manufacturers will have strong incentives to develop better, longer-lasting nets. Extension of the lifespan of nets would not only reduce commodity costs but also the frequency of redistribution campaigns and expenditures associated with ITN delivery.

IRS expenditure: Expenditure on IRS comprises a significant share of malaria control programme expenditures, particularly those of ministries of health and the PMI (**Fig.3.3**). Analysis of PMI programme costs indicated that the cost per person protected by IRS per year varies by programme size (*18*): those protecting 1 million people or more were less costly (median US$ 2.62 per person protected) than those that protect fewer than 1 million (median US$ 5.52 per person protected) (**Fig.3.7**). Costs in large programmes also decreased over time by about 25% as they matured. Evidently IRS may have to be undertaken on a considerable scale for the lowest costs to be achieved.

To reduce the risk of insecticide resistance emerging, IRS programmes should use several different insecticides, either in annual rotation or as a mosaic, and avoid using pyrethroids where LLIN coverage is high. Where pyrethroids were the predominant class of insecticide, insecticides comprised only 13%–18% of total costs in large IRS programmes, and 7%–10% in small programmes (*18*), the difference due to proportionally higher staff and other costs in small programmes. Given that carbamates cost roughly five times more than pyrethroids, these proportions suggest that spraying costs would increase by 50%–70% in large programmes and 30%–40% in small programmes if pyrethroids were replaced by carbamates in a cycle (or to US$ 4.0–4.5 per person protected in large programmes compared to US$ 7.0–7.7 in small programmes). While IRS is undoubtedly effective, and there is scope for reducing the cost per person protected by expanding programmes, the cost per person protected per year is greater than that for ITNs (which is approximately US$ 1.39[1] assuming ITNs are used at 96% of capacity (see section 4.1.3, **Fig.4.5**)).

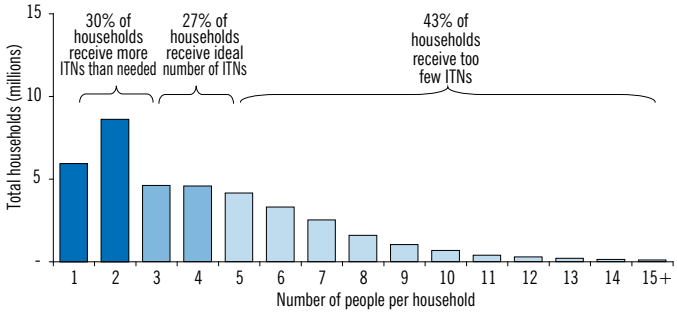
1 The cost of delivering an LLIN which lasts three years and covers an average of 1.8 people is US$ 7.66.

Figure 3.5 Weighted average unit price for 190x180x150 LLINs (US$)



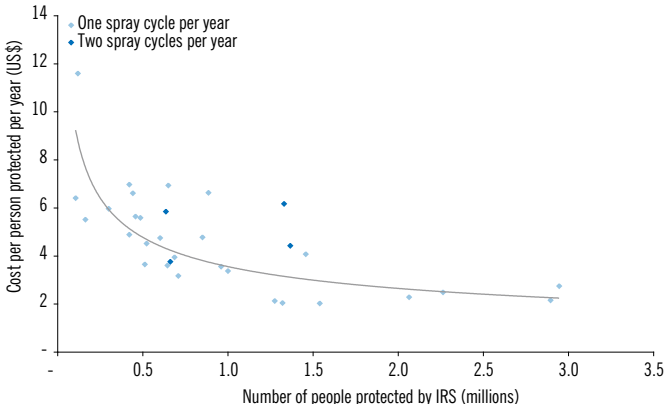
Source: Global Fund PQR database accessed Nov 2011. Includes only entries with 'Shipping reported separately'. Prices for 2011 are up to June.

Figure 3.6 Effect of delivering two ITNs per household in a mass campaign



Source: Population distribution as documented in Nigeria DHS 2008.

Figure 3.7 Cost per person protected by IRS per year in relation to programme size



Source: An economic analysis of the costs of indoor residual spraying in 12 PMI countries, 2008–2010 (18).

3.5.2 Diagnostic testing and treatment

Diagnostic testing and treatment is the largest category of expenditure after vector control. In countries with high levels of transmission, suspected malaria cases can comprise up to 50% of outpatient visits and all should receive a diagnostic test; in the absence of availability of malaria diagnostic testing, such patients are generally treated presumptively with antimalarial medicines.

Rapid diagnostic tests: According to 2010 PQR data, the weighted average price for *P. falciparum*-specific RDTs was US$ 0.51 (range: US$ 0.42–0.88) and US$ 0.69 (US$ 0.58–1.05) for multi-species tests. The weighted average prices for both types of tests fell by 11%–15% annually from 2008 to 2010.

The scope for cost savings by improving procurement is limited. If all countries purchasing *P. falciparum* or multi-species tests had been able to access the lowest price recorded in the PQR in 2010, they would have collectively saved approximately 15%. However, because of differences between competitors' tests, there are costs involved in switching from one product to another (e.g. re-training, new job aids, increased supervision). Even if countries had continued to purchase the same products, but with access to the lowest prices for each (for instance, through effective pooled procurement), they could have saved only 11%.

Little is known about the cost structure of RDTs for malaria. With the exception of monoclonal antibodies for detecting malaria-specific antigens, all of the components are readily available commodities, suggesting that there may be limited scope for reducing costs. In round 3 of product quality testing, undertaken by WHO, FIND, CDC, and TDR in 2010, 23 suppliers submitted 50 products for test quality assessments (*19*) suggesting that the market is relatively competitive, although in practice five manufacturers dominate actual sales. As the drive towards universal diagnostic testing accelerates, expenditures on RDTs will increase and the potential for cost savings will need to be kept under continual review. Excessive focus on RDT prices could jeopardize product quality. However, RDTs that score highest in quality testing also appear to be among the least expensive, perhaps because their popularity enables the manufacturers to achieve economies of scale (see **Fig.5.3**).

Decreases in the cost of RDTs may require new technologies, but research expenditure on diagnostic testing lags far behind that of ACTs, representing only 4.5% of total malaria research and development funding, compared to 31% for drugs (amounting to US$ 12 million in 2009) (*20*). The impact of reducing RDT costs could be considerable: even if RDTs were used for only half of the fever cases attending public health facilities in the WHO African Region, reducing their cost from US$ 0.50 to US$ 0.25 would save over US$ 45 million annually. Cheaper diagnostics would also encourage their use in the private sector, and thereby promote more rational use of subsidized ACTs.

Artemisinin-based combination therapy: Two artemisinin combinations dominate the market today, artemether-lumefantrine (AL) and artesunate-amodiaquine (AS-AQ). The public sector accounts for the largest share of orders for prequalified ACTs, and in 2011 the price offers of adult treatment packs of AL ranged between US$ 1.30 and US$ 1.40, while for adult treatment courses of AS-AQ the price was US$ 0.78 for a co-blister pack and US$ 0.94 for a fixed-dose combination. Despite its higher cost, AL accounted for two thirds of ACTs procured by the public sector in 2010 (**Fig.6.10 page 42**).

From 2007 to 2009 five additional ACT manufacturers met the WHO prequalification standards and the growing demand for ACTs in 2010 was met by increased production capacity. Higher sales volumes, increasing competition and lower artemisinin price have led to a progressive reduction of ACT prices. However, the tight supply of artemisinin in 2011 and its marked price increase this year is likely to have an impact on ACT prices in 2012: total sales were approximately 180 million treatment courses in 2010 but global ACT demand is forecast to reach 300 million treatment courses in 2012 (**Fig.6.12 page 44**). The demand for ACTs could potentially decrease in the future if diagnostic testing for malaria becomes more widely available.

Increasing parasitological testing: Expenditure on antimalarial treatment currently greatly exceeds that on diagnostic testing: the Global Fund spent US$ 630 million on treatment in 2010 compared to US$ 130 million on diagnostic testing.[1] In addition to regular Global Fund grant disbursements, US$ 216 million were committed to subsidize ACTs as part of AMFm Phase 1 implementation, which started in the second half of 2010.[2] The PMI allocated US$ 104 million for malaria treatment in 2011compared to US$ 37 million for diagnostics.[3]

Expenditures on malaria diagnostic tests are expected to increase and expenditures on malaria medicines to decrease as parasitological testing is extended to all suspected cases of malaria. RDTs are currently the most practical tool for expanding testing in health facilities that are unable to offer malaria microscopy. The extent to which cost savings on malaria commodities will be achieved by expanding parasitological diagnosis will depend on the relative cost of RDTs and ACTs and the endemicity of malaria as measured by the test positivity rate. With current prices of RDTs and ACTs (US$ 0.50 for RDT and US$ 1.40 for AL), and perfect compliance with test results, savings on commodities can be expected if test positivity rates are less than 64% (**Fig.3.8**). Test positivity rates lower than 60% are observed in the vast majority of African countries and in all countries elsewhere. It is estimated that approximately 183 million fever cases are seen annually at public health facilities in the WHO African Region;[4] this would give rise to a commodity cost of US$ 256 million if all cases were treated presumptively with AL, but only US$ 188 million if all cases had a parasitological diagnosis and were only treated with AL if positive, a saving of US$ 68 million. Further savings would be made if the cost of RDTs decreases relative to that of ACTs. However, savings will be less if health workers continue to provide antimalarial medicines to patients who have negative test results.

1 Global Fund enhanced financial reporting system
2 The Global Fund To Fight AIDS, Tuberculosis and Malaria (2011). AMFm Frequently Asked Questions. Updated: July 2011.
3 PMI operational plans for fiscal year 2011. http://www.pmi.gov/countries/mops/index.html
4 Of the estimated 174 million malaria cases in WHO African Region (Section 7.11), 40% are estimated to attend public health facilities, according to the treatment-seeking behaviour for fever observed in household surveys. The number of fever cases is estimated from the test positivity rates observed in each country.

This type of analysis does not take into account increased staff costs (if the time required to perform tests implies that more staff will be hired or that staff time will be taken away from other activities), the costs of establishing a quality control system for testing, the cost of alternative therapies in the event of a negative test, as well as the start-up costs of training staff, revising protocols and supervision which will be important in ensuring that health workers comply with test results. If these costs are taken into account, the expansion of RDTs may not lead to overall cost savings. However, any additional costs need to be balanced against the improved quality of care provided to patients, the expected enhanced health outcomes, and the reduction in the risk of emergence and spread of antimalarial drug resistance.

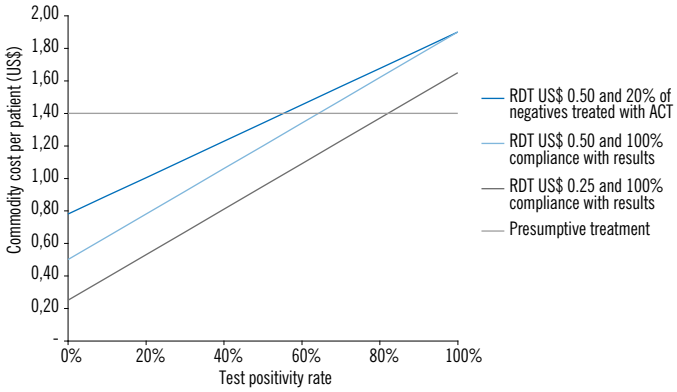
The impact of improved malaria control: Improved malaria control should result in lower numbers of malaria cases. Randomized controlled trials indicate that high coverage with ITNs reduces the incidence of malaria by 50% in a variety of settings (22). Therefore, the number of malaria cases can be expected to decrease to 119 million per year in the African Region if universal coverage with either ITNs or IRS is achieved by 2015, compared to 197 million cases if current rates of coverage are maintained (or respectively 48 million and 79 million attending public sector facilities) (**Fig.3.9**).[1]

Potential cost savings on antimalarial medicines will not be fully realized as long as antimalarial drugs are given as presumptive treatment to all patients with fever. With a policy of universal parasitological testing, the reduction in cases due to universal vector control coverage would result in total commodity cost savings of US$ 110 million compared to zero ITN coverage, or US$ 59 million compared to current ITN coverage levels. With a policy of presumptive treatment of all fever cases in the public sector the corresponding savings accrued through improved vector control would be US$ 81 million and US$ 44 million (**Fig.3.10**). On this basis, the additional costs for enhanced vector control would be compensated in part by the reduced diagnostic testing and treatment commodity costs; the amounts saved would be sufficient to purchase and deliver 7.8 million additional ITNs, providing 42 million person-years of protection.

There may be economic benefits beyond commodity costs, and which may fully justify investments in malaria control. For example, in Rwanda it has been estimated that while it would cost US$ 265 million to sustain the malaria control programme over the next five years, the public health system could avert about US$ 267 million in the costs of diagnosing and treating malaria; and households could avert about US$ 547 million in direct and indirect costs, equivalent to about 7% of household income (25). Much of the health-care savings would not result in cash savings since they relate to health worker time and the cost of infrastructure and equipment, but these could be applied to other medical conditions.

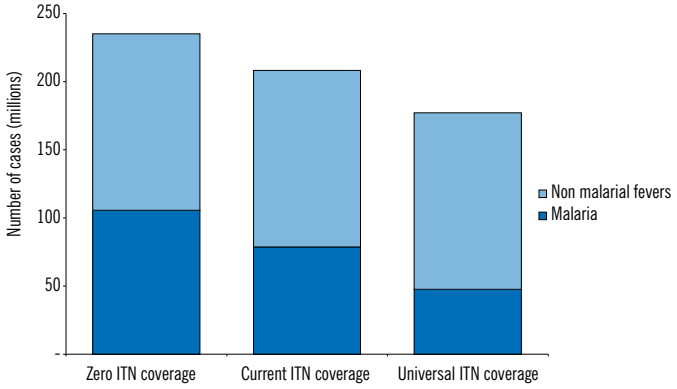
1 The current number of cases would be expected to increase in line with population growth if intervention coverage remained unchanged. Non-malarial fevers would also increase in line with population growth irrespective of changes in intervention coverage.

Figure 3.8 Cost of commodities for treating suspected malaria patients: test and treat versus presumptive treatment



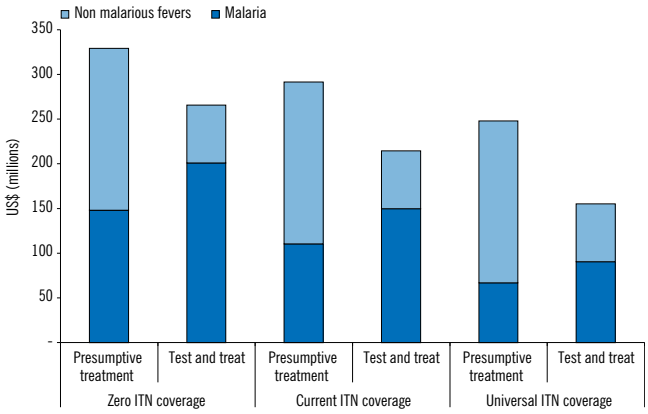
Source: WHO model

Figure 3.9 Estimated number of fever cases seen at public health facilities in Africa in 2015 according to different levels of ITN coverage



Source: WHO model for estimating number of malaria cases in sub-Saharan Africa (23, 24)

Figure 3.10 Commodity cost of treating cases presumptively, or with a policy of test and treat, with different levels of ITN coverage



Source: WHO model for estimating number of malaria cases in sub-Saharan Africa (23, 24). The cost of treating malaria cases presumptively includes the cost of ACTs only, while the cost of treating malaria with a policy of universal parasitological testing includes the cost of ACTs and RDTs. The cost of treating non-malarial fevers presumptively includes only the cost of ACTs, and with a policy of universal parasitological testing only the cost of RDTs.

3.6 Potential for increased funds for malaria control

International financing: Malaria programmes accounted for approximately 8% of Official Development Assistance (ODA) for health and population in 2009, increasing from 3% in 2005 (**Fig 3.11**). Overall financing for health and population remained stable between 2008 and 2009; while data for 2010 and 2011 are not yet available, there is little indication that the total funding amount will have increased. Given that malaria programmes account for such a significant proportion of health and population financing, and that total funding will probably remain stable, further increases in malaria funding may be unlikely unless a robust case can be made for investment in malaria control relative to other spending priorities.

It is not yet clear how the economic benefits of malaria control compare with other investments in the health and other sectors. However, malaria control may have wide economic benefits which would warrant its consideration alongside investment projects in other sectors and provide access to a broader range of funding. While total ODA disbursements across all sectors have not increased substantially since 2008, they amounted to US$ 147 billion in 2010.[1] Approximately US$ 49.3 billion has been pledged for the 16th International Development Association (IDA[2]) replenishment for the period July 2011–June 2014. IDA funds are traditionally used for infrastructure projects – if just 1% of these funds were made available for malaria control, approximately US$ 160 million could be raised over and above the World Bank's commitments to the Malaria Booster Program.

Domestic financing: Global economic growth since 2000 has led to increased domestic government revenues and spending in malaria-endemic countries (**Fig 3.12**). Total domestic government spending exceeded US$ 1000 per capita in 43 malaria-endemic countries in 2010, compared to 24 in 2000.[3]

While there are many demands on domestic government financing, if a modest proportion of 1%[4] of domestic spending were dedicated to malaria, this could raise more than US$ 1.39 per capita in 75 of the 99 countries with ongoing malaria transmission, the amount required to provide one person each year with access to an ITN.

Several countries have experienced particularly rapid growth in recent years, yet still benefit from international financial support for malaria control. A total of 28 malaria-endemic countries increased spending per capita by more than US$ 1000 between 2000 and 2010, and 5 more will have done so by 2015. These countries also tend to have relatively low malaria endemicity. If countries with a per capita domestic spending of more than US$ 1500 were to relinquish international assistance from the Global Fund for malaria control, a further US$ 80 million could be released for use in lower-income countries. At the 21st RBM board meeting in November 2011, Brazil announced that it would not accept funds for Phase 2 of the Round 8 malaria grant, even though it has successfully completed Phase 1.

Innovative financing mechanisms: A number of innovative financing schemes have been proposed, most of which are in the early stages of development. One option that has already been implemented is to impose taxes on selected financial transactions: the amounts are small enough to have a negligible effect on transaction frequency but generate sufficient funds for malaria control or other health projects for their collection to be worthwhile. For example, under UNITAID, a levy of between US$ 1.20 and US$ 6 is charged on each economy international flight (and more for business and first class). As of September 2011, nine countries were implementing the airline tax: Cameroon, Chile, Republic of Congo, France, Madagascar, Mali, Mauritius, Niger, and Republic of Korea.[5] In 2010 the tax generated approximately US$ 210 million (*26*). The amount generated in countries without well developed tourist industries is modest (e.g. Mali raised US$ 402,000) suggesting that such a tax, if extended to all malaria-endemic countries, would not generally provide sufficient funds for significant malaria programme expansion, but could nevertheless provide an important source of revenue domestically for programme maintenance. Extension of the tax to markets in which airline traffic is prominent and growing could potentially raise significant additional funds – for example, the top three airlines alone carried more than 150 million passengers in China in 2010.[6]

Other specific taxes may also generate significant revenues locally. Such schemes include a tourist tax, perhaps levied on international arrivals. In Zanzibar, the United Republic of Tanzania, it has been estimated that a tourist tax of US$ 5–10 levied on international arrivals may finance 10%–20% of the annual operating costs of the malaria control programme (*25*). Senegal is considering creating a solidarity fund which will support the purchase of a range of public health commodities, raising revenue from taxes on products potentially harmful to health (e.g. cigarettes), community health insurance schemes and private sector contributions. In addition, ways to involve the private sector to support malaria control efforts are being considered, either through tax breaks or direct support to the programmes in districts or areas where companies operate.

A tax on bonds and derivatives transactions could also raise significant resources for health development. At low rates, ranging from 0.0001% to 0.2% per transaction, such a tax could generate 12 billion euros annually in a country such as France, and 265 billion across all G20 countries (*27*). Such a financial transaction tax would be unlikely to have a significant impact on the domestic financial markets of the countries which implement it. However, various uses of such tax revenues have been proposed apart from malaria control or other health and development initiatives, not least to insure against defaults in loan repayments.

Different types of malaria bond have been proposed in order to encourage greater involvement of private sector investors. One such bond would aim to raise money for malaria control from private investors and provide them with a return according to the degree of success of a malaria control programme.[7] Ultimately the bond would be repaid by an international donor or domestic government. The advantage of involving the private sector in making an up-front investment is that the risk of programme failure is shared by the

1 Data on disbursements across all sectors are available up to 2010 but a breakdown by sector only to 2009.

2 World Bank financing for malaria is usually provided as a credit from IDA, which is an interest-free loan, with repayments starting after 10 years and maturing at 35 or 40 years. An annual service charge of 0.75% applies.

3 International Monetary Fund World Economic Outlook Database, September 2011, http://www.imf.org/external/pubs/ft/weo/2011/02/weodata/WEOSep2011all.xls

4 This could happen if 10% if domestic government spending were spent on health programmes, and 10% of that amount spent on malaria.

5 Norway allocates part of its tax on CO2 emissions from aviation fuel to UNITAID

6 http://www.iata.org/ps/publications/Pages/wats-passenger-carried.aspx

7 Private investors typically expect a return on investments that is proportional to the risk but may be willing to forgo some of the return if investments were linked to a social cause.

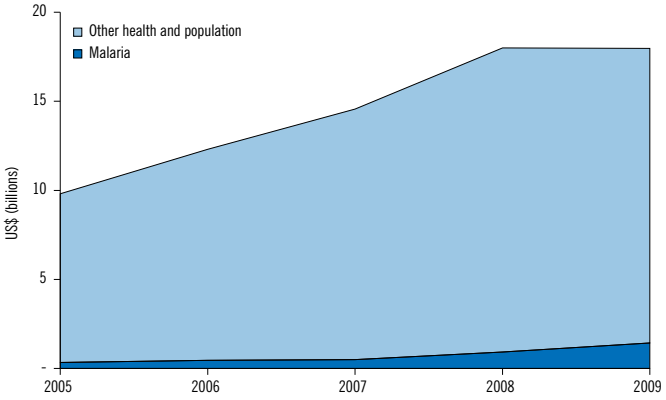
private investor and international donor or domestic government, and payments can be linked to improved efficiencies in programme delivery, the aim being that these efficiencies would be sufficient to offset the cost of paying premiums to investors. Other types of bond that have been considered aim to encourage local private sector consortia to take on the role of international donors and domestic governments in bearing the cost of bonds, since they stand to benefit if malaria control is successful.

In another approach, diaspora bonds would target nationals living abroad who may be prepared to lend to their national governments at favorable rates, although such a bond would only apply to a limited number of countries.

Private sector markets might also be used to bridge short term funding gaps in a similar way to the "Vaccine Bonds" issued to finance GAVI. To date US$ 1.8 billion have been disbursed by GAVI to immunization programmes as a result of funds raised in the capital markets since 2006, and repaid over 20 years by Australia, France, Italy, The Netherlands, Norway, the United Kingdom, South Africa, Spain and Sweden (28).

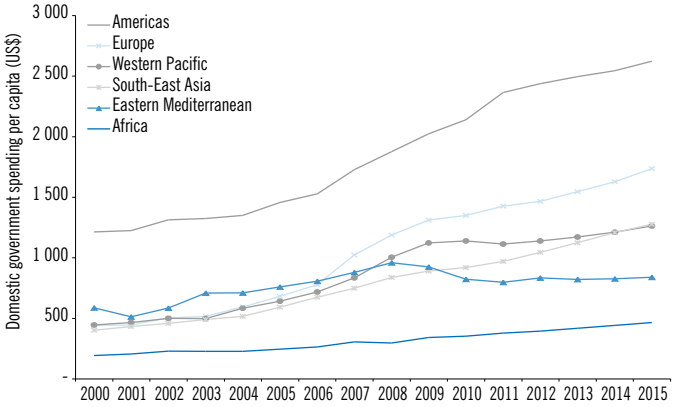
Improved accountability is being increasingly emphasized in malaria programme financing. The Global Fund has always operated on a principle of results-based disbursement. A restructuring of its grant architecture will emphasize achievement of outcomes and impact, as well as requiring domestic government financial contributions. The mechanisms by which development funds are delivered could have a significant influence on the efficiency of programmes. If programmes are rewarded for reducing costs while maintaining coverage, total programme costs could be reduced and the savings used to further increase coverage. More research is needed to assess what mechanisms are likely to maximize programme outcomes from the same levels of investment.

Figure 3.11 Official development assistance for malaria and other health and population activities



Source: OECD database on foreign aid flows http://stats.oecd.org/qwids/

Figure 3.12 Median total domestic government spending in malaria-endemic countries by WHO Region



Source: International Monetary Fund World Economic Outlook Database, September 2011

3.7 Conclusions

International funding for malaria control is expected to peak at US$ 2 billion in 2011. From 2012 to 2013 it is projected to remain relatively stable, but then decrease to US$ 1.5 billion in 2015. This analysis is relatively optimistic as it assumes consistency in funding over time for agencies where firm information on future funding trends is not available, although it excludes a possible future round of funding from the Global Fund in 2014.

Domestic government funding of malaria programmes is generally less than US$ 1 per person at risk in the most highly endemic countries. Domestic government expenditures are also generally substantially less than international malaria expenditures except in countries with relatively low malaria transmission. Thus, while it is currently not possible to ascertain total domestic government spending on malaria, it is likely to be less than the US$ 2 billion from international sources, and the total funds available for malaria control fall short of the US$ 5 billion identified in the *Global Malaria Action Plan* as being necessary for fully effective malaria control.

ITN and other vector control interventions account for the majority of malaria programme spending. The cost of delivering a LLIN is approximately US$ 7.50. While IRS is effective, and there is scope for reducing the cost per person protected by expanding programmes, the cost per person protected per year is US$ 2.62 in large programmes, which is higher than that for ITNs (approximately US$ 1.39).

The price of an ITN represents the largest component of the cost of supplying an ITN. Prices of the most widely procured ITNs decreased by 22% between 2007 and 2010, and by an additional 9% in the first half of 2011. Large purchasers usually obtain the lowest prices, and in general, most countries now achieve prices quite close to the minimum, leaving little room for further efficiencies through procurement prices alone. However, even relatively small savings may be important to particular countries.

Distribution costs typically comprise approximately 5%–10% of the total cost of delivery. The costs of the two main strategies for delivering ITNs, through mass campaigns and or health services, are similar. Existing channels may need to be refined to ensure that ITNs are delivered to all of those, and only those, who need them. As country programmes mature, the cost of delivery may increase as programmes consider how to replace ITNs, where only a proportion of a population may require a new ITN at any one time, compared to rapidly expanding coverage where ITNs are delivered to the entire population at risk.

Potentially large savings could be made by developing and deploying longer lasting ITNs. Approximately 1.2 billion ITNs are required to ensure that all people at risk of malaria in Africa have access to an ITN between 2011 and 2020 if ITNs last for 3 years. If ITNs lasted for 5 years, only 750 million ITNs would be required. If the unit cost of delivering both types of ITNs were similar, at US$ 7.66, a total of US$ 3.8 billion could be saved from a financing requirement of US$ 9.6 billion.

Expansion of diagnostic testing offers modest potential for cost savings on commodities. Diagnostic testing and treatment constitute the second largest category of malaria programme spending after vector control. Expenditure on treatment currently greatly exceeds that on diagnostic testing but is expected to decrease as parasitological testing is expanded to all suspected cases of malaria. With current prices of RDTs and ACTs (US$ 0.50 and US$ 1.40 for AL respectively), perfect compliance with test results, and test positivity rates less than 60%, savings on commodities could amount to US$ 68 million in the public sector in Africa. The price of RDTs has fallen by 11%–15% annually from 2008 to 2010. The impact of further cost reductions could be considerable: even if RDTs were used for only 50% of fever cases in the WHO Africa Region, reducing their cost from the current US$ 0.50 to US$ 0.25 would save a further US$ 45 million a year.

Improved malaria control will itself lead to some cost savings. With a policy of universal parasitological testing, the reduction in cases accruing from universal coverage of vector control would result in total commodity cost savings of US$ 110 million compared to zero coverage or US$ 59 million compared to current coverage levels. There may be additional significant economic benefits beyond commodity costs, which may further justify investment in malaria control.

There is limited scope for malaria control to attract additional international financing. Malaria programmes accounted for approximately 8% of Official Development Assistance (ODA) for health and population in 2009, increasing from 3% in 2005. Overall financing for health and population remained stable between 2008 and 2009, and is likely to do so thereafter. Given stable total funding, and that malaria programmes already receive a significant proportion of health and population financing, further increases in malaria funding within health sector financing may be unlikely. A clearer demonstration of the economic benefits of malaria control may help malaria programmes to access a broader range of development funding.

There is scope for domestic governments to invest more in malaria control. If just 1% of total domestic government spending were made available for malaria control in 2010, 75 of the 99 countries with ongoing malaria transmission could raise enough funds to provide each person at risk with access to an ITN. Global economic growth has allowed many malaria-endemic countries to increase total domestic government spending: more than 28 countries increased per capita spending by ≥US$ 1000 between 2000 and 2010.

Innovative financing mechanisms are in the early stages of development. Several schemes have been proposed. Taxes on bonds and derivatives transactions may offer the greatest potential for revenue generation – estimated in excess of US$ 250 billions – but their suggested uses go beyond malaria control. Taxes on airline journeys currently raise more than US$ 200 for health development and their extension to additional countries could generate significant additional funds. Other country-specific schemes, such as tourist taxes, may offer opportunities to raise funds for control programmes in malaria-endemic countries.

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Chapter 4

Vector Control

This chapter reviews (i) adoption of national policies for malaria vector control (ii) coverage and progress towards the goal of universal access and utilization, and (iii) the monitoring and management of insecticide resistance.

4.1 ITN policy and implementation

4.1.1 Policy adoption

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 4A**.

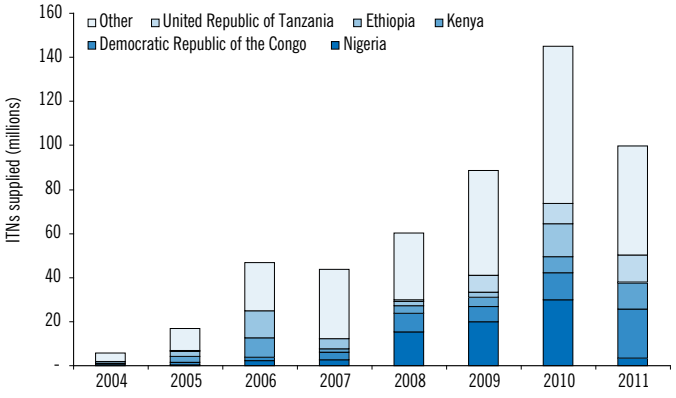
ITNs are distributed free of charge in 82 countries, mainly in Africa and South-East Asia. In some of these countries, programmes are targeted to specific age groups but in a majority – 67 of the 82 countries – ITNs are distributed free of charge to all age groups. In 28 countries, mainly in Africa, they are sold at subsidized prices through social marketing or routine delivery with vouchers, usually in parallel with free distribution campaigns.

The most common strategy for distribution of ITNs is through mass campaigns, which are used in 57 countries, followed by distribution through antenatal clinics in 56 countries. Antenatal clinics are the most widely used channel in the African Region, although greater quantities of ITNs are distributed through mass campaigns.

The Alliance for Malaria Prevention (AMP) collates information on the number of LLINs delivered by seven manufacturers which are believed to supply almost all ITNs for public sector distribution in Africa. While almost all ITNs distributed in Africa are long-lasting insecticidal nets (LLINs), this chapter refers to all treated nets as ITNs.

The number of nets delivered by manufacturers increased from 5.6 million in 2004 to 145 million in 2010 in sub-Saharan Africa (**Figure 4.1**), with a further 75 million ITNs supplied in 2011 to the end of September. While the number of ITNs supplied increased annually through 2010, the rate of supply from January to September 2011 suggests that the total number supplied in 2011 will be lower.

Figure 4.1 Number of LLINs delivered by manufacturers to countries in sub-Saharan Africa, 2004–2011



Source: Alliance for Malaria Prevention. Data for the first three quarters of 2011 have been multiplied by 4/3 to provide an annual estimate.

TABLE 4.1
Adoption of Policies for ITN Programmes by WHO Region, 2010

Policy	Africa	Americas	Eastern Mediterranean	Europe	South-East Asia	Western Pacific	Grand Total
ITNs/ LLINs are distributed for free	38	13	8	3	10	10	82
ITNs/ LLINs are sold at subsidized prices	21	2	1		1	3	28
ITNs/ LLINs are distributed to all age groups	27	12	7	2	10	9	67
ITNs/ LLINs distributed through mass campaigns to all age groups	27	12	4		6	8	57
ITNs/ LLINs distributed through mass campaigns to under 5 only	9	4	1		2	1	17
ITNs/ LLINs are distributed through antenatal clinics	38	5	3		4	5	56
ITNs/ LLINs are distributed through EPI clinics	29	1	2		1	1	32
Number of endemic countries/areas	**45**	**23**	**12**	**8**	**10**	**10**	**106**
Number of* P. falciparum *endemic countries/areas	**43**	**18**	**8**	**0**	**9**	**9**	**87**

Source: NMCP reports.

Between 2008 and 2010 a cumulative total of 294 million ITNs were supplied by manufacturers to countries in sub-Saharan Africa. Assuming all ITNs last three years, this would be enough to cover 73% of the 800 million persons at risk in 2011 (assuming an average of 1.8 people sleeping under each ITN). Such an estimate does not take into account delays in delivering ITNs within countries or loss of ITNs after delivery to households (due to wear and tear) and therefore produces an optimistic estimate of the availability of ITNs.

Outside Africa, available records show that 60 million ITNs were supplied between 2008 and September 2011, with six countries accounting for 66% of deliveries (India 13.7 million, Indonesia 7.9 million, Afghanistan 6.3 million, Pakistan 3.3 million, Papua New Guinea 2.8 million, Philippines 2.8 million).

During the last three years mass campaigns have been the main channel used by NMCPs to deliver ITNs, accounting for 71% of ITNs delivered (**Figure 4.2**), followed by antenatal care clinics (15%), immunization clinics (7%) and other channels (7%). The proportions vary by WHO Region.

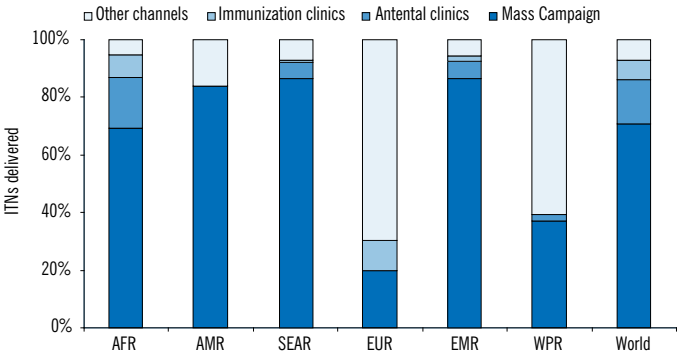
4.1.2 Trend in ITN coverage

Household surveys are the preferred means of assessing whether or not sufficient ITNs have been delivered to cover populations at risk of malaria, although surveys are not conducted frequently enough to provide up-to-date estimates for most countries. In the absence of a recent household survey, it is possible to estimate the ITN coverage by combining data from manufacturers' reports on ITNs delivered to countries, NMCP reports on ITNs distributed within countries, and previous household surveys as described in the *World Malaria Report 2009* and by Flaxman *et al* (*1*). The advantage of such an approach is that it uses all available data to estimate ITN coverage for years in which no survey was carried out.

From this analysis it is estimated that the proportion of households owning at least one ITN in sub-Saharan Africa has risen from 3% in 2000 to 50% in 2011 (**Figure 4.3**). Estimates are for 30 June of each year; the estimate for 2011 assumes that all nets delivered by manufacturers by December 2010 were distributed by NMCPs. Some countries appear to have made considerable advances towards achieving universal access to ITNs (e.g. Burundi, Madagascar, Namibia, Niger, Rwanda, Sierra Leone, United Republic of Tanzania) while others have yet to expand programmes to the scale required (**Figure 4.4**).

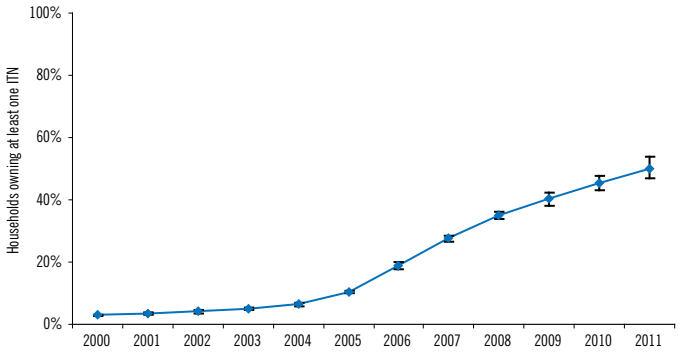
The estimate is lower than that obtained by simply considering the numbers of ITNs supplied by manufacturers in relation to the population at risk (73%). This may be partly because the ITN coverage model reflects lags in the delivery of ITNs by NMCPs after they have been procured from manufacturers, and takes into account the loss of ITNs occurring at household level after delivery. It may also be due in part to the fact that household surveys for several countries are more than three years old, and while the model summarizes the relationship between the numbers of ITNs delivered and household survey results over the entire period 2000–2010, it may not adequately reflect the rapid increases in coverage that are possible when mass campaigns are undertaken. There is a need for more up-to-date information on the availability and use of ITNs at household level, particularly after mass campaigns.

Figure 4.2 Channels used by NMCPs to deliver ITNs by WHO Region, 2008–2010



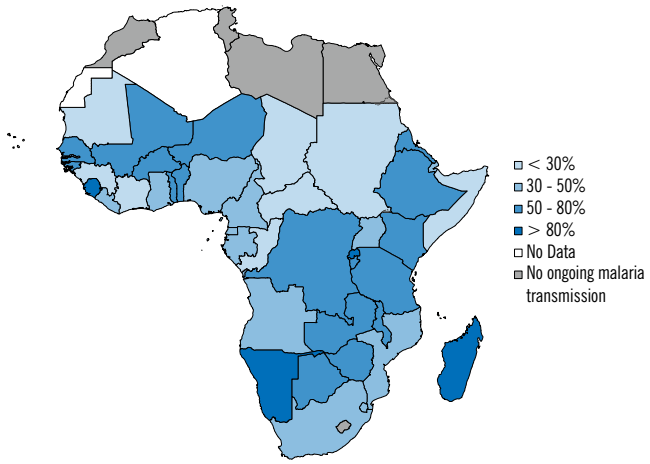
Source: NMCP reports.

Figure 4.3 Trend in estimated proportion of households with at least one ITN in sub-Saharan Africa, 2000–2011



Source: ITN coverage model taking 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.

Figure 4.4 Estimated proportion of households with at least one ITN in sub-Saharan Africa, June 2011



Source: ITN coverage model taking into account ITNs supplied by manufacturers, ITNs delivered by NMCPs and household survey results (1)

4.1.3 Coverage and use at population level

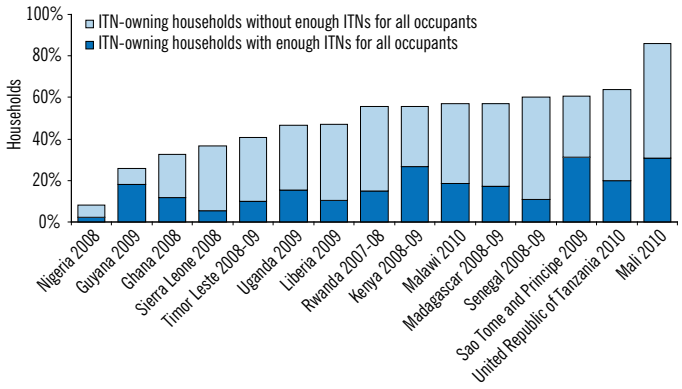
With the gains in malaria control over the past decade, and in line with recommendations by WHO in 2007 for universal coverage of all populations at risk (2), programmes have advanced from providing ITNs only to the population groups at greatest risk (children < 5 years of age and pregnant women) to seeking coverage for all people at risk in the population. To meet this target several intermediate steps need to be accomplished to ensure that: (i) ITN programmes have sufficient geographical reach to provide ITNs to all households; (ii) sufficient nets are provided to households to cover all people living in them; and (iii) people within households use the available nets.

In reviewing 15 household surveys with data on ITN coverage for the period 2008–2010, it was evident that modest proportions of households own at least one ITN (median 56%, lower quartile 39%, upper quartile 59%) (**Figure 4.5**). In almost all these countries less than half of households that had received ITNs had enough for all occupants (median 15%, lower quartile 11%, upper quartile 19%). It is possible that household surveys conducted from 2008 to 2010 do not yet adequately reflect the change in policy to provide ITNs to all persons living in households rather than focusing on pregnant women and children under 5 years of age.

In all surveys, a high proportion of available ITNs within households appear to be used; the median proportion of persons with access to an ITN who use it is 96% (lower quartile 93%, upper quartile 99%) assuming that one net can cover two people (**Figure 4.6**). Some countries have lower rates of use than others. These results are consistent with previous analyses which suggest that the main constraint to enabling persons at risk of malaria to sleep under an ITN is lack of availability of nets (3).

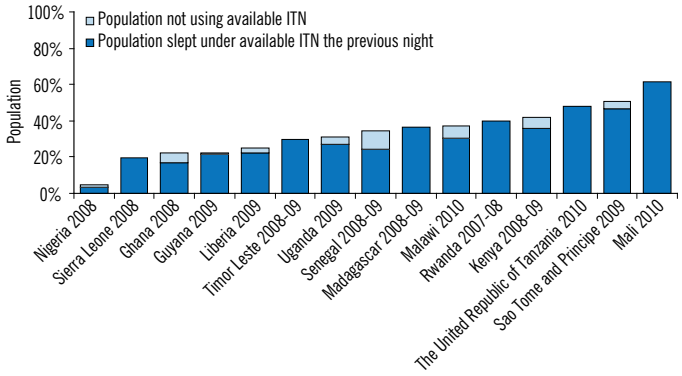
While many countries have adopted policies to achieve universal access to ITNs, and there has been considerable progress in increasing the supply of ITNs to endemic countries, evidence suggests that there is long way to go before the goal of universal access to ITNs will be reached. Where ITNs are available however, there appears to be a high rate of use.

Figure 4.5 Household ownership of ITNs



Source: Demographic and Health Surveys (Timor Leste, Ghana, Guyana, Kenya, Madagascar, Malawi, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, United Republic of Tanzania); Malaria Indicator Surveys (Uganda, Liberia); and a Special Survey (Mali).

Figure 4.6 Use of ITNs available in households



Source: Demographic and Health Surveys (Timor Leste, Ghana, Guyana, Kenya, Madagascar, Malawi, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, United Republic of Tanzania); Malaria Indicator Surveys (Uganda, Liberia); and a Special Survey (Mali).

TABLE 4.2
Adoption of policies for IRS programmes by WHO Region, 2010

Policy	Africa	Americas	Eastern Mediterranean	Europe	South-East Asia	Western Pacific	Grand Total
IRS is recommended by malaria control programme	36	15	5	6	6	5	73
IRS is used for the prevention and control of epidemics	21	9	4	6	4	7	51
IRS and ITNs used together for malaria control in at least some areas	31	11	3	6	5	6	62
DDT is used for IRS	12				1		13
Insecticide resistance monitoring is undertaken	35	12	6	6	10	9	78
Number of endemic countries/areas	**43**	**23**	**12**	**8**	**10**	**10**	**106**
Number of* P. falciparum *endemic countries/areas	**43**	**18**	**8**	**0**	**9**	**9**	**87**

Source: NMCP data

4.2 IRS policy and implementation

4.2.1 IRS policy adoption

Adoption and implementation of policies for IRS programmes by WHO Region are shown in **Table 4.2**. Adoption of policies by country is shown in **Annex 4A**.

IRS is recommended for the control of malaria by 73 countries, 36 of which are in Africa. IRS is sometimes used for control of epidemics in 51 countries and in combination with ITNs in 62countries, including 31 in Africa. DDT is reported to be used for IRS in 13 countries, of which 12 are in Africa. Approximately three quarters of endemic countries report that they are carrying out insecticide resistance monitoring.

4.2.2 IRS coverage achieved

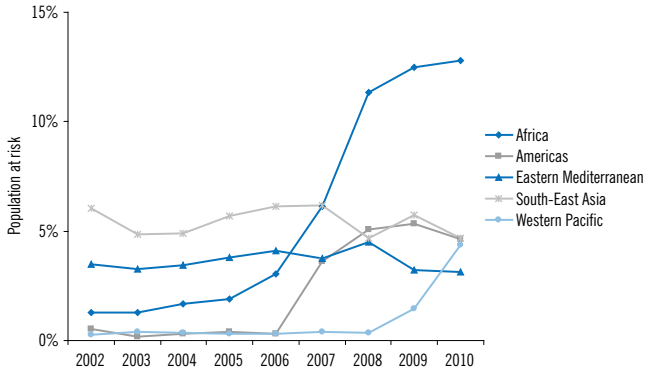
National malaria control programmes in malaria-endemic countries reported that a total of 185 million people were protected by IRS in 2010, representing 6% of the global population at risk. The use of IRS for vector control has continued to increase since 2006, particularly in the African Region where 78 million people, or 11% of the population at risk, were protected in 2010 (**Figure 4.7**). Including the African countries in the Eastern Mediterranean Region, 81 million people were protected by IRS, representing 11% of the at risk population in sub-Saharan Africa. The rate of increase in IRS coverage in Africa appears to have slowed over the past two years, after rapid scale up of IRS operations during 2006 to 2008. IRS coverage in the Western Pacific Region has increased in 2010, largely due to an increased number of people covered by IRS in China, and is equivalent to the proportion of the population covered by IRS in the Regions of the Americas and South-East Asia.

The proportion of the population at risk covered by IRS varies by country in the African Region (**Figure 4.8**). South Africa employed IRS to protect more than 80% of the population at risk, while Ethiopia, Madagascar, Zambia, and Zimbabwe protected at least 40%, and several countries used IRS in a more limited fashion. In other WHO Regions, Bhutan (26%) and Solomon Islands (36%) cover a substantial proportion of their population at risk of malaria through IRS.

In 2009, pyrethroids were estimated to account for approximately 77% of IRS coverage in terms of spray area covered.[1] DDT was the second most widely used insecticide for IRS, accounting for approximately 20% of sprayed areas in covered households. Carbamates and organophosphates represented a very small proportion of global usage for vector control (*4*). There has been a move away from using pyrethroids since 2009, largely because of increases in ITN coverage and concerns about potential development of insecticide resistance. For example, PMI supported the use of pyrethroids for IRS in 13 of 15 countries in 2009, but in only 12 of 16 countries in 2010; spraying with non-pyrethroid insecticides is being implemented in approximately half of the countries supported by PMI in 2011 (*5*) .

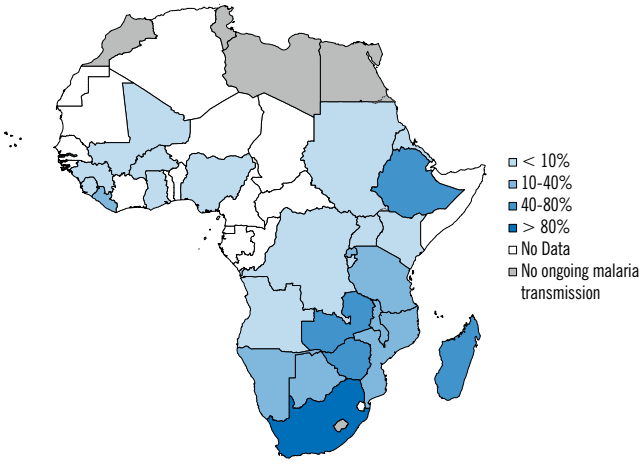
1 Pyrethroids account for a lower proportion of insecticide used when measured by tonnes of active ingredient, but a high proportion by area sprayed, as a unit of active ingredient of pyrethroids by weight covers approximately 60 times the area of other insecticide classes.

Figure 4.7 Proportion of population at malaria risk protected by IRS by WHO Region, 2002–2010



Source: NMCP reports.

Figure 4.8 Proportion of population at malaria risk protected by IRS in sub-Saharan Africa, 2010



Source: NMCP reports.

4.3 Malaria vector insecticide resistance

4.3.1 Insecticide resistance

Current malaria vector control uses insecticides from four chemical classes: pyrethroids, organochlorines (including DDT), organophosphates (OPs), and carbamates. The use of one class, the pyrethroids, far exceeds that of the other three due to its rapid and durable effect and its low toxicity and cost (**Box 4.1**). IRS can be conducted with any of the four classes of insecticides, whereas pyrethroids are the only insecticide class used for ITNs. Vector control can be rendered less effective by anopheline mosquitoes developing resistance to insecticides used in IRS and ITNs. Given the importance of vector control in combating malaria, retaining the susceptibility of malaria vectors to pyrethroids, and the other classes of currently available insecticides, is of critical importance.

Two main mechanisms of insecticide resistance have been identified: target site resistance and metabolic resistance. Target site resistance occurs when the site of action of an insecticide (typically within the nervous system of the anopheline mosquito) is

modified in resistant mosquito populations so that the insecticide no longer binds effectively and the insect is therefore unaffected, or less affected, by the insecticide. Target site resistant mutations can affect acetylcholinesterase, which is the molecular target of OPs and carbamates, or voltage-gated sodium channels (for pyrethroids and DDT), which is known as *knock-down resistance (kdr)*. Metabolic resistance occurs when increased levels or modified activities of a detoxifying enzyme system prevent the insecticide from reaching its intended site of action.

Both metabolic and target site resistance can be found in the same vector populations and sometimes within the same vector. Metabolic and target site resistance mechanisms appear to have differing capacity to reduce the effectiveness of insecticide-based vector control interventions. Metabolic resistance is the stronger resistance mechanism, and is of greater concern.

Insecticide resistance can be measured at the molecular level, by the presence of known resistance gene (such as *kdr*) in a mosquito population, and through a bioassay susceptibility test, which measures mosquito mortality to a standard dose of insecticide. In public health, resistance is more commonly presented through reports of bioassay susceptibility results.

BOX 4.1
Insecticides used for malaria vector control

Key attributes of the chemicals used for vector control insecticides are summarized below:

Pyrethroids. Pyrethroids are the only insecticides that are used for both IRS and LLINs, in the form of alphacypermethrin, bifenthrin, cyfluthrin, deltamethrin, lambdacyhalothrin and etofenprox. It has been the chemical class of choice in agriculture and public health applications over the last several decades because of its relatively low toxicity to humans, rapid knock-down effect, relative longevity (duration of 3–6 months when used as IRS), and low cost. It is also the only insecticide class used currently in recommended LLINs.

Pyrethroids have multiple modes of action on the mosquito vector. They open sodium channels, which leads to continuous nerve excitation, paralysis and death of the vector. They also have an irritant effect, resulting in hyperactivity, rapid knock-down, feeding inhibition, shorter landing times and undirected flight, all of which reduce vector biting ability.

Organochlorines. Organochlorines are used for IRS vector control in the form of DDT, which was the primary insecticide used in the eradication campaigns in the 1950s. At the Stockholm Convention in 2001, usage of DDT was banned for all applications except for disease control, due to concerns over its long-term toxicity. Because of limited options of equally effective and efficient alternative insecticides, continued use of DDT was permitted in public health until "locally safe, effective, and affordable alternatives are available for a sustainable transition from DDT". The 2006 WHO position statement reasserted the public health value of DDT when used for IRS.

As for pyrethroids, DDT has been popular because of its rapid ability to "knock down" mosquitoes, relative longevity (duration of 6–12 months when used for IRS), and low cost. DDT is not used on ITNs or LLINs.

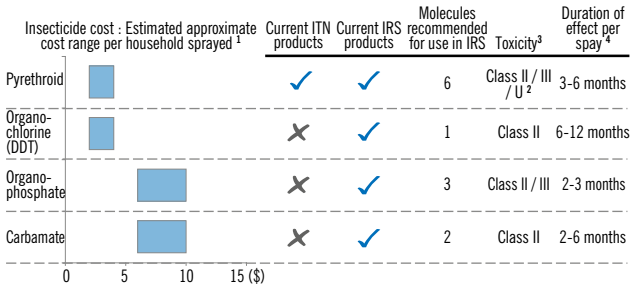
Despite chemical structural differences, DDT and pyrethroids have similar modes of action, and therefore cross-resistance to these two classes of insecticide may occur.

Organophosphates. Organophosphates comprise a vast range of chemicals, but are used for IRS vector control in the form of fenitrothion, malathion and pirimiphos-methyl. This insecticide class is highly effective, but has relatively short residual activity (duration of 2–3 months when used for IRS) compared to pyrethroids and DDT. At current price levels, it is also significantly more expensive. Because of the risk of accidental human overexposure to organophosphates and subsequent toxicity, toxicological monitoring is recommended. Those handling organophosphates during spray operations have the highest risk of exposure, and toxicity can be monitored through measurement of blood acetylcholinesterase enzyme levels.

The mode of action on the mosquito vector differs from that of pyrethroids and organochlorines. Organophosphates inhibit cholinesterase, thereby preventing neurotransmitter acetylcholine breakdown, resulting in neuromuscular over-stimulation and subsequent death of the vector.

Carbamates. Carbamates are used for IRS vector control, in the form of bendiocarb and propoxur. Carbamates have a similar mode of action to organophosphates, and as with organophosphates, they are highly effective. However, they have short residual activity (duration of 2–6 months when used for IRS) and are more expensive than pyrethroids and DDT.

TABLE BOX 4.1
Characteristics of insecticide classes used in malaria vector control



1. Analysis calculated for a household of 5 people (150 sqm sprayed) and based on WHOPES spraying guidelines and PMI cost data

2. Lambdacyhalothrin is WHO class III; Etofenprox is WHO class U

3. Malathion, pirimiphos-methyl are class III

Note: Toxicity ratings: Class II: Moderately hazardous; Class III: Slightly hazardous; Class U: Unlikely to present acute hazard in normal use

4. Duration as based on typical formulation for use in malaria control

Source: WHO , "WHO Recommended Classification of Pesticides by Hazard" (2009); WHOPES, "WHOPES guidelines for insecticide use in IRS" (2009); PMI, "PMI Insecticide resistance guidelines, 2010" (2010)

4.3.2 Current situation and operational impact on malaria control

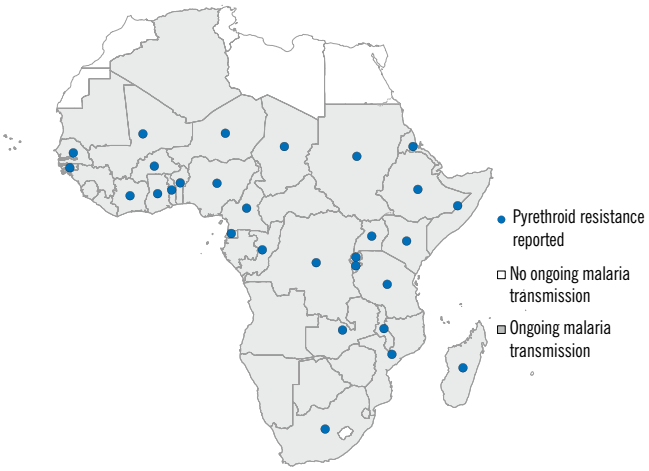
In 2011, WHO regional entomologists collected available data on insecticide resistance from malaria endemic countries which are conducting resistance monitoring. Among 87 countries for which information was available, 45 countries reported that resistance had been detected to at least one insecticide used for malaria vector control in at least one malaria vector in at least one monitoring site. The vast majority (39) of these reported resistance to pyrethroids, 27 of which are in sub-Saharan Africa (**Figure 4.9**). DDT resistance is also prevalent worldwide (14 countries), and there are some instances of resistance to organophosphates (5 countries) and carbamates (8 countries).

These data may underestimate the extent of insecticide resistance globally as regional entomologists may not have access to all information on all monitoring activities within any given country. Also, these resistance reports encompass a range of monitoring approaches by different investigators. However, other sources of information on insecticide resistance reveal a similar pattern. A review of recently published literature on the distribution of pyrethroid resistance in Africa reflecting data from 23 countries found evidence of resistance in 17 of them (6). Widespread reports of pyrethroid resistance in sub-Saharan Africa are of particular concern since this region has the highest malaria burden, and a reduction in vector control effectiveness could have serious consequences. In the South-East Asia Region the resistance situation in India is of greatest concern as there is widespread DDT resistance and patches of pyrethroid and OP (malathion) resistance (7).

In some cases, the increasing reports of resistance are partly a reflection of increased monitoring of insecticide resistance, but there are also many reports of resistance in places where it is known to have been absent before. However, the presence of resistance is of concern whether or not it developed recently. Building entomological capacity in all malaria endemic countries (both human and physical infrastructures) - including the capacity to conduct routine monitoring of insecticide resistance, analyse and use the data to take appropriate decisions on management of resistance in a multisectoral approach - will be crucial for the success of global insecticide resistance management (**Box 4.2**). Systematic, comprehensive tracking of resistance among insecticides used for malaria control, nationally and globally, has long been a priority activity for WHO, malaria endemic countries, and other global malaria control partners. A global plan for insecticide resistance management will address limitations of previous resistance monitoring systems and build on regional efforts such as the African Network on Vector Resistance to insecticides.[1]

The level of insecticide resistance at which the effectiveness of malaria vector control is compromised remains uncertain. Resistance is not a factor that can be randomly allocated to communities and withheld from others in field trials, so it is difficult to isolate the effect of resistance from that of other factors such as variations over time and space in background transmission intensity, and in vector control intervention coverage (IRS and LLINs). With at least one form of resistance, LLIN use can still have a valuable effect on malaria despite high frequencies of the resistance gene in local vector populations (*8*). On the other hand, in some situations, resistance has led to failure of IRS and a serious resurgence in malaria (*9*).

Figure 4.9 Malaria-endemic countries in Africa reporting resistance to pyrethroids in at least one malaria vector in at least one monitoring site, 2011.



Source: Reports from WHO regional entomologists in AFRO and EMRO. A dot indicates that resistance to pyrethroids has been reported in at least one malaria vector in at least one monitoring site. Note that map provides no indication of how widespread resistance is within a country. Countries with no insecticide resistance reported may have no resistance, or no susceptibility testing may be performed or results of susceptibility test may be unavailable.

It is important to note that IRS and LLINs are the two primary interventions not only because they are powerful, but also because they are durable (with a long period of effectiveness) and robust (effective despite imperfect conditions and coverage). It is therefore possible that as resistance evolves, vector control interventions will retain a degree of effectiveness, but with reduced durability (a shorter effective life) and with reduced robustness (less tolerance to gaps in coverage and sub-optimal circumstances). With funding from the Bill & Melinda Gates Foundation, WHO is coordinating studies in India, Sudan, Cameroon, Benin and Kenya to examine the association between resistance and malaria control failure.

4.3.3 Current recommendations and the Global Plan for Insecticide Resistance Management in malaria vectors (GPIRM)

WHO current guidance on measures to prevent the development and manage the spread of insecticide resistance is summarized in *The technical basis for coordinated action against insecticide resistance: preserving the effectiveness of modern malaria vector control* (*10*). Such measures include avoiding the use of pyrethroids for IRS when LLIN coverage is high, and the use of different classes of insecticides in rotation for IRS. The use of combination interventions (e.g. LLIN plus non-pyrethroid focal IRS) is also encouraged, as is the use of mixtures of different classes of insecticides when these become available. A key recommendation is that all vector control programmes should have a resistance management strategy, to be implemented pre-emptively without waiting for the appearance of resistance or for evidence of control failure. Insecticide resistance monitoring should be intensified and carried out as a routine activity by all vector control implementation agencies, including vector control programmes that rely solely on LLINs.

1 https://apps.who-int/tdr/topics/mol_entomology/files/anvr_1.pdf

BOX 4.2
Insecticide resistance monitoring in Sudan

Sudan established sentinel sites for insecticide resistance monitoring in 2006. There are a total of 64 sentinel sites in 12 of 15 states (provinces) (the remaining 3 states are either desert or inaccessible for security reasons). As part of a Regional initiative a total of 74 entomologists have received postgraduate training. Consequently, all the endemic states have at least 2 qualified entomologists whose responsibility is to carry out insecticide resistance monitoring. The field staff is supported by a core of 14 entomologists at the central level to guide decisions on vector control based on collected data. A multisectoral steering committee, including representatives from relevant ministries, academic and research institutions, and WHO, was set up to guide the vector control programme.

At each site, insecticide resistance monitoring was carried out every one to two years according to the availability of funds. Anopheline mosquito larvae were collected by dipping from a range of breeding sites and larvae were reared to adults in the field laboratories, under standard conditions (25 +/– 2 °C and 64%–80% relative humidity (RH). Insecticide susceptibility tests were performed using the WHO standard procedures and test kits for adult mosquitoes under optimum conditions (temperature 26–29 °C and 70%–80% RH).

This investment in capacity building and data systems began to yield benefits soon after the programme was established. Resistance to organochlorines and organophosphates was already widespread, especially in irrigated agricultural areas, prior to 2006. In 2006 resistance to pyrethroids was detected in13 of 17 sites in Gezira and Sennar state, at levels of kdr allele frequency of 0.47 to 0.68. The multisectoral steering committee was called upon to propose recommendations for the IRS programme in 2006. The input of international experts was sought in making this decision. In 2007 a rotation plan for IRS, replacing pyrethroids with a more expensive alternative (carbamate), was recommended by the committee and subsequently implemented in Gezira state through the state's governmental budgeting and support. In 2008, following decentralization of some governmental operations, vector control activities were devolved to states. Due to the high cost of carbamate, IRS was stopped in Gezira state after the first round. With comprehensive political advocacy to raise awareness of the threat to malaria control posed by cessation of IRS, state financial support was obtained and spraying resumed with carbamates in 2011.

TABLE BOX 4.2
Republic of Sudan, Federal Ministry of Health, National Malaria Control Programme: Sites for monitoring of insecticides resistance 2010–2011

State	No. of sites	Sites Investigated
Khartoum	13	Kafori, Al Faki Hasim, Shambat, El Giraif Sharg, Soba east, Soba West, Jabra, Arkaweet, Al Salama Al Jadida, Al Shigailab, Al Ameir
Gezira	9	El Masalamia, Tabat, El Hoosh, Haj Abdellah, Medani,Mobi,Rofaa,Wad Rawa,El Managil
Sennar	2	Sennar Sugar area, El Soki
Blue Nile	1	Damazin
White Nile	4	Kosti, Kennan sugar area, Assalaya sugar area, El Duwaim, Rebak
N. Kordofan	7	Bara, elnuhood, elobied, el rahad,abuzabadel khowai, umrwaba
Gedarif	2	Gedarif, Galabat East
Kassala	3	Kassala, El Gerba, New Halfa
River Nile	4	Abu Hamad, Attbara, El Damar, Shendi
Northern	6	Meowe,Kareema,Al Daba,Dongola,Burgage, Dalgo
West Darfu	5	Genaina,Fur Baranga,Zalengi,Garsilla,Um Dokhon
S. Dar Fur	9	Nyala, Eid Elfiran, Rehad elberdi, Kas, Tulus, sharia, Eldaien, Adella and Elburam

The 2011 World Health Assembly resolution on malaria[1] included the provision that WHO should "provide support to Member States in identifying new opportunities for malaria control, as well as combating major threats, notably plasmodial resistance to antimalarial agents and mosquito resistance to insecticides, through the development and implementation of the Global Plan for Artemisinin Resistance Containment and a global plan for the prevention and management of insecticide resistance".

Consequently, the WHO Global Malaria Programme is currently developing the *Global Plan for Insecticide Resistance Management* (GPIRM) in consultation with almost 150 stakeholders. The plan will: (i) define what is known, what is assumed and what remains unknown with regard to insecticide resistance among malaria vectors, its spread and operational impact, and options for managing the problem; (ii) estimate the potential impact of insecticide resistance on malaria burden, and the financial cost of monitoring and managing insecticide resistance; and (iii) based on these elements, define the plan for managing insecticide resistance and the way forward, including a short-term action plan with clear responsibilities, and ongoing research and development requirements. The GPIRM is expected to be released in the first quarter of 2012.

1 http://apps.who.int/gb/ebwha/pdf_files/WHA64/A64_R17-en.pdf

4.4 Conclusions

Progress in increasing access to ITNs: The number of ITNs delivered by manufacturers increased dramatically from 5.6 million in 2004 to 145 million in 2010 in sub-Saharan Africa. However, the number of ITNs supplied in 2011 appears to have reduced, partly because some countries have made substantial progress towards achieving universal access to ITNs in 2010 and are not scheduled to reorder ITNs, but also because some countries are still not expanding programmes to a sufficient scale. Using a model that takes into account the number of ITNs supplied by manufacturers, the number of ITNs delivered by NMCPs, and household survey data, the percentage of households owning at least one ITN in sub-Saharan Africa is estimated to have risen from 3% in 2000 to 50% in 2011, reflecting considerable progress but also signifying there is much more work to be done.

A high proportion of available ITNs within households appear to be used; approximately 96% of persons with access to an ITN within the household use it, suggesting that the main constraint to enabling people at risk of malaria to sleep under an ITN remains lack of available nets. There is a need for more up-to-date information on the availability and use of ITNs at household level, as the timing of existing household surveys may not adequately capture the progress made after mass campaigns.

Sustainability of ITN implementation: While the rapid scale up of ITN distribution in Africa is an enormous public health achievement, it also represents a formidable challenge for the future in ensuring that the high levels of coverage are maintained. During the last three years mass campaigns have been the main channel used by NMCPs to deliver ITNs, accounting for 71% of ITNs delivered, followed by antenatal care clinics (15%). Measures need to be in place to ensure that those not benefiting from the campaigns also have access to nets. Moreover, strategies will be needed to deal with replacement of the large number of ITNs that have recently been delivered, while continuing to scale up programmes in countries that have not achieved universal access. There is uncertainty over the extent to which ITN effectiveness decays over time, but the lifespan of an LLIN is currently estimated to be 3 years. Nets delivered in 2007 and 2008 are therefore due for replacement, soon to be followed by those delivered between 2009 and 2010. Failure to replace these nets will increase the risk of a resurgence of malaria cases and deaths.

Progress in implementation of IRS: IRS programmes have also expanded considerably in recent years, with the number of people protected in the African Region increasing from 10 million in 2005 to 78 million in 2010, and to 81 million among all countries in sub-Saharan Africa, a quantity which corresponds to protection for 11% of the population at risk. In other WHO Regions IRS implementation has not been expanding as rapidly, and is generally relatively stable. With the exception of India, the proportion of the population protected by IRS tends to be smaller than in the African countries which use IRS. The less extensive use of IRS vector control may reflect the more focal nature of malaria outside Africa, where smaller proportions of the population at risk would benefit from large-scale spray programmes.

Potential for insecticide resistance: Current methods of malaria control are highly dependent on a single class of insecticides, the pyrethroids, which are the most commonly used compounds for IRS and the only insecticide class used for ITNs. Pyrethroids are exceptionally safe for people and the environment, and effective compared to other classes of insecticide used in public health. However, the widespread use of a single class of insecticide increases the risk of mosquitoes developing resistance, and this could rapidly lead to a major public health problem. The risk is of particular concern in sub-Saharan Africa, where insecticide resistance has been reported in 27 countries and where insecticidal vector control is being deployed with unprecedented levels of coverage. Interim guidance on insecticide management is available and a *Global Action Plan for Insecticide Resistance Management* will be released in 2012. Prudent management of insecticide use, including monitoring for resistance and adopting practices which minimize selective pressure for insecticide resistance, are required to preserve the effectiveness of this important malaria control tool.

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Chapter 5

Preventive therapies for malaria

This chapter reviews (i) the adoption of policies and implementation of programmes to expand access to and utilization of intermittent preventive treatment of malaria in pregnancy and in infants and (ii) progress in the development of two new therapeutic tools for malaria prevention: seasonal malaria chemoprevention and malaria vaccine.

5.1 Intermittent preventive treatment

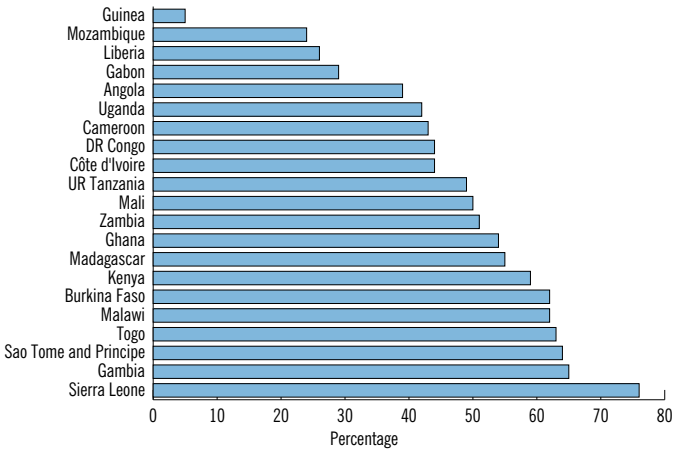
5.1.1 Intermittent preventive treatment of pregnant women

The countries which had adopted intermittent preventive treatment for pregnant women (IPTp) with sulfadoxine-pyramethamine (SP) as national policy by the end of 2010 include 35 high-burden countries in sub-Saharan Africa spanning two WHO Regions, and also Papua New Guinea (**Table 5.1**).

For 21 of the 36 high-burden countries which have adopted IPTp as national policy, consistent data for 2010 were available from NMCPs on both the second dose of IPTp (numerator) and the number of women who had attended antenatal care at least once (denominator). Approximately half of women attending antenatal clinics (52%, inter-quartile range 47%–61%) received a second dose of IPTp in countries which responded (**Figure 5.1**).

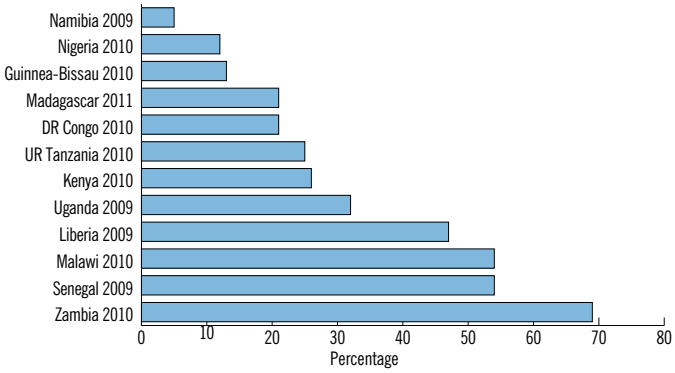
Information on the proportion of all pregnant women receiving the second dose of IPTp can be derived from household surveys. Data on IPTp for pregnant women from surveys in 2009–2011 were available for 12 countries in Africa, representing a combined population of 409 million. Although some low IPTp coverage rates for two doses may be attributable to the fact that some pregnant women do not attend ANC or only make a single ANC visit, a substantial proportion of all pregnant women nonetheless did not receive a second dose of IPTp. In 2009–2011, the percentage of women who received two doses of IPTp during pregnancy ranged from 5% in Namibia to 69% in Zambia (**Figure 5.2**); the weighted average remained low, at 23%, primarily due to low coverage rates in Nigeria and the Democratic Republic of the Congo.

Figure 5.1 Proportion of women attending antenatal care receiving the second dose of IPTp, 2010



Source: NMCP reports

Figure 5.2 Proportion of all pregnant women receiving the second dose of IPTp, 2009-2011



Source: Household survey data

TABLE 5.1
Adoption of Policies for Intermittent Preventive Treatment for Pregnant Women (IPTp)

Policy	Africa	Americas	Eastern Mediterranean	Europe	South-East Asia	Western Pacific	Grand Total
IPTp used to prevent malaria during pregnancy	33	N/A	2	N/A	N/A	1	36
Number of endemic countries/areas	**43**	**23**	**12**	**8**	**10**	**10**	**106**
Number of* P. falciparum *endemic countries/areas	**43**	**18**	**8**	**0**	**9**	**9**	**87**

5.1.2 Intermittent preventive treatment of infants

Intermittent preventive treatment in infancy (IPTi) with SP is the administration of a full therapeutic course 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 infants at risk of malaria. WHO recommends IPTi in countries with moderate to high malaria transmission, where levels of parasite resistance to SP are low. So far no country has adopted IPTi as national policy since its recommendation in 2009; however, the IPTi implementation guidelines were released only in September 2011, and eight countries recently met to discuss possible implementation.

5.2 New therapeutic tools for malaria prevention

The scale-up of currently available tools for malaria prevention and treatment has resulted in substantial progress in malaria control in many countries. However, new tools are needed, especially in countries where there is high malaria transmission potential. Two new therapeutic tools currently in development for malaria prevention are seasonal malaria chemoprevention and malaria vaccines.

5.2.1 Seasonal malaria chemoprevention

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

SMC has been studied most frequently in areas with seasonal malaria transmission where the main burden of malaria is in older children, rather than in infants, and the main risk of clinical malaria is restricted to a few months each year. WHO is presently assessing the potential role of SMC for use as an additional malaria measure strategy in different malaria epidemiological settings.

As a first step in the policy development process, the Technical Expert Group (TEG) on Preventive Chemotherapy was convened in May 2011 to review the current evidence on the efficacy, safety and feasibility of large-scale implementation of SMC, and to assess the risks and potential benefits. The report of this consultation will be presented to the newly established Malaria Policy Advisory Committee (MPAC) in early 2012. The MPAC will review the recommendations of the TEG together with additional analysis carried out since the consultation, and advise WHO on the potential role of SMC in the control of malaria. In accordance with this advice, a WHO policy recommendation will be formulated in the first quarter of 2012.

5.2.2 Malaria vaccine development

An effective vaccine against malaria has long been envisaged as a valuable addition to the available tools for malaria control. There are as yet no licensed malaria vaccines. A single candidate vaccine is currently being assessed in phase 3 clinical trials, and approximately 20 other projects are 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 and PATH Malaria Vaccine Initiative (MVI), with funds provided by the Bill & Melinda Gates Foundation to MVI. The vaccine manufacturer's target group for this vaccine is African infants resident in malaria-endemic countries, with vaccination administered at 6–14 weeks of age, together with other vaccines administered routinely to infants.

The first of three sets of results from the phase 3 trial were published in October 2011 and were consistent with results from the phase 2 trials (*1*). Conducted at 11 trial sites in seven countries across sub-Saharan Africa, the preliminary results from the phase 3 trial showed that the vaccine reduced the incidence of clinical malaria by 55% when evaluated over 12 months following the third dose; this conclusion was based on data from the first 6000 children, aged 5–17 months.

A preliminary analysis for efficacy against severe malaria was made when 250 cases accrued in both the 5–17 month and 6–14 week age groups in the trial. This analysis found an efficacy of 35% with variable follow-up from zero to 22 months after the third dose. The full trial results will become available to WHO in late 2014 and will include 30 months' safety and efficacy data from the target group aged 6–14 weeks, together with data on an 18-month booster dose and site-specific efficacy data.

The Joint Technical Expert Group on Malaria Vaccines, set up by the WHO Global Malaria Programme and Department of Immunization, Vaccines & Biologicals in April 2009, has advised that, in the light of the published results to date, a policy recommendation could be made 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. This vaccine will then be considered for potential addition to the current WHO recommended malaria preventive 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[1], 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 2025 goal set out in the malaria vaccine technology roadmap – a vaccine with at least 80% efficacy against clinical malaria. WHO also participated in the

1 Malaria Vaccine Project Spreadsheets (known as 'the rainbow tables'): www.who.int/vaccine_research/links/Rainbow/en/index.html

malaria eradication R&D agenda (malERA)[1] consultative process which supported the concept of a vaccine that can interrupt malaria transmission. The long-term goals for malaria vaccines will therefore include not only protection against clinical malaria, but also impact against malaria transmission as a core feature of vaccine performance (*2*).

5.3 Conclusions

Scale-up of intermittent preventive treatment of pregnant women: There has been substantial progress in scaling up IPTp in several countries, but implementation has been slow in many others. Overall progress in achieving coverage targets across high burden malaria-endemic countries has lagged behind the scale-up of other malaria control measures. This limited progress is unlikely to be related solely to low ANC attendance, as ANC attendance is fairly high in Africa, and even among women attending the clinics, IPTp coverage is only moderate. Simplified IPTp messages and health worker training have been shown to improve IPTp coverage (*3*). To facilitate scale-up, malaria control programmes should encourage ANC attendance and identify barriers to implementation. Some countries (Benin, Senegal, Ghana and Mali) have already decided to document the barriers to the implementation of IPTp as well as to the attendance of ANC. As the effectiveness of IPTp with SP is sensitive to changes in malaria burden and the level of resistance to SP, a decreasing malaria burden or increasing resistance to SP may render IPTp with SP a less attractive intervention in some areas. In such situations, programmes may need to reorient their malaria prevention efforts in pregnancy towards other approaches.

Implementation of intermittent preventive treatment of infants: The recent WHO policy recommendation for IPTi is based on results from seven studies on IPTi with SP in areas of moderate to high transmission of malaria, with varied levels of other malaria control measures in place. These studies showed that 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 patients with malaria parasitaemia and admissions for all causes. Introduction of this new intervention builds on established collaboration between malaria and other maternal and child health programmes in the distribution of ITNs through EPI services and delivery of IPTp in antenatal clinics. These established relationships should facilitate implementation in countries wishing to add IPTi to their malaria control efforts. The efficacy of IPTi is dependent upon resistance levels to SP, and, as for IPTp, new regimens are under investigation. These new regimins may prove useful where SP resistance prohibits IPTi implementation.

Development of policy on new tools for malaria control: An assessment of seasonal malaria chemoprevention will be one of the first tasks taken up by WHO's newly established Malaria Policy Advisory Committee. While much progress has been made in scaling up existing interventions, further efforts will be required to introduce and widen the application of new tools. The MPAC will have an important role in policy development on new tools for malaria control, an essential step towards making the tools available in the communities that will benefit from them.

1 The Malaria Eradication Research Agenda (malERA) initiative was a consultative initiative aimed at identifying current knowledge gaps and new tools needed for malaria eradication; it concluded its activities in 2011.

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Chapter 6

Diagnostic testing and treatment of malaria

This chapter reviews (i) 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, (ii) the adoption of policies and implementation of programmes to expand access to, and utilization of, effective treatment for malaria, (iii) the progress made in withdrawing oral artemisinin-based monotherapies from the market, (iv) the current status of drug efficacy monitoring and the latest trends in antimalarial drug resistance, and (v) efforts to contain artemisinin resistance on the Cambodia-Thailand border.

6.1 Diagnostic testing for malaria

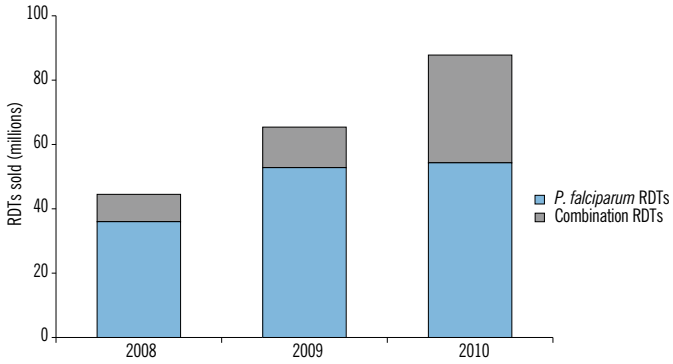
6.1.1 Policy adoption

WHO recommends that all persons of all ages in all epidemiological settings with suspected malaria should receive a parasitological confirmation of diagnosis by either rapid diagnostic test (RDT) or microscopy (*1*). National adoption and implementation of policies for diagnosis of malaria by WHO Region are shown in **Table 6.1** and by country in **Annex 4A**. In 2010, 37 of 43 malaria-endemic countries in the WHO African Region and 53 of 63 endemic countries in other Regions reported having adopted a policy of providing parasitological diagnosis for all age groups, an increase of 4 countries in the African Region and 8 elsewhere. A total of 20 African countries are now deploying RDTs at the community level, as are 28 countries in other Regions, 10 more countries than in 2009.

6.1.2 RDTs procured and distributed

RDTs procured: In 2011, manufacturers participating in the WHO Malaria RDT Product Testing Programme supplied data on RDT sales to public and private sectors in malaria endemic regions (**Figure 6.1**). Sales have increased dramatically over the last 3 years, for both *P. falciparum*-specific tests and combination tests that can detect more than one species.

Figure 6.1 RDT sales to public and private sectors 2008–2010



Source: data provided by 31 manufacturers participating in the WHO Malaria RDT Product Testing Programme

Results of product quality testing undertaken by WHO, Foundation for Innovative New Diagnostics (FIND), Special Programme for Research and Training in Tropical Diseases, and the US Centers for Disease Control and Prevention (CDC) show an

TABLE 6.1
Adoption of policies for malaria diagnosis's by WHO Region

Policy	Africa	Americas	Eastern Mediterranean	Europe	South-East Asia	Western Pacific	Grand Total
Patients of all ages should get diagnostic test	37	19	8	7	9	10	90
Only patients >5 years get diagnostic test	4						4
RDTs used at community level	20	8	6		8	6	48
Malaria diagnosis is free of charge in the public sector	28	18	8	8	10	9	81
Number of endemic countries/areas	**43**	**23**	**12**	**8**	**10**	**10**	**106**
Number of P. falciparum *endemic countries/areas*	**43**	**18**	**8**	**0**	**9**	**9**	**87**

improvement in test quality over time (*2*), and, as a consequence, proportionally more high quality tests are being procured over time (**Figure 6.2**). The panel detection score (PDS) measures the performance of RDTs against samples of known parasite presence; WHO recommends procurement of RDTs with PDS greater than 50% against low parasite densities of *P. falciparum* in areas of high transmission, and PDS greater than 75% for areas of low to moderate transmission. According to data supplied to FIND by 17 manufacturers, nearly 90% of RDTs procured in 2011 had panel detection scores of more than 75%, compared with only 23% of RDTs procured in 2007, before the Product Testing Programme began.

RDTs distributed: The reported number of RDTs delivered by NMCPs has increased rapidly, from less than 200 000 in 2005 to more than 50 million in 2010 (**Figure 6.3**). Most of the RDTs delivered (65%) were used in the African Region followed by the South-East Asia Region (30%) and Eastern Mediterranean Region (5%). Although these totals underestimate the total quantity of RDTs distributed (only 32 of the 44 endemic countries in Africa reported these data in 2010), the same upward trend is seen as in RDT sales, with most growth occurring in the African Region.

6.1.3 Microscopic examinations undertaken

The number of patients tested by microscopic examination increased to a peak of 165 million in 2010 (**Figure 6.4**). The global total is dominated by India, which accounted for over 100 million slide examinations in 2010. Decreases in the number of patients examined by microscopy were reported in the Americas, Eastern Mediterranean, and European Regions which may be due to a reduction in numbers of cases, particularly in the American and European Regions, and to increased use of RDTs. The number of patients examined by microscopy remains relatively low in the African Region, although it has increased over the last four years.

6.1.4 Place of care for patients with fever

With the adoption of a new diagnostic testing policy for suspected malaria, delivery of care by trained health-care providers is increasingly important. The providers considered to be appropriate may vary by country context. Household survey data from 42 countries from 1990 to 2010, with each country weighted equally, show that more children received care from public health facilities than private in the African and American Regions, while relatively few received care from community health workers (**Figure 6.5**). A more recent subset of surveys indicates that the proportion seeking care from different providers differs greatly by country (**Figure 6.6**), which suggests that the strategy for expanding access to treatment may also need to vary by country.

6.1.5 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 (**Figure 6.7**), with the value for the South-East Asia Region heavily influenced by India. The testing rate in the Eastern Mediterranean Region rose to 80% in 2010 while in the African Region it has risen from 20% in 2005 to 45% in 2010. Much of the increase in testing in the African Region is from an increase in use of RDTs, which accounted for nearly one third of confirmed cases diagnosed in 2010. The reported testing rate may overestimate the true extent of diagnostic testing in the public sector since countries with higher testing rates may have a greater propensity to report, and therefore countries with lower testing rates are underrepresented in the overall rate.

As diagnostic testing is scaled up, the need for quality assurance monitoring becomes even more important. In 2011, WHO and global malaria partners released an operational manual on improving access to malaria diagnostic testing (3), which included guidance on quality management of malaria diagnostic testing programmes. Some malaria programmes have made special efforts to improve the quality of diagnostic testing (**Box 6.1**).

BOX 6.1
Quality assurance for malaria microscopy in the Philippines

The quality assurance (QA) system for malaria microscopy in the Philippines, which was first piloted in five provinces in Mindanao in 2005, has now been expanded to 31 provinces. The Philippines Department of Health coordinates and monitors the implementation of the system with stakeholders at the national, provincial and/or regional level. The Research Institute for Tropical Medicine (RITM) is the national reference centre for QA and provides a core group of trainers who conduct training at all levels of the system. Other partners include ACTMalaria and WHO, which provide experts for conducting external competency assessments and training materials, the Global Fund and the Centers for Health Development (CHD).

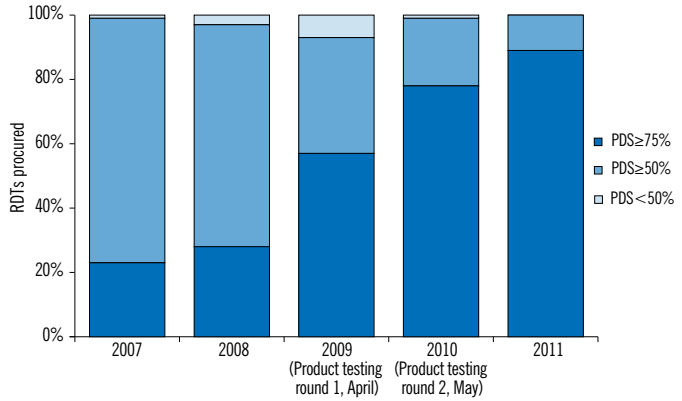
Microscopists are assessed at three levels: Level 1 – entry level for microscopists who undergo the basic malaria microscopy training; Level 2 – 82 qualified validators who are assessed by RITM every 2 years; and Level 3 – the national core group of 26 trainers who are certified through the WHO regional accreditation system every two to three years.

The Level 3 core group has attained performance benchmarks of >90% score in the detection of parasitemia, >90% score in species identification, and >50% on blood film readings that fall within ±20% of the true parasite count. The Level 2 validators adopt the appropriate slide sampling scheme based on the number of slides that each microscopist had read the previous year. Following the expansion of the QA system, the 457 Level 1 trained microscopists who have achieved an average of 80%–90% proficiency are currently providing quality diagnostic services.

6.1.6 Utilization of parasitological tests in the private sector

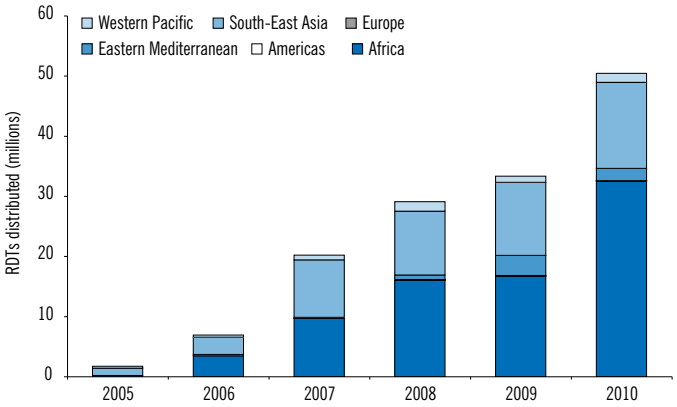
Data reported by ministries of health on the number of RDTs distributed and patients examined by microscopy or RDTs generally cover the public sector only. However, approximately 40% of malaria patients worldwide seek treatment in the private sector,

Figure 6.2 RDTs sales by panel detection score (PDS)



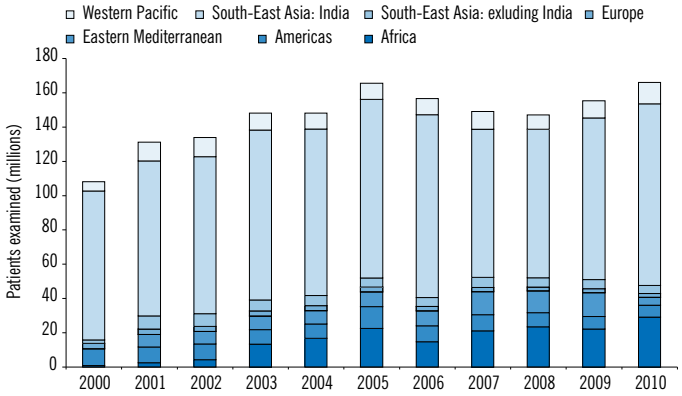
Source: Data provided to FIND by 17 manufacturers eligible for the WHO Malaria RDT Product Testing Programme

Figure 6.3 RDTs distributed by NMCPs, by WHO Region



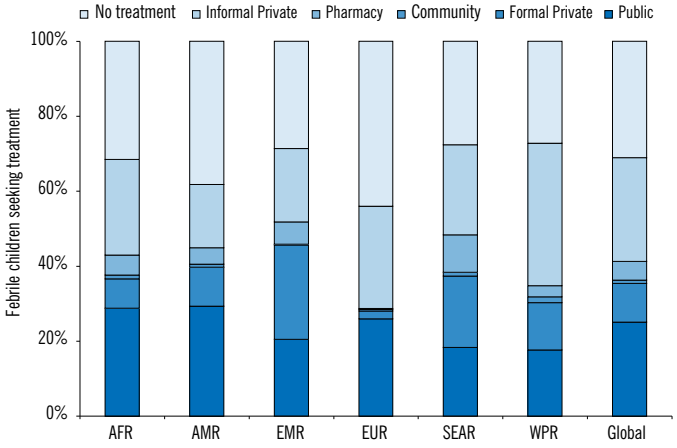
Source: NMCP reports

Figure 6.4 Number of patients examined by microscopy, by WHO Region



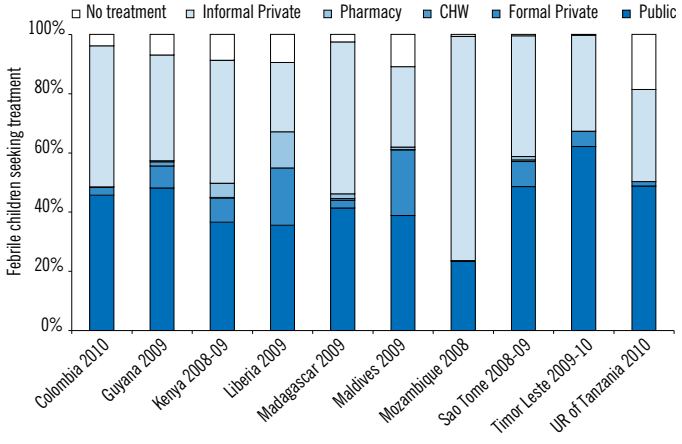
Source: NMCP reports

Figure 6.5 Proportion of febrile children seeking treatment from different sources, by WHO Region



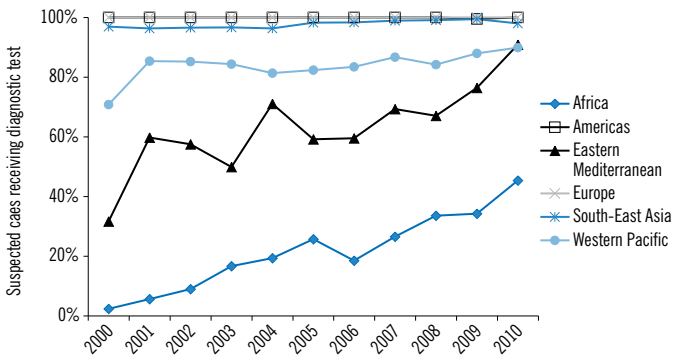
Source: Household survey data

Figure 6.6 Proportion of febrile children seeking treatment from different sources, 2008–2010



Source: Household survey data

Figure 6.7 Proportion of suspected malaria cases attending public health facilities that receive a diagnostic test



Source: NMCP reports

which includes regulated health facilities, pharmacies and other retail outlets *(4)*. Information on the extent of parasitological testing in the private sector is limited. Country-specific data collected by ACT Watch[1] in 2009–2010 suggest that with few exceptions, both microscopy and RDTs are more widely available in the public sector. Consequently, among selected countries in Africa, the proportion of children under 5 who received a blood test for suspected malaria was higher in public than in private facilities (**Figure 6.8**).

6.1.7 Malaria diagnostics in the community

A total of 42 countries report deployment of RDTs at the community level and 11 million patients were tested in 2010, including 10 million patients tested with RDTs in India. However, patients tested using RDTs in the community represent a relatively small proportion (5%) of the total number of patients receiving a parasitologic test. For 10 countries, information on RDT positivity rates was available from NMCP reports for the community and at public health facilities (**Figure 6.9**). Although community diagnosed cases accounted for a low proportion of all cases, in most of the countries, test positivity rates for these cases were similar to or higher than those reported for outpatient cases. A reporting bias cannot be excluded, however, this suggests that further expansion of diagnostic testing to the community level could potentially identify many additional confirmed malaria cases.

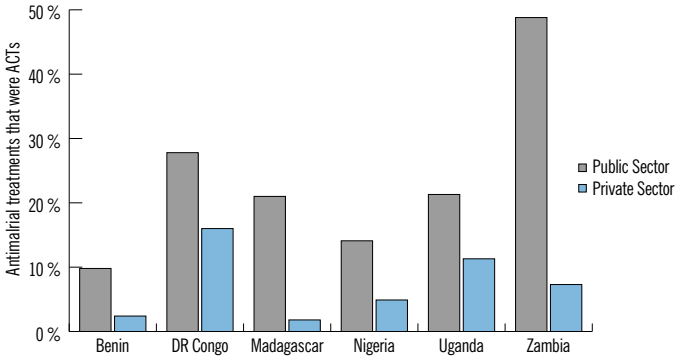
6.1.8 Scaling up diagnostics

Despite recent expansion of malaria diagnostic testing, many patients still do not receive a parasitological test. In the African Region in 2010, the number of ACTs distributed by NMCPs was more than twice the total number of tests (microscopy + RDTs) carried out in 2010, indicating that many patients receive ACTs without confirmatory diagnosis. 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 financing and subsequent procurement of RDTs.

The use of RDTs provides the most feasible means of rapidly expanding diagnostic testing, especially in peripheral health facilities and at community level in remote rural areas. The introduction of RDTs can significantly reduce expenditures on antimalarial drugs,

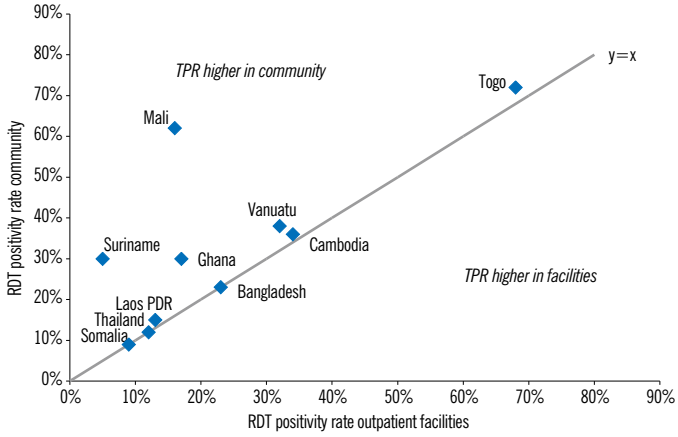
1 www.actwatch.info

Figure 6.8 Proportion of children under 5 with fever receiving a blood test for malaria



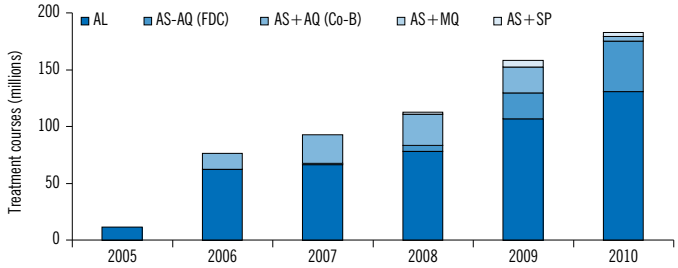
Source: adapted from Littrell, M., et al. Monitoring fever treatment behavior and equitable access to effective medicines in the context of initiatives to improve ACT access: baseline results and implications for programming in six African countries. Malaria Journal*, 2011, 10:327.*

Figure 6.9 RDT positivity rate among patients tested in outpatient facilities and in the community for 10 countries, 2010



Source: NMCP reports

Figure 6.10 ACT sales to the public sector, 2005–2010



Source: data provided by 8 companies eligible for procurement by WHO/UNICEF

TABLE 6.2
Adoption of Policies for Malaria Treatment by WHO Region

Policy	Africa	Americas	Eastern Mediterranean	Europe	South-East Asia	Western Pacific	Grand Total
ACT is used for treatment of of *P. falciparum*	42	10	12		9	9	84
ACT is free of charge for all age groups in public sector	28	10	7		8	7	60
ACT is free of charge only for under 5 years old in the public sector	5					1	6
ACT is delivered at community level	24	6	2		2	4	38
Pre-referral treatment with quinine/artemether IM/artesunate suppositories	34	4	6		7	7	58
Therapeutic efficacy monitoring is undertaken	27	10	5		7	6	55
Number of endemic countries/areas	**43**	**23**	**12**	**8**	**10**	**10**	**106**
Number of* P. falciparum *endemic countries/areas	**43**	**18**	**9**	**0**	**9**	**9**	**87**

BOX 6.2
Reductions in ACT use after RDT introduction in Zambia

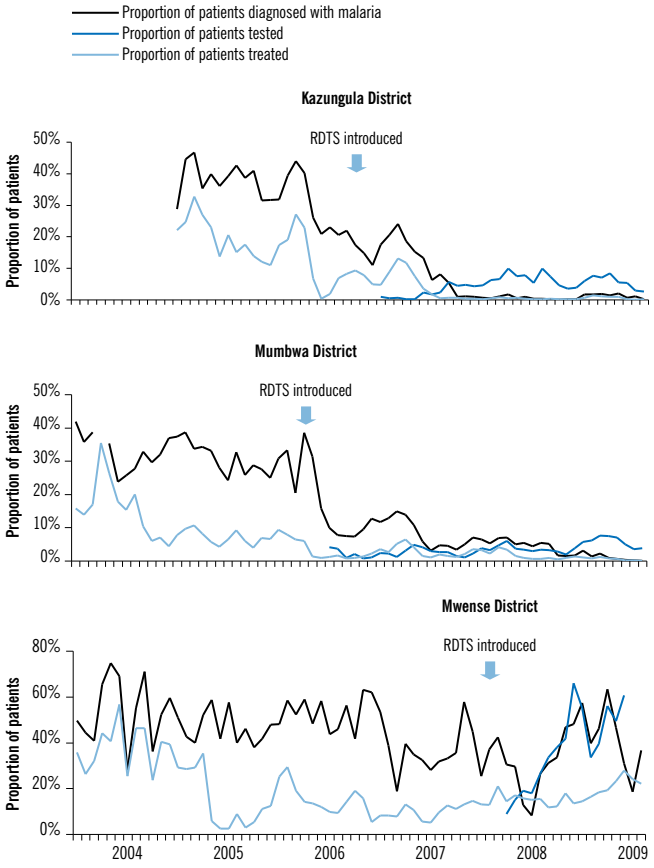
Malaria remains a public health problem in Zambia, despite recent progress in its control. ACTs were introduced in 2004 and RDTs at the village level in 2007. Diagnostic testing before starting antimalarial treatment is compulsory, where capacity exists, for patients above five years of age and recommended where possible for patients under five years of age. RDTs are made available primarily at health centres and health posts, with priority given to facilities without microscopy.

The results of a scale up in diagnostic testing can be seen in data for the period January 2004 to August 2009 from Kazungula, Mumbwa and Mwense districts in southern, central and northern Zambia respectively. After RDTs were introduced, testing rates have gradually increased over time with a corresponding reduction in the number of reported cases of malaria (which were previously diagnosed symptomatically and included non-malaria fevers) and consumption of antimalarial drugs.

There were differences between districts, with the two lower prevalence districts, Kazungula and Mumbwa, showing large reductions in both the proportion of patients reported as having malaria and those given antimalarial treatment, while in Mwense district no clear trends were discernable. It is possible that testing excluded fewer patients from malaria diagnosis and treatment in Mwense owing to the higher incidence of malaria in that district.

The data from Mumbwa and Kazungula districts show that reductions in ACT consumption did not occur until 6–18 months after the introduction of RDTs. This delay could be due in part to improved acceptance of test results over time, as clinicians gradually gained confidence in the new tests. Across the three districts, RDTs led to an approximate 9% reduction in prescriptions of antimalarial drugs which led to an overall reduction in commodity costs of approximately US$ 500 per facility per year, at current RDT and ACT prices.

Figure Box 6.2 Proportion of patients recorded as malaria, tested and treated, and introduction of RDTs in three districts, Zambia, 2004–2009



but usually this cost saving does not fully compensate for the cost of the tests. (5) Moreover, as diagnostic testing is expanded, the decrease in antimalarial use is likely to be gradual and programmes will experience a transition period in which the needs for treatment may equal those for diagnostic testing (**Box 6.2**). While any overall cost-savings will depend on the intensity of malaria transmission and other factors, RDTs appear to be cost-effective compared to presumptive treatment, largely due to improved patient outcomes for non-malarial febrile illness (6).

6.2 Treatment of malaria

6.2.1 Policy adoption

By the end of 2010, ACTs had been adopted as national policy for first-line treatment in 84 countries. In some cases *P. falciparum* cases will be exclusively imported. Chloroquine is still used in some countries in the Region of the Americas where it still remains efficacious. By mid-2010, 70 countries were deploying these medicines within their general health services, with varying levels of coverage.[1] The adoption of policies for the treatment of malaria is summarized by WHO Region in **Table 6.2** and by country in Annex 4A and 4B.

6.2.2 Quantity of ACTs procured and distributed

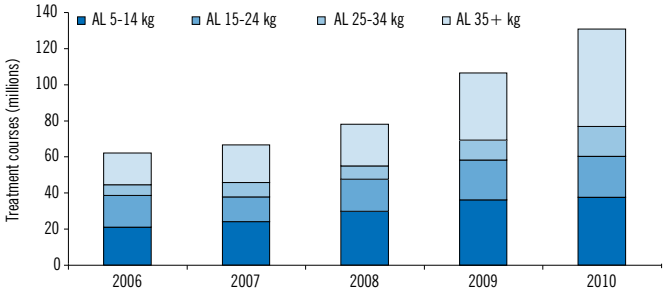
ACTs procured: The number of ACT treatment courses procured by the public sector increased greatly from 11 million in 2005 to 76 million in 2006, and reached 181 million in 2010 (**Figure 6.10**).

1 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.

Artemether-lumefantrine (AL) accounted for the largest volume of ACTs procured by the public sector (70%) in 2010. The second ACT in terms of volumes procured was artesunate + amodiaquine, which increased from fewer than 1 million treatment courses in 2007 to 41 million in 2010.[1] The proportion of fixed-dose combination ACTs (with the two medicines combined in the same tablet), which are preferred because of improved patient adherance to the recommended regimen, has been increasing and in 2010 accounted for 97% of all ACT sales.

Between 2006 and 2008, most AL was procured for young children weighing less than 15 kg, and the smallest proportion was supplied for patients with a body weight of 25–34 kg. Compared with previous years, in 2010 an increased amount of AL was procured for patients with a body weight over 35 kg, while supplies procured for young children weighing less than 15 kg[2] were unchanged (**Figure 6.11**). Whether this represents a response to changing epidemiology and age distribution of cases in endemic countries, or to other market forces, is unclear.

Figure 6.11 Artemether-lumefantrine sales to the public sector by weight-based treatment course

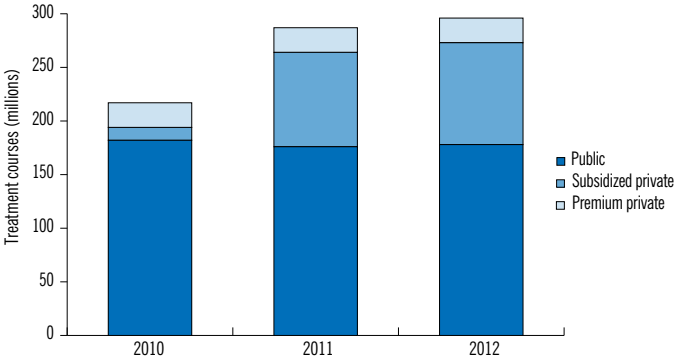


Source: data provided by 4 companies prequalified by WHO.

Forecasting future demand for ACTs is crucial for planning by manufacturers, funding agencies, and malaria control programme managers. In forecasts of global ACT demand (**Figure 6.12**), the proportion of ACT sales in the public sector compared to the private sector is changing, largely as a consequence of the implementation of the Affordable Medicines Facility-malaria (AMFm) initiative (**Box 6.3**). Overall ACT demand is estimated to reach 287 million treatments in 2011, an increase of 32% over that in 2010. The driver of this increase is the almost 10-fold increase in subsidized private sales through the AMFm while estimated premium (non-subsidized) private sales remain unchanged.

ACTs distributed by ministries of health: The number of ACTs distributed by NMCPs appears to have increased between 2007 and 2010 but reporting by countries is incomplete, and the totals do not match those delivered by manufacturers. The majority of ACTs distributed by NMCPs are in Africa, which accounted for 110 of 117 million treatments worldwide in 2010. Country reports indicate that by the end of 2010, 19 African countries had distributed sufficient courses of ACTs to cover more than 50% of patients treated in the public sector and 17 of these countries were providing ACTs for nearly 100% of public sector malaria cases seen.

Figure 6.12 Projected global ACT demand 2010–2012



Source: ACT Forecasting Consortium. presentation at WHO-RBM Round Table on ACT Supply, September 8, 2011 (http://www.rollbackmalaria.org/partnership/wg/wg_procurementsupply/docs/RBM-WHO-Round-Table-on-ACT-Supply.pdf).

6.2.3 Utilization of appropriate antimalarial medicines to treat febrile children

It has been difficult to track the extent to which malaria cases confirmed by RDT or microscopy receive antimalarial medicines because information on diagnostic testing has not generally been included in household surveys, and diagnostic test results are usually not linked to the treatment given to patients. Similarly, while routine information systems generally 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.

On the basis of the available data it is possible to examine the proportion of current antimalarial treatments that use an ACT. ACTWatch conducted household surveys in selected countries during 2009–2010 and collected information on antimalarial medicines received by patients in different health sectors (**Figure 6.13**). Among those surveyed in six countries, a higher proportion of patients attending a public facility received an antimalarial (of any type) than those attending private facilities, and among those who received an antimalarial, patients attending public facilities were more likely to receive an ACT. These results are consistent with those reported by WHO from an analysis of antimalarial treatments in 37 nationally representative household surveys (7) and suggest that ensuring access to ACTs remains a challenge in both public and private health care sectors.

Expanding malaria diagnostic testing and treatment to the community level would further improve access to appropriate antimalarial therapy. Programmes implementing community case management of malaria have been evolving (**Box 6.4**) and many now appropriately favour an integrated approach that includes other major childhood illnesses, namely pneumonia and diarrhoea.

1 WHO monitors the global supply of and demand for the artemether–lumefantrine fixed-dose combination as part of the requirements of the Memorandum of Understanding signed with the manufacturer Novartis in 2001, in order to make Coartem® available at cost price for distribution in the public sector of malaria-endemic developing countries.

2 Information on past AL sales for public sector use was obtained from manufacturers of ACTs which have been prequalified by in 2010.

BOX 6.3
Forecasting global ACT demand

The ACT Forecasting Consortium was created to develop regular forecasts of the global demand for ACTs and artemisinin requirements; it is sponsored by UNITAID, managed by Boston Consulting Group (BCG) and involves forecasting experts from BCG, Clinton Health Access Initiative (CHAI), and the International Logistics Programme at MIT-Zaragoza. The Consortium produces quarterly updates of a 2-year global forecast of ACT demand and artemisinin supply, providing important information to the main funding agencies and the pharmaceutical companies which supply ACTs.

Forecasting the ACT market is difficult because market data are incomplete, and there is often only limited access to country data on past consumption, current procurement, and projected demand. In addition, the lead time for the market to react to changes in demand is lengthy, primarily due to the long production time for artemisinin, which is currently derived exclusively from plants. The forecast combines available market data from all major funding and procurement agencies placing orders of prequalified ACTs, with corrective factors based on disbursement levels and procurement lead times, as well as modeled inputs on expected consumer demand in both public and private sectors. The combination of these multiple factors introduces significant uncertainties around the estimates.

Based on the best information available, the Consortium presented the latest forecasts at the recent RBM-WHO Round Table on ACT Supply in September, 2011 (**Figure 6.12**). Global WHO Pre-Qualified ACT consumer demand for 2011 is estimated at 287 million treatments, a 32% increase over 2010. The forecast for 2012 is for 295 million treatments. While the demand via the public sector seems to have reached a plateau after several years of annual increases, the main driver of this recent increase is the significant growth of demand for ACTs in the procurement for the Affordable Medicine Facility for malaria (AMFm). The AMFm was launched in 2010, hosted by the Global Fund, and is currently in Phase I, offering subsidies for purchase of ACTs by public and private First Line Buyers (FLBs) in 7 African countries. In addition to the demand for the private sector via AMFm, the premium private ACT market (i.e. for non-subsidized ACTs) requires an estimated additional 23 million treatments worldwide and has remained relatively constant.

BOX 6.4
From Community Case Management of Malaria (CCM) to integrated Community Case Management (iCCM)

Community Case Management of Malaria (previously known as Home Management of Malaria) has been evolving beyond malaria over the last several years into a more comprehensive strategy that addresses the three main killer diseases of children: malaria, pneumonia and diarrhoea. This new approach is termed integrated Community Case Management, iCCM.

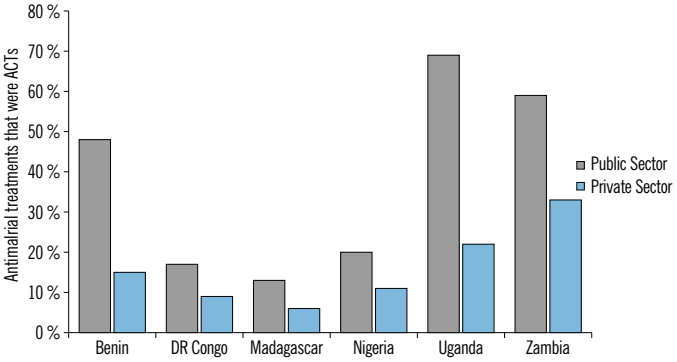
While the former strategy was based on the presumption that most fever cases in malaria endemic countries were due to malaria (and consequently the recommendation was to administer antimalarial medicines to all febrile children indiscriminately), iCCM incorporates the updated malaria treatment guidelines recommendation to confirm malaria infection in all patients prior to treatment. The availability of high-quality RDTs for malaria has made testing for malaria at the community level possible. This places a higher demand for high quality integrated treatment, so that when febrile children are found not to have malaria, there are other treatment options. The significant overlap in the clinical manifestation of pneumonia and malaria, often simultaneous with diarrhoeal disease and malnutrition, further justifies an integrated diagnostic and therapeutic approach.

As part of the iCCM approach, front-line workers at the community level are trained, supplied and supervised to treat children for malaria *and* pneumonia *and* diarrhoea, using ACT, oral antibiotics, and oral rehydration salts and zinc. All patients are screened for the three diseases and treatment is administered based on the results of diagnostic tests that include malaria RDTs, disease history, and respiratory rate.

The first experiences with iCCM are encouraging. In Ghana, nearly all carers of sick children (92%) sought treatment from community-based agents trained to manage pneumonia and malaria (8). Indeed, most (77%) sought care for their children with fever within 24 hours of onset. In Zambia, an iCCM study for pneumonia and malaria found that 68% of children with pneumonia received early and appropriate treatment from community health workers, and overtreatment of malaria significantly declined (9). In Ethiopia, iCCM workers deployed in remote communities delivered 2.5 times as many treatments for the three diseases than all the district's facility-based providers combined (10). The evidence for impact on mortality is still being collected, but programmatic experience suggests that the iCCM strategy can be effective in achieving high treatment coverage and delivering high quality care for sick children in the community.

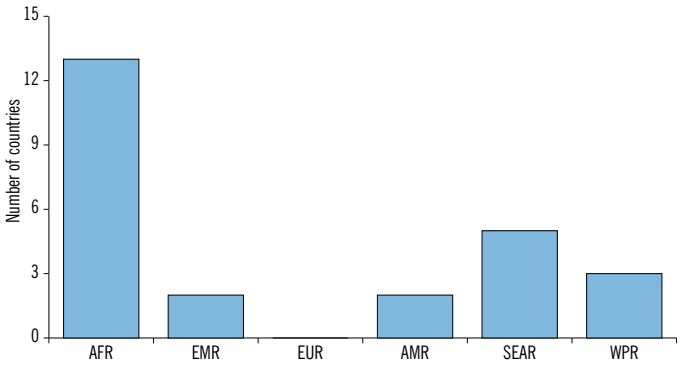
An inter-agency iCCM task force has recently been established with the participation of international partners including WHO, UNICEF and USAID, NGOs (Save the Children, BASICS, International Rescue Committee) and research institutions (Karolinksa Institute, Boston University, University of Dakar, and the Special Programme for Research and Training in Tropical Diseases, TDR). More information on iCCM and programme support tools can be found at the task force web site: www.ccmcentral.com

Figure 6.13 Proportion of ACTs among antimalarial treatments given to febrile children, by sector



Source: adapted from Littrell, M., et al. Monitoring fever treatment behavior and equitable access to effective medicines in the context of initiatives to improve ACT access: baseline results and implications for programming in six African countries. Malaria Journal, 2011, 10:327.

Figure 6.14 Number of countries allowing marketing of oral artemisinin-based monotherapies, by WHO Region



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

6.3 Antimalarial drug resistance

6.3.1 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 indicated by the World Health Assembly in 2007. WHO also calls upon manufacturers to cease the marketing of oral artemisinin-based monotherapies. (For the full text of the WHA resolution, see *http://apps.who.int/gb/ebwha/pdf_files/WHA60/A60_R18-en.pdf.)*

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 Internet.[1] By November 2011, 25 countries were still allowing the marketing of these products and 28 pharmaceutical companies were manufacturing these products, down from 39 one year ago. Most of the countries that still allow the marketing of monotherapies are located in the African Region (**Fig. 6.14**), while most of the manufacturers are located in India. One of the main reasons for the limited success in phasing out oral artemisinin-based monotherapy is the weak regulation of pharmaceutical markets in many malaria-endemic countries. Greater collaboration and involvement of national regulatory authorities is required to ensure complete withdrawal of oral artemisinin-based monotherapies from all countries.

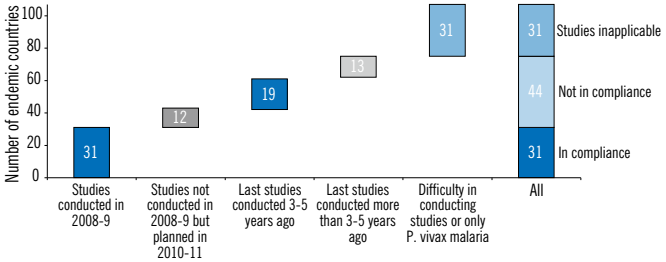
1 Information is available on the internet via the following links:
Manufacturing companies: http://www.who.int/malaria/monotherapy_manufacturers.pdf
National Regulatory Authorities: http://www.who.int/malaria/monotherapy_NDRAs.pdf

6.3.2 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 (11). WHO compiles the results of efficacy tests conducted by national malaria 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 report on antimalarial drug efficacy and drug resistance: 2000–2010* (12). 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 be monitored at least once every two years.

In 2008–2009 studies of first- or second-line antimalarial treatments were completed in 31 of 75 countries where *P.falciparum* efficacy studies are possible (**Figure 6.15**) In 17 countries, efficacy studies are impractical because of low malaria incidence, and 15 countries are endemic for *P. vivax* only. In 32 countries in which therapeutic efficacy studies are feasible, studies were last conducted more than three years ago, longer than recommended by WHO.

Figure 6.15 Status of therapeutic efficacy monitoring in 106 countries endemic for malaria



Source: WHO Global Malaria Program database on antimalarial therapeutic efficacy monitoring by country

Treatment of P. falciparum malaria: major findings related to the development of drug resistance concerning the treatment of *P. falciparum* globally are as follows:

- Artemether-lumefantrine is first- or second-line treatment in 56 countries worldwide and remains highly effective in most parts of the world, with the exception of Cambodia. However, more studies are needed to monitor the efficacy of artemether-lumefantrine, especially in Africa where the treatment is widely used.
- Among the 21 African countries which have adopted artesunate-amodiaquine, six countries have reported at least one study showing a high level of treatment failure (>10%). A high treatment failure rate for this combination was also observed in four Indonesian studies.
- The efficacy of artesunate-mefloquine is lowest in areas where mefloquine resistance is prevalent in Thailand and Cambodia. In Africa and the Americas, the combination remains highly effective.

BOX 6.5
Containment of artemisinin resistance

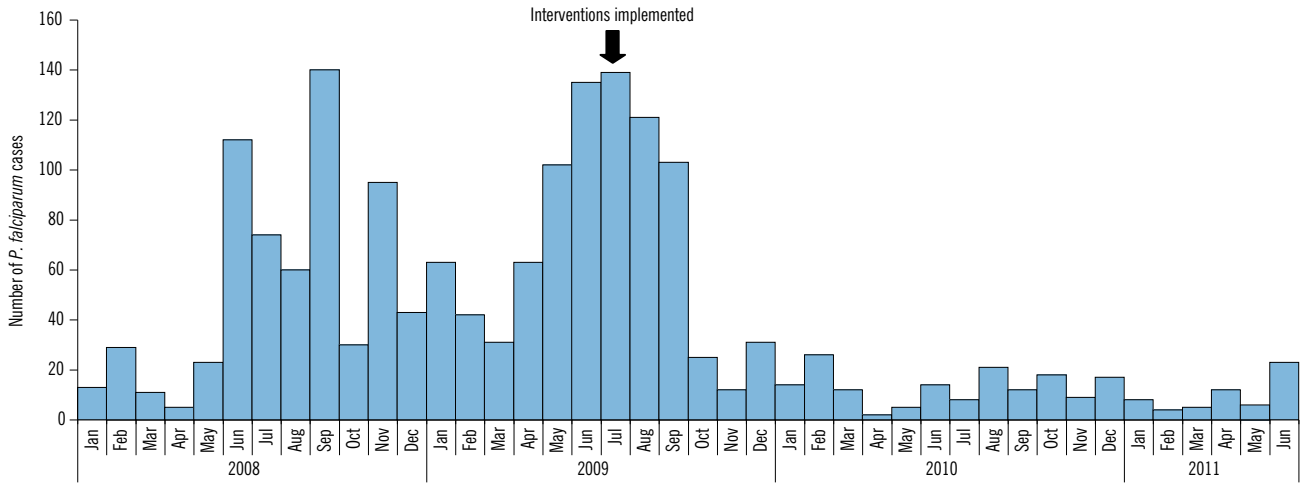
The Global Plan for Artemisinin Resistance Containment (GPARC) recommends that in areas with evidence of artemisinin resistance, an immediate, multifaceted response should be launched with the aim of containing and, if feasible, eliminating the resistant parasites.

Suspected resistance to artemisinins has been identified in four countries in the Greater Mekong subregion. Containment activities were first started in eastern Thailand and western Cambodia, following the evidence of resistance to artemisinins on the Cambodia–Thailand border that was found in therapeutic efficacy studies in 2006. The project started in 2009 and received funding from the Bill & Melinda Gates Foundation for the first two years of activities. The project covered 380 000 people on both sides of the border, in tier 1 areas, where artemisinin resistance had already been detected (Zone 1) and more than 4.1 million people in tier 2 buffer areas, where there was no evidence of resistance but the risk was deemed high (Zone 2). More than half a million LLINs were distributed to achieve universal coverage, allowing every person to sleep under a net each night. In addition, all villages in Zone 1 and all high-risk villages in Zone 2 had access to early diagnosis and treatment provided free of charge by trained village malaria workers. As a result of the project, there has been a drop in the malaria incidence in many of these areas since 2008, notably in *P. falciparum* cases diagnosed at health facilities in Pailin province. Cases declined there after interventions were implemented in 2009 (**Figure Box 6.5**).

Therapeutic efficacy studies in 2009 and 2010 in western Thailand, south-eastern Myanmar and in one province in Viet Nam found >10% of patients with parasitaemia on day 3 after treatment. Consequently, containment projects have been initiated in these areas drawing on the experience gained from the project on the Cambodia–Thailand border. Project components include increased coverage with LLINs, better access to quality assured diagnosis and treatment among local and migrant populations, and directly observed treatment and follow-up of all confirmed falciparum malaria patients, as well as strengthened monitoring and surveillance. Thailand's containment project, which includes both eastern and western provinces, has already been approved for funding from Global Fund Round 10. All the suspected foci of artemisinin resistance are in areas close to the border where there are large numbers of migrants. A regional framework for containment in the Greater Mekong subregion is being developed to strengthen the cross-border collaboration.

In Myanmar, the Ministry of Health, and partners including funding agencies, endorsed a plan for containment of artemisinin resistance in April 2011, and containment activities have started with support from the funding consortium Three Diseases Fund and Bill & Melinda Gates Foundation. In Viet Nam, a containment project has been initiated, similar to that carried out on the Cambodia–Thailand border, and additional funding is being sought.

Figure Box 6.5 ***P. falciparum*** **cases diagnosed by microscopy and RDT at health facilities in Pailin province, by month 2008–2011**



Source: National Malaria Center Cambodia

- Artesunate-sulfadoxine-pyrimethamine remains effective in the countries using this combination as a first-line treatment (this includes countries in the Middle East, South and Central Asia and the Horn of Africa). Failure rates remain high in regions where resistance to sulfadoxine-pyrimethamine is high.

- Data on the therapeutic efficacy of dihydroartemisinin-piperaquine are limited and come mainly from studies carried out in parts or Africa and in the Greater Mekong subregion. More studies are needed before drawing conclusions about its overall efficacy in endemic countries.

The crucial role of monitoring drug efficacy has been demonstrated in the Cambodia–Thailand border area, where studies in 2002–2005 by the Cambodia and Thailand national malaria programmes demonstrated prolonged parasite clearance times following treatment with ACTs. In 2006–2007, two cases of artemisinin resistance were detected in Tasanh, Cambodia, by the Armed Forces Research Institute of Medical Sciences, providing the first evidence of artemisinin resistance. Since 2008, WHO has been coordinating containment activities in this area.

In 2009 and 2010, therapeutic drug efficacy studies also detected suspected artemisinin resistance in western Thailand and south-eastern Myanmar, and in one province in Viet Nam, as evidenced by ≥ 10% of cases with parasites detectable on day 3 after treatment with an ACT. Day 3 parasite detection is one of earliest signs of potential artemisinin drug resistance. Containment activities have begun in Thailand along the Myanmar border, in south-eastern Myanmar and in Viet Nam (**Box 6.5**).

Although the observations suggest that there are changes in parasite sensitivity to artemisinins, ACTs remain clinically and parasitologically effective, except in Pailin province, Cambodia. In Pailin, resistance to both components, artesunate and mefloquine, of a commonly used ACT have been confirmed, and resistance to piperaquine is under investigation after a study in 2010 found 27% treatment failure with dihydroarteminin-piperaquine. Many aspects of artemisinin resistance are still not well understood and more research is needed, e.g. the importance of non-artemisinin component drugs in ACTs needs further clarification. The partner drugs usually have a longer half-life than the artemisinin component, and therefore complement and extend the therapeutic efficacy of the combination. Indiscriminate use of ACTs in patients who do not have malaria risks not only the development of artemisinin resistance but potential failure of the partner drug as well.

Treatment of P. vivax malaria: Chloroquine remains the drug of choice in areas where chloroquine is still effective. Treatment failure on or before day 28 and/or prophylactic failures have been observed in Afghanistan, Brazil, Cambodia, Colombia, Guyana, Ethiopia, India, Indonesia, Madagascar, Malaysia, Myanmar, Pakistan, Papua New Guinea, Peru, the Republic of Korea, Solomon Islands, Thailand, Turkey, Sri Lanka, 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. At least one case of chloroquine-resistant vivax malaria has been confirmed in 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 Conclusions

Utilization of parasitological testing: There have been significant increases in the availability and use of parasitological testing in the last few years, particularly in the WHO African Region where the percentage of reported suspected cases receiving a parasitological test increased from 20% in 2005 to 45% in 2010. Further funding and technical support are required to assist countries to achieve universal diagnostic testing of suspected malaria in the public sector. Given that a substantial proportion of children currently receive care in private facilities where the frequency of diagnostic testing for malaria is generally lower, further efforts are also needed both to increase the utilization of malaria diagnostic testing in the private sector and to encourage patients to seek care from providers who can provide the full range of diagnostic services and appropriate treatment.

Community-based diagnosis and treatment: For the many communities with limited access to public sector or private sector facility-based health-care providers, parasitological diagnosis and treatment of malaria will need to be provided by community-based programmes as already in place in some countries. Community-based programmes may also increase access to health service delivery in urban settings (*13*). The limited available data on testing carried out at the community level indicate that test positivity rates are in line with those among patients seen at public facilities; this implies that expanding access to testing and treatment to the community should have a positive effect on fever management in the periphery. There is progress in integrating community-based malaria programmes with those for other childhood illnesses (iCCM), and early experience in implementation of these programmes is encouraging.

Cost implications of improved diagnosis: Expanded use of diagnostic testing can significantly reduce expenditures on antimalarial drugs, but this saving generally does not fully compensate for the cost of the tests themselves. ACT needs may not decrease immediately after implementation of universal diagnostic testing due to delays in the uptake of testing, inconsistent use of test results in some settings (especially among medical personnel in facilities where microscopy already exists) and the collection and utilization of those data for estimating ACT procurement needs. Countries will need to take this lag time into account when planning diagnostic scale up, and have realistic expectations about the overall cost savings and the time frame. While the likelihood of cost-savings will depend on several factors, particularly the intensity of malaria transmission, RDTs appear to be cost effective compared to presumptive treatment, largely due to the improved patient outcomes for non-malarial febrile illness (*6*).

Access to treatment: Information from manufacturers indicates that the number of ACTs procured has increased in every year since 2005. It is difficult to track the extent to which malaria cases confirmed 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. The development of routine systems that track febrile patients, testing, results, and treatments given would enable better tracking of antimalarial utilization.

Combating drug resistance: The spread of resistance to antimalarial drugs over the past few decades has led to an intensification of efficacy monitoring to allow early detection of resistance in order to revise

national malaria treatment policies and ensure proper management of clinical cases. Containment efforts in the Mekong subregion have shown that malaria incidence can be decreased, a key component of the overall containment plan to halt the spread of resistant parasites. Despite the observed changes in parasite sensitivity to artemisinins, the clinical and parasitological efficacy of ACTs has not yet been compromised, except in Pailin province, Cambodia, where resistance to both ACT components has been found. In other areas in this region, the efficacy of both components of the combination is put at risk. Using an ACT containing a partner drug to which there is already resistance (and is therefore not effective) can increase the risk of development or spread of artemisinin resistance. The indiscriminate use of ACTs without diagnostic testing, especially in areas with higher malaria transmission, may also hasten the development of resistance to the partner drugs in ACTs. Similarly, if the efficacy of the artemisinin component is lost, the efficacy of the partner drug could be jeopardized. It is noted that 25 countries still allow the marketing of oral artemisinin-based monotherapies which threatens the continued efficacy of artemisinin.

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Chapter 7

Impact of malaria control

This chapter reviews trends in malaria cases and deaths and assesses the evidence that malaria control activities have had an impact on malaria disease burden in each WHO Region. Sections 7.1 to 7.7 present national data on malaria cases and deaths, the distribution of *P. falciparum* as compared with other *Plasmodium* species, level of diagnostic testing (as measured by the annual blood examination rate), malaria test positivity rate, and the potential for a plausible link between coverage of interventions for prevention (vector control) and treatment (antimalarial medicines) and trends in malaria burden over time. The comparison of interventions and trends leads to a discussion, and a cautious assessment, of the impact of malaria control across the Regions. Sections 7.8 and 7.9 give updates on malaria elimination and on imported malaria, respectively. The routine case reports presented in Sections 7.2 to 7.7 are part of the database used to estimate malaria incidence and mortality in Section 7.10. Finally, section 7.11 draws together the main conclusions on malaria burden and trends over the decade 2001–2010.

7.1 Assessing trends in the incidence of disease

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 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 three strengths: case reports are recorded continuously over time and can thus reflect changes in the implementation of interventions or other factors; routine case and death reports are often available for all geographical units of a country; and 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 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 that some of the cases reported as malaria may be other febrile illnesses (*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 done, 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 carried out. It is useful to measure the annual blood examination rate (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. 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. Since trends in the number of confirmed cases can be distorted by variations in case detection effort (as measured by ABER) it is often informative to examine trends in slide or test positivity rate, which is less affected by variation in ABER. 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, as this proportion is less sensitive to variation in reporting rates than the number of malaria admissions or deaths.

- Examining the consistency of trends. Unusual variation in the number of cases or deaths that cannot be explained by changes in intervention coverage, climate or other factors, or inconsistency between trends in cases and in deaths, can suggest deficiencies in reporting systems.

Further description of the procedures used is provided in the *World Malaria Report 2010*. The aim is 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. Even so, trends in health facility data may not reflect changes in the entire community. 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 that promote a reduction in cases, such as use of ITNs, are delivered throughout the community and not restricted to health facilities.

7.2 African Region

Because of the diversity of malaria epidemiological settings and control activities among African countries, and the importance of malaria in the African Region as a whole, this report divides the Region's 43 countries which have malaria transmission into four groups: (i) Central Africa; (ii) West Africa; (ii) East Africa and high transmission countries in southern Africa; and (iv) low transmission southern African countries.

7.2.1 Central Africa

Ïn all of the nine countries of this subregion all inhabitants live in areas with a high risk of *P. falciparum* malaria (**Figs A, B**).

The data used to assess trends are the numbers of admissions to hospitals and health centres with inpatient services. Angola and Gabon did not provide data on malaria admissions. In all other countries, malaria admissions were more or less stable (e.g. Central African Republic) or rising (e.g. Republic of the Congo and the Democratic Republic of the Congo) (**Figs D, F**). The sharp increases reported from some countries since 2007 may be due to improved reporting and/or better access to health services.

While there was no evidence of any decrease in malaria cases or deaths in nationally reported data from Equatorial Guinea, the prevalence of childhood infection on the Island of Bioko dropped from 40% in 2004 to 22% in 2005 after the combined implementation of ITNs (44% of children slept under an ITN) and IRS (78% of houses sprayed) (3). In Gabon, a study carried out in the general hospital of Libreville found that the slide positivity rate decreased from 45% in 2000 to 15% in 2008. It was also reported that introduction of IPTp in Gabon was associated with a reduction of 84% in maternal *P. falciparum* infection between 2004 and 2006 (*4*). Such selective studies, however, do not allow general conclusions to be drawn about trends in malaria throughout the subregion.

The percentage of the population potentially covered by ITNs delivered was high (>70%) in 2010 in Burundi, Central African Republic, the Democratic Republic of Congo and Equatorial Guinea (**Fig.G**). Of these countries, all except the Democratic Republic of Congo have at least moderately good access to ACTs (**Fig.H**). Although progress appears to have been made in delivering interventions within the subregion 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, greater emphasis needs to be placed on monitoring and evaluation.

BOX 7.1
Explanation of graphs A to H

A. Population at risk: Populations at high risk for malaria are those living in areas where the number of reported cases is ≥1 per 1000 per year, and those at low risk are living in areas with < 1 case of malaria per 1000 per year (defined at the lowest administrative level for which data are provided). Other parts of the country are free of malaria transmission.

B. Cases due to P. falciparum**:** Average percentage of confirmed cases in which *P. falciparum* was detected singly or in a mixed infection, 2006–2010.

C. Annual Blood Examination Rate (ABER): Number of slide examinations or rapid diagnostic tests carried out each year per person at any level of risk for malaria, expressed as the average percentage 2006–2010.

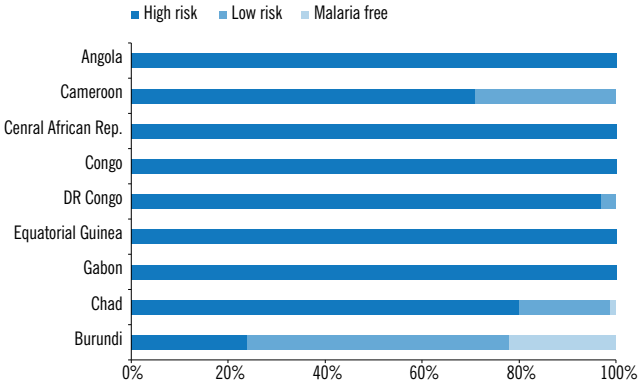
D–F. Trends in the numbers of reported cases: Figure D shows the percentage reductions in numbers of confirmed cases between 2000 and 2010 (fewer cases, upward bars; more cases, downward bars). For countries in the African Region (except Algeria, Cape Verde, Sao Tome and Principe, and five countries in low transmission South-East Africa, where confirmed cases are used) percentage reductions are in numbers of hospital admissions. For all other countries reductions are in confirmed cases reported by routine surveillance from all health facilities. Figures E and F present trends for each country between 2000 and 2010, dividing countries between those that show ≥50% (E) or <50% (F) reductions. Increases in numbers of cases are presented in the same graph as reductions of < 50% (F). The vertical axes in Figures E and F are on a logarithmic scale.

G. IRS and ITNs delivered: The vertical scale shows the percentage of the population at risk for malaria which is potentially covered by IRS and ITNs. It is assumed that each net delivered protects two people, that conventional nets are re-treated regularly, that each net lasts 3 years. For countries outside Africa, the denominator is the population living at high risk for malaria, as the number of malaria cases in areas of low risk is small. The scale of preventive efforts in any year can be calculated as 100 × (number of ITNs delivered in past 3 years + number of people protected by IRS in current year)/population at high risk, assuming that interventions are applied only to populations at high risk and that ITNs and IRS are used in different areas.

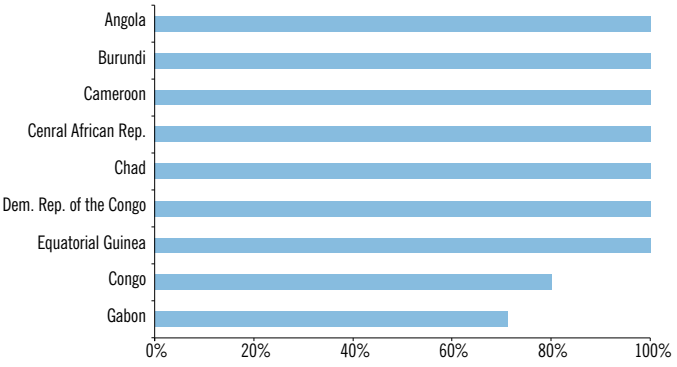
H. Cases potentially treated with antimalarial drugs. The number of treatment courses available is shown as a percentage of malaria cases reported (correcting for reporting completeness in the public sector). The bars for any antimalarial treatment indicate whether an adequate number of treatment courses have been supplied in relation to all malaria cases, including *P. falciparum*. The bars for ACT indicate whether an adequate number of treatment courses were made available for confirmed *P. falciparum* cases in the public sector.

Figure 7.1 Central Africa

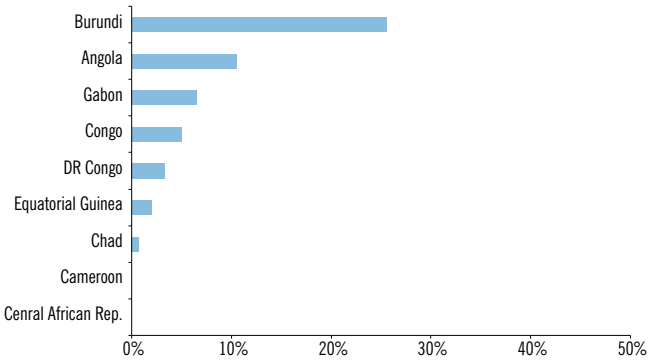
a) Population at risk, 2010



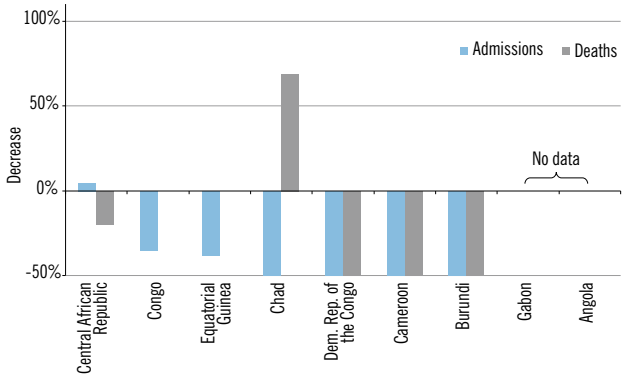
b) Percentage of cases due to P. falciparum, 2006-2010



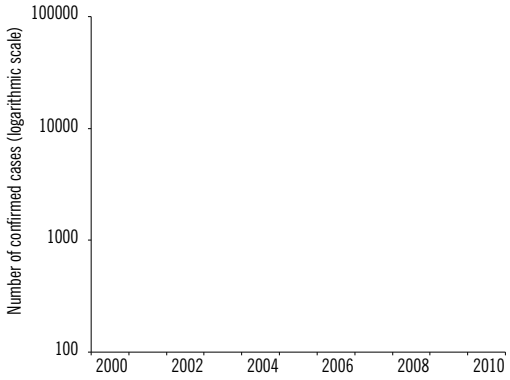
c) Annual blood examination rate, 2006–2010



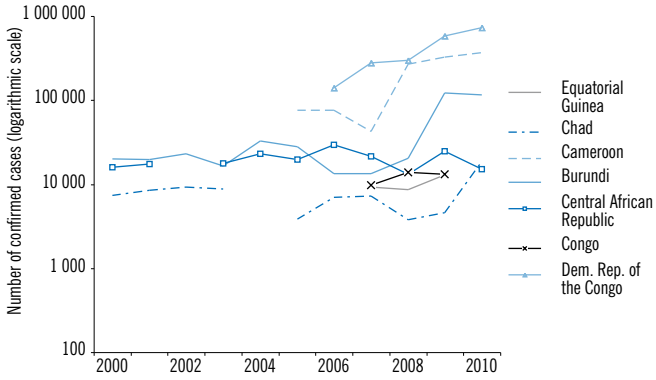
d) Percentage decrease in admissions and deaths, 2000–2010



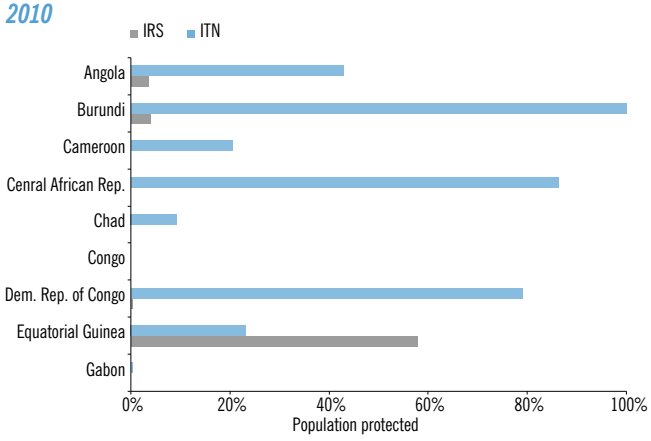
e) Countries with > 25% decrease in malaria admissions, 2000–2010



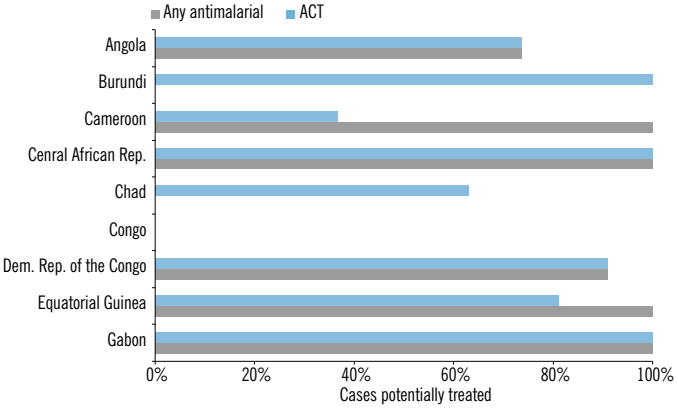
f) Countries with increase or < 25% decrease, 2000-2010



g) Percentage of high risk population protected with IRS and ITNs, 2010



h) Percentage of cases potentially treated with antimalarial medicines, 2010



7.2.2 West Africa

In three of the 18 countries in this subregion intense malaria control has markedly reduced the number of cases over the past decade: Algeria, Cape Verde, and Sao Tome and Principe (**Figs. D, E**)[1]. In the remaining 15 countries, malaria transmission rates are among the highest in the Africa Region with infections almost exclusively due to *P. falciparum* (**Figs. A, B**).

Between 2000 and 2010, the number of confirmed malaria cases in Algeria[2] and Sao Tome and Principe, reported through their national surveillance systems, decreased by more than half (**Figs.D, E**). For all other countries in this subregion, attempts to evaluate malaria trends are based on time series of hospital admissions and deaths (**Figs D, E, F**) because there are few data on parasitologically confirmed malaria cases in health facilities. Cape Verde and Senegal (**Box 7.1C**) have reported reductions in hospital admissions (**Figs.D, E**), and Guinea Bissau in hospital deaths, but in all other countries the numbers of admitted cases have been rising (**Figs. D, F**). These striking upward trends are almost certainly due to improved reporting or access to health services, and as a result, cross-country comparisons of routinely collected data do not show a link between the coverage and the impact of interventions. In 2010, the number of ITNs delivered could potentially have protected more than half of the populations at high risk in Burkina Faso, Gambia, Guinea, Liberia, Mali, Mauritania, Sierra Leone, Senegal and Togo, and yet there is no evidence of reductions in malaria burden as reported through the routine health information system (**Fig.G**).

Apart from Senegal (**Box 7.2**), the strongest associations between interventions and impact are seen in data from two small island countries, Cape Verde and Sao Tome and Principe (**Fig.E**). The diagnostic testing effort in Sao Tome and Principe is high: the ABER exceeds 30% on average, far greater than in other countries in this subregion (**Fig.C**). Cape Verde and Sao Tome and Principe both use IRS at high coverage, and in Sao Tome and Principe IRS is used together with ITNs. In addition, a more detailed evaluation in Sao Tome of malaria cases, admissions and deaths, and of malaria infection rates, has linked malaria decline to the intense use of IRS, ITNs and ACTs (*5*, *6*).

Two other special studies in Burkina Faso and Gambia have pointed to some additional successes in malaria control. In Gambia, a retrospective study carried out at four sites found reductions in the slide positivity rate, and in the proportions of hospital admissions and deaths due to malaria over the period 2003–2007 (*7*). And a malaria survey in a rural area of north-western Burkina Faso reported a 27% decline in rates of parasitaemia in 2009 compared to 1999 following an increase in ITN coverage from 22% to 73% (*8*). Many more special studies of this kind are needed to gain a full understanding of the effects of malaria control in this and other African subregions. Continued strengthening of routine health information systems is also necessary.

1 Algeria does not provide hospital data and is therefore not shown with other countries on trend graphs.

BOX 7.2
Malaria control in Senegal

The implementation of the Malaria control strategic plan during 2000–2005 was supported by JICA, USAID and WHO. From 2006, significant additional support from the Global Fund, complemented by funding from PMI, the Islamic Development Bank, UNICEF, the World Bank, with NGOs and local institutions, allowed the expansion of antimalarial interventions: universal coverage with LLINs, IRS in selected areas, IPTp, improved diagnostic testing, and more effective treatment.

In a malaria indicator survey (MIS) in 2006, 36% of households had at least one ITN and 21% of children < 5 years of age slept under an ITN the previous night. During 2006–2008, 2.3 million LLINs were delivered to pregnant women and children under 5, and during 2009–2010 about 3 million LLINs were distributed in a campaign that aimed to reach all people of all ages (one LLIN per sleeping space) in all 16 districts of the high transmission regions Kédougou, Tambacounda, Kolda and Sédhiou. Other regions were covered during 2010–2011. IRS has been used in six districts since 2007 (Richard Toll, Nioro, Vélingara, Guinguinéo, Koumpentoun, Malem Hodar), protecting almost a million people by 2010. Artesunate+amodiaquine was selected as first-line treatment for *P. falciparum* in March 2006. Universal diagnostic testing, primarily with RDTs, began in October 2007 and reached full coverage in 2008, with the exception of community case management.

Following the LLIN distribution campaign, a MIS in 2009 found that 82% of households had at least one ITN, 45% of children under 5 slept under an ITN the previous night, and 52% of pregnant women received at least two doses of SP during antenatal consultations.

The intensification of malaria control appears to have had an impact on the number of cases and deaths. In 14 of the 22 regional hospitals and in 52 of the 75 districts with complete data for 2001–2009, malaria hospital admissions (mostly confirmed by microscopy) decreased from 33 219 on average during 2001–2005 to 27 945 in 2009 (16% decrease). At the same time, non-malaria hospitalisations increased from 57 343 to 98 667 (72% increase). Similarly, malaria deaths decreased from an average of 1239 during 2001–2005 to 352 in 2009 (72% decrease), while other reported deaths increased from 3034 on average to 7194 (137% increase).

Figure Box 7.2 Trends in malaria and non-malarial admissions Senegal, 2001-2009

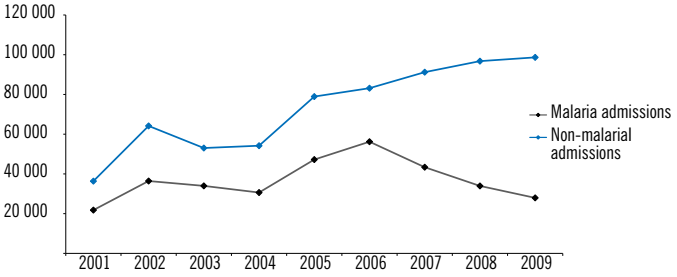
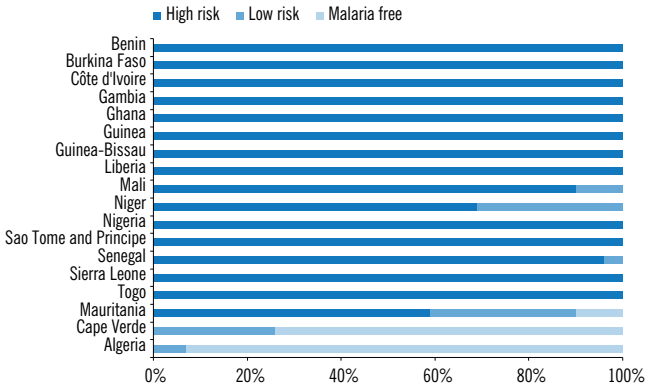
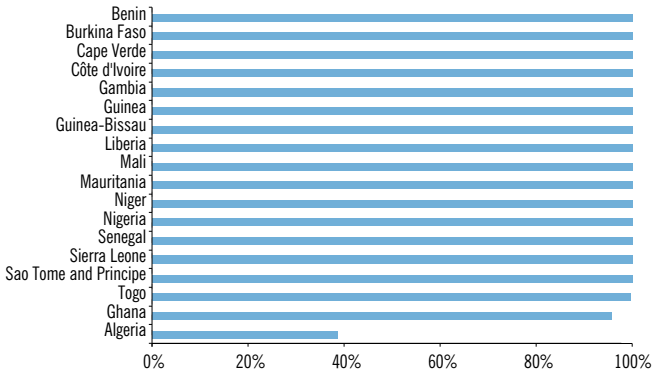


Figure 7.2 West Africa

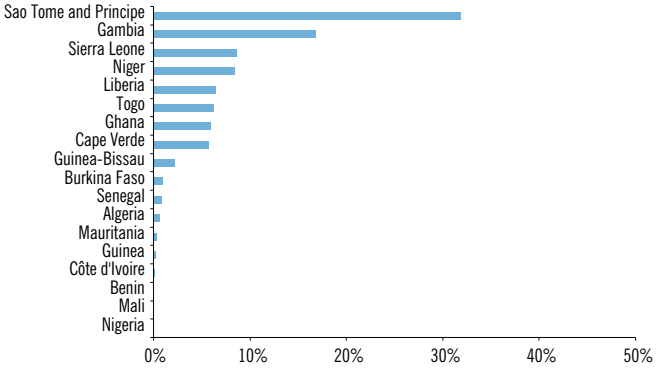
a) Population at risk, 2010



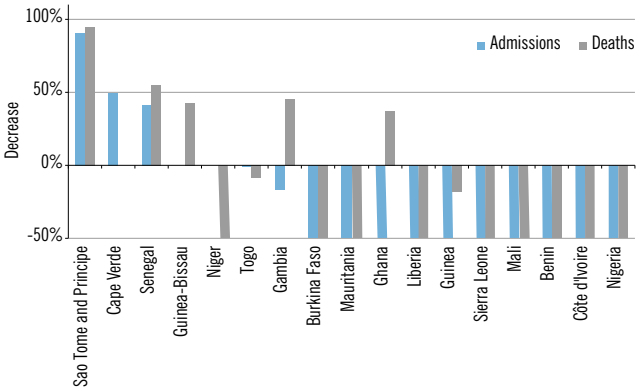
b) Percentage of cases due to P. falciparum, 2006-2010



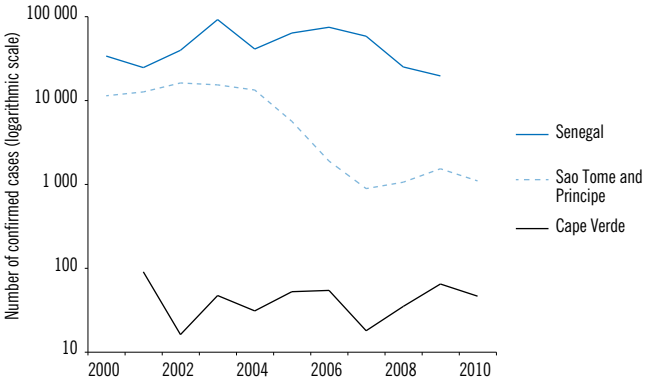
c) Annual blood examination rate, 2006–2010



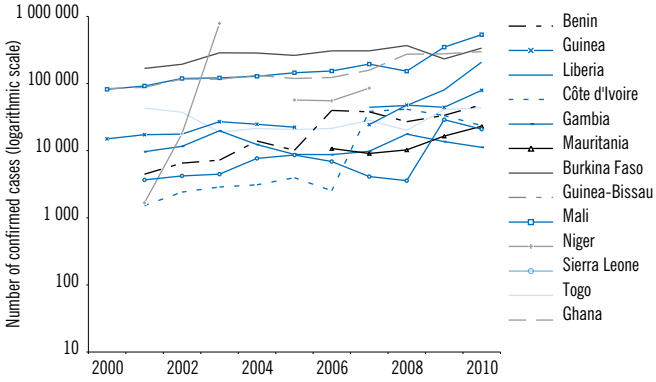
d) Percentage decrease in admissions and deaths, 2000–2010



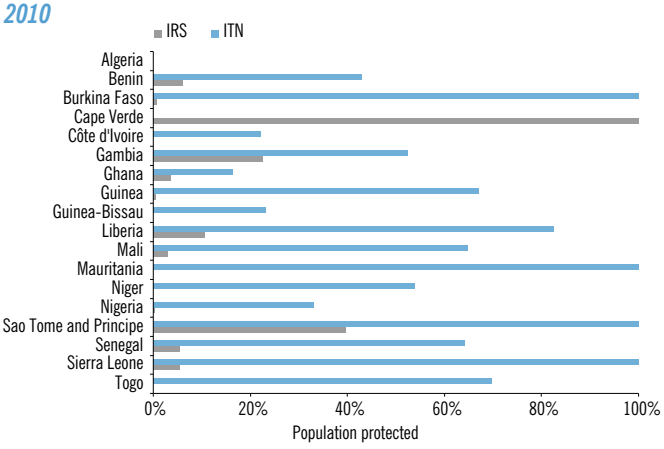
e) Countries with > 25% decrease in malaria admissions, 2000–2010



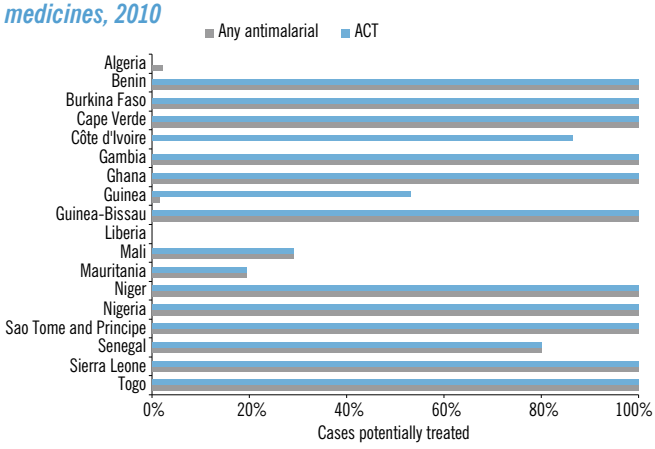
f) Countries with increase or < 25% decrease, 2000-2010



g) Percentage of high risk population protected with IRS and ITNs, 2010



h) Percentage of cases potentially treated with antimalarial medicines, 2010



7.2.3 East Africa and high transmission southern African countries

The majority of people in the 11 countries in this subregion are exposed to a high risk of malaria (**Fig. A**), although more than 20% of the population of Ethiopia and Kenya live in malaria-free areas. Cases of malaria are predominantly due to *P. falciparum* (**Fig. B**). The exceptions are Eritrea and Ethiopia where *P. vivax* causes a larger proportion of infections.

Between 2000 and 2010, malaria admissions to hospitals and health centres with inpatient services declined by more than half in Rwanda, United Republic of Tanzania (Zanzibar) and Zambia, but by smaller proportions in Eritrea, Ethiopia, Kenya, Madagascar and Mozambique (**Figs. D, E**). The four remaining countries/ areas (the Comoros, Malawi, Uganda, United Republic of Tanzania (mainland) reported increases in malaria admissions (**Figs. D, F**). As could be expected, the trends in hospital deaths were similar to the trends in hospitalized cases (**Fig. D**).

The declines in malaria admissions and deaths seen in nationally aggregated hospital data are consistent with published studies of data from health facilities in Eritrea, Ethiopia, Rwanda, and United Republic of Tanzania (Zanzibar) (*9*,*10*,*11*). In coastal areas of Kenya (Kilifi, Msambweni), district hospitals have reported that malaria cases declined among all paediatric admissions by 28%–63% between 1999 and 2007 (*12*). The observed increase in malaria admissions in Uganda agrees with an independent study, which found that hospitalizations increased by 47%–350% between 1999 and 2009 in four of five health facilities studied (*13*). An evaluation of malaria programmes in United Republic of Tanzania (mainland) from 1999 to 2010 found a 45% decline in the under-five mortality rate, and a 50% decline in severe anaemia prevalence in children 6–59 months of age following a 36-fold increase in ITN use among children < 5 years (*14*). During this period, climatic conditions favourable for malaria transmission persisted, and there were no additional sustained increase in other child survival interventions, suggesting that the improvements in child health indicators observed could be plausibly linked, at least in part, to the scale-up of malaria control activities.

ITNs are the principal method of vector control in this subregion. A relatively high coverage of ITNs in Madagascar, Rwanda, and United Republic of Tanzania (mainland and Zanzibar, **Fig.G**) might explain why cases declined substantially between 2000 and 2010 (**Box 7.3**). But this association has not been observed in the Comoros (**Figs. F, G**). Mozambique had the lowest reported coverage of ITNs and IRS, and yet malaria admissions were falling between 2007 and 2010. Deeper investigations are needed to understand these inconsistencies. Most countries had full access to ACTs, but Uganda, United Republic of Tanzania (mainland) and Zambia did not report on ACT consumption (**Fig. H**).

BOX 7.3

Malaria control in Rwanda

With full government commitment, the country was supported by WHO to develop a malaria comprehensive strategic plan for the period 2005-2010. With the support from the Global Fund, PMI, and other development partners, the national malaria control programme has made ITNs and ACTs widely available since 2005 (Fig. 7.1C). Malaria control is part of the country's Comprehensive Poverty Reduction Strategy. A health insurance scheme (Mutuelle de Santé), implemented nationwide since 2004, has made malaria diagnosis and treatment accessible to everyone affected by malaria.

During 2006–2007, more than 3 million ITNs were distributed, targeting pregnant women and children under 5. Owing to inadequate funding, the replacement of LLINs was delayed until 2009–2011 when a further 6.1 million LLINs were distributed, which is enough to cover 81% of the entire population (with the objective of providing 1 net for every 2 people). Since 2006, ACTs have been available without interruption in all health facilities. And from 2007, case management has been carried out nationwide by trained community health workers who test febrile cases using RDTs and treat the confirmed cases. In 2007, with support from PMI, IRS was carried out in 36 sectors of 5 districts (Nyagatare, Bugesera, Nyanza, Gisagara and Kirehe). The possibility of using IRS nationwide is being evaluated, taking into account financial and operational feasibility.

A WHO rapid impact assessment was carried out at 30 of the 40 hospitals in Rwanda. The number of confirmed malaria cases among outpatients of all ages decreased from an average of 32 420 annually during 2000–2005 to 8528 cases in 2010 (74% reduction), reflecting the trend in national surveillance data (Figure 7.1C). The slide positivity rate fell from an average of 35% to 9% over the same period. Inpatient malaria cases among all age groups decreased from an average of 32 892 during 2000–2005 to 11 411 in 2010 (65% decrease), and malaria deaths fell from an average of 1220 during 2000–2005 to 546 in 2010 (55% decrease). Among children under 5 years of age, the reductions were greater.

There appears to have been a brief resurgence of malaria between 2008 and 2009: confirmed malaria cases in the 30 hospitals increased from 4190 to 9287, malaria admissions increased from 12 000 to 19 728, malaria deaths from 488 to 671, and the slide positivity rate from 7% to 11%. The resurgence was contained in 2010, just as 4 million new LLINs were distributed to replace those provided in 2006–2007. This situation is a reminder for countries with high malaria receptivity of the need for effective surveillance systems and to maintain the coverage of interventions for prevention and treatment.

Figure Box 7.4 Trends in malaria and non-malarial admissions Rwanda, 2000-2010

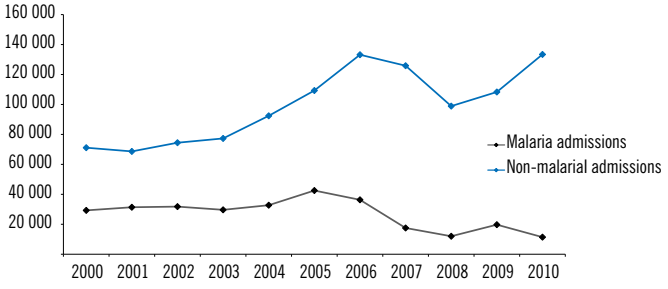
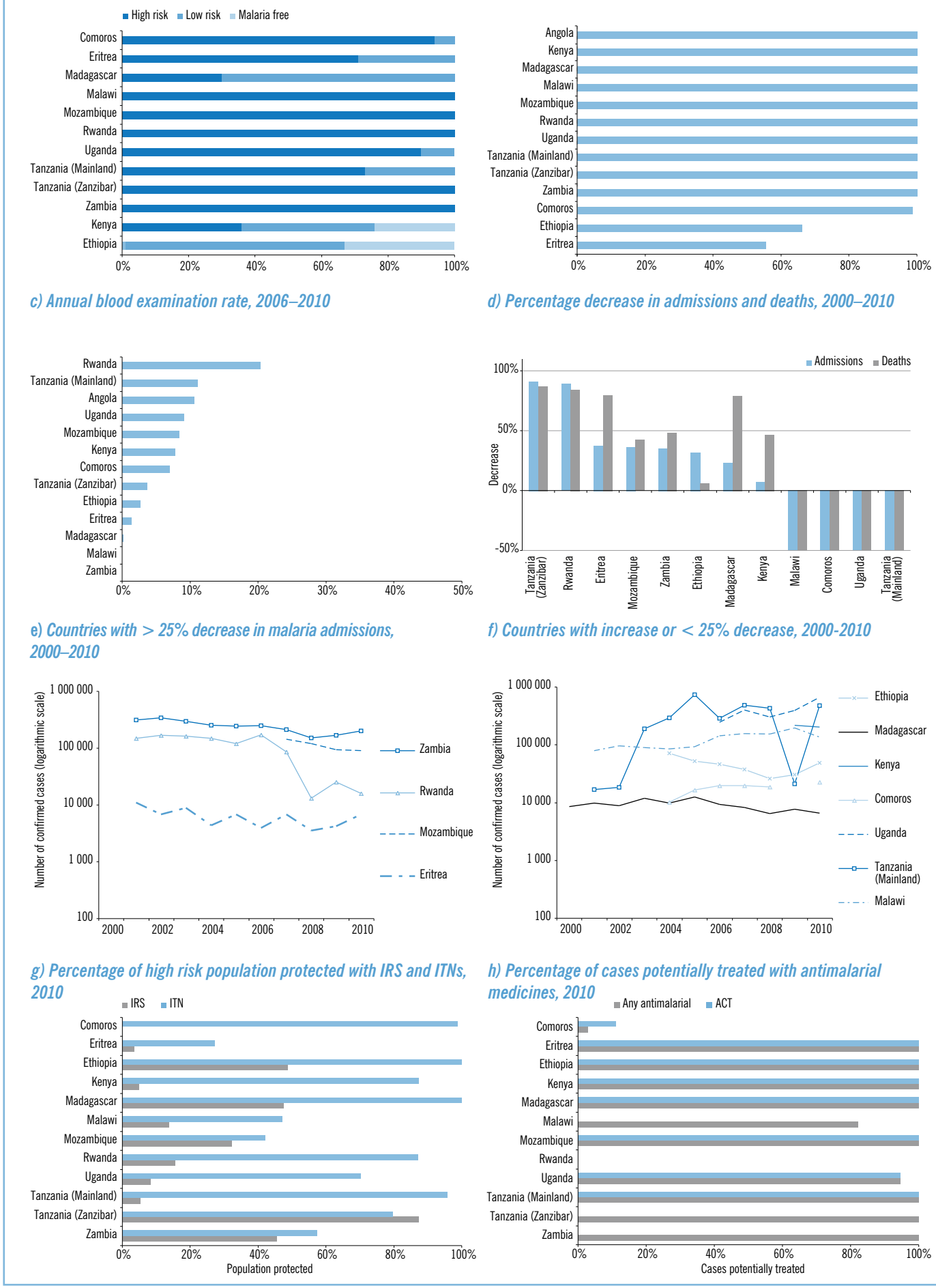


Figure 7.3 East Africa and high transmission areas in Southern Africa



7.2.4 Low transmission southern African countries

The majority of the population in this subregion lives in areas that are free of malaria. Botswana, Namibia, South Africa, Swaziland and Zimbabwe are in the control phase and malaria is highly seasonal. During the transmission season, parts of the population of all these countries, with the exception of Swaziland, are temporarily at high risk (Lesotho is entirely free of malaria transmission) (**Fig. A**). Almost all malaria cases in the five countries are caused by *P. falciparum* (**Fig. B**).

The coverage of parasitological diagnosis in the subregion is relatively low (**Fig. C**). Against the background of seasonal variations in malaria burden, Botswana, Namibia, South Africa and Swaziland reported significant declines in malaria cases over the decade 2000–2010, albeit with some fluctuations from year to year (**Fig. E**). Case reports from Zimbabwe have been inconsistent over the past decade, varying between a minimum of 34 000 and a maximum of 250 000 cases (**Fig. F**). The increases since 2008 might be explained by improvements in diagnosis (both microscopy and RDTs). Whatever the explanation, it appears that malaria is not declining in Zimbabwe.

The population coverage of preventive and curative measures in the five countries is at least moderate and mostly high. South Africa has carried out intensive malaria control activities over many decades and has succeeded in halting transmission in most of the country, but malaria remains endemic in north-eastern border regions adjacent to Mozambique and Swaziland. IRS is the primary vector control measure in South Africa and Swaziland, whereas ITNs predominate in Botswana (**Fig. G**). All countries reported at least 60% coverage of populations at high risk with either ITNs or IRS, and all except Zimbabwe had adequate access to ACTs (**Fig. H**).

Building on recent successes, all the countries in this subregion are signatories to a southern Africa initiative known as the Malaria Elimination 8 (E8), launched in March 2009. The initiative centres on the southernmost countries that are most likely to achieve elimination by 2020, namely Botswana, Namibia, South Africa and Swaziland, but also includes Angola, Mozambique, Zambia and Zimbabwe as the immediate northern neighbours. A major issue for the E8 initiative is the carriage of malaria infection across borders, and particularly the importation of malaria into the four countries with low malaria burden. Malaria control in these countries requires interventions targeted at known foci, strong surveillance systems, cross-border communication, and screening of migrant workers.

BOX 7.4

Malaria control in Swaziland

The malaria control programme of Swaziland was established in the 1940s. With sustained support and resources for IRS, active surveillance, as well as increased control in neighbouring countries, Swaziland managed to maintain low incidence throughout the 1950s and 1960s. The country almost eliminated malaria in 1969 when only 46 cases were reported, 36 of which were imported. However, funding cutbacks led to malaria epidemics in the 1970s and 1980s. By the mid-1990s, malaria had re-emerged as a serious public health threat in Swaziland, with incidence returning to its highest level since 1947 due to a combination of above-average rainfall, parasitic resistance to treatment options such as chloroquine and sulfadoxine-pyrimethamine, and instability in the health system exacerbated by the emerging HIV epidemic. In 1995–1996, 9700 confirmed cases and over 38 000 clinical cases were recorded in outpatient departments across the country.

Recently, Swaziland has achieved success in reducing malaria transmission, reporting a 90% decrease in confirmed malaria cases from 2001 to 2010 (Fig E). A malaria indicator survey, developed as a baseline measurement for the elimination campaign, estimated parasite prevalence to be 0.2% and 53% of households being protected by either IRS or by ITNs in 2010.

An elimination strategy was launched in 2008, emphasizing confirmed diagnosis by RDT or microscopy, prompt treatment with ACTs for patients with positive tests, and universal coverage of IRS and LLINs in the at-risk region. In October 2009 Swaziland launched an active surveillance programme, with support from the Global Fund. Cases detected at health facilities are reported through a toll-free telephone number and recorded in a central database, which in turn alerts the malaria control team of the new case by SMS message and triggers a case investigation. Between four to seven days after the case presents, an NMCP surveillance agent visits the household to carry out the case investigation; the agent collects coordinates of the household using a GPS, administers a paper-based questionnaire to determine the origin of the case, and collects a blood slide to confirm treatment success. If local transmission is suspected or uncertain, the surveillance agent conducts a mass screening with RDTs of all residents living within one kilometre of the index case in order to detect and treat additional cases and interrupt onward transmission. Between October 2009 and June 2011, 464 cases have been investigated, of which 241 cases were determined to have been locally transmitted.

Figure 7.4 Low Transmission Southern African Countries

7.3 Region of the Americas

The main characteristic of the Region of the Americas is that malaria is in decline in the majority of countries (**Fig. E**).

In 2010, malaria transmission occurred in 21 countries in the Region with about 20% of the total population at some degree of risk (**Fig. A**). Of these countries, 17 are in the control stage and four (Argentina, El Salvador, Mexico, and Paraguay) are in the pre-elimination stage. In addition two countries, the Bahamas and Jamaica, no longer have indigenous malaria, and are in the prevention of reintroduction stage.

Through routine surveillance, (**Fig. C**), approximately 675 000 confirmed cases were reported from 19 countries in 2010; ABERs were very heterogeneous across the Region. *P. vivax* malaria accounted for 70% of reported cases in the Region, but cases in the Dominican Republic and Haiti are almost exclusively due to *P. falciparum* (**Fig. B**). In Suriname, the proportion of cases due to *P. falciparum* fell from 84% in 2000 to 38% in 2010, linked to malaria control activities.

Between 2000 and 2009, the total number of confirmed cases reported by all countries dropped by 43%, with the majority of cases reported by Brazil and Colombia (typically 50%–60% in Brazil alone). Reductions of more than 50% between 2000 and 2010 were recorded in 15 countries, and smaller reductions in three countries (**Figs. D, E**). Three countries reported increases in case numbers between 2000 and 2010 – the Dominican Republic, Haiti, and the Bolivarian Republic of Venezuela (**Figs. D, F**). The increase in the Bolivarian Republic of Venezuela has been associated with an increased ABER and may reflect greater diagnostic effort rather than increased malaria incidence. The increase in Haiti in 2010 followed the earthquake in January of the same year. Given limitations in the surveillance system, it is unclear whether this reflects a real rise in incidence or disease prevalence, or is a consequence of increased availability of resources for case detection during the emergency response. Data from the Dominican Republic suggest a higher incidence of malaria in 2005 and 2010 compared to other years.

Although country trends can be classified by comparing the beginning and the end of the decade, there have been important fluctuations within this time period. Panama experienced a five-fold increase in confirmed cases between 2001 and 2004, but nevertheless reported an overall reduction of more than half during the decade. The Plurinational State of Bolivia, Colombia and Guyana reported upturns in the number of cases between 2009 and 2010. In Guyana the upturn is associated with an increase in ABER and may not reflect a real change in malaria incidence.

The coverage of high risk populations with IRS or ITNs between 2006 and 2010 was highly variable among countries (**Fig. G**). IRS coverage exceeded 50% only in Ecuador and Nicaragua, and ITN coverage exceeded 50% only in Ecuador, Guatemala, Nicaragua and Suriname. The availability of antimalarial drugs was sufficient to cover more than half of the cases attending public sector health facilities in almost all countries that reported data (**Fig. H**). No distribution of ACTs was reported in the Dominican Republic, Haiti or Suriname, countries where *P. falciparum* malaria is prevalent.

Four countries with IRS or ITN coverage of more than 50% in high-risk populations (Ecuador, Guatemala, Nicaragua, and Suriname) also reported that malaria cases declined by more than half between 2000 and 2010 (**Figs D, E, F**), and these countries were comparatively well supplied with antimalarial medicines (Ecuador, Guatemala, Nicaragua and Suriname). Case numbers did not decline in the Bolivarian Republic of Venezuela, however, despite a high proportion of households reported as being protected by IRS.

The Dominican Republic and Haiti, reported increasing numbers of cases, and had inadequate coverage of IRS or ITNs. However, Costa Rica, Mexico and Paraguay reported low IRS or ITN coverage and yet showed significant reductions in malaria cases, possibly because of intensified surveillance of cases. The association between prevention (IRS, ITN) or treatment (antimalarial drugs) and malaria trends across the countries in the Region of the Americas is therefore inconsistent.

BOX 7.5
Ten years of effective partnership for malaria prevention and control in the Region of the Americas

Malaria control in the Americas has progressed over the past decade through strong regional partnerships. Two of the important networks and institutions are the Amazon Network for the Surveillance of Antimalarial Drug Resistance (RAVREDA) and the Amazon Malaria Initiative (AMI).

RAVREDA is a network of countries including the Plurinational State of Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname and the Bolivarian Republic of Venezuela, along with WHO/PAHO, established in 2001 to respond to the challenge of antimalarial drug resistance in the Amazon. RAVREDA has also partnered with international institutions and local organizations, and has recently expanded to include components of the Regional Strategic Plan for Malaria in the Americas 2006–2010. French Guiana is currently associated with the network as an observer, while efforts are also being made to link with Mexico and the Central American countries.

AMI was launched in 2001 by USAID/LAC (Office for Infectious Diseases in Latin America and the Caribbean) and focuses its financial and technical resources in support of the Roll Back Malaria Partnership in Latin America. It involves USAID, AMRO/PAHO, CDC, the MSH/RPM Plus program, the United States Pharmacopeia's Drug Quality and Information (USP/DQI) program, Research Triangle Institute (RTI) and Linksmedia. AMI's thematic areas include surveillance of antimalarial resistance, drug policy implementation, access and quality of diagnosis and treatment, evidence-based vector control, epidemiological stratification, and advocacy and communication.

The AMI/RAVREDA network has helped countries in the Region to develop drug efficacy protocols based on current epidemiological situations and to conduct studies of therapeutic efficacy. As a result, eight countries were able to adopt ACTs as first-line treatment of *P. falciparum* malaria (the Plurinational State of Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname and the Bolivarian Republic of Venezuela). The network has also carried out more than 17 studies on chloroquine-resistant *P. vivax* in the Plurinational State of Bolivia, Brazil, Colombia, Peru, and the Bolivarian Republic of Venezuela. In 2009 and 2010, AMI/RAVREDA helped to standardize the methodology for ELISA-based tests used in monitoring temporal and spatial variations in drug susceptibility, to enable early detection of resistance to the new drugs used in the Region.

Finally, a key function of AMI/RAVREDA is to play a catalytic role in partnerships, filling regional gaps, supporting regional and subregional coordination, assisting in the preparation of Global Fund applications, and laying the foundations for malaria elimination in areas where this is deemed feasible.

Figure 7.5 Region of the Americas

7.4 Eastern Mediterranean Region

Malaria endemicity varies enormously across the Eastern Mediterranean Region: some countries are already free of malaria, a few have made substantial progress in control over the past decade, and some have a persistently high disease burden.

In September 2011, South Sudan[1] became a new WHO member state, increasing the number of member states in the Eastern Mediterranean Region to 23. These countries are in various stages of malaria control: seven still have areas of high malaria transmission and are in the *control stage* (Afghanistan, Djibouti, Pakistan, Somalia, Sudan, South Sudan, and Yemen; **Fig. A**); two countries with geographically limited malaria transmission are in the *elimination* stage (the Islamic Republic of Iran, and Saudi Arabia). Egypt, Oman and the Syrian Arab Republic are in the *prevention of reintroduction* stage. The remaining countries are *malaria-free*.

P. falciparum is the dominant species of parasite in the Afrotropical countries (Djibouti, Saudi Arabia, Somalia, Sudan and Yemen) while the majority of cases in Afghanistan, Iran, and Pakistan are due to *P. vivax* (**Fig. B**). In 2010, the Region reported a total of 7.3 million malaria cases from nine countries, of which 1.2 million (15%) were confirmed parasitologically. Four countries accounted for 97% of the confirmed cases: Sudan (58%), Pakistan (22%), Yemen (10%) and Afghanistan (6%).

Afghanistan, Iran, Iraq, and Saudi Arabia reported that malaria cases fell by more than half between 2000 and 2010 (**Figs. D, E**). The decline in case numbers in Saudi Arabia has been aided by the high coverage of IRS, by the use of ITNs (**Fig. G**) and by the consistent availability of antimalarial drugs (**Fig. H; Box 7.3**).

Following the steep decline in case numbers, Iraq was able to report zero locally-acquired cases for the first time in 2009, and all seven cases in 2010 were imported. In 2010, Saudi Arabia reported 29 locally-acquired cases and 1912 imported cases (see **Box 7.6**); Iran recorded 1847 locally-acquired cases and 1184 imported cases.

Malaria remains problematic in five countries in which large numbers of cases were reported between 2000 and 2010 and no discernible downward trends occurred (**Fig. F**), perhaps because there are no underlying trends in incidence, or because any trends are masked by inconsistent diagnostic testing and reporting. For example, Sudan has reported large fluctuations in case numbers (**Fig. F**), even with an apparently high coverage of ITNs (**Fig. G**), and the link between control efforts and malaria epidemiology remains unclear.

Further investigations in these five countries will be difficult to carry out, but a more detailed appraisal of malaria epidemiology is nevertheless needed, including evaluations of the coverage and impact of control measures.

1 Data reported to 2010 are compiled as from a single member state.

BOX 7.6
Progress towards malaria elimination in Saudi Arabia

Saudi Arabia took the decision in 2004 to eliminate malaria nationwide. Principal components of the elimination strategy are: laboratory confirmation of all cases and strengthened case management; vector control, mainly by IRS, ITNs, larviciding of breeding sites mapped by a geographical information system, and space spraying; improved surveillance, with the introduction of active case detection, epidemiological investigation of all cases, plus mapping of malaria foci; and cross-border initiatives including the establishment of surveillance units with Yemen, which provide free diagnosis and treatment, mostly for Yemeni people living (legally or illegally) in the border villages.

The border malaria units are supported by the mobile teams for active case detection. The joint Saudi –Yemeni vector control teams are responsible for spraying a 10 kilometre-wide border area inside Yemen. Enabling factors for the cross-border initiative include strong political commitment and mechanisms for intersectoral cooperation.

The malaria control programme distributed approximately 581 000 LLINs during 2008–2010, targeting populations at risk in focal areas. In addition, focal IRS protected approximately 2.5 million people at risk in 2010. ACTs and other antimalarial treatments are available through public health services, free of charge for all who need them. The government is the principal source of funding for the malaria programme, providing an average US$ 27 million annually between 2005 and 2010.

The impact of these interventions is clear. The number of autochthonous malaria cases in Saudi Arabia dropped from 36 139 in 1998 to just 29 in 2010, with 4657 and 1912 imported cases in 1998 and 2010 respectively. In 2010, all locally-acquired infections were due to *P. falciparum*. Most of the imported malaria cases in Saudi Arabia are detected by the border malaria units.

Considering the higher burden of malaria in neighbouring countries, the Gulf Cooperation Council, with Saudi Arabia taking the lead and technical support from WHO/EMRO, initiated the Malaria Free Arabian Peninsula Initiative in 2006. Six countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates) have agreed to support intensification of malaria control, aiming for elimination of malaria in Yemen. Implementation began in 2010.

Figure Box 7.6 Locally acquired and imported malaria cases in Saudi Arabia 1990-2010

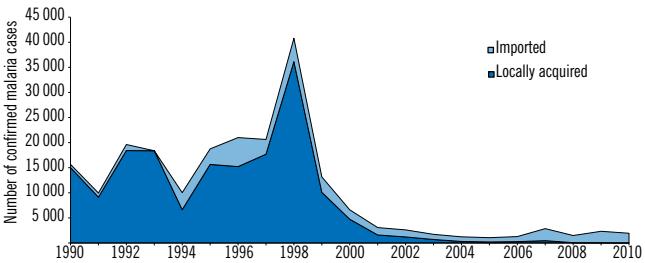
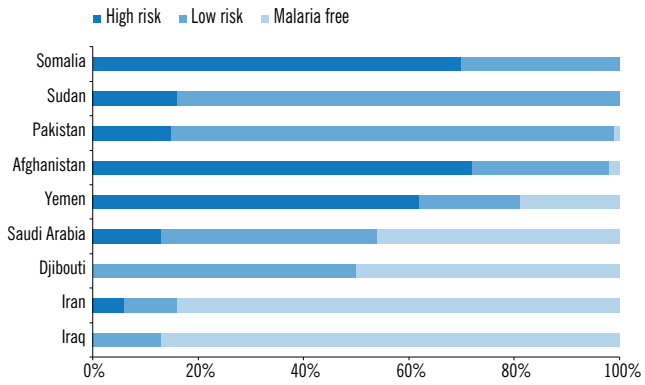
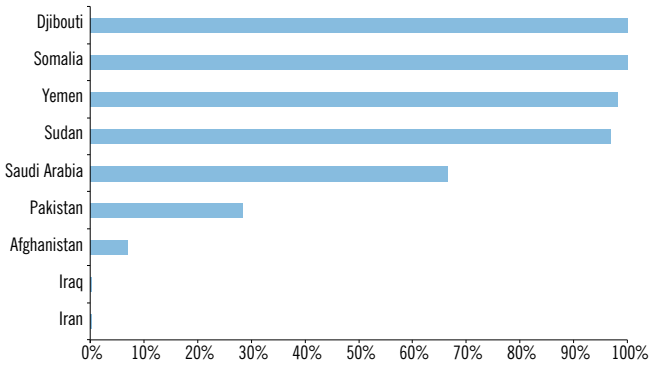


Figure 7.6 Eastern Mediterranean Region

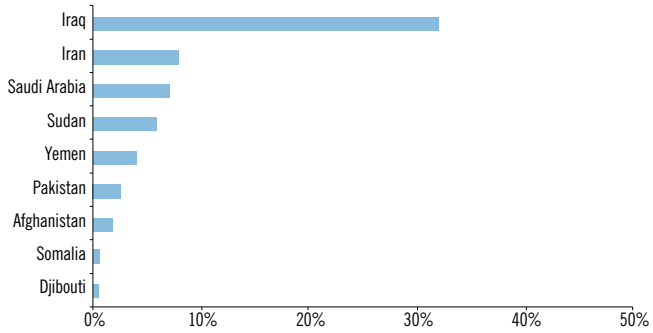
a) Population at risk, 2010



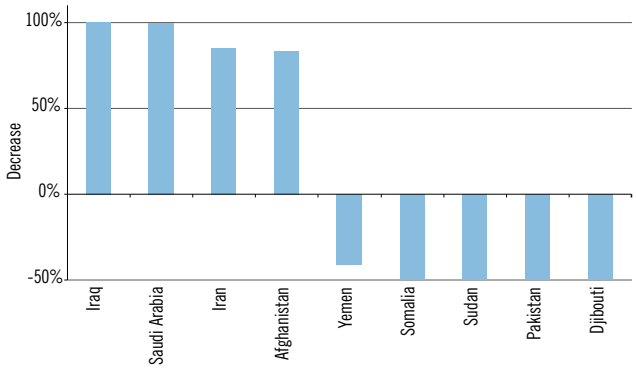
b) Percentage of cases due to P. falciparum, 2006-2010



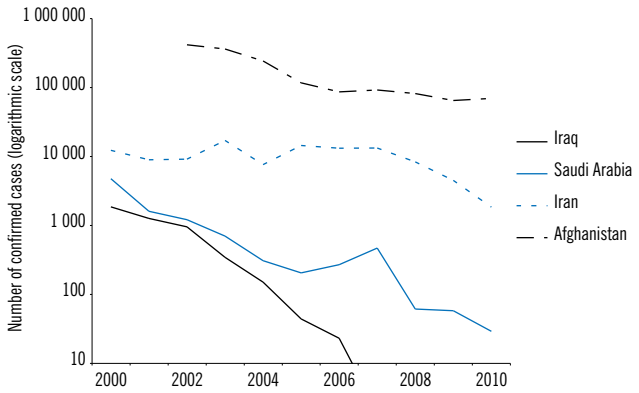
c) Annual blood examination rate, 2006–2010



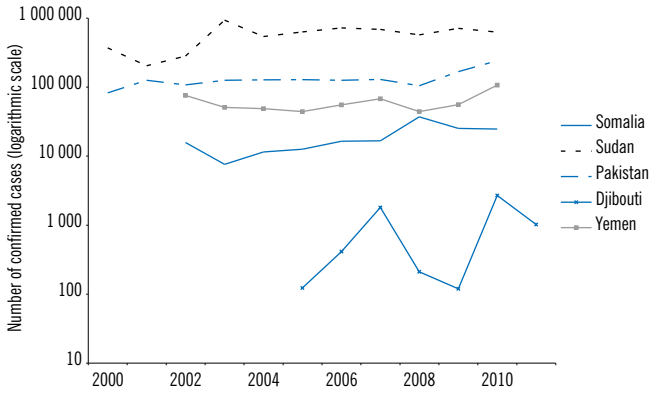
d) Percentage decrease in admissions and deaths, 2000–2010



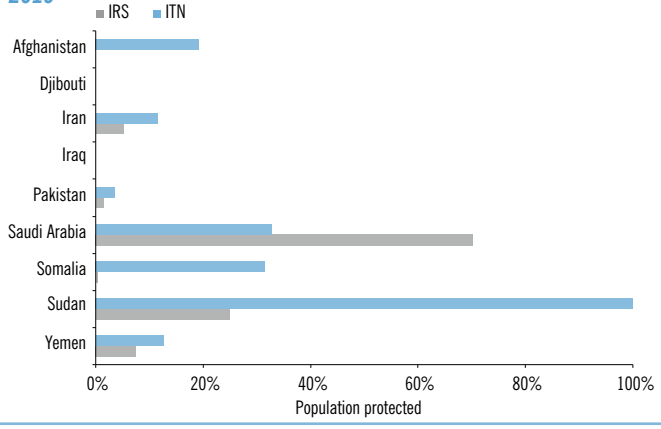
e) Countries with >50% decrease in confirmed cases, 2000–2010



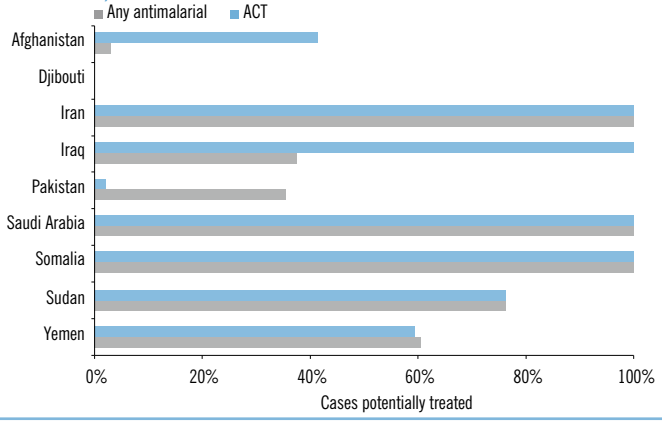
f) Countries with increase or < 50% decrease, 2000-2010



g) Percentage of high risk population protected with IRS and ITNs, 2010



h) Percentage of cases potentially treated with antimalarial medicines, 2010



7.5 European Region

The European Region has a real possibility of becoming the first to achieve the complete elimination of malaria within the next few years, and aims to do so by 2015.

The 2005 Tashkent Declaration, "The Move from Malaria Control to Elimination in the WHO European Region", was endorsed by 10 malaria-affected countries, including the Russian Federation. In addition, the goal of the new WHO regional strategy for Europe developed in 2006 is to interrupt transmission and eliminate malaria by 2015. Since 2008, all endemic countries have had active elimination programmes. In support of the move towards elimination, the Global Fund has provided financial assistance to some countries, to strengthen national capacities for malaria control.

The total number of reported indigenous malaria cases in the European Region decreased from 32 394 in 2000 to only 176 in 2010. Locally-acquired *P. vivax* cases are now only reported from five countries in the Region: Azerbaijan, Kyrgyzstan, Tajikistan, Turkey and Uzbekistan. No locally-acquired *P. falciparum* cases have been reported since 2008. **Figs. D** and **E** show how incidence has fallen in the seven principally affected countries. There are now no countries where malaria is increasing (**Fig. F**). Between 2001 and 2005, Turkey reported around half of all cases in the European Region, but had only nine cases in 2010 (**Fig. E**). Kyrgyzstan suffered a large outbreak in 2002 but, like Turkey, reported very few (three) cases in 2010 (**Fig. E**).

In 2009, Uzbekistan reported zero cases from indigenous transmission for the first time, but three local *P. vivax* cases arose from residual foci of infection in 2010. In 2010, Georgia reported zero locally-acquired cases for the first time. The transmission of *P. falciparum* malaria was interrupted in 2009 in Tajikistan, the last remaining falciparum malaria-endemic country in the Region. All other *P. falciparum* malaria cases found in the Region in 2010 were imported (**Fig. B**, see also **Section 7.8**). Turkmenistan was certified malaria-free in October 2010. With support from WHO, Armenia was certified malaria-free in 2011 (see **Section 7.7**).

IRS is the primary vector control measure in countries in the Region, where each country aims for complete coverage (>80% of population at high risk) of all remaining and any new foci of malaria (**Fig. G**). ITNs are used as a supplementary intervention to IRS, particularly in Azerbaijan, Kyrgyzstan, Tajikistan and Uzbekistan (**Fig. H**).

Intense diagnostic efforts in Armenia, Azerbaijan, Kyrgyzstan and Turkey are reflected in high ABERs (**Fig. C**). All suspected cases in the Region are examined microscopically, and all cases are traced to determine whether infection is due to local transmission or has been imported. Antimalarial medicines are maintained to ensure radical treatment of all confirmed cases (**Fig. H**). Countries in the elimination phase pay particular attention to the risk of malaria spreading among countries in the Region, and between the European and East Mediterranean Regions.

BOX 7.7
Elimination of *P. falciparum* malaria in Tajikistan

Tajikistan is landlocked and mountainous, and only 10% of the land is cultivable. It is the smallest country in the south-eastern part of Central Asia, bordered by Afghanistan, China, Kyrgyzstan and Uzbekistan.

Early in the 20th century, the lower valleys were endemic for *P. falciparum* and *P. vivax*. Malaria control measures began in the 1930s, when more than 100 000 cases were reported each year (176 125 cases in 1932). By the 1960s, malaria had almost been eliminated following intensified vector control during the Global Malaria Eradication Programme, and by 1966 only 11 locally-acquired cases were reported in the south of the country.

During the 1990s the malaria situation deteriorated due to political instability and economic hardship, leading to the disruption of health services and of vector control activities. During the armed conflict in 1992, more than 500 000 people were displaced, many to malaria-endemic areas of Afghanistan. The return home of nearly 30 000 Tajik refugees from these endemic areas, together with changes in agricultural practices (increased rice cultivation), led to the reintroduction and spread of *P. falciparum* and *P. vivax* across the country.

In 1997, the new malaria epidemic peaked at nearly 30 000 officially reported cases, although the true number may have been much greater. Since then, the total number of cases has fallen, despite notable increases in *P. falciparum* cases from 183 in 1997 to 831 in 2000. *An. superpictus*, *An. pulcherimus*, *An. maculipennis* and *An. hyrcanus* are the principal and secondary malaria vectors in the country.

The epidemic of the 1990s prompted intensified malaria control measures supported by the Government, WHO, USAID, UNICEF, WFP, ECHO, international NGOs and others. A five-year plan (2006–2010), developed in close cooperation with WHO and supported by the Global Fund, aimed to interrupt transmission of *P. falciparum* malaria by 2010.

Interventions included: case management and prevention through well-equipped public health services, adding malaria centres at national, district and regional level; deployment of 3600 trained health staff at all levels; vector control through intensified IRS covering around 120 000 households annually, complemented by the distribution of more than 35 000 LLINs in affected areas; plus the extensive use of larvivorous *Gambusia* fish in rice fields. Malaria diagnosis is based entirely on microscopy. ACTs (AS +SP) were adopted as first-line treatment for chloroquine-resistant *P. falciparum* in 2004, switching to artemether-lumefantrine in 2007.

As a result of all these activities, elimination of *P. falciparum* was achieved in 2009, one year ahead of schedule. At present only *P. vivax* is reported in the country. Malaria elimination measures now focus on improving capacity for early diagnosis and radical treatment of *P. vivax*, effective prevention through vector control, strengthening surveillance systems, and operational research for timely detection and response in the event of *P. falciparum* reintroduction.

Figure Box 7.7 Locally acquired *P. falciparum* cases in Tajikistan 1994-2010

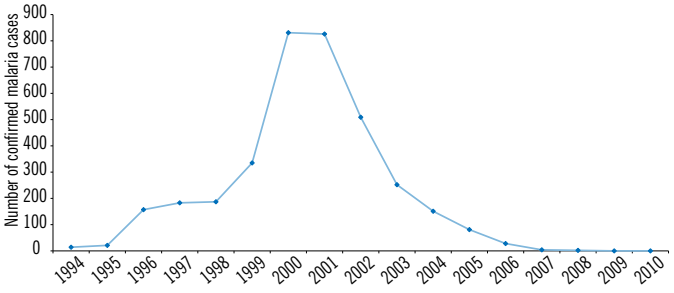
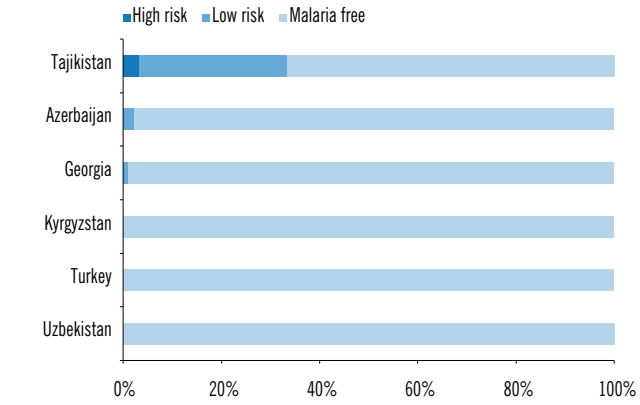
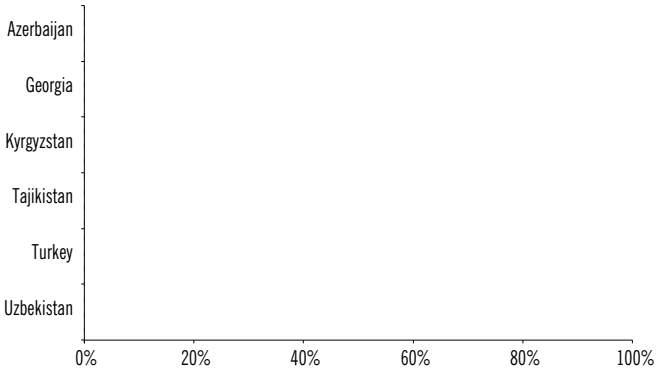


Figure 7.7 European Region

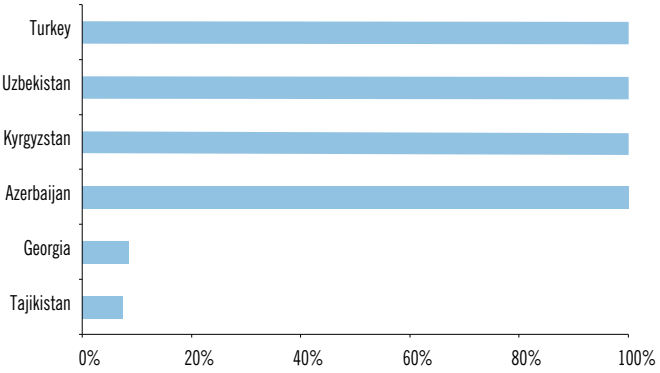
a) Population at risk, 2010



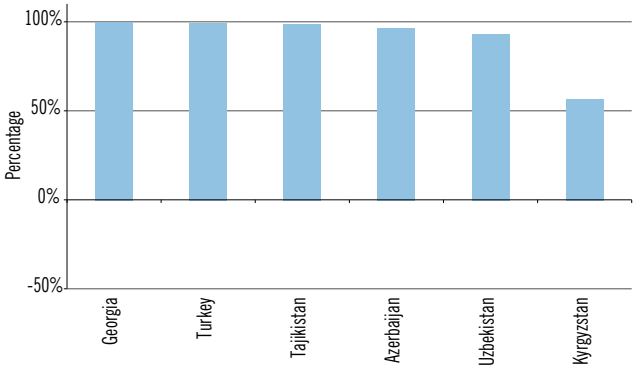
b) Percentage of cases due to P. falciparum, 2006-2010



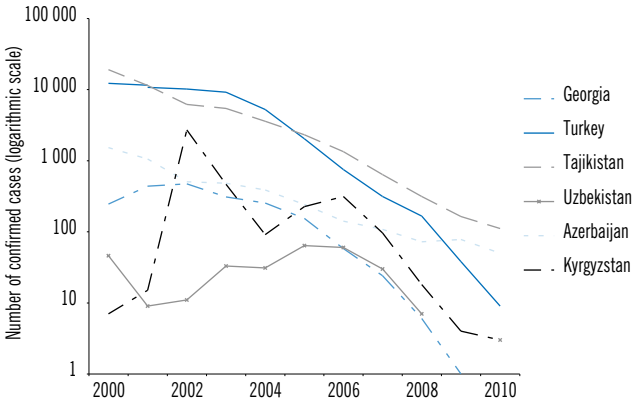
c) Annual blood examination rate, 2006–2010



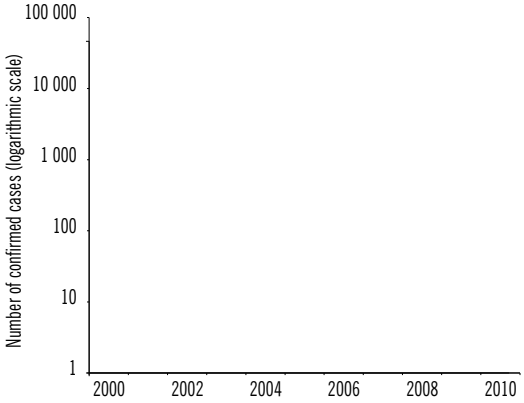
d) Percentage decrease in admissions and deaths, 2000–2010



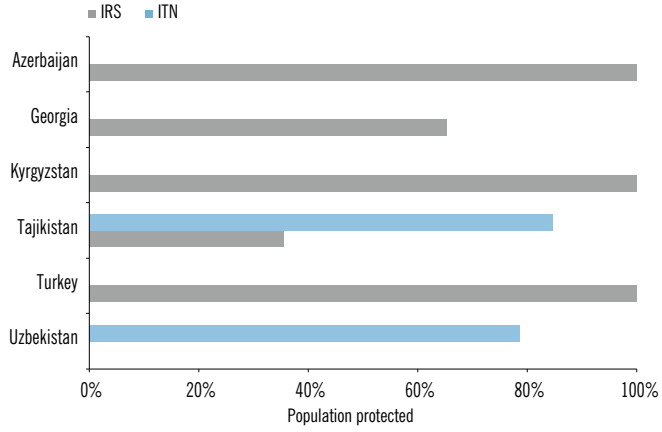
e) Countries with > 50% decrease in confirmed cases, 2000–2010



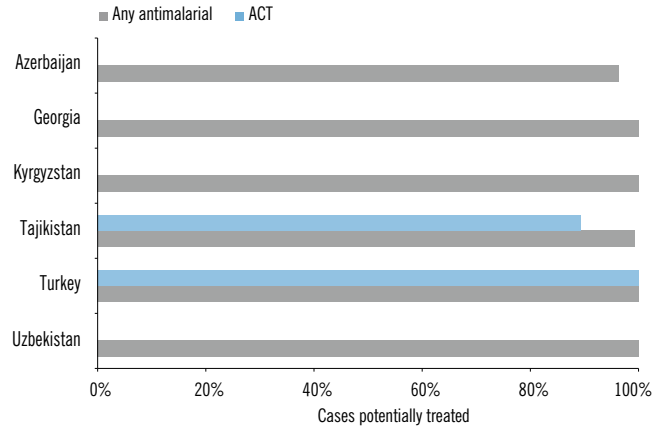
f) Countries with increase or < 50% decrease, 2000-2010



g) Percentage of high risk population protected with IRS and ITNs, 2010



h) Percentage of cases potentially treated with antimalarial medicines, 2010



7.6 South-East Asia Region

Malaria is clearly declining in the smaller countries of the South-East Asia Region, but is more stable in the major endemic centres – Bangladesh, India, Indonesia, and Myanmar.

Today, 10 of the 11 countries in the Region remain malaria-endemic. Bangladesh, Bhutan, the Democratic Republic of Timor-Leste, India, Indonesia, Myanmar, Nepal and Thailand are in the control phase. Two low-incidence countries are in the pre-elimination stage – the Democratic People's Republic of Korea and Sri Lanka. Only the Maldives is free of indigenous malaria transmission, as the country has been since 1984 (**Box 7.8**). Approximately 70% of the population of 1.8 billion people in the Region is at some risk for malaria, with 25% at high risk: 458 million people inhabit areas with a reported incidence of >1 case per 1000 population per year (**Fig. A**).

The majority of confirmed cases in the Region are due to *P. falciparum*, although the proportion varies greatly among countries (**Fig. B**). Malaria is due almost entirely 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 only 2% in 2010.

In 2010, 4.3 million malaria cases were reported, of which 2.4 million were parasitologically confirmed. Three countries accounted for 94% of confirmed cases: India (66%), Myanmar (18%) and Indonesia (10%). A total of 2426 malaria deaths were reported from eight countries, the great majority (93%) in India, Indonesia and Myanmar. 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, the Democratic People's Republic of Korea, Nepal, Sri Lanka and Thailand reported marked downward trends in confirmed cases, which probably reflect real declines in malaria incidence. In these countries the number of cases reported annually fell by more than half between 2000 and 2010 (**Figs. D, E**). India has reported a slow but steady decline in case numbers over the past decade, falling by 28% between 2000 and 2010 (**Figs. D, F**), while continuing to examine more than 100 million blood slides each year (**Fig. C**). The remaining countries reported either little change (Indonesia) or increasing case numbers. Between 2000 and 2010, the increases were 70% in Bangladesh, 250% in Myanmar and 216% in Timor-Leste; in all three countries the change is associated with a large increase in the extent of diagnostic testing, making it difficult to discern the underlying trend in malaria incidence.

The five countries in which cases fell by more than half over the past decade (**Fig. E**) all distributed adequate supplies of antimalarial medicines (**Fig. H**). Bhutan, the Democratic People's Republic of Korea and Thailand all reported combined totals of IRS and ITN coverage of more than 50%. However, the scale of preventive interventions appears to be limited in Nepal. Two countries in the pre-elimination stage (the Democratic People's Republic of Korea and Sri Lanka) actively follow up all suspected cases and this is reflected in a high ABER for Sri Lanka. As in other Regions, deeper 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 of confirmed malaria with antimalarial medicines.

BOX 7.8
Maldives: an example of prevention of reintroduction in the South-East Asia Region

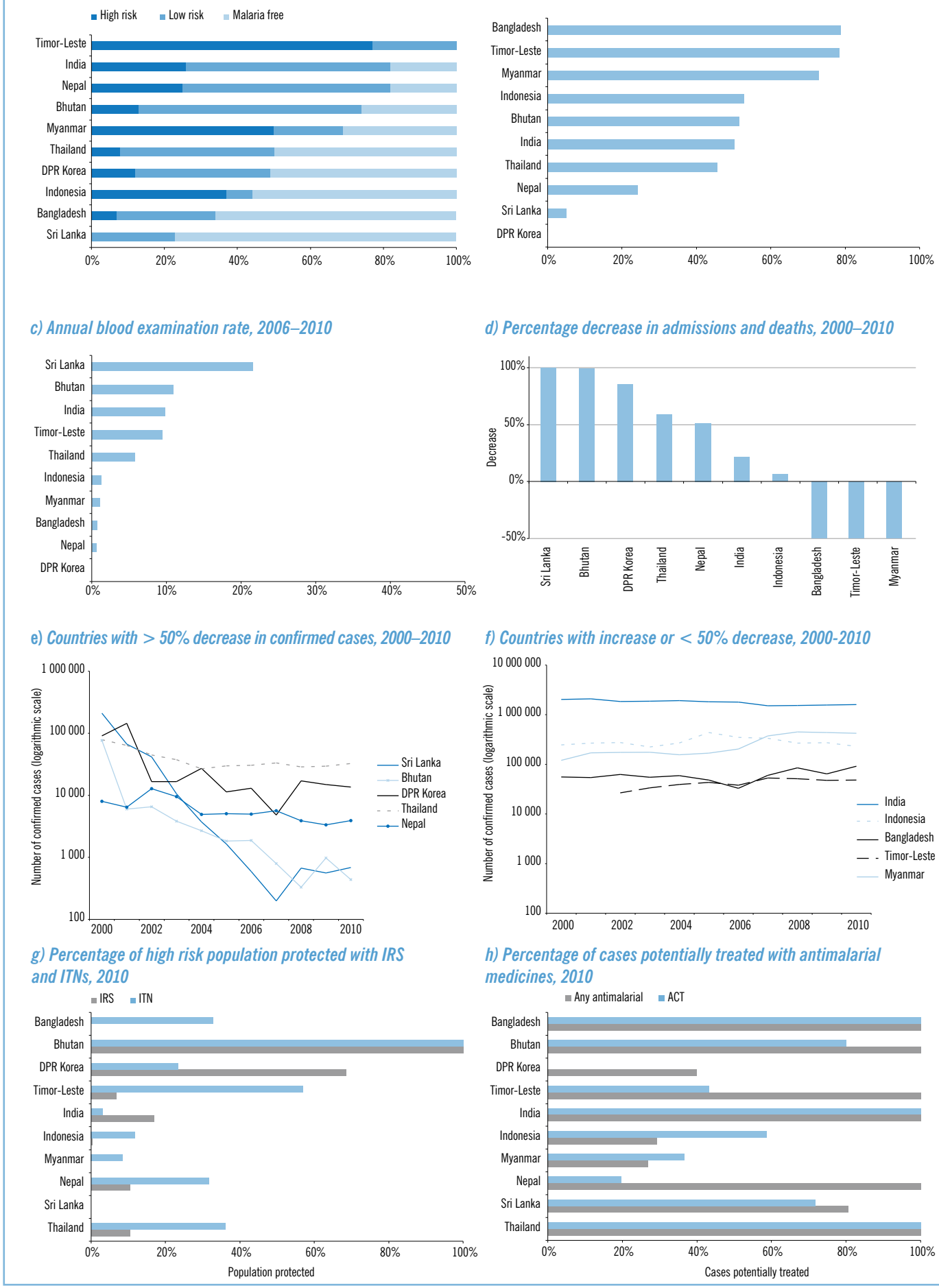
Malaria eradication in the Maldives was achieved through the elimination of anopheline mosquito vectors. Malaria in the Maldives was transmitted, perhaps uniquely, by two casual vectors, *An. tessellatus* and *An. subpictus,* in a fragile and unstable ecosystem lacking higher mammals, and thus totally dependent on human blood. Mosquitoes not killed by DDT were confined to forests. Their displacement away from human habitation effectively removed blood sources. Other inadvertent mosquito control measures were the withdrawal of waters from wells and the harvesting of forests near swamps, disturbing or removing larval breeding sites. All of these changes together led to the extinction of the two mosquito vector species from the islands. The last specimen of *An. subpictus* was reported in Maavaidhoo (Haa-Dhaal Atoll) in 1984 and *An. tessellatus* was last detected at Maamigili (Alif Atoll) in 1991. Since 2001, fewer than 10 imported malaria cases have been reported each year, mostly from neighbouring Bangladesh, India and Sri Lanka.

The Maldives has successfully prevented reintroduction, and thus maintained its malaria-free status since 1984, for three main reasons: (i) full political commitment by the government and continuous support by WHO, (ii) entomological surveillance since 1991, and (iii) parasitological and clinical surveillance.

Entomological surveillance has been carried out regularly at points of entry, notably Male' International airport, Seenu Regional airport, the sea port at Male' and three other ports on Lhaviyani, Gaafu, Alifu and Seenu atolls. Regular larval surveys have covered more than 50% of all domestic wells, rainwater holding containers and cisterns, solid waste containers that hold rainwater, soakage pits, natural ponds, tree holes and swamps.

For parasitological and clinical surveillance, passengers arriving at an international airport from malarious areas, with or without malaria symptoms, have been asked to provide blood samples that are examined within 1–2 days. Confirmed malaria cases are given radical treatment and followed up. Prophylactic treatment is given to Maldivians who travel to malaria endemic countries, and public health campaigns on the islands maintain a high level of awareness of the threat of malaria.

Figure 7.8 South-East Asia Region



7.7 Western Pacific Region

Nine of the ten principal malaria-endemic countries in the Western Pacific Region report downward trends in malaria but in some high-burden countries, notably Papua New Guinea, the rate of decline is still slow.

Malaria transmission in the Region is highly heterogeneous. It is intense through most of Papua New Guinea, Solomon Islands and Vanuatu. It 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 transmission 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 (**Fig. B**).

Approximately 262 000 confirmed malaria cases were reported from the Region in 2010. Three countries accounted for 70% of these cases: Papua New Guinea (36%), Cambodia, (19%) and Solomon Islands (15%).

In China, Philippines, Republic of Korea, and Viet Nam, the reported trends in confirmed cases were predominantly downwards, and the numbers of cases more than halved between 2000 and 2010, although numbers for the Republic of Korea showed wide fluctuations (**Figs. D, E**). In the remaining six countries, case numbers were falling more slowly (Cambodia, Lao People's Democratic Republic, Malaysia, Solomon Islands, Vanuatu), or were approximately stable (Papua New Guinea) (**Figs. D, F**). Increased use of RDTs by village health workers in Lao People's Democratic Republic, and increased reporting by private sector health facilities, probably contributed to the slower reported rates of decline.

Malaria interventions are implemented widely in the Western Pacific Region, both vector control and enhanced case management. However, the intensity of control varies among countries and the links between interventions and malaria trends in routinely collected data are imprecise. Two of the countries with large declines in malaria (China and Philippines) also reported a high coverage of either ITNs or IRS in 2010, but Viet Nam did not (**Fig. G**). Bednets have been widely used in Viet Nam, but most are not impregnated with insecticide and so ITN coverage is low (<10%); a household survey in Viet Nam (MICS 2006), found that only 19% of people sleep under an ITN. The proportion of people protected by ITNs is also low in Cambodia (5% in DHS 2005). The Republic of Korea reported almost no vector control activity in 2010.

Malaysia, Solomon Islands and Vanuatu have high diagnostic examination rates (ABER) (**Fig. C**), whereas ABER in the other countries is much lower. Antimalarial medicines were widely available in all ten countries (**Fig. H**). However, over the period 2006–2010 there were inadequate supplies of ACTs in two important *P. falciparum*-endemic countries, Papua New Guinea and Malaysia.

BOX 7.9
Increasing public health awareness of *Plasmodium knowlesi*

P. knowlesi is a malaria parasite of monkeys; it can also infect humans and is capable of producing severe illness with a high case fatality rate. *P. knowlesi* has been known as a human pathogen since early 1930s when thousands of people were deliberately infected with the parasite during the treatment of tertiary syphilis.

The first reported case of natural human infection with P. knowlesi was acquired in peninsular Malaysia in 1965, and since then other countries in South-East Asia have reported cases. Its importance as a public health problem is increasing although it is limited to population groups who live, work in, or visit forested areas. At highest risk are farmers, hunters, logging camp workers, army personnel and travellers.

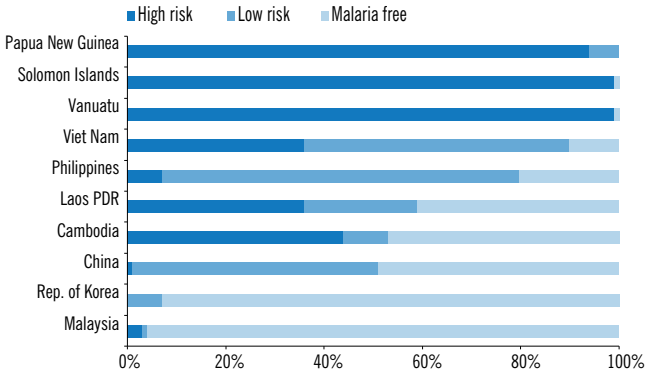
The principal mosquito vectors are species of the *Anopheles leucosphyrus* group, found throughout the South-East Asian Region. The natural reservoir hosts and source of human infections in Sarawak (Malaysia) are the long-tailed macaque (Macaca fascicularis) and pig-tailed macaque (M. nemestrina). In peninsular Malaysia the banded leaf monkey (Presbytis melalophus) has been identified as a natural host.

Definite diagnosis of *P. knowlesi* by microscopy is difficult because it can be confused with P. malariae. PCR is currently the only definitive, validated diagnostic method. Genetic characterization of human blood samples taken in 1996 in an endemic area of Thailand revealed that P. knowlesi accounted for 0.67% of all malaria cases. Two cases of P. knowlesi infection in humans were identified in Cambodia by molecular detection assays and sequencing, and the first three cases in Viet Nam were detected by a survey in Ninh Thuan province during 2004. In 2008, five cases of P. knowlesi in humans were reported from Palawan, Philippines. In a study carried out in 12 hospitals in Sarawak, Malaysia during 2001–2006, *P. knowlesi* was identified by PCR in 266/960 (28%) of blood samples from malaria patients. Similarly, a hospital-based study in Kota Kinabalu, Sabah, Malaysia, found that *P. knowlesi* accounted for 24% (78/324) of all cases, with a case fatality rate of 11% of all cases and 28% of all severe cases.

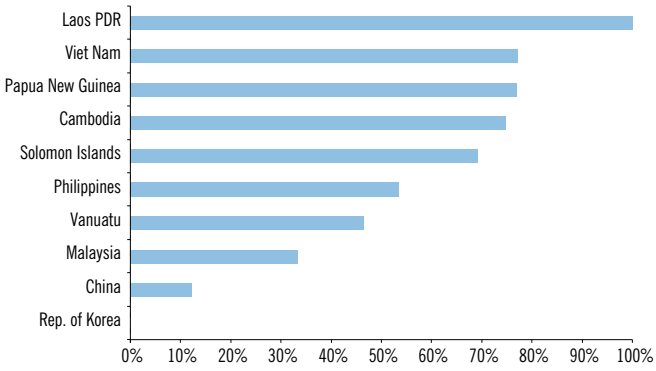
In view of the public health importance of *P. knowlesi*, the WHO Regional Office for the Western Pacific presented a new set of recommendations for control in 2011 (15), summarized as follows:- (i) Provide personal protection measures (ITNs, protective clothing, repellents) and/or chemoprophylaxis together with health promotion for populations at risk. (ii) Countries which are close to elimination should be vigilant for P. knowlesi and develop strategies for prevention and control. (iii) Surveillance should be continued to investigate possible transmission of P. knowlesi from human to human without an intermediate host (iv) A new generation of rapid diagnostic tests is needed for P. knowlesi. (v) Funds should be mobilized to carry out further research in settings where human cases of P. knowlesi have been reported.

Figure 7.9 Western Pacific Region

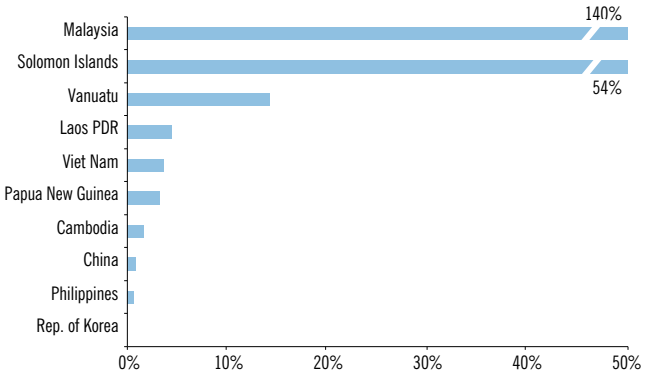
a) Population at risk, 2010



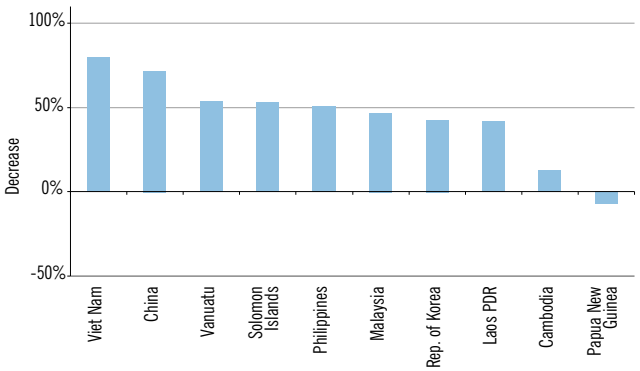
b) Percentage of cases due to P. falciparum, 2006-2010



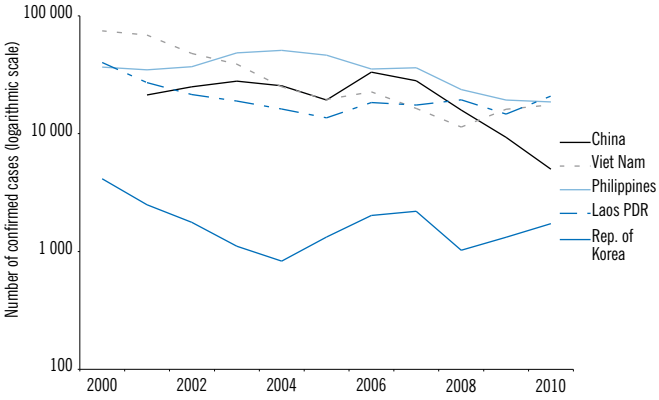
c) Annual blood examination rate, 2006–2010



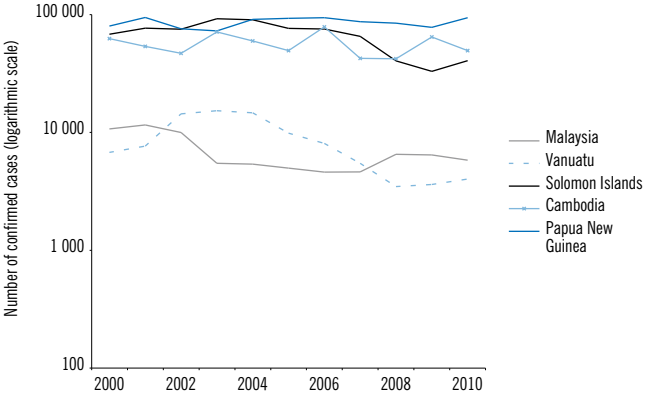
d) Percentage decrease in admissions and deaths, 2000–2010



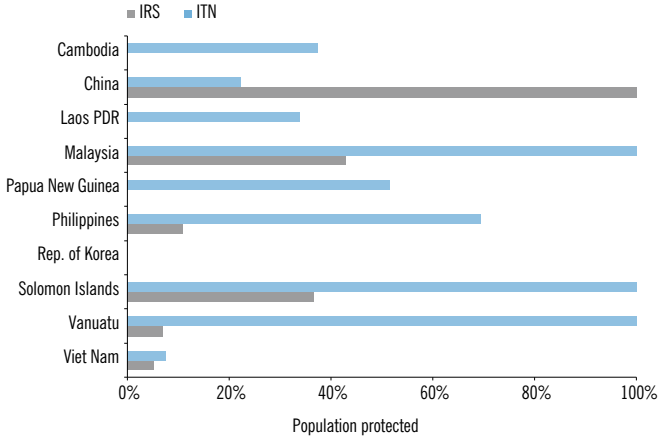
e) Countries with > 50% decrease in confirmed cases, 2000–2010



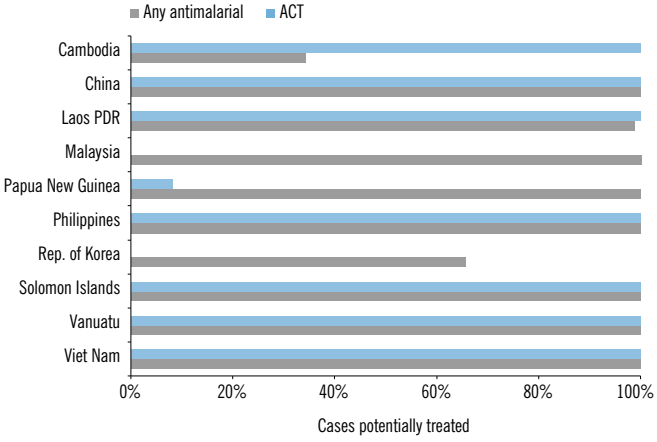
f) Countries with increase or < 50% decrease, 2000-2010



g) Percentage of high risk population protected with IRS and ITNs, 2010



h) Percentage of cases potentially treated with antimalarial medicines, 2010



7.8. Malaria elimination

Table 7.1 shows the countries in the pre-elimination, elimination and prevention of reintroduction stages as of 1 December 2011. Several countries are preparing to move between categories, entering **Table 7.1** from the left, and moving to the right. The ultimate goal of all malaria affected countries is to be certified malaria-free, which requires that no local mosquito-borne transmission has taken place for at least three consecutive years. To achieve certification, the distinction must be made between imported cases (see **Section 7.8**) and those that arise from local transmission.

Table 7.1 contains just two representatives from the African Region: Algeria which is in the elimination stage and Cape Verde which entered the pre-elimination stage in 2010, and secured a grant from the Global Fund to aid programme transition.

In the Region of the Americas, falciparum malaria outbreaks in the Bahamas and Jamaica that began in 2006 were under control by 2010. Bahamas reported zero locally-acquired cases in 2009 and 2010, as did Jamaica in 2010. Both countries are well prepared for the prevention and management of possible future outbreaks. Argentina, El Salvador, Mexico and Paraguay, in the pre-elimination stage, have reported few malaria cases (mostly *P. vivax*) in recent years.

The European Region is aiming for complete elimination of malaria by 2015. *P. falciparum* transmission has already been eliminated from the Region, with the last cases reported in Tajikistan in 2008. Georgia reported zero locally-acquired cases in 2010, and has moved to the prevention of reintroduction stage. Only Azerbaijan (50 cases in 2010), Tajikistan (111 cases) and Turkey (9 cases) still report local *P. vivax* malaria transmission. Elsewhere, sporadic cases were reported from Kyrgyzstan (3 cases), the Russian Federation (1 case) and Uzbekistan (3 cases). The latter two countries reported no local transmission in 2009 or 2010. The Russian Federation reported one case arising from local transmission in 2010. In Uzbekistan, transmission persists in a few remaining foci.

Among countries in the Eastern Mediterranean Region, Egypt (malaria-free) reported its last malaria cases (*P. falciparum* and *P. vivax*) in 1997 in the El Faiyûm agricultural area. Iraq reported no cases arising from local transmission in 2009 and 2010, and has moved to prevention of reintroduction. Iran moved to the elimination stage in 2010, and adopted a nation-wide elimination strategy in that year.

Many hundreds of malaria cases were imported into Oman in 2009 (898 reported), and outbreaks of both *P. falciparum* and *P. vivax* were reported in the North Sharqiya region of the country in 2010. Saudi Arabia (elimination stage) also records many imported cases of malaria (1912 in 2010, including *P. falciparum*) with local outbreaks, though the number of cases is falling each year.

In the South-East Asia Region, the Democratic People's Republic of Korea and Sri Lanka are in the pre-elimination stage while Bhutan and Nepal were finalizing pre-elimination strategies in 2010, and will shortly begin transition from the control stage.

In the Western Pacific Region, Malaysia is moving towards the elimination stage. The Republic of Korea, currently in the elimination stage, reported 1745 locally-acquired *P. vivax* malaria infections in 2010 with 27 imported cases.

Morocco and Turkmenistan were certified as Malaria-free in 2010. Armenia reported its last indigenous case in 2005 and achieved certification in 2011. These countries, with United Arab Emirates, give a total of four countries that have been certified malaria-free since 2007.

7.9 Imported malaria, 2001–2010

Imported malaria refers to infections acquired outside and brought into a national territory. The character of imported malaria and the problems it poses for countries in the prevention of reintroduction and malaria-free stages has changed over the period 2001–2010. Factors influencing the change include the reduction of malaria incidence in tourist destinations, an increase in the number of countries recently classified as malaria-free, and new patterns of travel and international migration.

Prior to year 2000, the importation of malaria into non-endemic countries as "traveller's malaria" was primarily a matter for foreign tourists returning home after visiting endemic areas. Since 2000, the problem has grown and changed in at least four ways: (i) in non-endemic countries with large and relatively affluent immigrant populations (e.g. countries in North America and Western Europe), immigrants returning home to endemic areas to visit friends and relatives have become a high-risk group among travellers; (ii) non-endemic countries take refugees from malaria-endemic areas; (iii) malaria cases are imported with returning members of national armed forces and UN peacekeeping forces; and (iv) malaria infections are often brought into countries by temporary migrant workers.

Imported malaria was reported by 91 countries between 2001 and 2010; the largest total numbers of cases were in the United States of America (12 701) in the Region of the Americas, the United Arab Emirates (20 452) in the Eastern Mediterranean Region, France (48 580) and the United Kingdom (17 063) in the European Region, and Australia (3355) in the Western Pacific Region. Between 2001 and 2010, 45 countries in the European Region reported a striking and consistent decline in imported malaria cases and deaths, for reasons that have not yet been investigated (**Annex Tables 8A** and **8B, Figure 7.10**).

Critical for malaria control is whether imported cases lead to local outbreaks of malaria, transmitted by indigenous anopheline mosquitoes. The risk can be high, for example when temporary agricultural workers infected with malaria are recruited for harvesting during the malaria transmission season. However, while malaria outbreaks are commonly documented, they are less frequently investigated to understand the precise circumstances of the outbreak and to identify the local vectors.

In the European Region, local transmission from imported cases has been reported in France (2006, 2008–2010), Greece (2009–2010), Italy (2007), the Republic of Moldova (2003), Spain (2010) and Ukraine (2003). In all these instances, local outbreaks were limited to fewer than 10 cases.

In the Region of the Americas, the United States of America reported an outbreak of eight cases of *P. vivax* in Palm Beach County, Florida, in 2003, probably originating from a single infected person. Immigration was the cause of a large outbreak of *P. falciparum* malaria that occurred in Jamaica between September 2006 and December 2009, in which there were 406

TABLE 7.1

Classification of countries in the Pre-elimination, Elimination, Prevention of Reintroduction and Malaria-free stages, as of 1 December 2011

WHO Region	Pre-elimination	Elimination	Prevention of reintroduction	Certified malaria-free within last 5 years, or no local transmission reported for over a decade
Africa	Cape Verde	Algeria		
Americas	Argentina El Salvador Mexico Paraguay		Bahamas[1] Jamaica[1]	
Eastern Mediterranean	→	Iran Saudi Arabia	→ Egypt Iraq[1] Oman[2] Syrian Arab Republic	Morocco Unitied Arab Emirates
Europe		Azerbaijan Kyrgyzstan Tajikistan Turkey Uzbekistan	→ Georgia[1] Russian Federation[1]	→ Armenia Turkmenistan
South East Asia	DPR Korea Sri Lanka			
Western Pacififc	Malaysia	Republic of Korea		
Typical additional programme activities and considerations in different phases of elimination (Footnote)				
Malaria situation	SPR < 5%[3] among suspected malaria patients throughout the year; a "manageable number" of cases	1 per 1000 population at risk[3]	Zero (or only very sporadic cases of) local transmission in recent years	
Programme goal	Programme reorientation from control towards elimination approach	Halt local transmission nation-wide	Prevent re-establishment of local transmission	
Case management	All malaria cases are microscopically confirmed, covering public and private sector Microscopy quality-assurance systems are put in place	Radical treatment of *P. vivax;* ACT plus gametocytocidal treatment for *P.falciparum* Routine QA/QC expert microscopic diagnosis	Case management of imported malaria	
Vector control and malaria prevention	Total IRS coverage in foci; IVM and LLIN as complementary measures in specific situations	Vector control to reduce receptivity in recent foci	Cluster response; and prevention in travelers	
Surveillance, monitoring and evaluation	All malaria cases are immediately notified GIS-based database for cases, vectors and foci Elimination database initiated	Active case detection cases and foci investigation and classification Collect documentation for eventual certification	Vigilance by the general health services Case investigation of imported cases; and response to introduced cases Certification process	
Health systems and financing	Mobilization of domestic resources	Largely reliant on domestic resources	Integration of malaria programme into other health and vector control programmes; maintance of a central nucleus of malaria expertise	

Arrows indicate movement of countries between categories in the interval 2010 to 2011. For further details of categores please refer to WHO 2007 Elimination Field manual.

1 Recently achieved zero locally acquired cases

2 Recent outbreaks after imported cases

3 These thresholds are indicative: in practice they will depend on the number of malaria cases that a programme can manage (including case notification, case investigations, etc.)

BOX 7.10
Prevention of malaria reintroduction in Mauritius

Transmission of malaria in Mauritius was interrupted in 1969 and the country certified by WHO as malaria-free in 1973. However, in 1975 an outbreak of 41 *P. vivax* cases was reported in a community of migrant workers. The outbreak resulted in a further 627 cases (623 local) and continued sporadic malaria transmission for the next 23 years. Many factors may have contributed to this resurgence. Of particular note is a four-fold increase in the number of new arrivals in Mauritius between 1968 and 1975, mainly from malaria-endemic areas of sub-Saharan Africa and India, as well as a relaxation of case detection activities.

A second effort to eliminate malaria succeeded in 1998 through the use of IRS focally, widespread larviciding, surveillance of passengers arriving in Mauritius, and a thorough case response system. Mauritius remains susceptible to outbreaks as there is continual importation of parasites and an efficient vector, *An. arabiensis*. For this reason, the country invests significant resources to prevent the reintroduction of malaria, including larviciding in areas receptive for malaria transmission and IRS at ports of entry. It also maintains a passenger screening programme which was initiated in the 1960s. Health surveillance officers take blood slides from all febrile passengers on entry and passengers that have a recent history of being in a malaria-endemic country are followed through home visits or telephone calls for up to six weeks. Each year, an average of 175 000 passengers are followed up; approximately 79% of passengers are contacted at least once and 38% followed for the full 42-day surveillance period. About 21% of passengers leave the country prior to contact or are not traceable.

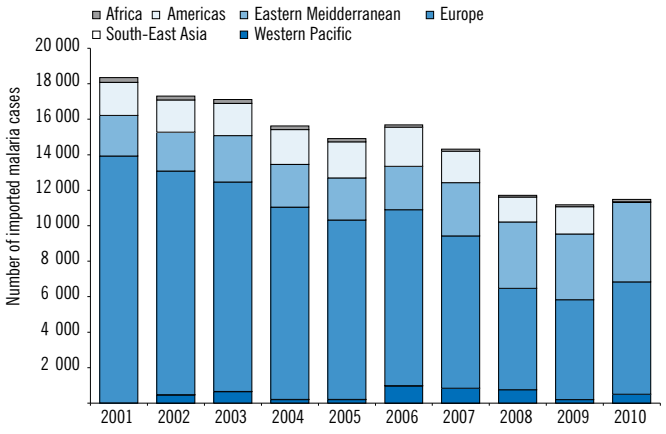
From 2005 to 2008, on average 36 imported cases were reported annually. Of these cases, 47% were identified through passive case detection in public and private clinics, 27% from further investigation of cases detected by health services, and 26% from the passenger screening programme.

The prevention of malaria reintroduction currently costs an average of US$ 2.06 per capita per year; of these costs, 35% are dedicated to the passenger screening programme. The government of Mauritius is the primary source of funds for these activities.

From: Tatarsky A, et al. Preventing the Reintroduction of Malaria in Mauritius: A Programmatic and Financial Assessment. 2011, *PLoS ONE* 6(9): e23832.

confirmed cases. In the Bahamas, 19 *P. falciparum* cases were identified on the island of Great Exuma between May and June 2006, apparently brought to the island by Haitian immigrants. These outbreaks in the Americas were contained by a swift reaction from public health authorities.

Figure 7.10 Reported number of imported malaria cases to malaria free countries



Source: WHO regional offices

In other parts of the world: three cases arising from local *P. falciparum* transmission were reported in Singapore in 2003; Oman, which interrupted transmission in 2004, has experienced several subsequent outbreaks of *P. vivax and P. falciparum* brought in by migrant workers from the Indian subcontinent; and Morocco, certified malaria-free in 2007, recorded two cases of "airport malaria" in 2009.

Other countries which eliminated malaria many years ago, including the Maldives, Mauritius and Tunisia, continue to invest effort in preventing the reintroduction of malaria. For the growing number of countries progressing to the prevention of reintroduction and malaria-free stages, the nature of malaria control will change, moving towards outbreak preparedness, surveillance and rapid response, and studies of malaria risk and receptivity.

7.10 Global estimates of malaria cases and deaths 2000-2009

Methods

The number of malaria cases in 2010 was estimated by the following methods:

(i) Countries outside the WHO African Region and low transmission countries in Africa.[1] Estimates of the number of cases were made by adjusting the number of reported malaria cases for completeness of reporting, the likelihood that cases are parasite-positive, and the extent of health service use. The procedure, which is described in the *World Malaria Report 2008 (16, 17),* combines data reported by NMCPs (reported cases, reporting completeness, likelihood that cases are parasite-positive) with those obtained from nationally representative household surveys on health service use. If data from more than one household survey was available for a country, estimates of health service use for intervening years were imputed by linear regression. If only one household survey was available, health service use was assumed to remain constant over time; analysis summarized in the *World Malaria Report 2008* indicated that in countries with multiple surveys the percentage of fever cases treated in public sector facilities varies little over time. This procedure results in an estimate with wide uncertainty intervals around the point estimate.

1 Botswana, Cape Verde, Eritrea, Madagascar, Namibia, Swaziland, South Africa, and Zimbabwe

(ii) Other countries in the WHO African Region. For some African countries the quality of surveillance data did not allow a convincing estimate to be made from the number of reported cases. For these countries, an estimate of the number of malaria cases was derived from an estimate of the number of people living at high, low or no risk of malaria. Malaria incidence rates for these populations are inferred from longitudinal studies of malaria incidence recorded in the published literature. Incidence rates are adjusted downward for populations living in urban settings and the expected impact of ITN and IRS programmes. The procedure was initially developed by the RBM Monitoring and Evaluation Reference Group in 2004 *(18)* and also described in *World Malaria Report 2008 (16, 17).*

The number of malaria deaths was estimated as follows:

(i) Countries outside the WHO African Region and low transmission countries in Africa.[1] The number of deaths was estimated by multiplying the estimated number of *P. falciparum* malaria cases by a fixed case fatality rate for each country as described in the *World Malaria Report 2008* (*16*). This method is used for all countries outside the African Region and for countries within the African Region where estimates of case incidence were derived from routine reporting systems and where malaria causes less than 5% of all deaths in children under 5 as described in the Global Burden of Disease 2004 update (*19*). A case fatality rate (CFR) of 0.45% is applied to the estimated number of *P. falciparum* cases for countries in the African Region and a CFR of 0.3% for *P. falciparum* cases in other Regions. In situations where the fraction of all deaths due to malaria is small, the use of a CFR in conjunction with estimates of case incidence was considered to provide a better guide to the levels of malaria mortality than attempts to estimate the fraction of deaths due to malaria.

(ii) Other countries in the WHO African Region, and Somalia and Sudan in the Eastern Mediterranean Region. Child malaria deaths were estimated using a verbal autopsy multi-cause model (VAMCM) developed by the WHO Child Health Epidemiology Reference Group (CHERG) to estimate causes of death for children aged 1–59 months in countries with less than 80% of vital registration coverage. The VAMCM is a revised model based on work described elsewhere *(20, 21).* The VAMCM derives mortality estimates for malaria, as well as 7 other causes (pneumonia, diarrhea, congenital malformation, other neonatal causes, injury, meningitis, and other causes) using multinomial logistic regression methods to ensure that all 9 causes are estimated simultaneously with the total cause fraction summing to 1. The regression model is first constructed using the study-level data and then populated with year 2000–2010 country-level input data to provide time-series estimates of causes of death in children aged 1–59 months. Deaths were retrospectively adjusted for coverage of ITNs and use of *Haemophilus influenzae* type b vaccine. The bootstrap method was employed to estimate uncertainty intervals by re-sampling from the study-level data to estimate the distribution of the predicted percent of deaths due to each cause.

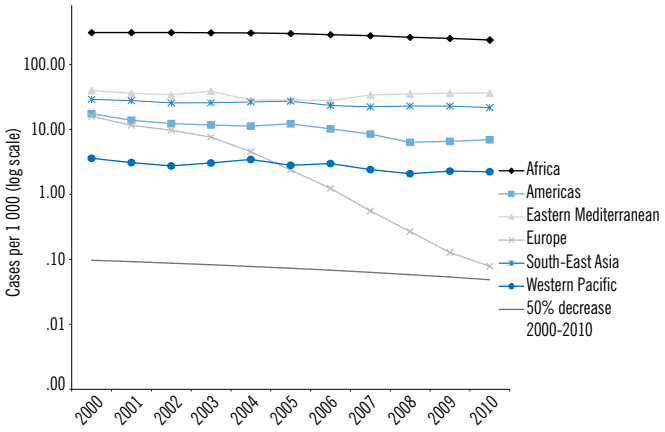
Disease burden and trends

Cases: In 2010 there were an estimated 216 million cases of malaria (5th–95th centiles, 149–274 million) worldwide (see Table 7.2), of which 91% were due to *P.falciparum*. The vast majority of cases (81%) were in the African Region followed by the South-East Asia (13%) and Eastern Mediterranean Regions (5%). The number of confirmed cases reported by NMCPs was only 11% of the estimated number of cases. The gap between case reports and estimated incidence was largest in the South-East Asia Region, and smallest in the American and European Regions.

The estimated number of malaria cases per 1000 persons at risk of malaria, which takes into account population growth over time, shows a reduction in case incidence of 17% globally between 2000 and 2010. Declines in cases incidence are seen in every Region but are greatest in the European (100%), American (60%) and Western Pacific Regions (38%).

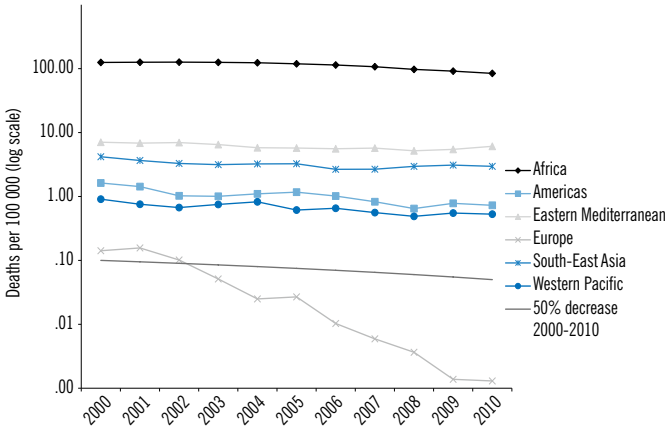
Deaths: There were an estimated 655 000 malaria deaths worldwide in 2010. It is estimated that 91% of deaths in 2010 were in the African Region, followed by the South-East Asia (6%) and Eastern Mediterranean Regions (3%). About 86% of deaths globally were in children under 5 years of age.

Figure 7.11 Estimated trends in malaria cases per 1 000 persons at risk by WHO Region, 2000–2010



Source: WHO. Rates are plotted on a logarithmic scale. A line representing the slope required to achieve a 50% reduction between 2000 and 2010 is shown to aid interpretation.

Figure 7.12 Estimated trends in malaria deaths per 100 000 persons at risk by WHO Region, 2000–2010



Source: WHO. Rates are plotted on a logarithmic scale. A line representing the slope required to achieve a 50% reduction between 2000 and 2010 is shown to aid interpretation.

The global number of cases was estimated to have increased from 223 million in 2000 (5th–95th centiles, 170–297 million) to 237 million cases in 2005 in line with population growth and decreased subsequently due to the impact of malaria control (**Table 7.3**). The estimated number of malaria cases per 1000 persons at

1 Botswana, Cape Verde, Eritrea, Madagascar, Namibia, Swaziland, South Africa, and Zimbabwe

TABLE 7.2
Estimates of malaria cases and deaths by WHO Region, 2010

	Estimated cases ('000s)				Confirmed cases reported	Reported/estimated
Region	Estimate	Lower	Upper	% *P. falciparum*		
Africa	174 000	113 000	239 000	98%	20 000	11%
Americas	1 000	1 000	1 000	34%	1 000	59%
Eastern Mediterranean	10 000	8 000	14 000	82%	1 000	10%
Europe	0.2	0.2	0.2	0%	0.2	87%
South-East Asia	28 000	23 000	35 000	54%	2 000	9%
Western Pacific	2 000	2 000	2 000	77%	257	13%
World	216 000	149 000	274 000	91%	24 000	11%

	Estimated deaths			
Region	Estimate	Lower	Upper	% <5
Africa	596 000	468 000	837 000	91%
Americas	1 000	1 000	2 000	29%
Eastern Mediterranean	15 000	1 000	38 000	60%
Europe	0	0	0	4%
South-East Asia	38 000	28 000	50 000	31%
Western Pacific	5 000	3 000	6 000	41%
World	655 000	537 000	907 000	86%

TABLE 7.3
Trend in estimated number of malaria cases and deaths, 2000-2010

Number of cases (000's)

Region	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	% reduction since 2000
Africa	175 000	179 000	183 000	188 000	190 000	191 000	189 000	187 000	182 000	179 000	174 000	1%
Americas	2 500	2 000	1 800	1 800	1 700	1 900	1 600	1 300	1 000	1 100	1 100	56%
Eastern Mediterranean	10 000	9 000	9 000	11 000	8 000	8 000	8 000	10 000	11 000	11 000	10 000	0%
Europe	38	28	24	19	11	6	3.1	1.4	0.7	0.3	0.2	99%
South-East Asia	33 000	32 000	30 000	31 000	32 000	33 000	29 000	28 000	29 000	30 000	28 000	15%
Western Pacific	3 000	2 600	2 300	2 600	2 900	2 400	2 600	2 100	1 800	2 000	2 000	33%
World	223 000	225 000	226 000	233 000	235 000	237 000	231 000	229 000	225 000	222 000	216 000	3%
Lower bound	**170 000**	**172 000**	**173 000**	**175 000**	**177 000**	**181 000**	**172 000**	**169 000**	**165 000**	**163 000**	**149 000**	
Upper bound	**297 000**	**301 000**	**304 000**	**310 000**	**316 000**	**319 000**	**310 000**	**304 000**	**298 000**	**292 000**	**274 000**	

Number of deaths

Region	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	% reduction since 2000
Africa	682 000	705 000	726 000	740 000	748 000	740 000	727 000	701 000	654 000	630 000	596 000	13%
Americas	2 300	2 000	1 500	1 500	1 600	1 800	1 500	1 300	1 000	1 200	1 200	48%
Eastern Mediterranean	17 000	17 000	18 000	17 000	16 000	16 000	16 000	16 000	15 000	16 000	15 000	12%
Europe	3	4	2	1	1	1	0	0	0	0	0	100%
South-East Asia	46 000	41 000	37 000	36 000	38 000	39 000	32 000	33 000	37 000	39 000	38 000	17%
Western Pacific	7 300	6 100	5 500	6 200	6 800	5 100	5 500	4 700	4 200	4 700	4 600	37%
World	755 000	771 000	789 000	801 000	810 000	801 000	782 000	756 000	711 000	691 000	655 000	13%
Lower bound	**575 000**	**588 000**	**600 000**	**612 000**	**625 000**	**621 000**	**607 000**	**597 000**	**567 000**	**554 000**	**539 000**	
Upper bound	**969 000**	**992 000**	**1 018 000**	**1 034 000**	**1 053 000**	**1 045 000**	**1 023 000**	**992 000**	**944 000**	**932 000**	**906 000**	

TABLE 7.4

Trend in estimated malaria incidence and mortality rates, 2000-2010

Cases per 1,000 at risk

Region	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	% reduction since 2000
Africa	321	320	319	318	315	308	297	286	271	259	246	23%
Americas	18	14	13	12	12	13	11	9	7	7	7	60%
Eastern Mediterranean	41	37	35	40	29	29	29	35	36	37	33	19%
Europe	16	12	10	8	5	2	1	1	0	0	0	100%
South-East Asia	30	29	26	27	27	28	24	23	24	24	22	25%
Western Pacific	4	3	3	3	4	3	3	2	2	2	2	38%
World	79	78	77	78	78	77	74	72	70	68	65	17%

Deaths per 100,000 at risk

Region	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	% reduction since 2000
Africa	125.1	126.0	126.5	125.5	123.7	119.1	114.0	107.2	97.4	91.5	84.3	33%
Americas	1.6	1.4	1.0	1.0	1.1	1.2	1.0	0.8	0.6	0.8	0.7	55%
Eastern Mediterranean	7.1	6.8	7.0	6.5	5.8	5.7	5.6	5.7	5.2	5.5	4.9	31%
Europe	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	99%
South-East Asia	4.2	3.7	3.3	3.1	3.2	3.2	2.7	2.7	3.0	3.1	3.0	29%
Western Pacific	0.9	0.8	0.7	0.8	0.8	0.6	0.7	0.6	0.5	0.6	0.5	42%
World	26.6	26.8	26.9	26.9	26.8	26.1	25.1	23.9	22.1	21.2	19.8	26%

risk, which takes into account population growth over time, shows a reduction in case incidence of 17% globally between 2000 and 2010. Declines in case incidence are seen in every Region but are greatest in the European (100%), American (60%) and Western Pacific Regions (38%) (**Table 7.4, Fig. 7.11**).

The estimates of number of cases are similar to those published in the *World Malaria Report 2010* but some adjustments have been made according to feedback from country consultations and because of updated country reports, household surveys or population estimates.

Deaths: There were an estimated 655 000 malaria deaths worldwide in 2010 (5^{th}–95^{th} centiles, 539 000–906 000). It is estimated that 91% of deaths in 2010 were in the African Region, followed by the South-East Asian Region (6%), and Eastern Mediterranean Regions (3%). About 86% of deaths globally were in children (**Table 7.2**).

The estimated number of deaths has fallen in all regions between 2000 and 2010 although there is some fluctuation year by year (**Table 7.3**). In the African Region the number of deaths is estimated to have risen from 682 000 in 2000 to 748 000 in 2004 before decreasing to 596 000 in 2010 following a scale up of control activities. The trend in estimated number of deaths is similar to that for the estimated number of cases.

While the number of deaths in the African Region (and globally) increased between 2000 and 2004 the risk of death - or malaria mortality rate - remained relatively constant until 2004 and has decreased continuously between 2005 and 2010 with more pronounced decreases in more recent years (**Table 7.4, Fig. 7.12**). Malaria mortality rates decreased by 25% worldwide between 2000 and 2010 and by 33% in the WHO African Region.

The estimates of the number of deaths outside Africa are similar to those published in the *World Malaria Report 2010* but those for the WHO African Region differ substantially. This is for two reasons: (i) A downward revision of the total number of child deaths occurring globally made by the UN Inter-agency Group for Child Mortality Estimation (22); and (ii) Changes in the assignment in cause of death made by the Child Health Epidemiology Reference Group (CHERG), that affected the proportion of deaths attributed to malaria particularly at the beginning of the last decade. These methodological changes resulted in an overall lowering of the number of malaria deaths in the African Region of approximately 11% for 2009 and larger percentages in earlier years.

7.11 Conclusions

7.11.1 Malaria in the African Region

The majority of the world's malaria cases and deaths occur in the African Region, but malaria burden and trends, and the success of control measures, appear to vary greatly across the continent (**Table 7.5**).

The 'E8 initiative', launched by eight southern African countries, has set the ambitious goal of eliminating malaria by 2020. Between 2000 and 2008 there were steep declines in malaria cases in Botswana, Namibia, South Africa and Swaziland, indicating progress in this direction. Beyond the southern tip of Africa, the biggest reductions in malaria cases and deaths since 2000 have been on islands and in small countries with intensive control programmes. The islands are Sao Tome and Principe, Bouaké (Equatorial Guinea), Cape Verde and Zanzibar (United Republic of Tanzania). The best-performing small countries are Eritrea, Rwanda and Senegal. Malaria also appears to be in decline in Ethiopia and Zambia which have greatly increased

ITN and IRS coverage and expanded programmes for diagnostic testing and treatment of malaria. In each of these countries, the number of cases reported annually fell by at least a quarter and, in some instances, by more than a half, between 2000 and 2010 (**Table 7.1**).

While substantial decreases in the numbers of malaria cases are observed in countries that have well developed surveillance systems, it is much more difficult to detect such changes in countries where surveillance systems are weaker, particularly in the more populous countries of central and west Africa. The reasons are twofold:- (i) Most fever episodes have, until recently, been treated presumptively as malaria without diagnostic confirmation. With the expanding use of microscopy and RDTs, including in Burkina Faso, Democratic Republic of Congo and Nigeria, the numbers of confirmed cases has risen steadily, reflecting changes in diagnostic practice and concealing the underlying trends in malaria incidence. (ii) Because consistent information on confirmed cases may not be available, malaria trends have to be assessed from data on hospital admissions. While the predictive value of a malaria diagnosis for an admitted patient is considered to be higher than for an outpatient diagnosis based only on clinical signs and symptoms, many admissions may not be confirmed parasitologically and there may be uncertainty over whether malaria is being reported accurately; non-malarial admissions are not likely to respond to malaria therapy.

The implications for monitoring and evaluation in the African Region are clear: a better understanding of malaria trends and their causes requires improvements in routine national surveillance, with close monitoring of confirmed cases, medical certification of causes of death, and the documentation of intervention type and coverage on small spatial and temporal scales.

7.11.2 Malaria in other WHO Regions

Malaria outside Africa is caused by a variable mix of *P. falciparum*, *P. vivax* and other *Plasmodium* species, transmitted by a diversity of *Anopheles* vectors. The approach to vector control and case management, and the predicted impact of control, are determined in each setting by the local combination of parasites and vectors.

Routine surveillance outside Africa does not capture all malaria cases, but the consistency of annual reporting means that time trends in confirmed cases probably reflect, to a good approximation, underlying trends in malaria incidence in most countries. As in the African Region, these trends are determined by multiple factors. And, as in Africa, the challenge is to disentangle the effects of specific interventions from those of other determinants.

Against that biological background, all five Regions other than Africa offer striking examples of malaria in decline (**Table 7.5, Figure 7.13**). But in some Regions, and in some individual countries, the downward trends are more conspicuous than in others.

In the South-East Asia Region, malaria is clearly declining in the smaller countries but the burden appears persistently high in the major endemic centres, which are Bangladesh, India, Indonesia and Myanmar. These large countries dominate the regional trend.

The Eastern Mediterranean Region is characterised by enormous heterogeneity in malaria burden and trends, and inconsistent reporting from the largest countries. The North African countries and United Arab Emirates are already free of malaria. Afghanistan, Islamic Republic of Iran, Iraq and Saudi Arabia have reported sharp declines in malaria over the past decade. But Pakistan, Somalia, Sudan and Yemen have persistently high burdens of disease.

Malaria is declining in most parts of the Region of the Americas, but comparatively slowly, if at all, in the high-burden countries Brazil and Colombia. The most impressive rates of decline have been reported in Costa Rica, Ecuador, El Salvador, Nicaragua, Paraguay and Suriname, while malaria incidence appears to be increasing in the Dominican Republic and possibly in Haiti.

Nine of the ten principal malaria-endemic countries in the Western Pacific Region have reported downward trends in malaria but in some high-burden countries, especially Cambodia and Papua New Guinea, the rate of decline is still very slow.

The European Region could be the first to eliminate malaria in the next few years. Almost all remaining malaria cases in 2010 were reported from just two countries, Azerbaijan and Tajikistan and case numbers are continuing to fall in both countries.

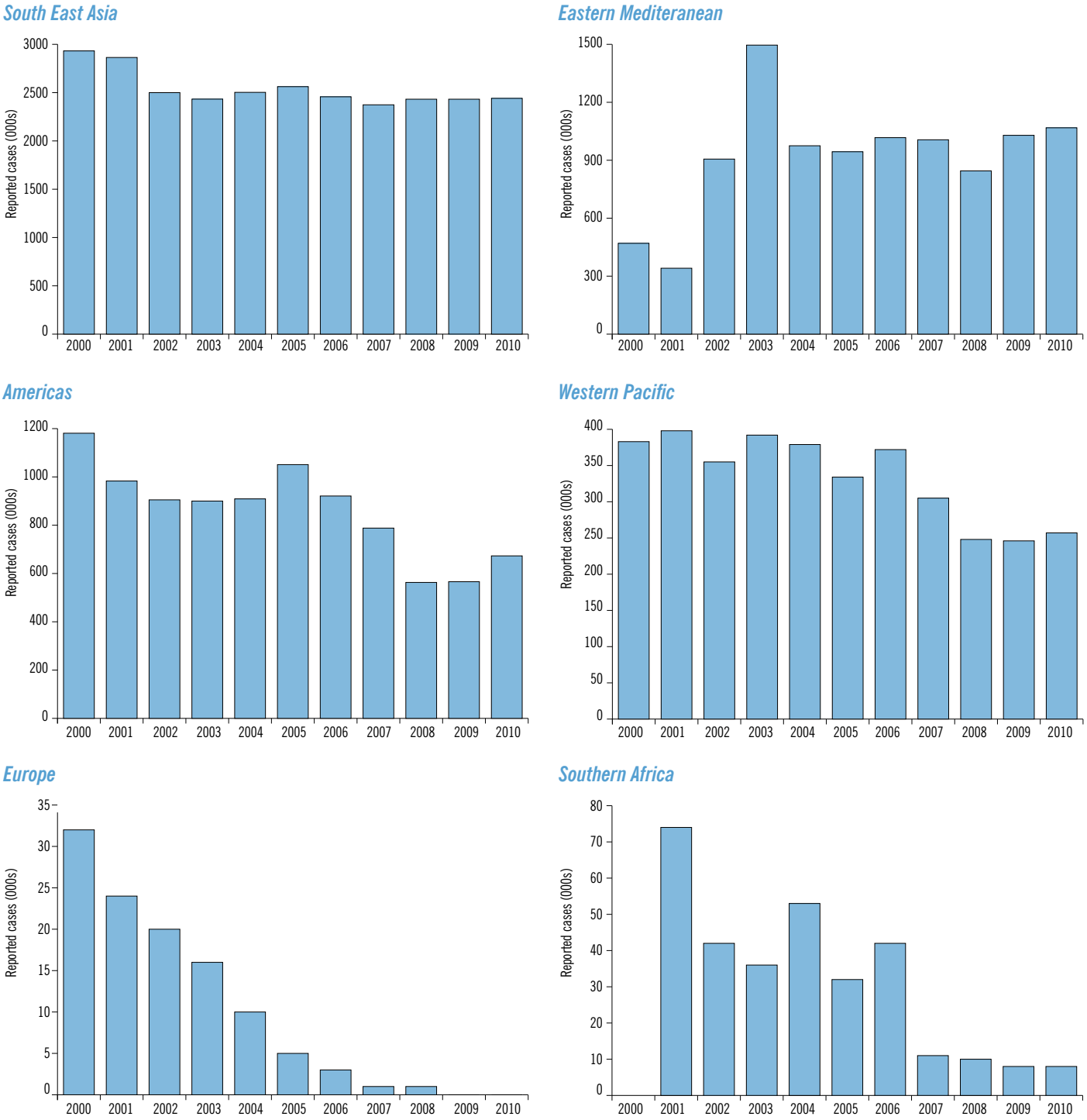
Cross-country comparisons of routine surveillance data are a weak instrument for assessing the effects of malaria control, but specific studies in selected countries have provided some good examples of the link between intervention and impact. These examples include Nicaragua in the Americas, Saudi Arabia in the Eastern Mediterranean Region, and Tajikistan in the European Region. It is very likely that the downward trends in other countries can be explained, at least in part, by recent improvements in vector control and case management. Further detailed studies, retrospective and prospective, are needed to document exactly where and by how much these measures are having an impact.

TABLE 7.5

Decrease in cases, >50%	Decrease in cases , 25-50%	Change in cases, <25%	Increase in cases, >25%	Insufficient data
AFRICAN REGION				
Algeria Botswana Cape Verde Namibia Rwanda Sao Tome and Principe South Africa Swaziland	Ethiopia Senegal Eritrea Zambia	Gambia* Madagascar		Angola Benin Burkina Faso+ Burundi+ Cameroon Central African Republic Chad Congo Côte d'Ivoire Dem. Rep. of the Congo+ Equatorial Guinea* Gabon Ghana Guinea Guinea-Bissau Kenya* Liberia+ Malawi Mali Mauritania Mozambique Niger Nigeria Sierra Leone+ Togo+ Uganda+ United Republic of Tanzania* Zimbabwe+
REGION OF THE AMERICAS				
Argentina Belize Bolivia (Plurinational State) Costa Rica Ecuador El Salvador French Guiana Guatemala Honduras Mexico Nicaragua Panama Paraguay Peru Suriname	Brazil	Colombia Guyana	Dominican Republic Venezuela (Bolivarian Republic)	Haiti+
EASTERN MEDITERRANEAN REGION				
Afghanistan Iran (Islamic Republic) Iraq Saudi Arabia				Djibouti Pakistan* Somalia Sudan* Yemen*
EUROPEAN REGION				
Azerbaijan Georgia Kyrgyzstan Tajikistan Turkey Uzbekistan				
SOUTH-EAST ASIA REGION				
Bhutan Democratic People's Republic of Korea Nepal Sri Lanka Thailand		India		Bangladesh+ Timor-Leste Indonesia Myanmar+
WESTERN PACIFIC REGION				
China Philippines Republic of Korea Solomon Islands Viet Nam	Lao People's Democratic Republic Malaysia Vanuatu	Cambodia* Papua New Guinea		

Source: NMCP data.
* Progress in reducing cases by >50% has been reported sub-nationally where intervetniosn have been intensified
+ Country has recently expanded diagnostic testing, so assessment of trends is made difficult

Figure 7.13 Total confirmed cases reported in five WHO Regions, and one subregion of southern Africa, 2000–2010



Source: NMCP data. The southern Africa group includes Botswana, Namibia, South Africa and Swaziland. South-East Asia reported the largest number of cases, and the slowest rate of decline. The Region of the Americas and Western Pacific Region have fewer cases with faster rates of decline, but malaria is in steepest decline in the European Region and the four southern African countries.

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Methods for preparing the country profiles

This section describes the methods used for preparing country profiles.

Epidemiological profile

Population 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 annual incidence of malaria due to all species was ≥1 per 1000 population in 2010.

2. Areas of low transmission, where the reported annual malaria case incidence from all species was < 1 per 1000 population in 2010 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 *(2)*. An area is designated malaria-free when no cases have occurred for several years. Areas may become malaria-free due to environmental factors or 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 of low and high transmission. The population at risk is used as the denominator in calculating operational coverage of malaria preventive interventions and case incidence. 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.

Parasites and vectors 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.

Maps of malaria

Maps are based on the number of cases per 1000 population in 2010. For countries in the African Region, and for Sudan in the Eastern Mediterranean Region and Papua New Guinea in the Western Pacific Region, the total of the probable and confirmed cases was used as numerator because relatively small proportions of cases are confirmed. In other countries the number of confirmed malaria cases was used as numerator. Six 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 case per 1000 population per year but ≤ 1 cases;
- 0 recorded cases.

The first four categories correspond to the high-transmission category defined above. 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.

Intervention policies and strategies

Intervention This section of the profile shows the policies and strategies adopted by each country for malaria prevention, diagnosis and treatment. Policies 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 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.

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 3. All countries were requested to convert their local currencies to 2010 US$.

Expenditure by intervention The pie chart shows the proportion of malaria funding from all sources, spent on different activities in 2010: ITNs, insecticides and spraying materials, IRS, diagnosis, antimalarial medicines, monitoring and evaluation; and human resources and technical assistance. 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.

Coverage

Coverage of ITN and IRS The percentage of households that own at least one ITN, and the percentage of persons who slept 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. For high-burden countries in the WHO African Region a model was used to estimate the percentage of households owning at least one ITN for years in which household surveys were not undertaken. 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) *(3)*.

Coverage with IRS is 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. Programme data are the most important source of information for estimating 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: programme data (public sector) (i) Percentage of suspected cases tested is calculated as the number of suspected cases examined by microscopy or by RDT divided by the total number of suspected malaria cases x 100. This indicator reflects the extent to which a programme can provide diagnostic services to patients attending public health facilities. (ii) The percentage of malaria cases receiving any antimalarial in the public sector is derived from the number of antimalarial treatment courses delivered by health services divided by the number of reported malaria cases attending public sector health facilities x 100, with correction for reporting completeness. This indicator can provide information on whether the malaria control programme delivers sufficient antimalarials to treat all patients who seek treatment in the public sector. (iii) The percentage of falciparum malaria cases receiving ACT in the public sector is derived from the number of ACT courses delivered divided by the number of reported falciparum malaria cases in the public sector x 100, with correction for reporting completeness. This indicator can provide information on whether the malaria control programme delivers sufficient ACTs to treat the number of falciparum cases seeking treatment in the public sector.

Impact

Malaria test positivity rate and ABER ABER is calculated as the number of parasitological tests done (by microscopy and/or RDTs) divided by the total population at risk. This indicator reflects the extent of diagnostic testing in the population and is useful in interpreting trends in confirmed cases (an increase in diagnostic testing can produce an increase in cases even if case incidence in the population is constant). 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.

Confirmed cases, admissions and deaths 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. 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 and elimination phases, the total number of cases is plotted on an arithmetic scale along with those acquired within the country (indigenous).

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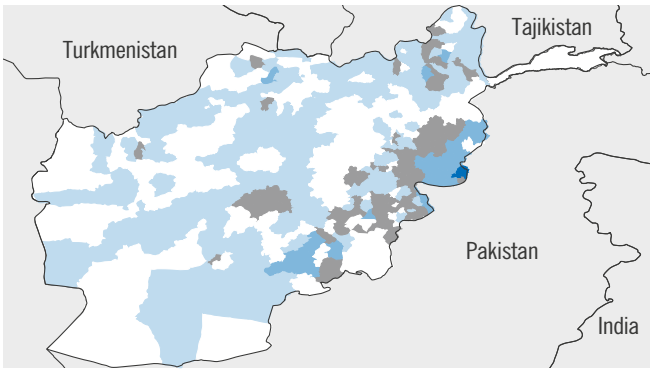
Afghanistan

Phase: Control.



Distribution of probable and confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	22 600 000	72
Low transmission (0-1 cases per 1000 population)	8 170 000	26
Malaria-free (0 cases)	628 000	2
Total	31 398 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (9%), *P. vivax*

Major anopheles species: *An. superpictus, stephensi, pulcherrimus, subpictus, hyrcanus, culicifacies*

II. INTERVENTION POLICIES AND STRATEGIES

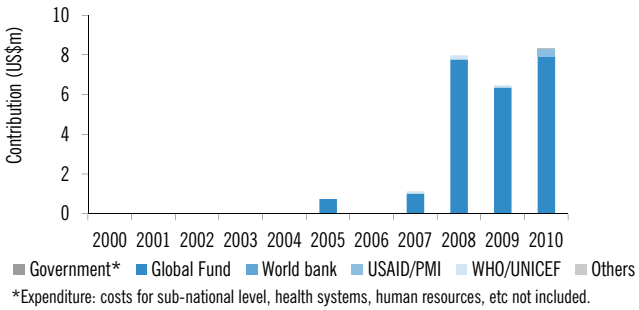
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2005
	ITNs/ LLINs: distributed to all age groups	Yes	2010
IRS	IRS is recommended	No	-
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	Patients 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

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	CQ	-
First-line treatment of *P. falciparum*	AS+SP	2004
Treatment failure of *P. falciparum*	QN	-
Treatment of severe malaria	AM ;QN	-
Treatment of *P. vivax*	CQ+PQ(14d)	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

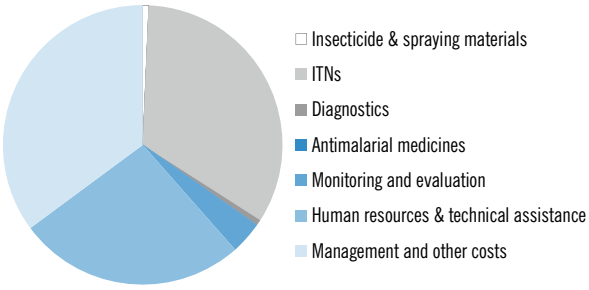
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+SP	2004–2006	5	0	0	0	28 days

III. FINANCING – Government and external financing

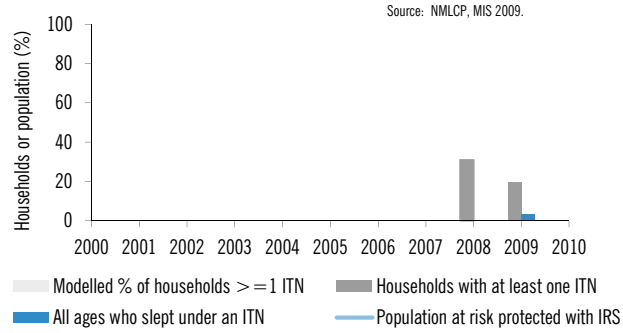


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

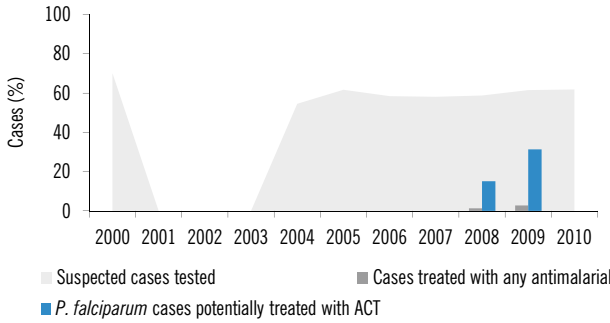
Expenditure by intervention in 2010



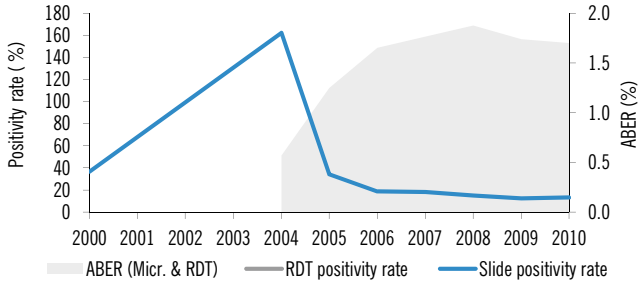
IV. COVERAGE – Coverage of ITN and IRS



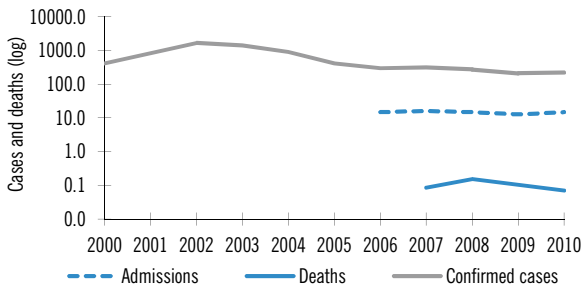
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER



Confirmed cases, admissions and deaths (per 100 000)



Algeria

Phase: Elimination.

Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
Number of active foci	0	
Number of people living within active foci	-	
Number of people living in malaria-free areas	-	
Total	35 500 000	

Parasites and vectors

Major Plasmodium species: *P. falciparum* (98%), *P. vivax*
Major Anopheles species: *An.labranchiae, multicolor, hispaniola, claviger*

II. INTERVENTION POLICIES AND STRATEGIES

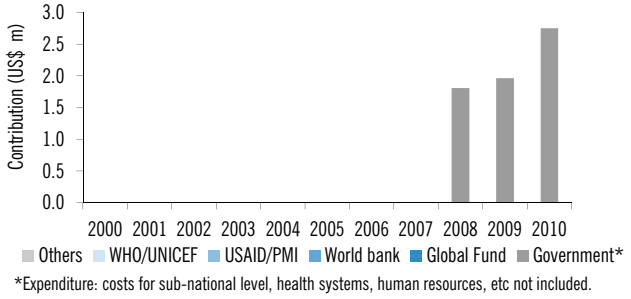
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	No	-
	ITNs/ LLINs: distributed to all age groups	No	-
IRS	IRS is recommended	Yes	1980
	DDT is used for IRS	No	-
Case management	Malaria diagnosis is free of charge in the public sector	Yes	-
	Gametocidal treatment of P.falciparum cases	Yes	-
	Radical treatment of P. vivax cases	Yes	1968
Surveillance	Foci and case investigation undertaken	-	-
	Case reporting from private sector is mandatory	-	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum* (confirmed)	-	-
Treatment failure of *P. falciparum*	-	-
Treatment of severe malaria	-	-
Treatment of *P. vivax*	CQ	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

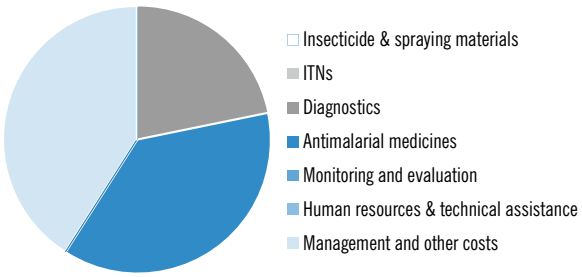
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

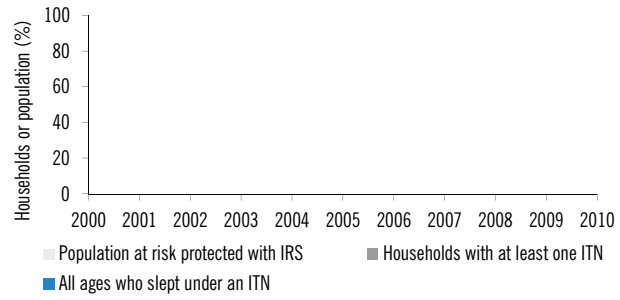


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2010

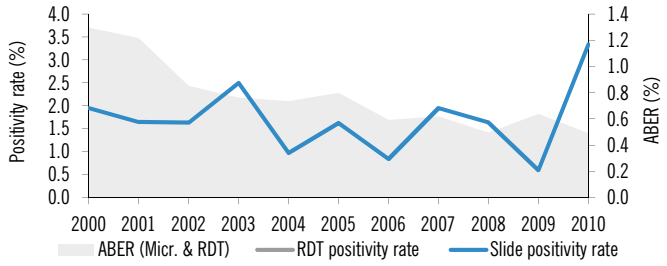


IV. COVERAGE – Coverage of ITN and IRS

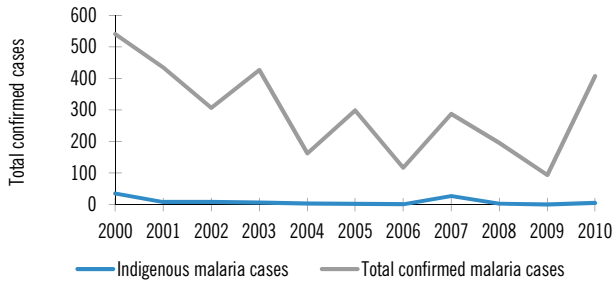


Cases tested and ACT delivered: Programme data (public sector)

V. IMPACT – Malaria test positivity rate and ABER

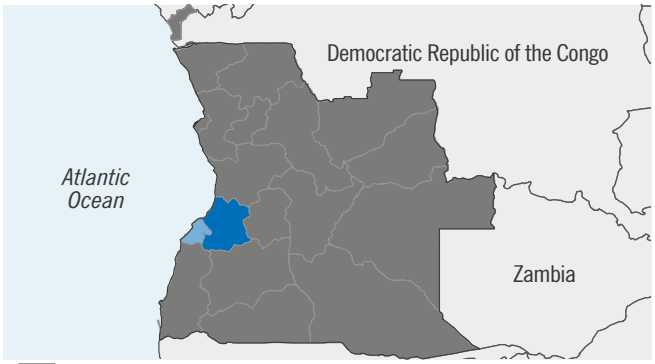


Total confirmed malaria cases and indigenous cases



Angola

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect 25%–50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	19 100 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	19 100 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, funestus, nili*

II. INTERVENTION POLICIES AND STRATEGIES

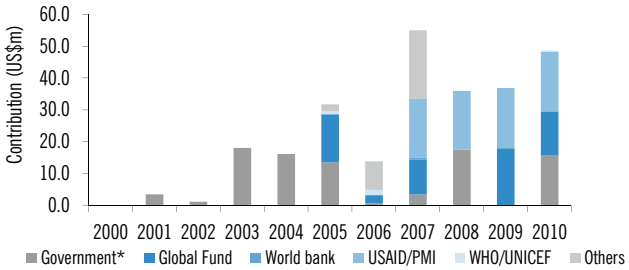
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2001
	ITNs/ LLINs: distributed to all age groups	Yes	2010
IRS	IRS is recommended	Yes	2003
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	Yes	2005
Case management	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	2005
	Pre-referral treatment with recommended medicines	Yes	2004
	Oral artemisinin-based monotherapies are not registered	Yes	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2006
First-line treatment of *P. falciparum*	AL	2006
Treatment failure of *P. falciparum*	QN	2006
Treatment of severe malaria	QN	2006
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

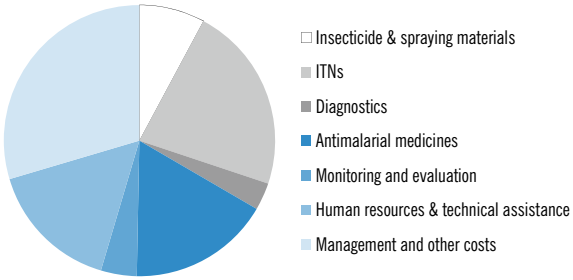
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AL	2004–2004	2	0	1.15	2.3	28 days

III. FINANCING – Government and external financing

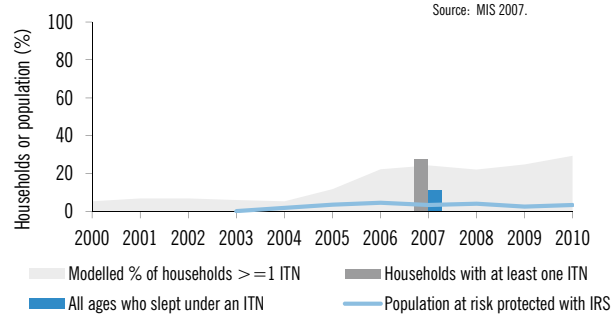


*Budget: costs for sub-national level, health systems, human resources, etc not included.

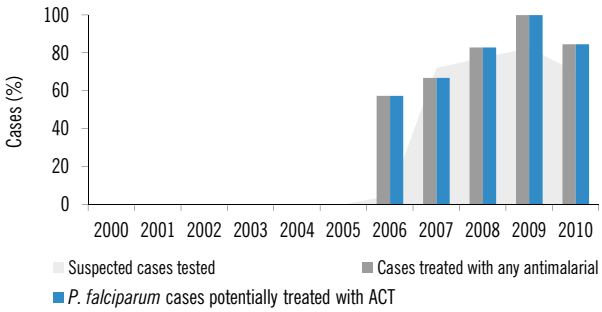
Expenditure by intervention in 2010



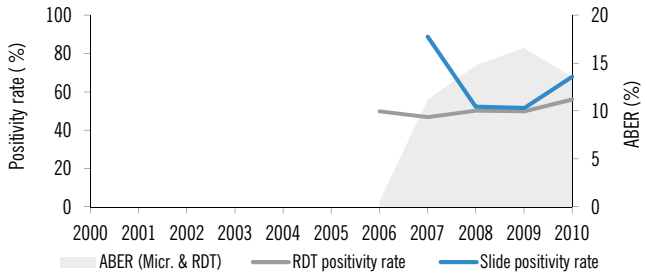
IV. COVERAGE – Coverage of ITN and IRS



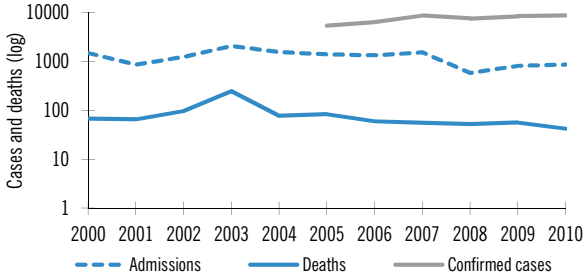
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

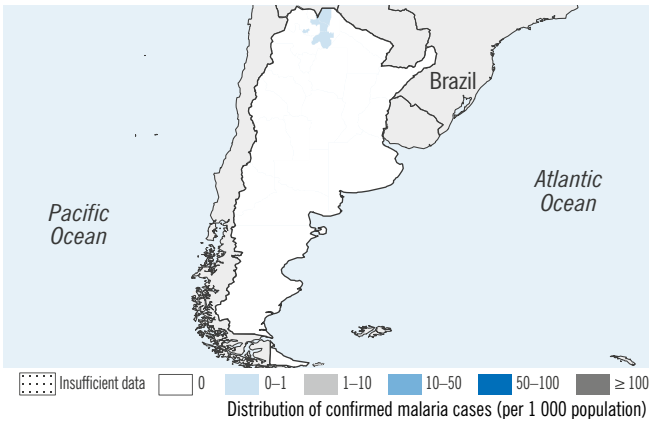


Confirmed cases, admissions and deaths (per 100 000)



Argentina

Phase: Pre-elimination.



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)	202 000	0
Malaria-free (0 cases)	40 200 000	100
Total	40 402 000	

Parasites and vectors

Major plasmodium species:
Major anopheles species: *An. pseudopunctipennis, darlingi*

II. INTERVENTION POLICIES AND STRATEGIES

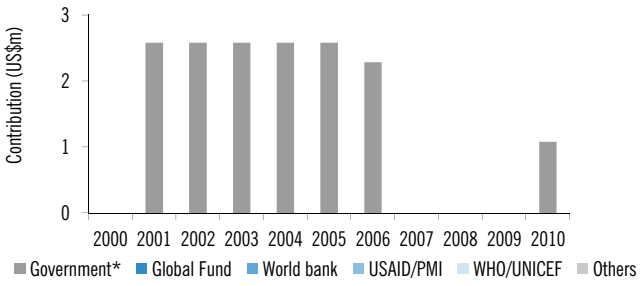
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	No	-
	ITNs/ LLINs: distributed to all age groups	No	-
IRS	IRS is recommended	-	-
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	Patients of all ages should receive diagnostic test	-	-
	RDTs used at community level	-	-
	ACT is free for all ages in public sector	-	-
	Pre-referral treatment with recommended medicines	-	-
	Oral artemisinin-based monotherapies are not registered	-	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	-	-
Treatment failure of *P. falciparum*	-	-
Treatment of severe malaria		-
Treatment of *P. vivax*	CQ+PQ	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

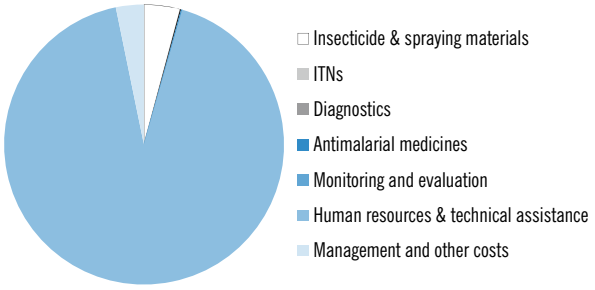
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

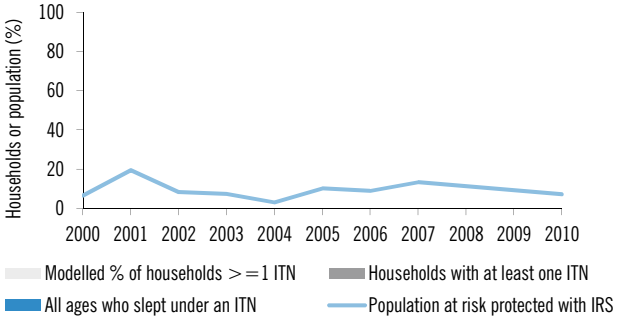


*Bugdet: costs for sub-national level, health systems, etc not included.

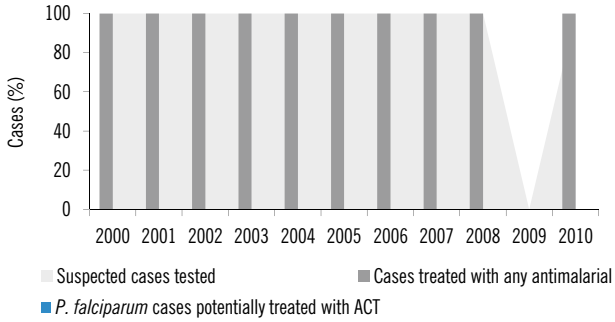
Expenditure by intervention in 2010



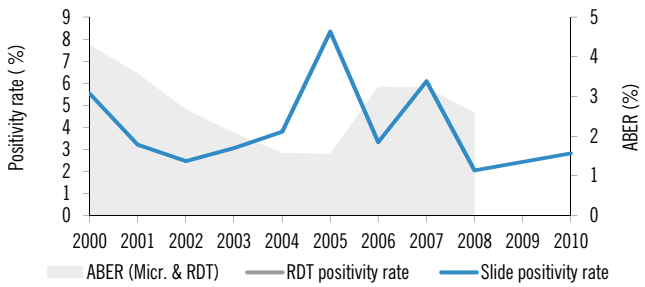
IV. COVERAGE – Coverage of ITN and IRS



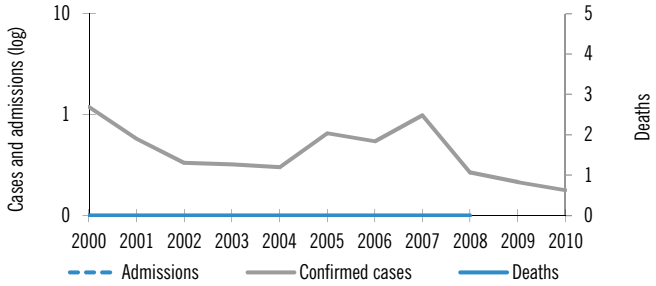
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

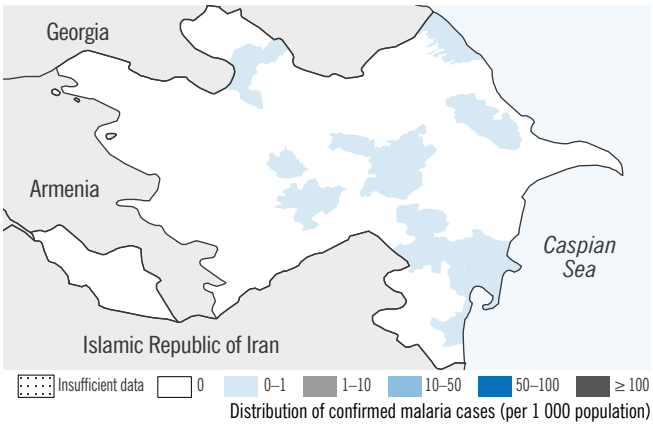


Confirmed cases, admissions (per 100 000) and deaths



Azerbaijan

Phase: Elimination. Intensive control measures improved malaria situation in Azerbaijan – 50 indigenous cases were reported in 2010. 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)	2010	%
Number of active foci	30	
Number of people living within active foci	69 100	1
Number of people living in malaria-free areas	9 120 000	99
Total	9 189 100	

Parasites and vectors

Major Plasmodium species: *P. vivax*
Major Anopheles species: *An.sacharovi, maculipennis*

II. INTERVENTION POLICIES AND STRATEGIES

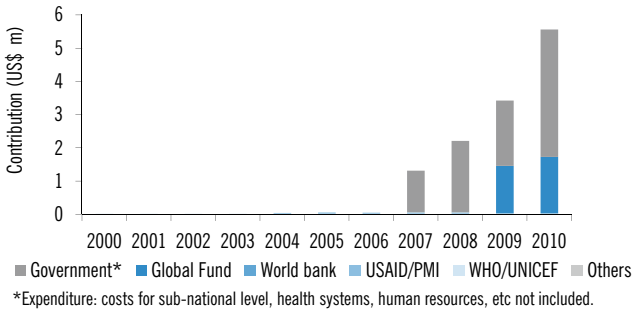
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2009
	ITNs/ LLINs: distributed to all age groups	No	-
IRS	IRS is recommended	Yes	1930
	DDT is used for IRS	No	-
Case management	Malaria diagnosis is free of charge in the public sector	Yes	1930
	Gametocidal treatment of P.falciparum case	-	-
	Radical treatment of P. vivax cases	Yes	1956
Surveillance	Foci and case investigation undertaken	Yes	1930
	Case reporting from private sector is mandatory	Yes	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+SP	2008
First-line treatment of *P. falciparum* (confirmed)	AS+SP	2008
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 (therapeutic or parasitological failure, %)

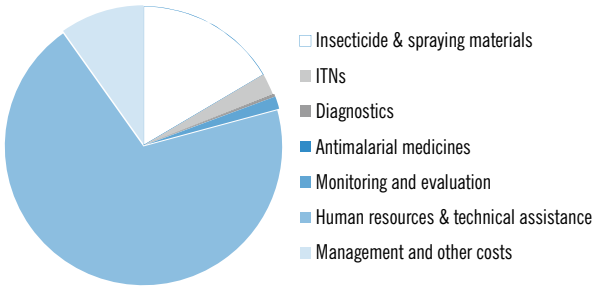
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing



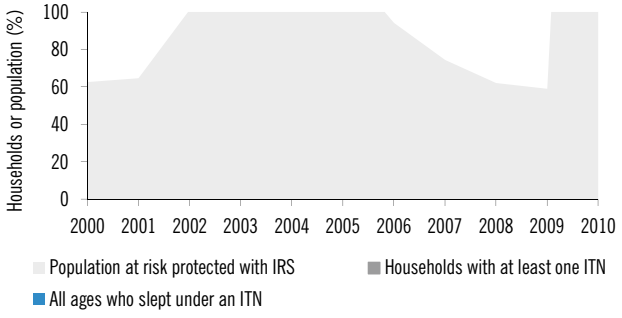
*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2010

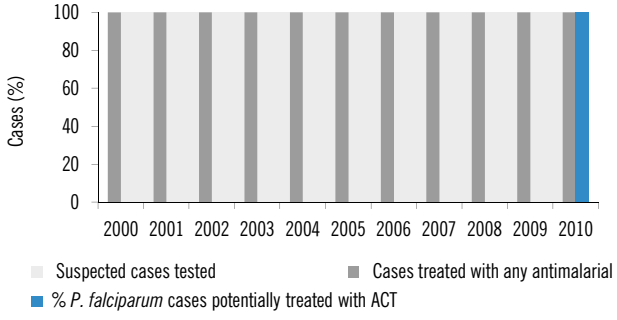


IV. COVERAGE – Coverage of ITN and IRS

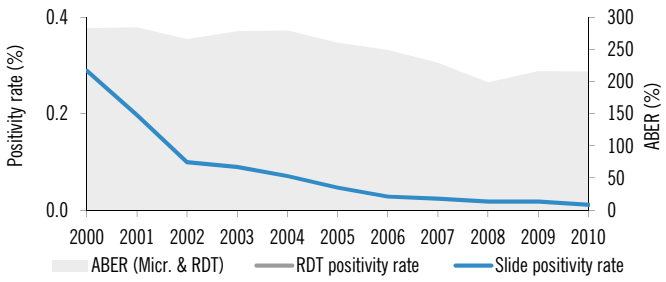
Source: MICS 2000.



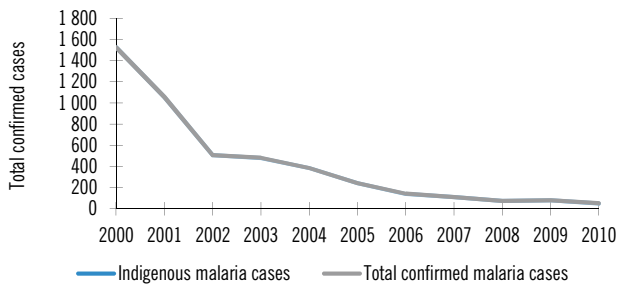
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

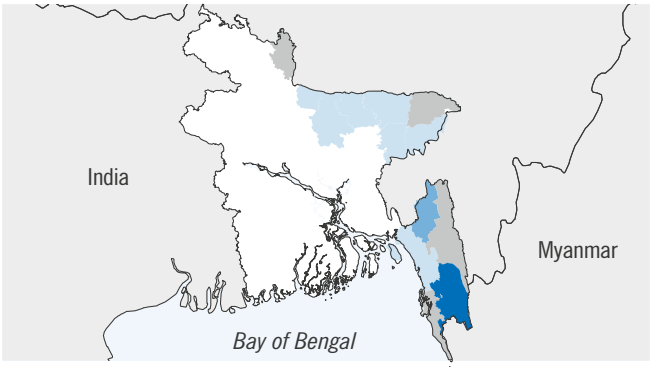


Total confirmed malaria cases and indigenous cases



Bangladesh

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect 25%–50% of the population at high risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	10 400 000	7
Low transmission (0-1 cases per 1000 population)	40 100 000	27
Malaria-free (0 cases)	98 100 000	66
Total	148 600 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (92%), *P. vivax*
Major anopheles species: *An. dirus, minimus, philippinensis, sundaicus*

II. INTERVENTION POLICIES AND STRATEGIES

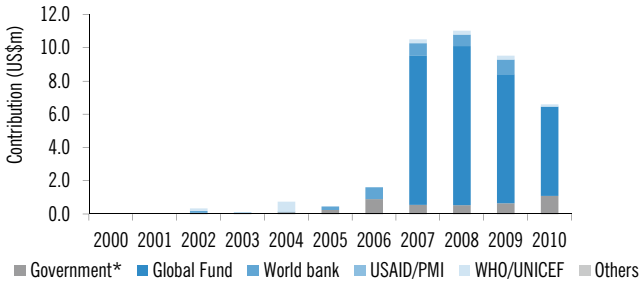
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2008
	ITNs/ LLINs: distributed to all age groups	Yes	2008
IRS	IRS is recommended	No	-
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	Patients 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	No	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	AL	2004
Treatment failure of *P. falciparum*	QN+D ;QN+T	2004
Treatment of severe malaria	AM ;QN	2004
Treatment of *P. vivax*	CQ+PQ(14d)	2004

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

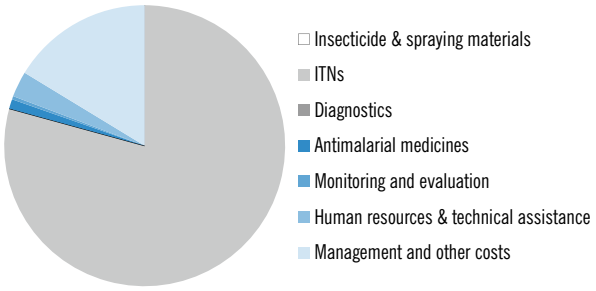
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AL	2003–2007	3	0	2.9	5.7	42 days

III. FINANCING – Government and external financing

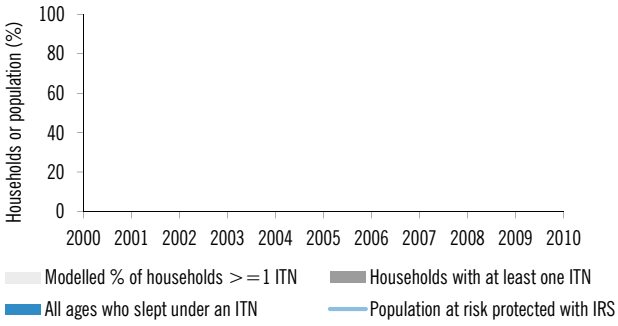


*Budget: costs for sub-national level, health systems, human resources, etc not included.

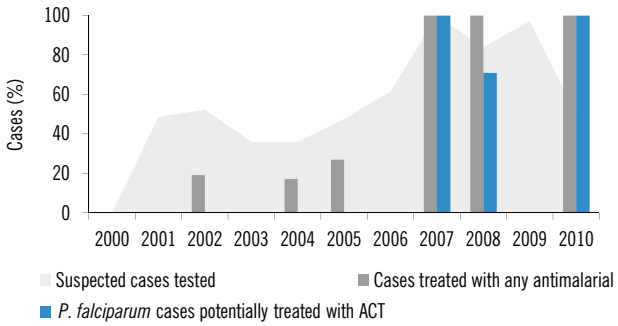
Expenditure by intervention in 2010



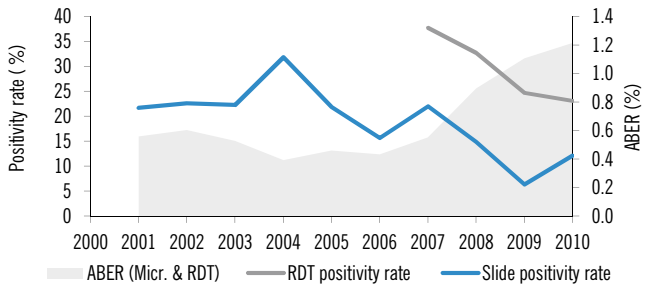
IV. COVERAGE – Coverage of ITN and IRS



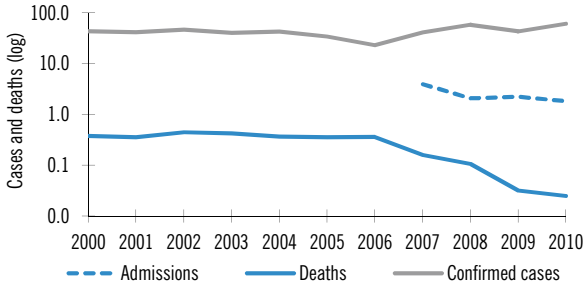
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

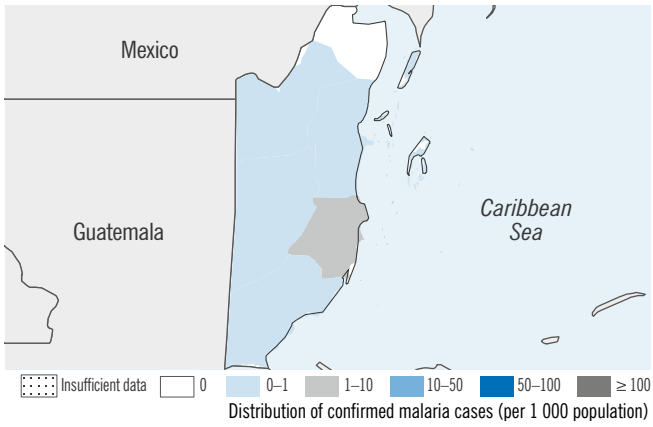


Confirmed cases, admissions and deaths (per 100 000)



Belize

Phase: Control. Coverage: In 2010, IRS was sufficient to protect 23% of the population at high risk.



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)	215 000	69
Malaria-free (0 cases)	96 600	31
Total	311 600	

Parasites and vectors

Major plasmodium species: *P. falciparum* (0%), *P. vivax*
Major anopheles species: *An. albimanus, darlingi*

II. INTERVENTION POLICIES AND STRATEGIES

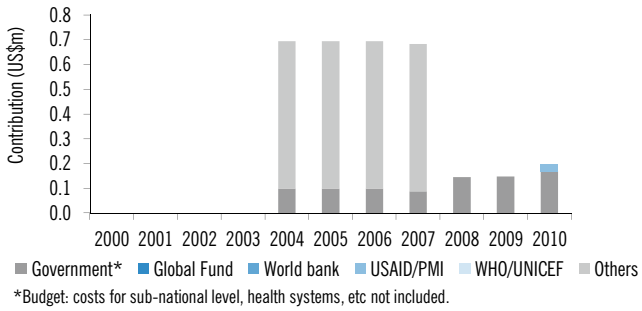
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2009
	ITNs/ LLINs: distributed to all age groups	Yes	-
IRS	IRS is recommended	Yes	-
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	Patients 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	-	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	CQ+PQ	-
Treatment failure of *P. falciparum*	-	-
Treatment of severe malaria	-	-
Treatment of *P. vivax*	CQ+PQ	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

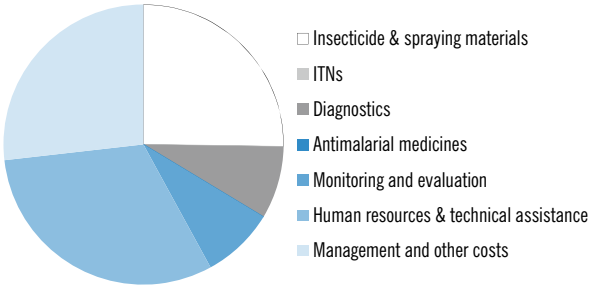
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

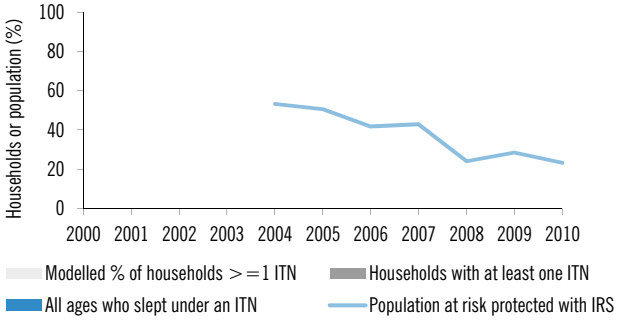


*Budget: costs for sub-national level, health systems, etc not included.

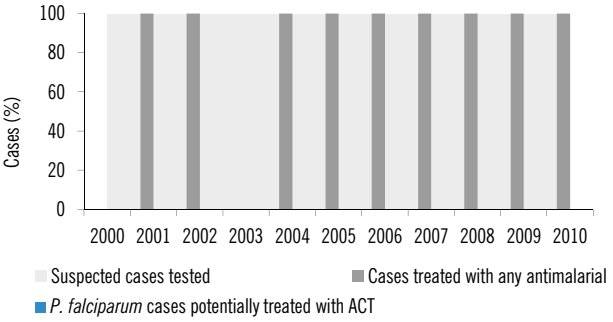
Expenditure by intervention in 2010



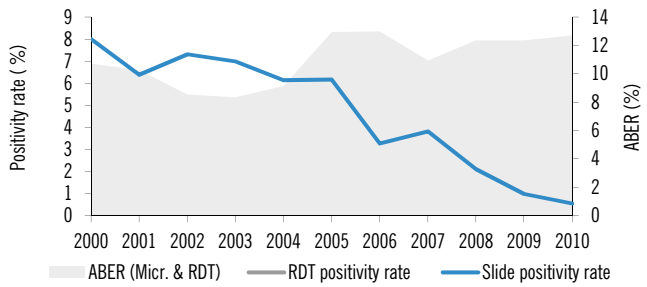
IV. COVERAGE – Coverage of ITN and IRS



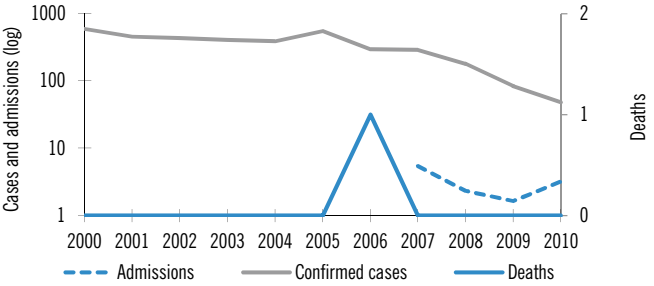
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

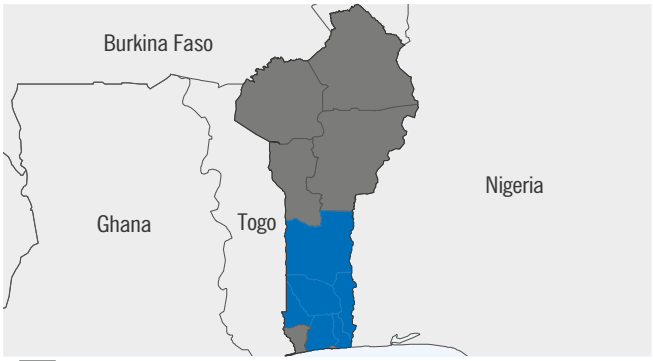


Confirmed cases, admissions (per 100 000) and deaths



Benin

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect >50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population), year:2009

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	8 850 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	8 850 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, funestus, melas*

II. INTERVENTION POLICIES AND STRATEGIES

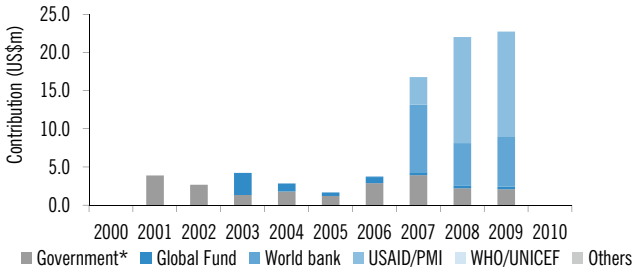
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2007
	ITNs/ LLINs: distributed to all age groups	No	-
IRS	IRS is recommended	Yes	2006
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	Yes	2005
Case management	Patients of all ages should receive diagnostic test	No	-
	RDTs used at community level	No	-
	ACT is free for all ages in public sector	No	-
	Pre-referral treatment with recommended medicines	Yes	2008
	Oral artemisinin-based monotherapies are not registered	Yes	2008

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2004
First-line treatment of *P. falciparum*	AL	2004
Treatment failure of *P. falciparum*	QN	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

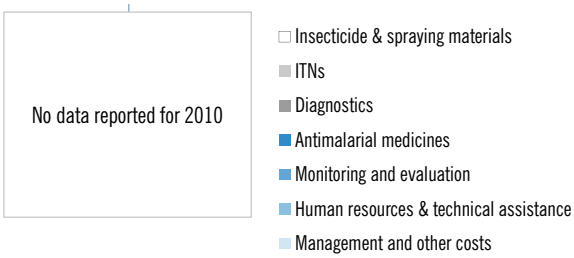
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AL	2005–2007	4	0	0.75	6.5	28 days

III. FINANCING – Government and external financing

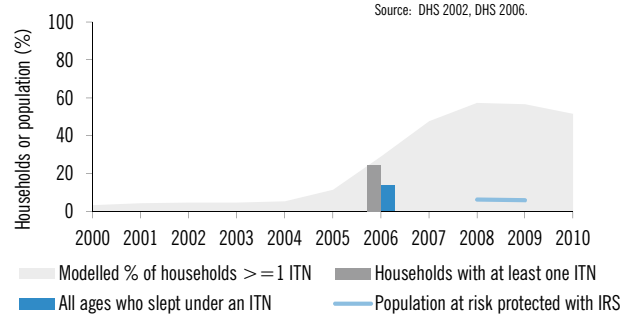


*Budget: costs for sub-national level, health systems, human resources, etc not included.

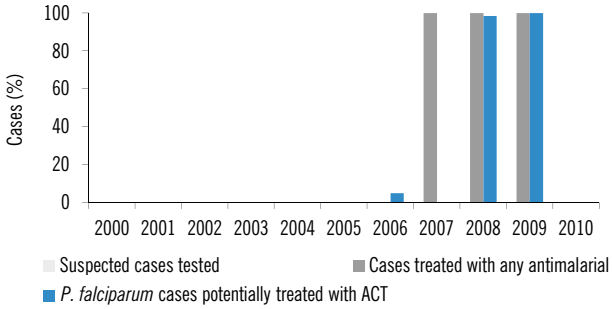
Expenditure by intervention in 2010



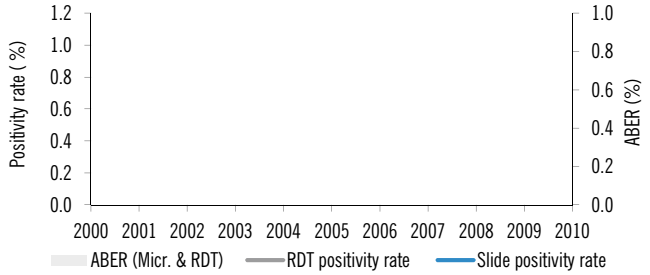
IV. COVERAGE – Coverage of ITN and IRS



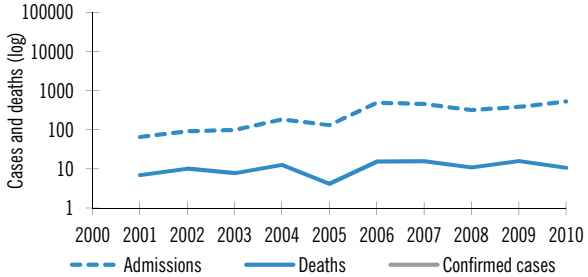
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

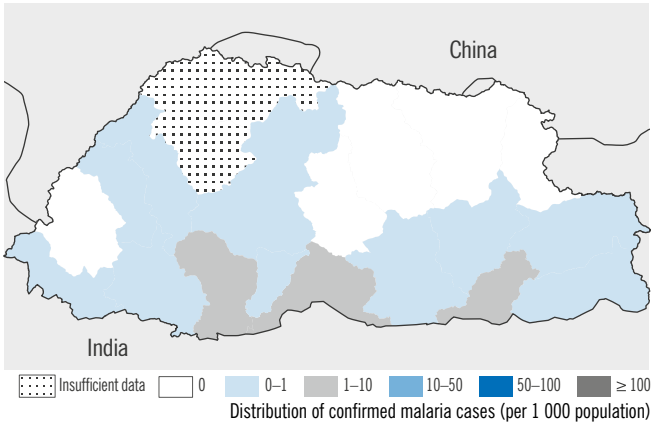


Confirmed cases, admissions and deaths (per 100 000)



Bhutan

Phase: Control. Coverage: In 2010, IRS was sufficient to protect >50% of the population at high risk; ITN/LLINs delivered were sufficient to protect >50% of the population at high risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	94 400	13
Low transmission (0-1 cases per 1000 population)	443 000	61
Malaria-free (0 cases)	189 000	26
Total	726 400	

Parasites and vectors

Major plasmodium species: *P. falciparum* (40%), *P. vivax*
Major anopheles species: *An. culicifacies, maculatus*

II. INTERVENTION POLICIES AND STRATEGIES

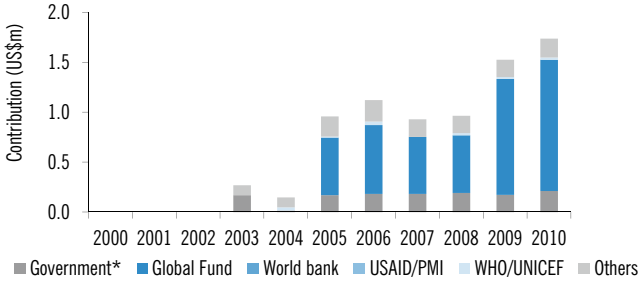
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2006
	ITNs/ LLINs: distributed to all age groups	Yes	2006
IRS	IRS is recommended	Yes	1964
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	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	Yes	2006
	Oral artemisinin-based monotherapies are not registered	Yes	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	AL	2006
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 (therapeutic or parasitological failure, %)

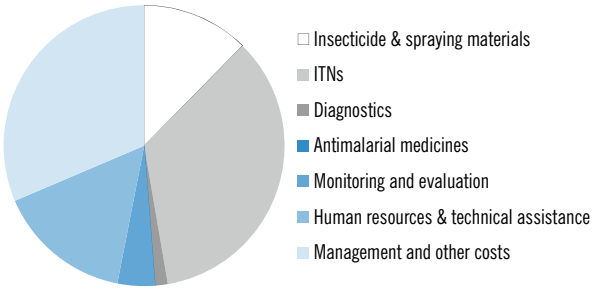
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

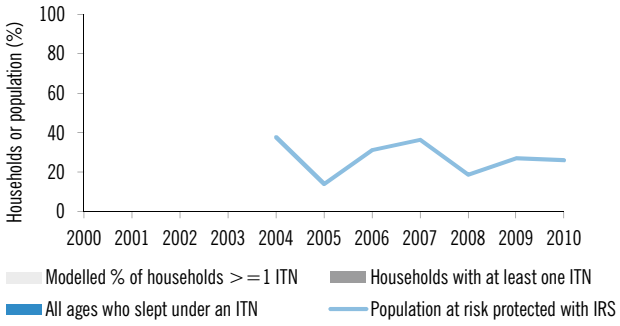


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

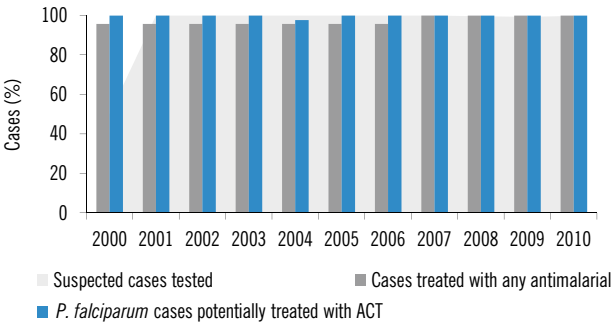
Expenditure by intervention in 2010



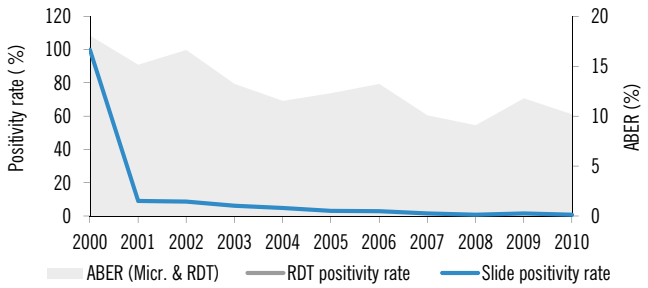
IV. COVERAGE – Coverage of ITN and IRS



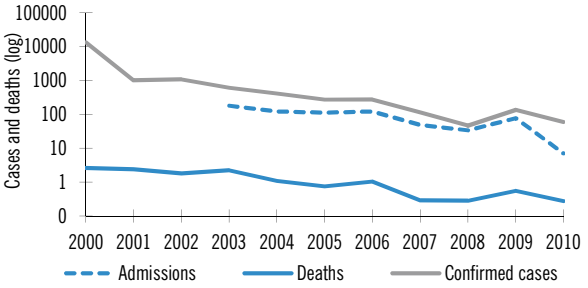
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

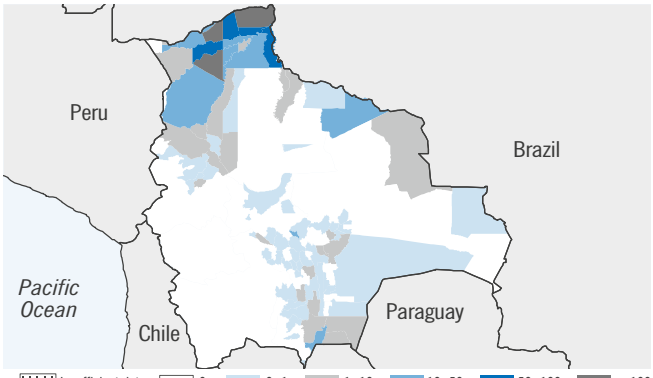


Confirmed cases, admissions and deaths (per 100 000)



Bolivia (Plurinational State of)

Phase: Control. Coverage: In 2010, IRS was sufficient to protect 8% of the population at high risk; ITN/LLINs delivered were sufficient to protect 8% of the population at high risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	477 000	5
Low transmission (0-1 cases per 1000 population)	3 030 000	31
Malaria-free (0 cases)	6 420 000	65
Total	9 927 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (7%), *P. vivax*
Major anopheles species: *An. pseudopunctipennis, darlingi*

II. INTERVENTION POLICIES AND STRATEGIES

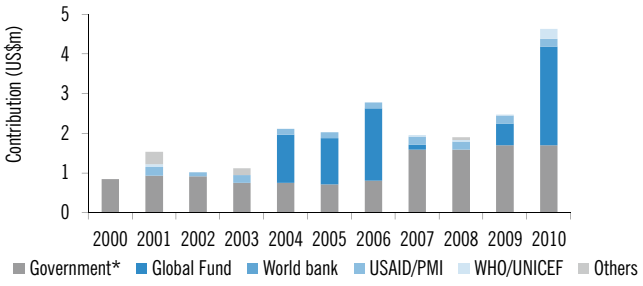
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2008
	ITNs/ LLINs: distributed to all age groups	Yes	2005
IRS	IRS is recommended	Yes	1959
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	Patients of all ages should receive diagnostic test	Yes	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	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	AS+MQ	2001
Treatment failure of *P. falciparum*	QN+CL	-
Treatment of severe malaria	QN	2001
Treatment of *P. vivax*	CQ+PQ	2001

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

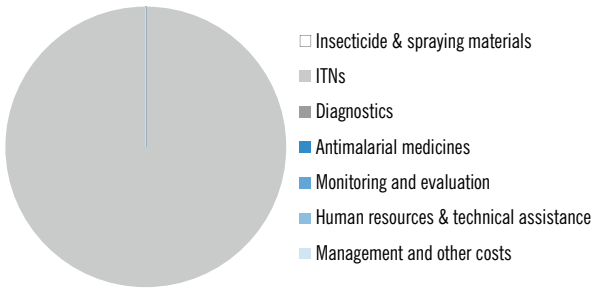
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

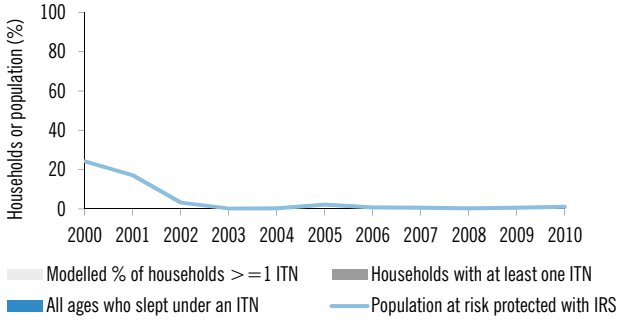


*Budget: costs for sub-national level, health systems, etc not included.

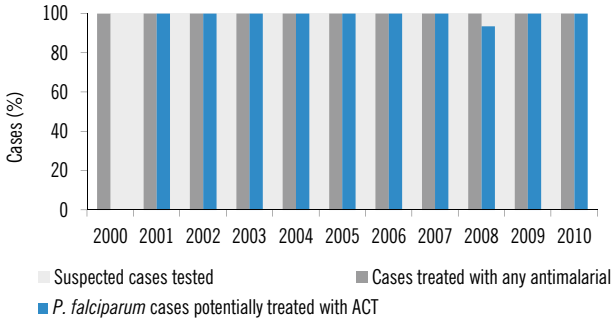
Expenditure by intervention in 2010



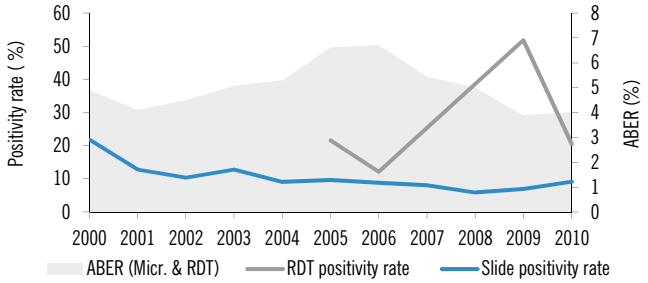
IV. COVERAGE – Coverage of ITN and IRS



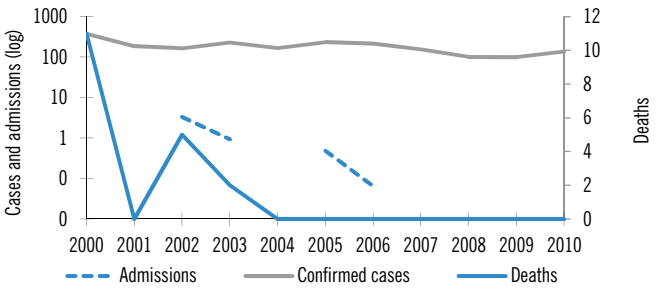
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

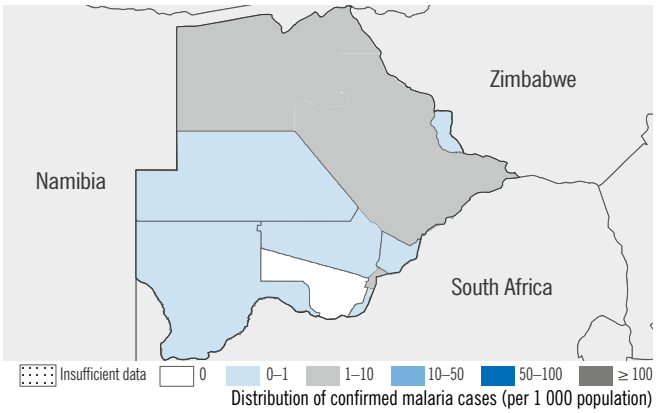


Confirmed cases, admissions (per 100 000) and deaths



Botswana

Phase: Control. Coverage: In 2010, IRS was sufficient to protect >50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	361 000	18
Low transmission (0-1 cases per 1000 population)	943 000	47
Malaria-free (0 cases)	702 000	35
Total	2 006 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, arabiensis*

II. INTERVENTION POLICIES AND STRATEGIES

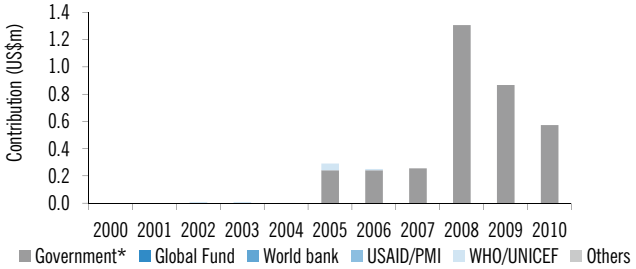
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2009
	ITNs/ LLINs: distributed to all age groups	Yes	1997
IRS	IRS is recommended	Yes	1950
	DDT is used for IRS	Yes	1950
IPT	IPT used to prevent malaria during pregnancy	No	-
Case management	Patients of all ages should receive diagnostic test	Yes	2007
	RDTs used at community level	No	-
	ACT is free for all ages in public sector	Yes	2007
	Pre-referral treatment with recommended medicines	Yes	1998
	Oral artemisinin-based monotherapies are not registered	No	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2007
First-line treatment of *P. falciparum*	AL	2007
Treatment failure of *P. falciparum*	QN	2007
Treatment of severe malaria	QN	2007
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

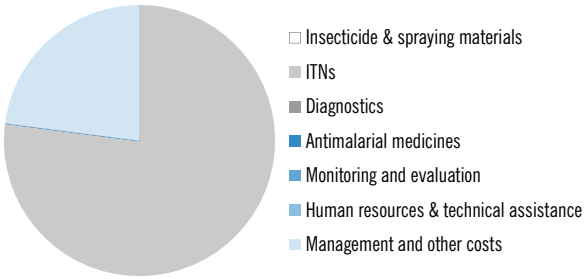
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

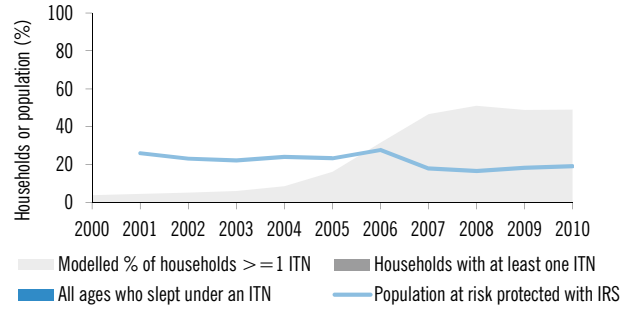


*Budget: costs for sub-national level, health systems, human resources, etc not included.

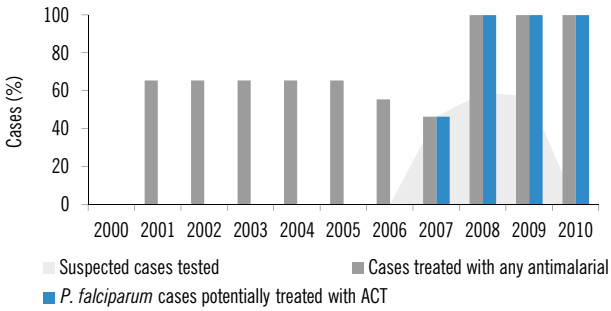
Expenditure by intervention in 2010



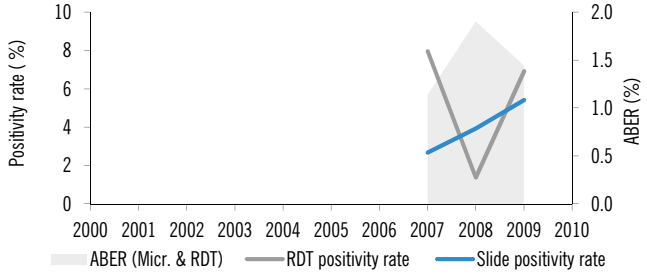
IV. COVERAGE – Coverage of ITN and IRS



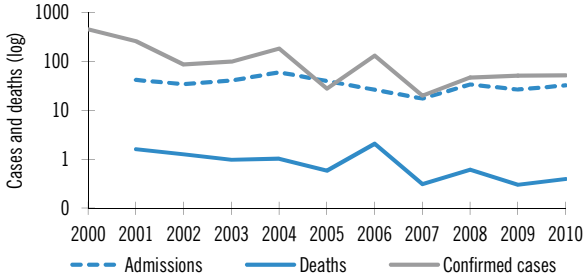
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

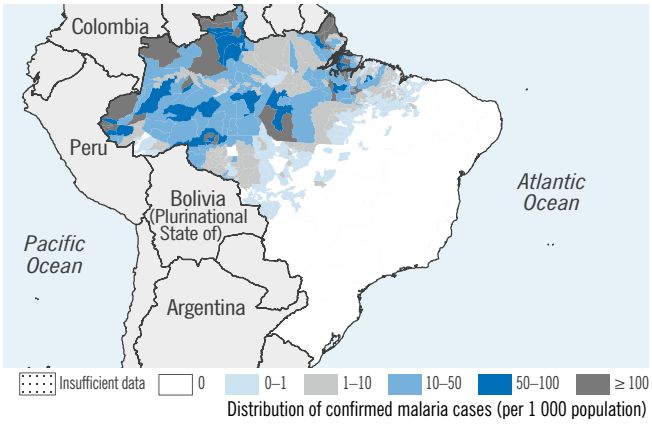


Confirmed cases, admissions and deaths (per 100 000)



Brazil

Phase: Control. Coverage: In 2010, IRS was sufficient to protect 4% of the population at high risk; ITN/LLINs delivered were sufficient to protect 11% of the population at high risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	4 480 000	2
Low transmission (0-1 cases per 1000 population)	35 100 000	18
Malaria-free (0 cases)	155 000 000	80
Total	194 580 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (15%), *P. vivax*
Major anopheles species: *An. darlingi, albitarsis, aquasalis*

II. INTERVENTION POLICIES AND STRATEGIES

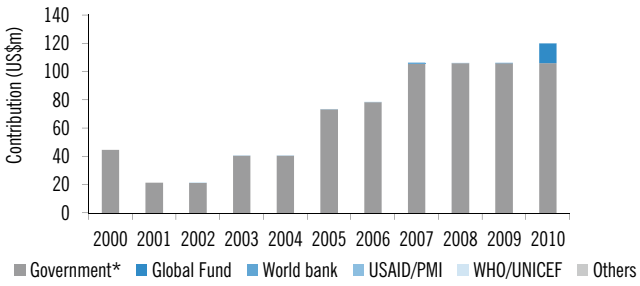
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2007
	ITNs/ LLINs: distributed to all age groups	Yes	2007
IRS	IRS is recommended	Yes	1945
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	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

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	AL ;AS+MQ	2006
Treatment failure of *P. falciparum*	-	-
Treatment of severe malaria	AM ;AS ;QN	2006
Treatment of *P. vivax*	CQ+PQ	2006

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

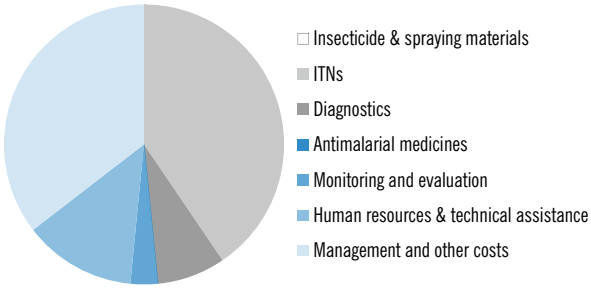
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+MQ	2005–2007	3	0	0	0	28 days
AL	2005–2007	2	0	0	0	28 days

III. FINANCING – Government and external financing

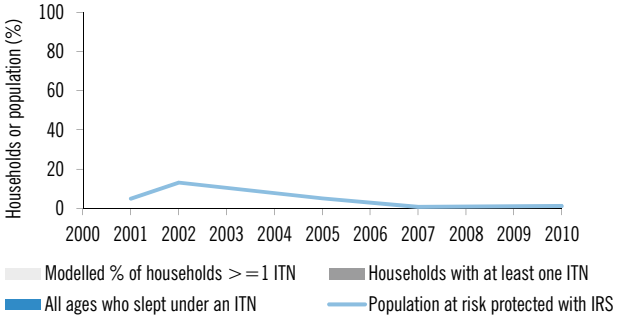


*Budget: costs for sub-national level, health systems, etc not included.

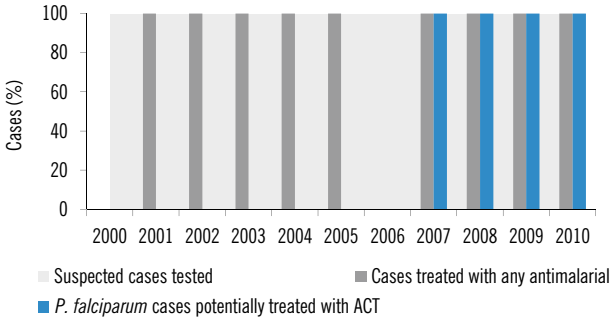
Expenditure by intervention in 2010



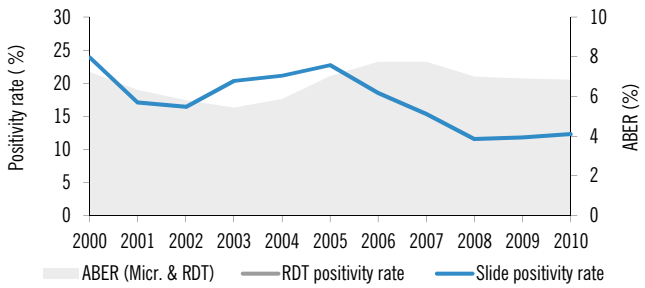
IV. COVERAGE – Coverage of ITN and IRS



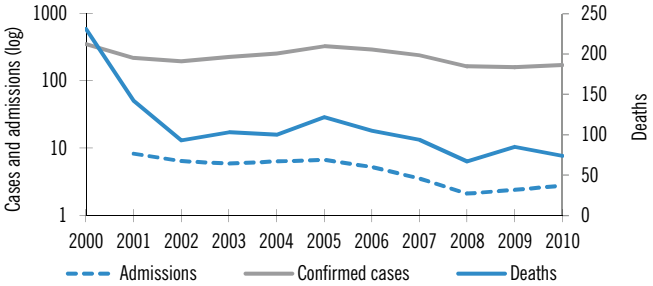
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

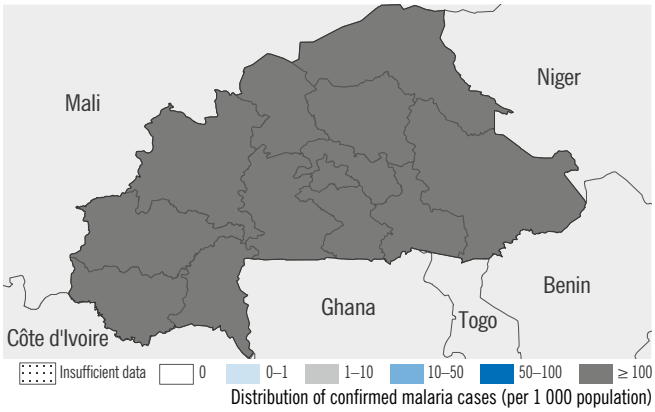


Confirmed cases, admissions (per 100 000) and deaths



Burkina Faso

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect >50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	16 500 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	16 500 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, funestus*

II. INTERVENTION POLICIES AND STRATEGIES

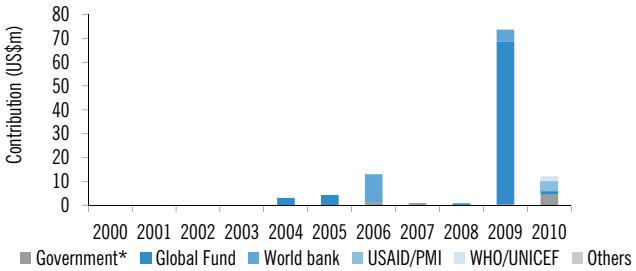
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2007
	ITNs/ LLINs: distributed to all age groups	Yes	1998
IRS	IRS is recommended	Yes	2006
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	Yes	2005
Case management	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	No	-
	Pre-referral treatment with recommended medicines	Yes	2005
	Oral artemisinin-based monotherapies are not registered	Yes	2009

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL ;AS+AQ	2005
First-line treatment of *P. falciparum*	AL ;AS+AQ	2005
Treatment failure of *P. falciparum*	QN	-
Treatment of severe malaria	QN	-
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

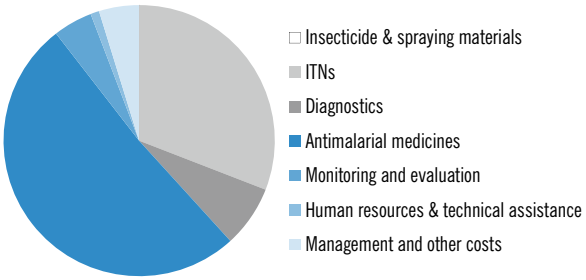
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+AQ	2004–2007	5	3.9	4.9	21.5	28 days
AL	2005–2007	4	1.9	4.25	12.3	28 days

III. FINANCING – Government and external financing

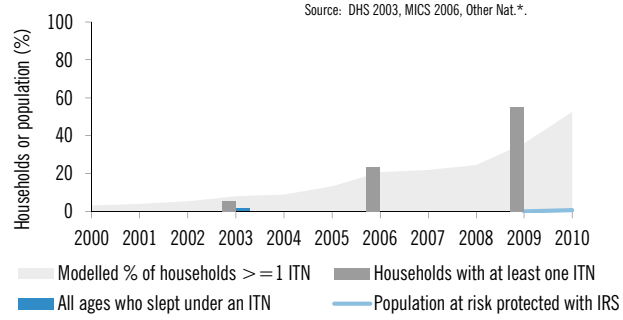


*Budget: costs for sub-national level, health systems, human resources, etc not included.

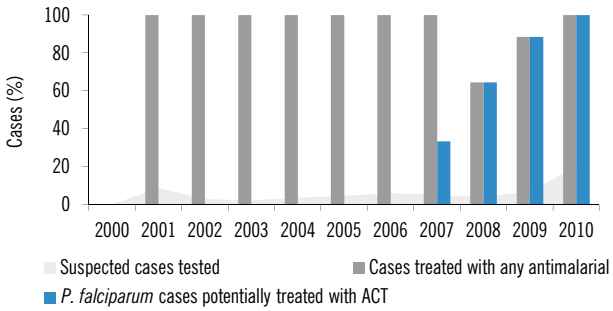
Expenditure by intervention in 2010



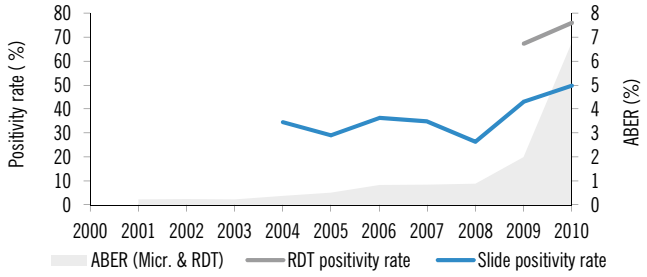
IV. COVERAGE – Coverage of ITN and IRS



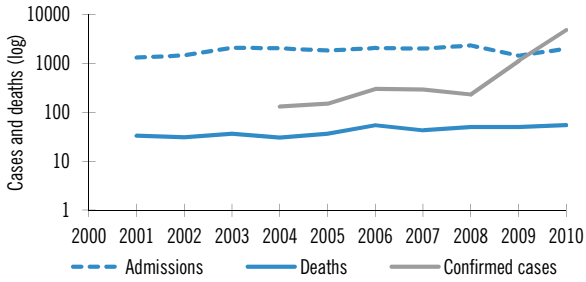
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER



Confirmed cases, admissions and deaths (per 100 000)



Burundi

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect 25%–50% of the population at risk.

Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	2 010 000	24
Low transmission (0-1 cases per 1000 population)	4 530 000	54
Malaria-free (0 cases)	1 840 000	22
Total	8 380 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, funestus*

II. INTERVENTION POLICIES AND STRATEGIES

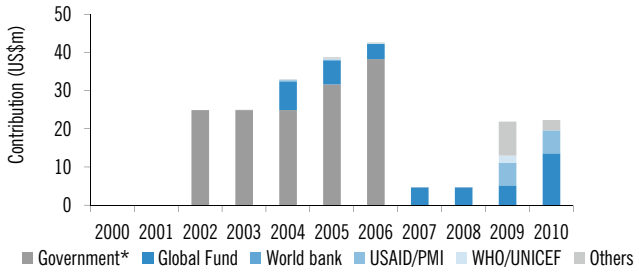
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2004
	ITNs/ LLINs: distributed to all age groups	Yes	2009
IRS	IRS is recommended	Yes	2009
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	No	-
Case management	Patients of all ages should receive diagnostic test	Yes	2007
	RDTs used at community level	No	-
	ACT is free for all ages in public sector	Yes	2009
	Pre-referral treatment with recommended medicines	No	-
	Oral artemisinin-based monotherapies are not registered	No	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2003
First-line treatment of *P. falciparum*	AS+AQ	2003
Treatment failure of *P. falciparum*	QN	2003
Treatment of severe malaria	QN	2003
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

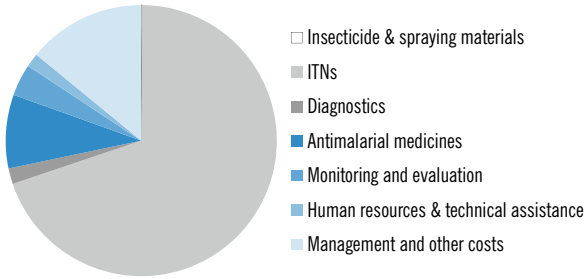
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+AQ	2005–2006	2	2.9	5.2	7.5	28 days

III. FINANCING – Government and external financing



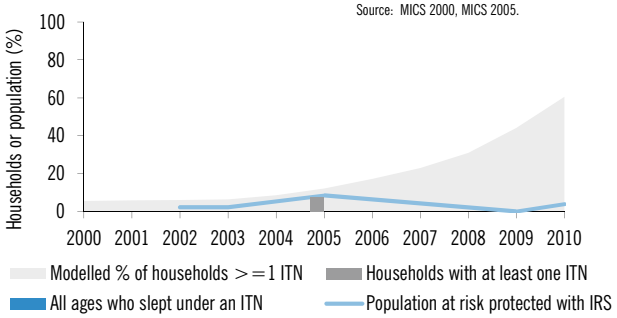
*Budget: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2010

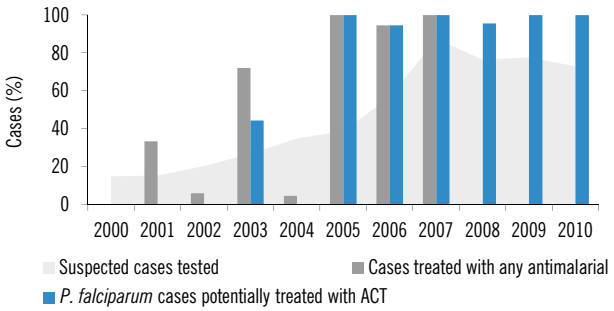


IV. COVERAGE – Coverage of ITN and IRS

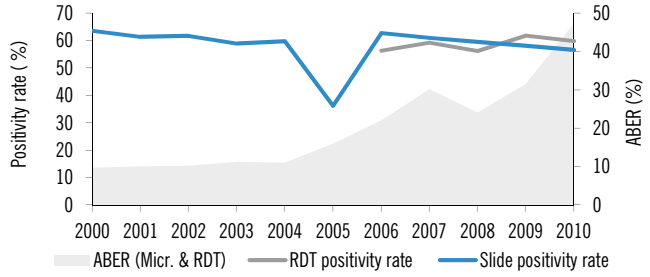
Source: MICS 2000, MICS 2005.



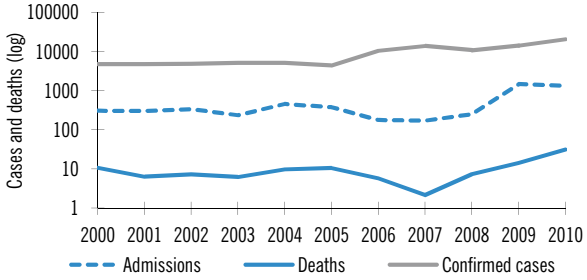
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

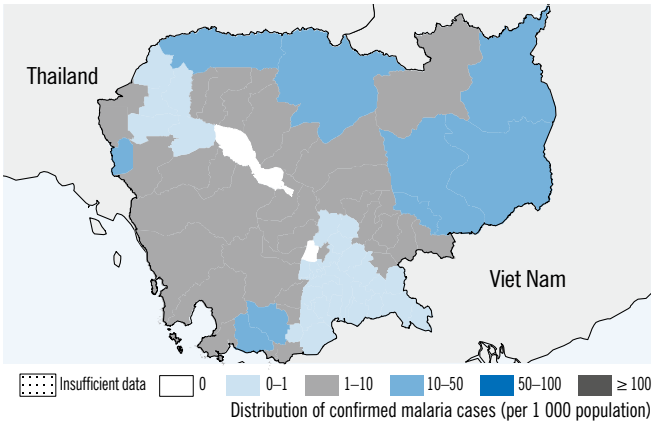


Confirmed cases, admissions and deaths (per 100 000)



Cambodia

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect 25%–50% of the population at high risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	6 220 000	44
Low transmission (0-1 cases per 1000 population)	1 270 000	9
Malaria-free (0 cases)	6 640 000	47
Total	14 130 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (66%), *P. vivax*
Major anopheles species: *An. minimus, dirus, maculatus, sundaicus*

II. INTERVENTION POLICIES AND STRATEGIES

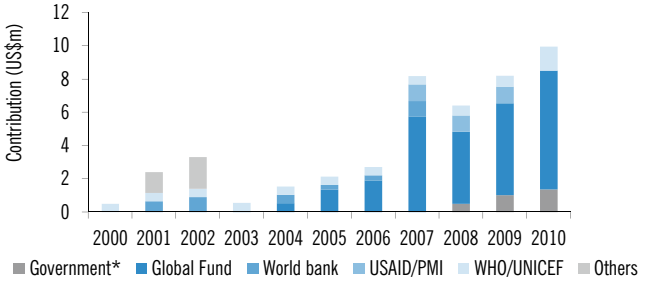
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2000
	ITNs/ LLINs: distributed to all age groups	Yes	2000
IRS	IRS is recommended	Yes	2010
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	Patients of all ages should receive diagnostic test	Yes	2000
	RDTs used at community level	Yes	2002
	ACT is free for all ages in public sector	Yes	2000
	Pre-referral treatment with recommended medicines	Yes	2000
	Oral artemisinin-based monotherapies are not registered	Yes	2009

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	AS+MQ ;DHA-PPQ+PQ	2000
Treatment failure of *P. falciparum*	QN+T	2000
Treatment of severe malaria	AS+DHA-PPQ	2000
Treatment of *P. vivax*	CQ	2000

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

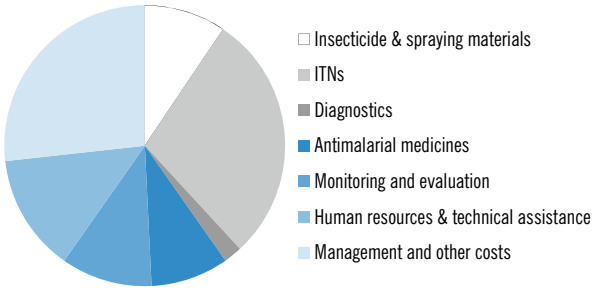
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+MQ	2001–2010	26	0	2.35	14.3	28 days
DHA-PPQ	2008–2010	5	0	1.3	7.9	28 days

III. FINANCING – Government and external financing

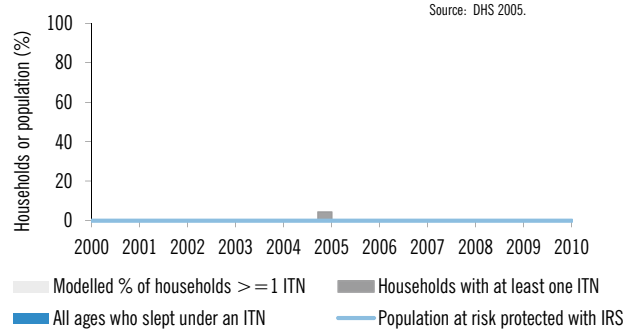


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

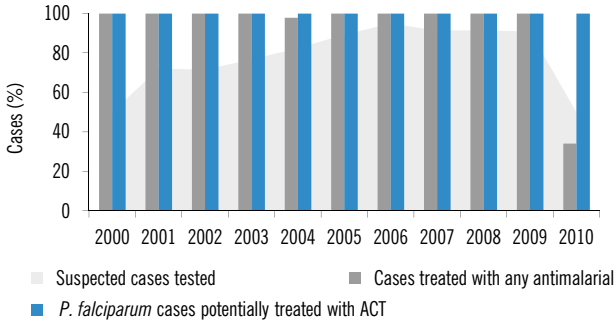
Expenditure by intervention in 2010



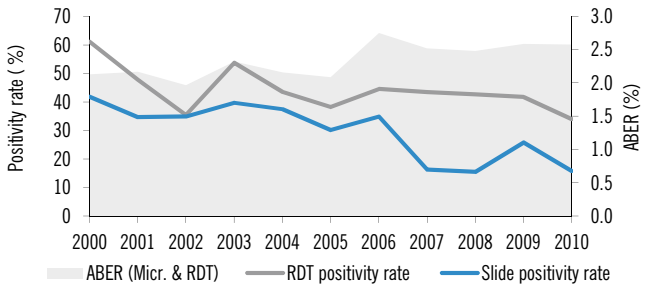
IV. COVERAGE – Coverage of ITN and IRS



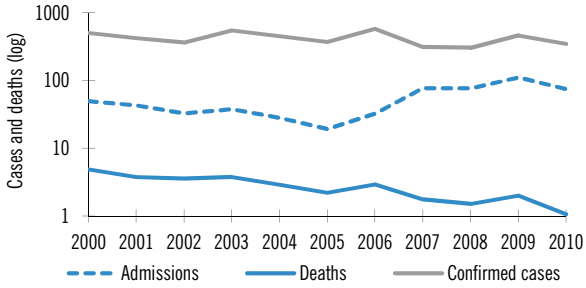
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

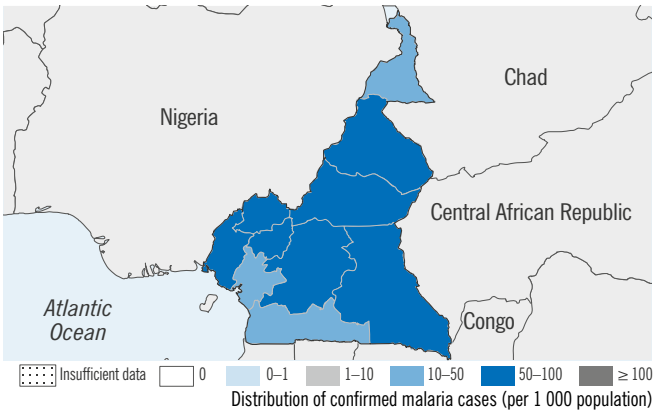


Confirmed cases, admissions and deaths (per 100 000)



Cameroon

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect 25%–50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	13 900 000	71
Low transmission (0-1 cases per 1000 population)	5 680 000	29
Malaria-free (0 cases)	0	0
Total	19 580 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, arabiensis, funestus, moucheti*

II. INTERVENTION POLICIES AND STRATEGIES

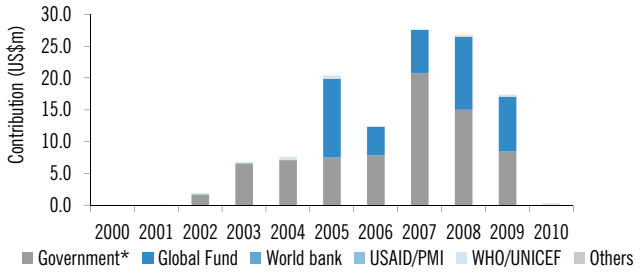
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2003
	ITNs/ LLINs: distributed to all age groups	Yes	2010
IRS	IRS is recommended	Yes	2007
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	Yes	2004
Case management	Patients of all ages should receive diagnostic test	No	-
	RDTs used at community level	No	-
	ACT is free for all ages in public sector	No	-
	Pre-referral treatment with recommended medicines	Yes	2005
	Oral artemisinin-based monotherapies are not registered	Yes	2006

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2004
First-line treatment of *P. falciparum*	AS+AQ	2004
Treatment failure of *P. falciparum*	QN	2004
Treatment of severe malaria	AM ;QN	2004
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

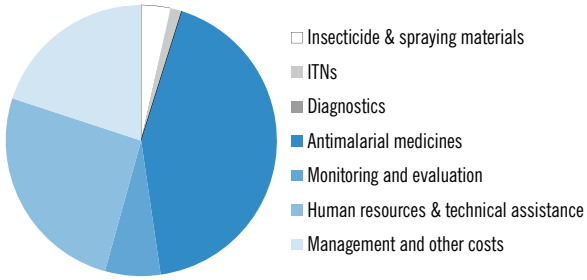
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+AQ	2005–2009	9	0	3.7	8.7	28 days

III. FINANCING – Government and external financing

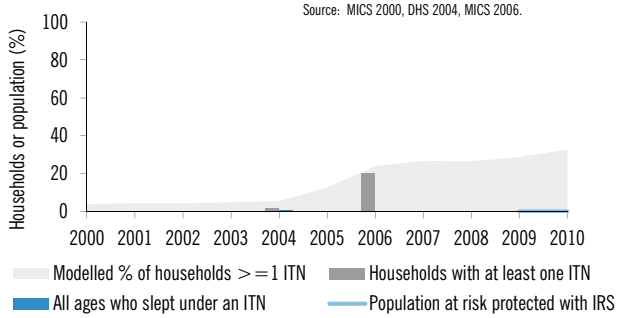


*Budget: costs for sub-national level, health systems, human resources, etc not included.

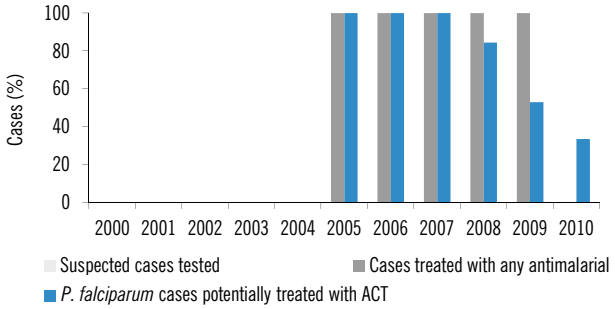
Expenditure by intervention in 2010



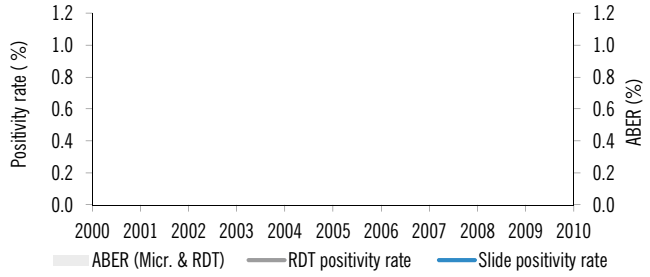
IV. COVERAGE – Coverage of ITN and IRS



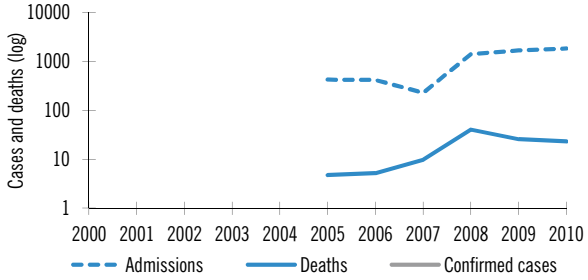
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

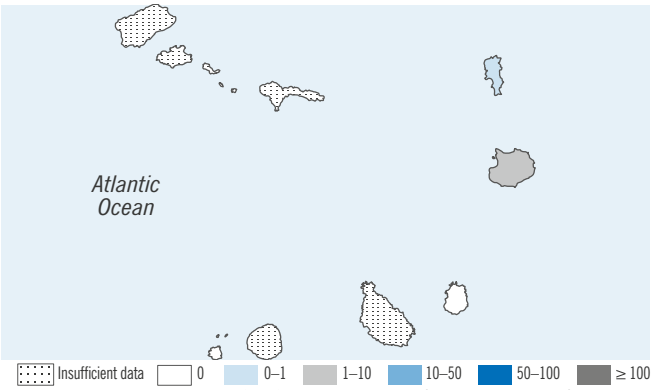


Confirmed cases, admissions and deaths (per 100 000)



Cape Verde

Phase: Pre-elimination. Coverage: In 2010, IRS was sufficient to protect >50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population), year:2009

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)	129 000	26
Malaria-free (0 cases)	367 000	74
Total	496 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, arabiensis*

II. INTERVENTION POLICIES AND STRATEGIES

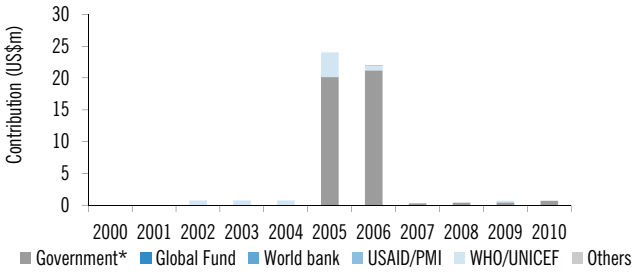
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	No	-
	ITNs/ LLINs: distributed to all age groups	No	-
IRS	IRS is recommended	Yes	1998
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	No	-
Case management	Patients 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	Yes	-
	Oral artemisinin-based monotherapies are not registered	No	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2007
First-line treatment of *P. falciparum*	AL	2007
Treatment failure of *P. falciparum*	QN	-
Treatment of severe malaria	QN	-
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

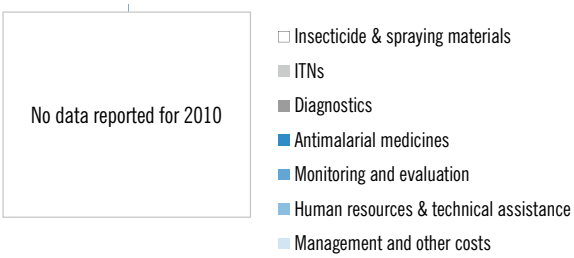
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

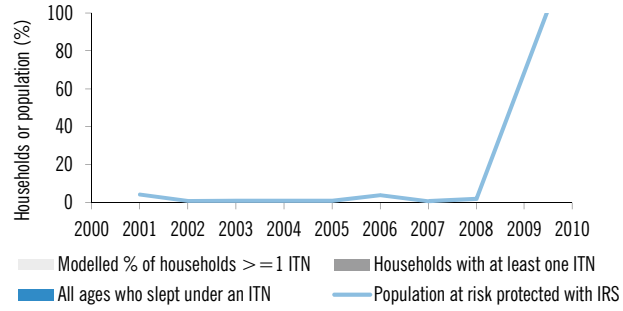


*Budget: costs for sub-national level, health systems, human resources, etc not included.

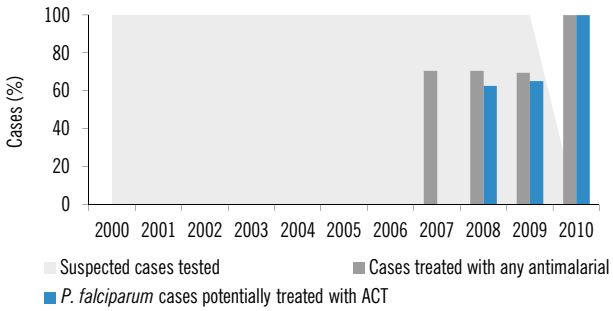
Expenditure by intervention in 2010



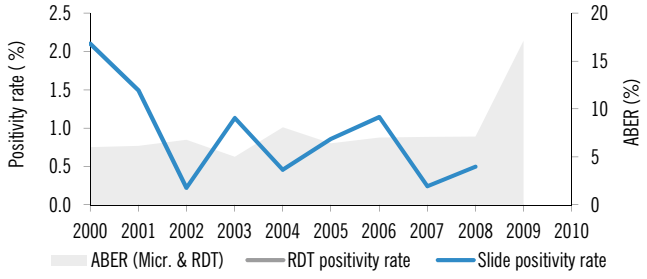
IV. COVERAGE – Coverage of ITN and IRS



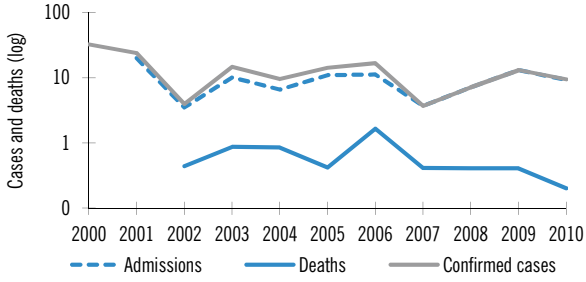
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

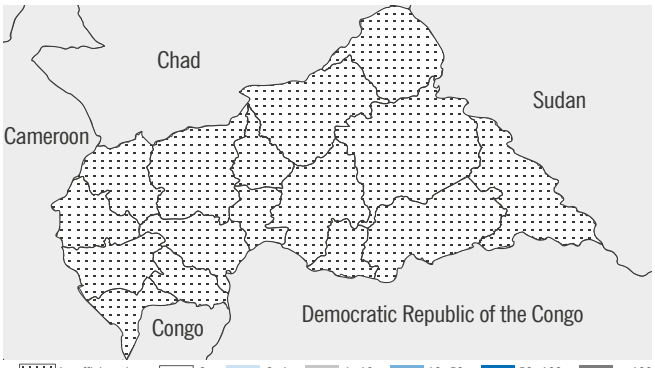


Confirmed cases, admissions and deaths (per 100 000)



Central African Republic

Phase: Control.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	4 400 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	4 400 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (98%),
Major anopheles species: *An. gambiae, arabiensis, funestus*

II. INTERVENTION POLICIES AND STRATEGIES

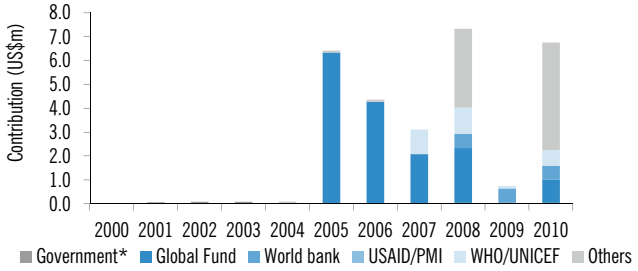
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2006
	ITNs/ LLINs: distributed to all age groups	Yes	2010
IRS	IRS is recommended	No	-
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	Yes	2004
Case management	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	No	-
	Pre-referral treatment with recommended medicines	Yes	2008
	Oral artemisinin-based monotherapies are not registered	Yes	2010

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2005
First-line treatment of *P. falciparum*	AL	-
Treatment failure of *P. falciparum*	QN	-
Treatment of severe malaria	AM ;QN	2005
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

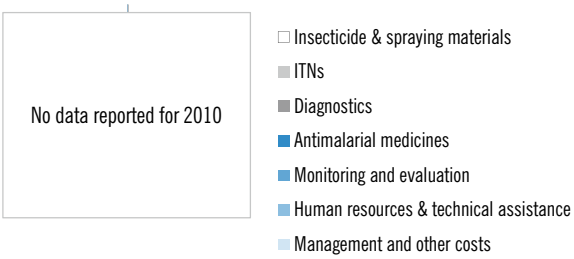
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

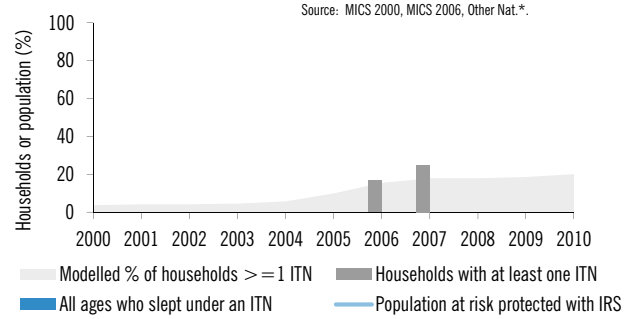


*Budget: costs for sub-national level, health systems, human resources, etc not included.

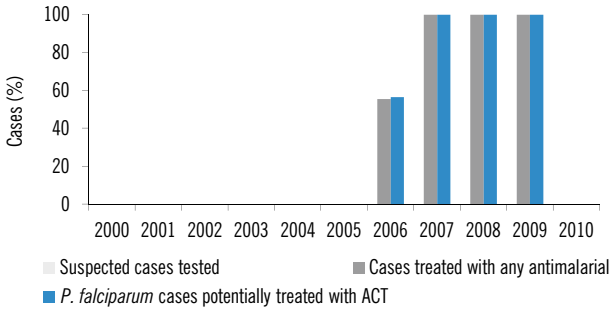
Expenditure by intervention in 2010



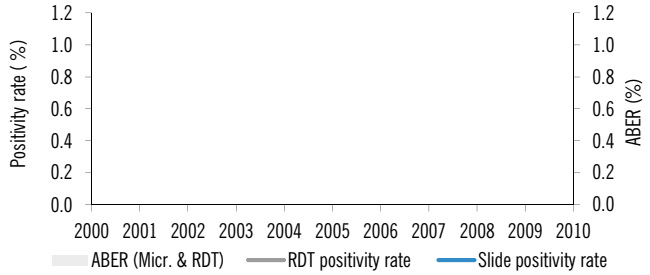
IV. COVERAGE – Coverage of ITN and IRS



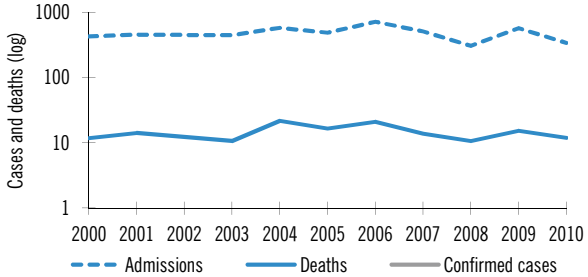
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

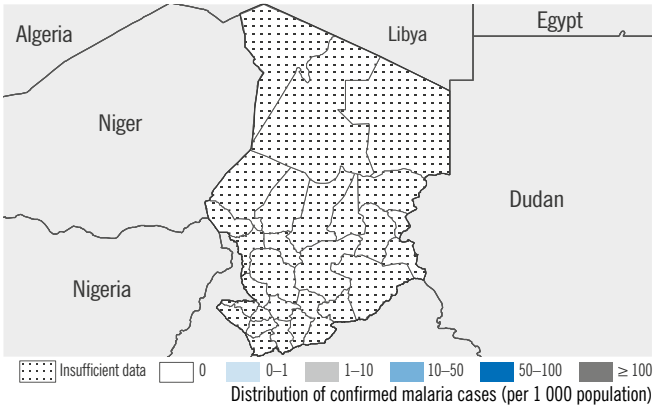


Confirmed cases, admissions and deaths (per 100 000)



Chad

Phase: Control.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	8 980 000	80
Low transmission (0-1 cases per 1000 population)	2 130 000	19
Malaria-free (0 cases)	112 000	1
Total	11 222 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, arabiensis, funestus, nili*

II. INTERVENTION POLICIES AND STRATEGIES

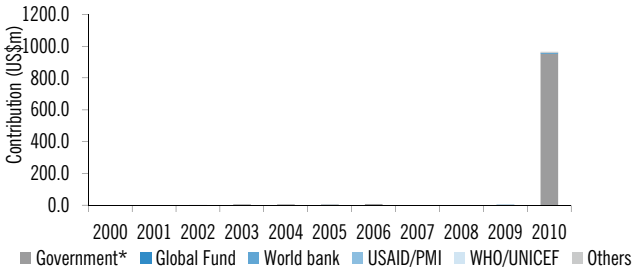
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2003
	ITNs/ LLINs: distributed to all age groups	No	-
IRS	IRS is recommended	No	-
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	Yes	2004
Case management	Patients of all ages should receive diagnostic test	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	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL ;AS+AQ	-
First-line treatment of *P. falciparum*	AL ;AS+AQ	-
Treatment failure of *P. falciparum*	QN	-
Treatment of severe malaria	AM ;QN	-
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing



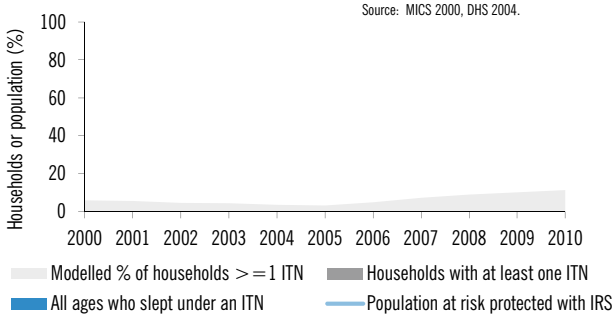
*Budget: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2010

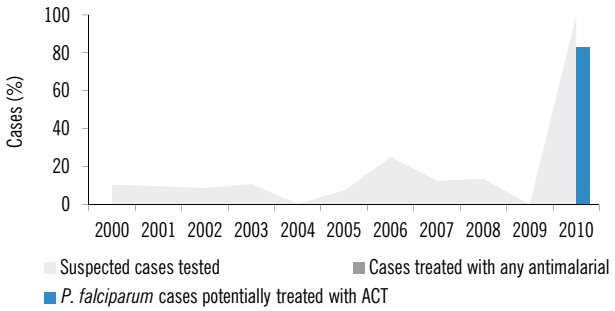
No data reported for 2010

- Insecticide & spraying materials
- ITNs
- Diagnostics
- Antimalarial medicines
- Monitoring and evaluation
- Human resources & technical assistance
- Management and other costs

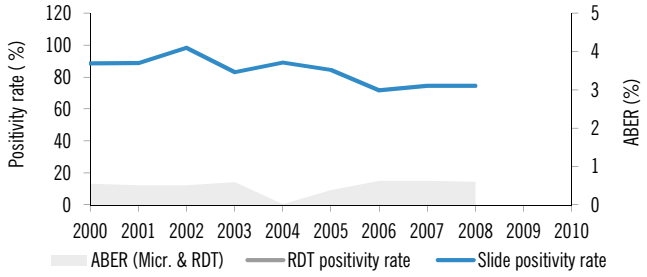
IV. COVERAGE – Coverage of ITN and IRS



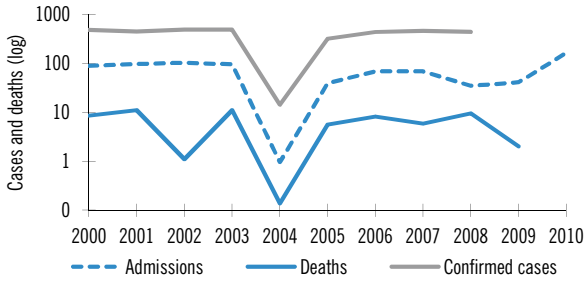
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER



Confirmed cases, admissions and deaths (per 100 000)



China

Phase: Control. Coverage: In 2010, IRS was sufficient to protect >50% of the population at high risk.

Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	13 400 000	1
Low transmission (0-1 cases per 1000 population)	671 000 000	50
Malaria-free (0 cases)	657 000 000	49
Total	1341 400 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (26%), *P. vivax*
Major anopheles species: *An. minimus, sinensis, anthropophagus, dirus*

II. INTERVENTION POLICIES AND STRATEGIES

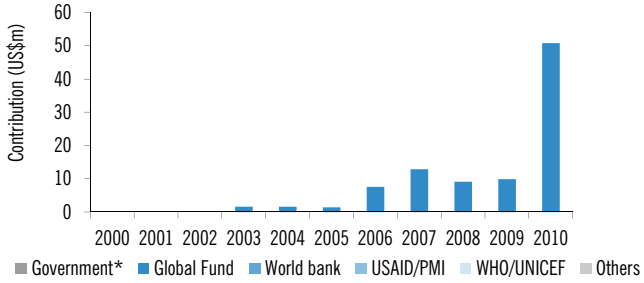
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2003
	ITNs/ LLINs: distributed to all age groups	Yes	2000
IRS	IRS is recommended	No	-
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	Patients of all ages should receive diagnostic test	Yes	2000
	RDTs used at community level	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	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	ART+NQ ;ART-PPQ ;AS+AQ ;DHA-PPQ	2009
Treatment failure of *P. falciparum*	-	-
Treatment of severe malaria	AM ;AS ;PYR	2009
Treatment of *P. vivax*	CQ+PQ(8d)	2006

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

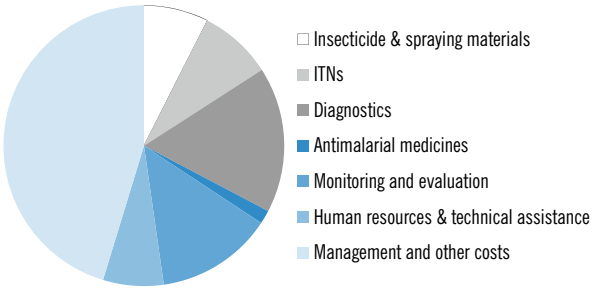
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
DHA-PPQ	2004–2009	2	0	0	0	28 days

III. FINANCING – Government and external financing

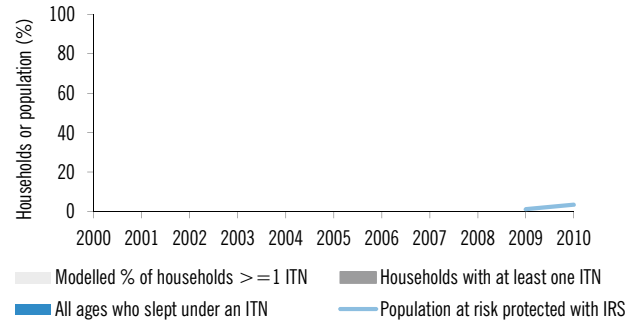


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

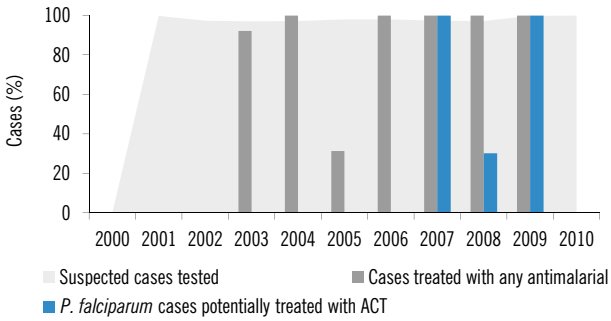
Expenditure by intervention in 2010



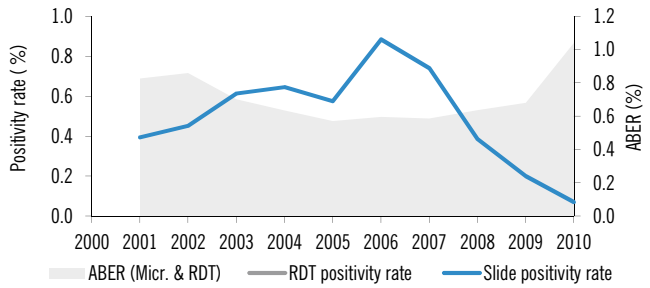
IV. COVERAGE – Coverage of ITN and IRS



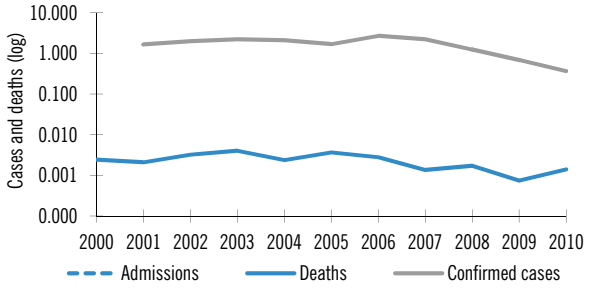
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

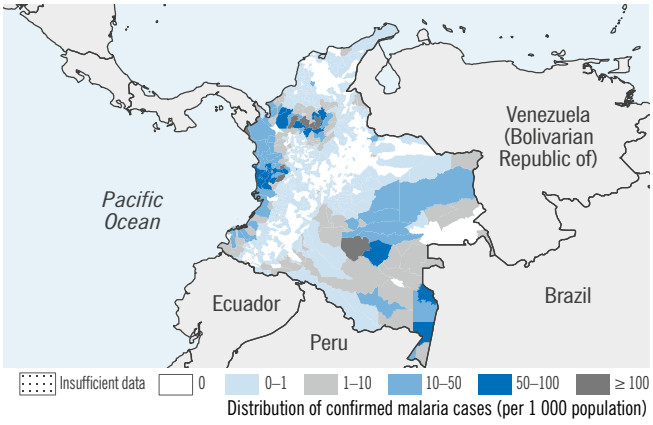


Confirmed cases, admissions and deaths (per 100 000)



Colombia

Phase: Control. Coverage: In 2010, IRS was sufficient to protect 2% of the population at high risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	6 850 000	15
Low transmission (0-1 cases per 1000 population)	3 560 000	8
Malaria-free (0 cases)	35 900 000	78
Total	46 310 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (30%), *P. vivax*

Major anopheles species: *An. albimanus, darlingi, nunestovari, neivai, pseudopunctipenis*

II. INTERVENTION POLICIES AND STRATEGIES

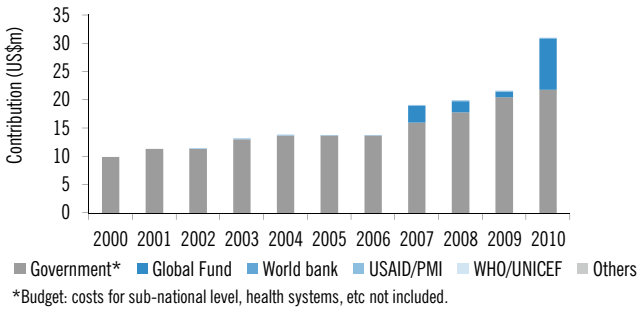
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2005
	ITNs/ LLINs: distributed to all age groups	Yes	2005
IRS	IRS is recommended	Yes	1958
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	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	Yes	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	AS+MQ	2006
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 (therapeutic or parasitological failure, %)

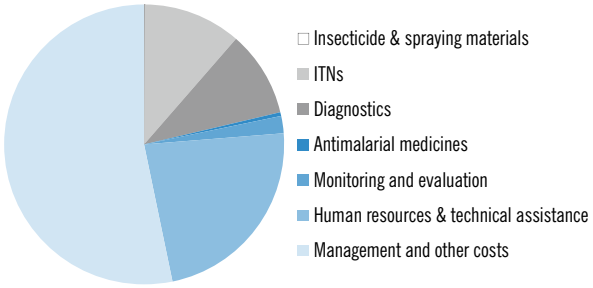
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+MQ	2007–2008	1	0	0	0	28 days

III. FINANCING – Government and external financing

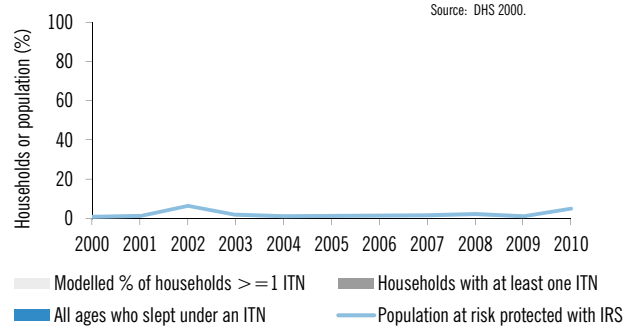


*Budget: costs for sub-national level, health systems, etc not included.

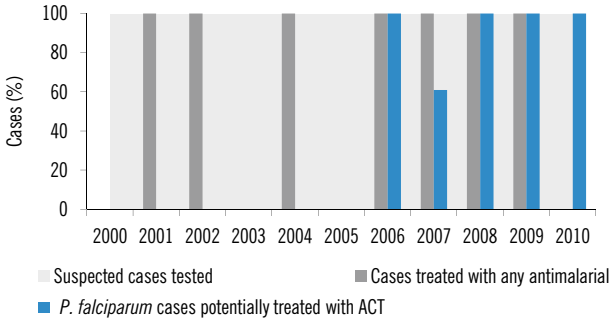
Expenditure by intervention in 2010



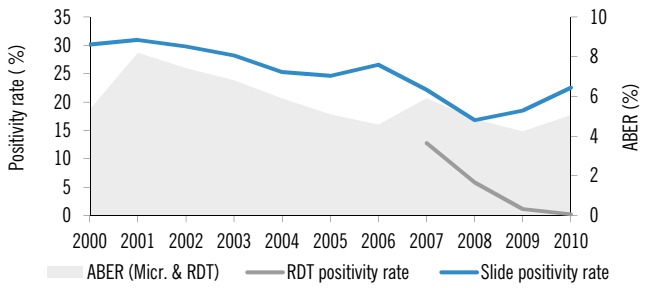
IV. COVERAGE – Coverage of ITN and IRS



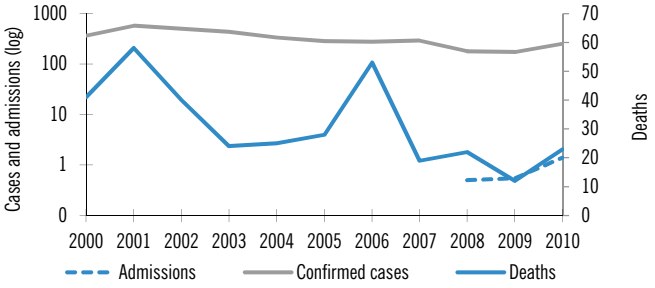
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

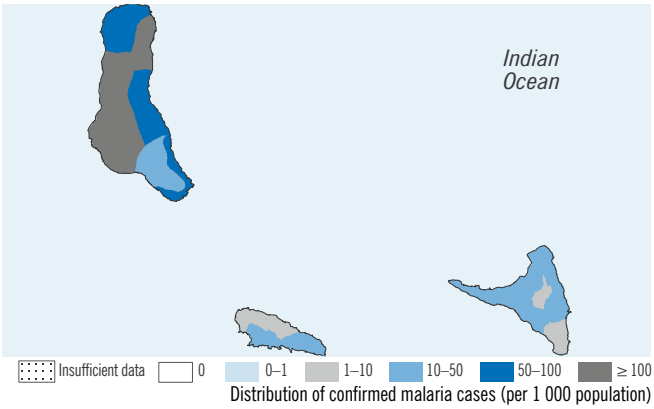


Confirmed cases, admissions (per 100 000) and deaths



Comoros

Phase: Control.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	691 000	94
Low transmission (0-1 cases per 1000 population)	44 100	6
Malaria-free (0 cases)	0	0
Total	735 100	

Parasites and vectors

Major plasmodium species: *P. falciparum* (96%), *P. vivax*
Major anopheles species: *An. gambiae, funestus*

II. INTERVENTION POLICIES AND STRATEGIES

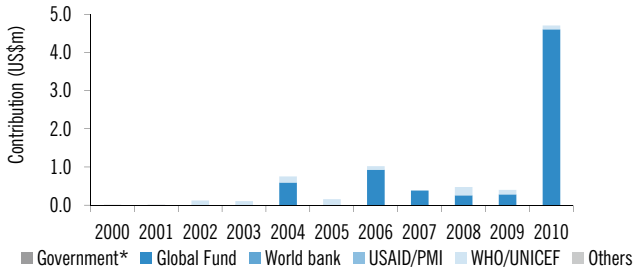
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2005
	ITNs/ LLINs: distributed to all age groups	No	-
IRS	IRS is recommended	No	-
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	Yes	2004
Case management	Patients of all ages should receive diagnostic test	Yes	1997
	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	Yes	2005

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2003
First-line treatment of *P. falciparum*	AL	2003
Treatment failure of *P. falciparum*	QN	2003
Treatment of severe malaria	QN	2003
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

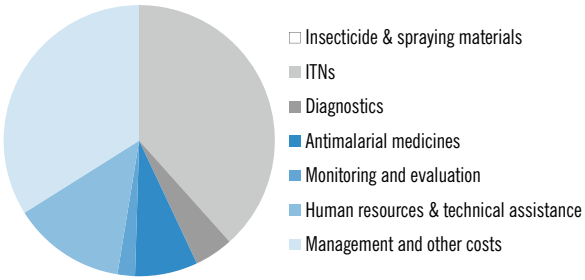
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AL	2004–2007	9	0	0	3.2	28 days

III. FINANCING – Government and external financing

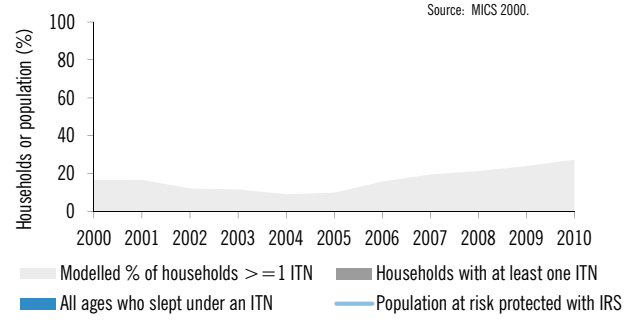


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

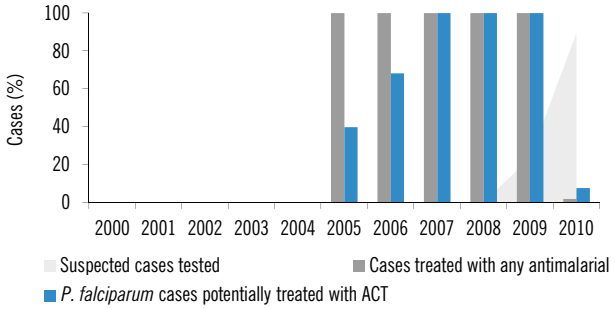
Expenditure by intervention in 2010



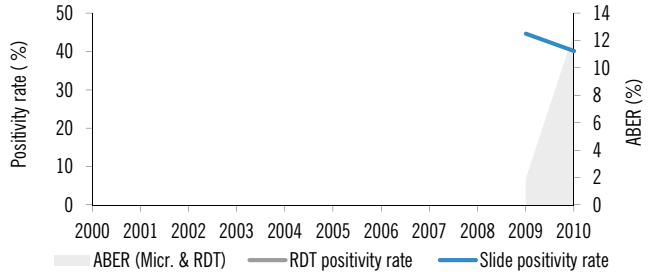
IV. COVERAGE – Coverage of ITN and IRS



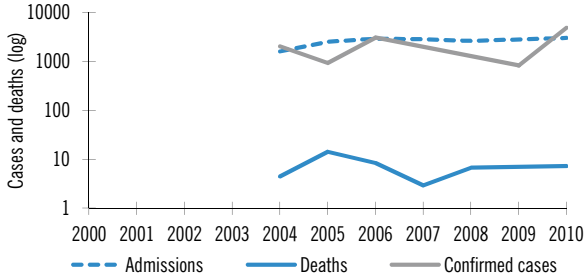
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

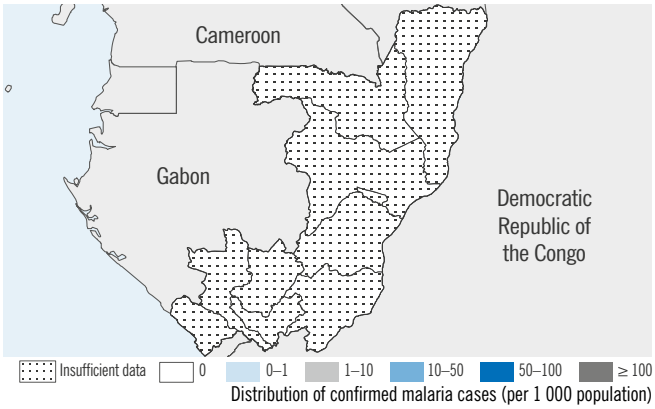


Confirmed cases, admissions and deaths (per 100 000)



Congo

Phase: Control.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	4 040 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	4 040 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%),
Major anopheles species: *An. gambiae, arabiensis, funestus, brochieri, coustani*

II. INTERVENTION POLICIES AND STRATEGIES

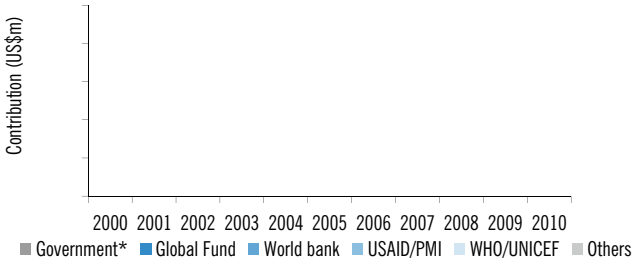
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2007
	ITNs/ LLINs: distributed to all age groups	-	-
IRS	IRS is recommended	-	-
	DDT is used for IRS	-	-
IPT	IPT used to prevent malaria during pregnancy	Yes	2006
Case management	Patients of all ages should receive diagnostic test	-	-
	RDTs used at community level	-	-
	ACT is free for all ages in public sector	-	-
	Pre-referral treatment with recommended medicines	-	-
	Oral artemisinin-based monotherapies are not registered	-	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	-
First-line treatment of *P. falciparum*	AS+AQ	-
Treatment failure of *P. falciparum*	AL	-
Treatment of severe malaria	QN	-
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

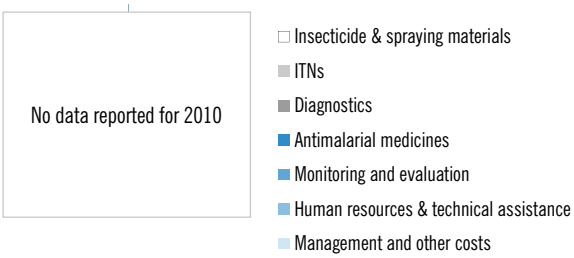
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+AQ	2004–2004	1	1.5	1.5	1.5	28 days
AL	2004–2006	2	0	1.6	3.2	28 days

III. FINANCING – Government and external financing

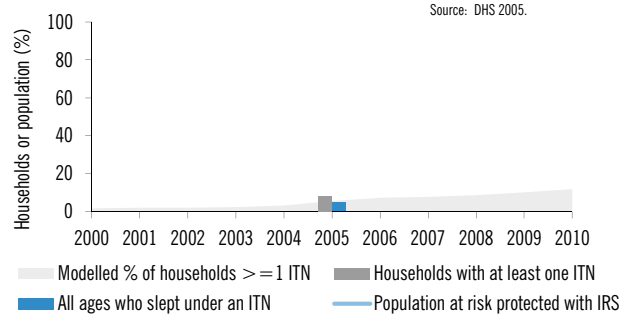


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

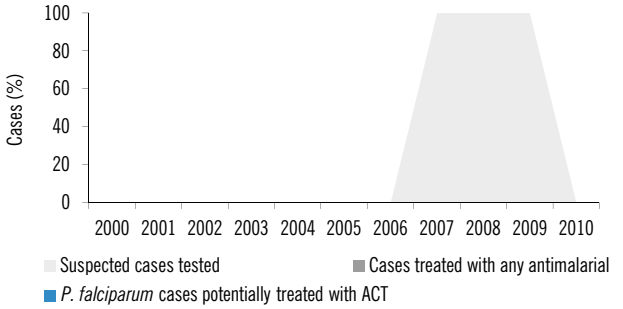
Expenditure by intervention in 2010



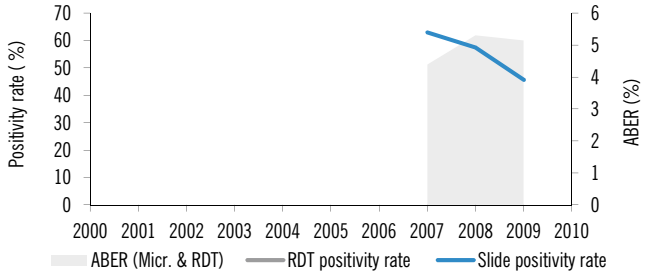
IV. COVERAGE – Coverage of ITN and IRS



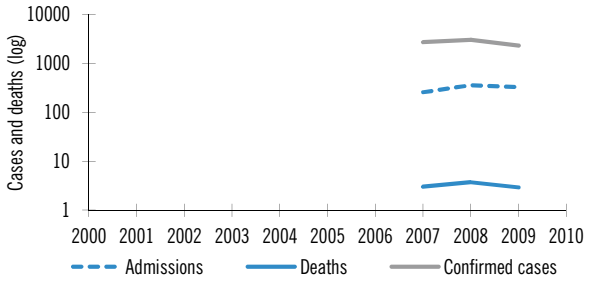
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

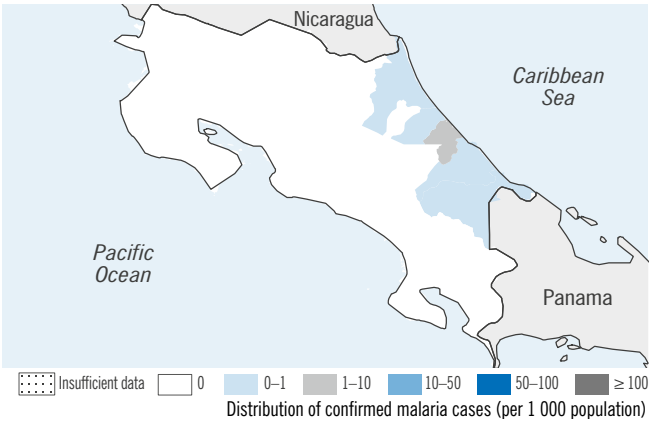


Confirmed cases, admissions and deaths (per 100 000)



Costa Rica

Phase: Control.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	46 600	1
Low transmission (0-1 cases per 1000 population)	1 580 000	34
Malaria-free (0 cases)	3 030 000	65
Total	4 656 600	

Parasites and vectors

Major plasmodium species: *P. falciparum* (2%), *P. vivax*
Major anopheles species: *An. albimanus*

II. INTERVENTION POLICIES AND STRATEGIES

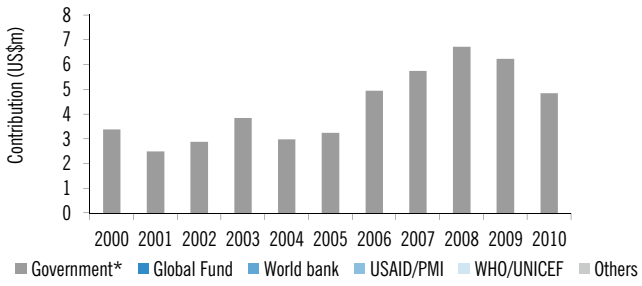
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2009
	ITNs/ LLINs: distributed to all age groups	Yes	2009
IRS	IRS is recommended	Yes	1957
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	Patients of all ages should receive diagnostic test	No	-
	RDTs used at community level	No	-
	ACT is free for all ages in public sector	-	-
	Pre-referral treatment with recommended medicines	-	-
	Oral artemisinin-based monotherapies are not registered	-	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	CQ+PQ	-
Treatment failure of *P. falciparum*	-	-
Treatment of severe malaria	-	-
Treatment of *P. vivax*	CQ+PQ	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

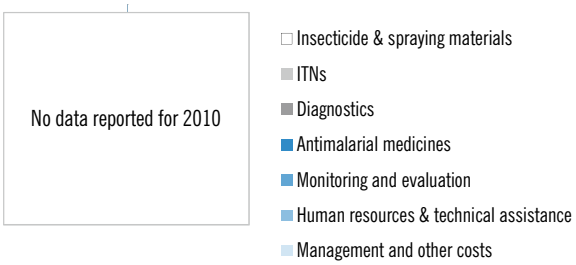
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

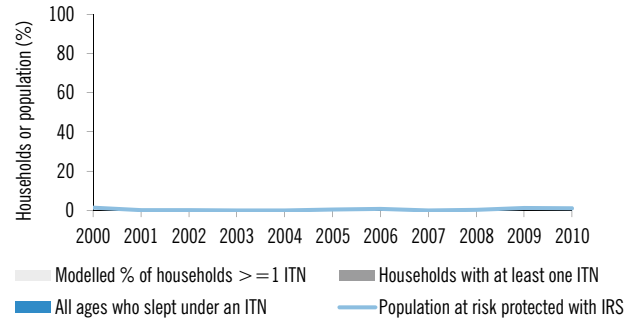


*Budget: costs for sub-national level, health systems, etc not included.

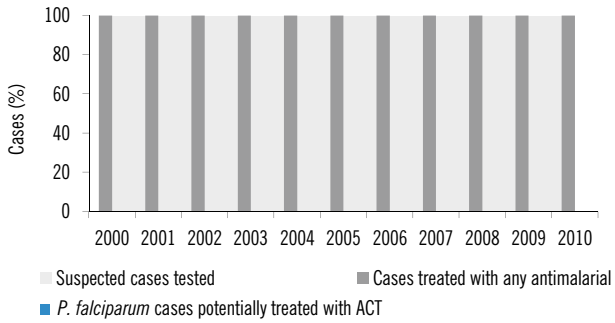
Expenditure by intervention in 2010



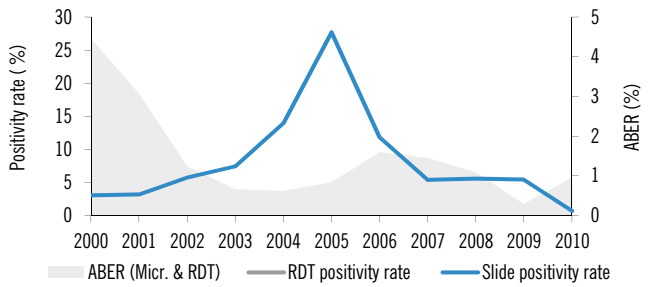
IV. COVERAGE – Coverage of ITN and IRS



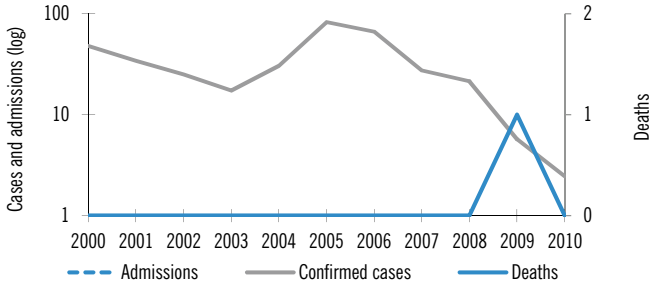
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

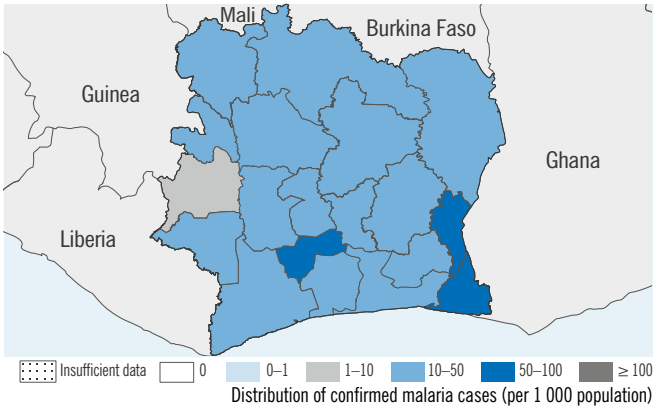


Confirmed cases, admissions (per 100 000) and deaths



Côte d'Ivoire

Phase: Control.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	19 700 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	19 700 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, funestus*

II. INTERVENTION POLICIES AND STRATEGIES

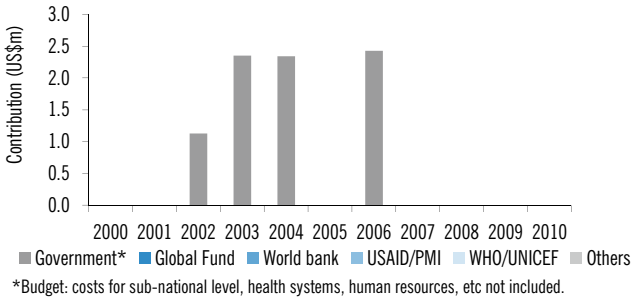
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2006
	ITNs/ LLINs: distributed to all age groups	Yes	2005
IRS	IRS is recommended	No	-
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	Yes	2005
Case management	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	No	-
	Oral artemisinin-based monotherapies are not registered	No	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2003
First-line treatment of *P. falciparum*	AS+AQ	2003
Treatment failure of *P. falciparum*	AL	2003
Treatment of severe malaria	QN	2003
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

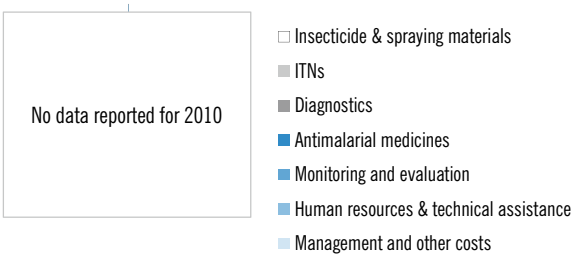
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AL	2005–2009	4	0	2.1	7.4	28 days
AS+AQ	2008–2009	2	0	0	0	28 days

III. FINANCING – Government and external financing

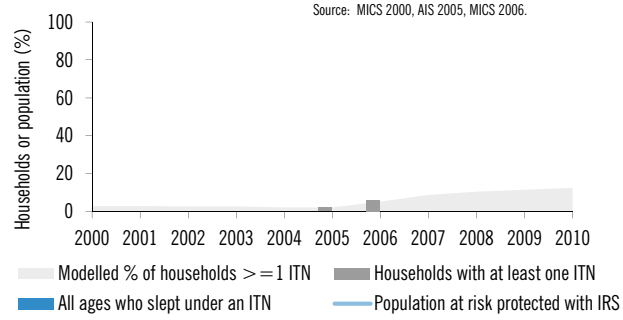


*Budget: costs for sub-national level, health systems, human resources, etc not included.

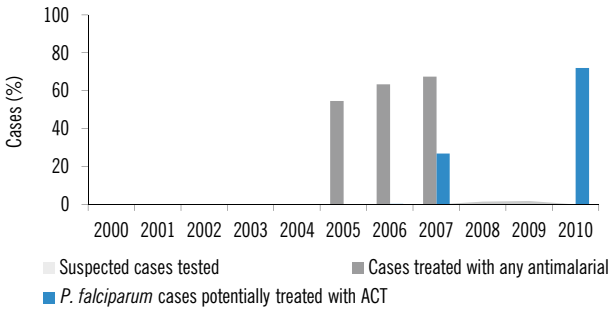
Expenditure by intervention in 2010



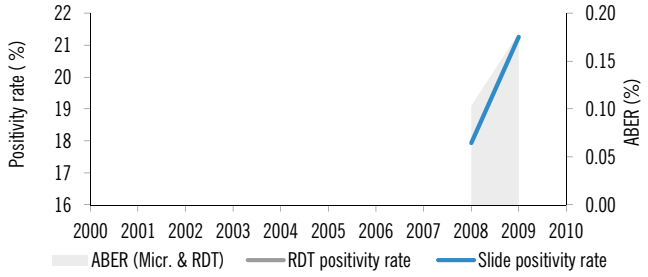
IV. COVERAGE – Coverage of ITN and IRS



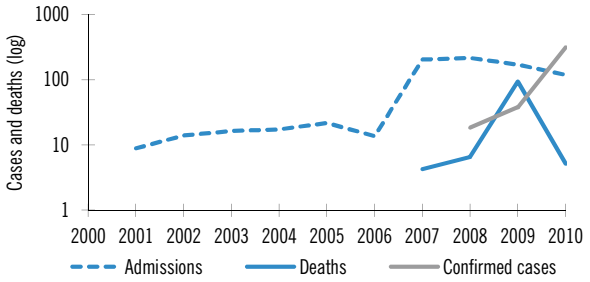
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

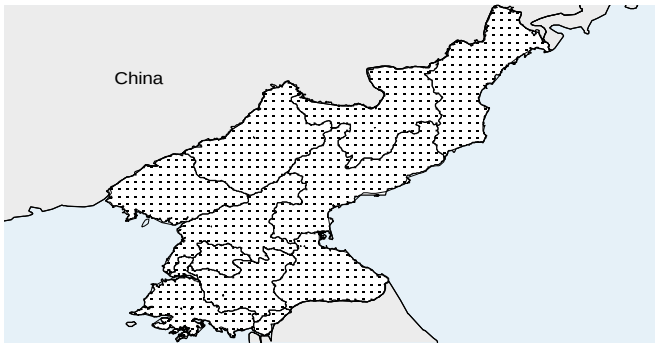


Confirmed cases, admissions and deaths (per 100 000)



Democratic People's Republic of Korea

Phase: Pre-elimination. Coverage: In 2010, IRS was sufficient to protect >50% of the population at high risk.



Insufficient data | 0 | 0–1 | 1–10 | 10–50 | 50–100 | ≥ 100

Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
Number of active foci	123	
Number of people living within active foci	15 000 000	62
Number of people living in malaria-free areas	9 350 000	38
Total	24 350 000	

Parasites and vectors

Major Plasmodium species: *P. vivax*
Major Anopheles species: *An.sinensis*

II. INTERVENTION POLICIES AND STRATEGIES

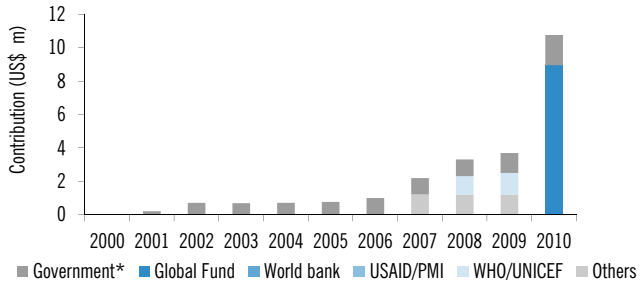
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2002
	ITNs/ LLINs: distributed to all age groups	Yes	2002
IRS	IRS is recommended	Yes	2007
	DDT is used for IRS	No	-
Case management	Malaria diagnosis is free of charge in the public sector	Yes	1953
	Gametocidal treatment of P.falciparum cases	-	-
	Malaria treatment is free of charge in the private sector	-	-
	Radical treatment of P. vivax cases	Yes	2000
Surveillance	Foci and case investigation undertaken	No	-
	Case reporting from private sector is mandatory	-	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	CQ	-
First-line treatment of *P. falciparum* (confirmed)	-	-
Treatment failure of *P. falciparum*	-	-
Treatment of severe malaria	-	-
Treatment of *P. vivax*	CQ+PQ(14d)	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

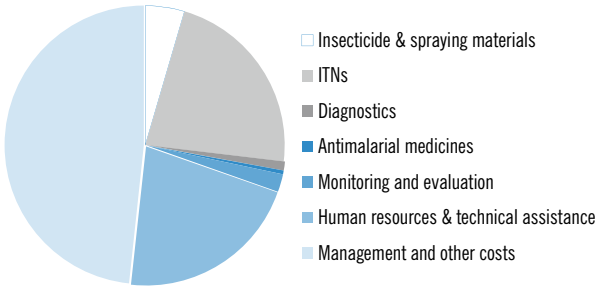
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

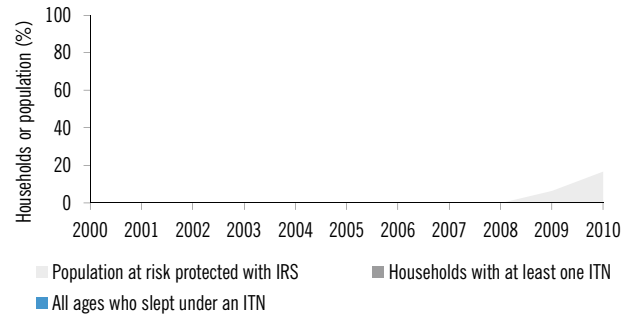


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

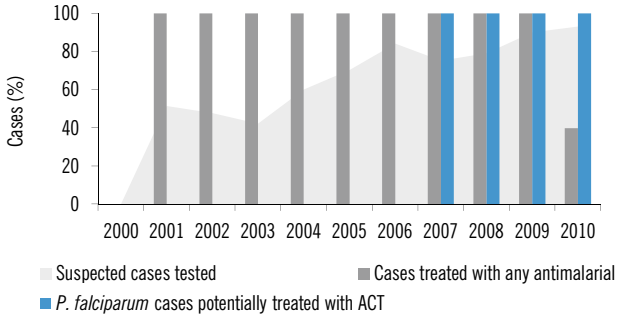
Expenditure by intervention in 2010



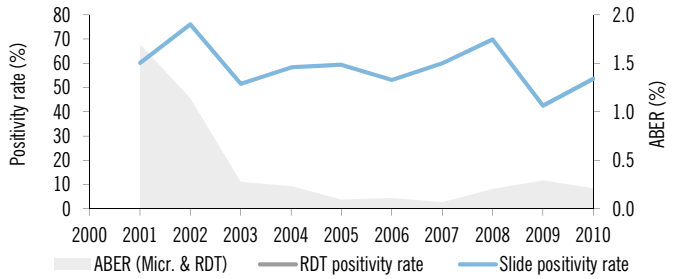
IV. COVERAGE – Coverage of ITN and IRS



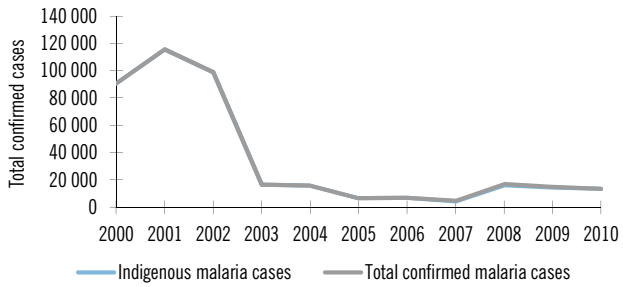
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

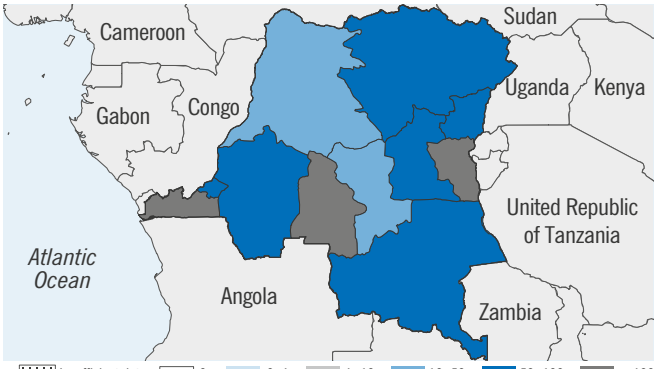


Total confirmed malaria cases and indigenous cases



Democratic Republic of the Congo

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect 25%–50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	64 000 000	97
Low transmission (0-1 cases per 1000 population)	1 980 000	3
Malaria-free (0 cases)	0	0
Total	65 980 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, funestus, nili, moucheti*

II. INTERVENTION POLICIES AND STRATEGIES

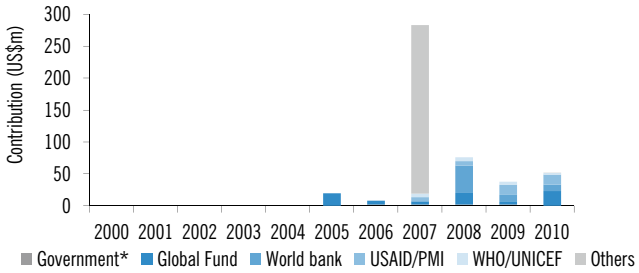
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2006
	ITNs/ LLINs: distributed to all age groups	Yes	2008
IRS	IRS is recommended	Yes	2007
	DDT is used for IRS	Yes	2008
IPT	IPT used to prevent malaria during pregnancy	Yes	2004
Case management	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	-
	Oral artemisinin-based monotherapies are not registered	No	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2005
First-line treatment of *P. falciparum*	AS+AQ	2005
Treatment failure of *P. falciparum*	QN	2005
Treatment of severe malaria	QN	2005
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

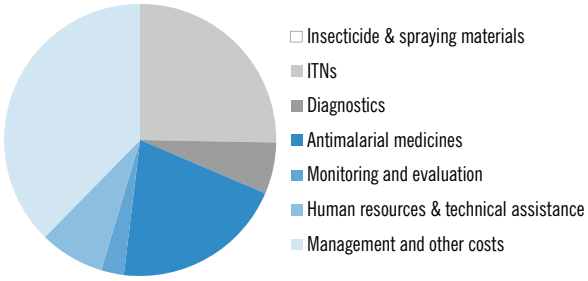
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+AQ	2003–2005	8	0	6.15	19	28 days

III. FINANCING – Government and external financing

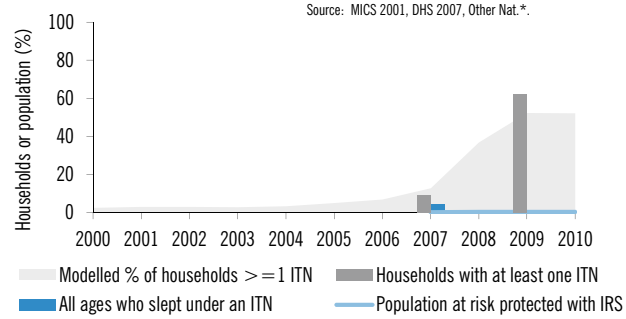


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

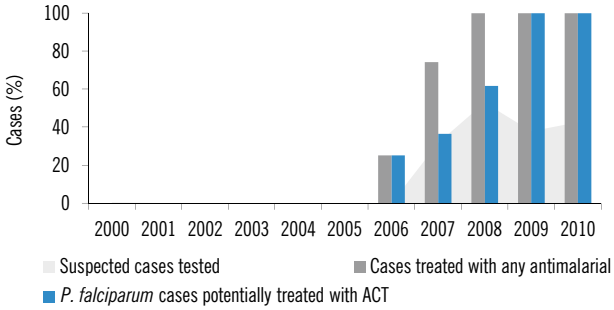
Expenditure by intervention in 2010



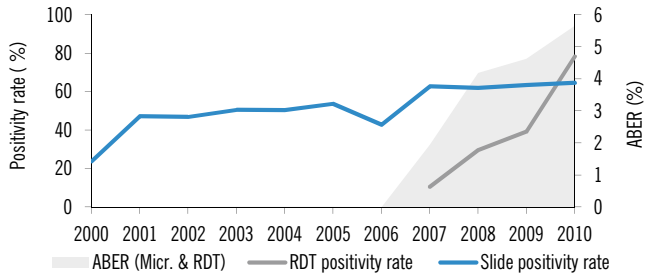
IV. COVERAGE – Coverage of ITN and IRS



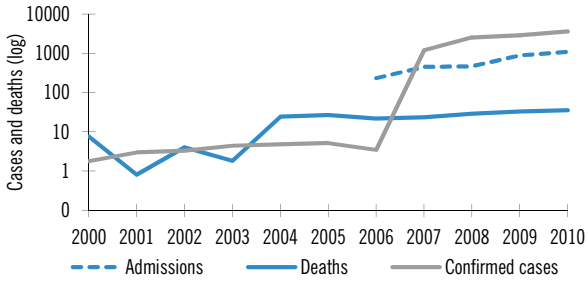
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

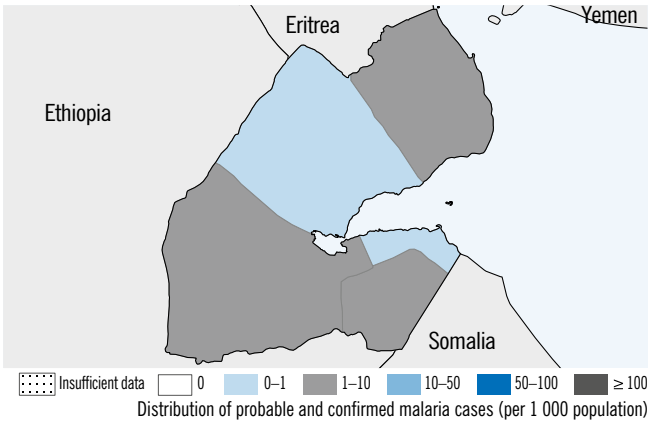


Confirmed cases, admissions and deaths (per 100 000)



Djibouti

Phase: Control.



Distribution of probable and 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)	444 000	50
Malaria-free (0 cases)	444 000	50
Total	888 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%) *P. vivax*
Major anopheles species: *An. arabiensis*

II. INTERVENTION POLICIES AND STRATEGIES

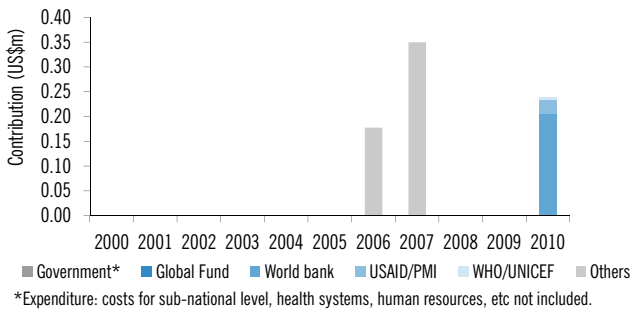
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2008
	ITNs/ LLINs: distributed to all age groups	No	-
IRS	IRS is recommended	Yes	2006
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	Patients 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	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+SP	2008
First-line treatment of *P. falciparum*	AS+SP	2008
Treatment failure of *P. falciparum*	AL	2008
Treatment of severe malaria	QN	-
Treatment of *P. vivax*	CQ+PQ(14d)	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

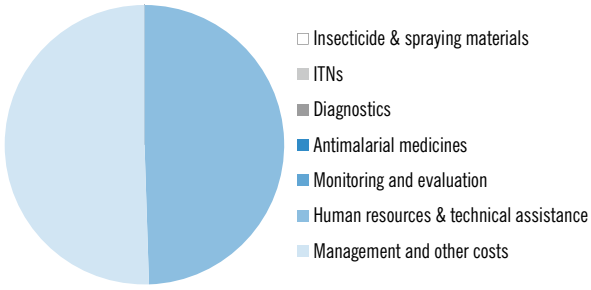
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

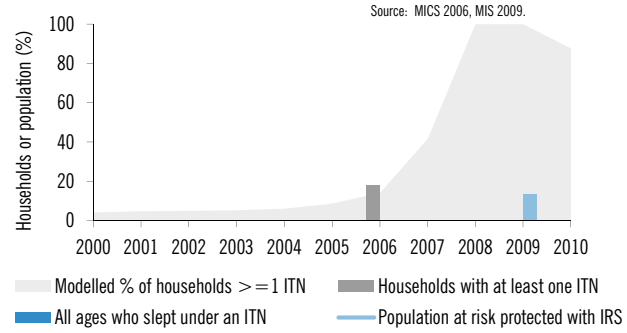


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

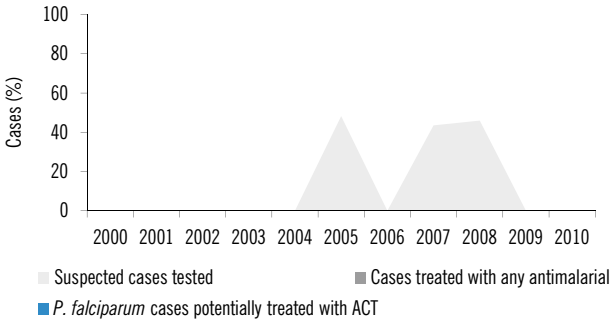
Expenditure by intervention in 2010



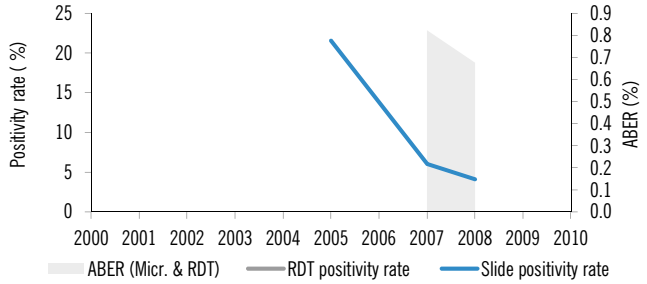
IV. COVERAGE – Coverage of ITN and IRS



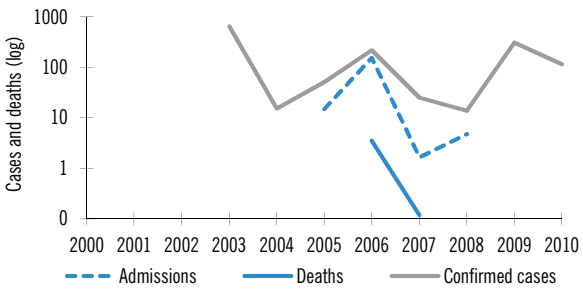
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

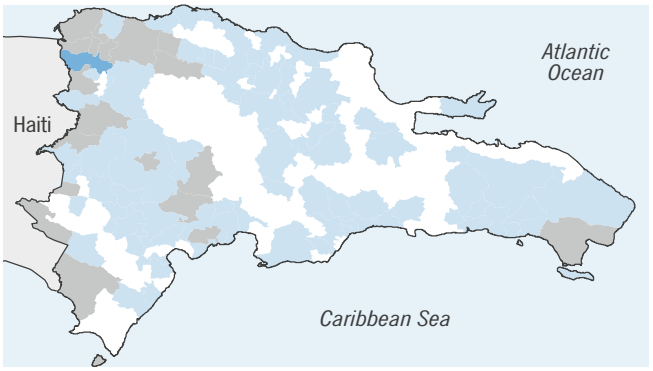


Confirmed cases, admissions and deaths (per 100 000)



Dominican Republic

Phase: Control. Coverage: In 2010, IRS was sufficient to protect 12% of the population at high risk; ITN/LLINs delivered were sufficient to protect 25%–50% of the population at high risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	427 000	4
Low transmission (0-1 cases per 1000 population)	8 070 000	81
Malaria-free (0 cases)	1 430 000	14
Total	9 927 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. albimanus*

II. INTERVENTION POLICIES AND STRATEGIES

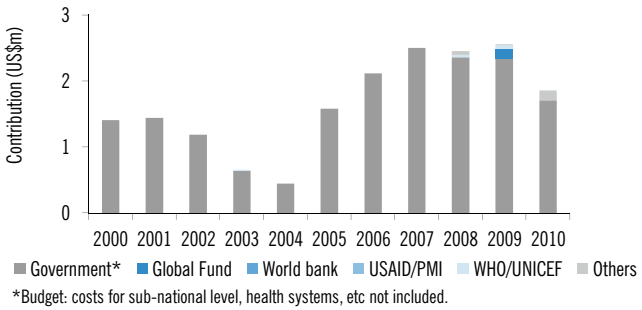
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2008
	ITNs/ LLINs: distributed to all age groups	Yes	2008
IRS	IRS is recommended	Yes	1946
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	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	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	CQ+PQ	-
First-line treatment of *P. falciparum*	CQ+PQ(3d)	-
Treatment failure of *P. falciparum*	AS+D	-
Treatment of severe malaria	CQ ;QN	-
Treatment of *P. vivax*	CQ+PQ	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

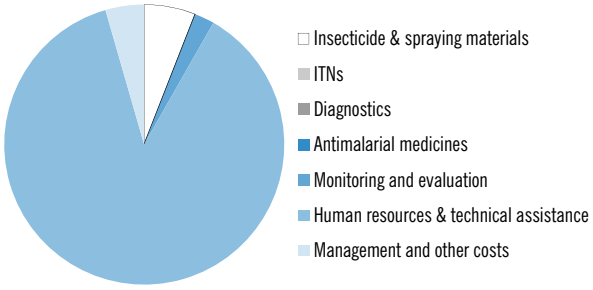
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

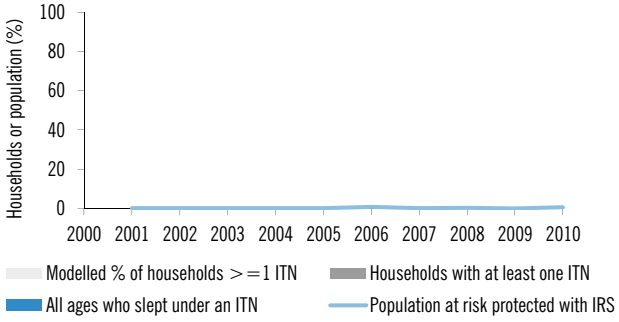


*Budget: costs for sub-national level, health systems, etc not included.

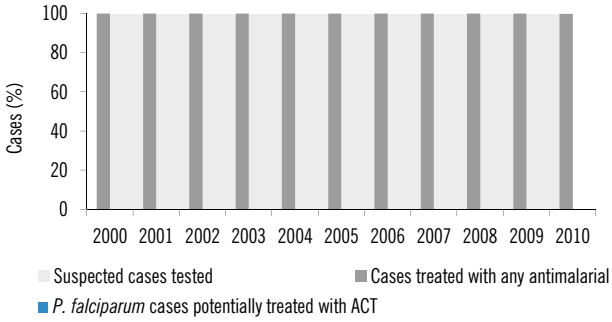
Expenditure by intervention in 2010



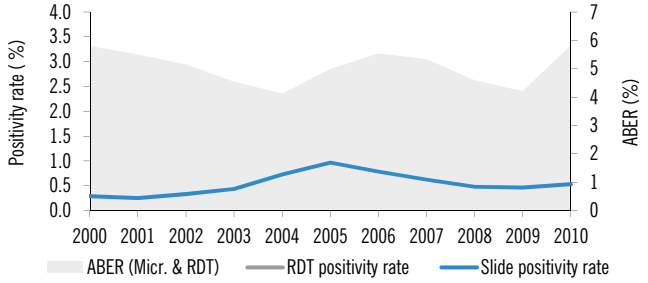
IV. COVERAGE – Coverage of ITN and IRS



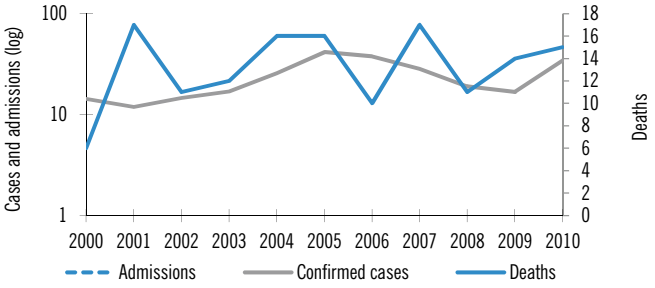
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

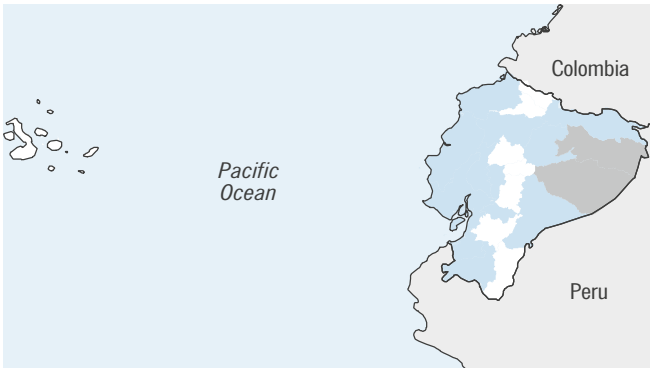


Confirmed cases, admissions (per 100 000) and deaths



Ecuador

Phase: Control. Coverage: In 2010, IRS was sufficient to protect 25%–50% of the population at high risk; ITN/LLINs delivered were sufficient to protect >50% of the population at high risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	217 000	2
Low transmission (0-1 cases per 1000 population)	8 530 000	59
Malaria-free (0 cases)	5 710 000	39
Total	14 457 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (14%), *P. vivax*
Major anopheles species: *An. albimanus, punctimacula, pseudopunctipennis, neivai*

II. INTERVENTION POLICIES AND STRATEGIES

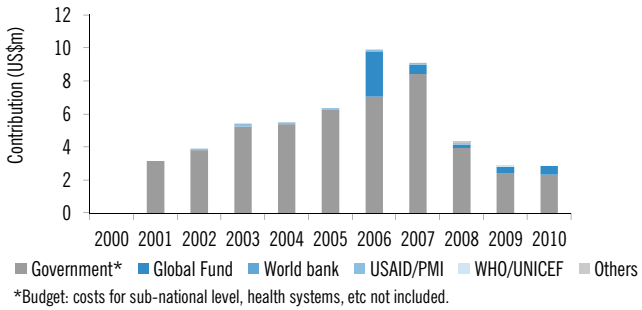
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	-
	ITNs/ LLINs: distributed to all age groups	No	-
IRS	IRS is recommended	-	-
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	Patients of 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	-	-
	Oral artemisinin-based monotherapies are not registered	No	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	AS+SP	2004
Treatment failure of *P. falciparum*	AL	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	CQ+PQ	2004

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

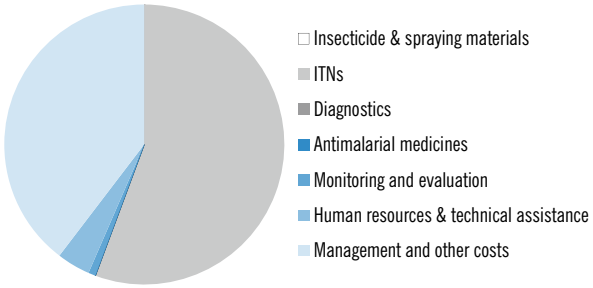
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+SP	2003–2004	2	0	0	0	28 days

III. FINANCING – Government and external financing

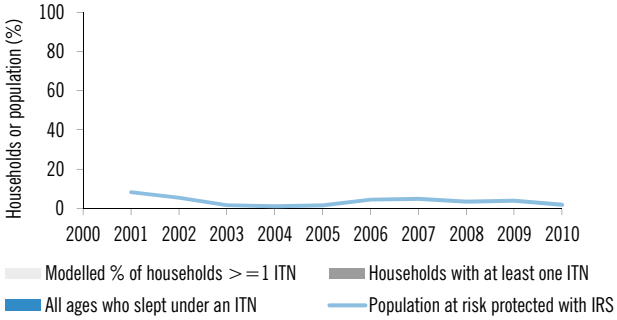


*Budget: costs for sub-national level, health systems, etc not included.

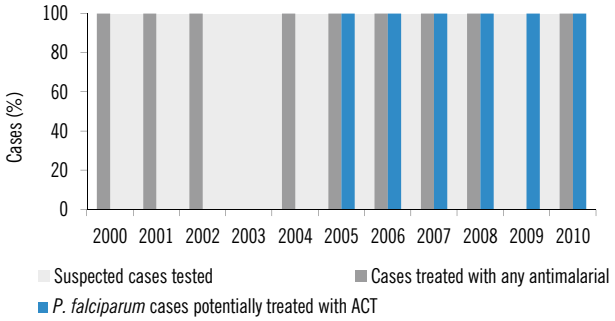
Expenditure by intervention in 2010



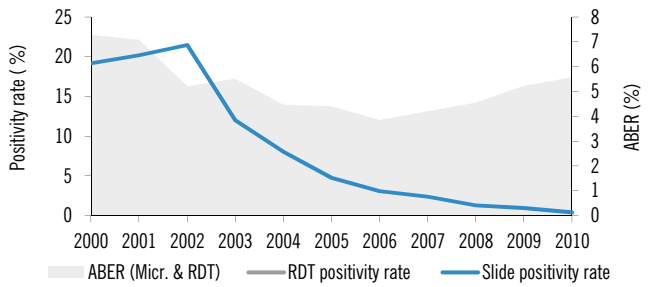
IV. COVERAGE – Coverage of ITN and IRS



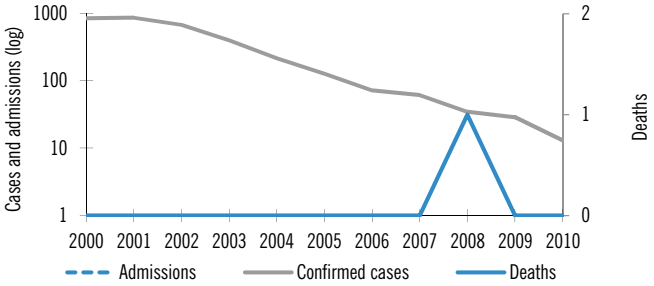
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER



Confirmed cases, admissions (per 100 000) and deaths



El Salvador

Phase: Pre-elimination.

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)	4 940 000	80
Total	6 200 000	

Parasites and vectors

Major plasmodium species:
Major anopheles species:

II. INTERVENTION POLICIES AND STRATEGIES

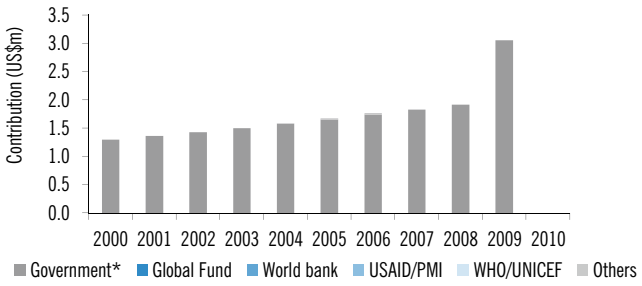
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	No	-
	ITNs/ LLINs: distributed to all age groups	-	-
IRS	IRS is recommended	-	-
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	Patients of all ages should receive diagnostic test	Yes	-
	RDTs used at community level	-	-
	ACT is free for all ages in public sector	-	-
	Pre-referral treatment with recommended medicines	No	-
	Oral artemisinin-based monotherapies are not registered	-	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	CQ+PQ	-
Treatment failure of *P. falciparum*	-	-
Treatment of severe malaria	-	-
Treatment of *P. vivax*	CQ+PQ	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing



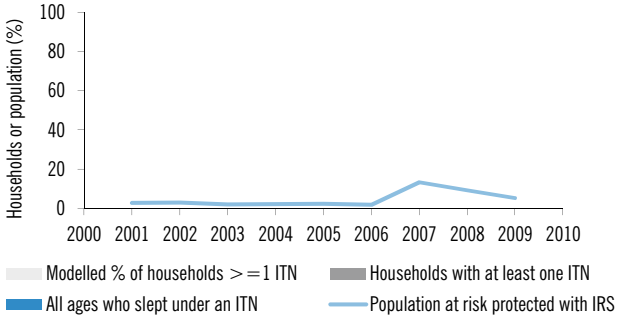
*Expenditure: costs for sub-national level, health systems, etc not included.

Expenditure by intervention in 2010

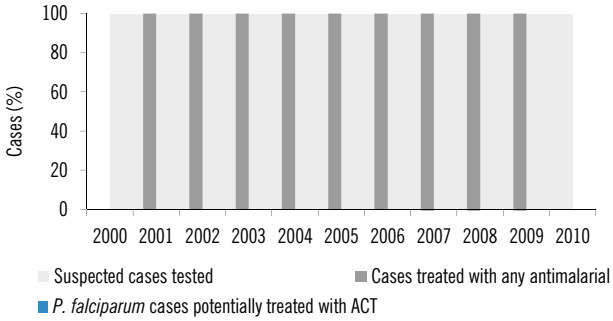
No data reported for 2010

- Insecticide & spraying materials
- ITNs
- Diagnostics
- Antimalarial medicines
- Monitoring and evaluation
- Human resources & technical assistance
- Management and other costs

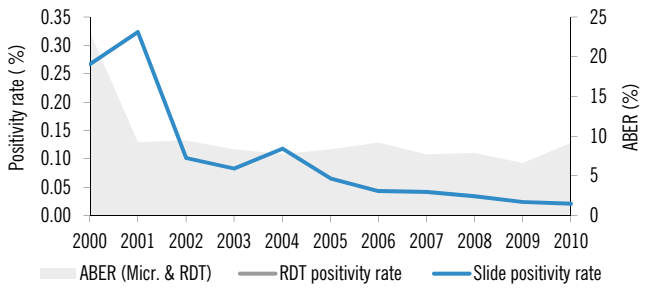
IV. COVERAGE – Coverage of ITN and IRS



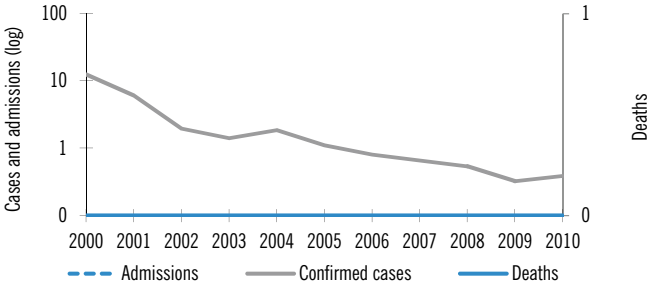
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

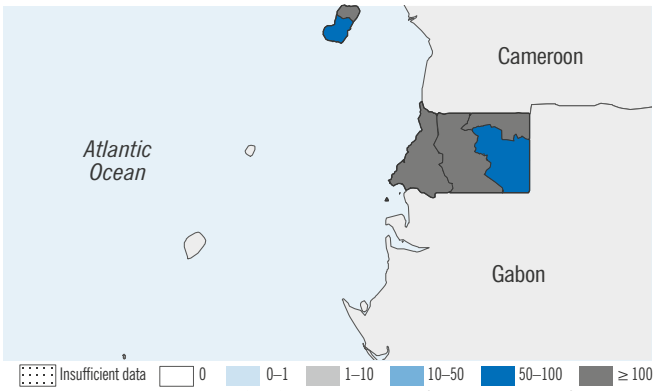


Confirmed cases, admissions (per 100 000) and deaths



Equatorial Guinea

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect 25%–50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population), year:2009

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	700 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	700 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, cinctus, melas*

II. INTERVENTION POLICIES AND STRATEGIES

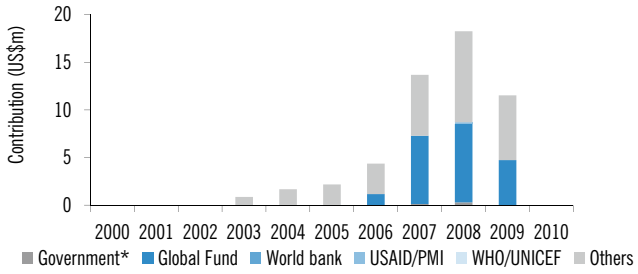
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2007
	ITNs/ LLINs: distributed to all age groups	-	-
IRS	IRS is recommended	Yes	2005
	DDT is used for IRS	-	-
IPT	IPT used to prevent malaria during pregnancy	-	-
Case management	Patients of all ages should receive diagnostic test	Yes	2005
	RDTs used at community level	Yes	2005
	ACT is free for all ages in public sector	Yes	2008
	Pre-referral treatment with recommended medicines	Yes	2008
	Oral artemisinin-based monotherapies are not registered	Yes	2008

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2004
First-line treatment of *P. falciparum*	AS+AQ	2004
Treatment failure of *P. falciparum*	QN	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

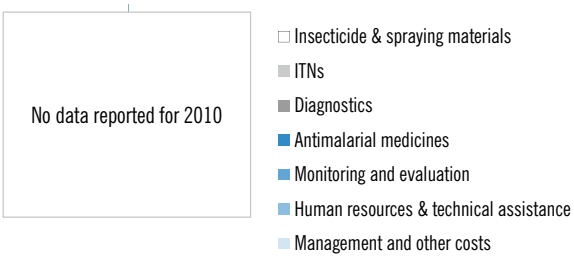
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+AQ	2006–2006	1	3.3	3.3	3.3	28 days

III. FINANCING – Government and external financing

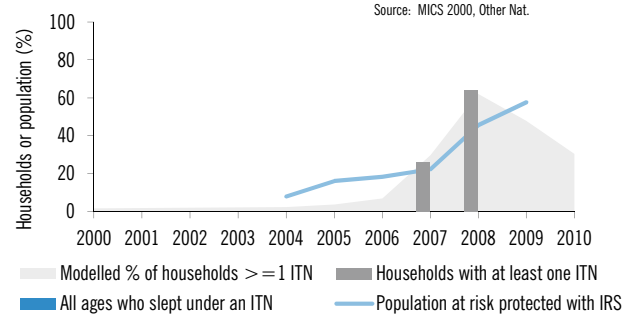


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

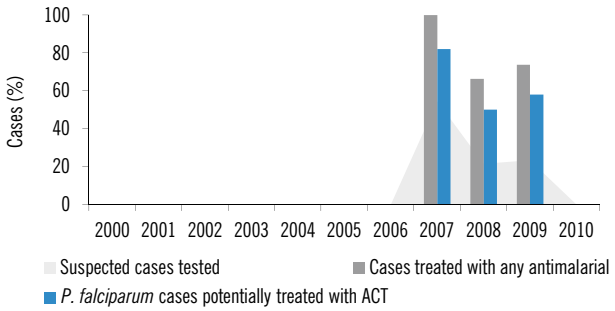
Expenditure by intervention in 2010



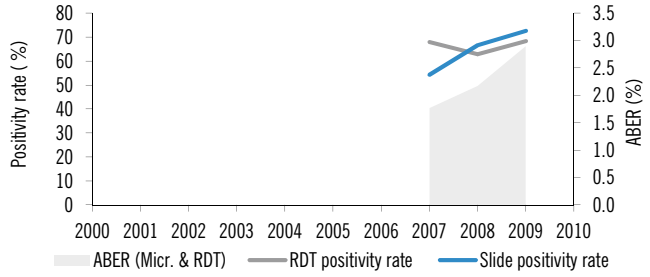
IV. COVERAGE – Coverage of ITN and IRS



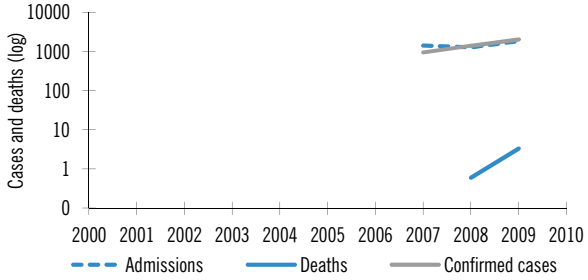
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

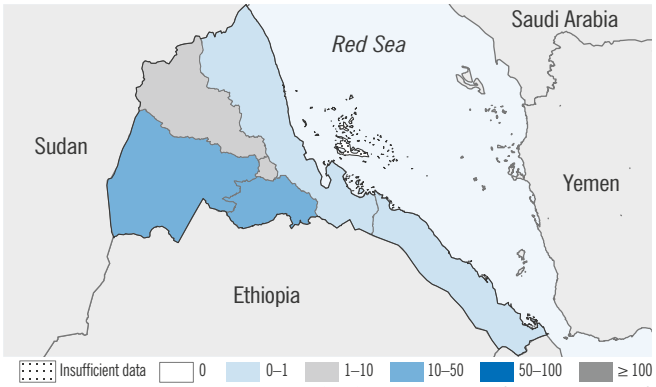


Confirmed cases, admissions and deaths (per 100 000)



Eritrea

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect >50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	3 730 000	71
Low transmission (0-1 cases per 1000 population)	1 520 000	29
Malaria-free (0 cases)	0	0
Total	5 250 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (71%), *P. vivax*
Major anopheles species: *An. arabiensis*

II. INTERVENTION POLICIES AND STRATEGIES

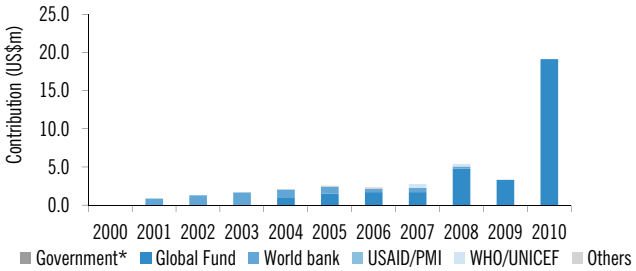
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2002
	ITNs/ LLINs: distributed to all age groups	Yes	2000
IRS	IRS is recommended	Yes	1995
	DDT is used for IRS	Yes	1997
IPT	IPT used to prevent malaria during pregnancy	No	-
Case management	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
	Oral artemisinin-based monotherapies are not registered	Yes	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	CQ+SP	2007
First-line treatment of *P. falciparum*	AS+AQ	2007
Treatment failure of *P. falciparum*	QN	2007
Treatment of severe malaria	QN	2007
Treatment of *P. vivax*	CQ+PQ	2007

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

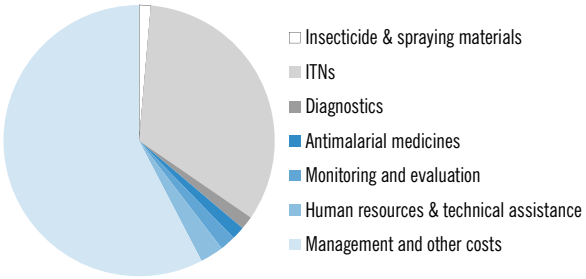
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+AQ	2006–2009	8	1.5	4.1	12.5	28 days

III. FINANCING – Government and external financing

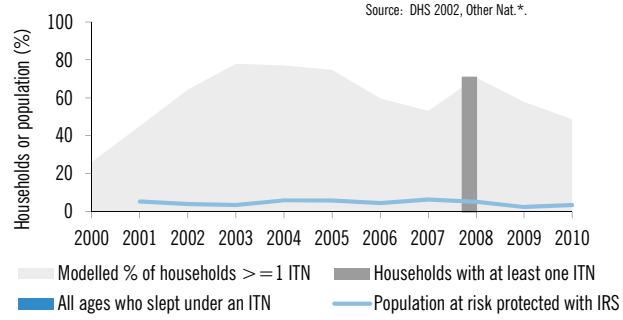


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

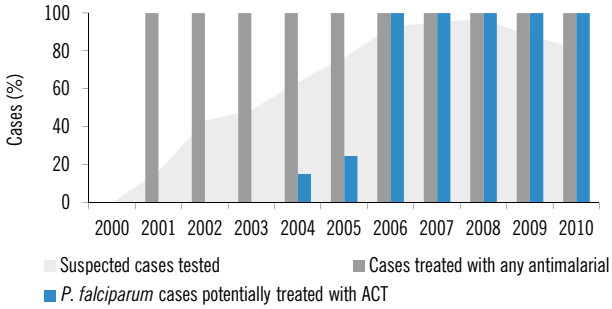
Expenditure by intervention in 2010



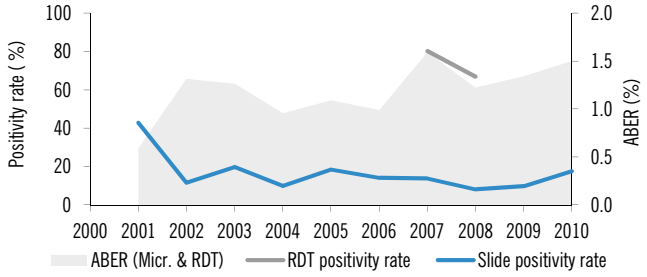
IV. COVERAGE – Coverage of ITN and IRS



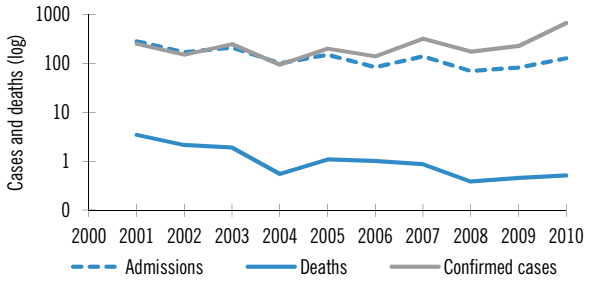
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

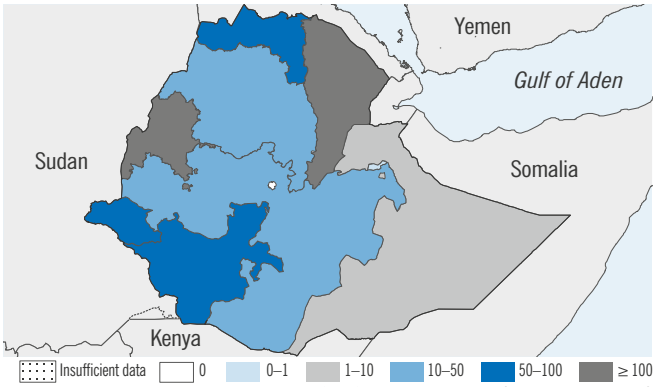


Confirmed cases, admissions and deaths (per 100 000)



Ethiopia

Phase: Control. Coverage: In 2010, IRS was sufficient to protect 25%–50% of the population at risk; ITN/LLINs delivered were sufficient to protect 25%–50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	829 000	1
Low transmission (0-1 cases per 1000 population)	54 700 000	66
Malaria-free (0 cases)	27 400 000	33
Total	82 929 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (70%), *P. vivax*
Major anopheles species: *An. arabiensis, funestus, pharoensis, nili*

II. INTERVENTION POLICIES AND STRATEGIES

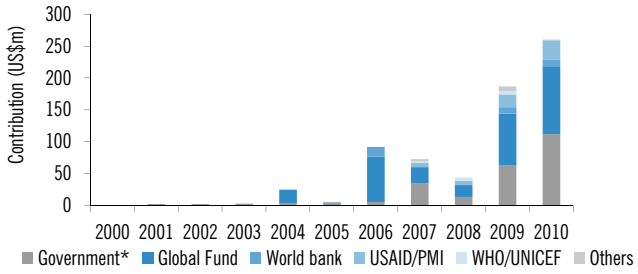
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2004
	ITNs/ LLINs: distributed to all age groups	Yes	2004
IRS	IRS is recommended	Yes	1960
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	No	-
Case management	Patients of all ages should receive diagnostic test	Yes	1997
	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
	Oral artemisinin-based monotherapies are not registered	Yes	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2004
First-line treatment of *P. falciparum*	AL	2004
Treatment failure of *P. falciparum*	QN	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	CQ	2004

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

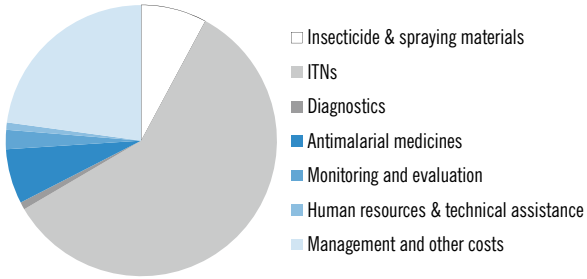
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AL	2003–2009	9	0	0	7.5	28 days
QN	2006–2006	1	10	10	10	28 days

III. FINANCING – Government and external financing

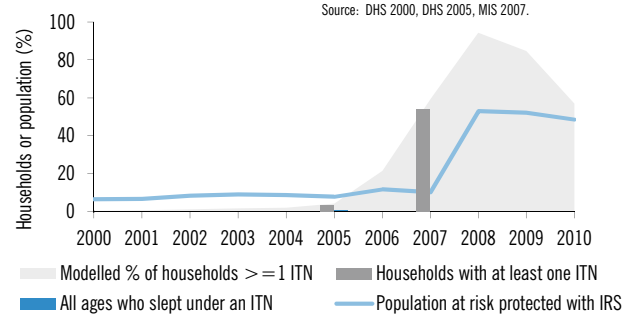


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

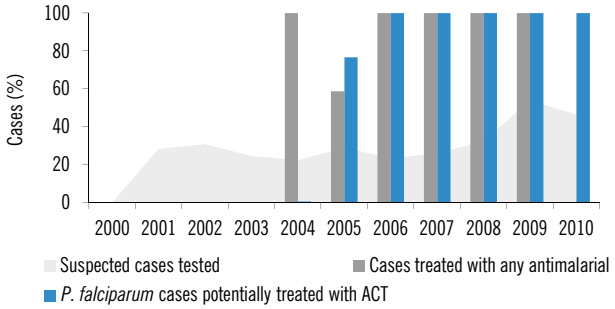
Expenditure by intervention in 2010



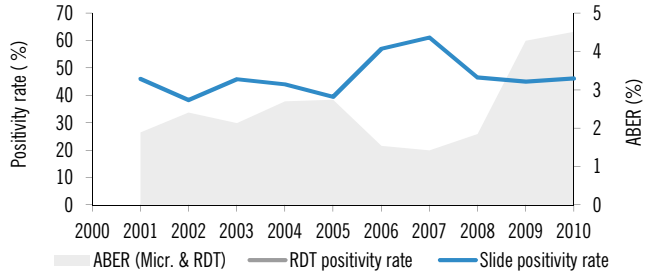
IV. COVERAGE – Coverage of ITN and IRS



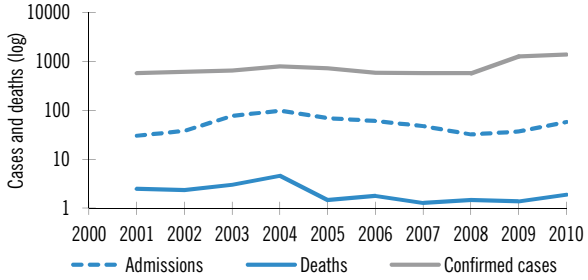
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

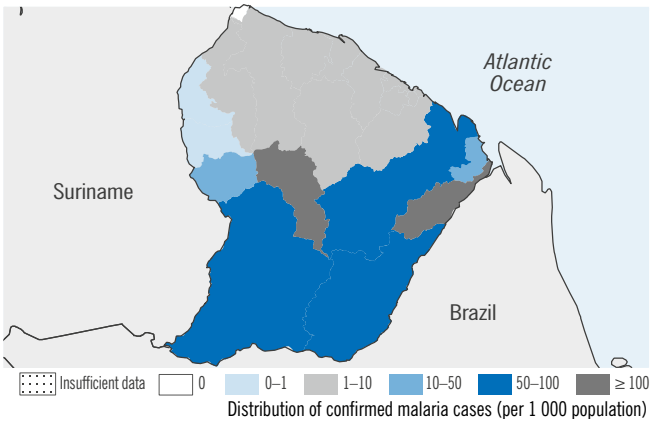


Confirmed cases, admissions and deaths (per 100 000)



French Guiana

Phase: Control. Coverage: In 2010, IRS was sufficient to protect 21% of the population at high risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	198 000	86
Low transmission (0-1 cases per 1000 population)	33 500	14
Malaria-free (0 cases)	0	0
Total	231 500	

Parasites and vectors

Major plasmodium species: *P. falciparum* (34%), *P. vivax*
Major anopheles species: *An. darlingi*

II. INTERVENTION POLICIES AND STRATEGIES

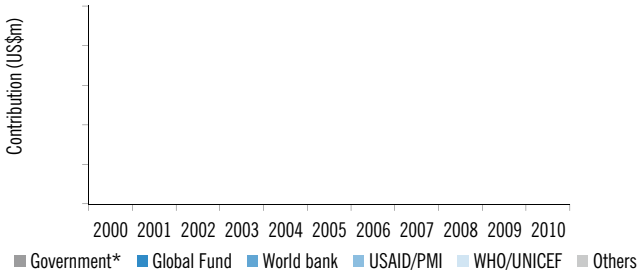
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	No	-
	ITNs/ LLINs: distributed to all age groups	Yes	2005
IRS	IRS is recommended	Yes	-
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	Patients 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	-	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	AL	-
Treatment failure of *P. falciparum*	QN+D	-
Treatment of severe malaria	-	-
Treatment of *P. vivax*	CQ+PQ	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

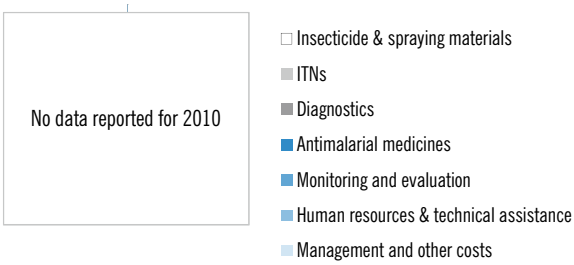
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

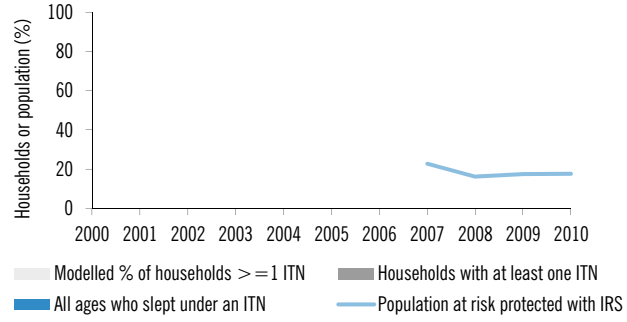


*Expenditure: costs for local level, health systems, etc not included.

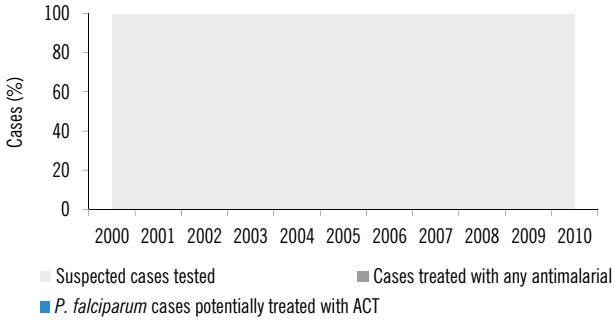
Expenditure by intervention in 2010



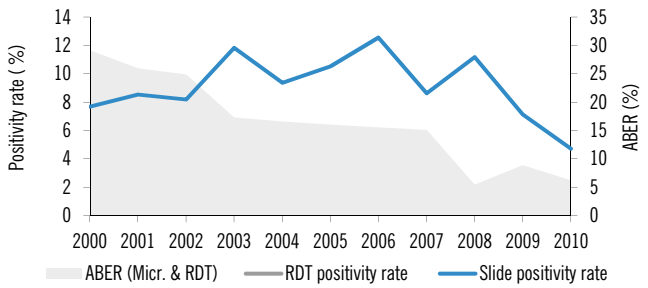
IV. COVERAGE – Coverage of ITN and IRS



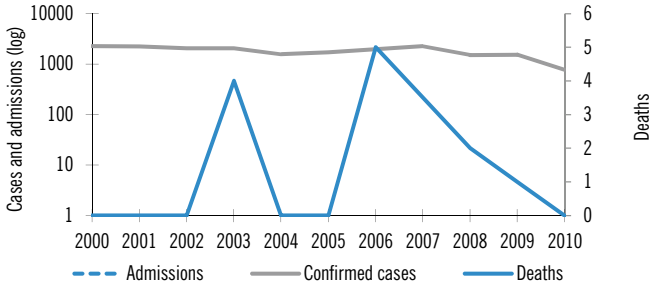
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

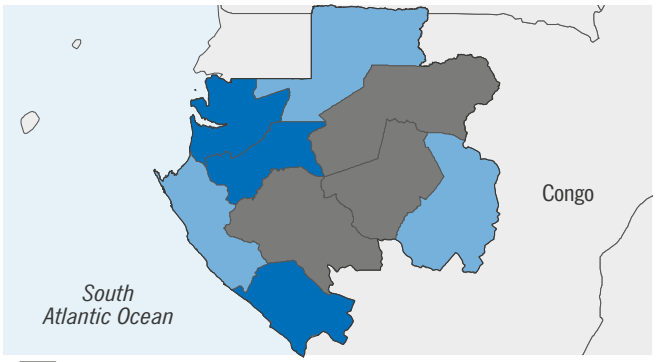


Confirmed cases, admissions (per 100 000) and deaths



Gabon

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect >50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	1 510 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	1 510 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, funestus, melas*

II. INTERVENTION POLICIES AND STRATEGIES

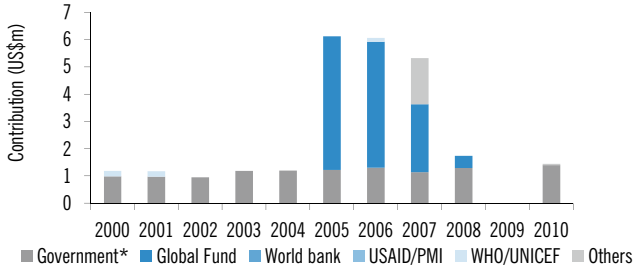
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2003
	ITNs/ LLINs: distributed to all age groups	Yes	2007
IRS	IRS is recommended	No	-
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	Yes	2003
Case management	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
	Oral artemisinin-based monotherapies are not registered	Yes	2003

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2003
First-line treatment of *P. falciparum*	AS+AQ	2003
Treatment failure of *P. falciparum*	AL	2003
Treatment of severe malaria	QN	2003
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

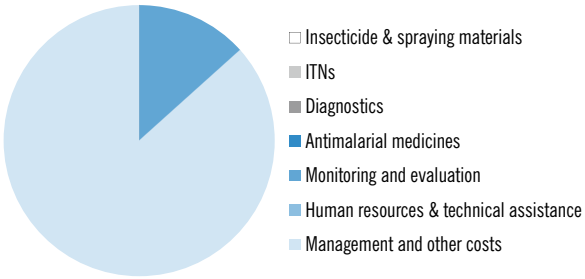
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+AQ	2004–2005	1	13.8	13.8	13.8	28 days

III. FINANCING – Government and external financing

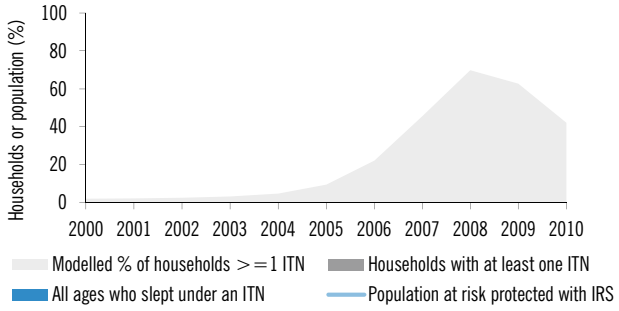


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

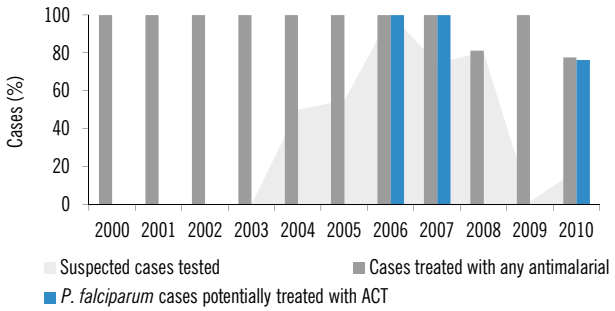
Expenditure by intervention in 2010



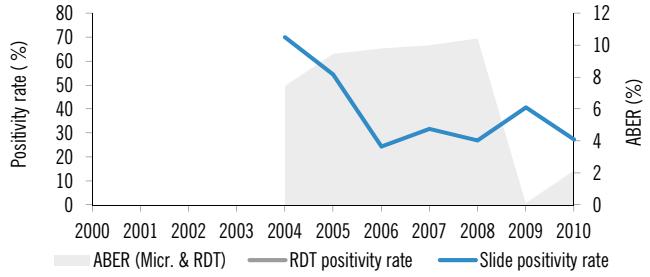
IV. COVERAGE – Coverage of ITN and IRS



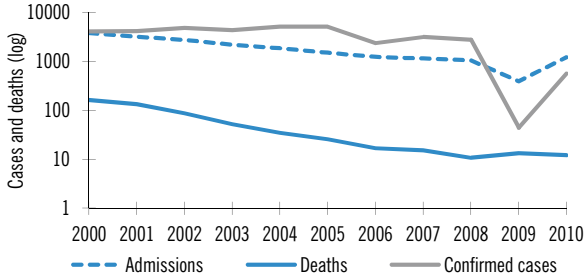
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

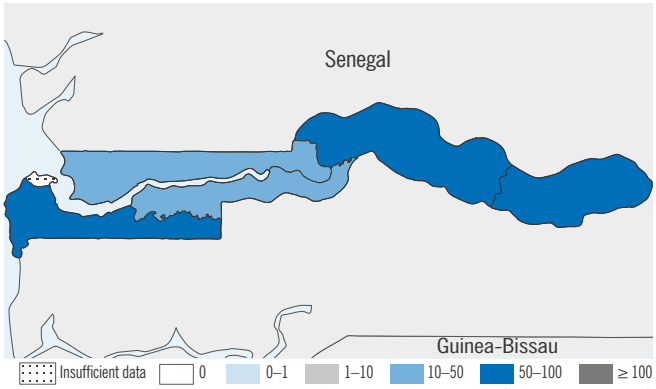


Confirmed cases, admissions and deaths (per 100 000)



Gambia

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect 25%–50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	1 730 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	1 730 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, arabiensis, funestus, melas, pharoensis, nili*

II. INTERVENTION POLICIES AND STRATEGIES

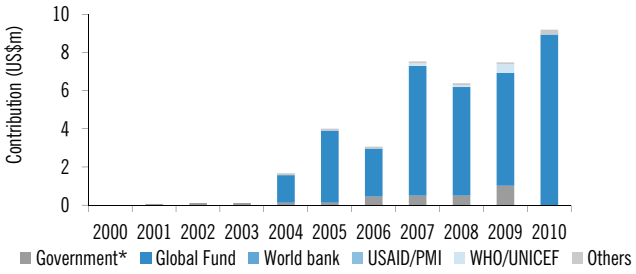
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2000
	ITNs/ LLINs: distributed to all age groups	Yes	1998
IRS	IRS is recommended	Yes	2008
	DDT is used for IRS	Yes	2008
IPT	IPT used to prevent malaria during pregnancy	Yes	2002
Case management	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
	Oral artemisinin-based monotherapies are not registered	Yes	2008

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2005
First-line treatment of *P. falciparum*	AL	2005
Treatment failure of *P. falciparum*	QN	2005
Treatment of severe malaria	QN	2005
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

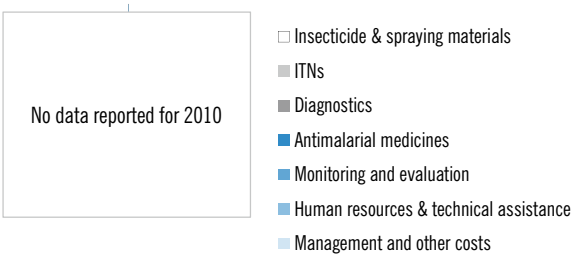
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AL	2002–2008	2	0	1.95	3.9	28 days

III. FINANCING – Government and external financing

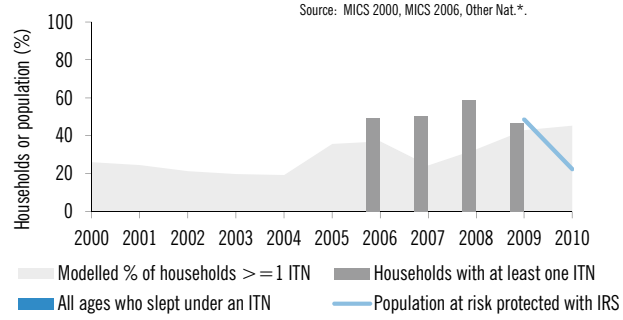


*Budget: costs for sub-national level, health systems, human resources, etc not included.

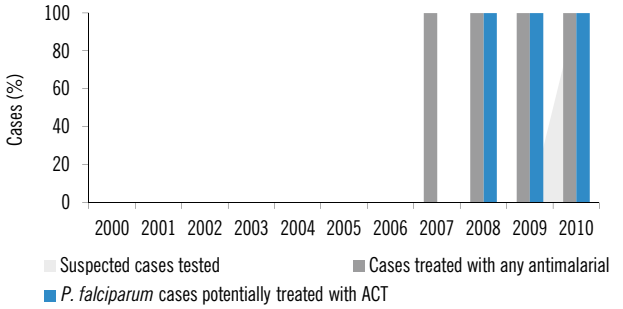
Expenditure by intervention in 2010



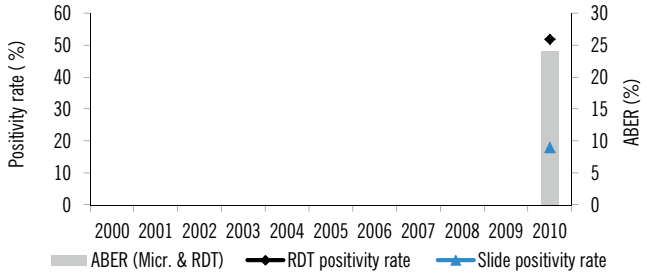
IV. COVERAGE – Coverage of ITN and IRS



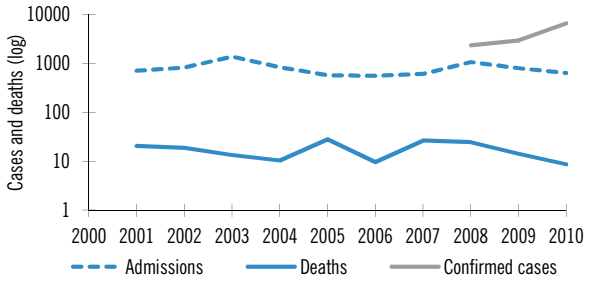
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

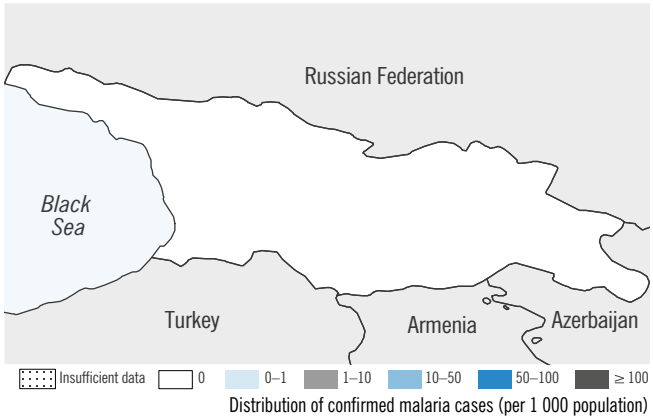


Confirmed cases, admissions and deaths (per 100 000)



Georgia

Phase: Prevention of reintroduction. Since 2003 malaria cases have been on the decline and the last locally acquired case was reported in 2009. Malaria elimination strategy with the goal to eliminate P. vivax malaria by 2013 is launched in 2008.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
Number of active foci	1	
Number of people living within active foci	43 300	1
Number of people living in malaria-free areas	4 310 000	99
Total	4 353 300	

Parasites and vectors

Major Plasmodium species: *P. vivax*
Major Anopheles species: *An.sacharovi*

II. INTERVENTION POLICIES AND STRATEGIES

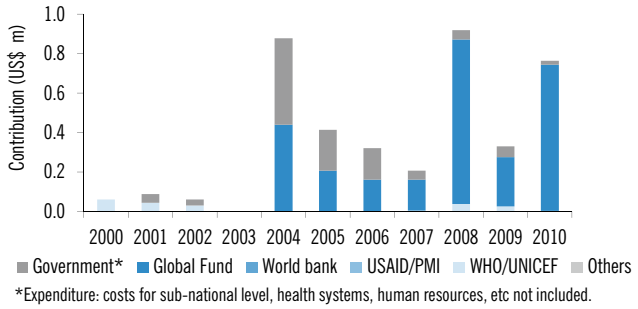
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	No	-
	ITNs/ LLINs: distributed to all age groups	No	-
IRS	IRS is recommended	Yes	2000
	DDT is used for IRS	No	-
Case management	Malaria diagnosis is free of charge in the public sector	Yes	2000
	Gametocidal treatment of P.falciparum cases	Yes	2000
	Radical treatment of P. vivax cases	Yes	2000
Surveillance	Foci and case investigation undertaken	No	-
	Case reporting from private sector is mandatory	No	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum* (confirmed)	-	-
Treatment failure of *P. falciparum*	-	-
Treatment of severe malaria	-	-
Treatment of *P. vivax*	CQ+PQ(14d)	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

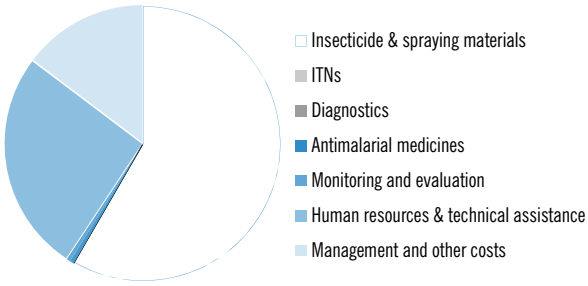
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

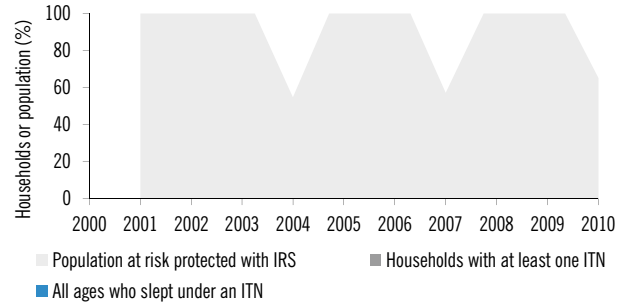


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

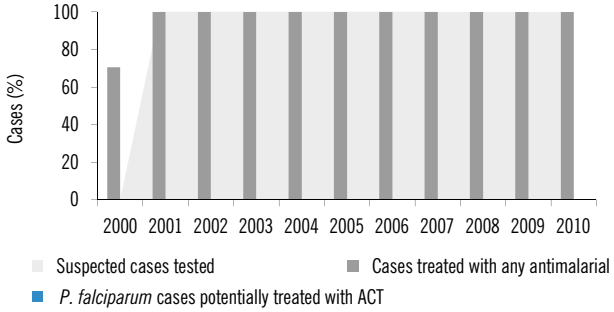
Expenditure by intervention in 2010



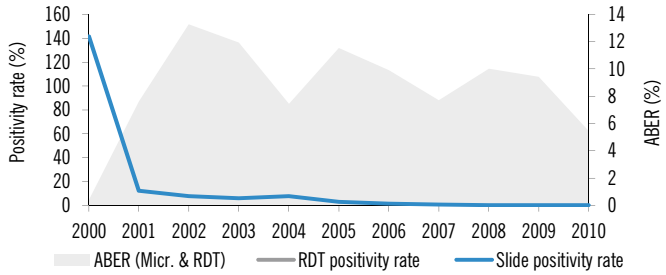
IV. COVERAGE – Coverage of ITN and IRS



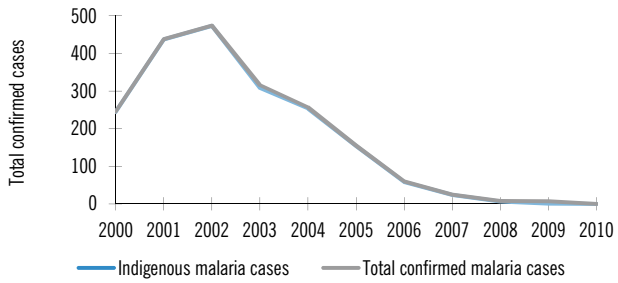
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

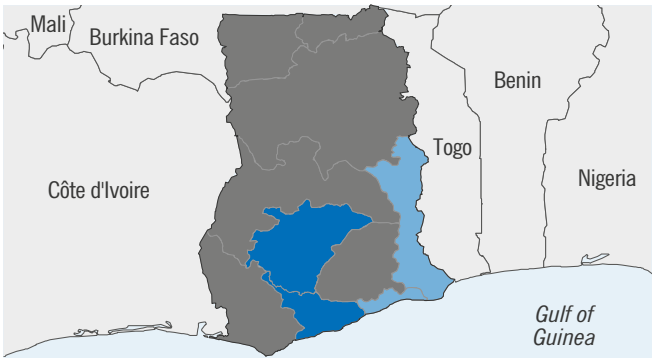


Total confirmed malaria cases and indigenous cases



Ghana

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect 25%–50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	24 400 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	24 400 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (90%), *P. vivax*
Major anopheles species: *An. gambiae, arabiensis, funestus*

II. INTERVENTION POLICIES AND STRATEGIES

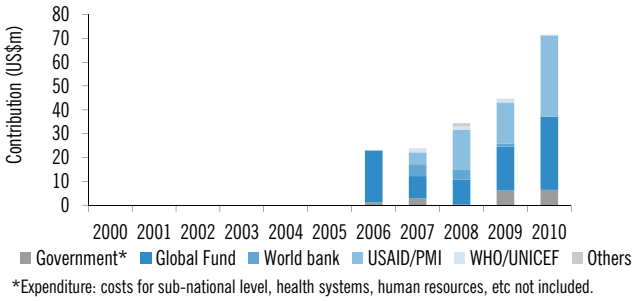
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2006
	ITNs/ LLINs: distributed to all age groups	Yes	2010
IRS	IRS is recommended	Yes	2005
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	Yes	2003
Case management	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
	Oral artemisinin-based monotherapies are not registered	Yes	2010

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2004
First-line treatment of *P. falciparum*	AL ;AS+AQ	2004
Treatment failure of *P. falciparum*	QN	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

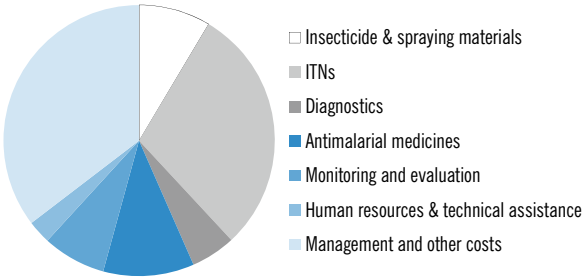
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+AQ	2003–2006	4	0	4.3	14	28 days
AL	2003–2007	5	1.7	4	13.8	28 days

III. FINANCING – Government and external financing



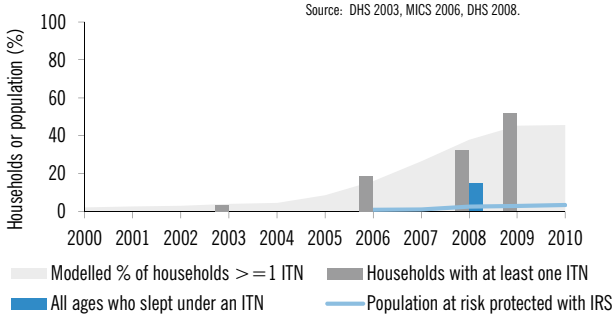
*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2010

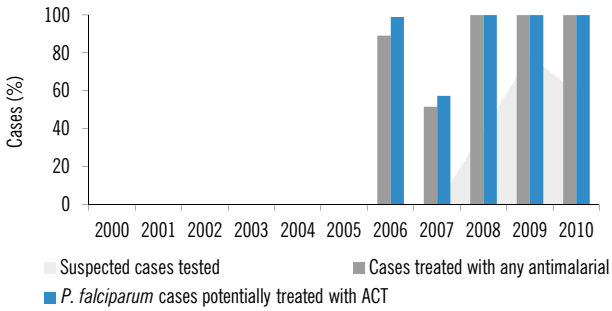


IV. COVERAGE – Coverage of ITN and IRS

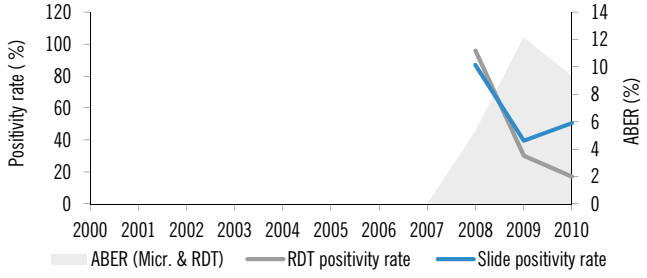
Source: DHS 2003, MICS 2006, DHS 2008.



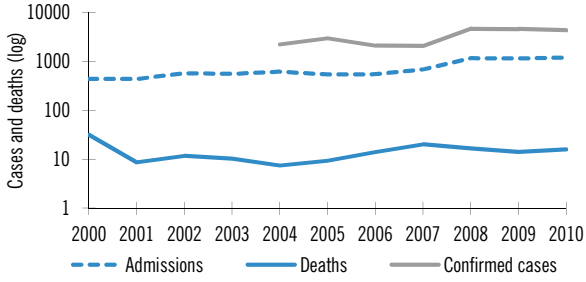
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

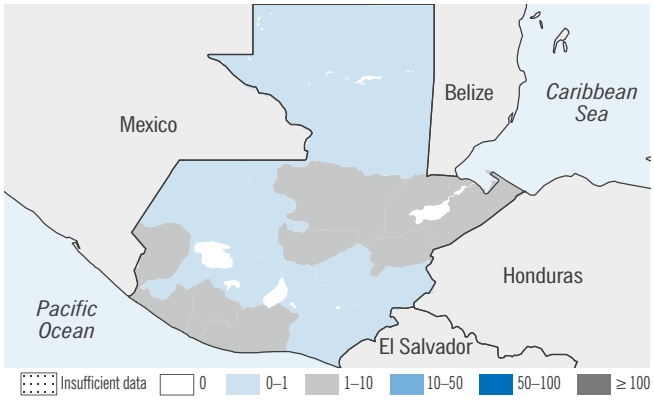


Confirmed cases, admissions and deaths (per 100 000)



Guatemala

Phase: Control. Coverage: In 2010, IRS was sufficient to protect 7% of the population at high risk; ITN/LLINs delivered were sufficient to protect 25- 50% of the population at high risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	2 160 000	15
Low transmission (0-1 cases per 1000 population)	4 390 000	31
Malaria-free (0 cases)	7 840 000	54
Total	14 390 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (0%), *P. vivax*
Major anopheles species: *An. albimanus, pseudopunctipennis, darlingi*

II. INTERVENTION POLICIES AND STRATEGIES

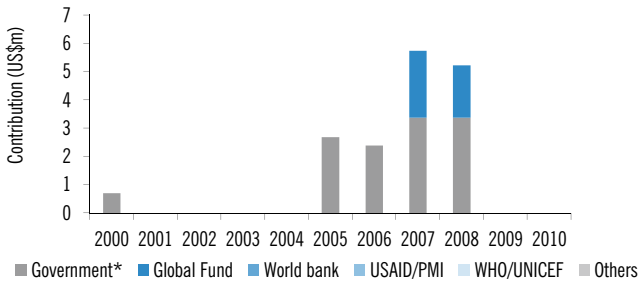
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2006
	ITNs/ LLINs: distributed to all age groups	Yes	2006
IRS	IRS is recommended	Yes	-
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	Patients of all ages should receive diagnostic test	Yes	-
	RDTs used at community level	Yes	-
	ACT is free for all ages in public sector	No	-
	Pre-referral treatment with recommended medicines	No	-
	Oral artemisinin-based monotherapies are not registered	No	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	CQ+PQ	-
Treatment failure of *P. falciparum*	-	-
Treatment of severe malaria	CQ	-
Treatment of *P. vivax*	CQ+PQ	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

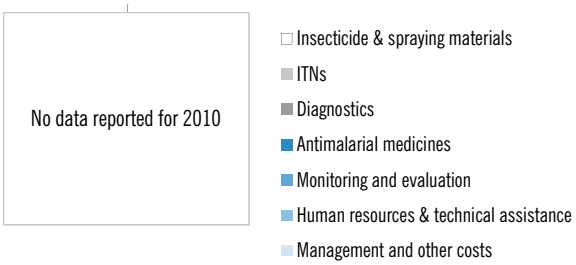
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

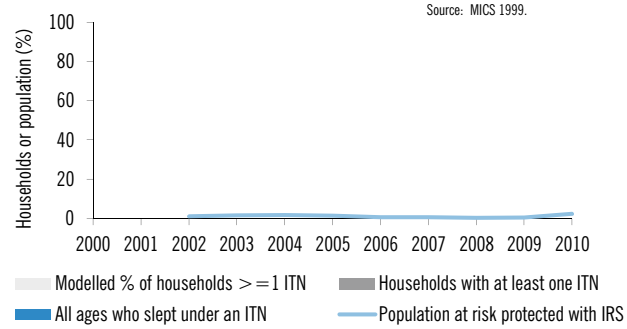


*Budget: costs for sub-national level, health systems, etc not included.

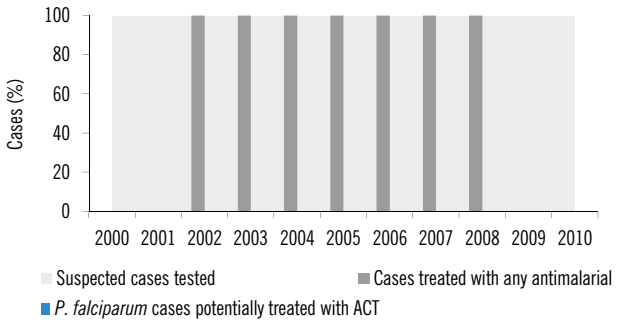
Expenditure by intervention in 2010



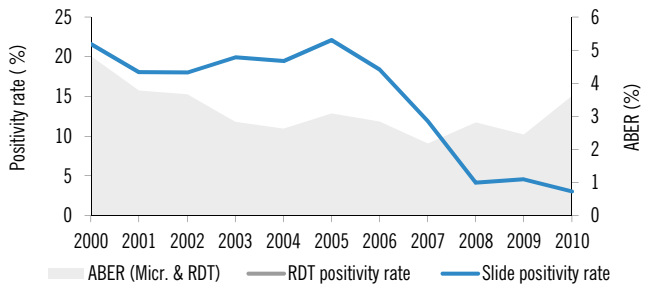
IV. COVERAGE – Coverage of ITN and IRS



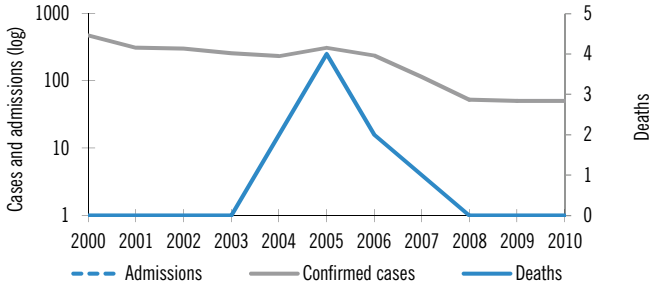
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

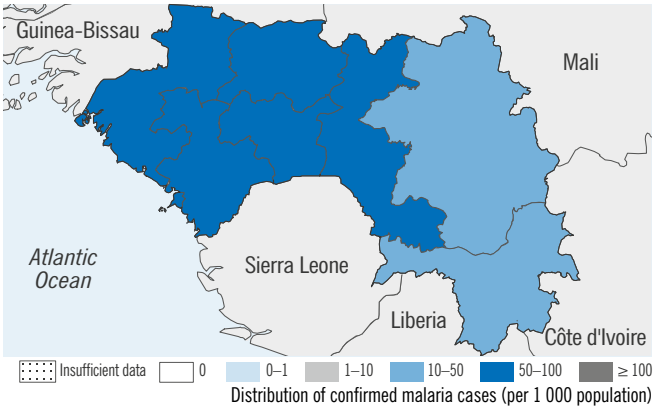


Confirmed cases, admissions (per 100 000) and deaths



Guinea

Phase: Control.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	9 980 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	9 980 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, funestus, melas*

II. INTERVENTION POLICIES AND STRATEGIES

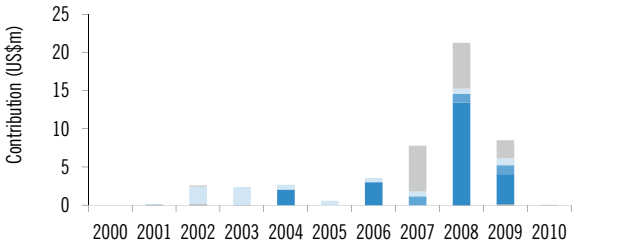
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2007
	ITNs/ LLINs: distributed to all age groups	Yes	2007
IRS	IRS is recommended	Yes	2001
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	Yes	2005
Case management	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	2009
	Pre-referral treatment with recommended medicines	Yes	2005
	Oral artemisinin-based monotherapies are not registered	No	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	-
First-line treatment of *P. falciparum*	AS+AQ	-
Treatment failure of *P. falciparum*	QN	-
Treatment of severe malaria	QN	-
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

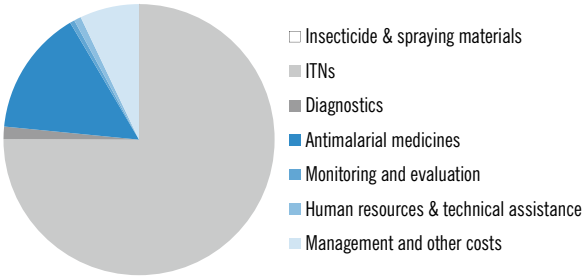
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+AQ	2004–2004	1	1	1	1	28 days

III. FINANCING – Government and external financing

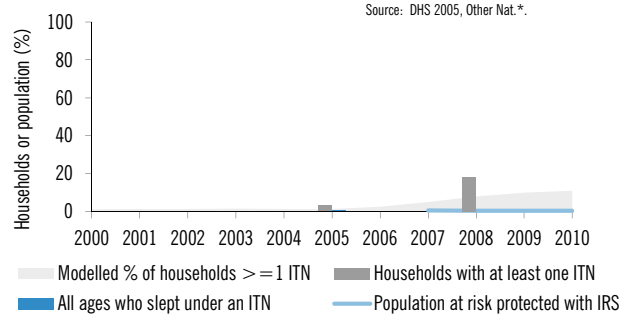


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

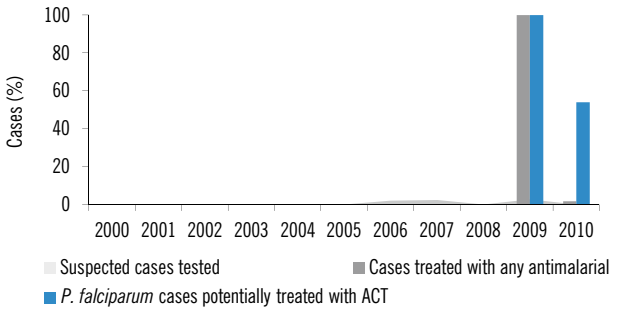
Expenditure by intervention in 2010



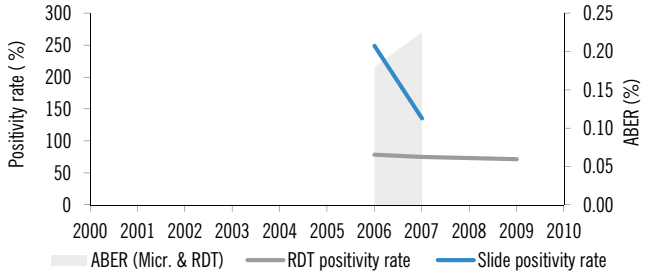
IV. COVERAGE – Coverage of ITN and IRS



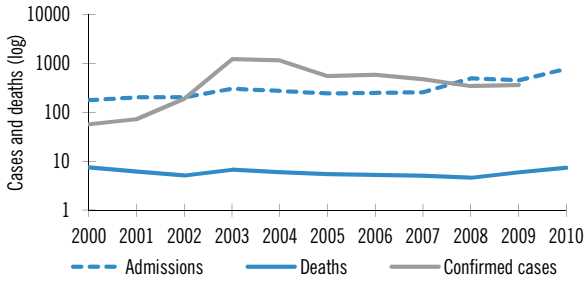
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

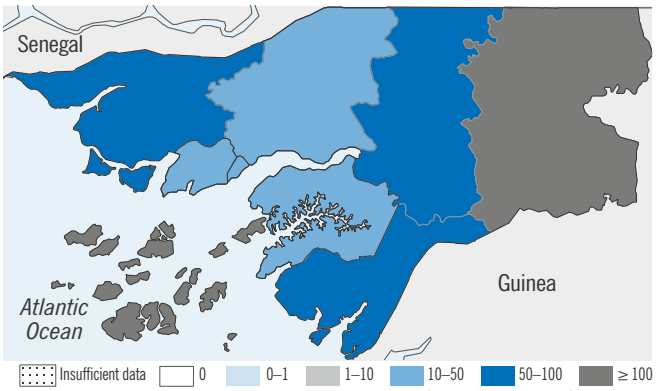


Confirmed cases, admissions and deaths (per 100 000)



Guinea-Bissau

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect >50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population), year:2009

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	1 520 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	1 520 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, arabiensis, funestus*

II. INTERVENTION POLICIES AND STRATEGIES

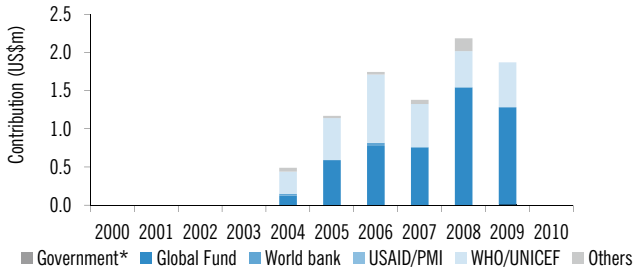
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2005
	ITNs/ LLINs: distributed to all age groups	Yes	2004
IRS	IRS is recommended	-	-
	DDT is used for IRS	-	-
IPT	IPT used to prevent malaria during pregnancy	Yes	2005
Case management	Patients of all ages should receive diagnostic test	Yes	2008
	RDTs used at community level	-	-
	ACT is free for all ages in public sector	-	-
	Pre-referral treatment with recommended medicines	Yes	2003
	Oral artemisinin-based monotherapies are not registered	-	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	-
First-line treatment of *P. falciparum*	AL	-
Treatment failure of *P. falciparum*	QN	-
Treatment of severe malaria	QN	-
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

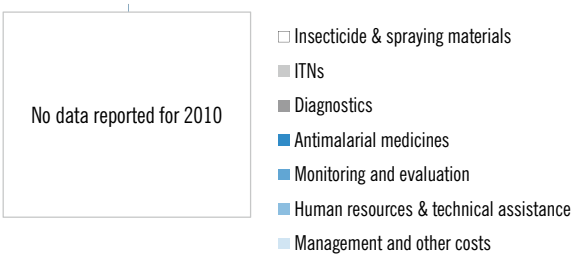
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

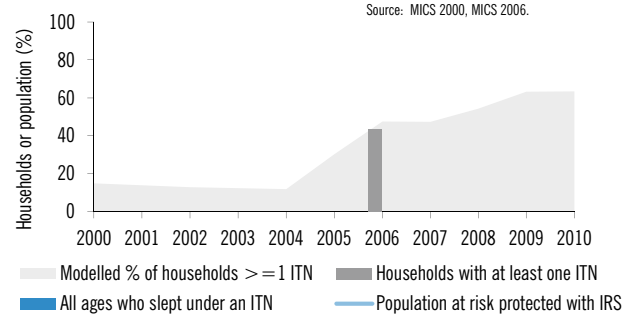


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

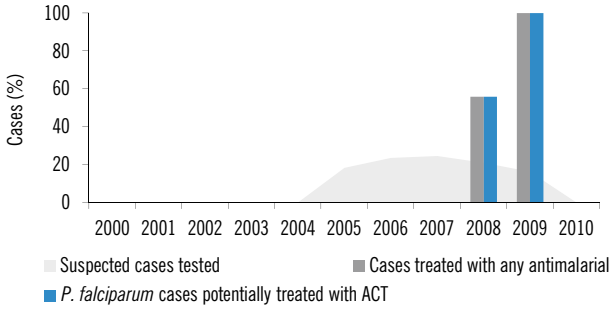
Expenditure by intervention in 2010



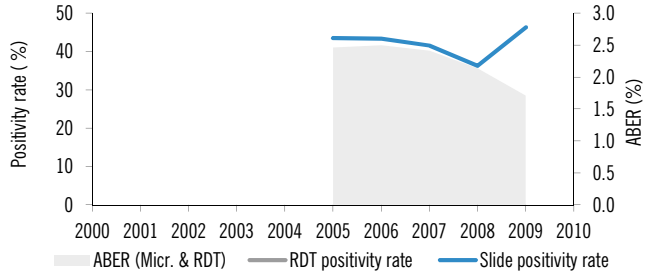
IV. COVERAGE – Coverage of ITN and IRS



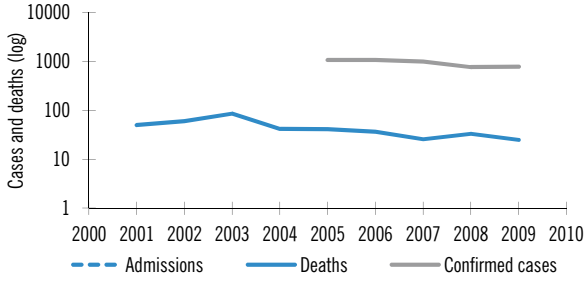
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

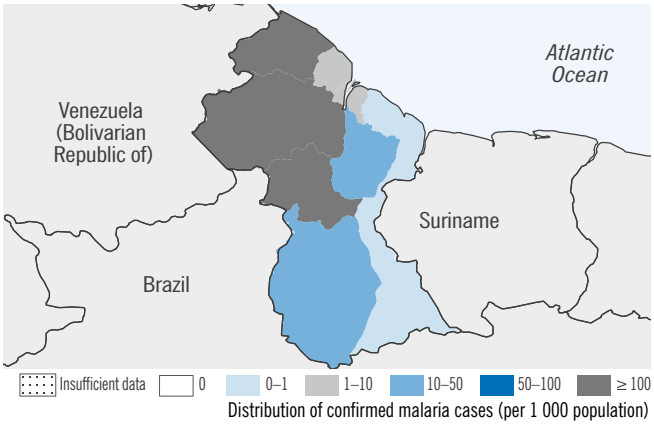


Confirmed cases, admissions and deaths (per 100 000)



Guyana

Phase: Control. Coverage: In 2010, ITNs distributed were sufficient to protect 7% of the population at high risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	264 000	35
Low transmission (0-1 cases per 1000 population)	438 000	58
Malaria-free (0 cases)	52 800	7
Total	754 800	

Parasites and vectors

Major plasmodium species: *P. falciparum* (63%), *P. vivax*
Major anopheles species: *An. darlingi, aquasalis*

II. INTERVENTION POLICIES AND STRATEGIES

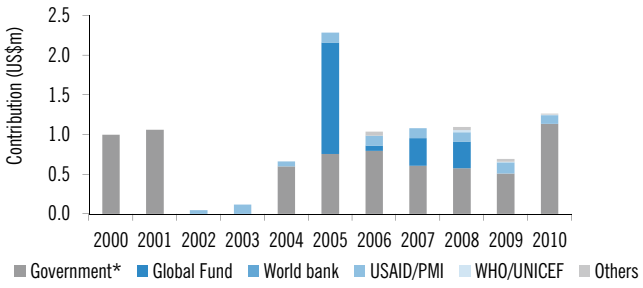
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2005
	ITNs/ LLINs: distributed to all age groups	Yes	2005
IRS	IRS is recommended	No	-
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	Patients 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	-
	Oral artemisinin-based monotherapies are not registered	No	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	AL+PQ	2004
Treatment failure of *P. falciparum*	QN+T	2004
Treatment of severe malaria	-	-
Treatment of *P. vivax*	CQ+PQ	2004

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

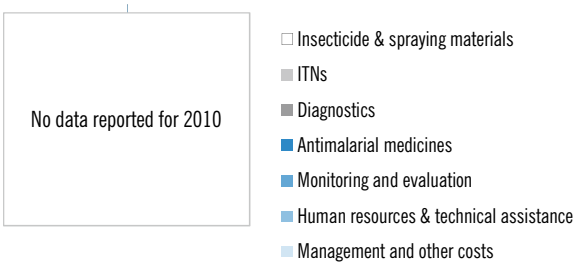
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AL	2004–2008	2	0	1.6	3.2	28 days

III. FINANCING – Government and external financing

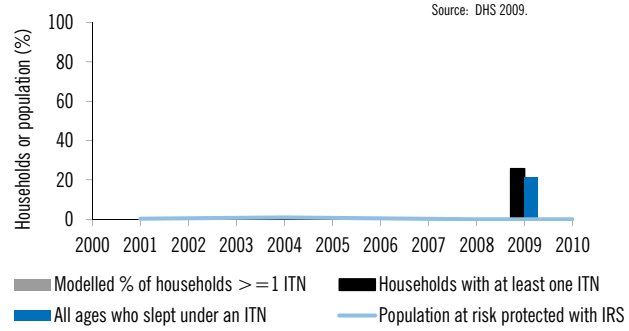


*Budget: costs for sub-national level, health systems, etc not included.

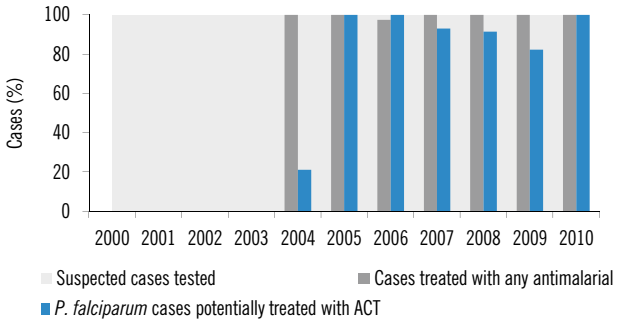
Expenditure by intervention in 2010



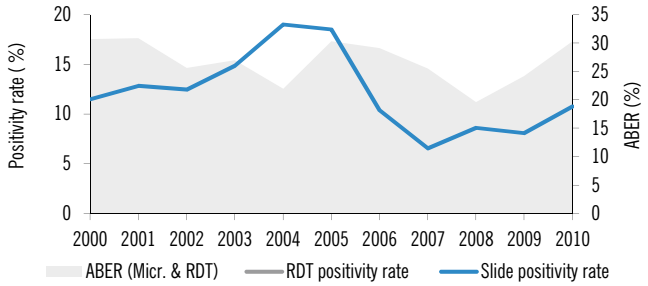
IV. COVERAGE – Coverage of ITN and IRS



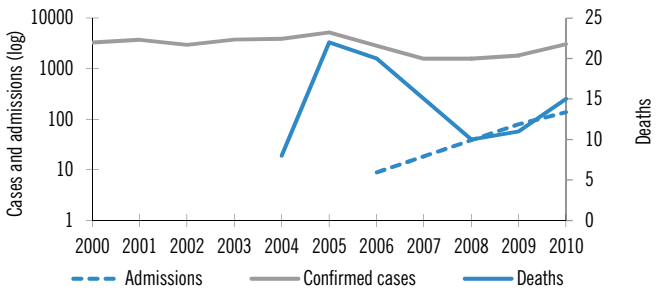
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

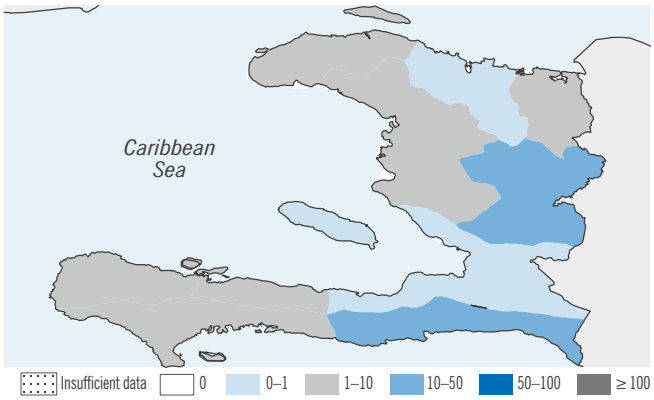


Confirmed cases, admissions (per 100 000) and deaths



Haiti

Phase: Control.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	5 300 000	53
Low transmission (0-1 cases per 1000 population)	4 700 000	47
Malaria-free (0 cases)	0	0
Total	10 000 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species:

II. INTERVENTION POLICIES AND STRATEGIES

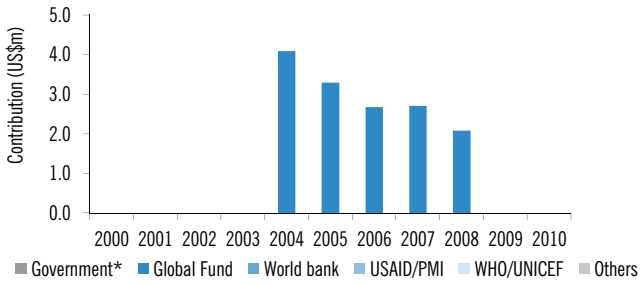
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	No	-
	ITNs/ LLINs: distributed to all age groups	Yes	2005
IRS	IRS is recommended	-	-
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	Patients of all ages should receive diagnostic test	Yes	-
	RDTs used at community level	-	-
	ACT is free for all ages in public sector	-	-
	Pre-referral treatment with recommended medicines	No	-
	Oral artemisinin-based monotherapies are not registered	-	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	CQ+PQ	-
Treatment failure of *P. falciparum*	-	-
Treatment of severe malaria	-	-
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing



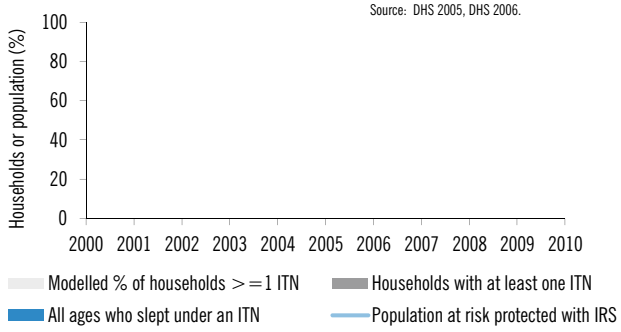
*Expenditure: costs for sub-national level, health systems, etc not included.

Expenditure by intervention in 2010

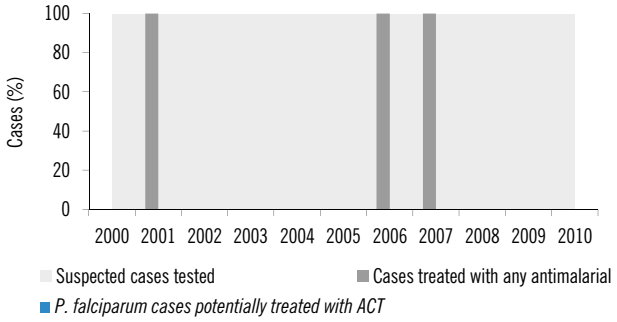
No data reported for 2010

- Insecticide & spraying materials
- ITNs
- Diagnostics
- Antimalarial medicines
- Monitoring and evaluation
- Human resources & technical assistance
- Management and other costs

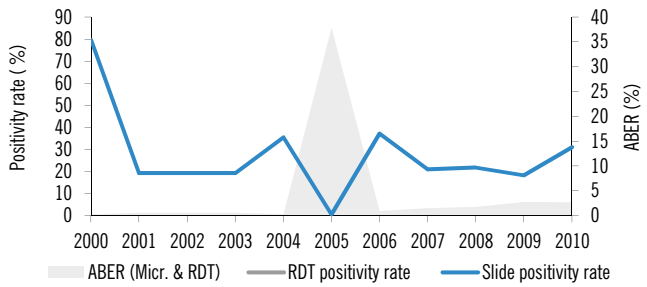
IV. COVERAGE – Coverage of ITN and IRS



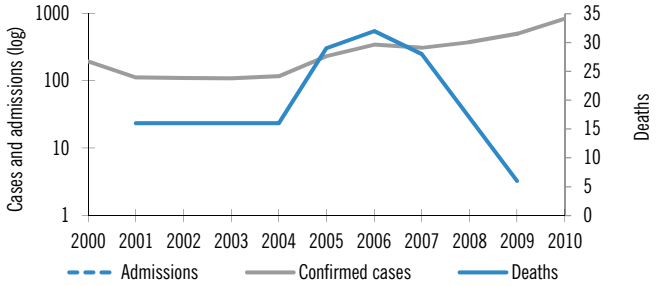
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

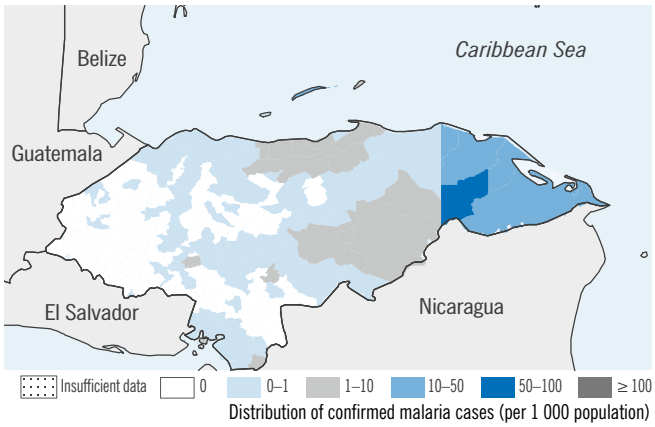


Confirmed cases, admissions (per 100 000) and deaths



Honduras

Phase: Control. Coverage: In 2010, IRS was sufficient to protect 6% of the population at high risk; ITN/LLINs delivered were sufficient to protect 1% of the population at high risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	1 060 000	14
Low transmission (0-1 cases per 1000 population)	4 470 000	59
Malaria-free (0 cases)	2 070 000	27
Total	7 600 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (10%), *P. vivax*
Major anopheles species: *An. albimanus, darlingi, pseudopunctipennis, aquasalis*

II. INTERVENTION POLICIES AND STRATEGIES

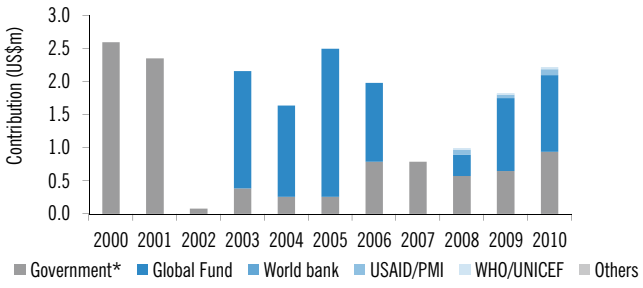
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2009
	ITNs/ LLINs: distributed to all age groups	Yes	2009
IRS	IRS is recommended	Yes	-
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	Patients 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	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	CQ+PQ	-
Treatment failure of *P. falciparum*	SP	-
Treatment of severe malaria	QN	-
Treatment of *P. vivax*	CQ+PQ	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

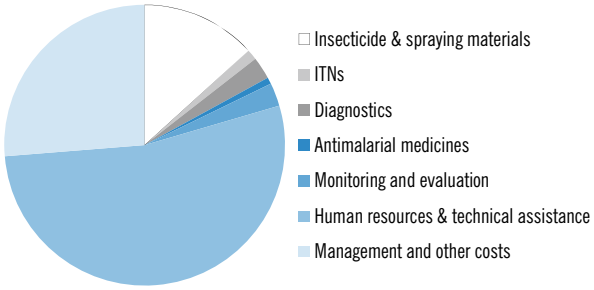
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
CQ	2008–2009	1	0	0	0	28 days

III. FINANCING – Government and external financing

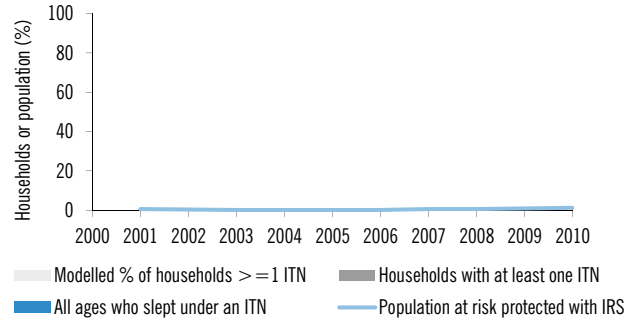


*Budget: costs for sub-national level, health systems, etc not included.

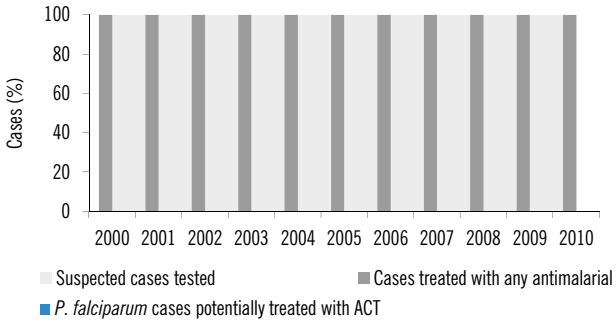
Expenditure by intervention in 2010



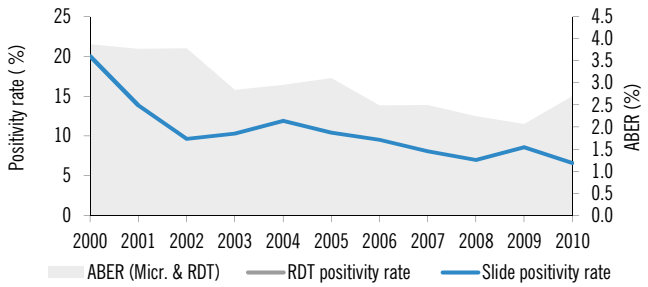
IV. COVERAGE – Coverage of ITN and IRS



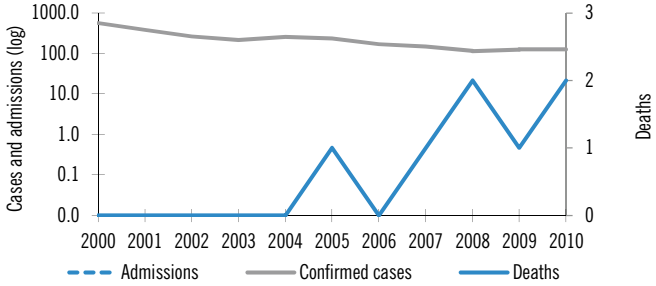
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

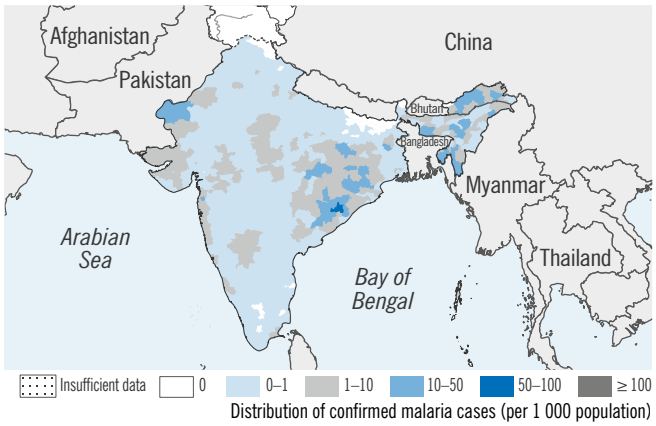


Confirmed cases, admissions (per 100 000) and deaths



India

Phase: Control.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	318 000 000	26
Low transmission (0-1 cases per 1000 population)	686 000 000	56
Malaria-free (0 cases)	220 000 000	18
Total	1224 000 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (52%), *P. vivax*
Major anopheles species: *An. stephensi, culicifacies, fluviatilis, minimus, dirus, annularis*

II. INTERVENTION POLICIES AND STRATEGIES

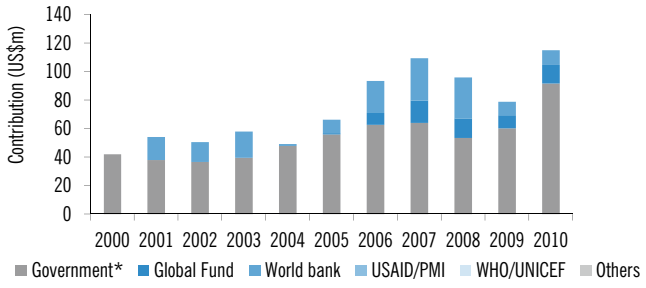
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2001
	ITNs/ LLINs: distributed to all age groups	Yes	2001
IRS	IRS is recommended	Yes	1953
	DDT is used for IRS	Yes	1953
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	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

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	CQ	2007
First-line treatment of *P. falciparum*	AS+SP	2007
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 (therapeutic or parasitological failure, %)

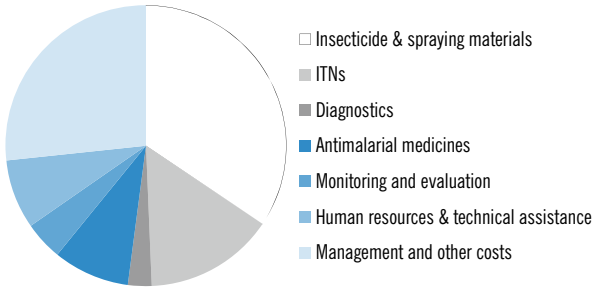
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+SP	2005–2007	9	0	0	4	28 days

III. FINANCING – Government and external financing

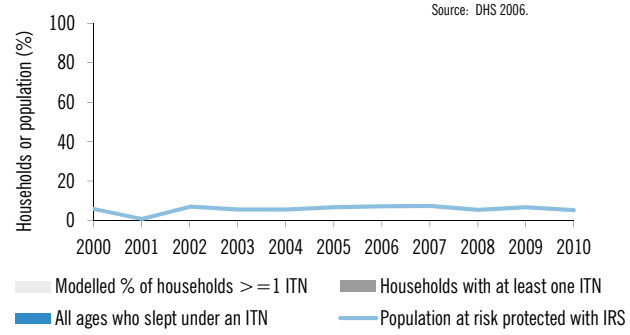


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

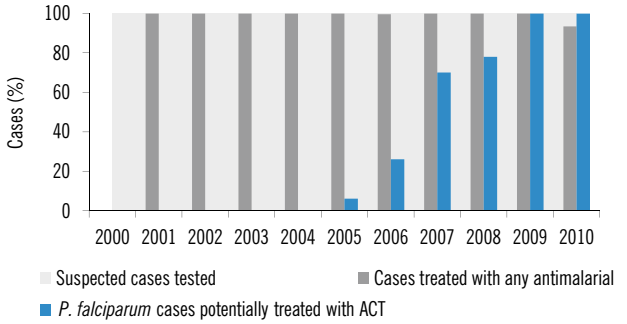
Expenditure by intervention in 2010



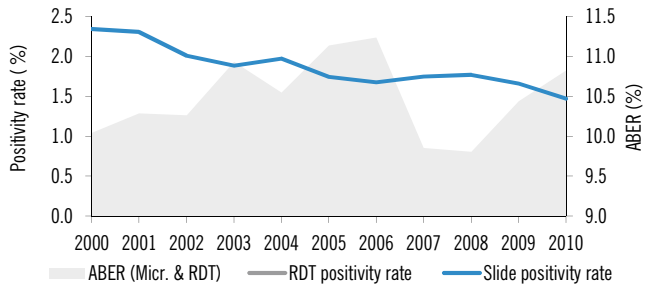
IV. COVERAGE – Coverage of ITN and IRS



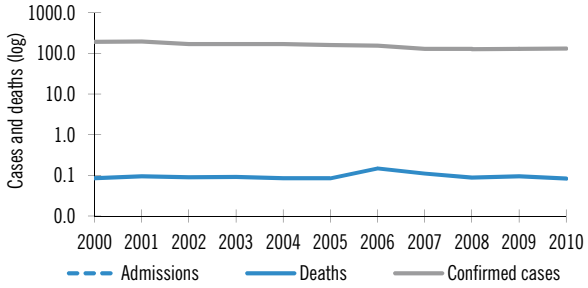
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

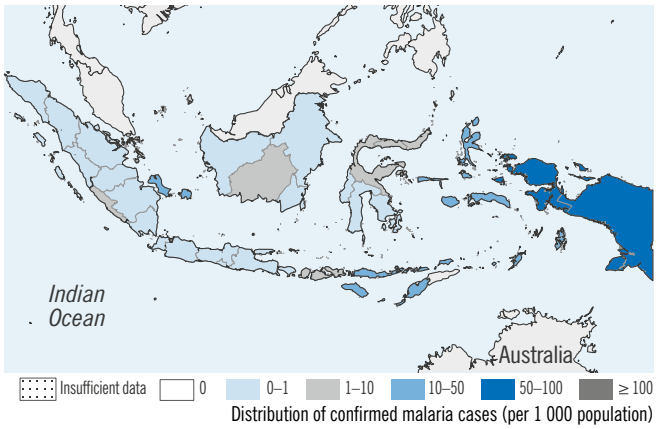


Confirmed cases, admissions and deaths (per 100 000)



Indonesia

Phase: Control.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	88 800 000	37
Low transmission (0-1 cases per 1000 population)	16 800 000	7
Malaria-free (0 cases)	134 000 000	56
Total	239 600 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (53%), *P. vivax*

Major anopheles species: *An. sundaicus, balabacensis, maculatus, Maculatus, farauti, subpictus*

II. INTERVENTION POLICIES AND STRATEGIES

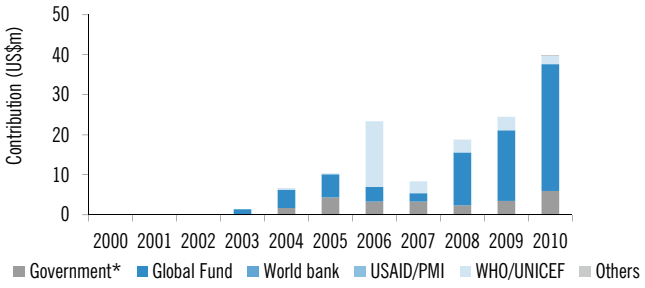
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2006
	ITNs/ LLINs: distributed to all age groups	No	-
IRS	IRS is recommended	Yes	1959
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	Patients 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	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	AS-AQ/DHA-PP+PQ	2008
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 (therapeutic or parasitological failure, %)

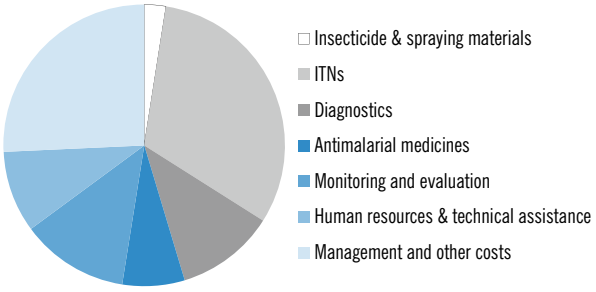
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+AQ	2003–2006	8	0	8.8	24.1	28 days
DHA-PPQ	2004–2008	3	2.7	4.1	4.8	42 days

III. FINANCING – Government and external financing

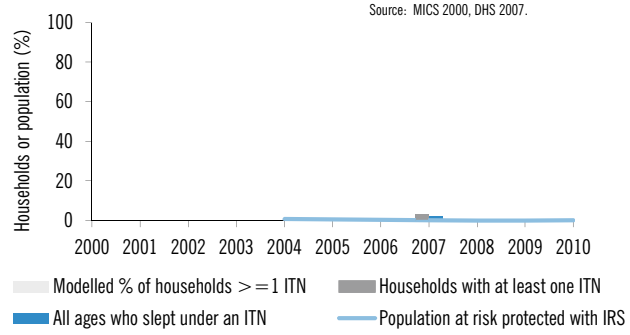


*Budget: costs for sub-national level, health systems, human resources, etc not included.

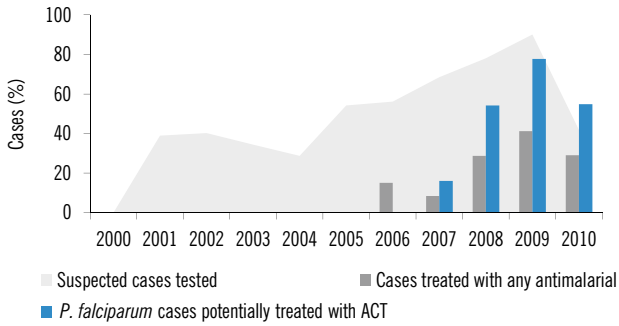
Expenditure by intervention in 2010



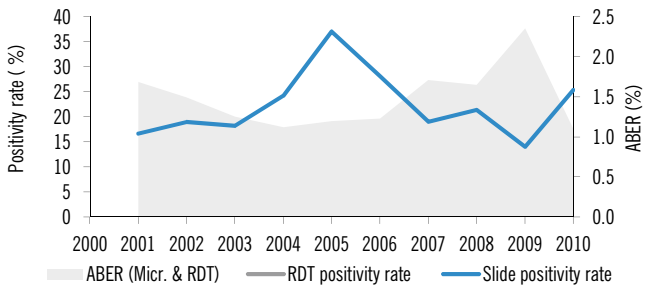
IV. COVERAGE – Coverage of ITN and IRS



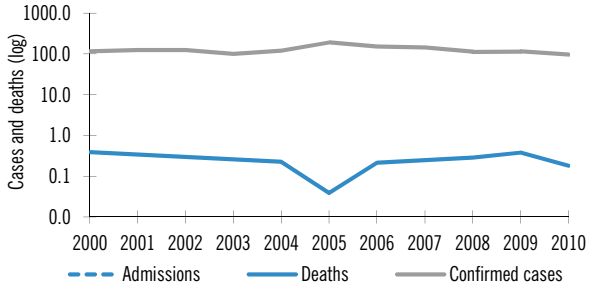
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

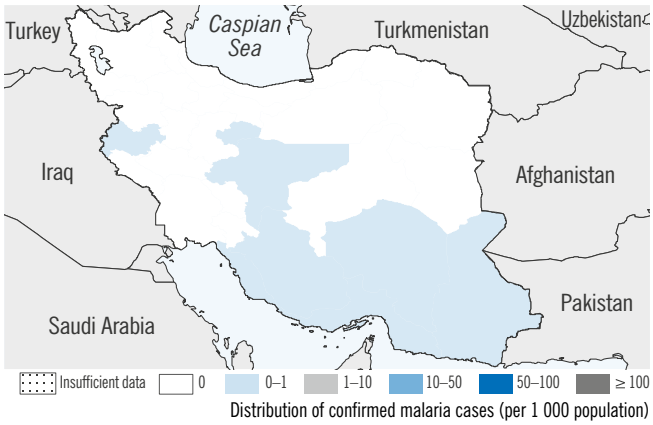


Confirmed cases, admissions and deaths (per 100 000)



Iran (Islamic Republic of)

Phase: Pre-elimination.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
Number of active foci	564	
Number of people living within active foci	2 310 000	3
Number of people living in malaria-free areas	71 700 000	97
Total	74 010 000	

Parasites and vectors

Major Plasmodium species: *P. falciparum* (14%), *P. vivax*
Major Anopheles species: *An.stephensi, culicifacies, fluviatilis, superpictus*

II. INTERVENTION POLICIES AND STRATEGIES

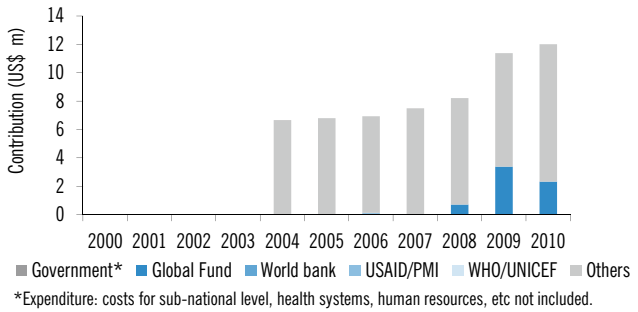
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2005
	ITNs/ LLINs: distributed to all age groups	Yes	2005
IRS	IRS is recommended	Yes	-
	DDT is used for IRS	No	-
Case management	Malaria diagnosis is free of charge in the public sector	Yes	-
	Gametocidal treatment of P.falciparum cases	No	-
	Radical treatment of P. vivax cases	Yes	-
Surveillance	Foci and case investigation undertaken	Yes	2010
	Case reporting from private sector is mandatory	Yes	1981

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum* (confirmed)	AS+SP	2006
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 (therapeutic or parasitological failure, %)

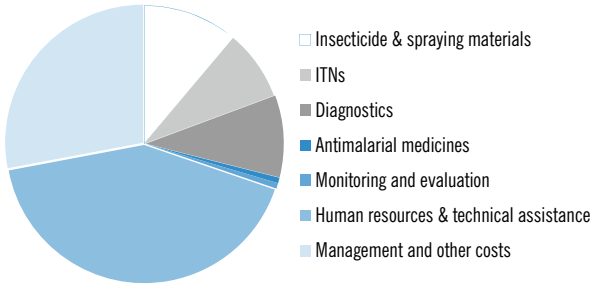
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+SP	2005–2007	4	0	0	0	28 days

III. FINANCING – Government and external financing

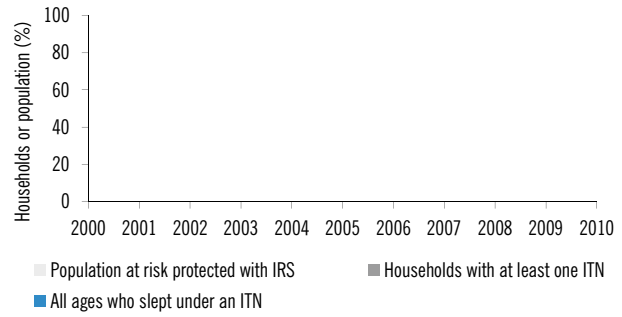


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

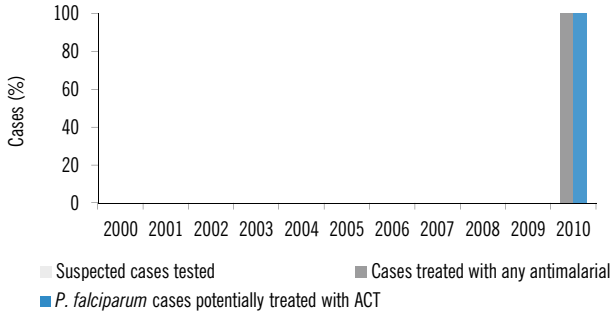
Expenditure by intervention in 2010



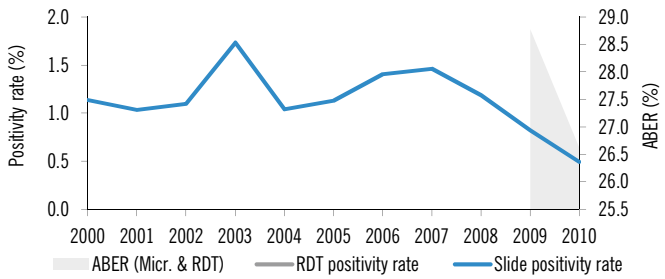
IV. COVERAGE – Coverage of ITN and IRS



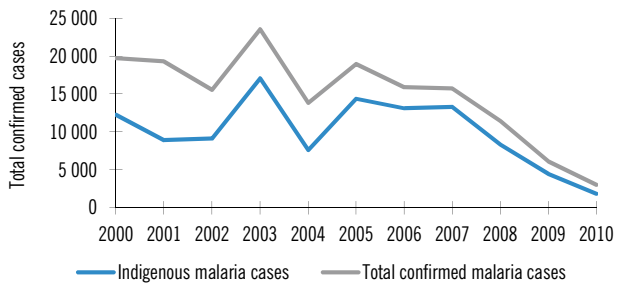
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

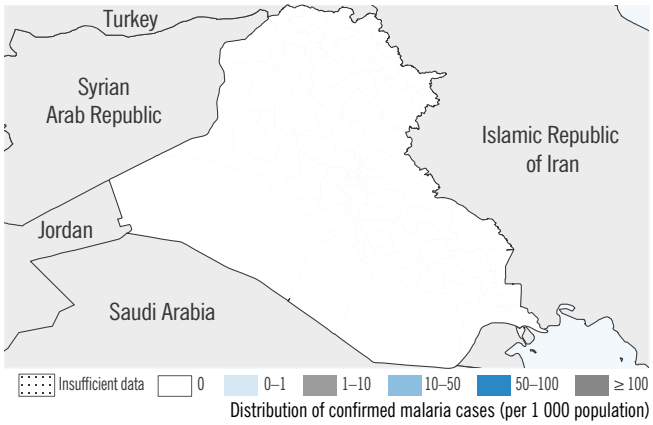


Total confirmed malaria cases and indigenous cases



Iraq

Phase: Prevention of reintroduction. Coverage: In 2010, IRS was sufficient to protect 25%–50% of the population at high risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
Number of active foci	0	
Number of people living within active foci	0	0
Number of people living in malaria-free areas	31 700 000	100
Total	31 700 000	

Parasites and vectors

Major Plasmodium species: *P. vivax*
Major Anopheles species: *An.stephensi, superpictus, pulcherrimus*

II. INTERVENTION POLICIES AND STRATEGIES

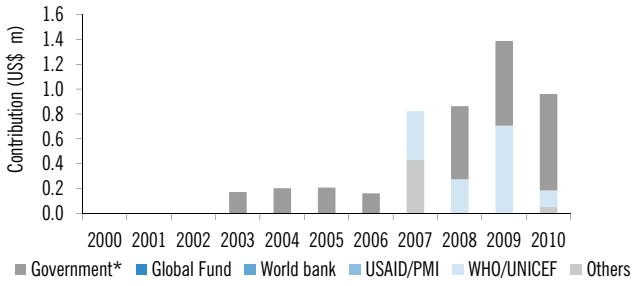
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	No	-
	ITNs/ LLINs: distributed to all age groups	Yes	2005
IRS	IRS is recommended	-	-
	DDT is used for IRS	No	-
Case management	Malaria diagnosis is free of charge in the public sector	Yes	1957
	Gametocidal treatment of P.falciparum cases	Yes	-
	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

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum* (confirmed)	AL	2006
Treatment failure of *P. falciparum*	QN+D	2006
Treatment of severe malaria	QN	-
Treatment of *P. vivax*	CQ+PQ(14d)	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

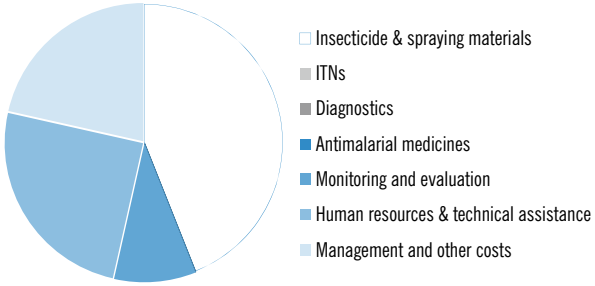
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing



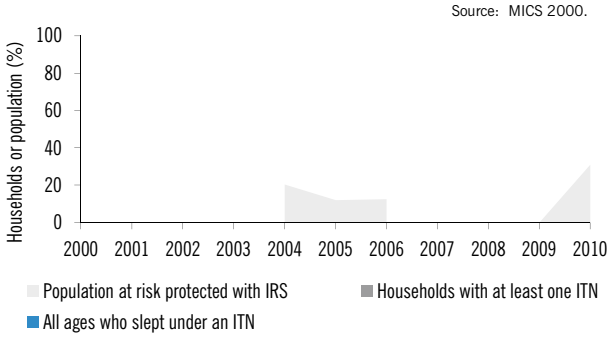
*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2010

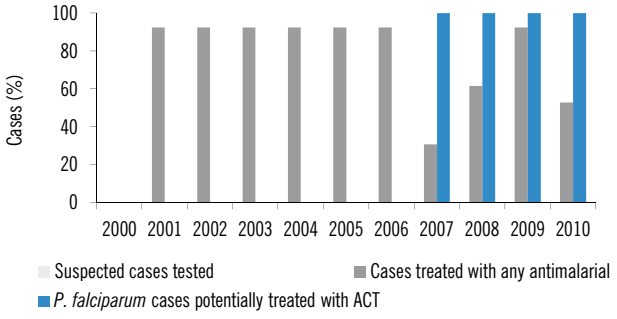


IV. COVERAGE – Coverage of ITN and IRS

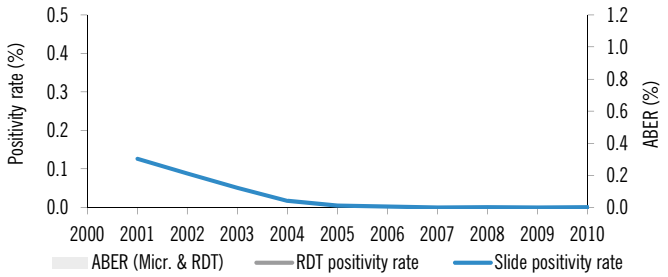
Source: MICS 2000.



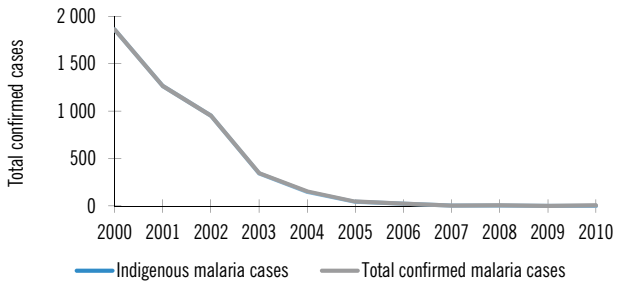
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

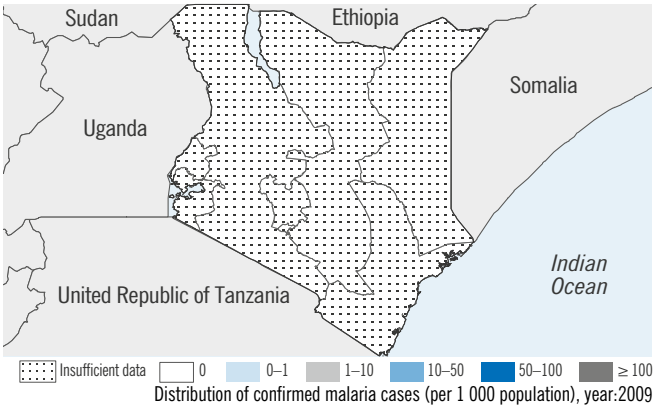


Total confirmed malaria cases and indigenous cases



Kenya

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect 25%–50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population), year:2009

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	14 600 000	36
Low transmission (0-1 cases per 1000 population)	16 200 000	40
Malaria-free (0 cases)	9 720 000	24
Total	40 520 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, arabiensis, funestus, merus*

II. INTERVENTION POLICIES AND STRATEGIES

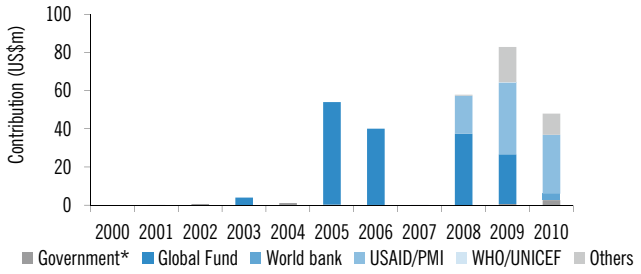
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2006
	ITNs/ LLINs: distributed to all age groups	Yes	2010
IRS	IRS is recommended	Yes	-
	DDT is used for IRS	-	-
IPT	IPT used to prevent malaria during pregnancy	Yes	2001
Case management	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
	Oral artemisinin-based monotherapies are not registered	Yes	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2004
First-line treatment of *P. falciparum*	AL	2004
Treatment failure of *P. falciparum*	QN	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

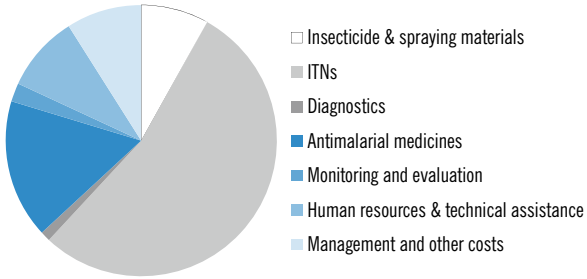
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AL	2002–2008	12	0	2.65	6.6	28 days

III. FINANCING – Government and external financing

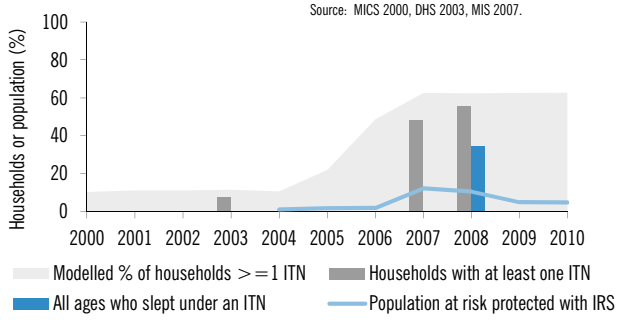


*Budget: costs for sub-national level, health systems, human resources, etc not included.

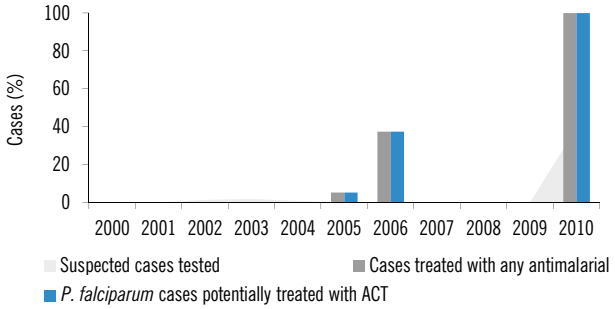
Expenditure by intervention in 2010



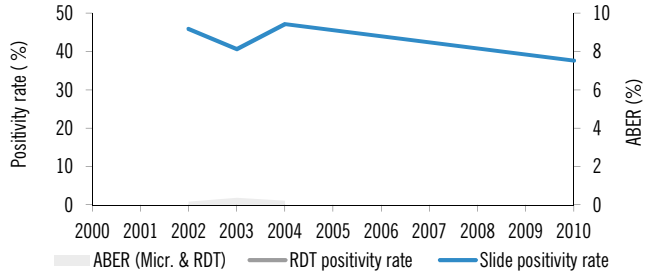
IV. COVERAGE – Coverage of ITN and IRS



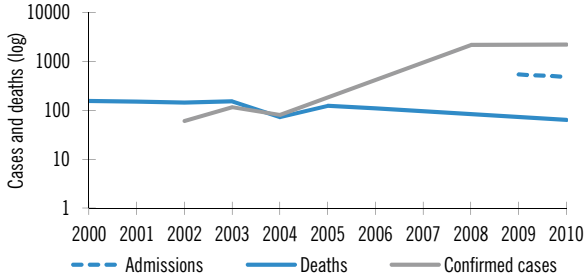
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

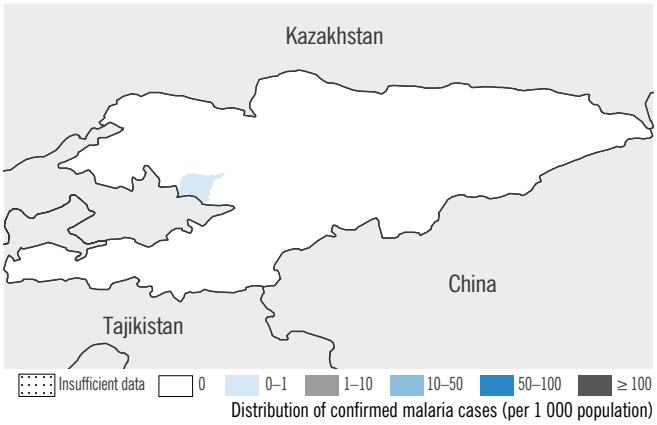


Confirmed cases, admissions and deaths (per 100 000)



Kyrgyzstan

Phase: Elimination. Only 3 indigenous malaria cases were reported in the country in 2010. 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)	2010	%
Number of active foci	2	
Number of people living within active foci	22 900	0
Number of people living in malaria-free areas	5 310 000	100
Total	5 332 900	

Parasites and vectors

Major Plasmodium species: *P. vivax*
Major Anopheles species: *An.superpictus, pulcherrimus, claviger*

II. INTERVENTION POLICIES AND STRATEGIES

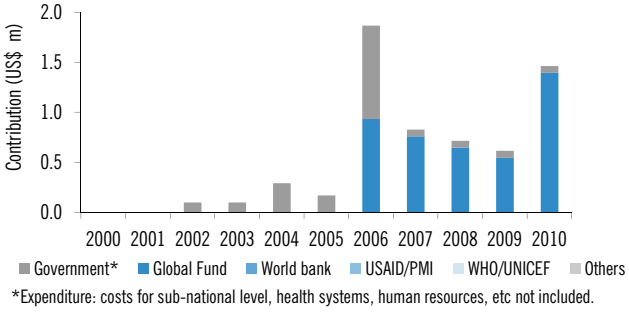
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2003
	ITNs/ LLINs: distributed to all age groups	Yes	2006
IRS	IRS is recommended	Yes	2002
	DDT is used for IRS	No	-
Case management	Malaria diagnosis is free of charge in the public sector	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	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum* (confirmed)	-	-
Treatment failure of *P. falciparum*	-	-
Treatment of severe malaria	-	-
Treatment of *P. vivax*	CQ+PG(14d)	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

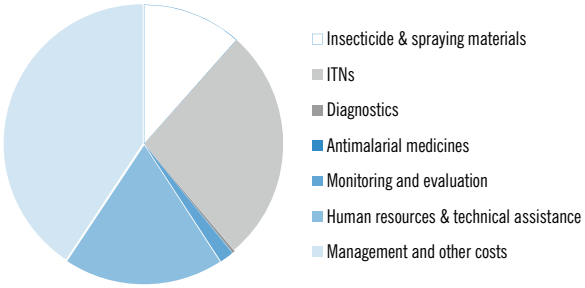
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

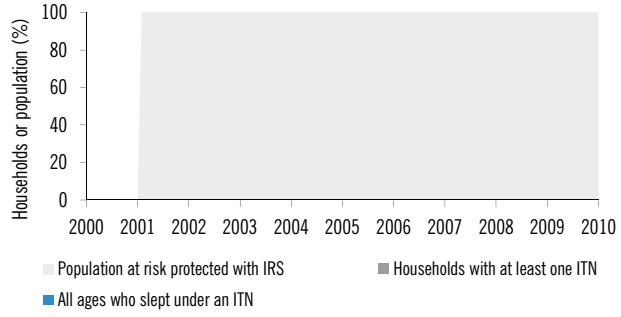


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

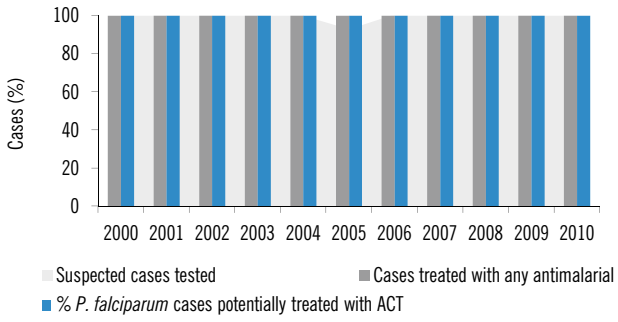
Expenditure by intervention in 2010



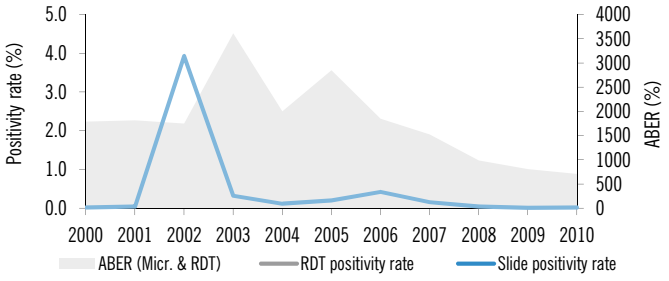
IV. COVERAGE – Coverage of ITN and IRS



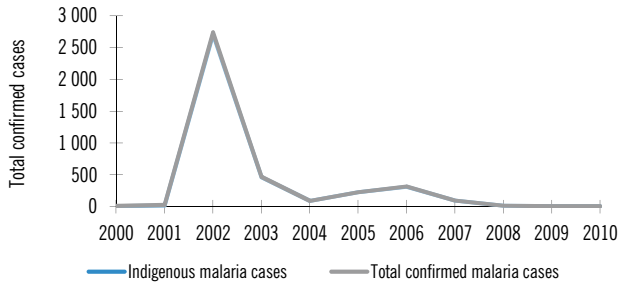
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

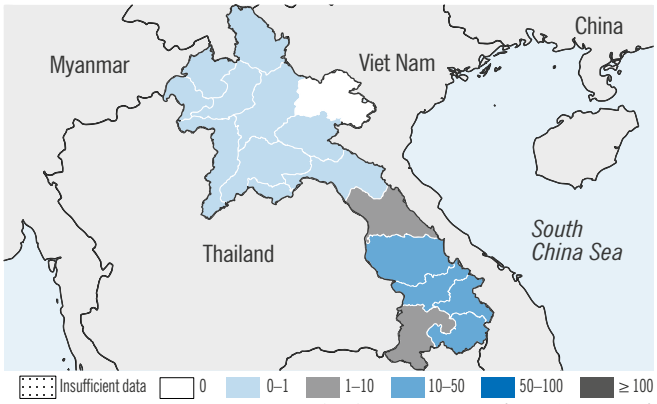


Total confirmed malaria cases and indigenous cases



Lao People's Democratic Republic

Phase: Pre-elimination. Coverage: In 2010, IRS was sufficient to protect >50% of the population at high risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	2 230 000	36
Low transmission (0-1 cases per 1000 population)	1 430 000	23
Malaria-free (0 cases)	2 540 000	41
Total	6 200 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (97%), *P. vivax*
Major anopheles species: *An. minimus, dirus, maculatus, jeyporiensis*

II. INTERVENTION POLICIES AND STRATEGIES

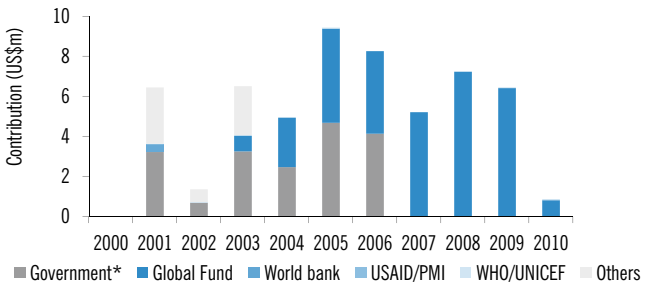
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2003
	ITNs/ LLINs: distributed to all age groups	Yes	2000
IRS	IRS is recommended	Yes	2010
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	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

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	AL	2001
Treatment failure of *P. falciparum*	QN+D	2001
Treatment of severe malaria	AS+AL	2001
Treatment of *P. vivax*	CQ+PQ(14d)	2001

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

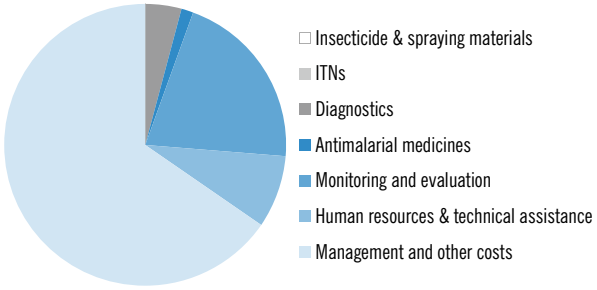
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AL	2002–2006	4	0	1.55	6.3	28 days

III. FINANCING – Government and external financing

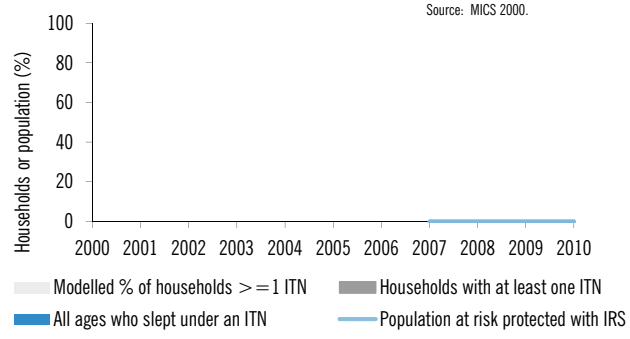


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

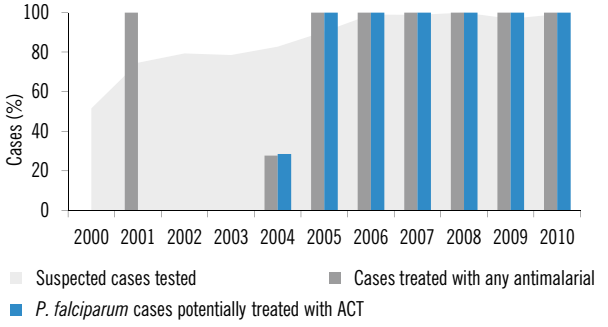
Expenditure by intervention in 2010



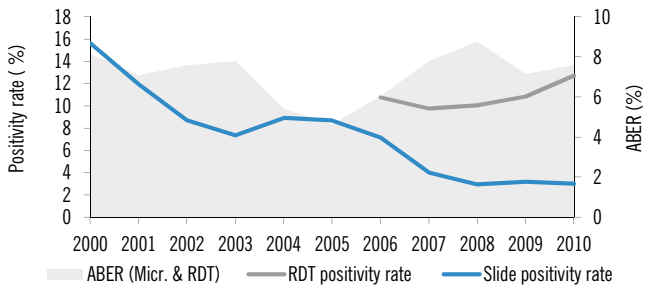
IV. COVERAGE – Coverage of ITN and IRS



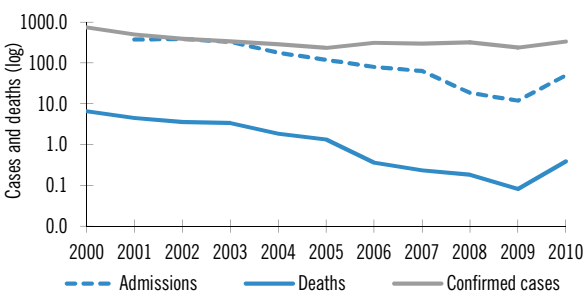
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

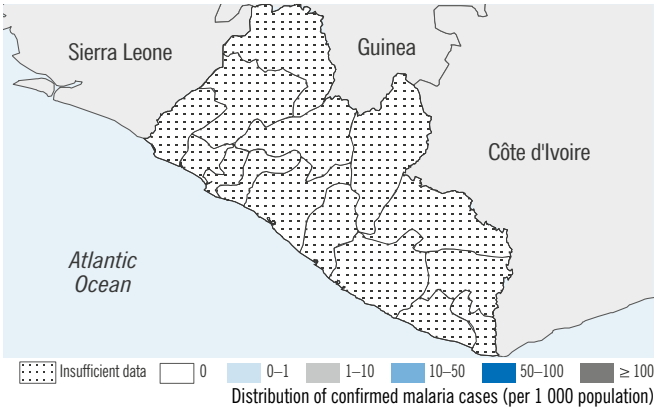


Confirmed cases, admissions and deaths (per 100 000)



Liberia

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect >50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	3 990 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	3 990 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae*

II. INTERVENTION POLICIES AND STRATEGIES

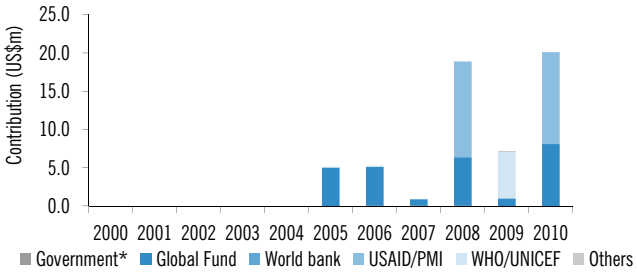
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2005
	ITNs/ LLINs: distributed to all age groups	Yes	2008
IRS	IRS is recommended	Yes	2009
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	Yes	2005
Case management	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	2005
	Pre-referral treatment with recommended medicines	Yes	2005
	Oral artemisinin-based monotherapies are not registered	No	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2004
First-line treatment of *P. falciparum*	AS+AQ	2004
Treatment failure of *P. falciparum*	QN	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

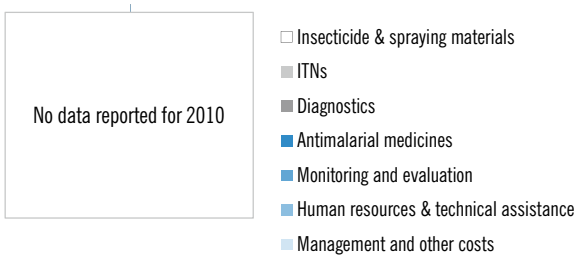
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+AQ	2007–2007	2	0	0	0	28 days

III. FINANCING – Government and external financing

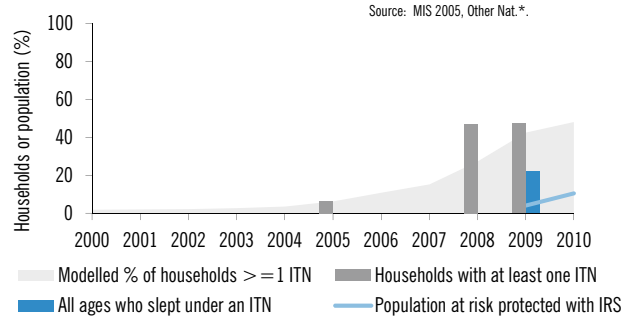


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

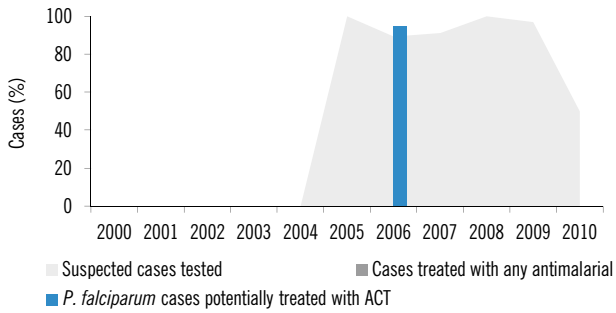
Expenditure by intervention in 2010



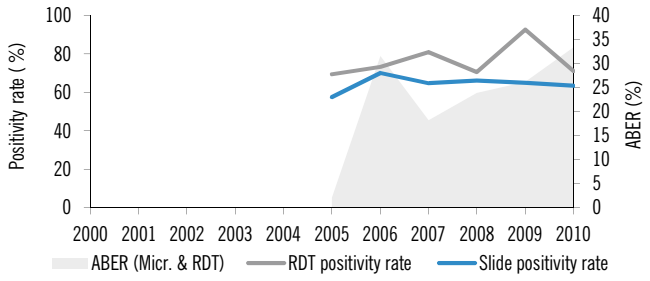
IV. COVERAGE – Coverage of ITN and IRS



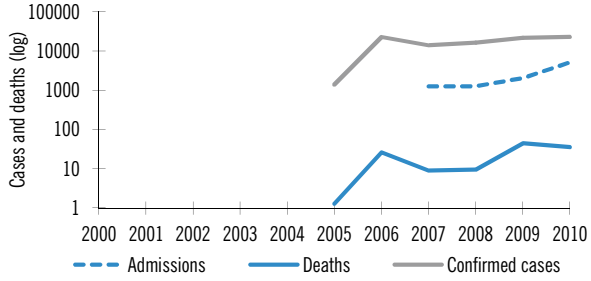
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

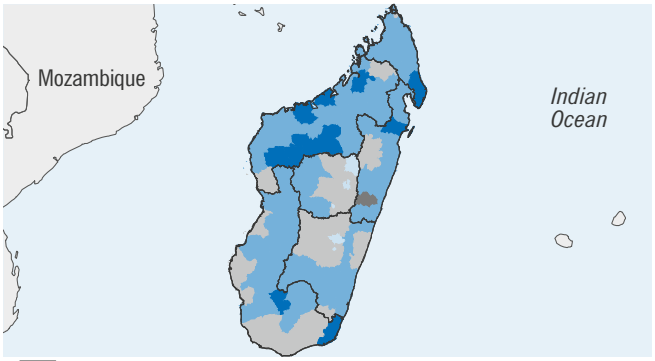


Confirmed cases, admissions and deaths (per 100 000)



Madagascar

Phase: Control. Coverage: In 2010, IRS was sufficient to protect 25%–50% of the population at risk; ITN/LLINs delivered were sufficient to protect >50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	6 210 000	30
Low transmission (0-1 cases per 1000 population)	14 500 000	70
Malaria-free (0 cases)	0	0
Total	20 710 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, arabiensis, funestus*

II. INTERVENTION POLICIES AND STRATEGIES

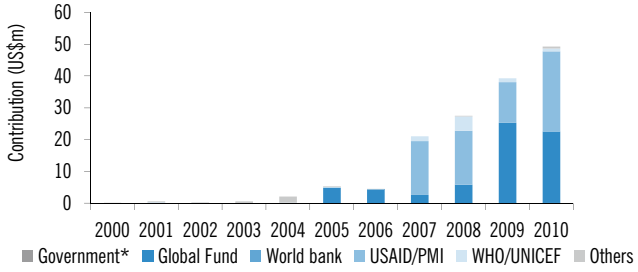
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2004
	ITNs/ LLINs: distributed to all age groups	Yes	2009
IRS	IRS is recommended	Yes	1993
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	Yes	2006
Case management	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	-
	Oral artemisinin-based monotherapies are not registered	No	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2006
First-line treatment of *P. falciparum*	AS+AQ	2006
Treatment failure of *P. falciparum*	QN	2006
Treatment of severe malaria	QN	2006
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

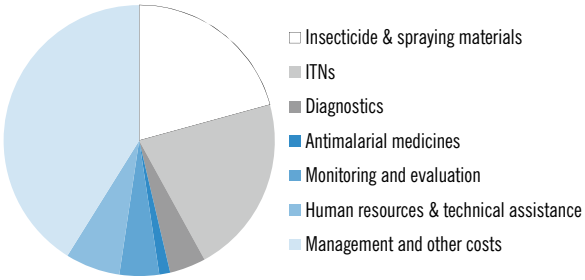
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+AQ	2006–2007	10	0	0	8.7	28 days

III. FINANCING – Government and external financing

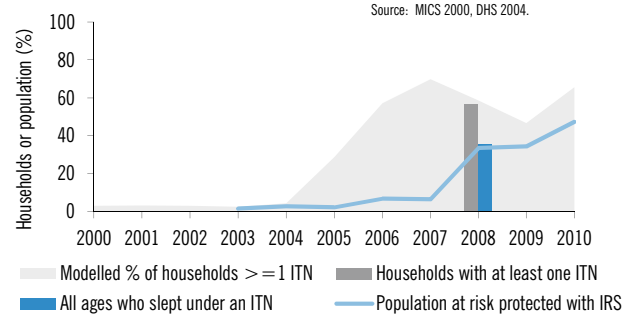


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

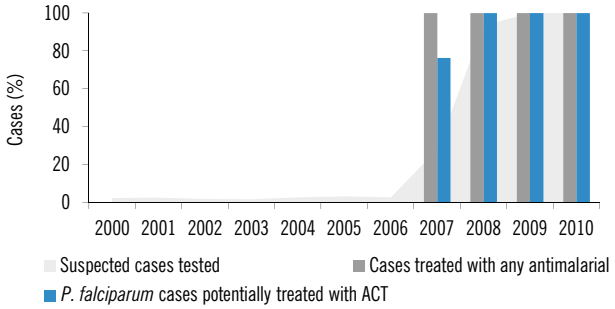
Expenditure by intervention in 2010



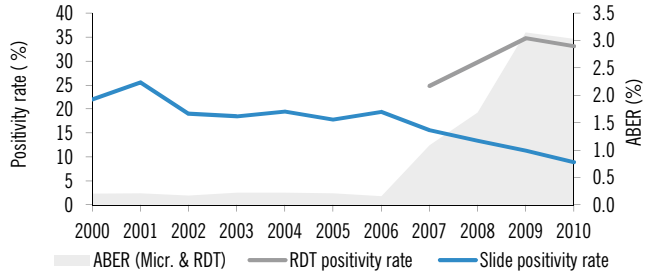
IV. COVERAGE – Coverage of ITN and IRS



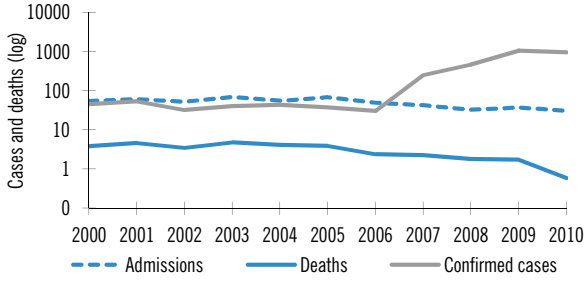
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

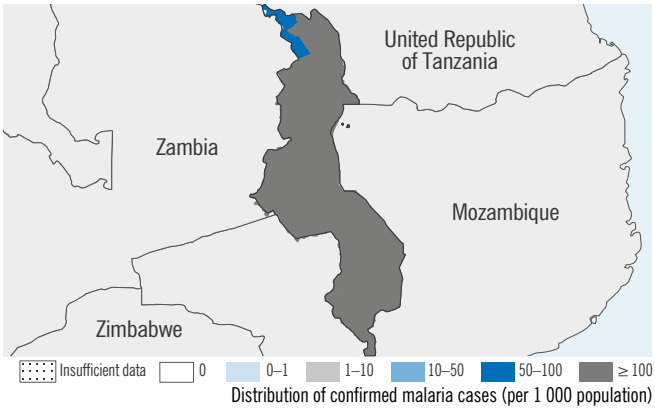


Confirmed cases, admissions and deaths (per 100 000)



Malawi

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect >50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	14 900 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	14 900 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, arabiensis, funestus*

II. INTERVENTION POLICIES AND STRATEGIES

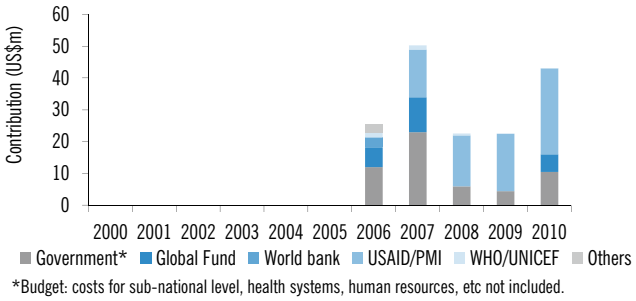
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2006
	ITNs/ LLINs: distributed to all age groups	Yes	2010
IRS	IRS is recommended	Yes	2007
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	Yes	1993
Case management	Patients of all ages should receive diagnostic test	No	-
	RDTs used at community level	No	-
	ACT is free for all ages in public sector	No	-
	Pre-referral treatment with recommended medicines	Yes	2009
	Oral artemisinin-based monotherapies are not registered	Yes	2009

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2007
First-line treatment of *P. falciparum*	AL	2007
Treatment failure of *P. falciparum*	AS+AQ	2007
Treatment of severe malaria	QN	2007
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

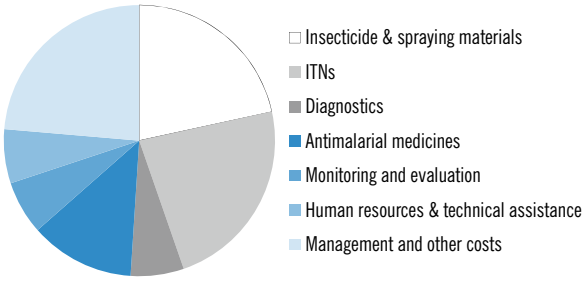
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+AQ	2005–2005	2	0	1.8	3.6	28 days
AL	2005–2005	1	7.1	7.1	7.1	28 days

III. FINANCING – Government and external financing

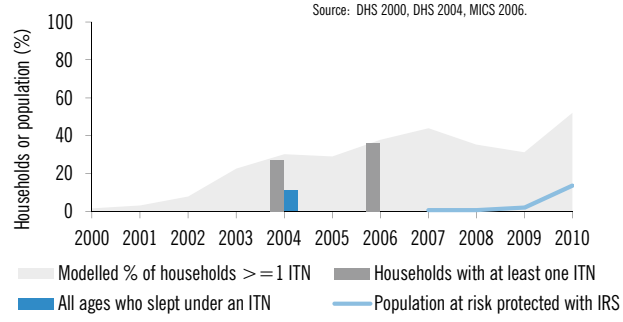


*Budget: costs for sub-national level, health systems, human resources, etc not included.

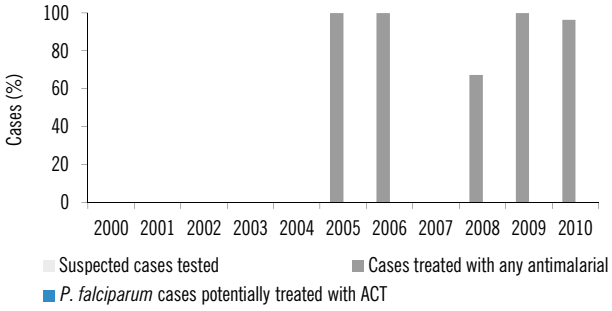
Expenditure by intervention in 2010



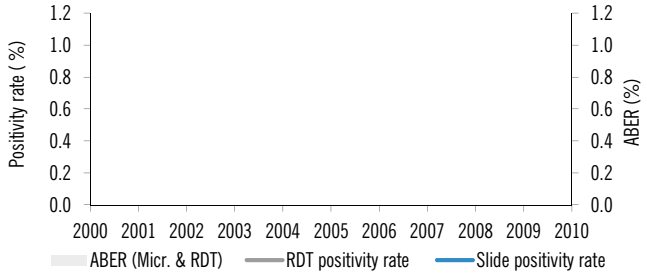
IV. COVERAGE – Coverage of ITN and IRS



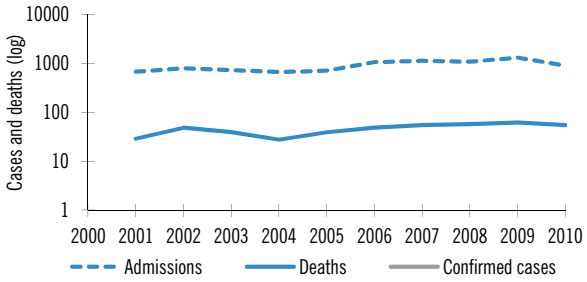
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER



Confirmed cases, admissions and deaths (per 100 000)



Malaysia

Phase: Pre-elimination. Coverage: In 2010, IRS was sufficient to protect 25%–50% of the population at high risk; ITN/LLINs delivered were sufficient to protect >50% of the population at high risk.

Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
Number of active foci	3 198	
Number of people living within active foci	760 000	3
Number of people living in malaria-free areas	27 600 000	97
Total	28 360 000	

Parasites and vectors

Major Plasmodium species: *P. falciparum* (28%), *P. vivax*
Major Anopheles species: *An.donaldi, balabacensis, maculatus*

II. INTERVENTION POLICIES AND STRATEGIES

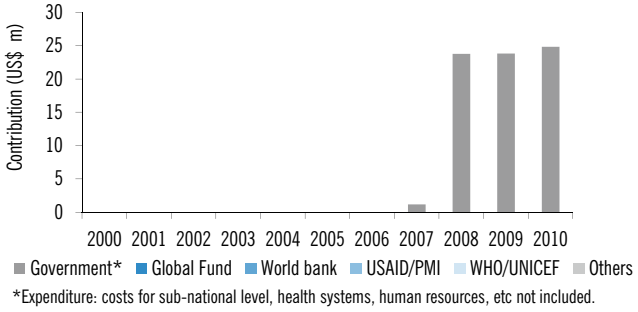
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	1995
	ITNs/ LLINs: distributed to all age groups	Yes	1995
IRS	IRS is recommended	-	-
	DDT is used for IRS	No	-
Case management	Malaria diagnosis is free of charge in the public sector	Yes	1967
	Gametocidal treatment of P.falciparum cases	No	-
	Radical treatment of P. vivax cases	Yes	-
Surveillance	Foci and case investigation undertaken	Yes	-
	Case reporting from private sector is mandatory	Yes	1988

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum* (confirmed)	AS+MQ	-
Treatment failure of *P. falciparum*	QN+T	-
Treatment of severe malaria	QN+T	-
Treatment of *P. vivax*	CQ+PQ(14d)	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

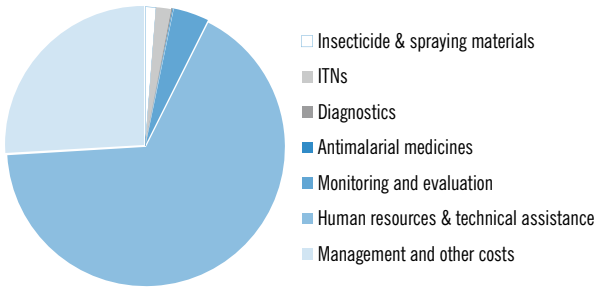
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

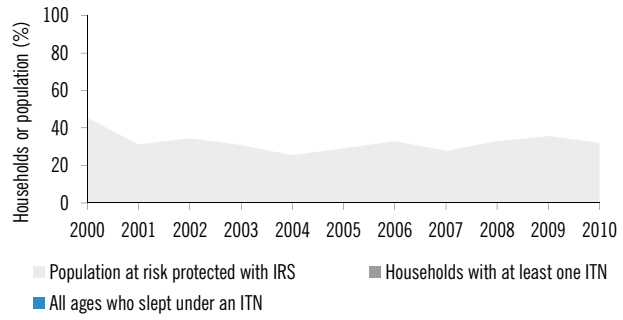


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

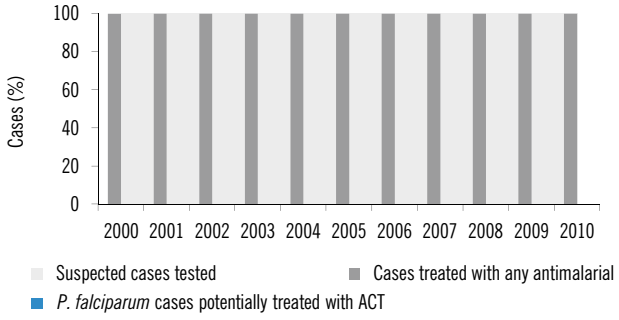
Expenditure by intervention in 2010



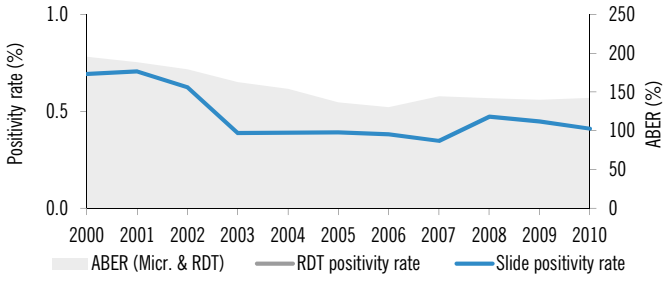
IV. COVERAGE – Coverage of ITN and IRS



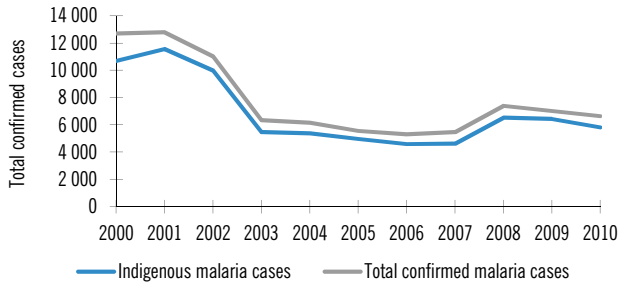
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

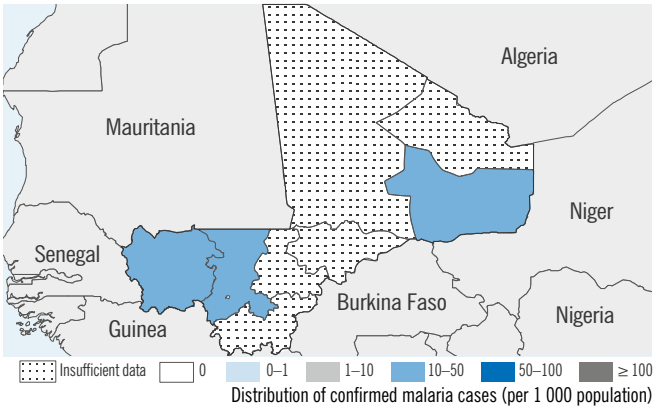


Total confirmed malaria cases and indigenous cases



Mali

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect >50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	13 800 000	90
Low transmission (0-1 cases per 1000 population)	1 540 000	10
Malaria-free (0 cases)	0	0
Total	15 340 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, funestus*

II. INTERVENTION POLICIES AND STRATEGIES

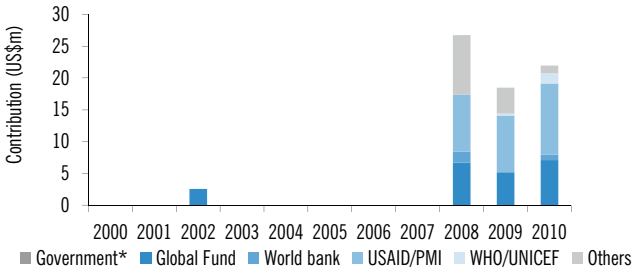
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2005
	ITNs/ LLINs: distributed to all age groups	No	-
IRS	IRS is recommended	Yes	2007
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	Yes	2003
Case management	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
	Oral artemisinin-based monotherapies are not registered	No	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2007
First-line treatment of *P. falciparum*	AL ;AS+AQ	2007
Treatment failure of *P. falciparum*	AL	2007
Treatment of severe malaria	QN	-
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

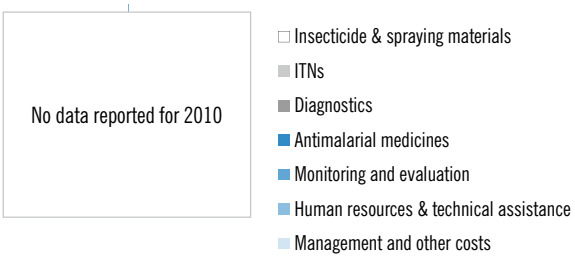
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+AQ	2002–2006	4	0	2	7.6	28 days
AL	2004–2008	6	0	3	6	28 days

III. FINANCING – Government and external financing

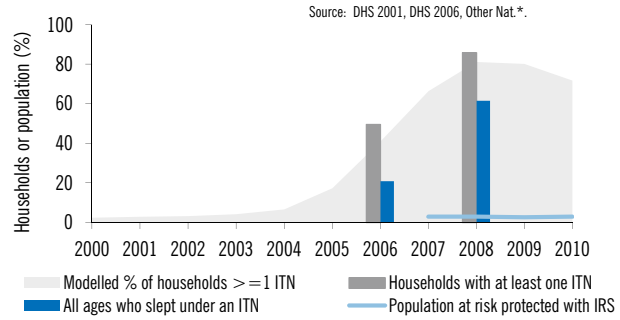


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

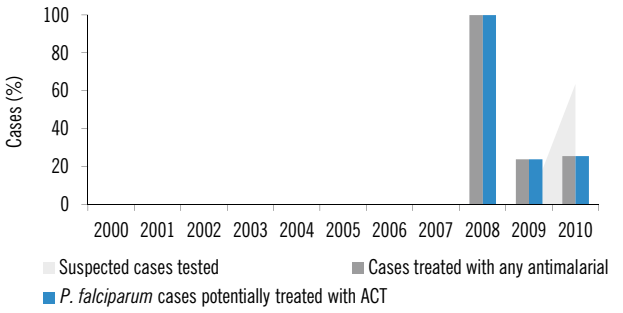
Expenditure by intervention in 2010



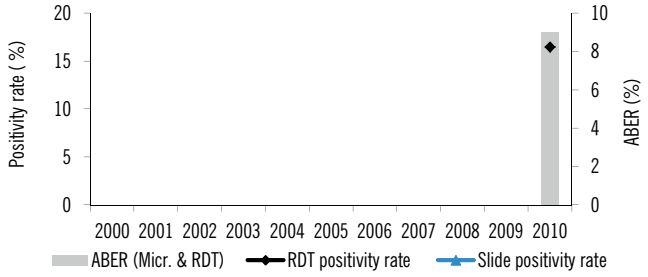
IV. COVERAGE – Coverage of ITN and IRS



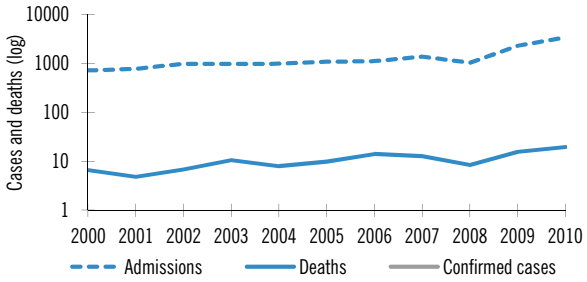
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

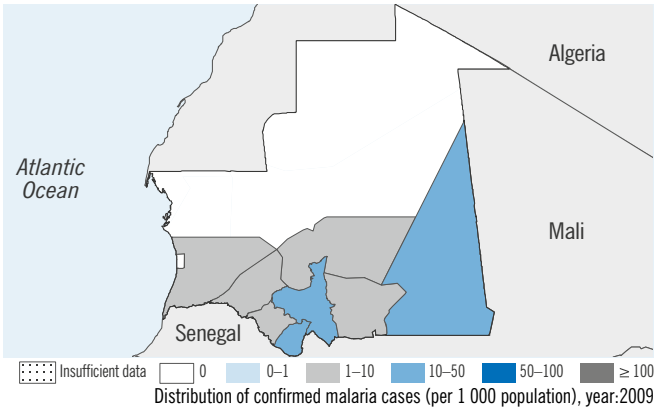


Confirmed cases, admissions and deaths (per 100 000)



Mauritania

Phase: Control.



Distribution of confirmed malaria cases (per 1 000 population), year:2009

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	2 040 000	59
Low transmission (0-1 cases per 1000 population)	1 070 000	31
Malaria-free (0 cases)	346 000	10
Total	3 456 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, arabiensis, pharoensis*

II. INTERVENTION POLICIES AND STRATEGIES

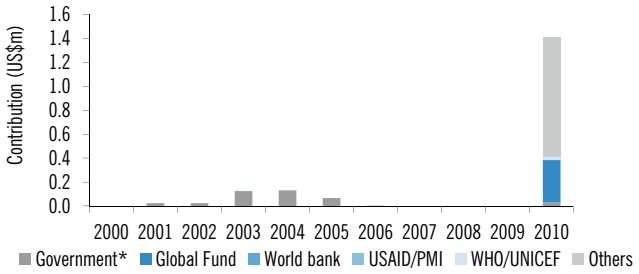
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	1998
	ITNs/ LLINs: distributed to all age groups	No	-
IRS	IRS is recommended	Yes	-
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	Yes	2008
Case management	Patients 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	Yes	2006
	Oral artemisinin-based monotherapies are not registered	No	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	-
First-line treatment of *P. falciparum*	AL ;AS+AQ	-
Treatment failure of *P. falciparum*	-	-
Treatment of severe malaria	QN	-
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

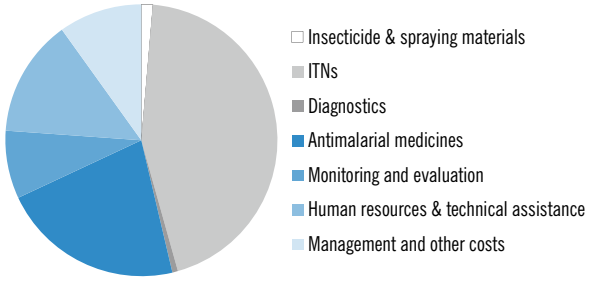
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

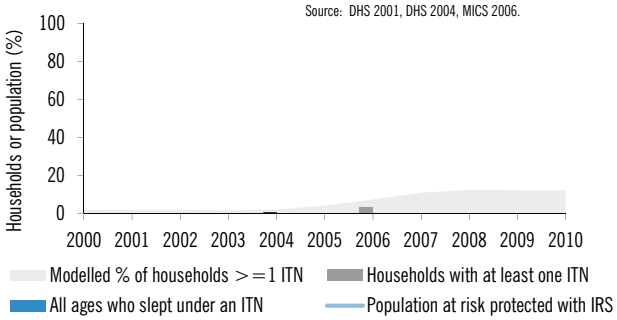


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

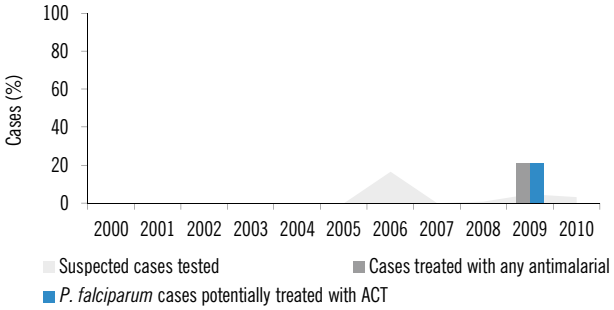
Expenditure by intervention in 2010



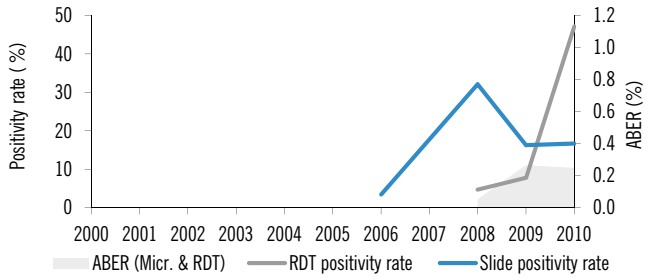
IV. COVERAGE – Coverage of ITN and IRS



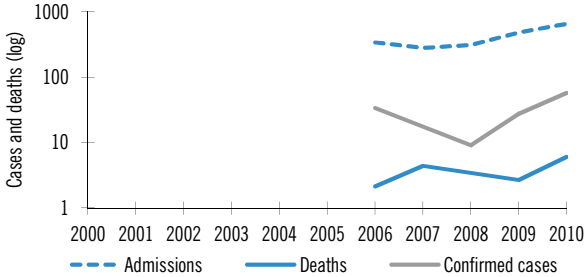
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER



Confirmed cases, admissions and deaths (per 100 000)



Mexico

Phase: Pre-elimination. Coverage: In 2010, IRS was sufficient to protect 25%–50% of the population at high risk.

Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	340 000	0
Low transmission (0-1 cases per 1000 population)	3 740 000	3
Malaria-free (0 cases)	109 000 000	96
Total	113 080 000	

Parasites and vectors

Major plasmodium species: *P. vivax*
Major anopheles species: *An. pseudopunctipennis, albimanus*

II. INTERVENTION POLICIES AND STRATEGIES

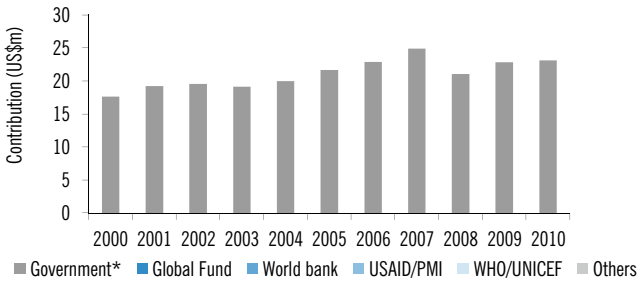
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	-
	ITNs/ LLINs: distributed to all age groups	Yes	-
IRS	IRS is recommended	Yes	-
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	Patients 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	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	CQ+PQ	-
Treatment failure of *P. falciparum*	-	-
Treatment of severe malaria	-	-
Treatment of *P. vivax*	CQ+PQ	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

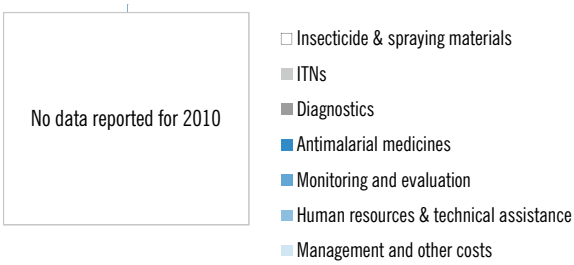
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

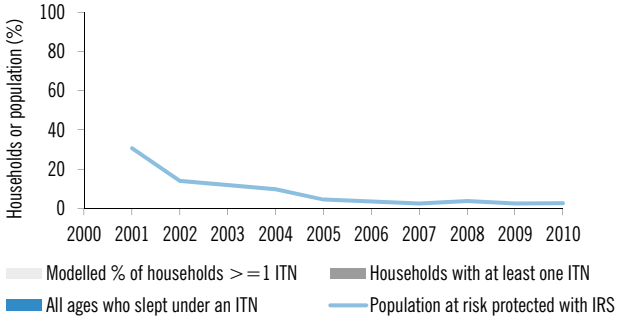


*Budget: costs for sub-national level, health systems, etc not included.

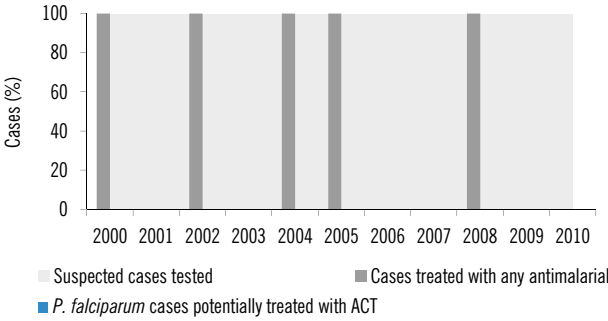
Expenditure by intervention in 2010



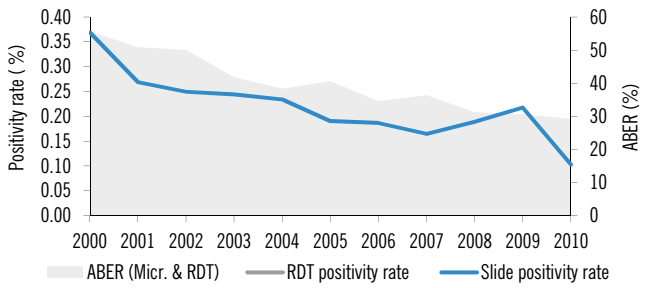
IV. COVERAGE – Coverage of ITN and IRS



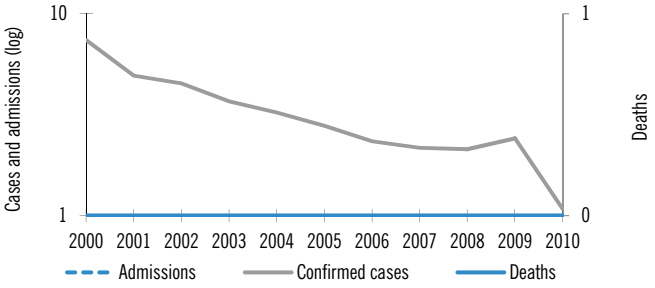
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

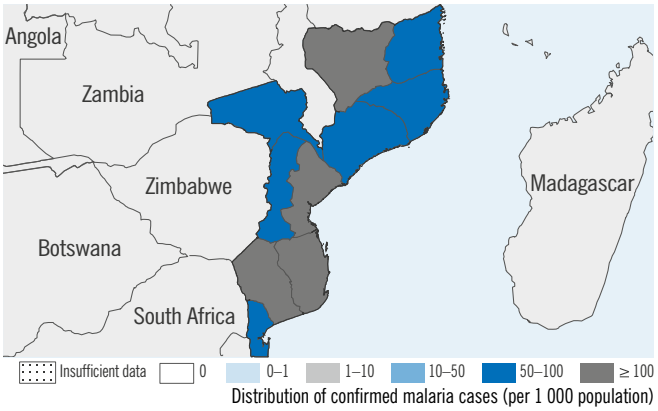


Confirmed cases, admissions (per 100 000) and deaths



Mozambique

Phase: Control. Coverage: In 2010, IRS was sufficient to protect 25%–50% of the population at risk; ITN/LLINs delivered were sufficient to protect 25%–50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	23 400 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	23 400 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, arabiensis, funestus*

II. INTERVENTION POLICIES AND STRATEGIES

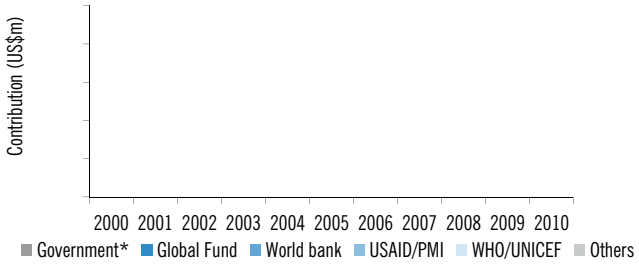
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2003
	ITNs/ LLINs: distributed to all age groups	Yes	2009
IRS	IRS is recommended	Yes	2003
	DDT is used for IRS	Yes	2005
IPT	IPT used to prevent malaria during pregnancy	Yes	2006
Case management	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
	Oral artemisinin-based monotherapies are not registered	Yes	2010

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2004
First-line treatment of *P. falciparum*	AL	2004
Treatment failure of *P. falciparum*	-	-
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

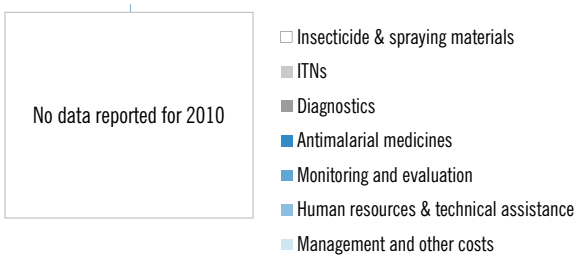
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AL	2005–2008	4	0	1.6	3.1	28 days

III. FINANCING – Government and external financing

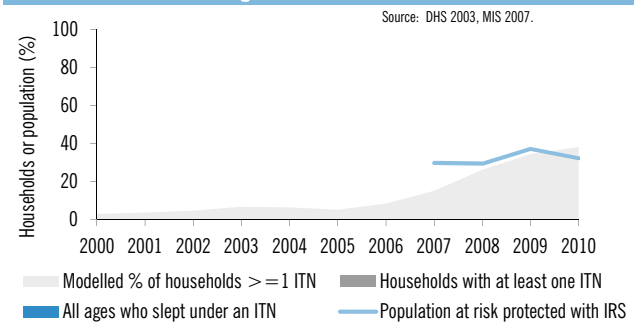


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

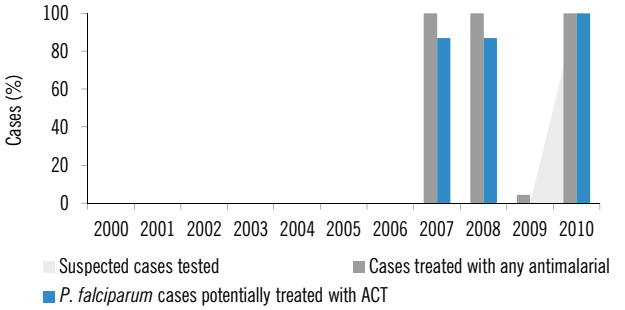
Expenditure by intervention in 2010



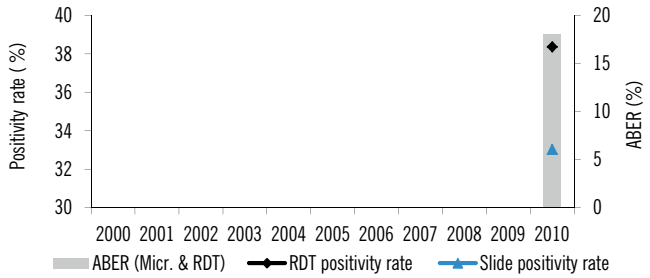
IV. COVERAGE – Coverage of ITN and IRS



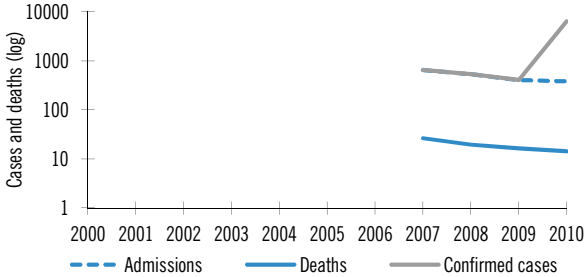
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

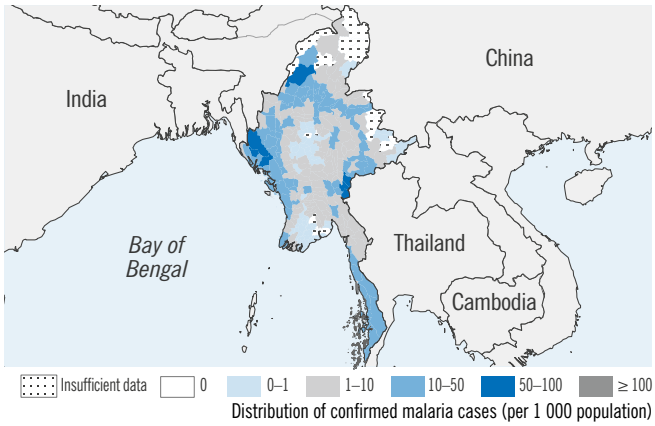


Confirmed cases, admissions and deaths (per 100 000)



Myanmar

Phase: Control.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	24 000 000	50
Low transmission (0-1 cases per 1000 population)	9 110 000	19
Malaria-free (0 cases)	14 900 000	31
Total	48 010 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (71%), *P. vivax*
Major anopheles species: *An. minimus, dirus, annularis, sundaicus*

II. INTERVENTION POLICIES AND STRATEGIES

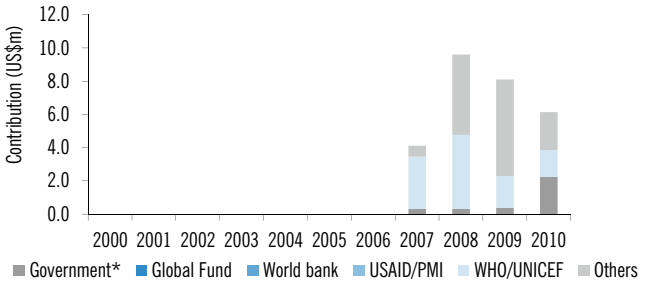
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	-
	ITNs/ LLINs: distributed to all age groups	Yes	-
IRS	IRS is recommended	No	-
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	Patients 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	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	AL ;AS+MQ ;DHA-PPQ	2008
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 (therapeutic or parasitological failure, %)

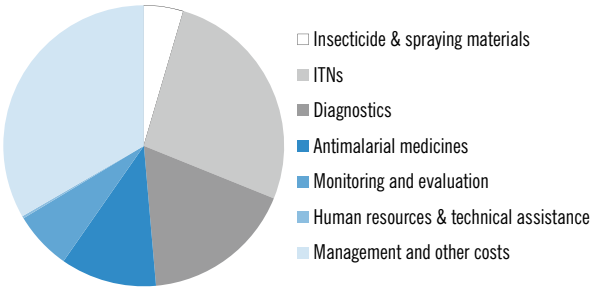
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+MQ	2000–2006	9	0	1.8	8.9	28 days
DHA-PPQ	2003–2009	4	0	2.85	5	28 days
AL	2004–2009	15	0	2.5	8.3	28 days

III. FINANCING – Government and external financing

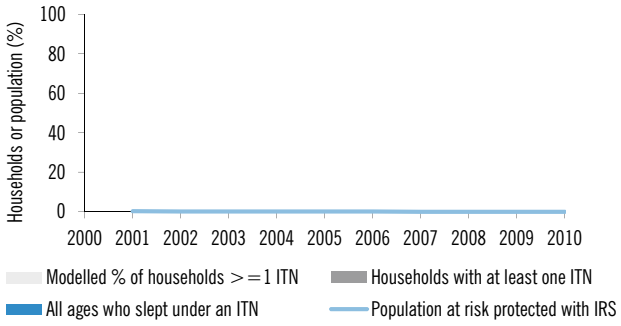


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

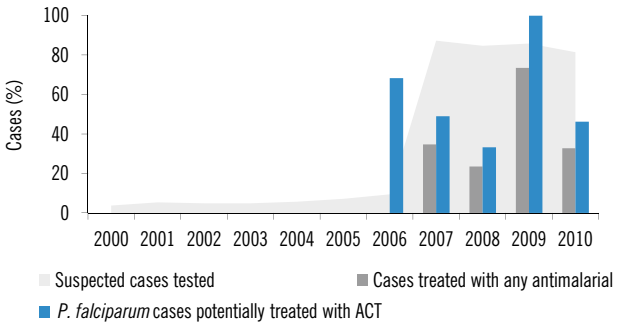
Expenditure by intervention in 2010



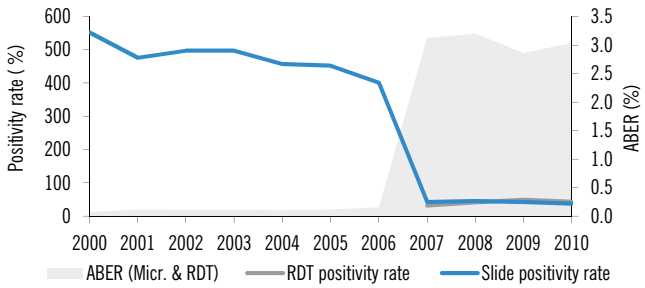
IV. COVERAGE – Coverage of ITN and IRS



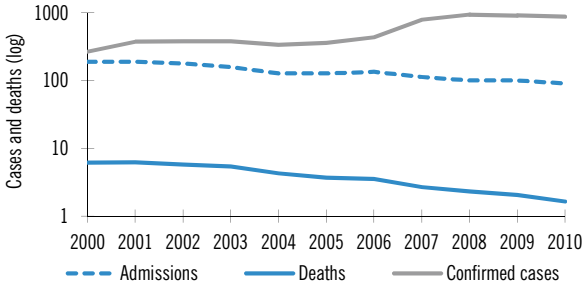
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

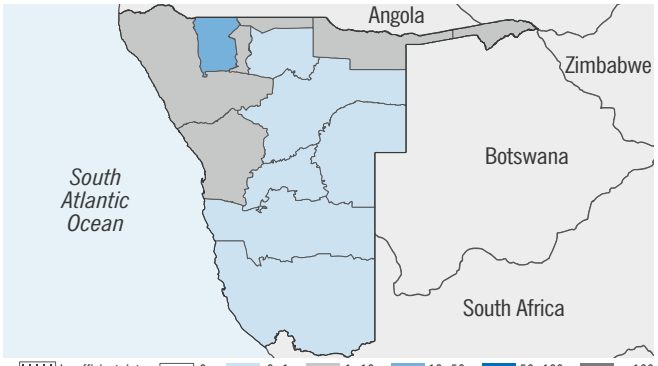


Confirmed cases, admissions and deaths (per 100 000)



Namibia

Phase: Control. Coverage: In 2010, IRS was sufficient to protect 25%–50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	1 530 000	67
Low transmission (0-1 cases per 1000 population)	114 000	5
Malaria-free (0 cases)	639 000	28
Total	2 283 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, arabiensis, funestus*

II. INTERVENTION POLICIES AND STRATEGIES

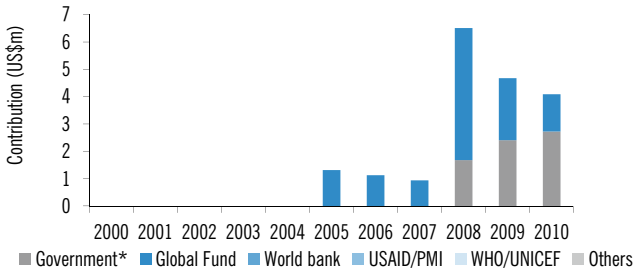
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	1998
	ITNs/ LLINs: distributed to all age groups	Yes	-
IRS	IRS is recommended	Yes	1965
	DDT is used for IRS	Yes	1965
IPT	IPT used to prevent malaria during pregnancy	Yes	2007
Case management	Patients of all ages should receive diagnostic test	Yes	1997
	RDTs used at community level	No	-
	ACT is free for all ages in public sector	Yes	2006
	Pre-referral treatment with recommended medicines	Yes	2005
	Oral artemisinin-based monotherapies are not registered	No	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2006
First-line treatment of *P. falciparum*	AL	2006
Treatment failure of *P. falciparum*	QN	2006
Treatment of severe malaria	QN	2006
Treatment of *P. vivax*	AL	2006

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

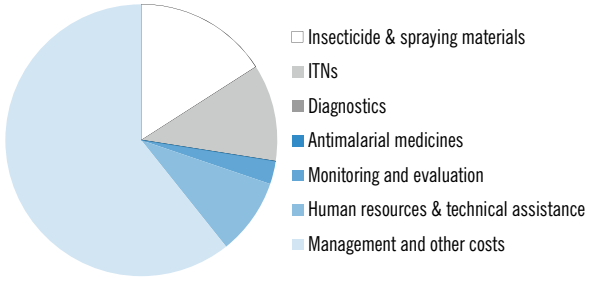
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

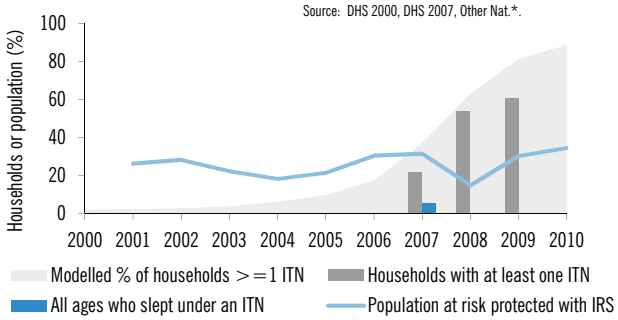


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

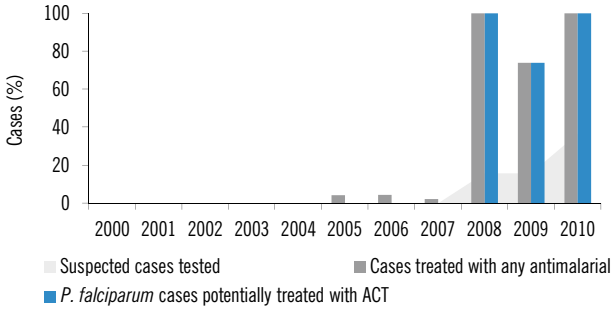
Expenditure by intervention in 2010



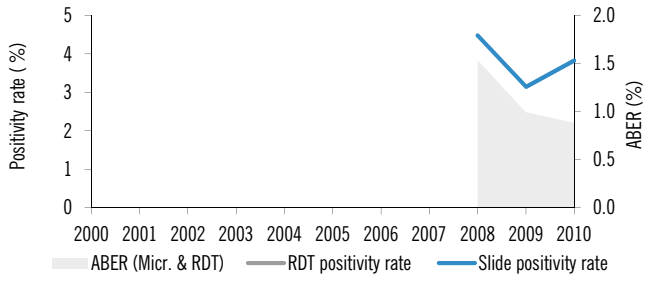
IV. COVERAGE – Coverage of ITN and IRS



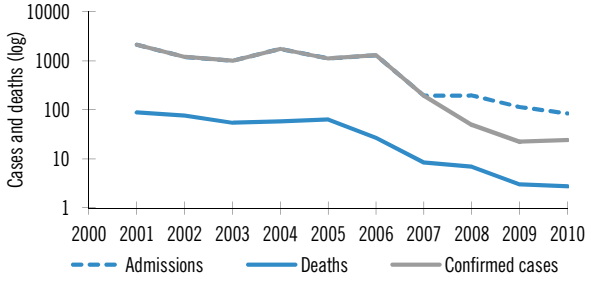
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

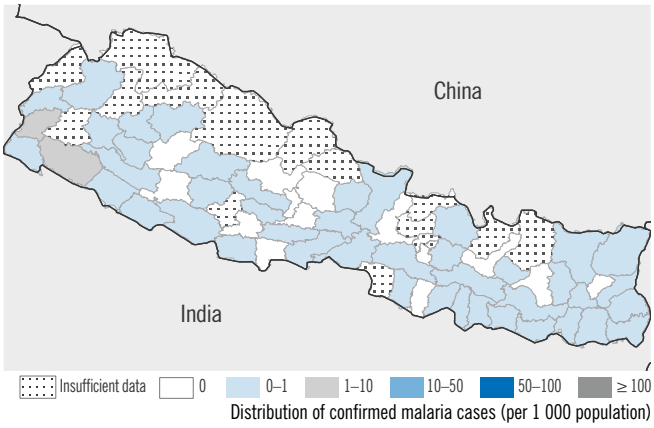


Confirmed cases, admissions and deaths (per 100 000)



Nepal

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect 25%–50% of the population at high risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	689 000	2
Low transmission (0-1 cases per 1000 population)	22 200 000	74
Malaria-free (0 cases)	7 040 000	24
Total	29 929 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (25%), *P. vivax*
Major anopheles species: *An. fluviatilis, annularis, maculatus*

II. INTERVENTION POLICIES AND STRATEGIES

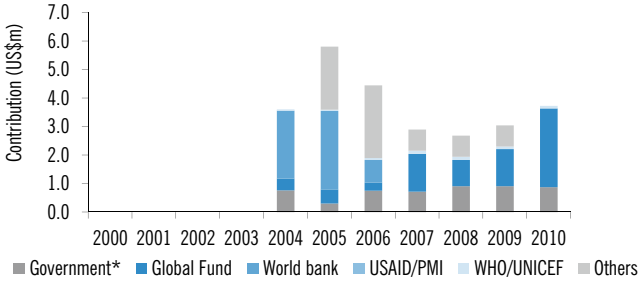
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2007
	ITNs/ LLINs: distributed to all age groups	Yes	2007
IRS	IRS is recommended	Yes	1962
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	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	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	CQ	2004
First-line treatment of *P. falciparum*	AL	2004
Treatment failure of *P. falciparum*	-	-
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	CQ+PQ(14d)	2004

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

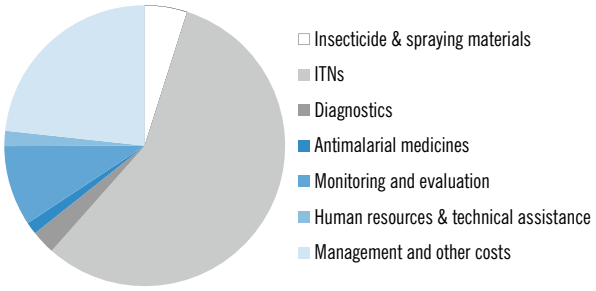
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AL	2005–2008	2	0	0	0	28 days

III. FINANCING – Government and external financing

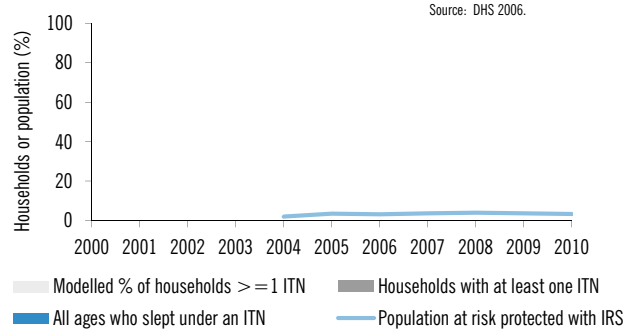


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

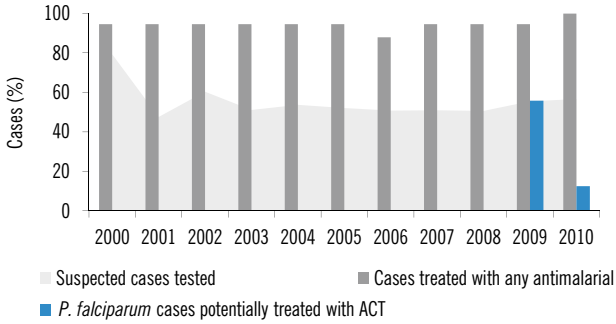
Expenditure by intervention in 2010



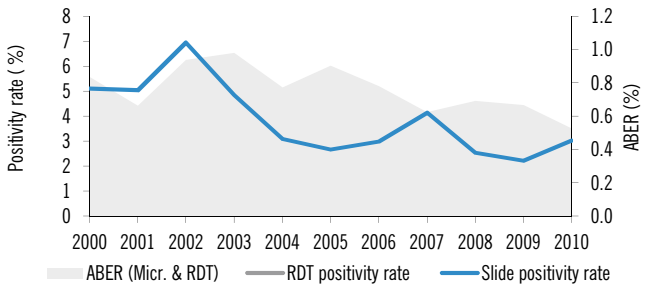
IV. COVERAGE – Coverage of ITN and IRS



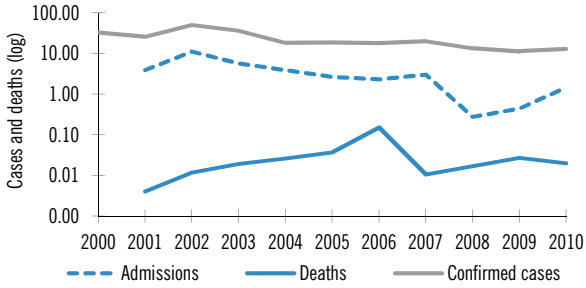
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

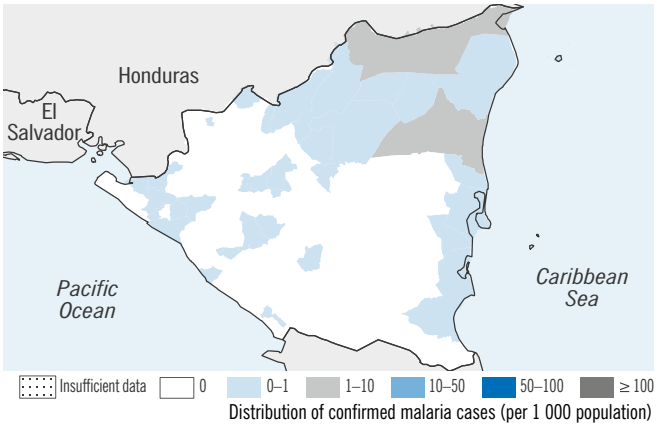


Confirmed cases, admissions and deaths (per 100 000)



Nicaragua

Phase: Control. Coverage: In 2010, IRS was sufficient to protect >50% of the population at high risk; ITN/LLINs delivered were sufficient to protect >50% of the population at high risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	75 200	1
Low transmission (0-1 cases per 1000 population)	2 830 000	49
Malaria-free (0 cases)	2 890 000	50
Total	5 795 200	

Parasites and vectors

Major plasmodium species: *P. falciparum* (22%), *P. vivax*
Major anopheles species: *An. albimanus, pseudopunctipennis*

II. INTERVENTION POLICIES AND STRATEGIES

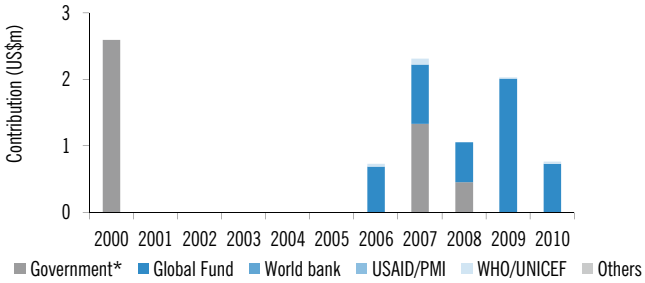
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2004
	ITNs/ LLINs: distributed to all age groups	Yes	2004
IRS	IRS is recommended	Yes	1959
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	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	No	-
	Oral artemisinin-based monotherapies are not registered	No	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	CQ+PQ	-
Treatment failure of *P. falciparum*	AS+MQ ;AS+SP	-
Treatment of severe malaria	QN+CL	-
Treatment of *P. vivax*	CQ+PQ	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

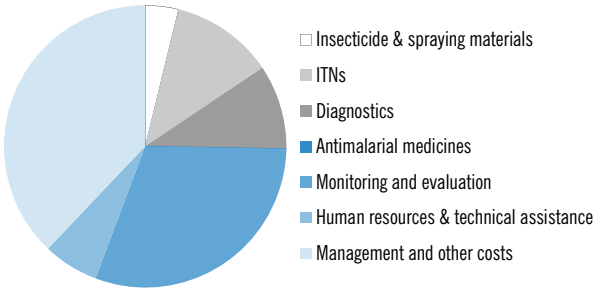
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
CQ	2005–2006	1	0	0	0	28 days

III. FINANCING – Government and external financing

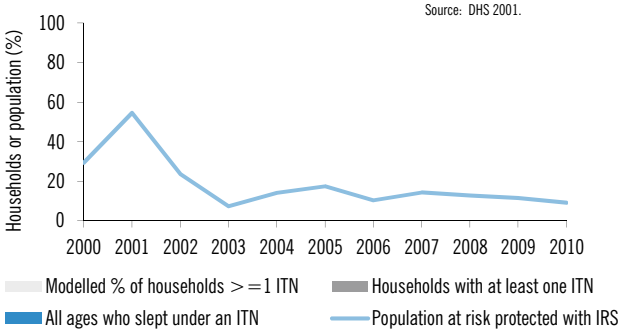


*Budget: costs for sub-national level, health systems, etc not included.

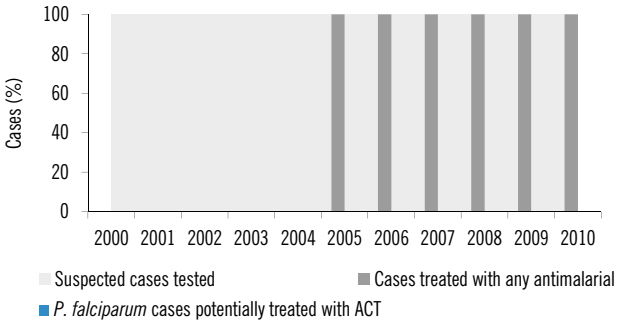
Expenditure by intervention in 2010



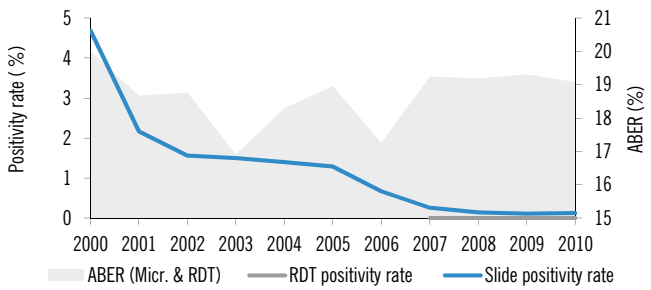
IV. COVERAGE – Coverage of ITN and IRS



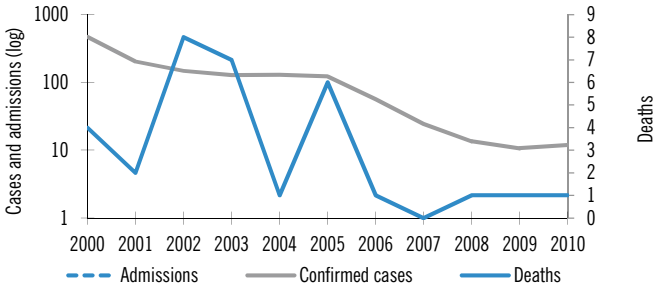
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

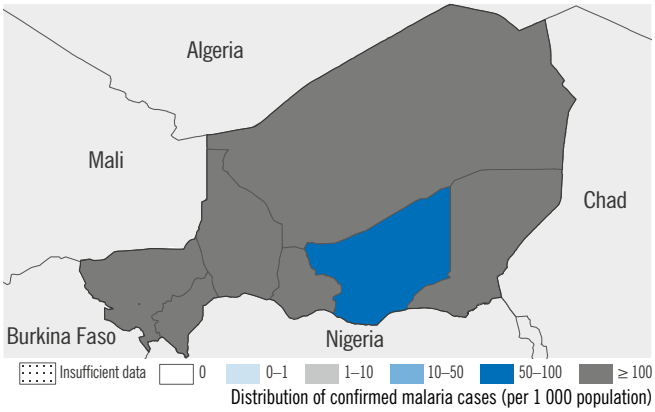


Confirmed cases, admissions (per 100 000) and deaths



Niger

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect >50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	10 700 000	69
Low transmission (0-1 cases per 1000 population)	4 810 000	31
Malaria-free (0 cases)	0	0
Total	15 510 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (79%), *P. vivax*
Major anopheles species: *An. gambiae, arabiensis, funestus*

II. INTERVENTION POLICIES AND STRATEGIES

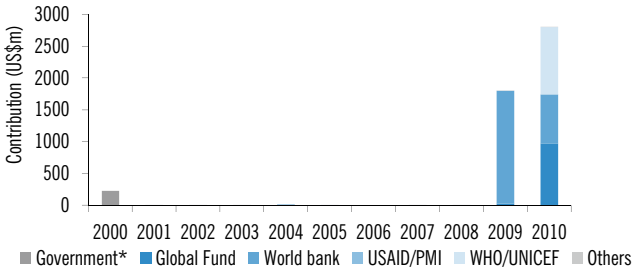
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2005
	ITNs/ LLINs: distributed to all age groups	No	-
IRS	IRS is recommended	Yes	2003
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	Yes	2005
Case management	Patients of all ages should receive diagnostic test	No	-
	RDTs used at community level	Yes	2006
	ACT is free for all ages in public sector	No	-
	Pre-referral treatment with recommended medicines	Yes	1998
	Oral artemisinin-based monotherapies are not registered	No	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2005
First-line treatment of *P. falciparum*	AL	2005
Treatment failure of *P. falciparum*	QN	2005
Treatment of severe malaria	QN	2005
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

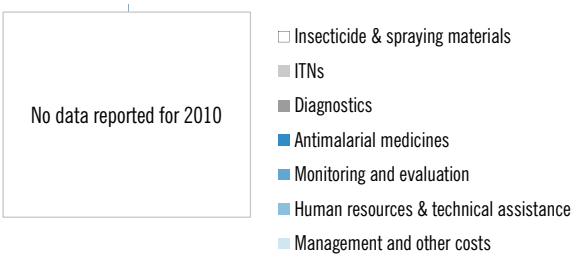
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AL	2006–2006	1	4.4	4.4	4.4	28 days

III. FINANCING – Government and external financing

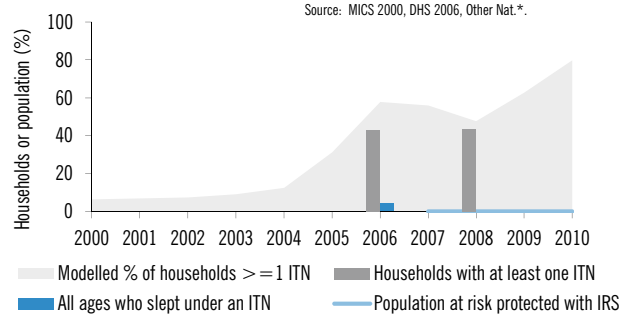


*Budget: costs for sub-national level, health systems, human resources, etc not included.

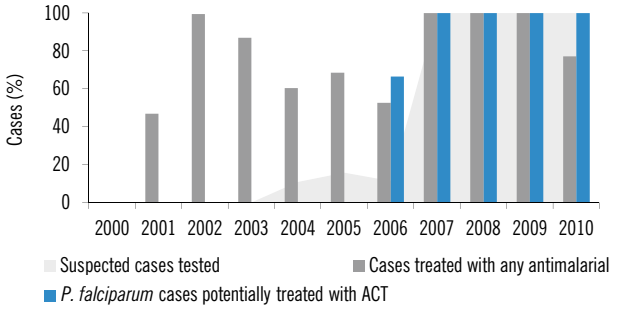
Expenditure by intervention in 2010



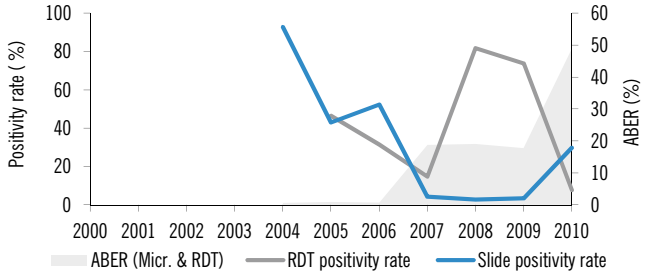
IV. COVERAGE – Coverage of ITN and IRS



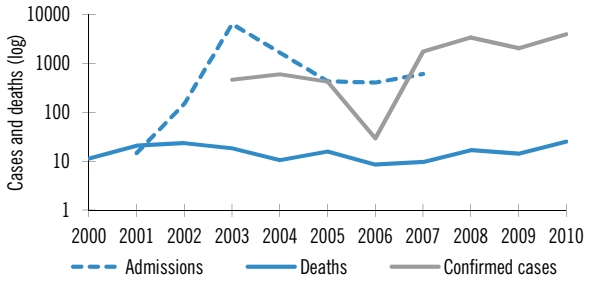
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

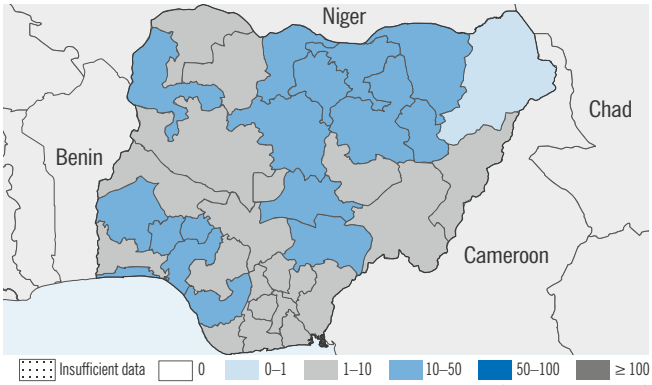


Confirmed cases, admissions and deaths (per 100 000)



Nigeria

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect 25%–50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	158 000 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	158 000 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, arabiensis, funestus, Moucheti, melas, nili*

II. INTERVENTION POLICIES AND STRATEGIES

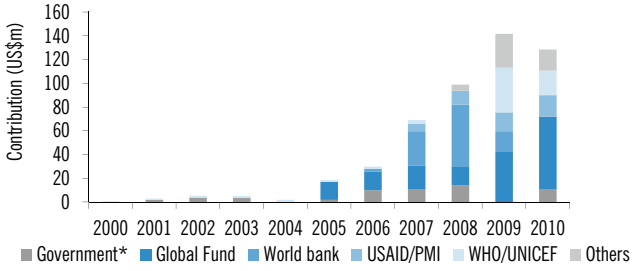
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2001
	ITNs/ LLINs: distributed to all age groups	Yes	2009
IRS	IRS is recommended	Yes	2007
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	Yes	2004
Case management	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
	Oral artemisinin-based monotherapies are not registered	No	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL ;AS+AQ	2004
First-line treatment of *P. falciparum*	AL ;AS+AQ	2004
Treatment failure of *P. falciparum*	QN	2004
Treatment of severe malaria	AM ;AS ;QN	2004
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

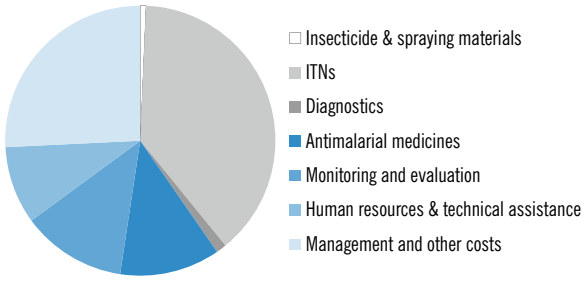
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AL	2002–2007	5	0	0	2	28 days
AS+AQ	2004–2006	5	0	0	7.8	28 days

III. FINANCING – Government and external financing

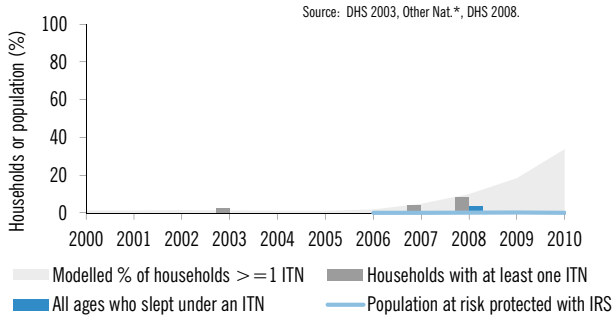


*Budget: costs for sub-national level, health systems, human resources, etc not included.

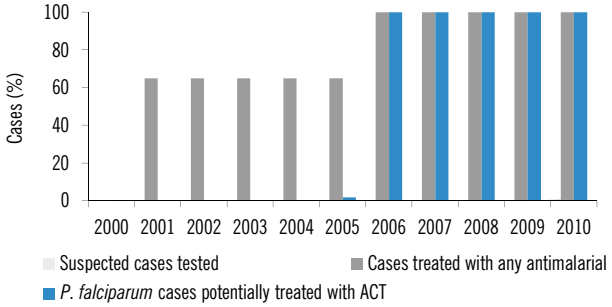
Expenditure by intervention in 2010



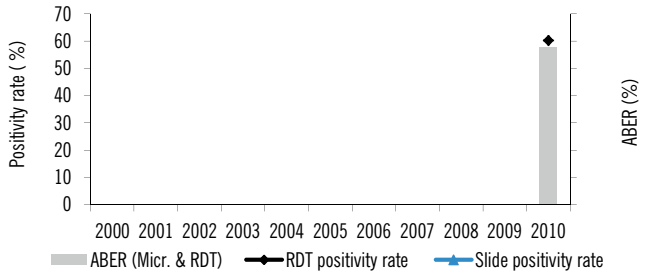
IV. COVERAGE – Coverage of ITN and IRS



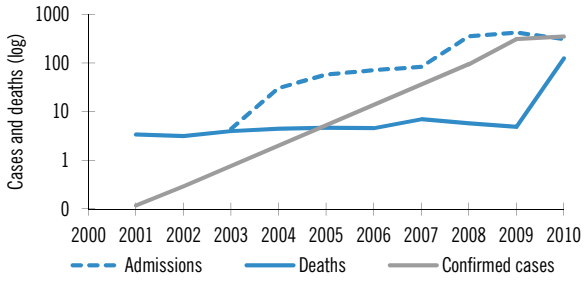
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

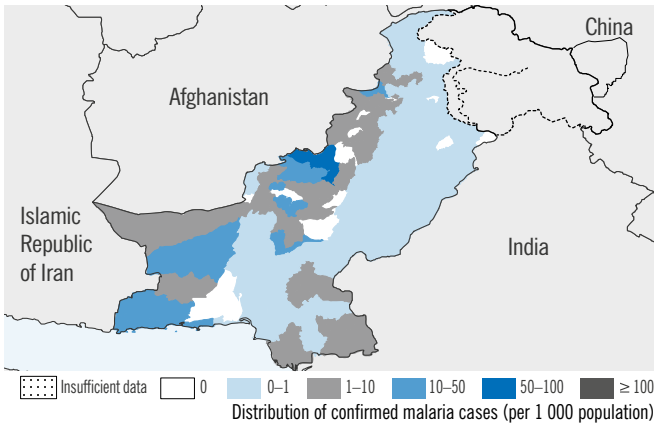


Confirmed cases, admissions and deaths (per 100 000)



Pakistan

Phase: Control.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	26 000 000	15
Low transmission (0-1 cases per 1000 population)	146 000 000	84
Malaria-free (0 cases)	1 740 000	1
Total	173 740 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (28%), *P. vivax*
Major anopheles species: *An. culicifacies, stephensi*

II. INTERVENTION POLICIES AND STRATEGIES

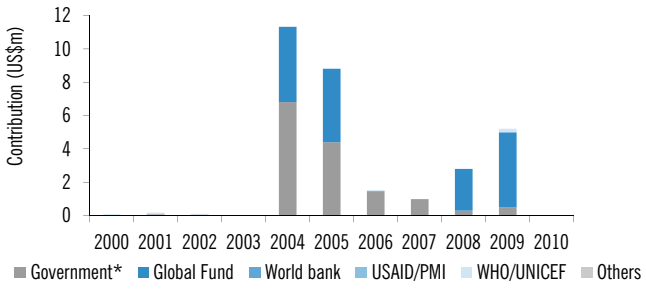
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2008
	ITNs/ LLINs: distributed to all age groups	Yes	2008
IRS	IRS is recommended	Yes	1961
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	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	2009
	Oral artemisinin-based monotherapies are not registered	Yes	2007

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	CQ	-
First-line treatment of *P. falciparum*	AS+SP	2007
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 (therapeutic or parasitological failure, %)

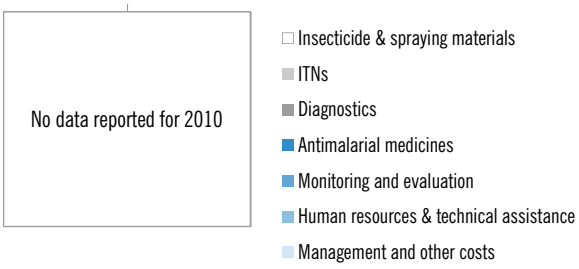
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+SP	2004–2008	6	0	0	3.2	28 days

III. FINANCING – Government and external financing

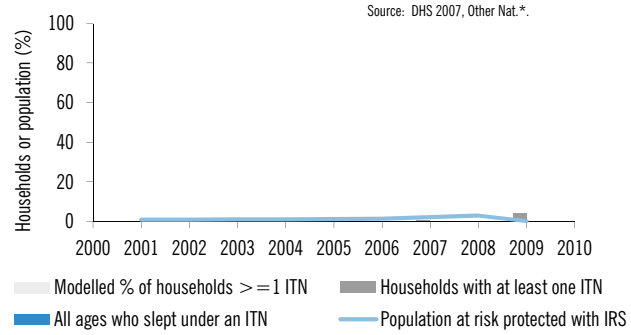


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

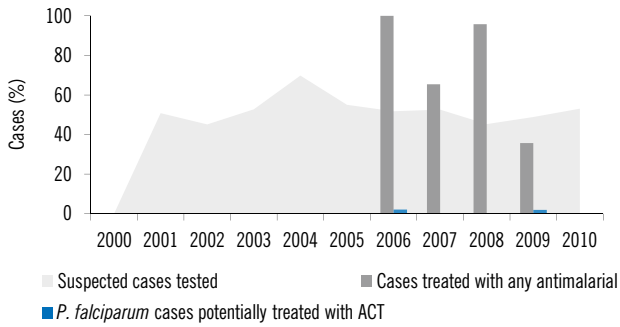
Expenditure by intervention in 2010



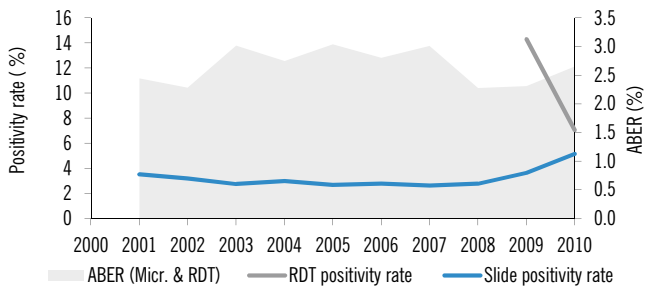
IV. COVERAGE – Coverage of ITN and IRS



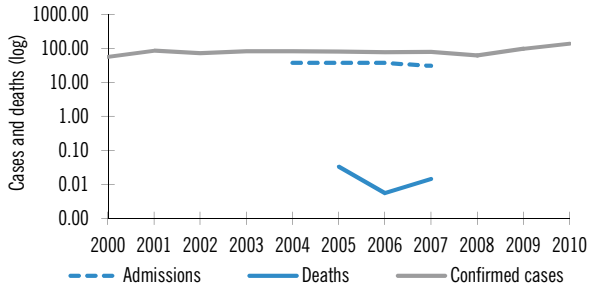
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

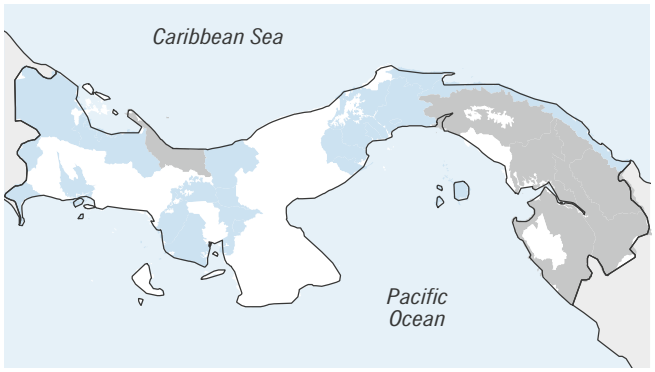


Confirmed cases, admissions and deaths (per 100 000)



Panama

Phase: Control. Coverage: In 2010, IRS was sufficient to protect >50% of the population at high risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	155 000	4
Low transmission (0-1 cases per 1000 population)	2 500 000	71
Malaria-free (0 cases)	858 000	24
Total	3 513 000	

Parasites and vectors

Major plasmodium species:	*P. falciparum* (5%), *P. vivax*
Major anopheles species:	*An. albimanus, pseudopunctipennis, punctimacula, aquasalis, darlingi*

II. INTERVENTION POLICIES AND STRATEGIES

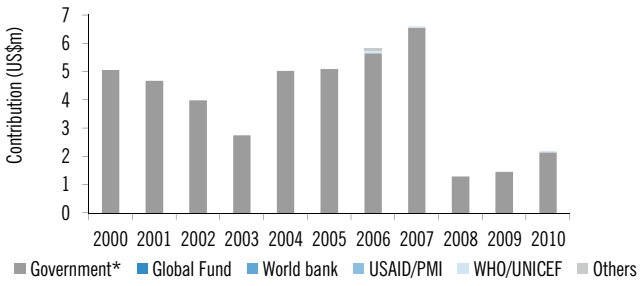
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	No	-
	ITNs/ LLINs: distributed to all age groups	No	-
IRS	IRS is recommended	Yes	1957
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	Patients 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	-
	Pre-referral treatment with recommended medicines	No	-
	Oral artemisinin-based monotherapies are not registered	No	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	SP	-
Treatment failure of *P. falciparum*	SP+PQ	-
Treatment of severe malaria	MQ	-
Treatment of *P. vivax*	CQ+PQ	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

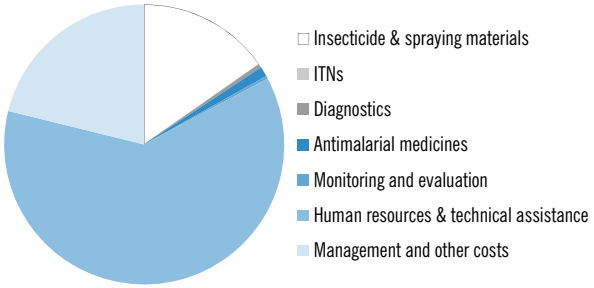
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

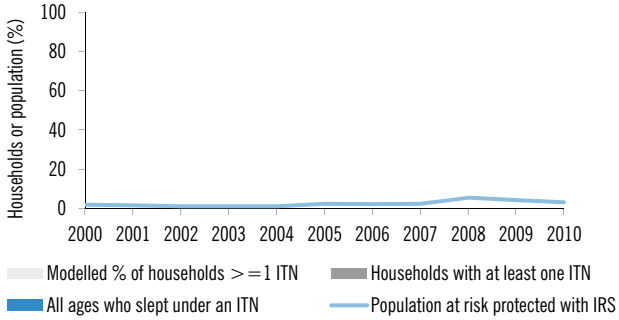


*Budget: costs for sub-national level, health systems, etc not included.

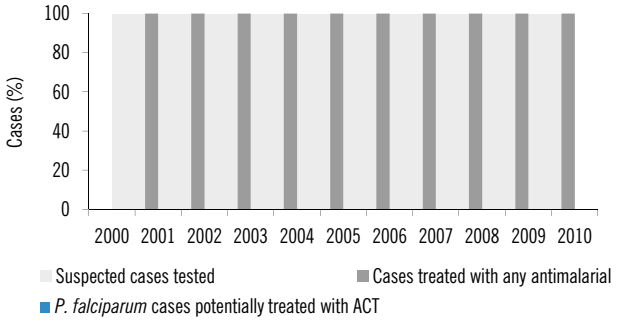
Expenditure by intervention in 2010



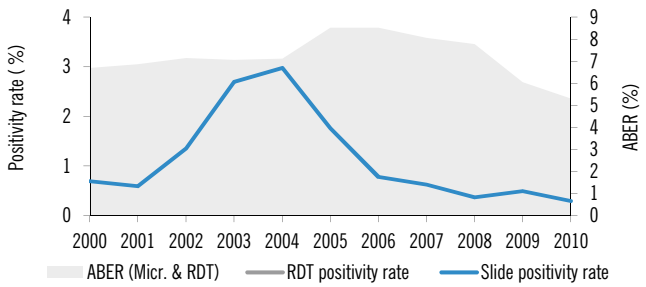
IV. COVERAGE – Coverage of ITN and IRS



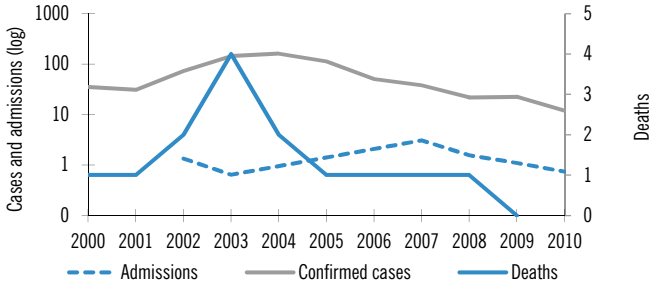
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

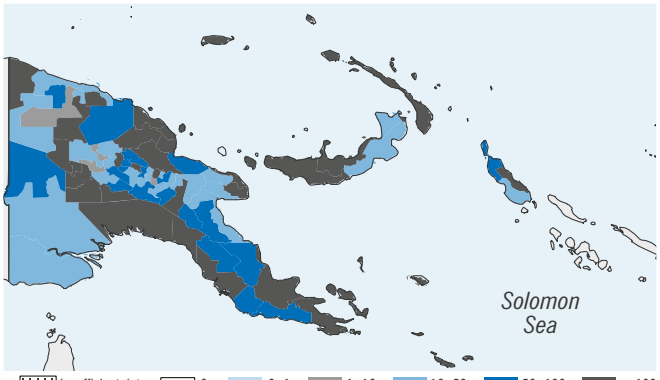


Confirmed cases, admissions (per 100 000) and deaths



Papua New Guinea

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect 25%–50% of the population at high risk.



Distribution of probable and confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	6 450 000	94
Low transmission (0-1 cases per 1000 population)	411 000	6
Malaria-free (0 cases)	0	0
Total	6 861 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (80%), *P. vivax*
Major anopheles species: *An. punctulatus, farauti, koliensis*

II. INTERVENTION POLICIES AND STRATEGIES

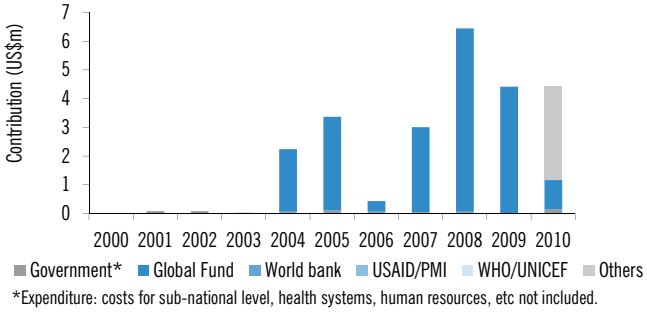
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2004
	ITNs/ LLINs: distributed to all age groups	Yes	2000
IRS	IRS is recommended	Yes	2010
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	Yes	1981
Case management	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	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	AL	2008
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 (therapeutic or parasitological failure, %)

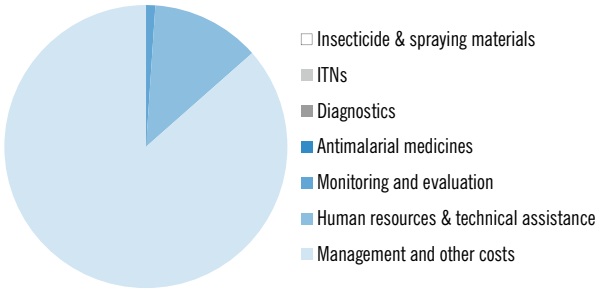
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
DHA-PPQ	2006–2007	1	9.9	9.9	9.9	28 days
AL	2006–2007	1	2.7	2.7	2.7	28 days

III. FINANCING – Government and external financing

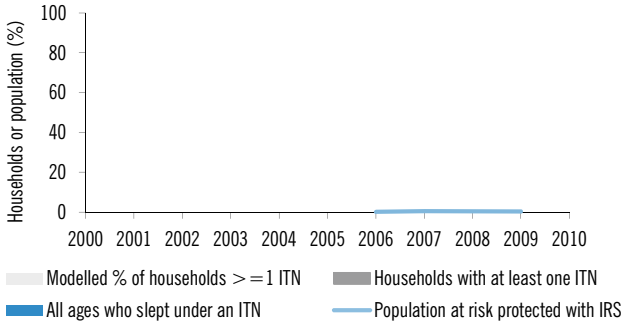


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

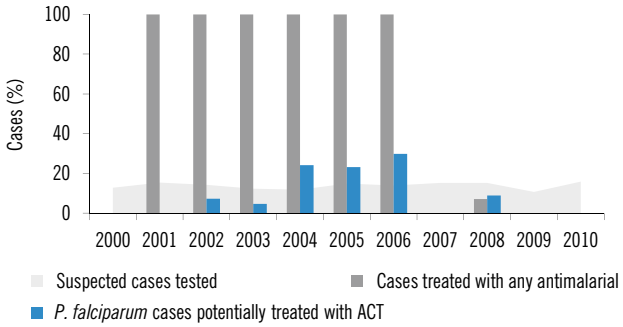
Expenditure by intervention in 2010



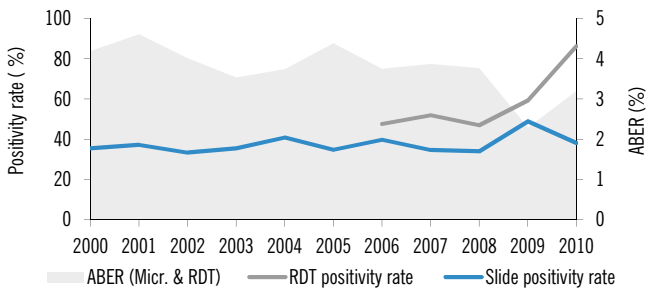
IV. COVERAGE – Coverage of ITN and IRS



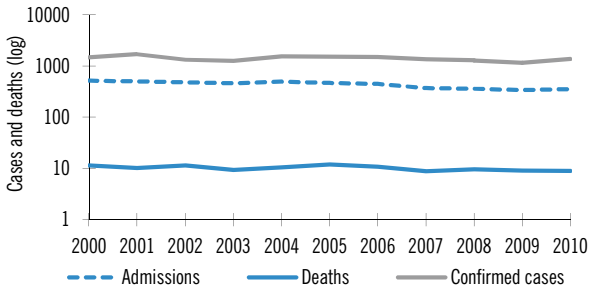
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER



Confirmed cases, admissions and deaths (per 100 000)



Paraguay

Phase: Pre-elimination. Coverage: In 2010, IRS was sufficient to protect 16% of the population at risk.

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)	232 000	4
Malaria-free (0 cases)	6 220 000	96
Total	6 452 000	

Parasites and vectors

Major plasmodium species:	*P. vivax*
Major anopheles species:	*An. darlingi, albitarsis*

II. INTERVENTION POLICIES AND STRATEGIES

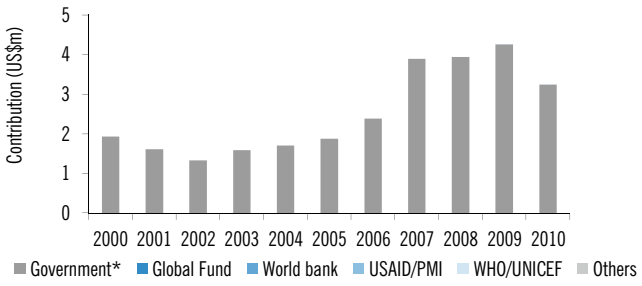
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	No	-
	ITNs/ LLINs: distributed to all age groups	No	-
IRS	IRS is recommended	Yes	1957
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	Patients 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	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	AL	-
Treatment failure of *P. falciparum*	-	-
Treatment of severe malaria	-	-
Treatment of *P. vivax*	CQ+PQ	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

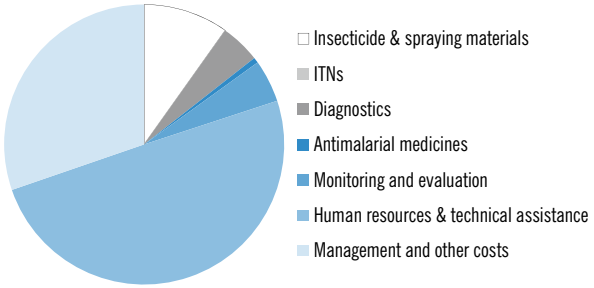
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

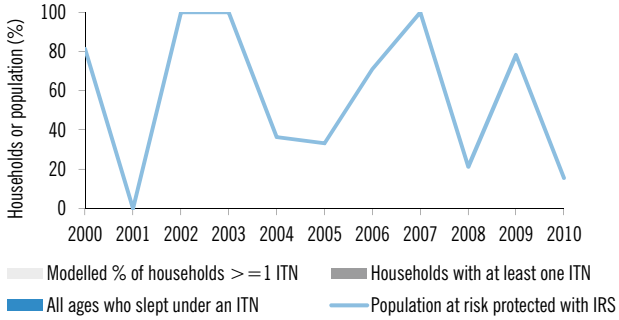


*Budget: costs for sub-national level, health systems, etc not included.

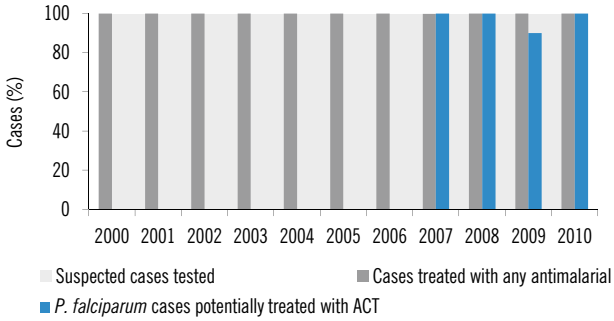
Expenditure by intervention in 2010



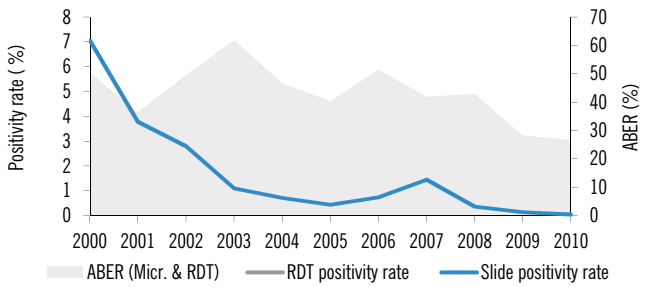
IV. COVERAGE – Coverage of ITN and IRS



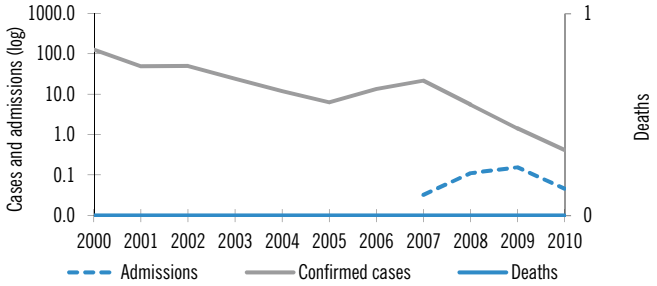
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

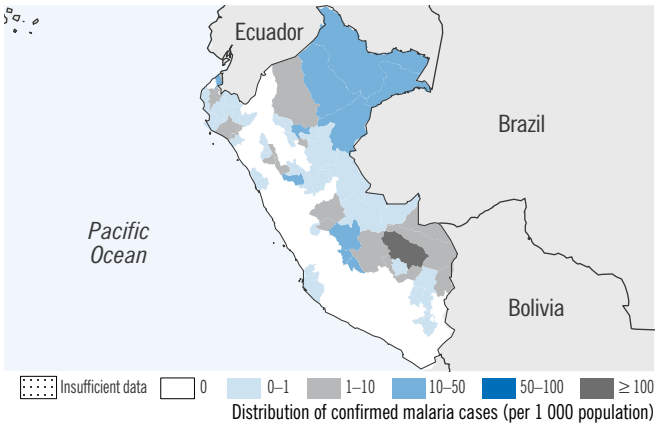


Confirmed cases, admissions (per 100 000) and deaths



Peru

Phase: Control.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	2 470 000	8
Low transmission (0-1 cases per 1000 population)	3 590 000	12
Malaria-free (0 cases)	23 000 000	79
Total	29 060 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (8%), *P. vivax*

Major anopheles species:

II. INTERVENTION POLICIES AND STRATEGIES

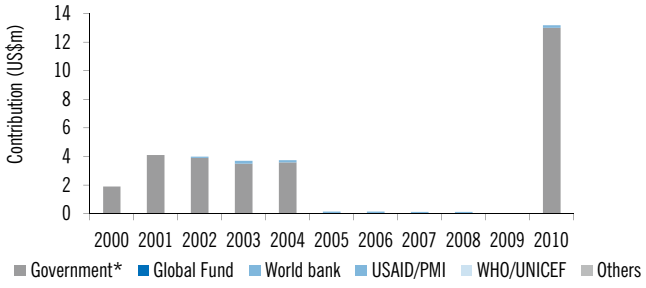
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2006
	ITNs/ LLINs: distributed to all age groups	Yes	2006
IRS	IRS is recommended	Yes	-
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	Patients of all ages should receive diagnostic test	Yes	1994
	RDTs used at community level	Yes	2000
	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	2000

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	AS+MQ	2001
Treatment failure of *P. falciparum*	-	-
Treatment of severe malaria	-	-
Treatment of *P. vivax*	CQ+PQ	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

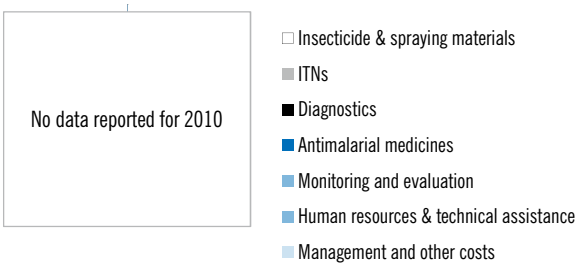
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+MQ	2003–2006	3	0	0	0	28 days

III. FINANCING – Government and external financing

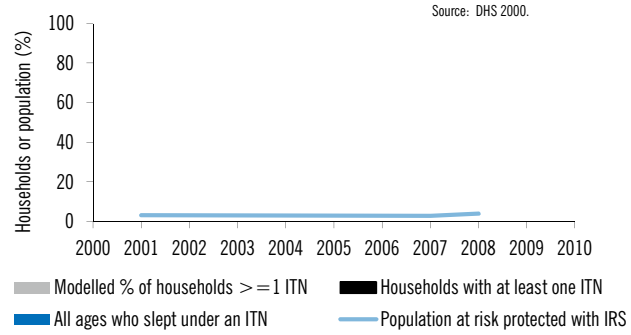


*Expenditure: costs for sub-national level, health systems, etc not included.

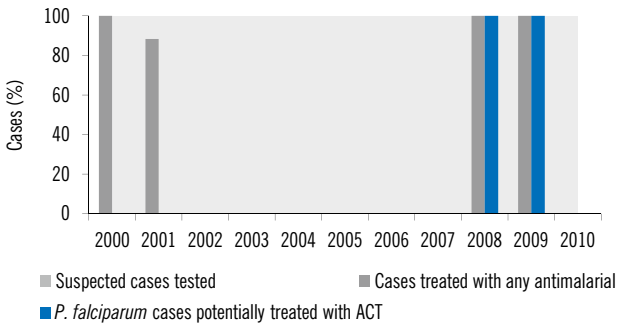
Expenditure by intervention in 2010



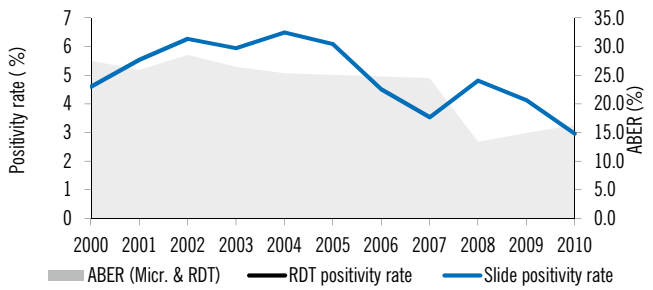
IV. COVERAGE – Coverage of ITN and IRS



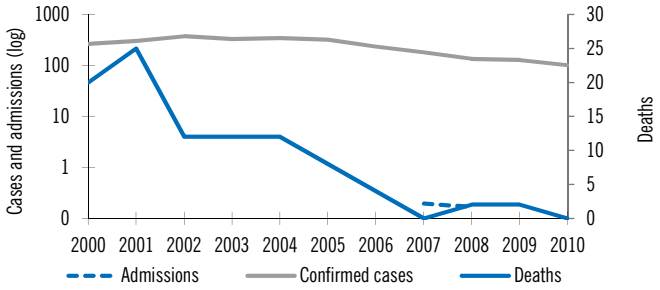
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

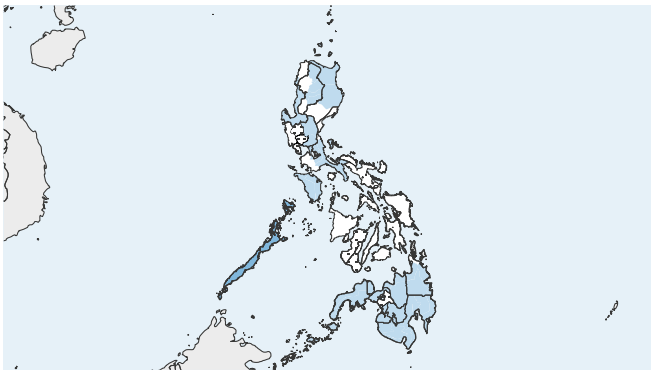


Confirmed cases, admissions (per 100 000) and deaths



Philippines

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect >50% of the population at high risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	6 690 000	7
Low transmission (0-1 cases per 1000 population)	67 700 000	73
Malaria-free (0 cases)	18 900 000	20
Total	93 290 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (65%), *P. vivax*
Major anopheles species: *An. flavirostris, maculatus, balabacensis, Litoralis*

II. INTERVENTION POLICIES AND STRATEGIES

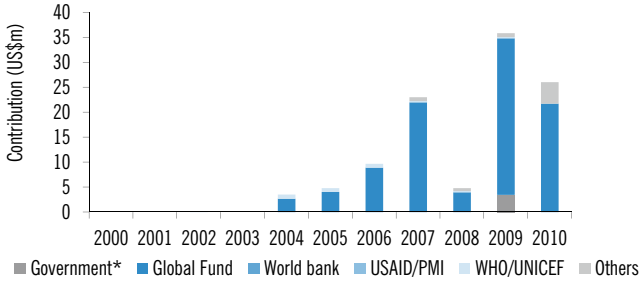
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2006
	ITNs/ LLINs: distributed to all age groups	Yes	2000
IRS	IRS is recommended	Yes	-
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	Patients 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	Yes	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2009
First-line treatment of *P. falciparum*	AL+PQ	2009
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 (therapeutic or parasitological failure, %)

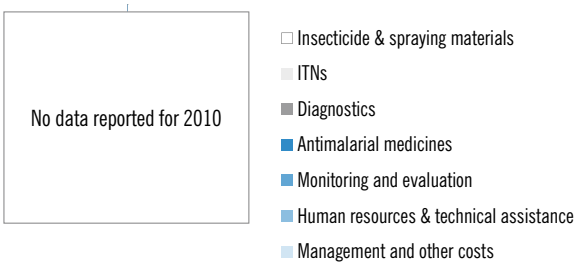
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AL	2003–2009	9	0	0	5.6	28 days

III. FINANCING – Government and external financing

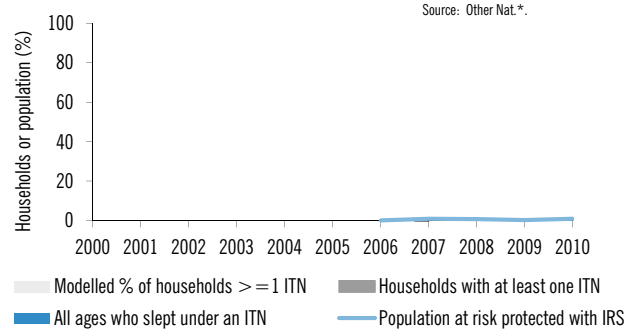


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

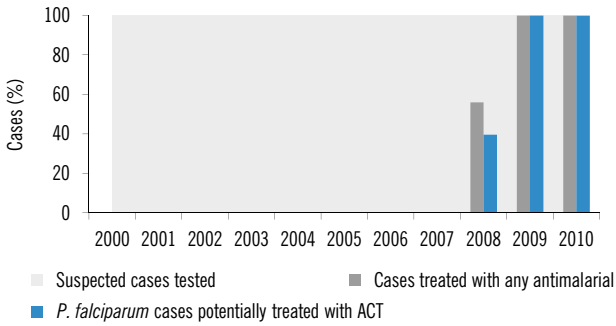
Expenditure by intervention in 2010



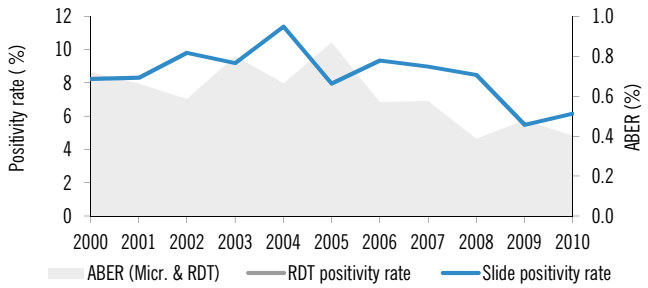
IV. COVERAGE – Coverage of ITN and IRS



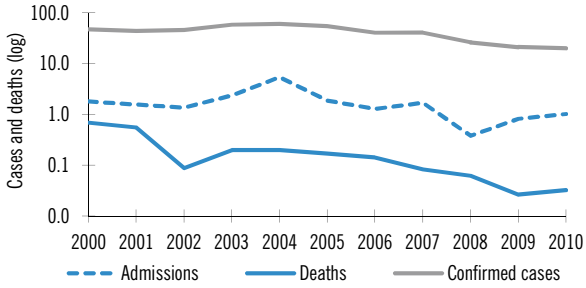
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

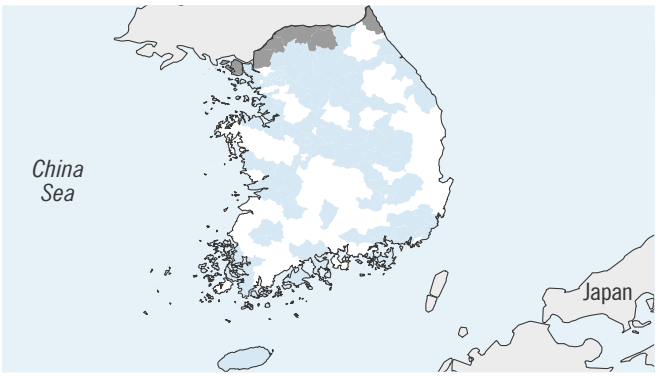


Confirmed cases, admissions and deaths (per 100 000)



Republic of Korea

Phase: Elimination.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
Number of active foci	22	
Number of people living within active foci	3 570 000	7
Number of people living in malaria-free areas	44 600 000	93
Total	48 170 000	

Parasites and vectors

Major Plasmodium species: *P. vivax*
Major Anopheles species: *An.sinensis*

II. INTERVENTION POLICIES AND STRATEGIES

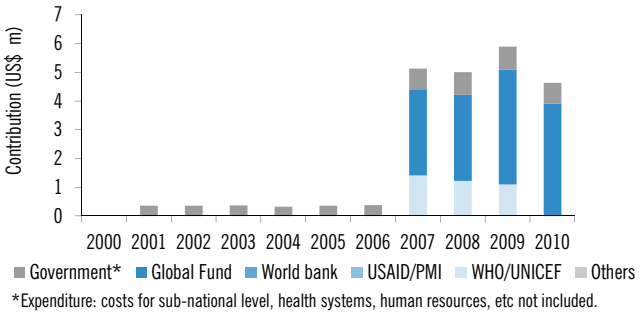
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	-
	ITNs/ LLINs: distributed to all age groups	No	-
IRS	IRS is recommended	-	-
	DDT is used for IRS	No	-
Case management	Malaria diagnosis is free of charge in the public sector	Yes	-
	Gametocidal treatment of P.falciparum cases	No	-
	Radical treatment of P. vivax cases	Yes	-
Surveillance	Foci and case investigation undertaken	Yes	-
	Case reporting from private sector is mandatory	Yes	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum* (confirmed)	-	-
Treatment failure of *P. falciparum*	-	-
Treatment of severe malaria	-	-
Treatment of *P. vivax*	CQ+PQ(14d)	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

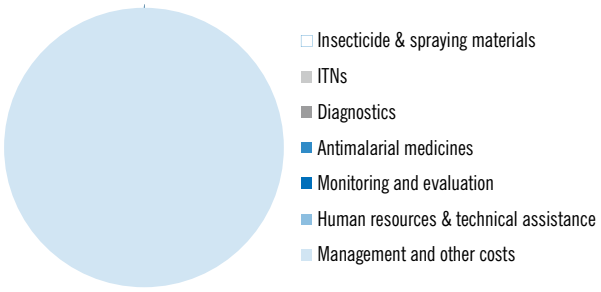
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

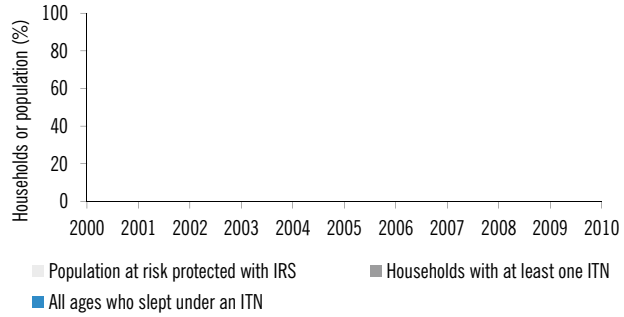


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

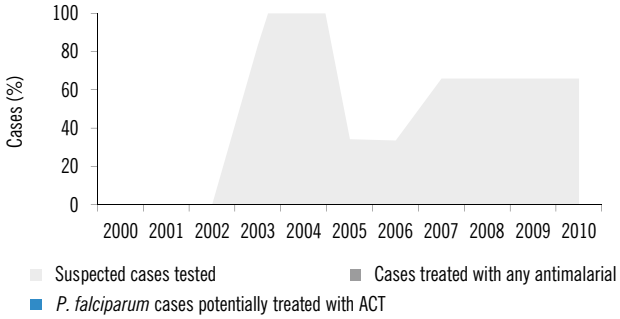
Expenditure by intervention in 2010



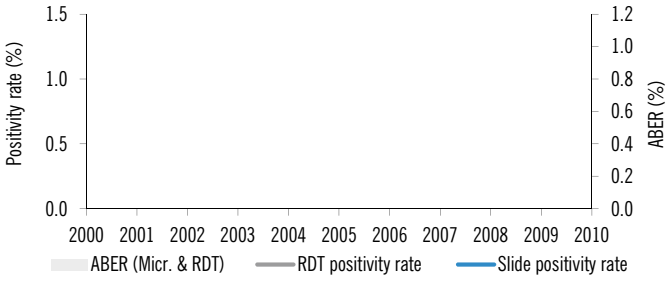
IV. COVERAGE – Coverage of ITN and IRS



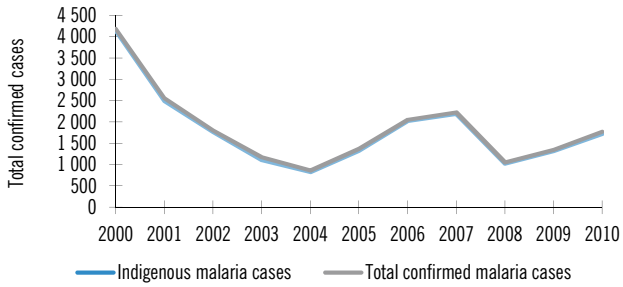
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

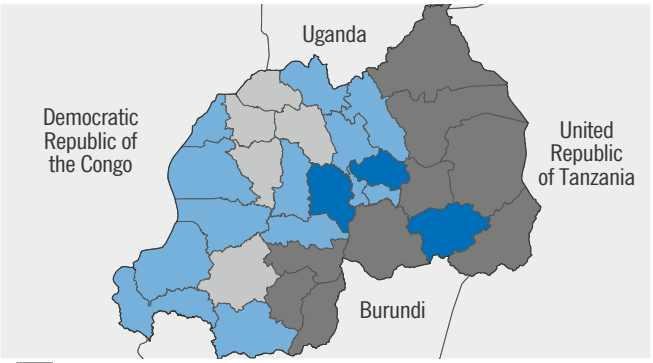


Total confirmed malaria cases and indigenous cases



Rwanda

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect >50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	10 600 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	10 600 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, arabiensis, funestus*

II. INTERVENTION POLICIES AND STRATEGIES

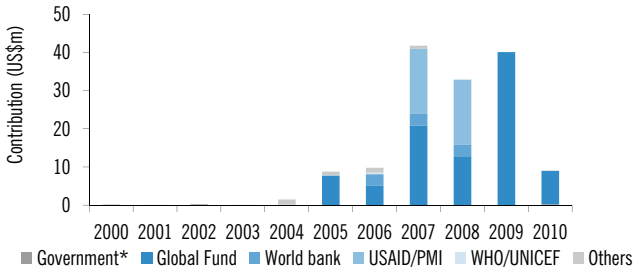
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2004
	ITNs/ LLINs: distributed to all age groups	No	-
IRS	IRS is recommended	Yes	2007
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	No	-
Case management	Patients 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	2001
	Oral artemisinin-based monotherapies are not registered	No	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2005
First-line treatment of *P. falciparum*	AL	2005
Treatment failure of *P. falciparum*	QN	2005
Treatment of severe malaria	AM ;QN	2005
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

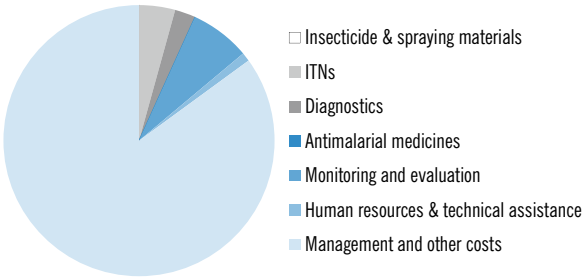
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AL	2004–2007	3	0	1.5	6.9	28 days

III. FINANCING – Government and external financing

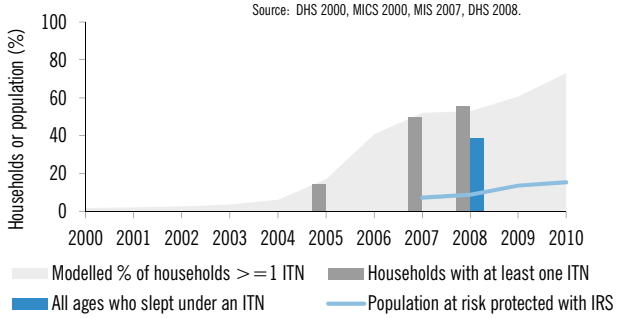


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

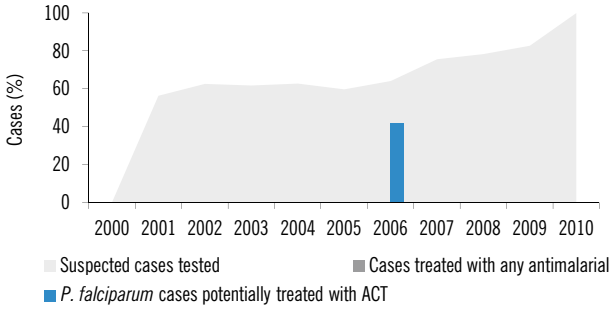
Expenditure by intervention in 2010



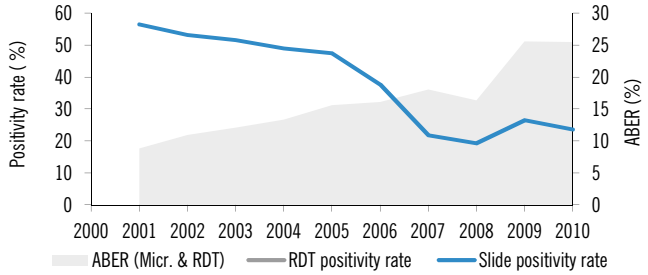
IV. COVERAGE – Coverage of ITN and IRS



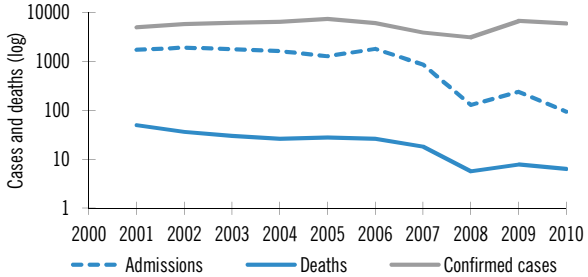
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

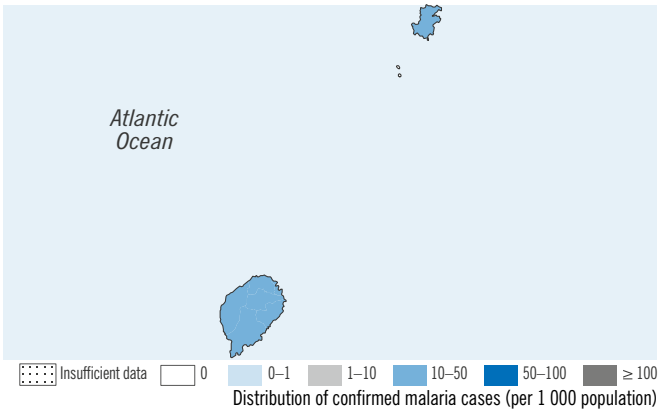


Confirmed cases, admissions and deaths (per 100 000)



Sao Tome and Principe

Phase: Control. Coverage: In 2010, IRS was sufficient to protect 25%–50% of the population at risk; ITN/LLINs delivered were sufficient to protect >50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	165 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	165 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (99%), *P. vivax*
Major anopheles species: *An. gambiae*

II. INTERVENTION POLICIES AND STRATEGIES

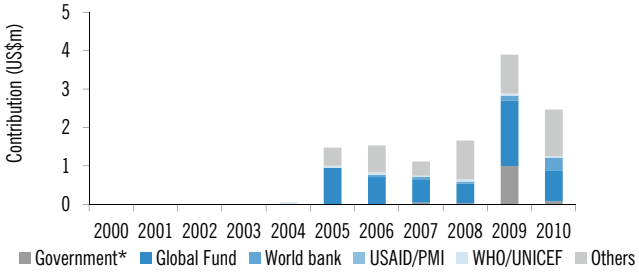
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2005
	ITNs/ LLINs: distributed to all age groups	No	-
IRS	IRS is recommended	Yes	2003
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	Yes	2004
Case management	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	2010
	Pre-referral treatment with recommended medicines	Yes	2004
	Oral artemisinin-based monotherapies are not registered	Yes	2009

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2004
First-line treatment of *P. falciparum*	AS+AQ	2004
Treatment failure of *P. falciparum*	AL	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

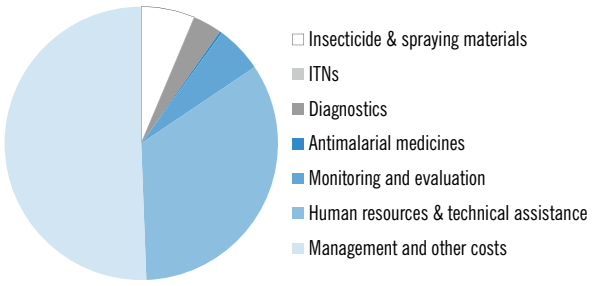
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

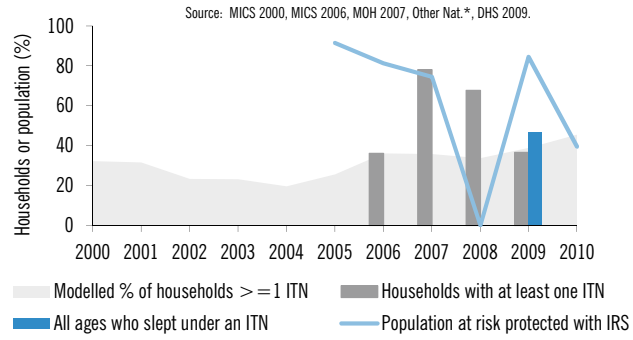


*Budget: costs for sub-national level, health systems, human resources, etc not included.

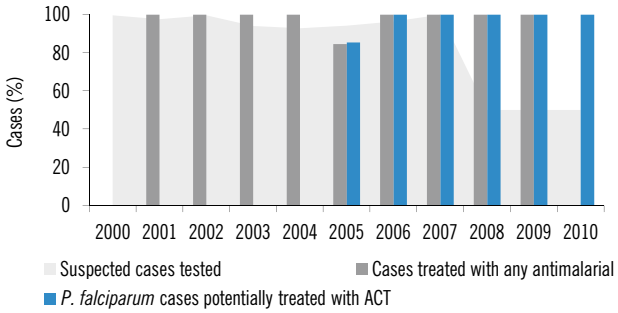
Expenditure by intervention in 2010



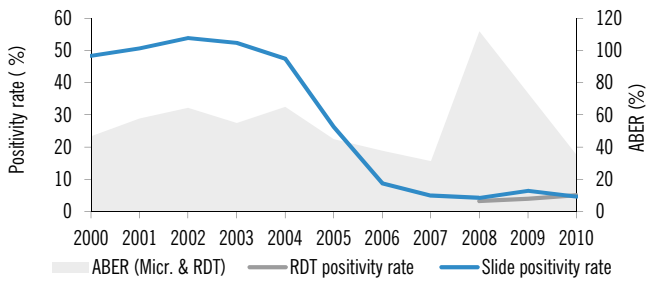
IV. COVERAGE – Coverage of ITN and IRS



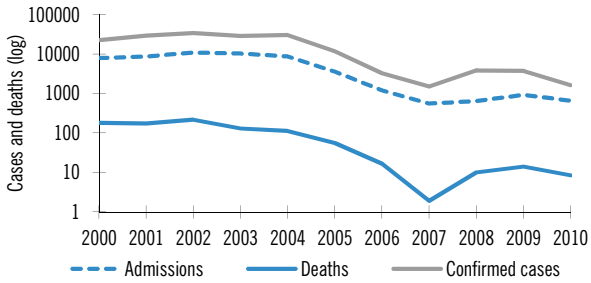
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

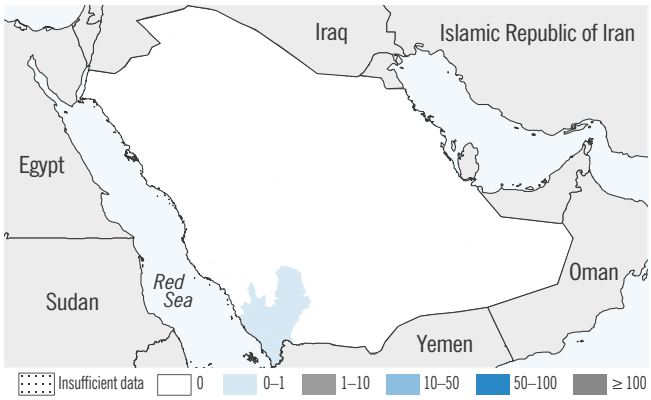


Confirmed cases, admissions and deaths (per 100 000)



Saudi Arabia

Phase: Elimination. Coverage: In 2010, IRS was sufficient to protect >50% of the population at high risk; ITN/LLINs delivered were sufficient to protect 25%–50% of the population at high risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
Number of active foci	68	
Number of people living within active foci	3 150 000	11
Number of people living in malaria-free areas	24 300 000	89
Total	27 450 000	

Parasites and vectors

Major Plasmodium species: *P. falciparum* (46%), *P. vivax*
Major Anopheles species: *An.arabiensis, sergentii, bacroftii, funestus, albimanus*

II. INTERVENTION POLICIES AND STRATEGIES

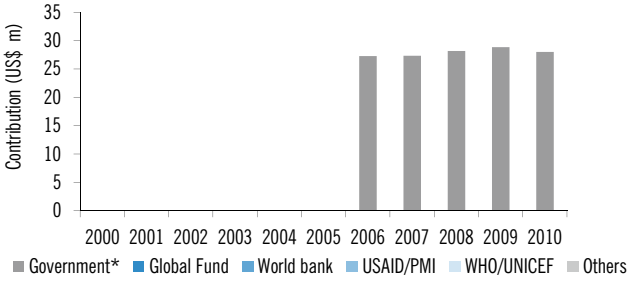
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	-
	ITNs/ LLINs: distributed to all age groups	No	-
IRS	IRS is recommended	-	-
	DDT is used for IRS	No	-
Case management	Malaria diagnosis is free of charge in the public sector	Yes	-
	Gametocidal treatment of P. falciparum cases	No	-
	Radical treatment of P. vivax cases	Yes	-
Surveillance	Foci and case investigation undertaken	No	-
	Case reporting from private sector is mandatory	Yes	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum* (confirmed)	AS+SP	2007
Treatment failure of *P. falciparum*	AL	2007
Treatment of severe malaria	AM ;QN	2007
Treatment of *P. vivax*	CQ+PQ(14d)	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

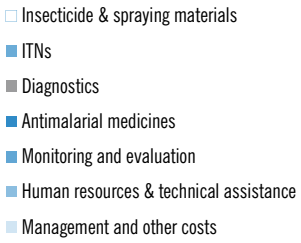
III. FINANCING – Government and external financing



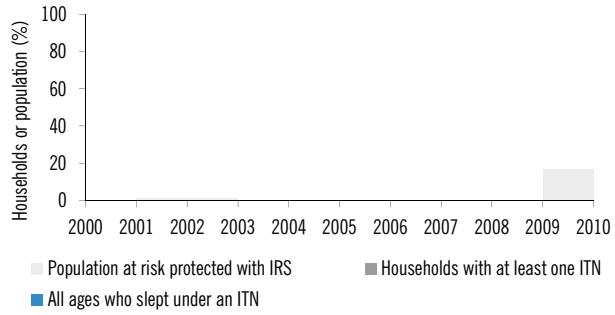
*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2010

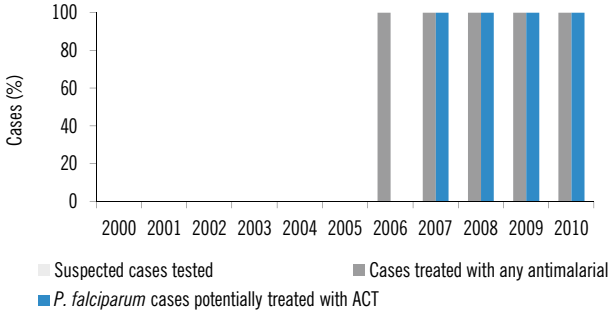
No data reported for 2010



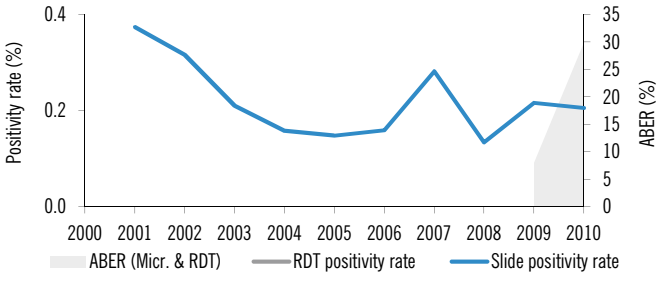
IV. COVERAGE – Coverage of ITN and IRS



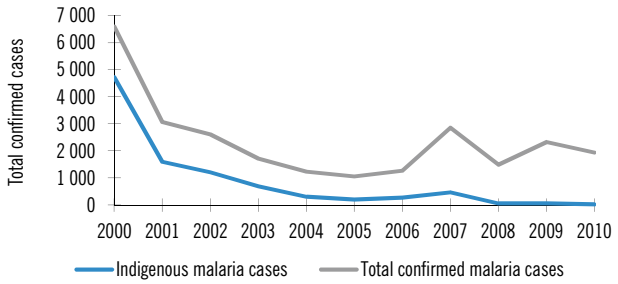
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

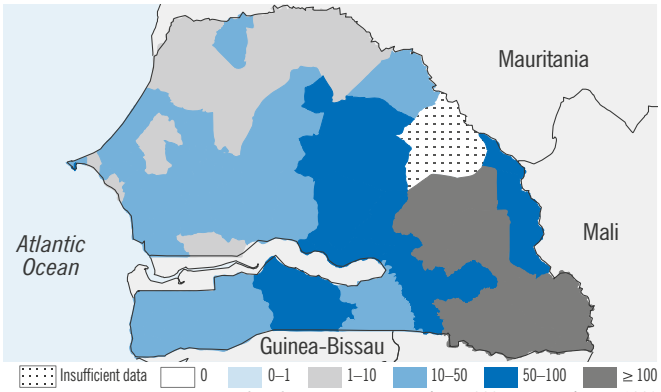


Total confirmed malaria cases and indigenous cases



Senegal

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect >50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population), year:2009

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	11 900 000	96
Low transmission (0-1 cases per 1000 population)	497 000	4
Malaria-free (0 cases)	0	0
Total	12 397 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, arabiensis, funestus, pharoensis*

II. INTERVENTION POLICIES AND STRATEGIES

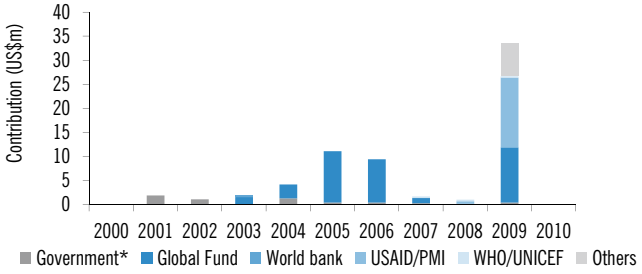
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	1998
	ITNs/ LLINs: distributed to all age groups	Yes	1998
IRS	IRS is recommended	Yes	2005
	DDT is used for IRS	-	-
IPT	IPT used to prevent malaria during pregnancy	Yes	2004
Case management	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	-	-
	Pre-referral treatment with recommended medicines	Yes	2005
	Oral artemisinin-based monotherapies are not registered	-	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2005
First-line treatment of *P. falciparum*	AL ;AS+AQ	2005
Treatment failure of *P. falciparum*	-	-
Treatment of severe malaria	QN	2005
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

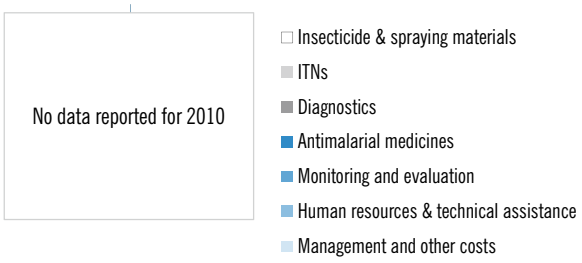
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+AQ	2002–2008	7	0	0	0.5	28 days
AL	2002–2008	6	0	0.85	3.2	28 days

III. FINANCING – Government and external financing

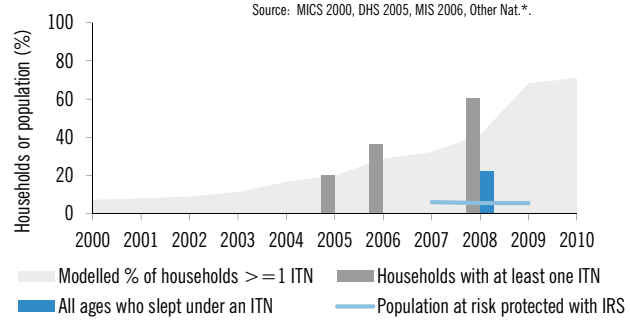


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

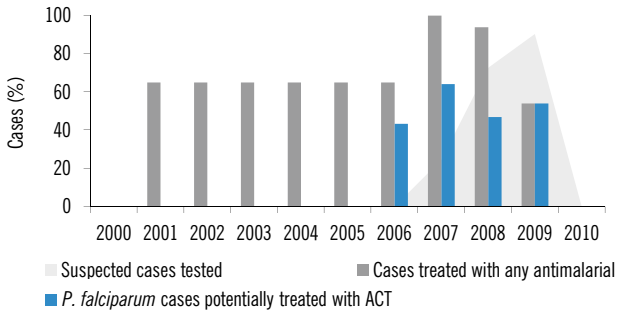
Expenditure by intervention in 2010



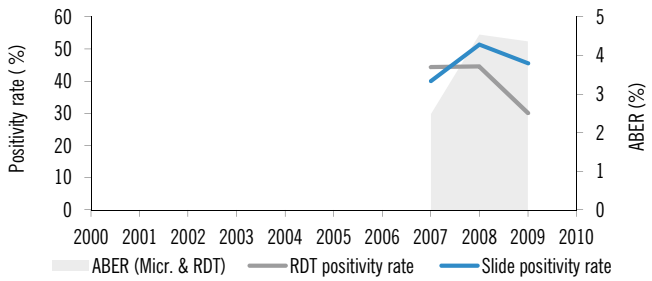
IV. COVERAGE – Coverage of ITN and IRS



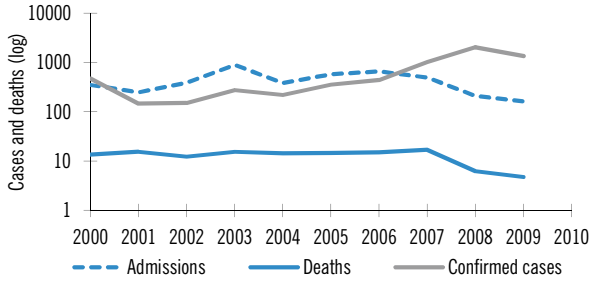
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

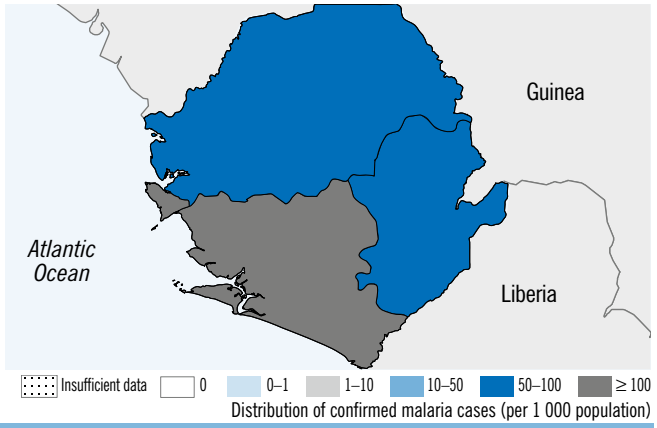


Confirmed cases, admissions and deaths (per 100 000)



Sierra Leone

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect 25%–50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	5 870 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	5 870 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, funestus, melas*

II. INTERVENTION POLICIES AND STRATEGIES

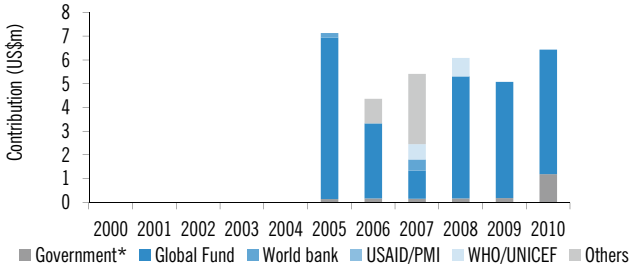
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2002
	ITNs/ LLINs: distributed to all age groups	Yes	2003
IRS	IRS is recommended	Yes	2010
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	Yes	2006
Case management	Patients of all ages should receive diagnostic test	Yes	2010
	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	2006
	Oral artemisinin-based monotherapies are not registered	No	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2004
First-line treatment of *P. falciparum*	AL ;AS+AQ	2004
Treatment failure of *P. falciparum*	QN	2004
Treatment of severe malaria	AM ;QN	2004
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

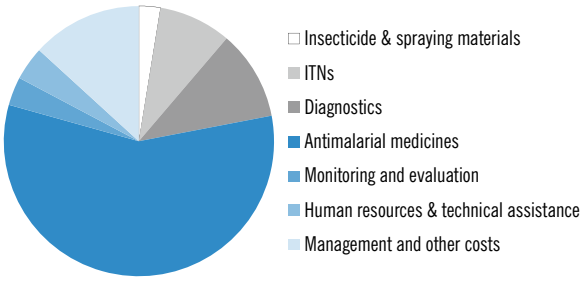
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+AQ	2004–2004	1	27	27	27	28 days

III. FINANCING – Government and external financing

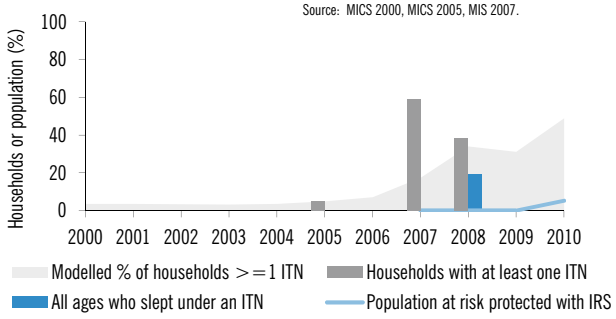


*Budget: costs for sub-national level, health systems, human resources, etc not included.

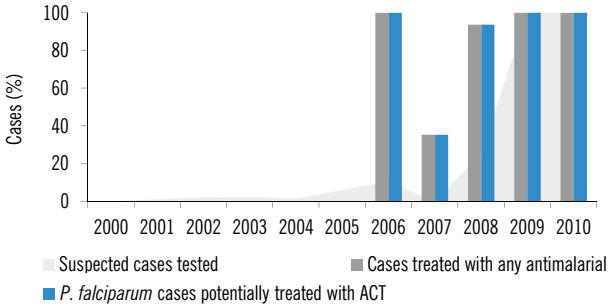
Expenditure by intervention in 2010



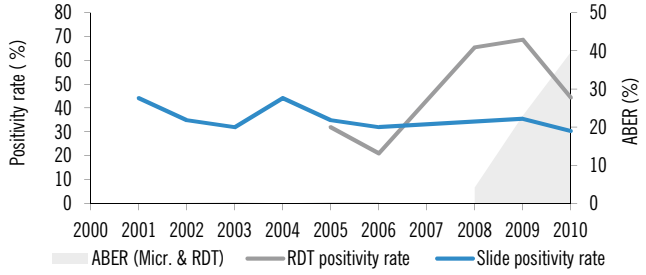
IV. COVERAGE – Coverage of ITN and IRS



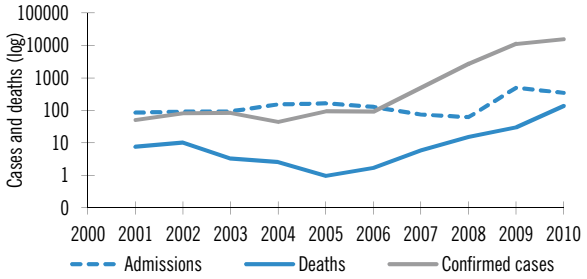
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

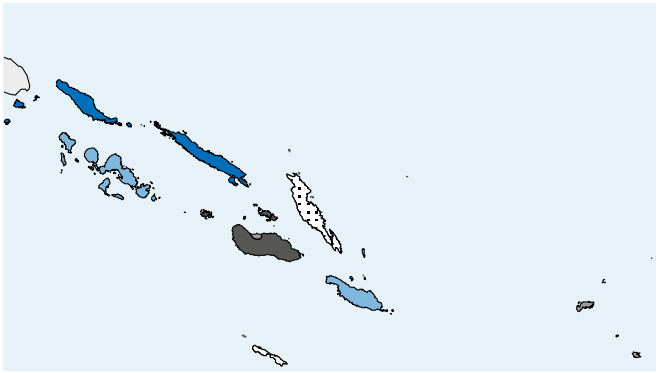


Confirmed cases, admissions and deaths (per 100 000)



Solomon Islands

Phase: Control. Coverage: In 2010, IRS was sufficient to protect 25%–50% of the population at high risk; ITN/LLINs delivered were sufficient to protect >50% of the population at high risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	533 000	99
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	5 380	1
Total	538 380	

Parasites and vectors

Major plasmodium species: *P. falciparum* (65%), *P. vivax*
Major anopheles species: *An. farauti, punctulatus, koliensis*

II. INTERVENTION POLICIES AND STRATEGIES

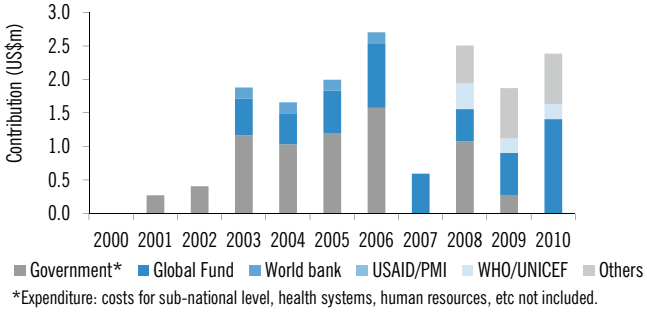
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2006
	ITNs/ LLINs: distributed to all age groups	Yes	1996
IRS	IRS is recommended	-	-
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	-	-
Case management	Patients of all ages should receive diagnostic test	Yes	1968
	RDTs used at community level	-	-
	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	Yes	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	AL	2007
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 (therapeutic or parasitological failure, %)

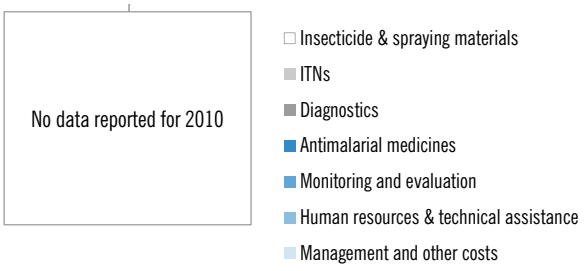
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AL	2008–2008	1	0	0	0	28 days

III. FINANCING – Government and external financing

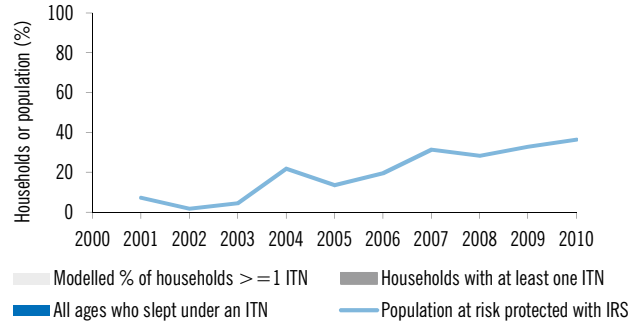


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

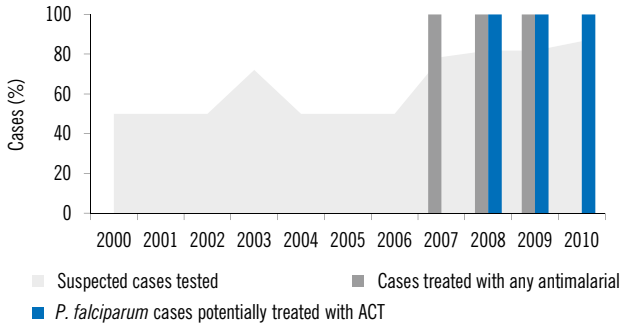
Expenditure by intervention in 2010



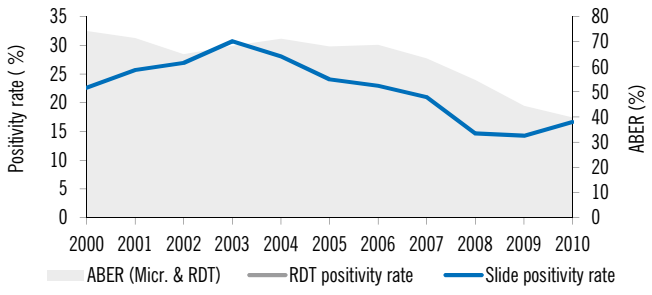
IV. COVERAGE – Coverage of ITN and IRS



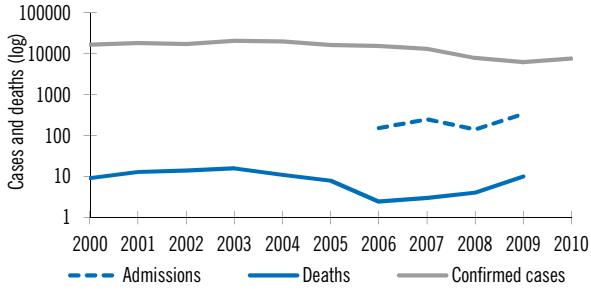
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

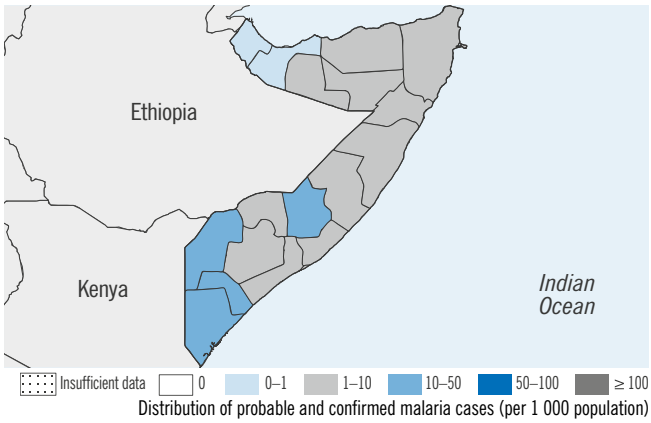


Confirmed cases, admissions and deaths (per 100 000)



Somalia

Phase: Control.



Distribution of probable and confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	6 530 000	70
Low transmission (0-1 cases per 1000 population)	2 800 000	30
Malaria-free (0 cases)	0	0
Total	9 330 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%) *P. vivax*
Major anopheles species: *An. arabiensis, funestus*

II. INTERVENTION POLICIES AND STRATEGIES

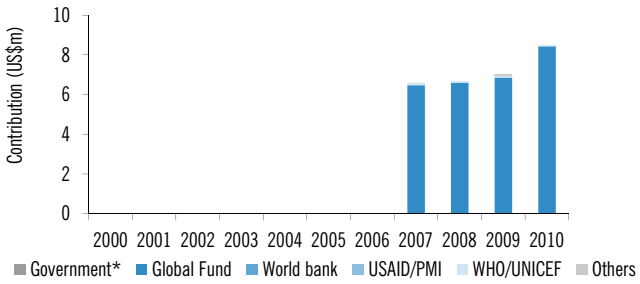
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2005
	ITNs/ LLINs: distributed to all age groups	Yes	2006
IRS	IRS is recommended	Yes	2004
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	Yes	2005
Case management	Patients of all ages should receive diagnostic test	Yes	2006
	RDTs used at community level	Yes	2010
	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	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+SP	2006
First-line treatment of *P. falciparum*	AS+SP	2006
Treatment failure of *P. falciparum*	QN	2006
Treatment of severe malaria	QN	2006
Treatment of *P. vivax*	CQ+PQ(14d)	2006

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

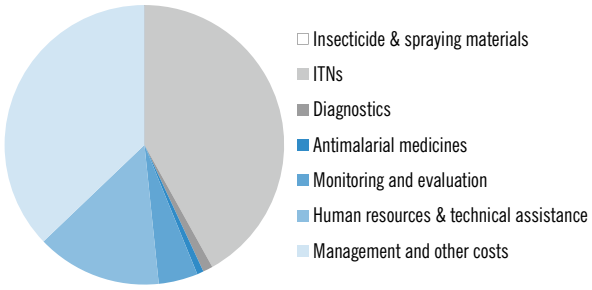
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+SP	2004–2006	3	0	1	5.1	28 days

III. FINANCING – Government and external financing

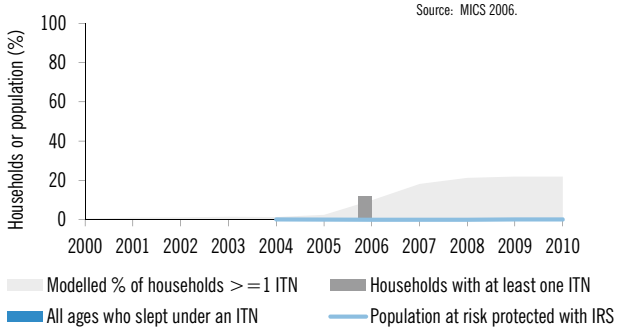


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

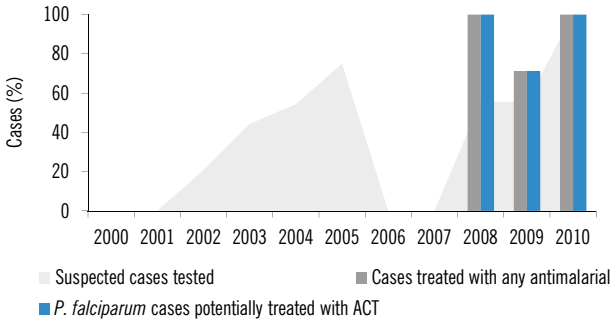
Expenditure by intervention in 2010



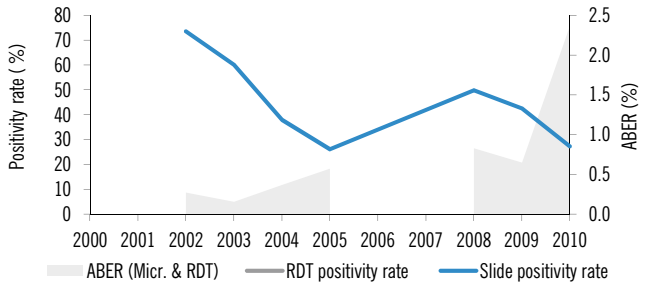
IV. COVERAGE – Coverage of ITN and IRS



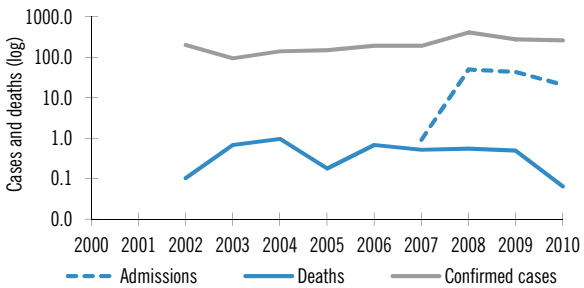
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER



Confirmed cases, admissions and deaths (per 100 000)



South Africa

Phase: Control. Coverage: In 2010, IRS was sufficient to protect >50% of the population at risk.

Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	2 010 000	4
Low transmission (0-1 cases per 1000 population)	3 010 000	6
Malaria-free (0 cases)	45 100 000	90
Total	50 120 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (58%), *P. vivax*
Major anopheles species: *An. arabiensis, funestus, albitarsis*

II. INTERVENTION POLICIES AND STRATEGIES

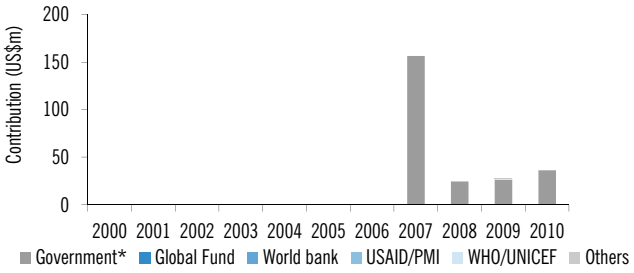
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	No	-
	ITNs/ LLINs: distributed to all age groups	No	-
IRS	IRS is recommended	Yes	-
	DDT is used for IRS	Yes	1945
IPT	IPT used to prevent malaria during pregnancy	No	-
Case management	Patients of all ages should receive diagnostic test	Yes	-
	RDTs used at community level	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	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	AL ;QN+CL ;QN+D	2001
Treatment failure of *P. falciparum*	AS ;QN	2001
Treatment of severe malaria	QN	2001
Treatment of *P. vivax*	AL+PQ ;CQ+PQ	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

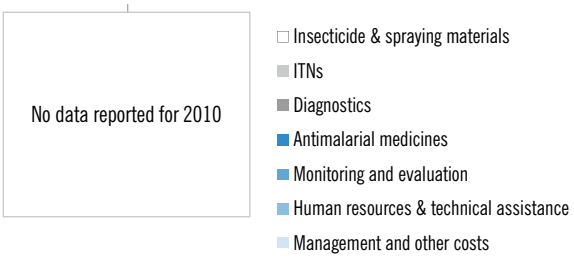
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AL	2002–2007	3	0	0	5.2	28 days

III. FINANCING – Government and external financing

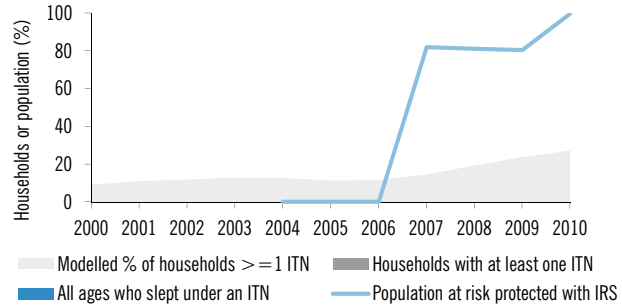


*Budget: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2010

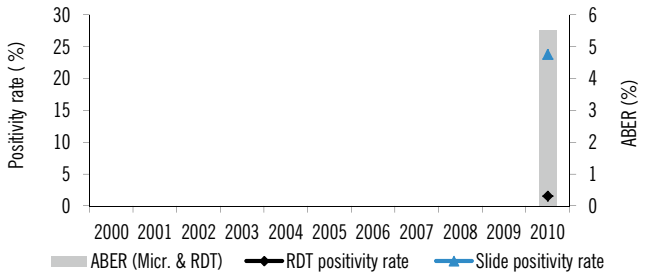


IV. COVERAGE – Coverage of ITN and IRS

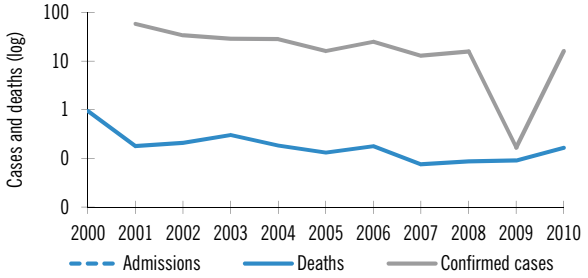


Cases tested and ACT delivered: Programme data (public sector)

V. IMPACT – Malaria test positivity rate and ABER

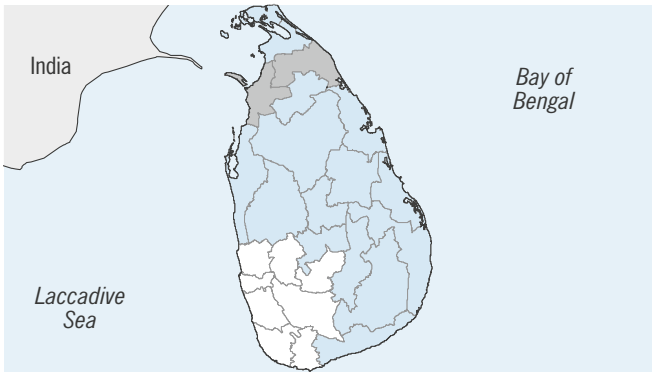


Confirmed cases, admissions and deaths (per 100 000)



Sri Lanka

Phase: Pre-elimination. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect 25%–50% of the population at high risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
Number of active foci	217	
Number of people living within active foci	4 880 000	23
Number of people living in malaria-free areas	16 000 000	77
Total	20 880 000	

Parasites and vectors

Major Plasmodium species: *P. falciparum* (2%), *P. vivax*
Major Anopheles species: *An.culicifacies, subpictus*

II. INTERVENTION POLICIES AND STRATEGIES

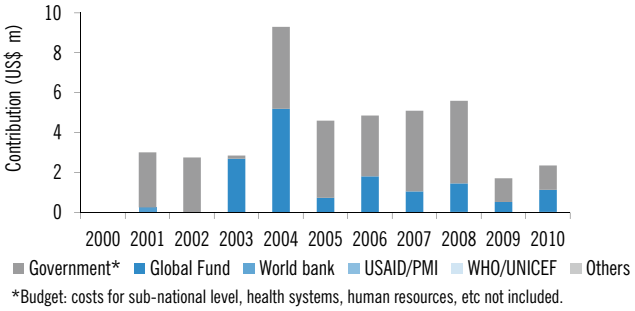
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	1992
	ITNs/ LLINs: distributed to all age groups	Yes	2004
IRS	IRS is recommended	Yes	1945
	DDT is used for IRS	No	-
Case management	Malaria diagnosis is free of charge in the public sector	Yes	1911
	Malaria treatment is permitted in the private sector	Yes	-
	Malaria treatment is free of charge in the private sector	No	-
	Radical treatment of P. vivax cases	Yes	-
Surveillance	Foci and case investigation undertaken	Yes	1958
	Case reporting from private sector is mandatory	Yes	2008

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum* (confirmed)	AL+PQ	2008
Treatment failure of *P. falciparum*	-	-
Treatment of severe malaria	QN	1936
Treatment of *P. vivax*	CQ+PQ(14d)	2008

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

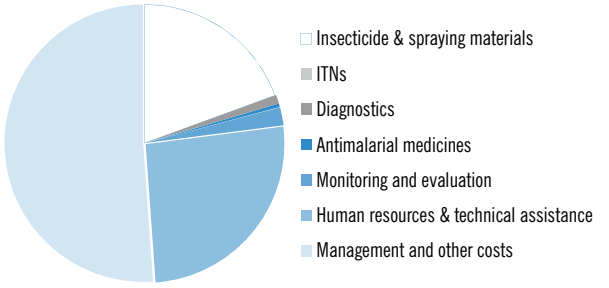
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

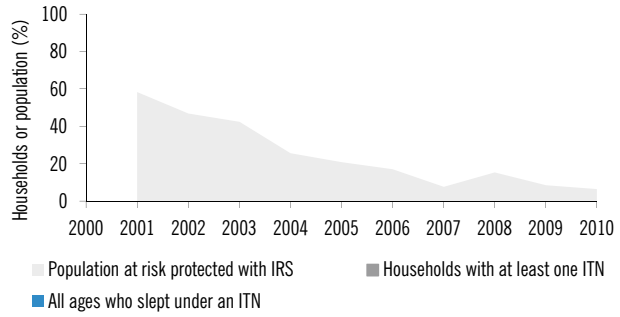


*Budget: costs for sub-national level, health systems, human resources, etc not included.

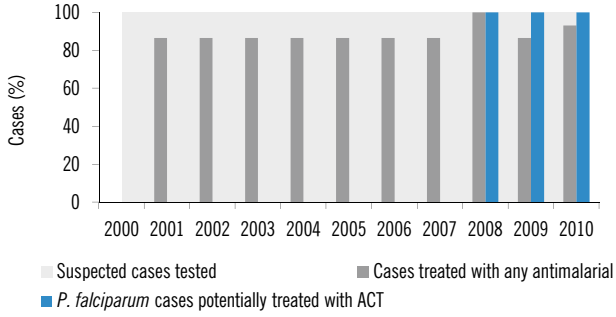
Expenditure by intervention in 2010



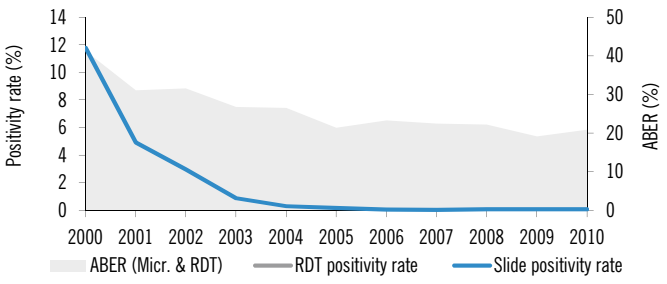
IV. COVERAGE – Coverage of ITN and IRS



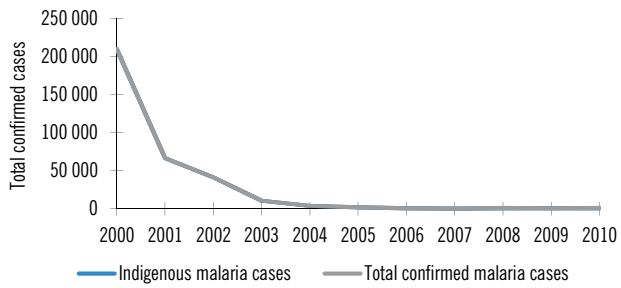
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER



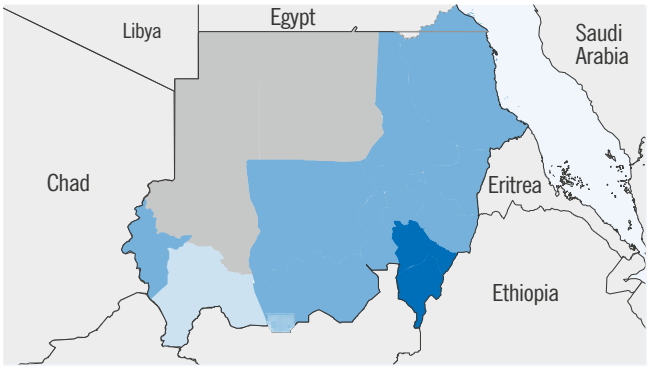
Total confirmed malaria cases and indigenous cases



Sudan

north (low transmission)

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect >50% of the population at high risk.



Distribution of probable and confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	28 300 000	83
Low transmission (0-1 cases per 1000 population)	5 790 000	17
Malaria-free (0 cases)	0	0
Total	34 090 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (95%), *P. vivax*
Major anopheles species: *An. arabiensis, gambiae, funestus*

II. INTERVENTION POLICIES AND STRATEGIES

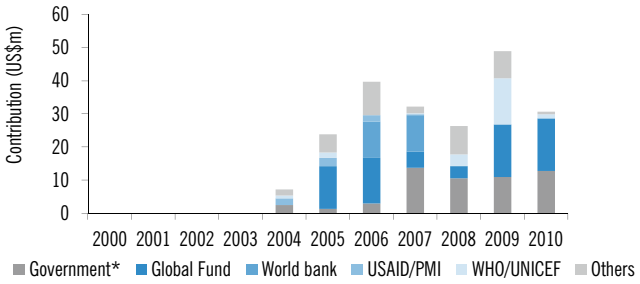
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2005
	ITNs/ LLINs: distributed to all age groups	Yes	2010
IRS	IRS is recommended	Yes	1956
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	Yes	-
Case management	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

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+SP	2006
First-line treatment of *P. falciparum*	AS+SP	2006
Treatment failure of *P. falciparum*	AL	2006
Treatment of severe malaria	AM ;QN	2006
Treatment of *P. vivax*	AL	2006

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing



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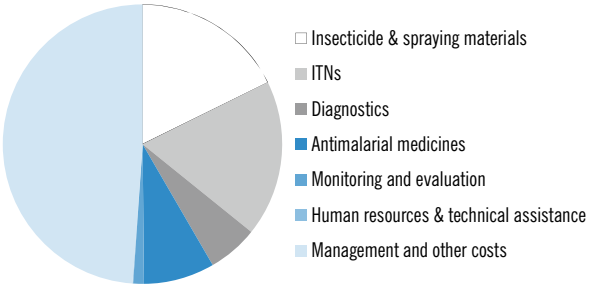
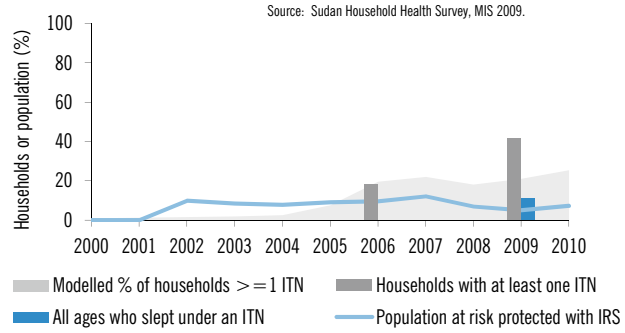
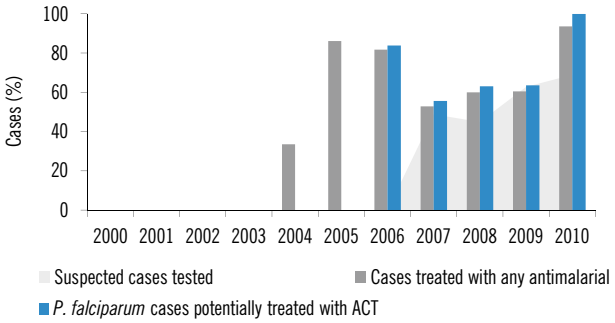
Expenditure by intervention in 2010



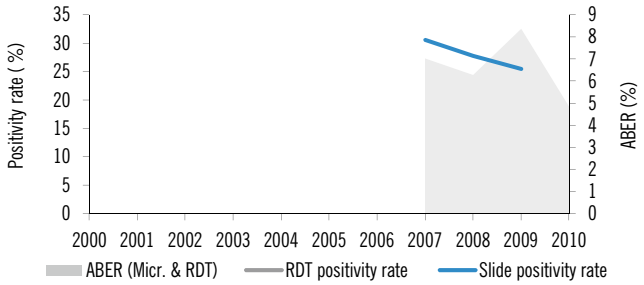
IV. COVERAGE – Coverage of ITN and IRS



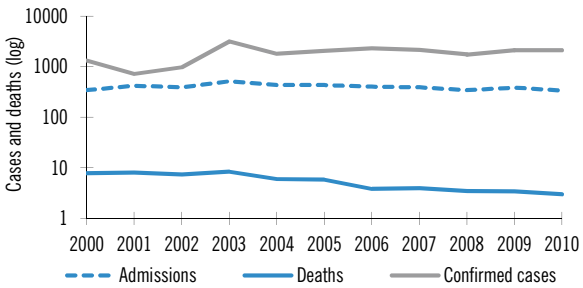
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER



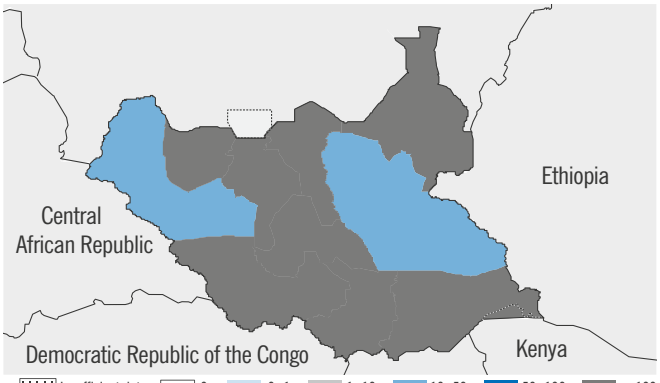
Confirmed cases, admissions and deaths (per 100 000)



Sudan

south (high transmission)

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect >50% of the population at high risk.



Distribution of probable and confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	9 110 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	9 110 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. arabiensis, funestus*

II. INTERVENTION POLICIES AND STRATEGIES

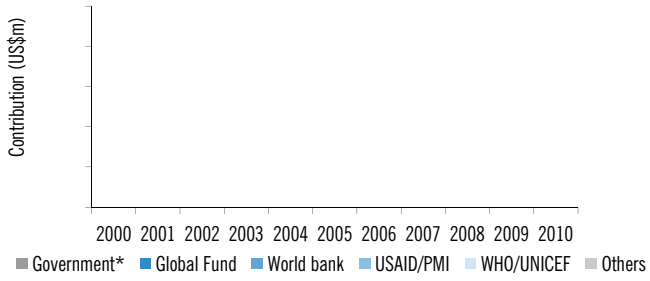
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2008
	ITNs/ LLINs: distributed to all age groups	Yes	2008
IRS	IRS is recommended	-	-
	DDT is used for IRS	-	-
IPT	IPT used to prevent malaria during pregnancy	Yes	2005
Case management	Patients of all ages should receive diagnostic test	-	-
	RDTs used at community level	-	-
	ACT is free for all ages in public sector	Yes	-
	Pre-referral treatment with recommended medicines	Yes	2005
	Oral artemisinin-based monotherapies are not registered	-	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2006
First-line treatment of *P. falciparum*	AS+AQ	2006
Treatment failure of *P. falciparum*	AL	2006
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	CQ	2004

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

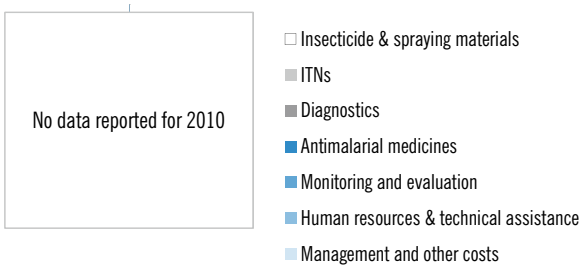
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

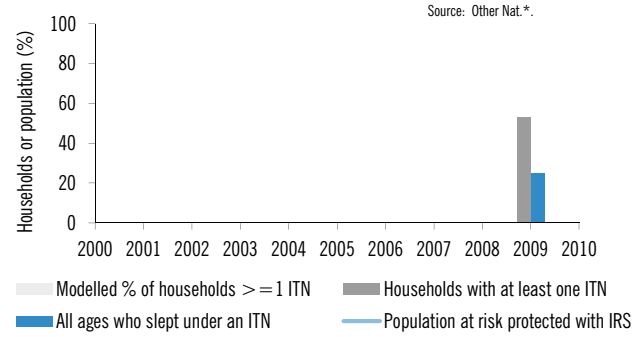


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

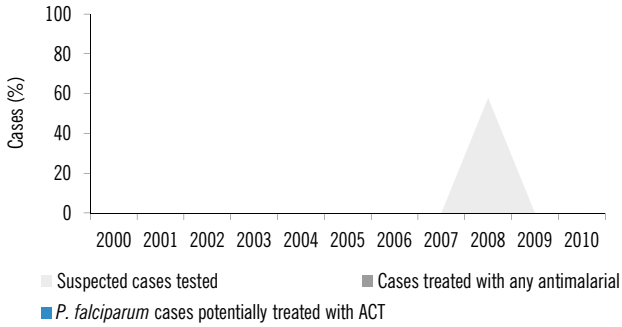
Expenditure by intervention in 2010



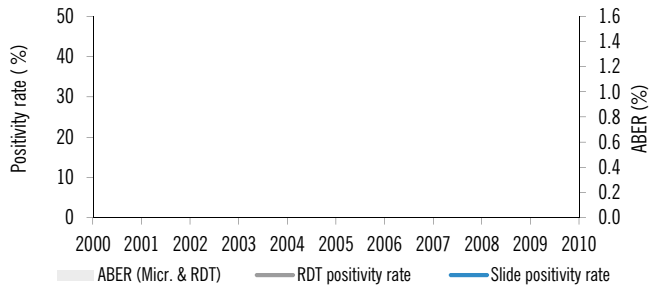
IV. COVERAGE – Coverage of ITN and IRS



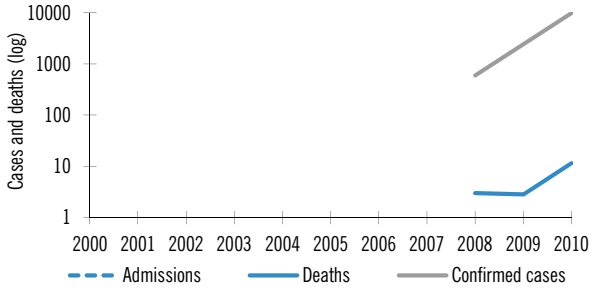
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER



Confirmed cases, admissions and deaths (per 100 000)



Suriname

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect 25%–50% of the population at high risk.

Distribution of confirmed malaria cases (per 1 000 population), data 2009

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	82 400	16
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	442 000	84
Total	524 400	

Parasites and vectors

Major plasmodium species: *P. falciparum* (40%), *P. vivax*
Major anopheles species: *An. darlingi*

II. INTERVENTION POLICIES AND STRATEGIES

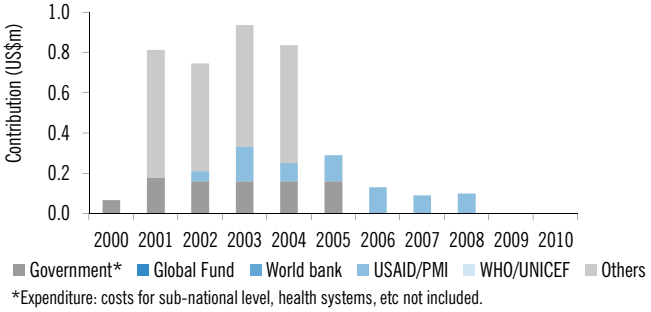
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2005
	ITNs/ LLINs: distributed to all age groups	Yes	2006
IRS	IRS is recommended	Yes	-
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	Patients of all ages should receive diagnostic test	Yes	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	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	AL	2004
Treatment failure of *P. falciparum*	QN	2004
Treatment of severe malaria	-	-
Treatment of *P. vivax*	CQ+PQ	2004

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

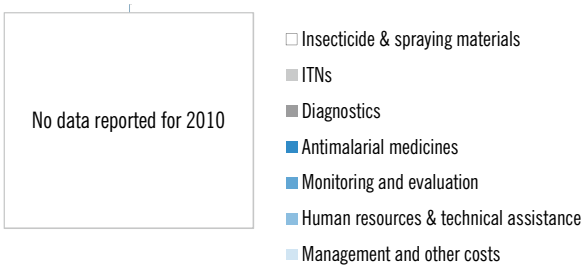
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AL	2003–2006	3	1.9	2	4.7	28 days

III. FINANCING – Government and external financing

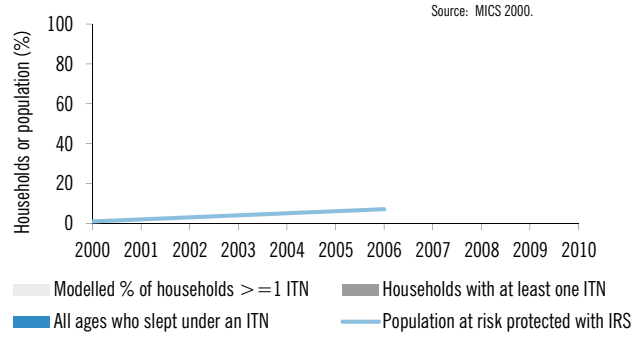


*Expenditure: costs for sub-national level, health systems, etc not included.

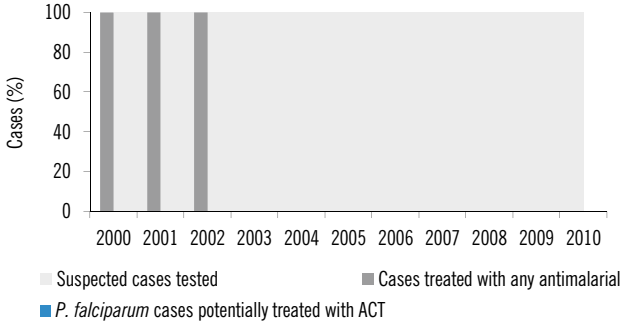
Expenditure by intervention in 2010



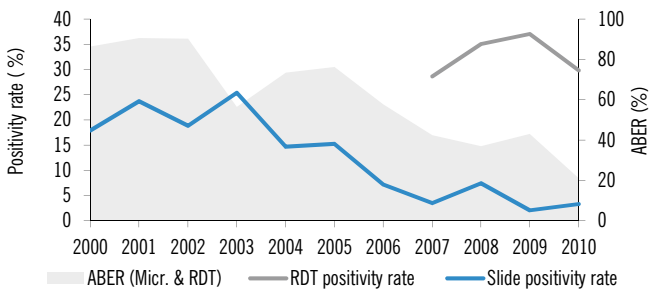
IV. COVERAGE – Coverage of ITN and IRS



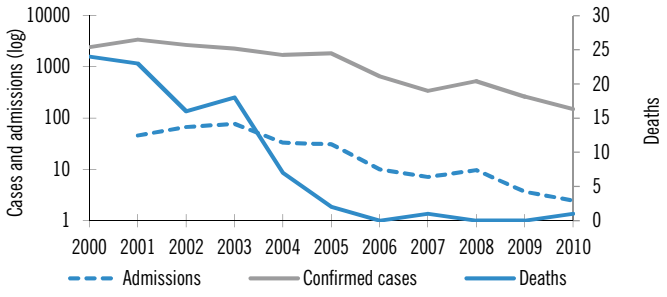
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER



Confirmed cases, admissions (per 100 000) and deaths



Swaziland

Phase: Control. Coverage: In 2010, IRS was sufficient to protect >50% of the population at risk; ITN/LLINs delivered were sufficient to protect >50% of the population at risk.

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)	332 000	28
Malaria-free (0 cases)	854 000	72
Total	1 186 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, arabiensis, funestus*

II. INTERVENTION POLICIES AND STRATEGIES

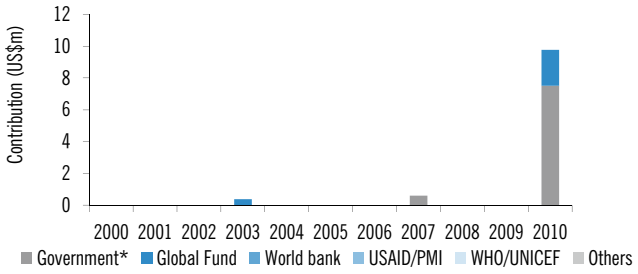
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2003
	ITNs/ LLINs: distributed to all age groups	Yes	2010
IRS	IRS is recommended	Yes	1956
	DDT is used for IRS	Yes	1956
IPT	IPT used to prevent malaria during pregnancy	No	-
Case management	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
	Oral artemisinin-based monotherapies are not registered	No	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	AL	2009
Treatment failure of *P. falciparum*	QN	2009
Treatment of severe malaria	QN	-
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

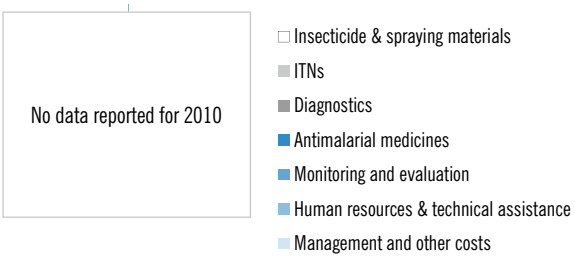
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

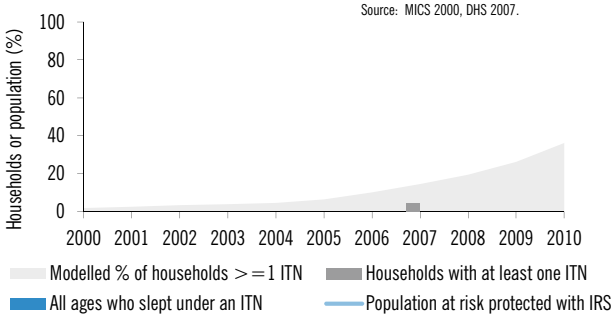


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

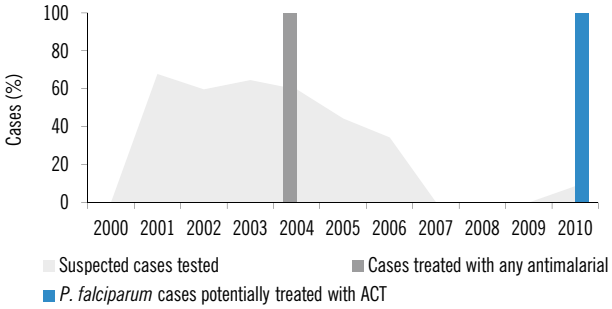
Expenditure by intervention in 2010



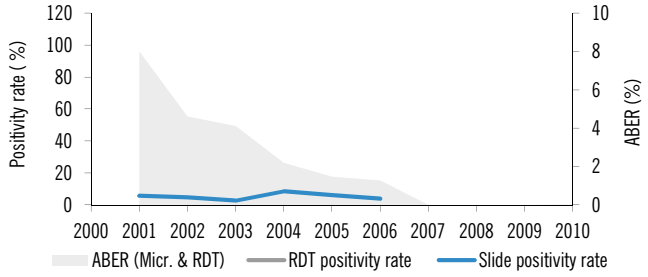
IV. COVERAGE – Coverage of ITN and IRS



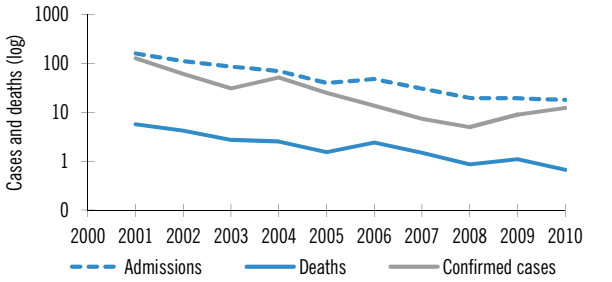
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER



Confirmed cases, admissions and deaths (per 100 000)



Tajikistan

Phase: Elimination. 111 indigenous cases reported in Tajikistan in 2010. No locally acquired P.falciparum cases registered since 2009. Malaria programme aimed to interrupt P.vivax transmission by 2015 is funded by the government, the Global Fund and WHO.

Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
Number of active foci	67	
Number of people living within active foci	2 710 000	39
Number of people living in malaria-free areas	4 170 000	61
Total	6 880 000	

Parasites and vectors

Major Plasmodium species: *P. falciparum* (1%), *P. vivax*
Major Anopheles species: *An.superpictus, pulcherrimus*

II. INTERVENTION POLICIES AND STRATEGIES

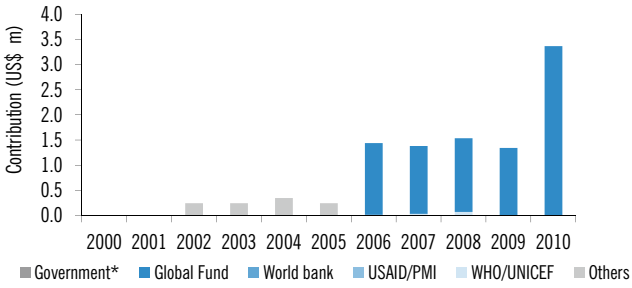
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2006
	ITNs/ LLINs: distributed to all age groups	Yes	2006
IRS	IRS is recommended	Yes	1997
	DDT is used for IRS	No	-
Case management	Malaria diagnosis is free of charge in the public sector	Yes	1997
	Gametocidal treatment of P.falciparum cases	-	-
	Radical treatment of P. vivax cases	Yes	1997
Surveillance	Foci and case investigation undertaken	Yes	2007
	Case reporting from private sector is mandatory	-	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum* (confirmed)	AL	2008
Treatment failure of *P. falciparum*	QN	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	CQ+PQ(14d)	2004

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

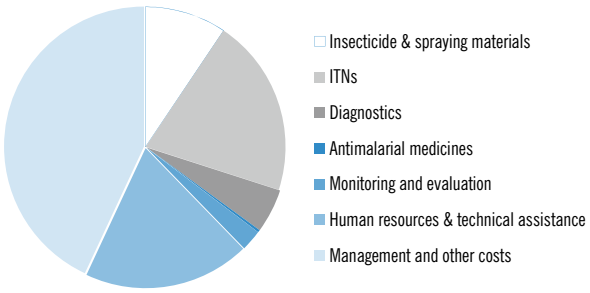
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
QN	2003–2003	1	0	0	0	28 days

III. FINANCING – Government and external financing



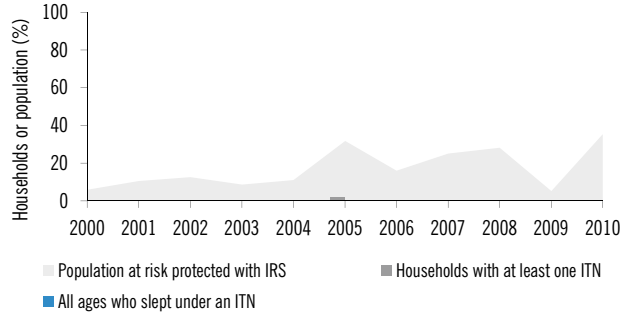
*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

Expenditure by intervention in 2010

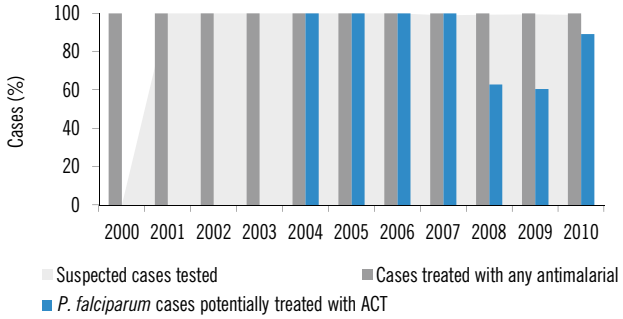


IV. COVERAGE – Coverage of ITN and IRS

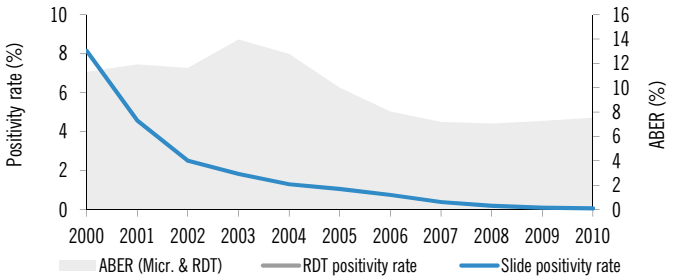
Source: MICS 2005.



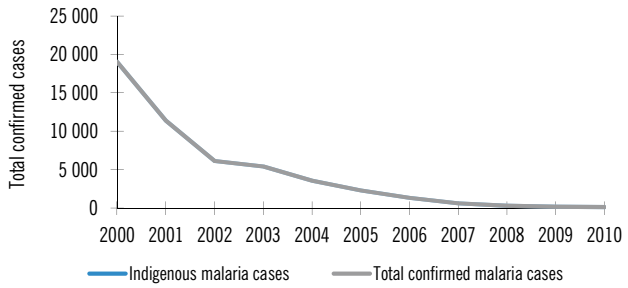
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

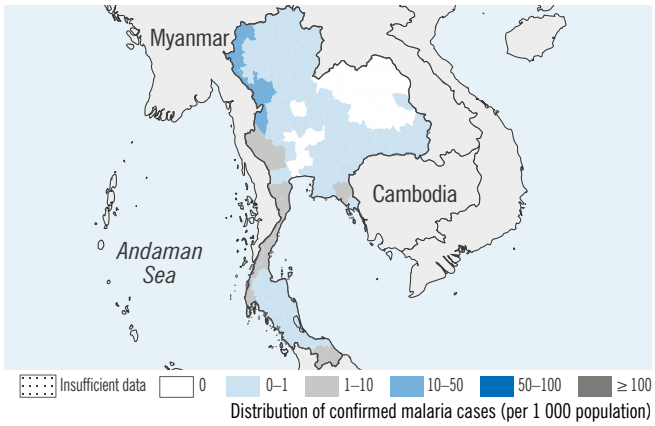


Total confirmed malaria cases and indigenous cases



Thailand

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect 25%–50% of the population at high risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	5 530 000	8
Low transmission (0-1 cases per 1000 population)	29 000 000	42
Malaria-free (0 cases)	34 600 000	50
Total	69 130 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (42%), *P. vivax*
Major anopheles species: *An. minimus, dirus, maculatus, campestris, philippinensis, sundaicus*

II. INTERVENTION POLICIES AND STRATEGIES

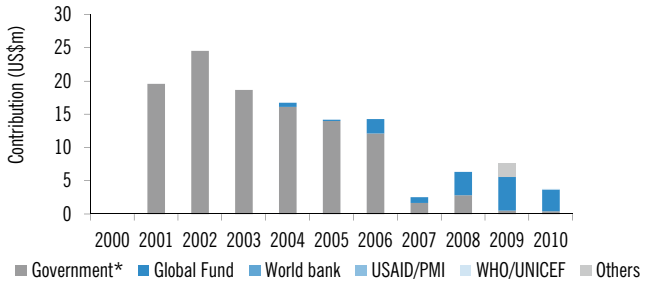
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2008
	ITNs/ LLINs: distributed to all age groups	Yes	2008
IRS	IRS is recommended	Yes	2003
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	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	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	AS+MQ	-
Treatment failure of *P. falciparum*	QN+D	-
Treatment of severe malaria	AS ;QN	-
Treatment of *P. vivax*	CQ+PQ(14d)	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

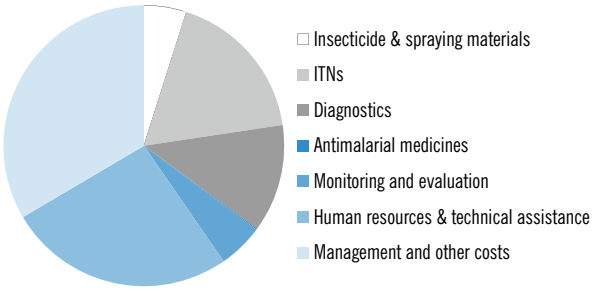
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+MQ	2001–2009	20	0	0.5	10.4	28 days

III. FINANCING – Government and external financing

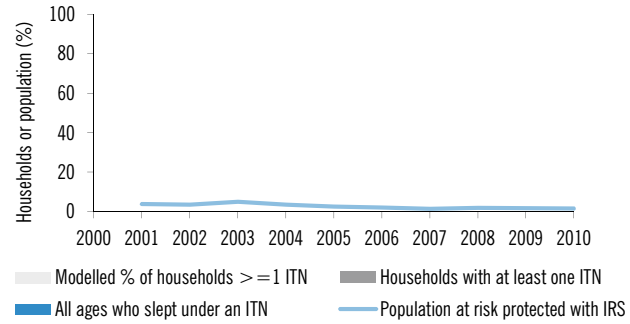


*Budget: costs for sub-national level, health systems, human resources, etc not included.

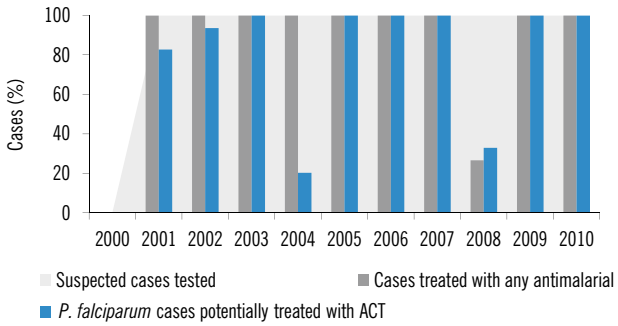
Expenditure by intervention in 2010



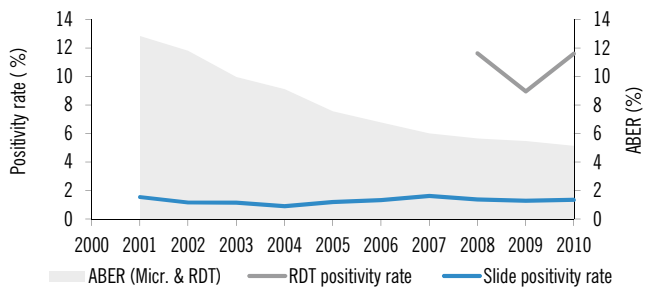
IV. COVERAGE – Coverage of ITN and IRS



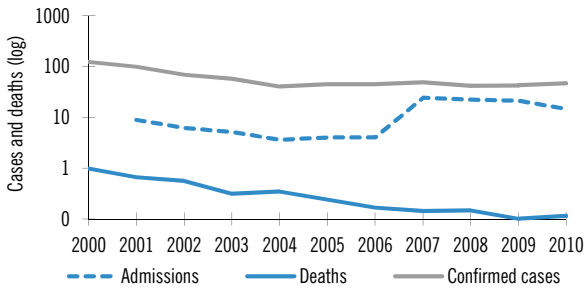
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

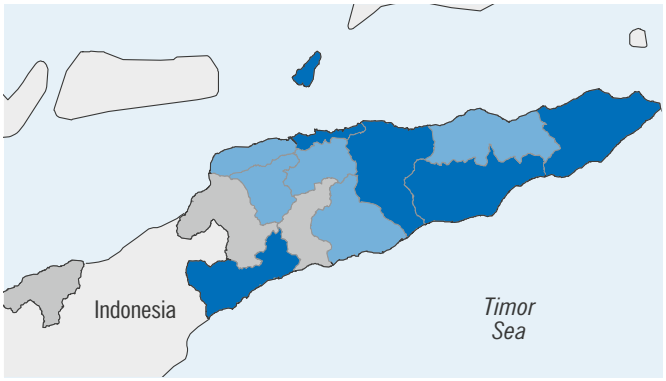


Confirmed cases, admissions and deaths (per 100 000)



Democratic Republic of Timor-Leste

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect >50% of the population at high risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	866 000	77
Low transmission (0-1 cases per 1000 population)	259 000	23
Malaria-free (0 cases)	0	0
Total	1 125 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (72%), *P. vivax*
Major anopheles species: *An. subpictus*

II. INTERVENTION POLICIES AND STRATEGIES

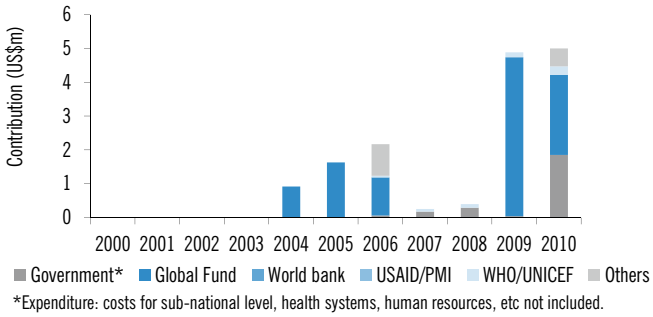
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2003
	ITNs/ LLINs: distributed to all age groups	Yes	2007
IRS	IRS is recommended	Yes	2006
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	Patients of all ages should receive diagnostic test	Yes	2007
	RDTs used at community level	Yes	2007
	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	Yes	2007

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	AL	-
Treatment failure of *P. falciparum*	QN+D	-
Treatment of severe malaria	AM ;QN	-
Treatment of *P. vivax*	CQ+PQ(14d)	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

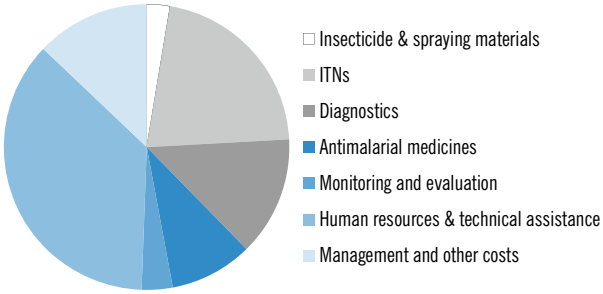
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

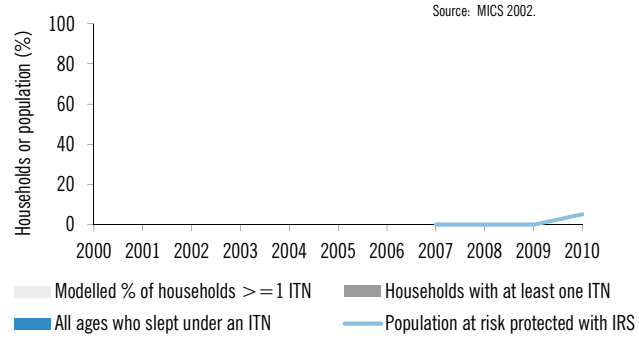


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

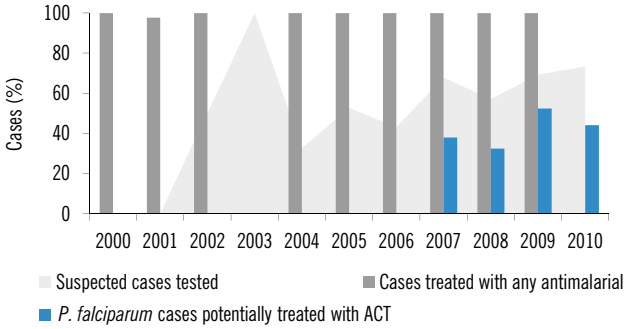
Expenditure by intervention in 2010



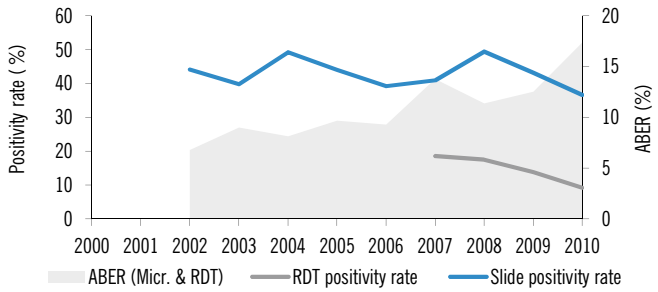
IV. COVERAGE – Coverage of ITN and IRS



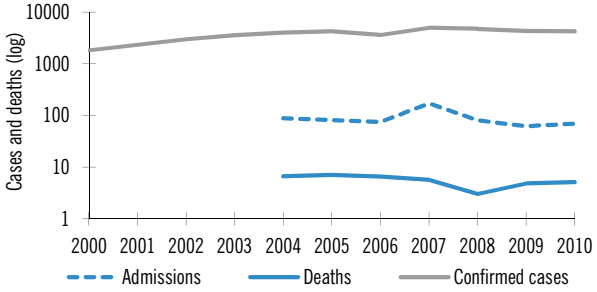
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

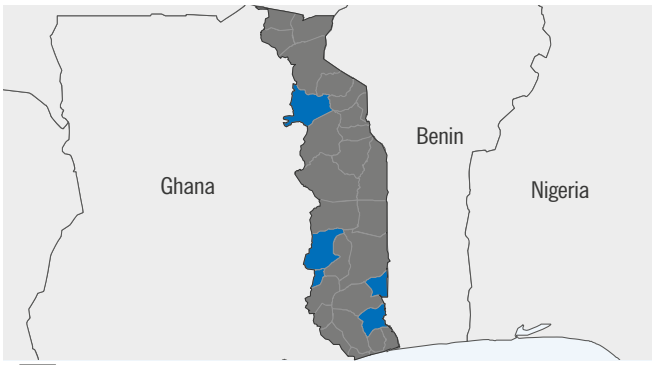


Confirmed cases, admissions and deaths (per 100 000)



Togo

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect >50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	6 030 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	6 030 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, funestus, melas*

II. INTERVENTION POLICIES AND STRATEGIES

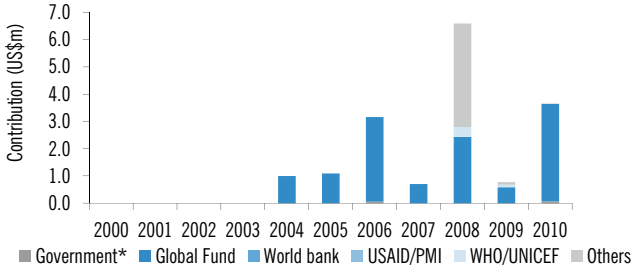
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	No	-
	ITNs/ LLINs: distributed to all age groups	No	-
IRS	IRS is recommended	No	-
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	Yes	2005
Case management	Patients of all ages should receive diagnostic test	Yes	2009
	RDTs used at community level	Yes	2007
	ACT is free for all ages in public sector	No	-
	Pre-referral treatment with recommended medicines	Yes	2006
	Oral artemisinin-based monotherapies are not registered	Yes	2004

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL ;AS+AQ	-
First-line treatment of *P. falciparum*	AL ;AS+AQ	-
Treatment failure of *P. falciparum*	-	-
Treatment of severe malaria	QN	-
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

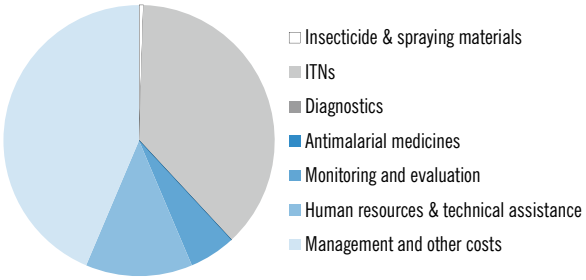
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+AQ	2005–2008	6	0	0	6.1	28 days
AL	2005–2008	6	0	1.45	4.4	28 days

III. FINANCING – Government and external financing

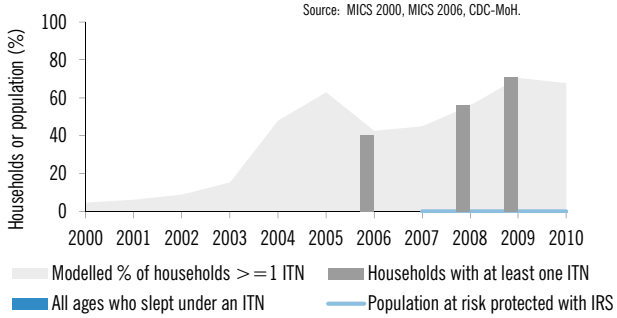


*Budget: costs for sub-national level, health systems, human resources, etc not included.

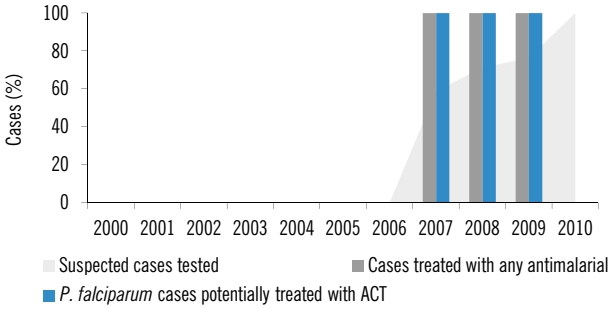
Expenditure by intervention in 2010



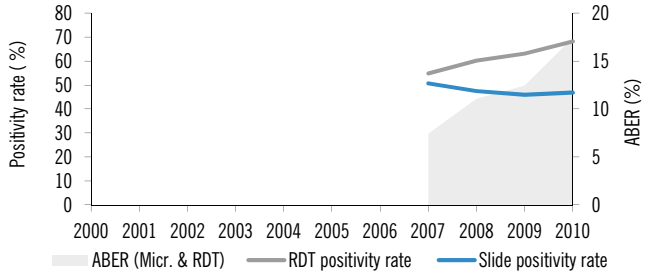
IV. COVERAGE – Coverage of ITN and IRS



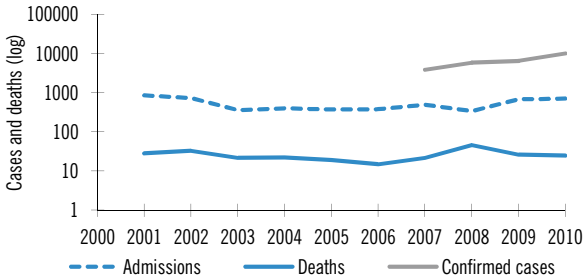
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER



Confirmed cases, admissions and deaths (per 100 000)



Turkey

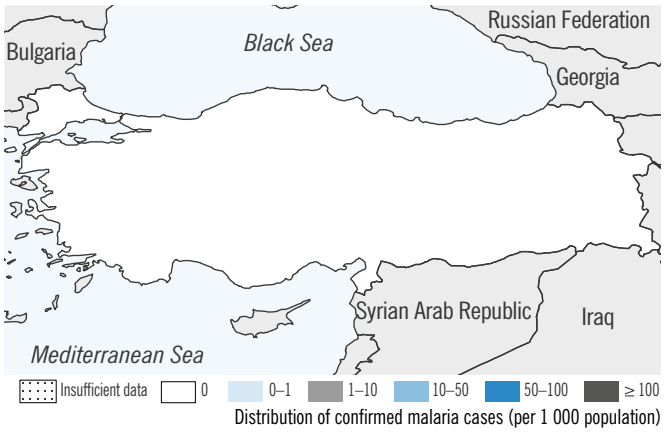
Phase: Elimination. The number of malaria cases decreased from 9,465 in 2000 to 78 in 2010, of which 9 only is indigenous cases. National malaria elimination strategy aims for interruption of transmission by 2012.

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
Number of active foci	0	
Number of people living within active foci	0	0
Number of people living in malaria-free areas	72 800 000	100
Total	72 800 000	

Parasites and vectors

Major Plasmodium species: *P. vivax*
Major Anopheles species: *An.sacharovi, superpictus*



Distribution of confirmed malaria cases (per 1 000 population)

II. INTERVENTION POLICIES AND STRATEGIES

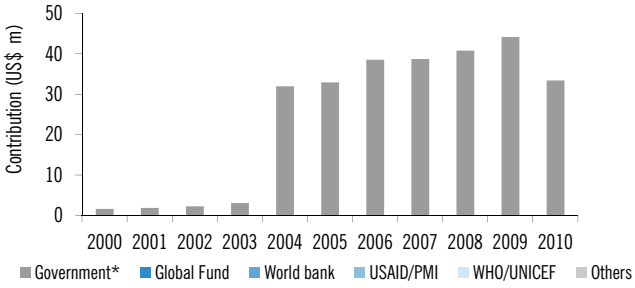
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	No	-
	ITNs/ LLINs: distributed to all age groups	No	-
IRS	IRS is recommended	Yes	2000
	DDT is used for IRS	No	-
Case management	Malaria diagnosis is free of charge in the public sector	Yes	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

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum* (confirmed)	-	-
Treatment failure of *P. falciparum*	-	-
Treatment of severe malaria	-	-
Treatment of *P. vivax*	CQ+PQ(14d)	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

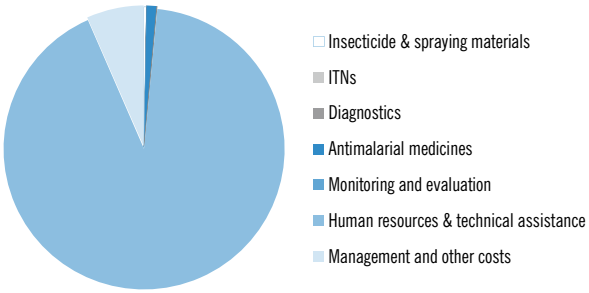
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

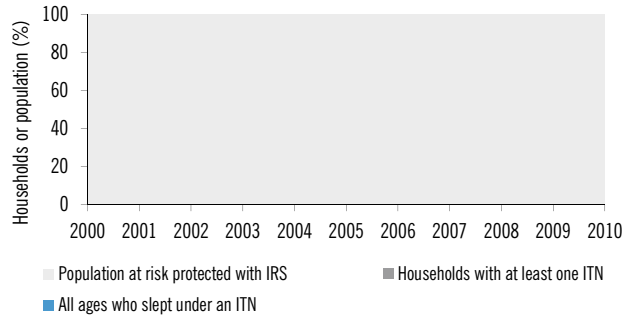


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

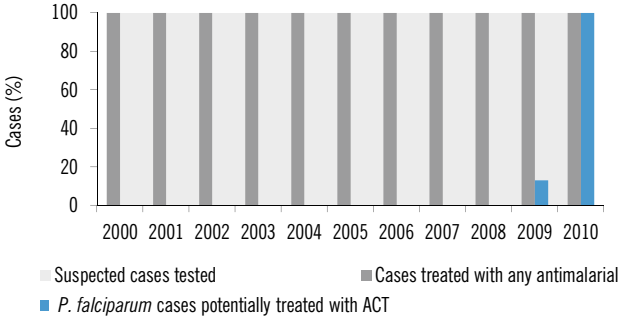
Expenditure by intervention in 2010



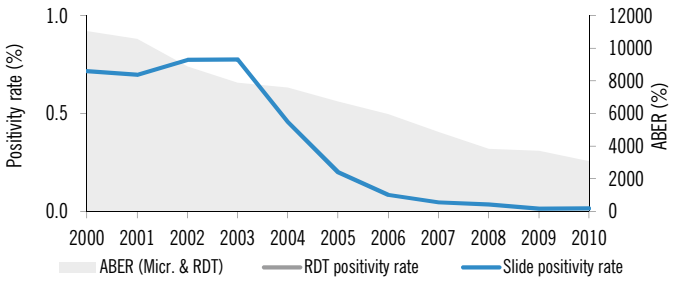
IV. COVERAGE – Coverage of ITN and IRS



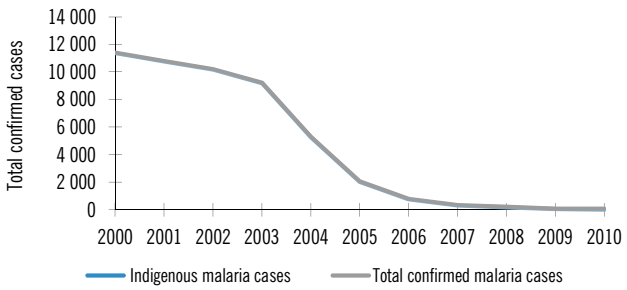
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

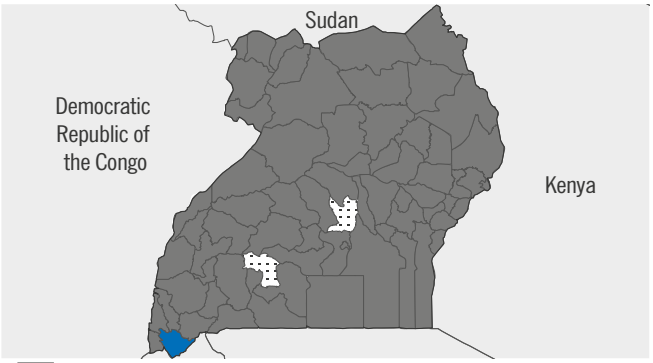


Total confirmed malaria cases and indigenous cases



Uganda

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect 25%–50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	30 100 000	90
Low transmission (0-1 cases per 1000 population)	3 340 000	10
Malaria-free (0 cases)	0	0
Total	33 440 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, funestus*

II. INTERVENTION POLICIES AND STRATEGIES

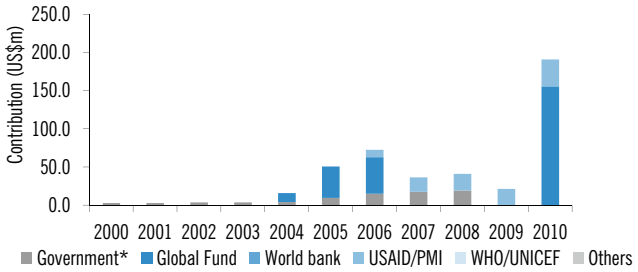
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2006
	ITNs/ LLINs: distributed to all age groups	No	-
IRS	IRS is recommended	Yes	2005
	DDT is used for IRS	Yes	2008
IPT	IPT used to prevent malaria during pregnancy	Yes	2000
Case management	Patients of all ages should receive diagnostic test	Yes	1997
	RDTs used at community level	No	-
	ACT is free for all ages in public sector	Yes	2006
	Pre-referral treatment with recommended medicines	Yes	2002
	Oral artemisinin-based monotherapies are not registered	Yes	2005

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2004
First-line treatment of *P. falciparum*	AL	2004
Treatment failure of *P. falciparum*	QN	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

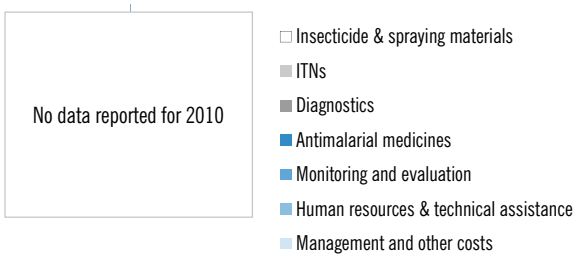
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AL	2002–2008	8	0	2.3	8.9	28 days

III. FINANCING – Government and external financing

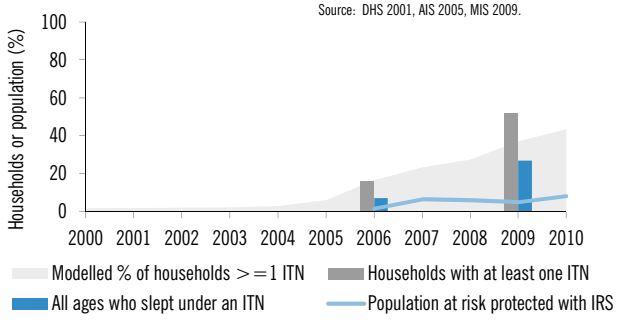


*Budget: costs for sub-national level, health systems, human resources, etc not included.

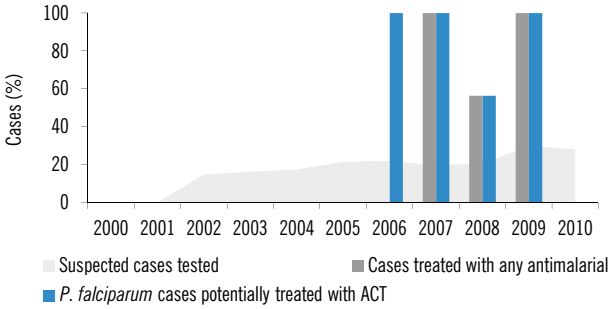
Expenditure by intervention in 2010



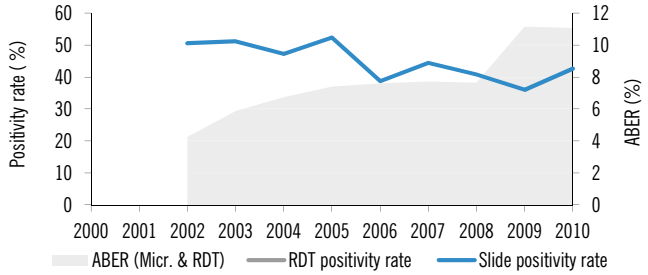
IV. COVERAGE – Coverage of ITN and IRS



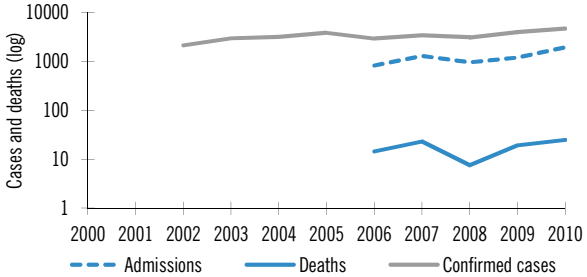
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

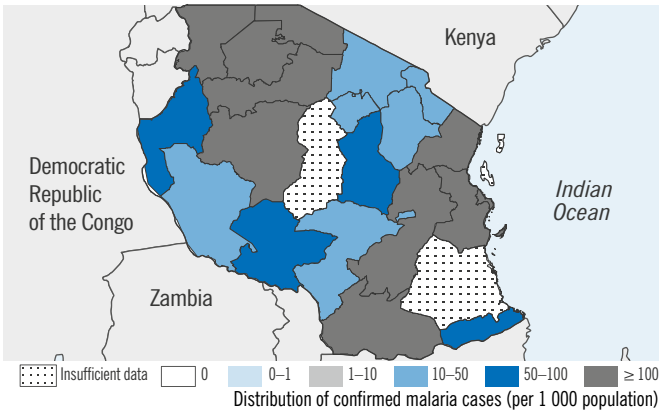


Confirmed cases, admissions and deaths (per 100 000)



United Republic of Tanzania (Mainland)

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect >50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	31 900 000	73
Low transmission (0-1 cases per 1000 population)	11 800 000	27
Malaria-free (0 cases)	0	0
Total	43 700 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, arabiensis, funestus*

II. INTERVENTION POLICIES AND STRATEGIES

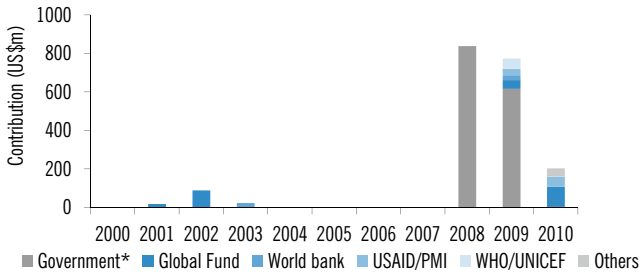
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	No	-
	ITNs/ LLINs: distributed to all age groups	No	-
IRS	IRS is recommended	Yes	2006
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	Yes	2001
Case management	Patients 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
	Oral artemisinin-based monotherapies are not registered	Yes	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2004
First-line treatment of *P. falciparum*	AL	2004
Treatment failure of *P. falciparum*	QN	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

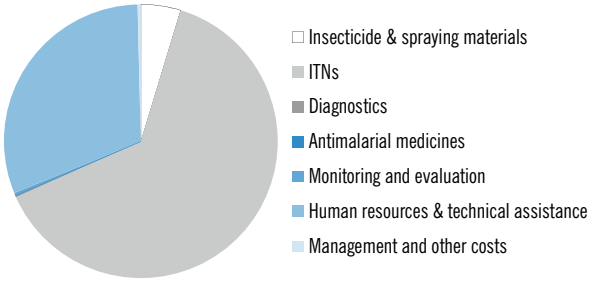
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AL	2002–2008	8	0	2.85	8.6	28 days

III. FINANCING – Government and external financing

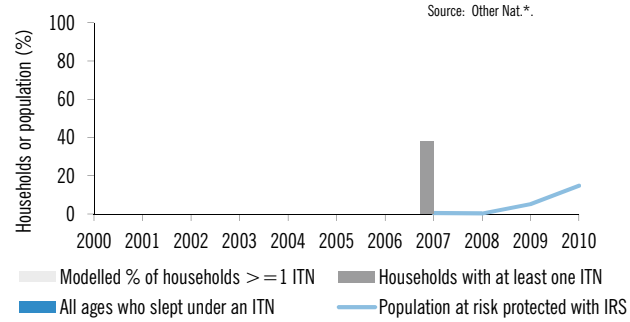


*Budget: costs for sub-national level, health systems, human resources, etc not included.

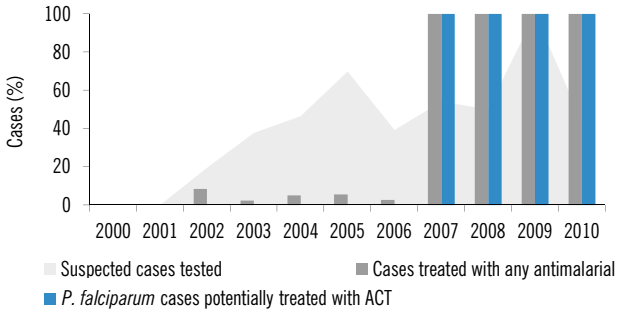
Expenditure by intervention in 2010



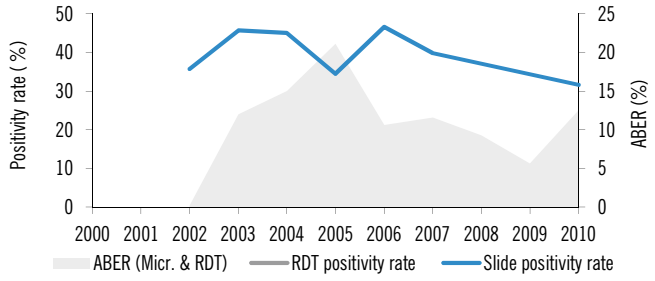
IV. COVERAGE – Coverage of ITN and IRS



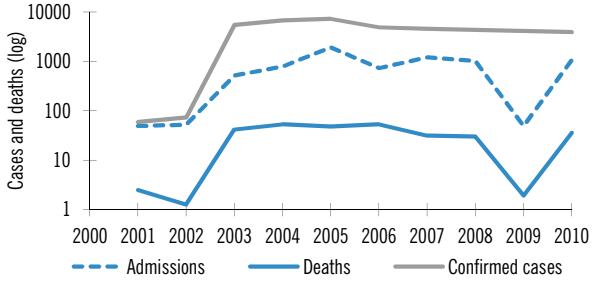
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

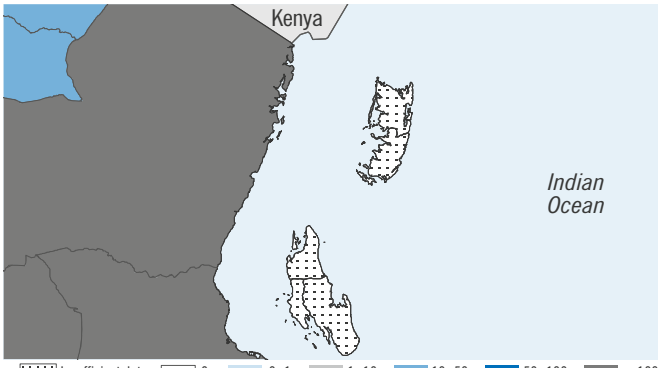


Confirmed cases, admissions and deaths (per 100 000)



United Republic of Tanzania (Zanzibar)

Phase: Control. Coverage: In 2010, IRS was sufficient to protect >50% of the population at risk; ITN/LLINs delivered were sufficient to protect >50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	1 360 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	1 360 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae*

II. INTERVENTION POLICIES AND STRATEGIES

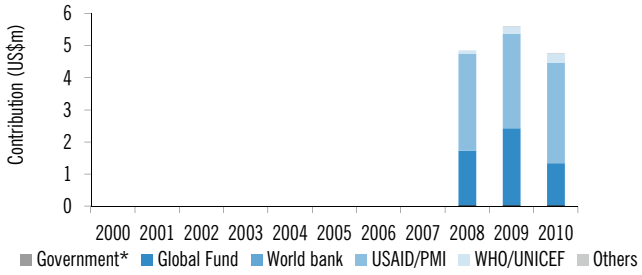
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2005
	ITNs/ LLINs: distributed to all age groups	Yes	2008
IRS	IRS is recommended	Yes	2006
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	Yes	2004
Case management	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	Yes	2003
	Pre-referral treatment with recommended medicines	Yes	2004
	Oral artemisinin-based monotherapies are not registered	No	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+AQ	2004
First-line treatment of *P. falciparum*	AS+AQ	2004
Treatment failure of *P. falciparum*	QN	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

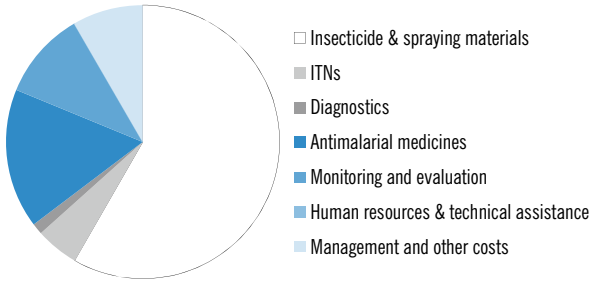
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+AQ	2002–2005	2	10.8	12.1	13.4	42 days

III. FINANCING – Government and external financing

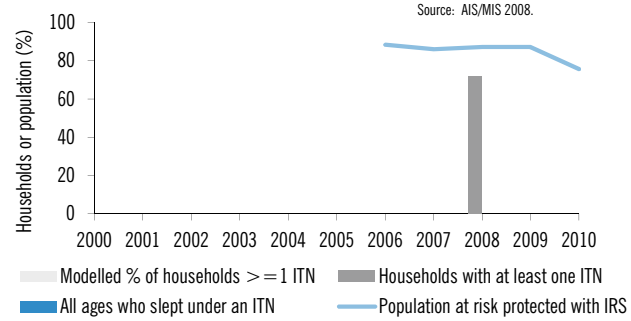


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

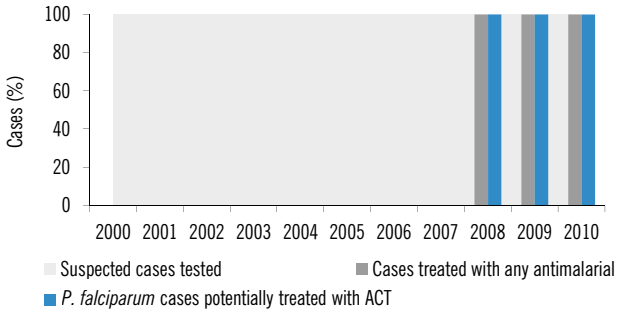
Expenditure by intervention in 2010



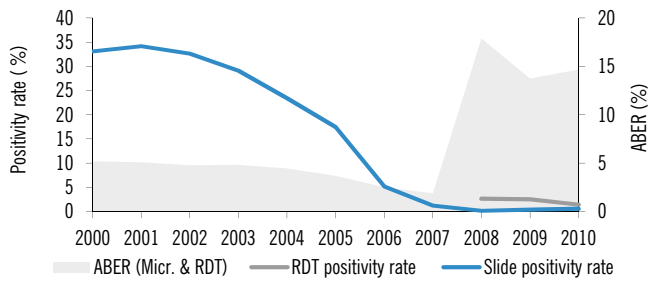
IV. COVERAGE – Coverage of ITN and IRS



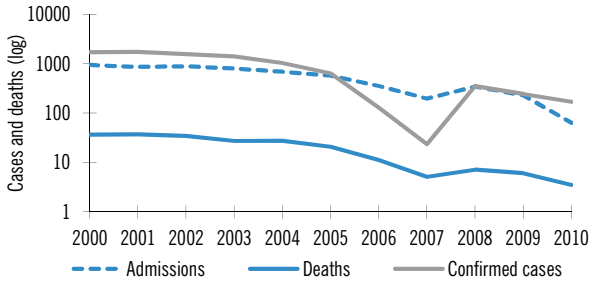
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

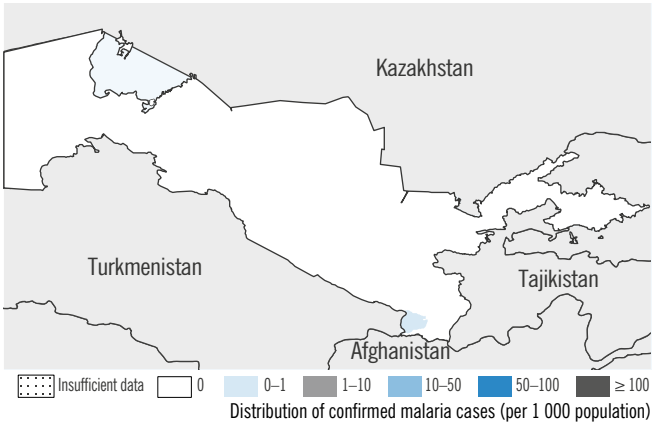


Confirmed cases, admissions and deaths (per 100 000)



Uzbekistan

Phase: Elimination. Malaria transmission risk exists in the area bordering Afghanistan. 3 indigenous cases reported in 2010. 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)	2010	%
Number of active foci	2	
Number of people living within active foci	3 820	0
Number of people living in malaria-free areas	27 400 000	100
Total	27 403 820	

Parasites and vectors

Major Plasmodium species: *P. vivax*
Major Anopheles species: *An.superpictus, pulcherrimus, hyrcanus, claviger*

II. INTERVENTION POLICIES AND STRATEGIES

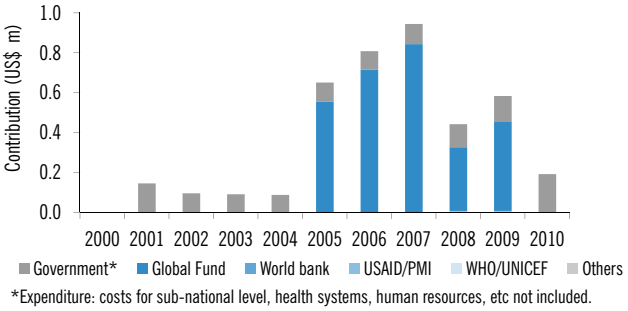
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	No	-
	ITNs/ LLINs: distributed to all age groups	No	-
IRS	IRS is recommended	Yes	1925
	DDT is used for IRS	No	-
Case management	Malaria diagnosis is free of charge in the public sector	Yes	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

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum* (confirmed)	-	-
Treatment failure of *P. falciparum*	-	-
Treatment of severe malaria	-	-
Treatment of *P. vivax*	CQ+PQ(14d)	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

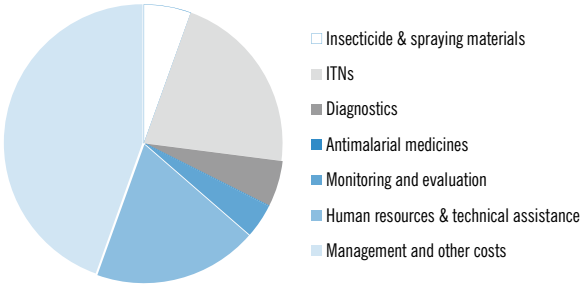
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

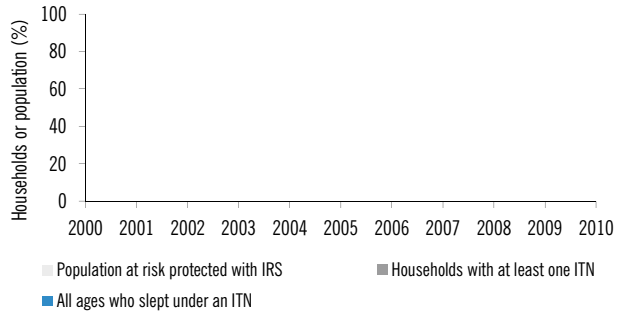


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

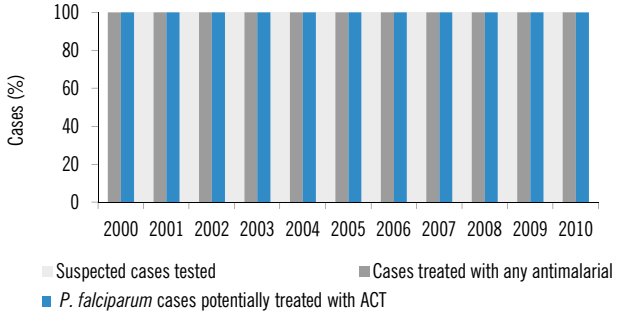
Expenditure by intervention in 2010



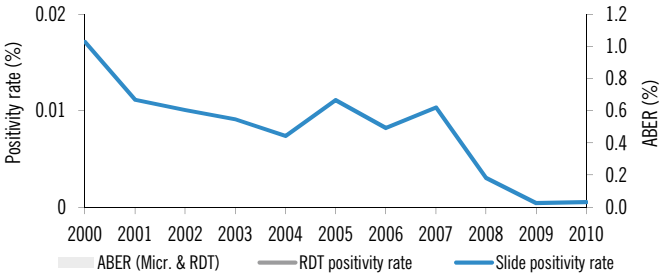
IV. COVERAGE – Coverage of ITN and IRS



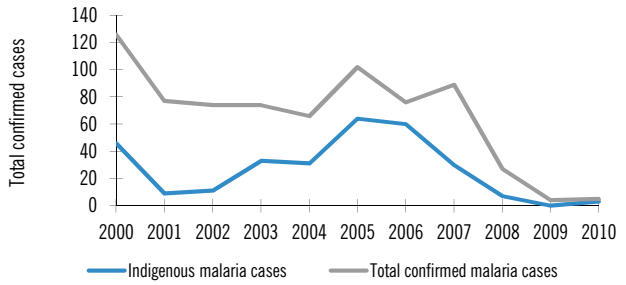
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

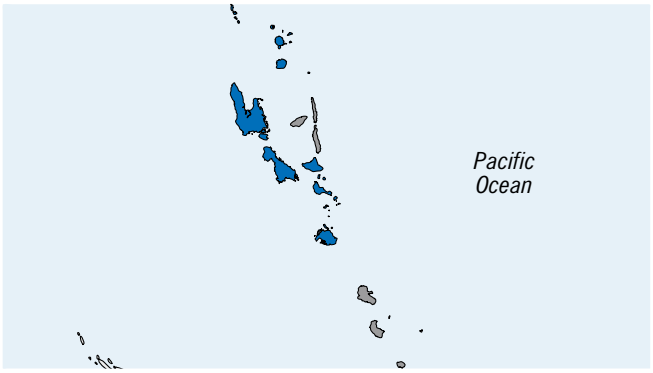


Total confirmed malaria cases and indigenous cases



Vanuatu

Phase: Control. Coverage: In 2010, ITN/LLINs delivered were sufficient to protect >50% of the population at high risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	237 000	99
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	2 400	1
Total	239 400	

Parasites and vectors

Major plasmodium species: *P. falciparum* (43%), *P. vivax*
Major anopheles species: *An. farauti*

II. INTERVENTION POLICIES AND STRATEGIES

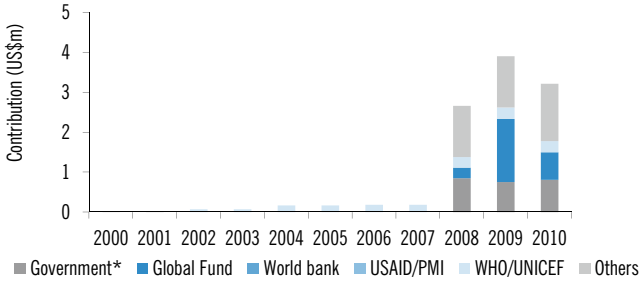
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2008
	ITNs/ LLINs: distributed to all age groups	Yes	1990
IRS	IRS is recommended	No	-
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	NA
Case management	Patients 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	2009
	Pre-referral treatment with recommended medicines	Yes	2009
	Oral artemisinin-based monotherapies are not registered	No	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	AL	2007
Treatment failure of *P. falciparum*	QN	2007
Treatment of severe malaria	QN	2007
Treatment of *P. vivax*	AL+PQ(14d)	2007

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

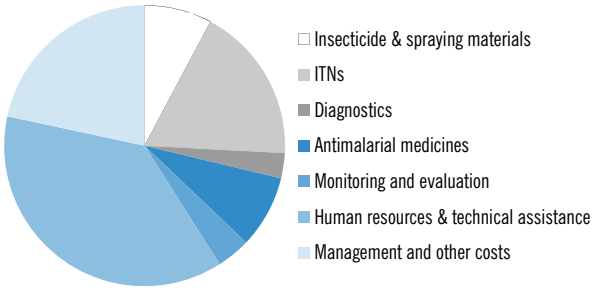
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up

III. FINANCING – Government and external financing

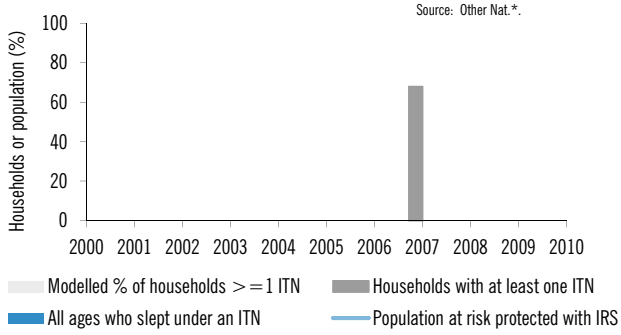


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

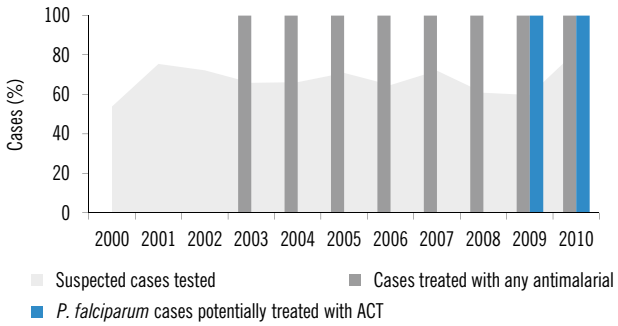
Expenditure by intervention in 2010



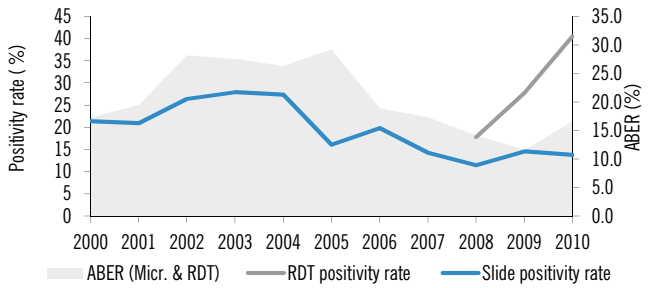
IV. COVERAGE – Coverage of ITN and IRS



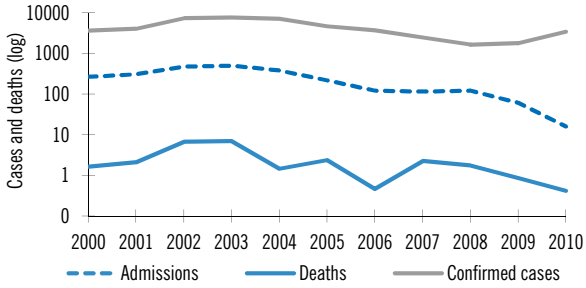
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

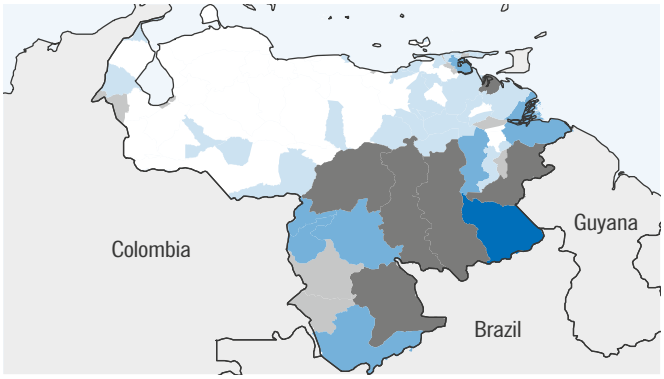


Confirmed cases, admissions and deaths (per 100 000)



Venezuela (Bolivarian Republic of)

Phase: Control. Coverage: In 2010, IRS spraying was sufficient to protect 25-50% of the population at high risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	753 000	3
Low transmission (0-1 cases per 1000 population)	4 690 000	16
Malaria-free (0 cases)	23 500 000	81
Total	28 943 000	

Parasites and vectors

Major plasmodium species:
Major anopheles species: *An. darlingi, aquasalis, nuneztovari, braziliensis, albitarsis*

II. INTERVENTION POLICIES AND STRATEGIES

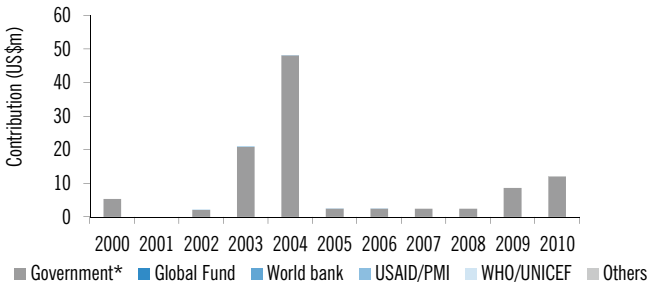
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	-
	ITNs/ LLINs: distributed to all age groups	Yes	2005
IRS	IRS is recommended	Yes	-
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	Patients 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	No	-
	Oral artemisinin-based monotherapies are not registered	-	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	AS+MQ+PQ	2004
Treatment failure of *P. falciparum*	QN+CL ;QN+D ;QN+T	2004
Treatment of severe malaria	AM ;QN	2004
Treatment of *P. vivax*	CQ+PQ	2004

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

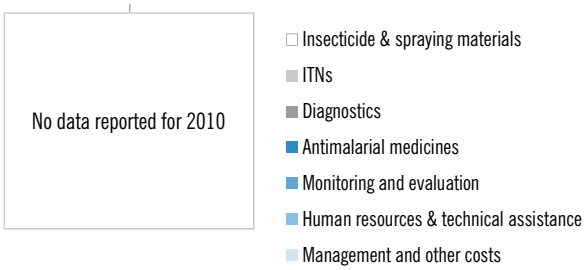
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+MQ	2004–2005	1	0	0	0	28 days

III. FINANCING – Government and external financing

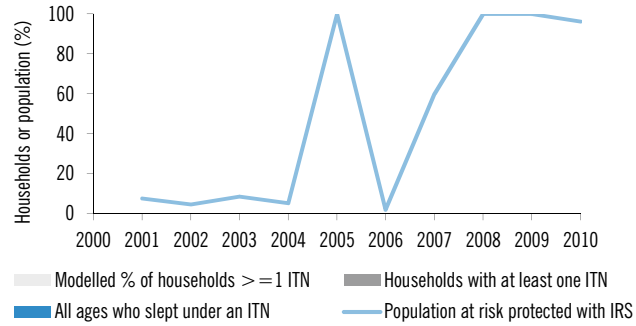


*Budget: costs for sub-national level, health systems, etc not included.

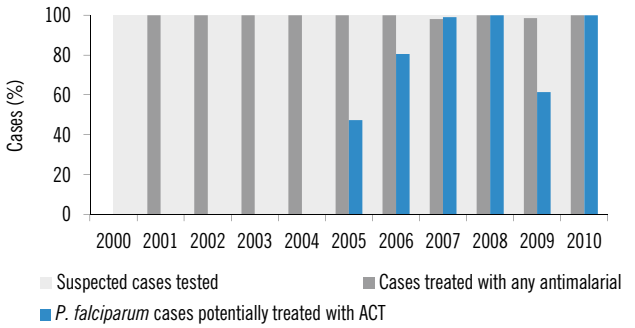
Expenditure by intervention in 2010



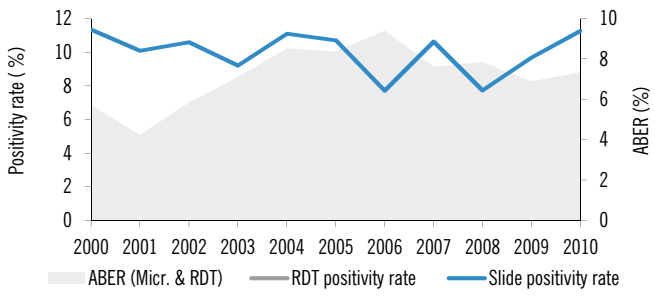
IV. COVERAGE – Coverage of ITN and IRS



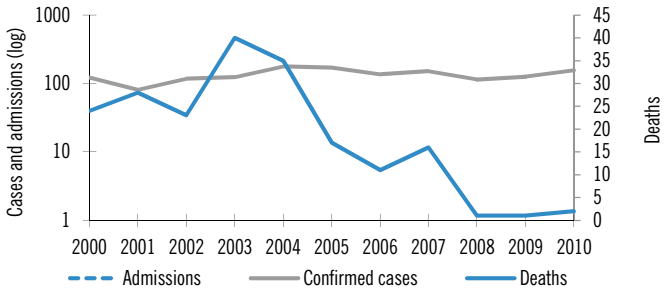
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

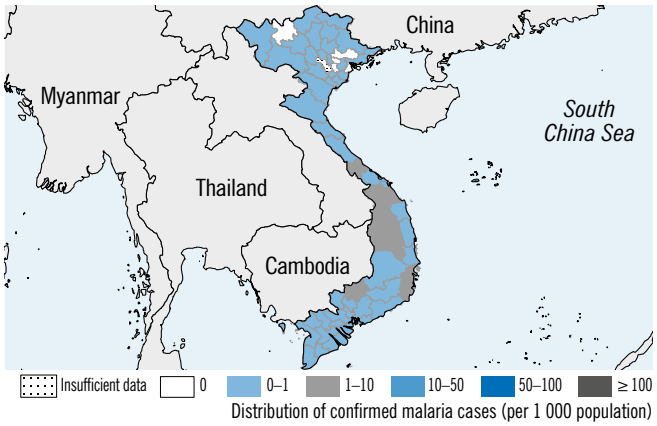


Confirmed cases, admissions (per 100 000) and deaths



Viet Nam

Phase: Control.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	31 600 000	36
Low transmission (0-1 cases per 1000 population)	47 400 000	54
Malaria-free (0 cases)	8 780 000	10
Total	87 780 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (75%), *P. vivax*
Major anopheles species: *An. minimus, dirus, sundaicus*

II. INTERVENTION POLICIES AND STRATEGIES

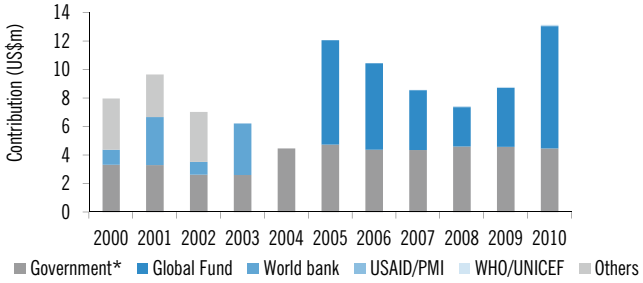
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	1992
	ITNs/ LLINs: distributed to all age groups	Yes	1992
IRS	IRS is recommended	Yes	1991
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	NA
Case management	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	Yes	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	-	-
First-line treatment of *P. falciparum*	DHA-PPQ	2009
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 (therapeutic or parasitological failure, %)

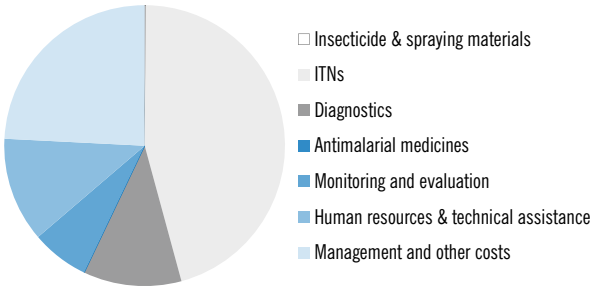
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
DHA-PPQ	2001–2010	14	0	0	6.1	28 days

III. FINANCING – Government and external financing

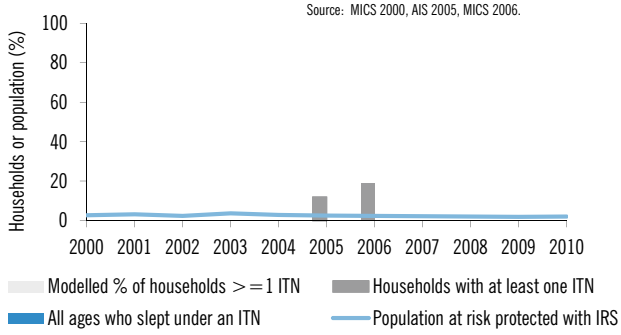


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

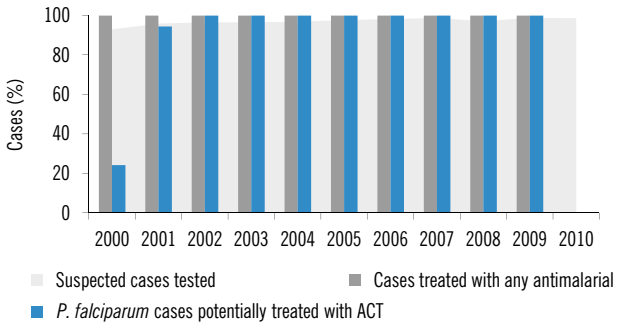
Expenditure by intervention in 2010



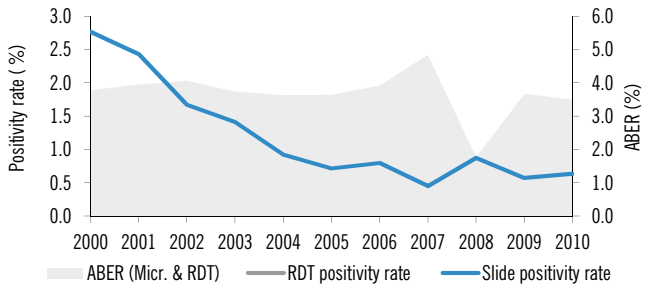
IV. COVERAGE – Coverage of ITN and IRS



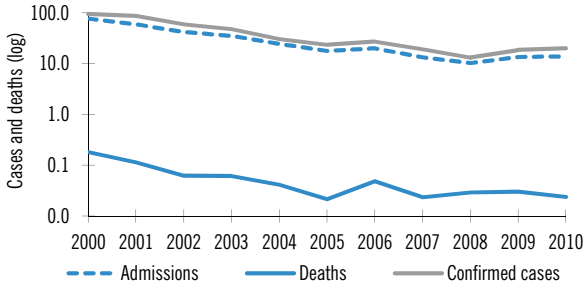
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

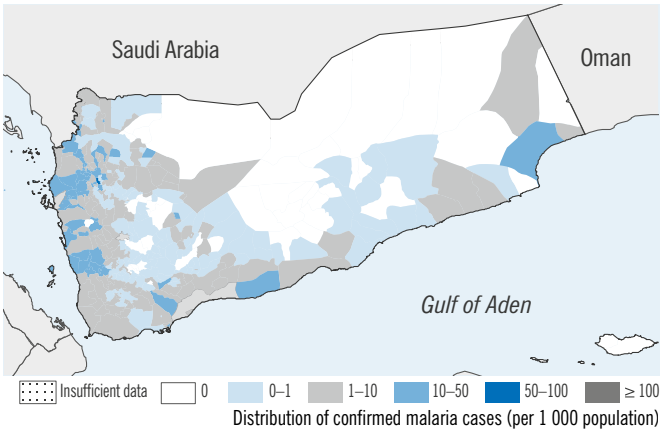


Confirmed cases, admissions and deaths (per 100 000)



Yemen

Phase: Control.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	14 900 000	62
Low transmission (0-1 cases per 1000 population)	4 570 000	19
Malaria-free (0 cases)	4 570 000	19
Total	24 040 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (99%), *P. vivax*
Major anopheles species: *An. arabiensis, culicifacies, sergentii*

II. INTERVENTION POLICIES AND STRATEGIES

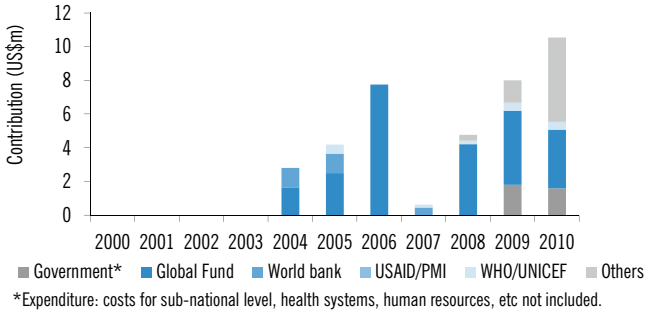
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2002
	ITNs/ LLINs: distributed to all age groups	Yes	2009
IRS	IRS is recommended	Yes	2001
	DDT is used for IRS	No	-
IPT	IPT used to prevent malaria during pregnancy	NA	-
Case management	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

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AS+SP	2009
First-line treatment of *P. falciparum*	AS+SP	2009
Treatment failure of *P. falciparum*	AL	2009
Treatment of severe malaria	AM ;QN	2009
Treatment of *P. vivax*	CQ+PQ(14d)	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

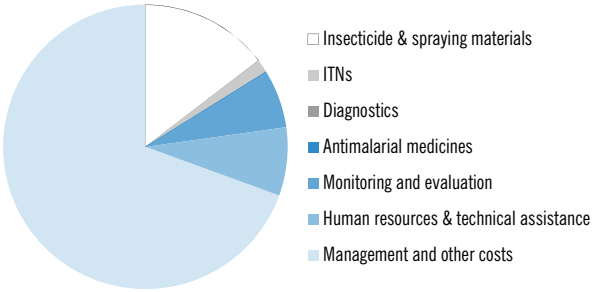
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AS+SP	2007–2007	2	0	0.75	1.5	28 days

III. FINANCING – Government and external financing

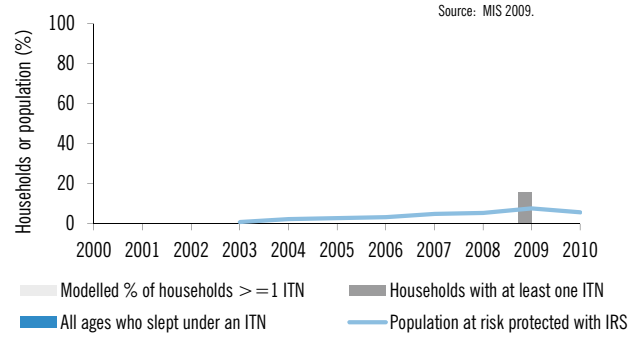


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

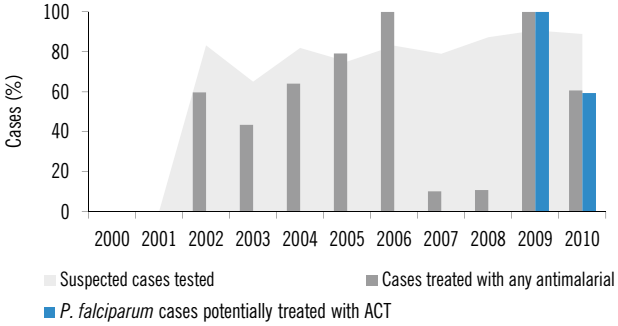
Expenditure by intervention in 2010



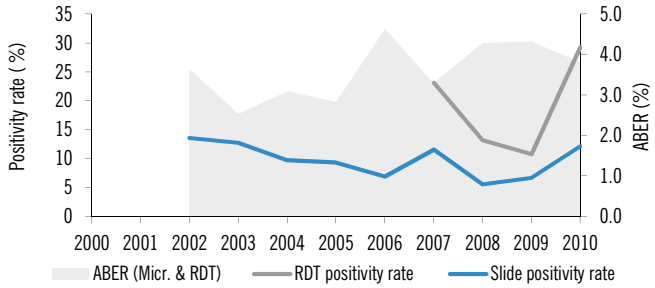
IV. COVERAGE – Coverage of ITN and IRS



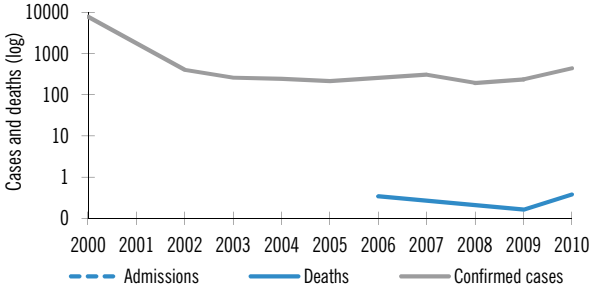
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER



Confirmed cases, admissions and deaths (per 100 000)



Zambia

Phase: Control. Coverage: In 2010, IRS was sufficient to protect 25%–50% of the population at risk; ITN/LLINs delivered were sufficient to protect >50% of the population at risk.

Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	13 100 000	100
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Total	13 100 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%), *P. vivax*
Major anopheles species: *An. gambiae, arabiensis, funestus*

II. INTERVENTION POLICIES AND STRATEGIES

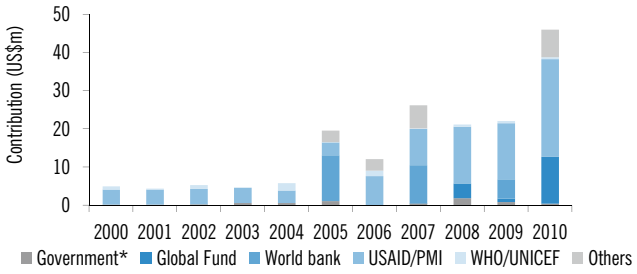
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2005
	ITNs/ LLINs: distributed to all age groups	Yes	1998
IRS	IRS is recommended	Yes	-
	DDT is used for IRS	Yes	2001
IPT	IPT used to prevent malaria during pregnancy	Yes	2001
Case management	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
	Oral artemisinin-based monotherapies are not registered	Yes	2003

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2002
First-line treatment of *P. falciparum*	AL	2002
Treatment failure of *P. falciparum*	QN	2002
Treatment of severe malaria	QN	2002
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

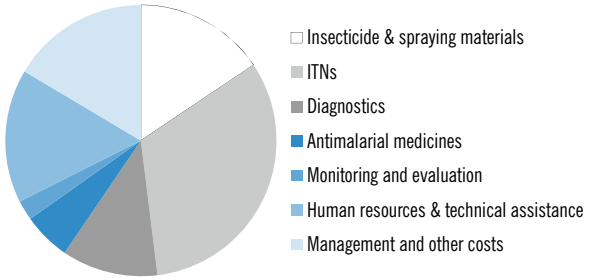
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AL	2004–2006	12	0	0	6.7	28 days

III. FINANCING – Government and external financing

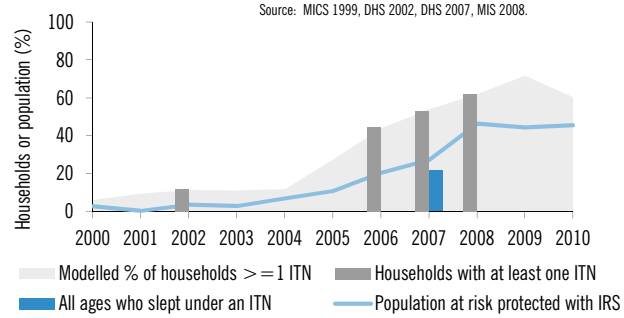


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

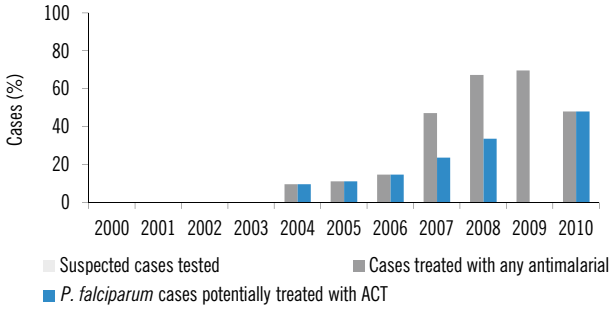
Expenditure by intervention in 2010



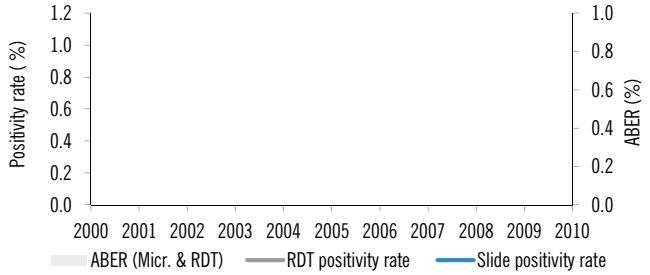
IV. COVERAGE – Coverage of ITN and IRS



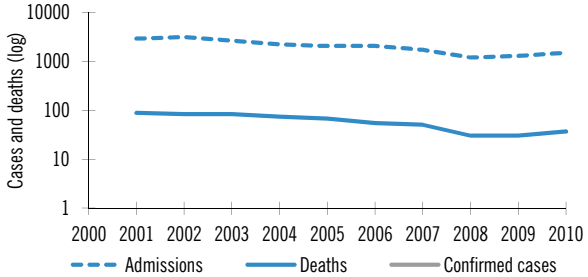
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER

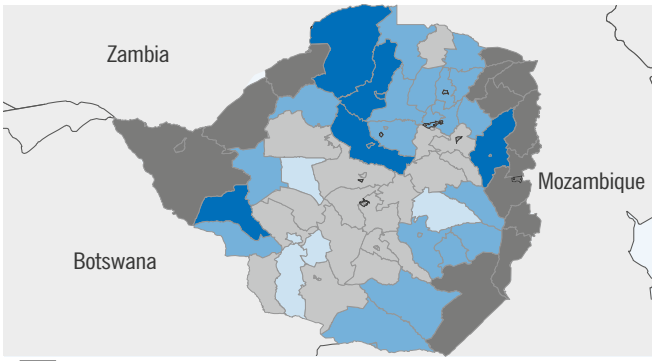


Confirmed cases, admissions and deaths (per 100 000)



Zimbabwe

Phase: Control. Coverage: In 2010, IRS was sufficient to protect 25%–50% of the population at risk; ITN/LLINs delivered were sufficient to protect 25%–50% of the population at risk.



Distribution of confirmed malaria cases (per 1 000 population)

I. EPIDEMIOLOGICAL PROFILE

Population (UN Population Division)	2010	%
High transmission (≥ 1 case per 1000 population)	6 290 000	50
Low transmission (0-1 cases per 1000 population)	0	0
Malaria-free (0 cases)	6 290 000	50
Total	12 580 000	

Parasites and vectors

Major plasmodium species: *P. falciparum* (100%) *P. vivax*
Major anopheles species: *An. gambiae, arabiensis, funestus*

II. INTERVENTION POLICIES AND STRATEGIES

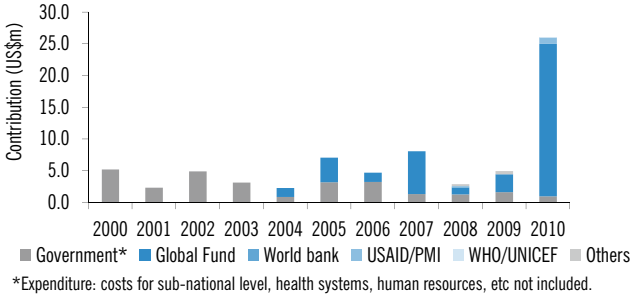
Intervention	WHO-recommended policies/strategies	Yes/No	Year adopted
ITN	ITNs/ LLINs: distributed free of charge	Yes	2001
	ITNs/ LLINs: distributed to all age groups	Yes	2001
IRS	IRS is recommended	Yes	1948
	DDT is used for IRS	Yes	2004
IPT	IPT used to prevent malaria during pregnancy	Yes	1997
Case management	Patients of all ages should receive diagnostic test	Yes	2008
	RDTs used at community level	No	-
	ACT is free for all ages in public sector	Yes	2008
	Pre-referral treatment with recommended medicines	Yes	1998
	Oral artemisinin-based monotherapies are not registered	No	-

Antimalarial policy	Medicine	Year adopted
First-line treatment of unconfirmed malaria	AL	2004
First-line treatment of *P. falciparum*	AL	2004
Treatment failure of *P. falciparum*	QN	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	-	-

Therapeutic efficacy tests (therapeutic or parasitological failure, %)

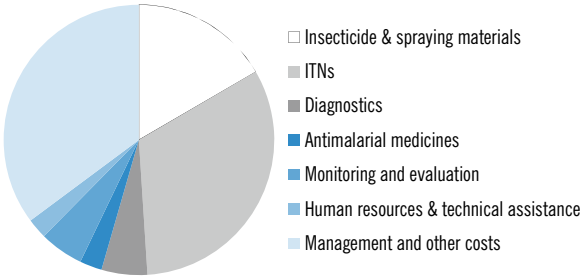
Medicine	Year	No. of Studies	Min	Median	Max	Follow-up
AL	2007–2007	3	0	0	1.9	28 days

III. FINANCING – Government and external financing

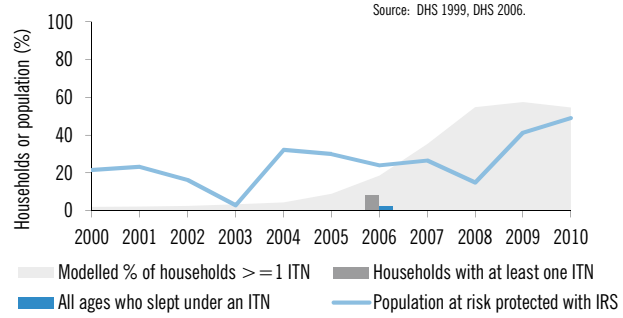


*Expenditure: costs for sub-national level, health systems, human resources, etc not included.

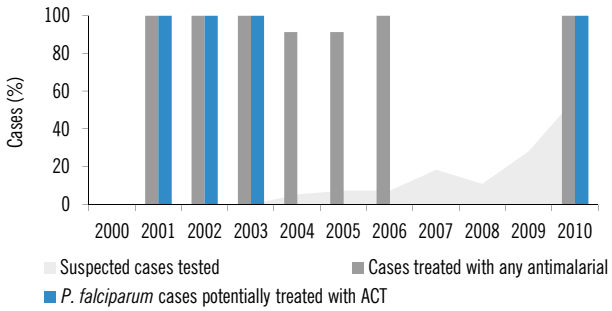
Expenditure by intervention in 2010



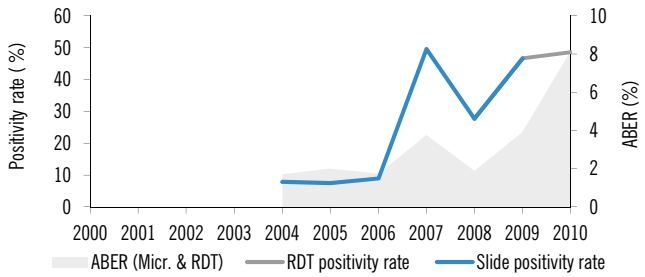
IV. COVERAGE – Coverage of ITN and IRS



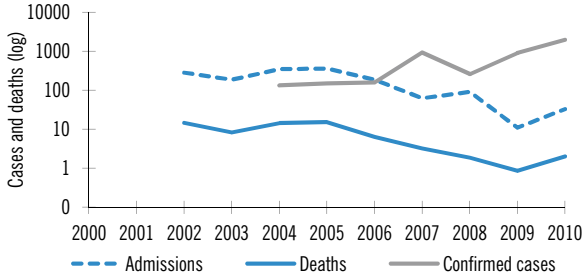
Cases tested and ACT delivered: Programme data (public sector)



V. IMPACT – Malaria test positivity rate and ABER



Confirmed cases, admissions and deaths (per 100 000)



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Annex 1 – Data Completeness, 2010

WHO region	Country/Area	Phase	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 %
Africa	Algeria	Elimination	21%	33%	20%	0%	31%	-	0%	46%	60%	5%	0%
	Angola	Control	52%	33%	86%	100%	50%	0%	0%	95%	71%	42%	67%
	Benin	Control	56%	33%	100%	100%	25%	0%	67%	100%	42%	42%	67%
	Botswana	Control	54%	100%	50%	80%	50%	0%	0%	100%	48%	36%	100%
	Burkina Faso	Control	68%	100%	100%	100%	50%	0%	0%	100%	79%	76%	92%
	Burundi	Control	60%	100%	89%	100%	50%	0%	0%	100%	56%	52%	50%
	Cameroon	Control	59%	100%	100%	100%	8%	0%	0%	100%	69%	61%	75%
	Cape Verde	Prevention of re-introduction	49%	67%	58%	100%	54%	0%	0%	97%	63%	42%	33%
	Central African Republic	Control	56%	33%	81%	100%	0%	0%	0%	100%	67%	100%	100%
	Chad	Control	36%	100%	64%	20%	21%	0%	0%	82%	19%	27%	25%
	Comoros	Control	59%	100%	72%	100%	58%	0%	33%	100%	40%	52%	58%
	Congo	Control	NR	NR	NR	NR	NR	NR	NR	NR	NR		NR
	Côte d'Ivoire	Control	37%	33%	94%	100%	25%	0%	0%	100%	38%	0%	0%
	Democratic Republic of the Congo	Control	67%	67%	100%	100%	58%	0%	0%	100%	83%	82%	100%
	Equatorial Guinea	Control	NR	NR	NR	NR	NR	NR	NR	NR	NR		NR
	Eritrea	Control	67%	100%	100%	100%	100%	0%	50%	94%	94%	55%	0%
	Ethiopia	Control	75%	100%	100%	80%	88%	0%	50%	95%	71%	91%	100%
	Gabon	Control	55%	33%	100%	100%	71%	0%	0%	100%	58%	27%	58%
	Gambia	Control	59%	100%	86%	100%	25%	0%	0%	100%	75%	79%	50%
	Ghana	Control	90%	100%	100%	100%	100%	0%	100%	100%	96%	100%	100%
	Guinea	Control	59%	33%	89%	100%	25%	0%	0%	100%	81%	85%	100%
	Guinea-Bissau	Control	NR	NR	NR	NR	NR	NR	NR	NR	NR		NR
	Kenya	Control	43%	67%	47%	40%	21%	0%	0%	98%	54%	61%	67%
	Liberia	Control	61%	33%	89%	100%	100%	0%	100%	100%	44%	36%	25%
	Madagascar	Control	79%	100%	100%	100%	50%	0%	67%	100%	98%	100%	100%
	Malawi	Control	53%	100%	72%	100%	0%	0%	0%	100%	69%	52%	58%
	Mali	Control	58%	100%	89%	100%	8%	0%	0%	100%	83%	70%	50%
	Mauritania	Control	47%	100%	58%	100%	50%	0%	0%	84%	35%	33%	33%
	Mozambique	Control	34%	33%	92%	40%	25%	0%	0%	98%	69%	0%	0%
	Namibia	Control	79%	100%	100%	100%	75%	0%	100%	98%	92%	45%	100%
	Niger	Control	68%	100%	81%	100%	71%	0%	17%	100%	90%	67%	75%
	Nigeria	Control	56%	67%	94%	80%	25%	0%	0%	100%	58%	76%	75%
	Rwanda	Control	36%	33%	100%	40%	38%	0%	0%	100%	44%	18%	8%
	Sao Tome and Principe	Control	80%	100%	100%	100%	67%	0%	67%	100%	90%	100%	100%
	Senegal	Control	NR	NR	NR	NR	NR	NR	NR	NR	NR		NR
	Sierra Leone	Control	60%	100%	100%	100%	50%	0%	0%	100%	85%	33%	50%
	South Africa	Control	54%	100%	31%	100%	50%	0%	50%	91%	19%	39%	83%
	Swaziland	Control	78%	100%	100%	100%	63%	0%	100%	100%	85%	64%	67%
	Togo	Control	59%	33%	100%	100%	100%	0%	0%	100%	79%	52%	42%
	Uganda	Control	59%	100%	94%	100%	58%	0%	0%	100%	88%	27%	42%
	UR Tanzania (Mainland)	Control	63%	100%	75%	100%	25%	0%	33%	95%	77%	64%	83%
	UR Tanzania (Zanzibar)	Control	81%	33%	100%	100%	100%	0%	100%	100%	100%	100%	100%
	Zambia	Control	69%	100%	100%	100%	0%	0%	67%	96%	81%	76%	92%
	Zimbabwe	Control	57%	33%	94%	100%	46%	0%	33%	100%	44%	67%	75%
Eastern Mediterranean	Afghanistan	Control	67%	100%	100%	100%	79%	0%	25%	97%	69%	48%	75%
	Djibouti	Control	37%	0%	42%	40%	25%	0%	33%	97%	42%	45%	67%
	Iran (Islamic Republic of)	Elimination	72%	100%	47%	100%	72%	-	100%	91%	47%	67%	67%
	Iraq	Prevention of re-introduction	77%	100%	100%	100%	78%	-	100%	95%	87%	48%	25%
	Pakistan	Control	NR	NR	NR	NR	NR	NR	NR	NR	NR		NR
	Saudi Arabia	Elimination	79%	67%	100%	100%	78%	-	100%	62%	93%	71%	83%
	Somalia	Control	52%	67%	47%	100%	58%	0%	0%	98%	94%	30%	25%
	N. Sudan (low transmission)	Control	66%	100%	100%	100%	29%	0%	0%	98%	83%	88%	67%
	S. Sudan (high transmission)	Control	NR	NR	NR	NR	NR	NR	NR	NR	NR		NR
	Yemen	Control	73%	100%	50%	60%	100%	0%	100%	100%	75%	91%	75%

Annex 1 – Data Completeness, 2010 (continued)

WHO region	Country/Area	Phase	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 %
Europe	Armenia	Certified malaria free	85%	100%	100%	100%	100%	-	100%	80%	100%	76%	58%
	Azerbaijan	Elimination	86%	100%	100%	100%	97%	-	83%	85%	100%	86%	75%
Europe	Georgia	Prevention of re-introduction	94%	100%	100%	100%	100%	-	100%	100%	100%	100%	100%
	Kyrgyzstan	Elimination	90%	100%	100%	100%	100%	-	100%	100%	100%	86%	75%
	Russian Federation	Prevention of re-introduction	93%	100%	100%	100%	89%	-	100%	100%	100%	100%	100%
	Tajikistan	Elimination	86%	100%	100%	100%	100%	-	100%	86%	100%	67%	67%
	Turkey	Elimination	86%	100%	100%	100%	100%	-	100%	95%	100%	71%	50%
	Turkmenistan	Certified malaria free	77%	67%	100%	100%	97%	-	100%	76%	100%	57%	33%
	Uzbekistan	Elimination	91%	100%	100%	100%	100%	-	100%	100%	100%	90%	83%
Americas	Argentina	Pre-elimination	NR	NR	NR	NR	NR	NR	NR	NR	NR		NR
	Bahamas	Prevention of re-introduction	NR	NR	NR	NR	NR	NR	NR	NR	NR		NR
	Belize	Control	23%	0%	69%	0%	50%	0%	17%	23%	21%	12%	33%
	Bolivia (Plurinational State of)	Control	69%	100%	100%	100%	96%	0%	50%	95%	50%	48%	75%
	Brazil	Control	62%	100%	100%	40%	75%	0%	50%	98%	56%	45%	75%
	Colombia	Control	54%	67%	50%	80%	100%	0%	0%	85%	46%	82%	50%
	Costa Rica	Control	71%	100%	50%	80%	100%	0%	100%	72%	75%	82%	50%
	Dominican Republic	Control	71%	100%	64%	20%	100%	0%	83%	97%	81%	94%	92%
	Ecuador	Control	45%	100%	39%	0%	71%	0%	0%	55%	46%	61%	83%
	El Salvador	Control	19%	0%	19%	0%	71%	0%	0%	43%	17%	21%	17%
	French Guiana	Control	37%	100%	67%	20%	88%	0%	50%	53%	10%	0%	0%
	Guatemala	Control	44%	100%	53%	20%	88%	0%	17%	79%	29%	55%	17%
	Guyana	Control	76%	100%	72%	100%	100%	0%	100%	89%	58%	85%	75%
	Haiti	Control	NR	NR	NR	NR	NR	NR	NR	NR	NR		NR
	Honduras	Control	65%	100%	33%	100%	88%	0%	58%	88%	81%	79%	42%
	Mexico	Control	62%	100%	56%	40%	100%	0%	100%	20%	52%	94%	83%
	Jamaica	Prevention of re-introduction				NR							
	Nicaragua	Control	69%	100%	89%	80%	88%	0%	100%	82%	69%	45%	58%
	Panama	Control	82%	100%	61%	100%	100%	0%	100%	81%	79%	100%	100%
	Paraguay	Control	71%	100%	94%	60%	100%	0%	100%	97%	77%	48%	50%
	Peru	Control	NR	NR	NR	NR	NR	NR	NR	NR	NR		NR
	Suriname	Control	42%	67%	50%	100%	96%	0%	50%	62%	15%	3%	0%
	Venezuela (Bolivarian Republic of)	Control	50%	100%	25%	100%	75%	0%	50%	61%	38%	52%	25%
South-East Asia	Bangladesh	Control	55%	100%	53%	100%	88%	0%	0%	93%	35%	39%	42%
	Bhutan	Control	80%	100%	100%	100%	75%	0%	100%	92%	92%	91%	75%
	Democratic People's Republic of Korea	Pre-elimination	81%	100%	100%	100%	100%	-	100%	60%	100%	62%	50%
	India	Control	58%	100%	17%	100%	75%	0%	0%	93%	71%	52%	92%
	Indonesia	Control	69%	100%	100%	100%	100%	0%	50%	93%	81%	39%	50%
	Myanmar	Control	58%	100%	100%	100%	100%	0%	17%	59%	56%	42%	25%
	Nepal	Control	70%	100%	69%	100%	71%	0%	42%	95%	60%	94%	92%
	Sri Lanka	Pre-elimination	79%	100%	53%	100%	69%	-	100%	91%	100%	67%	75%
	Thailand	Control	76%	100%	67%	100%	100%	0%	100%	97%	60%	55%	100%
	Timor-Leste	Control	68%	33%	100%	100%	100%	0%	33%	98%	77%	88%	67%
Western Pacific	Cambodia	Control	82%	100%	100%	100%	100%	0%	100%	98%	81%	91%	75%
	China	Control	80%	100%	100%	40%	100%	0%	100%	97%	81%	100%	100%
	Lao People's Democratic Republic	Control	87%	100%	100%	100%	100%	0%	100%	98%	94%	100%	100%
	Malaysia	Pre-elimination	92%	100%	100%	100%	100%	-	100%	86%	100%	100%	100%
	Papua New Guinea	Control	54%	100%	56%	100%	100%	0%	0%	98%	25%	33%	50%
	Philippines	Control	85%	100%	100%	100%	100%	0%	100%	90%	81%	97%	100%
	Republic of Korea	Elimination	42%	100%	0%	50%	33%	-	0%	61%	27%	67%	75%
	Solomon Islands	Control	65%	100%	67%	40%	92%	0%	67%	83%	75%	85%	58%
	Vanuatu	Control	77%	100%	100%	100%	100%	0%	100%	97%	81%	73%	42%
	Viet Nam	Control	63%	100%	97%	100%	88%	0%	25%	45%	73%	73%	50%

"-" Does not apply

"NR" No report submitted

Annex 2 – Funding for malaria control, 2010

WHO Region/ Sub-region	Country/Area	Year	Contributions reported by donors: Global Fund[1]	PMI[2]	The World Bank[3]	Government	Global Fund	The World Bank	PMI/USAID	Other bilaterals	WHO	UNICEF	Other Contributions[4]	European Union
Africa	Algeria	2008	-	-	-	1 811 684	0	-	-	0	-	-	-	-
		2009	-	-	-	1 956 642	0	-	-	0	12 000	-	-	-
		2010	-	-	-	2 745 392	0	-	-	0	10 000	-	-	-
	Angola	2001	-	-	-	3 449 000	-	-	-	-	-	-	-	-
		2002	-	-	-	1 169 000	-	-	-	-	-	-	-	-
		2003	-	-	-	18 024 239 [5]	-	-	-	-	-	-	-	-
		2004	-	-	-	16 135 633 [5]	-	-	-	-	-	-	-	-
		2005	19 510 833	1 740 000	-	2 000 000	15 107 895	0	-	2 100 000	826 266	200 000	-	0
		2006	3 203 423	-	-	2 000 000	2 354 259	330 000	-	9 000 000	1 340 225	200 000	-	0
		2007	8 559 054	55 500 000	-	3 482 407 [5]	11 011 200	500 000	18 500 000	-	-	-	21 500 000	-
		2008	9 872 558	37 692 000	-	17 525 978 [5]	-	-	18 500 000	-	-	-	-	-
		2009	9 614 770	37 400 000	-	-	17 950 321	-	18 925 000	-	-	-	-	-
		2010	11 244 641	177 500 000	-	15 676 687 [5]	13 873 496	-	18 700 000	-	439 000	-	-	-
	Benin	2001	-	-	-	3 918 000 [5]	-	-	-	-	-	-	-	-
		2002	-	-	-	2 700 000 [5]	-	-	-	-	-	-	-	-
		2003	1 238 496	-	-	1 370 000 [5]	2 900 000	-	-	-	-	-	-	-
		2004	1 725 397	-	-	914 000	1 037 400	-	-	-	-	-	-	-
		2005	1 094 616	-	-	1 196 600	426 400	-	-	-	-	-	-	-
		2006	387 527	7 096 000	124 000 000	2 933 170	759 640	88 460	-	-	-	-	-	-
		2007	361 858	10 800 000	-	1 822 122	384 891	8 859 000	3 600 000	-	-	-	-	-
		2008	6 345 919	41 661 000	-	764 627	376 990	5 547 000	13 887 000	-	-	-	-	-
		2009	214 400	27 600 000	-	2 042 222	327 593	6 527 000	13 800 000	-	-	-	-	-
		2010	21 711 217	63 000 000	-	-	-	-	-	-	-	-	-	-
	Botswana	2002	-	-	-	-	-	-	-	-	10 000	-	-	-
		2003	-	-	-	-	-	-	-	-	9 795	-	-	-
		2004	-	-	-	-	-	-	-	-	2 000	-	-	-
		2005	-	-	-	242 858 [5]	-	-	-	-	50 110	-	-	-
		2006	-	-	-	242 858 [5]	-	-	-	-	9 000	-	-	-
		2007	-	-	-	256 825 [5]	-	-	-	-	-	-	-	-
		2008	-	-	-	1 308 890	-	-	-	-	-	-	-	-
		2009	-	-	-	876 647	-	-	-	-	-	-	-	-
		2010	-	-	-	709 607	-	-	-	-	-	-	-	-
	Burkina Faso	2001	-	-	-	56 393 [5]	0	0	-	-	-	-	-	0
		2002	-	-	-	87 755	0	0	-	-	-	-	-	0
		2003	627 513	-	-	151 567	0	0	-	-	-	-	-	0
		2004	2 298 000	-	-	197 387	2 925 513	0	-	-	-	-	-	0
		2005	4 193 558	-	-	200 000	4 193 558	0	-	-	-	-	-	0
		2006	-	-	12 000 000	1 119 000	0	12 000 000	-	-	-	-	-	0
		2007	-	-	-	1 058 476 [5]	0	0	-	-	-	-	-	0
		2008	7 283 872	-	-	58 662	813 399	-	-	-	-	-	-	-
		2009	14 812 697	-	-	554 094	67 991 119	5 073 238	0	33 879	108 966	75 895	-	-
		2010	43 783 725	18 000 000	-	4 508 617	1 458 620	0	4 210 524	64 530	16 940	1 816 055	0	-
	Burundi	2002	-	-	-	24 998 092 [5]	-	-	-	-	-	-	-	-
		2003	2 038 647	-	-	24 998 092 [5]	-	-	-	70 000	-	-	-	-
		2004	4 631 017	-	-	24 998 092 [5]	7 447 706	342 200	-	70 000	228 000	-	-	-
		2005	6 260 398	-	-	31 664 760 [5]	6 344 420	250 000	-	70 000	228 000	-	-	300 000
		2006	3 638 269	-	-	38 331 426 [5]	3 973 999	0	-	70 000	232 500	-	35 000	-
		2007	2 881 171	-	-	43 000 [5]	4 683 029	-	-	35 000	-	-	70 000	-
		2008	9 623 263	-	-	46 000 [5]	4 683 029	-	-	-	-	-	70 000	-
		2009	4 532 059	-	-	30 000 [5]	5 185 632	-	6 000 000	8 856 727	45 003	1 817 914	-	-
		2010	15 473 005	12 000 000	-	30 000 [5]	13 625 189	-	6 000 000	2 720 000	12 771	-	-	-

Annex 2 – Funding for malaria control, 2010 (continued)

WHO Region/ Sub-region	Country/Area	Year	Contributions reported by donors: Global Fund[1]	PMI[2]	The World Bank[3]	Government	Global Fund	The World Bank	PMI/USAID	Other bilaterals	WHO	UNICEF	Other Contributions[4]	European Union
Africa	Cameroon	2000	-	-	-	-	-	-	-	-	102 000	-	-	-
		2001	-	-	-	-	-	-	-	-	102 000	-	-	-
		2002	-	-	-	1 714 290 [5]	-	-	-	-	197 500	-	-	-
		2003	-	-	-	5 301 365	-	-	-	-	197 500	-	-	-
		2004	1 886 215	-	-	5 717 600	-	-	-	-	500 000	-	-	-
		2005	5 155 782	-	-	6 003 200	12 416 102	-	-	-	500 000	-	-	-
		2006	8 606 164	-	-	6 304 000	4 472 742	-	-	-	100 000	-	-	-
		2007	5 122 854	-	-	3 068 190	6 754 170	-	-	-	100 000	-	-	-
		2008	6 046 764	-	-	14 006 863	11 506 022	-	-	-	300 000	-	-	-
		2009	9 610 844	-	-	8 545 999 [5]	8 529 662	0	0	0	300 000	-	0	-
		2010	1 635 796	-	-	-	0	-	-	-	264 625	34 981	-	-
	Cape Verde	2002	-	-	-	-	-	-	-	-	774 400	-	-	-
		2003	-	-	-	-	-	-	-	-	774 400	-	-	-
		2004	-	-	-	-	-	-	-	-	774 400	-	-	-
		2005	-	-	-	1 560 735 053	-	-	-	-	3 872 000	-	-	-
		2006	-	-	-	1 641 916 954	-	-	-	24 161	774 400	-	-	-
		2007	-	-	-	326 245 [5]	0	0	0	-	-	-	-	-
		2008	-	-	-	401 316 [5]	0	0	0	-	58 500	33 400	-	-
		2009	-	-	-	451 098 [5]	0	0	0	-	74 327	178 043	-	-
		2010	-	-	-	707 795 [5]	-	-	-	-	-	-	-	-
	Central African Republic	2000	-	-	-	-	0	0	0	0	-	-	0	0
		2001	-	-	-	72 000 [5]	0	0	0	0	-	-	0	0
		2002	-	-	-	90 000 [5]	0	0	0	0	-	-	0	4 000
		2003	-	-	-	90 000 [5]	0	0	0	0	-	-	0	4 000
		2004	-	-	-	10 000 [5]	0	0	0	0	-	-	0	90 000
		2005	1 872 782	-	-	10 000 [5]	6 329 201	0	0	0	-	-	0	90 000
		2006	4 217 076	-	-	10 000 [5]	4 263 623	0	0	0	-	-	0	100 000
		2007	4 287 672	-	-	10 000 [5]	2 082 761	0	0	0	33 333	991 505	0	0
		2008	2 294 055	-	-	45 000	2 294 055	600 000	0	3 300 000	100 000	1 000 644	0	0
		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	-
	Chad	2002	-	-	-	1 714 290 [5]	-	-	-	-	-	-	-	-
		2003	-	-	-	5 301 365	-	-	-	-	-	-	-	-
		2004	-	-	-	5 717 600	-	-	-	-	-	-	-	-
		2005	-	-	-	6 003 200	-	-	-	-	30 000	-	-	-
		2006	-	-	-	6 304 000	-	-	-	-	-	-	-	-
		2008	-	-	-	-	-	-	-	-	-	30 000	-	-
		2009	4 644 509	-	-	-	5 262 314	-	-	-	77 083	-	3 958	-
		2010	22 686 793	-	-	953 930 000	5 215 000	-	-	-	-	-	6 682 000	-
	Comoros	2000	-	-	-	1 875	-	-	-	-	-	-	-	-
		2001	-	-	-	2 142	-	-	-	-	-	10 400	-	-
		2002	-	-	-	2 142	-	-	-	-	112 500	17 000	-	-
		2003	-	-	-	2 330	-	-	-	-	112 500	-	-	-
		2004	599 483	-	-	2 678	599 483	-	-	-	156 000	-	-	-
		2005	455 769	-	-	2 678	-	-	-	-	156 000	-	-	-
		2006	479 379	-	-	2 678	935 080	-	-	-	90 000	-	-	-
		2007	390 246	-	-	3 080	390 246	-	-	-	-	-	-	-
		2008	264 709	-	-	2 678	264 708	-	-	-	146 250	65 000	-	-
		2009	232 885	-	-	24 158 [5]	290 612	-	-	-	104 000	11 656	-	-
		2010	4 256 900	-	-	-	4 610 020	0	0	-	104 000	-	-	-

Annex 2 – Funding for malaria control, 2010 (continued)

WHO Region/ Sub-region	Country/Area	Year	Contributions reported by donors: Global Fund[1]	PMI[2]	The World Bank[3]	Government	Global Fund	The World Bank	PMI/USAID	Other bilaterals	WHO	UNICEF	Other Contributions[4]	European Union
Africa	Congo	2008	-	-	4 500 000	-	-	-	-	-	-	-	-	-
		2010	11 861 711	-	-	-	-	-	-	-	-	-	-	-
	Côte d'Ivoire	2002	-	-	-	1 129 683 [5]	-	-	-	-	-	-	-	-
		2003	-	-	-	2 352 953 [5]	-	-	-	-	-	-	-	-
		2004	-	-	-	2 206 653	-	-	-	-	-	-	-	-
		2005	-	-	-	2 206 653	-	-	-	-	-	-	-	-
		2006	-	-	-	2 267 892	-	-	-	-	-	-	-	-
		2007	4 325 690	-	-	-	-	-	-	-	-	-	-	-
		2009	16 210 042	-	-	-	-	-	-	-	-	-	-	-
		2010	58 306 513	-	-	-	-	-	-	-	-	-	-	-
	Democratic Republic of the Congo	2004	1 441 186	-	-	-	-	-	-	-	-	-	-	-
		2005	18 579 231	-	30 000 000	-	20 020 417	-	-	-	-	-	-	-
		2006	6 471 520	-	-	2 000 000	6 471 520	-	-	-	-	-	-	-
		2007	5 184 339	-	13 000 000	2 000 000	5 184 339	-	6 700 000	250 000 000	-	5 351 451	-	6 700 000
		2008	18 188 352	-	-	2 000 000	18 188 352	43 000 000	7 240 000	-	45 104	5 662 078	-	-
		2009	70 944 854	-	-	2 000 000	4 071 980	11 101 283	15 580 000	-	86 895	5 365 009	-	-
		2010	44 323 509	36 000 000	-	296 436	23 044 824	10 262 916	15 580 000	596 182	-	2 271 712	-	-
	Equatorial Guinea	2003	-	-	-	-	-	-	-	-	-	-	874 000	-
		2004	-	-	-	-	-	-	-	-	40 000	-	1 669 000	-
		2005	-	-	-	-	-	-	-	-	40 000	-	2 160 000	-
		2006	3 483 905	-	-	-	1 172 344	-	-	-	20 000	-	3 179 000	-
		2007	1 799 583	-	-	150 000	7 141 363	-	-	3 196 000	-	-	3 196 000	-
		2008	6 305 881	-	-	300 000	8 245 229	-	165 000	4 759 000	15 000	-	4 759 000	-
		2009	3 445 774	-	-	-	4 756 207	-	-	-	-	-	6 787 000	-
		2010	5 371 664	-	-	-	-	-	-	-	-	-	-	-
	Eritrea	2001	-	-	-	-	0	913 000	-	-	-	-	-	0
		2002	-	-	-	-	0	1 307 103	-	-	-	-	-	0
		2003	324 063	-	-	-	0	1 694 894	-	-	-	-	-	0
		2004	756 152	-	-	-	1 080 209	1 006 250	-	-	-	-	-	0
		2005	1 537 418	-	2 000 000	-	1 537 424	880 620	-	180 000	-	-	-	0
		2006	1 140 635	-	-	-	1 716 844	453 400	-	180 000	-	-	-	0
		2007	3 137 002	-	-	-	1 748 745	516 200	0	-	30 000	476 600	-	-
		2008	4 754 718	-	-	-	4 792 642	300 000	0	-	100 000	254 037	-	-
		2009	206 600	-	-	-	3 312 520	0	0	0	-	105 000	0	-
		2010	21 382 276	-	-	-	19 155 845	0	0	0	0	0	0	-
	Ethiopia	2001	-	-	-	2 119 140	0	0	-	-	-	-	-	0
		2002	-	-	-	2 167 894	0	0	-	-	-	-	-	0
		2003	17 891 589	-	-	2 346 156	0	12 500	-	-	-	-	-	0
		2004	-	-	-	2 858 151	21 757 639	11 120	-	-	-	-	-	0
		2005	20 023 422	-	-	4 588 476	-	695 037	-	-	-	-	-	0
		2006	70 074 800	5 126 000	43 000 000	5 252 564	71 421 627	15 128 000	-	-	-	-	-	0
		2007	17 480 252	6 700 000	12 200 000	34 946 890	24 999 226	-	6 587 000	2 947 894	-	3 000 808	-	0
		2008	3 138 583	19 838 000	-	13 055 600	18 990 619	-	6 587 000	164 372	-	4 200 000	-	-
		2009	121 481 761	98 500 000	-	62 883 603	81 586 570	10 090 000	19 700 000	0	280 000	5 000 000	7 624 294	-
		2010	28 254 185	31 000 000	-	111 785 828	107 128 416	9 900 000	31 000 000	0	210 960	1 297 858	0	-
	Gabon	2000	-	-	-	987 402	-	-	-	-	200 000	-	-	-
		2001	-	-	-	982 919	-	-	-	-	200 000	-	-	-
		2002	-	-	-	952 790	-	-	-	-	-	-	-	-
		2003	-	-	-	1 187 897	-	-	-	-	-	-	-	-
		2004	1 224 253	-	-	1 201 252	-	-	-	-	-	-	-	-
		2005	3 091 210	-	-	1 227 350	4 902 284	-	-	-	-	-	-	-

Annex 2 – Funding for malaria control, 2010 (continued)

WHO Region/ Sub-region	Country/Area	Year	Contributions reported by donors: Global Fund[1]	PMI[2]	The World Bank[3]	Government	Global Fund	The World Bank	PMI/USAID	Other bilaterals	WHO	UNICEF	Other Contributions[4]	European Union
Africa	Gabon	2006	4 059 253	-	-	1 311 772	4 619 385	-	-	-	-	140 977	-	-
		2007	3 063 767	-	-	1 145 099	2 490 749	-	-	1 691 729	-	-	-	-
		2008	1 338 162	-	-	1 293 523	450 693	-	-	-	-	-	-	-
		2009	3 891 808	-	-	-	-	-	-	-	-	-	-	-
		2010	871 083	-	-	1 400 769	-	-	-	45 000	-	-	-	-
	Gambia	2000	-	-	-	-	0	0	0	0	-	-	0	0
		2001	-	-	-	70 000 [5]	0	0	0	0	-	-	0	0
		2002	-	-	-	129 000 [5]	0	0	0	0	-	-	0	0
		2003	-	-	-	129 653 [5]	0	0	0	0	-	-	0	0
		2004	1 456 473	-	-	135 570 [5]	1 456 473	0	0	0	-	-	100 000	0
		2005	3 772 423	-	-	145 900 [5]	3 772 423	0	0	0	-	-	100 000	0
		2006	2 521 319	-	-	459 014 [5]	2 521 319	0	0	0	-	-	100 000	0
		2007	6 803 737	-	-	502 234 [5]	6 803 737	0	0	0	72 500	65 000	100 000	0
		2008	5 683 473	-	-	517 767 [5]	5 683 474	0	0	113 000	72 500	17 000	0	0
		2009	5 921 546	-	-	1 025 550 [5]	5 921 546	0	0	100 000	380 500	65 000	0	-
		2010	6 891 419	-	-	-	8 960 101	0	0	250 000	-	2 143	0	-
	Ghana	2003	886 150	-	-	-	-	-	-	-	-	-	-	-
		2004	2 034 960	-	-	0	-	-	-	-	-	-	-	-
		2005	15 370 497	-	-	-	-	-	-	-	-	-	-	-
		2006	5 177 461	4 434 000	-	1 229 000	21 762 030	0	-	-	-	-	-	70 000
		2007	13 723 225	25 000 000	50 000 000	2 980 000	9 269 310	5 000 000	5 000 000	0	100 000	1 200 000	300 000	-
		2008	10 544 980	50 586 000	-	269 583	10 544 980	4 000 000	16 900 000	1 000 000	200 000	1 200 000	300 000	-
		2009	27 046 752	34 600 000	-	6 214 286	18 363 180	1 283 389	17 300 000	0	290 000	939 300	300 000	-
		2010	30 649 705	34 000 000	-	6 533 333	30 649 705	0	34 000 000	0	150 000	101 053	98 733	-
	Guinea	2001	-	-	-	73 264	-	7 500	-	-	-	-	-	-
		2002	-	-	-	127 637	-	-	-	177 240	268 000	2 063 000	-	-
		2003	177 112	-	-	36 264	-	-	-	-	303 000	2 063 000	-	-
		2004	1 220 983	-	-	-	2 089 204	-	-	-	594 500	-	-	-
		2005	3 406 208	-	-	-	-	-	-	-	594 500	-	-	-
		2006	-2 225 574	-	5 200 000	-	3 036 257	-	-	-	219 500	335 000	-	-
		2007	2 833 474	-	-	-	-	1 181 250	-	-	219 500	432 000	6 000 000	-
		2008	1 002 592	-	-	9 687	13 424 707	1 181 250	-	-	250 000	432 000	6 000 000	-
		2009	-	-	-	154 564	3 914 541	1 181 250	-	-	109 000	819 553	2 375 040	-
		2010	12 449 403	-	-	3 948	0	0	0	0	51 500	-	0	-
	Guinea-Bissau	2004	192 906	-	-	-	129 359	24 776	-	-	250 000	39 830	-	-
		2005	1 076 489	-	-	-	592 201	-	-	-	25 000	526 248	-	-
		2006	200 000	-	-	-	778 391	40 000	-	-	146 000	750 000	-	-
		2007	677 067	-	-	-	760 640	-	-	-	146 000	420 543	-	-
		2008	1 526 060	-	-	-	1 545 699	-	-	-	146 000	329 305	-	-
		2009	1 644 833	-	-	8 000	1 279 343	-	-	-	100 000	486 579	-	-
		2010	6 965 345	-	-	-	-	-	-	-	-	-	-	-
	Kenya	2001	-	-	-	27 631	-	-	-	-	-	-	-	-
		2002	-	-	-	774 984	0	0	-	-	-	-	-	0
		2003	940 541	-	-	84 882	3 976 069	0	-	-	-	-	-	0
		2004	3 699 906	-	-	1 233 505	0	0	-	-	-	-	-	0
		2005	-	-	-	379 494	53 698 910	0	-	-	-	-	-	0
		2006	52 188 969	16 410 000	-	308 660	39 858 515	0	-	-	-	-	-	0
		2007	4 949 799	6 050 000	6 000 000	30 513	-	-	-	-	-	-	-	-
		2008	18 964 849	19 838 000	-	32 566	37 543 798	-	19 838 000	500 000	-	-	-	-
		2009	26 431 540	19 700 000	-	822 742 [5]	25 921 567	-	37 652 822	17 975 039	87 584	30 000	500 000	-
		2010	39 084 205	40 000 000	-	2 741 417 [5]	-	3 400 000	30 829 000	-	-	-	11 131 200	-

Annex 2 – Funding for malaria control, 2010 (continued)

WHO Region/ Sub-region	Country/Area	Year	Contributions reported by donors: Global Fund[1]	PMI[2]	The World Bank[3]	Government	Global Fund	The World Bank	PMI/USAID	Other bilaterals	WHO	UNICEF	Other Contributions[4]	European Union
Africa	Liberia	2004	2 797 574	-	-	-	-	-	-	-	-	-	-	-
		2005	3 387 041	-	-	27 216	5 024 741	-	-	-	93 931	-	-	-
		2006	5 956 306	-	-	44 569	5 098 262	-	-	-	163 508	-	-	-
		2007	-	2 500 000	-	51 104	849 710	-	-	-	-	-	-	-
		2008	8 863 680	24 798 000	-	60 118	6 347 301	-	12 500 000	-	-	-	-	-
		2009	345 575	11 800 000	-	-	990 100	-	61 375	50 000	5 786 287	226 743	-	-
		2010	8 229 609	72 000 000	-	-	8 118 208	-	12 000 000	-	-	-	-	-
	Madagascar	2000	-	-	-	3 124	-	-	-	-	-	-	-	-
		2001	-	-	-	3 124	-	-	-	265 825	123 407	258 092	-	-
		2002	-	-	-	3 481	-	-	-	222 654	16 540	14 784	-	-
		2003	733 622	-	-	5 023	-	-	-	593 450	22 425	-	-	-
		2004	3 781 455	-	-	14 183	-	-	-	1 949 254	226 228	-	-	-
		2005	17 576 016	-	-	8 298	4 984 782	-	-	193 612	147 661	3 447	5 845	-
		2006	5 834 491	4 338 000	-	8 925	4 322 427	90 000	-	91 189	20 000	-	-	-
		2007	20 964 506	30 000 000	-	10 205	2 609 988	0	17 000 000	0	-	1 505 155	0	-
		2008	15 103 081	101 172 000	-	19 387	5 814 063	0	17 000 000	0	638 691	3 852 552	210 000	-
		2009	12 108 636	83 500 000	-	19 000	25 329 554	0	12 753 000	0	100 532	1 103 644	0	-
		2010	54 473 973	169 500 000	-	110 504	22 463 047	0	25 200 000	578 000	418 861	523 000	0	-
	Malawi	2006	6 363 507	2 045 000	5 000 000	12 000 000	6 300 000	3 000 000	-	-	100 000	1 500 000	-	-
		2007	11 594 207	18 500 000	-	23 000 000 [5]	11 000 000	-	15 000 000	-	100 000	1 200 000	-	-
		2008	14 961 664	17 854 000	-	5 985 915 [5]	-	-	16 000 000	-	100 000	500 000	-	-
		2009	3 721 540	17 700 000	-	4 482 759 [5]	-	-	18 000 000	-	50 000	50 000	-	-
		2010	5 492 126	27 000 000	-	8 453 947	5 492 126	-	27 000 000	-	70 000	50 000	-	-
	Mali	2002	-	-	-	-	2 592 990	-	-	-	-	-	-	-
		2003	678 620	-	-	-	-	-	-	-	-	-	-	-
		2004	266 500	-	-	-	-	-	-	-	-	-	-	-
		2005	746 721	-	-	-	-	-	-	-	-	-	-	-
		2006	802 828	7 470 000	34 800 000	-	-	-	-	-	-	-	-	-
		2007	4 216 975	9 000 000	-	-	-	-	-	-	-	-	-	-
		2008	4 233 040	29 758 000	-	-	6 703 715	1 749 540	8 932 000	2 806 479	-	-	6 550 000	-
		2009	-	15 400 000	-	-	5 214 224	-	8 932 000	965 774	292 000	-	3 116 725	-
		2010	4 330 851	56 000 000	-	-	7 120 975	847 617	11 184 211	291 162	50 535	1 575 926	894 577	-
	Mauritania	2001	-	-	-	26 190	0	-	-	-	-	-	-	0
		2002	-	-	-	26 190	0	-	-	-	-	-	-	0
		2003	-	-	-	123 850	3	-	-	-	-	-	-	0
		2004	432 745	-	-	131 538	0	-	-	-	-	-	-	0
		2005	248 254	-	-	68 386	0	0	-	-	-	-	-	0
		2006	600 105	-	23 000 000	-	14	0	-	-	-	-	-	0
		2007	1 346 380	-	-	-	-	-	-	-	-	-	-	-
		2008	1 342 027	-	-	-	-	-	-	-	-	-	-	-
		2009	541 854	-	-	-	-	-	-	-	-	-	-	-
		2010	500 223	-	-	33 941	350 000	0	0	0	1 000	25 000	1 000 000	-
	Mozambique	2004	6 653 718	-	-	-	-	-	-	-	-	-	-	-
		2006	5 380 306	6 259 000	-	-	-	-	-	-	-	-	-	-
		2007	12 432 871	54 000 000	-	-	-	-	-	-	-	-	-	-
		2008	11 625 136	59 514 000	-	-	-	-	-	-	-	-	-	-
		2009	1 041 731	39 400 000	13 600 000	-	-	-	-	-	-	-	-	-
		2010	23 027 794	76 000 000	-	-	-	-	-	-	-	-	-	-
	Namibia	2001	-	-	-	-	0	-	-	-	-	-	-	-
		2002	-	-	-	-	0	-	-	-	-	-	-	-
		2003	-	-	-	-	0	-	-	-	-	-	-	-

Annex 2 – Funding for malaria control, 2010 (continued)

WHO Region/ Sub-region	Country/Area	Year	Contributions reported by donors: Global Fund[1]	PMI[2]	The World Bank[3]	Government	Global Fund	The World Bank	PMI/USAID	Other bilaterals	WHO	UNICEF	Other Contributions[4]	European Union
Africa	Namibia	2004	349 654	-	-	-	0	-	-	-	-	-	-	-
		2005	1 370 770	-	-	-	1 323 641	-	-	-	-	-	-	-
		2006	1 930 312	-	-	-	1 135 789	-	-	-	-	-	-	-
		2007	6 789 375	-	-	-	947 674	-	-	-	-	-	-	-
		2008	412 016	-	-	1 690 211	4 826 069	-	-	-	-	-	-	-
		2009	3 797 710	-	-	2 411 088	2 267 472	-	-	-	-	-	-	-
		2010	1 165 287	-	-	2 731 460	1 362 347	-	-	-	-	-	-	-
	Niger	2000	-	-	-	231 000 000 [5]	-	-	-	-	-	-	-	-
		2001	-	-	-	25 000 [5]	-	-	-	-	-	-	-	-
		2002	-	-	-	25 000 [5]	-	-	-	-	-	-	-	-
		2003	-	-	-	8 846 [5]	-	-	-	-	-	-	-	-
		2004	2 882 940	-	-	444 231 [5]	11 257 988	0	-	-	-	-	-	0
		2005	10 216 624	-	-	342 346 [5]	-	-	-	-	-	-	-	-
		2006	4 914 290	-	40 000 000	-	-	-	-	-	-	-	-	-
		2007	2 658 719	-	-	900 000 [5]	-	-	-	-	-	-	-	-
		2008	12 345 165	-	-	900 000 [5]	-	-	-	-	-	-	-	-
		2009	17 502 558	-	-	900 000 [5]	28 057 121	1 773 423 718	0	194 428	15 000	840 196	-	-
		2010	2 989 716	-	-	700 000 [5]	972 351 152	772 219 032	0	556 900	4 500	1 058 500 000	2 374 736	-
	Nigeria	2000	-	-	-	-	-	-	-	-	500 000	500 000	-	-
		2001	-	-	-	2 020 000 [5]	0	0	-	-	550 000	550 000	-	-
		2002	-	-	-	4 000 000 [5]	0	0	-	-	700 000	700 000	-	-
		2003	-	-	-	3 530 000 [5]	0	0	-	-	855 000	855 000	-	-
		2004	8 851 119	-	-	92 308	0	0	-	-	800 000	800 000	-	-
		2005	5 784 648	-	-	384 615	15 000 000	0	-	-	850 000	850 000	-	-
		2006	13 107 787	-	720 000 000	11 000 000	16 000 000	2 000 000	-	-	1 000 000	1 000 000	-	-
		2007	28 022 180	-	-	11 000 000 [5]	20 000 000	28 700 000	6 500 000	-	1 500 000	1 500 000	-	-
		2008	16 273 780	-	-	14 324 952	15 353 110	52 358 702	11 900 000	2 235 276	-	-	2 895 752	-
		2009	224 403 482	-	300 000 000	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	36 000 000	-	6 493 506	61 357 535	-	18 000 000	-	-	20 750 000	17 678 415	-
	Rwanda	2000	-	-	-	186 000	-	-	-	-	-	-	-	-
		2001	-	-	-	86 000	-	-	-	-	-	-	-	-
		2002	-	-	-	275 000	-	-	-	-	-	-	-	-
		2003	-	-	-	120 000	-	-	-	-	-	-	-	-
		2004	7 428 843	-	-	271	-	-	-	1 349 117	100 000	75 527	-	-
		2005	4 395 064	-	-	89	7 802 000	-	-	929 884	100 000	-	-	-
		2006	32 601 503	5 916 000	-	40	5 243 000	2 916 666	-	822 187	350 000	50 000	486 000	-
		2007	1 391 593	20 000 000	-	300 000 [5]	20 900 000	3 083 332	17 000 000	486 000	-	-	393 186	-
		2008	19 260 378	33 724 000	-	500 000 [5]	12 884 983	3 083 332	17 000 000	-	-	-	-	-
		2009	42 472 309	48 900 000	-	-	40 117 815	-	-	-	0	-	-	-
		2010	20 481 098	36 000 000	-	318 991	8 710 956	-	-	117 807	45 000	-	-	-
	Sao Tome and Principe	2000	-	-	-	-	-	-	-	-	9 060	-	-	-
		2001	-	-	-	-	-	-	-	-	9 060	-	-	-
		2002	-	-	-	-	-	-	-	-	9 060	-	-	-
		2003	-	-	-	-	-	-	-	-	9 060	-	-	-
		2004	-	-	-	-	-	-	-	-	65 410	-	-	-
		2005	1 051 345	-	-	9 100 [5]	939 449	-	-	415 000	65 410	-	47 920	-
		2006	834 299	-	-	10 000 [5]	703 167	66 000	-	385 914	53 237	-	320 485	-
		2007	394 662	-	-	51 537	589 781	79 000	-	5 000	26 742	-	364 000	-
		2008	2 424 782	-	-	54 267	514 393	40 000	0	1 700	63 165	10 000	1 000 000	-
		2009	75 857	-	-	303 802	1 699 172	126 000	0	1 717	59 965	5 000	1 000 000	-
		2010	1 060 100	-	-	74 583	782 254	350 000	0	30 315	38 163	3 000	1 172 611	-

Annex 2 – Funding for malaria control, 2010 (continued)

WHO Region/ Sub-region	Country/Area	Year	Contributions reported by donors: Global Fund[1]	PMI[2]	The World Bank[3]	Government	Global Fund	The World Bank	PMI/USAID	Other bilaterals	WHO	UNICEF	Other Contributions[4]	European Union
Africa	Senegal	2001	-	-	-	1 925 760	0	-	-	-	-	-	-	-
		2002	-	-	-	1 078 220	0	-	-	-	-	-	-	-
		2003	500 000	-	-	109 780	1 428 571	467 480	-	-	-	-	-	-
		2004	1 026 770	-	-	1 324 770	2 857 143	-	-	-	-	-	-	-
		2005	10 634 063	-	-	460 000	10 634 063	-	-	-	-	-	-	-
		2006	17 916 101	13 008 000	141 900 000	444 221	8 958 051	-	-	-	-	-	-	-
		2007	1 063 231	16 700 000	-	327 621	1 067 834	-	-	-	340 796	-	-	-
		2008	5 839 346	47 610 000	-	176 000	-	-	490 000	-	394 552	-	-	-
		2009	14 310 644	15 700 000	-	449 813	11 436 555	-	14 512 634	6 793 567	288 302	-	-	-
		2010	2 507 790	54 000 000	-	-	-	-	-	-	-	-	-	-
	Sierra Leone	2005	2 043 498	-	-	151 492	6 784 566	191 833	-	-	-	-	-	-
		2006	3 985 298	-	-	166 641	3 155 047	-	-	-	-	-	-	1 047 500
		2007	927 301	-	-	164 138 [5]	1 187 379	460 620	-	2 950 000	-	650 000	-	-
		2008	4 840 240	-	-	180 552 [5]	5 126 487	5 141	-	-	778 590	-	-	-
		2009	2 794 509	-	-	198 586 [5]	4 884 763	-	-	-	-	-	-	-
		2010	799 743	-	-	1 198 629 [5]	5 241 344	-	-	-	-	-	-	-
	South Africa	2007	-	-	-	156 500 000 [5]	-	-	-	-	-	-	-	-
		2008	-	-	-	24 757 142 [5]	-	-	-	-	-	-	-	-
		2009	-	-	-	27 142 857 [5]	-	-	-	-	100 000	-	50 000	-
		2010	-	-	-	25 064 907	-	-	-	-	0	-	-	-
	Swaziland	2003	383 000	-	-	-	400 000	-	-	-	-	-	-	-
		2005	231 500	-	-	-	-	-	-	-	-	-	-	-
		2006	393 800	-	-	-	-	-	-	-	-	-	-	-
		2007	129 215	-	-	611 990	-	0	0	0	0	0	0	-
		2008	294 218	-	-	-	-	0	0	0	0	0	0	-
		2009	2 607 294	-	-	-	-	0	0	0	0	0	0	-
		2010	1 377 144	-	-	7 520 447	2 263 001	-	-	-	-	-	-	-
	Togo	2004	2 146 271	-	-	-	1 007 724	-	-	-	-	-	-	-
		2005	4 356 862	-	-	-	1 102 231	-	-	-	-	-	-	-
		2006	633 065	-	-	57 906	3 110 435	-	-	-	-	-	-	-
		2007	5 159 581	-	-	-	704 271	-	0	-	-	-	-	-
		2008	5 026 694	-	-	-	2 442 924	-	0	3 788 783	20 573	341 805	-	-
		2009	4 525 903	-	-	-	592 434	-	0	-	-	92 523	92 378	-
		2010	8 447 243	-	-	77 778 [5]	3 565 262	-	-	2 688	1 489	-	-	-
	Uganda	2000	-	-	-	3 166 060 [5]	-	-	-	-	-	-	-	-
		2001	-	-	-	3 311 458 [5]	-	-	-	-	-	-	-	-
		2002	-	-	-	4 007 349 [5]	-	-	-	-	-	-	-	-
		2003	-	-	-	4 130 696 [5]	-	-	-	-	-	-	-	-
		2004	9 749 358	-	-	4 224 945 [5]	12 000 000	-	-	-	-	-	-	-
		2005	31 149 704	510 775	-	3 500 000	40 899 062	-	-	-	-	-	-	-
		2006	27 715 494	-	-	4 500 000	47 854 144	-	9 500 000	-	-	-	-	-
		2007	5 175 831	21 500 000	-	6 025 455	-	-	19 000 000	-	-	-	-	-
		2008	6 335 768	21 822 000	-	7 267 857	-	-	21 752 000	-	-	-	-	-
		2009	40 985 476	21 600 000	-	-	-	-	21 600 000	-	-	-	-	-
		2010	31 078 370	70 000 000	-	-	155 963 673	-	35 000 000	-	-	-	-	-
	United Republic of Tanzania	2001	-	-	-	-	19 800 000	-	-	-	-	-	-	-
		2002	-	-	-	-	90 400 000	-	-	-	-	-	-	-
		2003	-	-	-	-	-	25 000 000	-	-	-	-	-	-
		2005	-	2 000 000	-	-	-	-	-	-	-	-	-	-
		2006	-	-	25 000 000	-	-	-	-	-	-	-	-	-
		2007	-	31 000 000	-	-	-	-	-	-	-	-	-	-

Annex 2 – Funding for malaria control, 2010 (continued)

WHO Region/ Sub-region	Country/Area	Year	Contributions reported by donors: Global Fund[1]	PMI[2]	The World Bank[3]	Government	Global Fund	The World Bank	PMI/USAID	Other bilaterals	WHO	UNICEF	Other Contributions[4]	European Union
Africa	United Republic of Tanzania	2008	-	33 725 000	-	838 226 415 [5]	-	-	-	-	-	-	-	-
		2009	-	35 000 000	-	616 085 000 [5]	46 300 000	25 000 000	34 000 000	1 000 000	50 000 000	-	-	-
		2010	-	52 000 000	-	-	-	-	-	-	-	-	-	-
	Mainland	2001	-	-	-	-	19 800 000	-	-	-	-	-	-	-
		2002	-	-	-	-	90 400 000	-	-	-	-	-	-	-
		2003	489 478	-	-	-	-	25 000 000	-	-	-	-	-	-
		2004	5 074 373	-	-	-	-	-	-	-	-	-	-	-
		2005	21 802 333	-	-	-	-	-	-	-	-	-	-	-
		2006	22 161 581	-	-	-	-	-	-	-	-	-	-	-
		2007	21 962 255	-	-	-	-	-	-	-	-	-	-	-
		2008	56 892 271	-	-	838 226 415 [5]	-	-	-	-	-	-	-	-
		2009	58 558 606	-	-	616 085 000 [5]	46 300 000	25 000 000	34 000 000	1 000 000	50 000 000	-	-	-
		2010	50 407 374	-	-	21 830 362	105 217 601	-	52 000 000	43 401 000	300 000	139 313	-	-
	Zanzibar	2003	162 700	-	-	-	-	-	-	-	-	-	-	-
		2004	3 410 597	-	-	-	-	-	-	-	-	-	-	-
		2006	1 439 430	-	-	-	-	-	-	-	-	-	-	-
		2007	1 411 307	-	-	-	-	-	-	-	-	-	-	-
		2008	1 770 569	-	-	29 467	1 705 252	0	3 020 800	0	0	108 552	0	-
		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	-
	Zambia	2000	-	-	-	160 000	-	-	4 000 000	-	280 000	538 437	-	-
		2001	-	-	-	160 000	-	-	4 000 000	-	-	208 481	-	-
		2002	-	-	-	302 860	-	-	4 000 000	-	674 000	330 579	-	-
		2003	4 907 830	-	-	588 571	-	-	4 000 000	-	-	183 190	-	-
		2004	11 899 516	-	-	588 571	-	-	3 300 300	-	1 500 000	477 624	-	-
		2005	10 145 802	-	20 000 000	1 160 000	-	12 000 000	3 300 000	-	-	131 116	3 000 000	-
		2006	5 483 132	30 636 000	-	-	-	-	7 650 000	-	1 026 000	451 781	3 000 000	-
		2007	14 170 170	37 880 000	-	497 078	38 875	10 000 000	9 470 000	6 046 354	20 639	114 285	-	-
		2008	15 423 129	74 395 000	35 000 000	1 900 000	3 817 916	-	14 888 000	-	-	550 847	-	-
		2009	8 510 296	58 800 000	-	848 745	986 834	5 000 000	14 700 000	-	398 000	212 570	-	-
		2010	2 445 410	76 800 000	-	414 580	12 335 725	0	25 600 000	-	380 000	100 000	7 200 000	-
	Zimbabwe	2000	-	-	-	5 221 776	-	-	-	-	-	-	-	-
		2001	-	-	-	2 350 375	-	-	-	-	-	-	-	-
		2002	-	-	-	4 895 768	-	-	-	-	-	-	-	-
		2003	1 415 000	-	-	3 152 180	-	-	-	-	-	-	-	-
		2004	-	-	-	895 000	1 415 000	-	-	-	-	-	-	-
		2005	3 861 938	-	-	3 212 565	3 861 937	-	-	-	-	-	-	-
		2006	724 675	-	-	3 261 450	1 439 313	-	-	-	-	-	-	-
		2007	9 047 742	-	-	1 315 428	6 780 000	-	0	0	-	-	-	-
		2008	-	-	-	1 302 500	1 100 000	-	200 000	300 000	-	-	-	-
		2009	35 355 230	-	-	1 650 000	2 800 000	-	0	500 000	-	-	-	-
		2010	19 796 951	-	-	1 000 000	24 000 000	0	1 000 000	0	79 000	25 000	0	-
Americas	Argentina	2001	-	-	-	2 580 000 [5]	0	-	-	-	-	-	-	-
		2002	-	-	-	2 580 000 [5]	0	-	-	-	-	-	-	-
		2003	-	-	-	2 580 000 [5]	0	-	-	-	-	-	-	-
		2004	-	-	-	2 580 180 [5]	0	-	-	-	-	-	-	-
		2005	-	-	-	2 580 180 [5]	0	-	-	-	-	-	-	-
		2006	-	-	-	2 287 066 [5]	0	-	-	-	-	-	-	-
		2010	-	-	-	1 082 700 [5]	-	-	-	-	-	-	-	-

Annex 2 – Funding for malaria control, 2010 (continued)

WHO Region/ Sub-region	Country/Area	Year	Contributions reported by donors: Global Fund[1]	PMI[2]	The World Bank[3]	Government	Global Fund	The World Bank	PMI/USAID	Other bilaterals	WHO	UNICEF	Other Contributions[4]	European Union
Americas	Belize	2004	-	-	-	100 000 [5]	0	-	-	-	-	-	595 000	-
		2005	-	-	-	100 000 [5]	0	-	-	-	-	-	595 000	-
		2006	-	-	-	100 000 [5]	0	-	-	-	-	-	595 000	-
		2007	-	-	-	87 993 [5]	0	-	-	-	-	-	595 000	-
		2008	-	-	-	170 494 [5]	0	-	-	-	-	-	-	-
		2009	-	-	-	172 801 [5]	0	-	-	-	-	-	-	-
	Bolivia (Plurinational State of)	2000	-	-	-	845 764 [5]	-	-	-	-	-	-	-	-
		2001	-	-	-	1 800 000	0	0	216 777	274 515	-	70 000	40 364	-
		2002	-	-	-	918 145 [5]	-	-	100 000	-	-	-	-	-
		2003	-	-	-	300 000	-	-	197 000	-	-	-	176 743	-
		2004	780 367	-	-	1 412 074	1 212 074	-	150 000	-	-	-	-	-
		2005	1 630 869	-	-	1 390 737	1 170 737	-	150 000	-	-	-	-	-
		2006	2 369 685	-	-	1 962 739	1 817 739	-	150 000	-	-	-	-	-
		2007	422 354	-	-	1 593 626	121 276	-	200 000	-	-	40 000	-	-
		2008	-	-	-	1 593 484	-	-	200 000	-	-	40 000	-	70 000
		2009	2 116 856	-	-	1 699 130	550 000	-	200 000	-	-	25 000	-	-
		2010	1 773 184	-	-	1 700 145	2 482 576	-	200 000	-	200 000	50 000	-	-
	Brazil	2000	-	-	-	44 766 876 [5]	-	-	-	-	-	-	-	-
		2001	-	-	-	21 517 299 [5]	-	-	-	-	-	-	-	-
		2002	-	-	-	21 411 765 [5]	-	-	111 505	-	-	-	-	-
		2003	-	-	-	40 695 955 [5]	-	-	200 000	-	-	-	-	-
		2004	-	-	-	40 695 955 [5]	-	-	190 000	-	-	-	-	-
		2005	-	-	-	73 469 000 [5]	-	-	164 252	-	-	-	-	-
		2006	-	-	-	78 535 000 [5]	-	-	164 252	-	-	-	-	-
		2007	-	-	-	106 000 000 [5]	0	350 000	243 204	-	-	-	-	0
		2008	-	-	-	106 000 000 [5]	0	-	65 000	0	-	0	-	-
		2009	4 858 206	-	-	106 000 000 [5]	134 611	-	65 000	0	-	0	-	-
		2010	5 509 722	-	-	106 000 000 [5]	13 968 815	-	227 000	0	-	0	-	-
	Colombia	2000	-	-	-	9 950 000 [5]	-	-	-	-	-	-	-	-
		2001	-	-	-	11 363 636 [5]	-	-	-	-	-	-	-	-
		2002	-	-	-	225 000	-	-	99 558	-	-	-	-	-
		2003	-	-	-	13 049 962 [5]	-	-	176 000	-	-	-	-	-
		2004	-	-	-	13 702 460 [5]	-	-	155 000	-	-	-	-	-
		2005	-	-	-	13 702 460 [5]	-	-	135 451	-	-	-	-	-
		2006	-	-	-	13 702 460 [5]	-	-	135 451	-	-	-	-	-
		2007	-	-	-	16 000 000 [5]	3 000 000	-	140 000	-	-	-	-	-
		2008	-	-	-	17 800 000 [5]	2 000 000	0	120 000	0	0	0	0	0
		2009	-	-	-	20 500 000 [5]	1 000 000	0	120 000	0	0	0	0	0
		2010	10 787 550	-	-	21 775 000	9 100 000	0	120 000	0	0	0	0	0
	Costa Rica	2000	-	-	-	3 380 000 [5]	-	-	-	-	-	-	-	-
		2001	-	-	-	2 500 000 [5]	-	-	-	-	-	-	-	-
		2002	-	-	-	2 880 000 [5]	-	-	-	-	-	-	-	-
		2003	-	-	-	3 840 000 [5]	-	-	-	-	-	-	-	-
		2004	-	-	-	2 980 000 [5]	-	-	-	-	-	-	-	-
		2005	-	-	-	3 250 000 [5]	-	-	-	-	-	-	-	-
		2006	-	-	-	4 940 000 [5]	-	-	-	-	-	-	-	-
		2007	-	-	-	5 750 000 [5]	-	-	-	-	-	-	-	-
		2008	-	-	-	6 720 000 [5]	0	0	0	0	0	0	0	-
		2009	-	-	-	6 240 000 [5]	0	0	0	0	0	0	0	-
		2010	-	-	-	4 845 000 [5]	0	0	0	0	0	0	0	-

Annex 2 – Funding for malaria control, 2010 (continued)

WHO Region/ Sub-region	Country/Area	Year	Contributions reported by donors: Global Fund[1]	PMI[2]	The World Bank[3]	Government	Global Fund	The World Bank	PMI/USAID	Other bilaterals	WHO	UNICEF	Other Contributions[4]	European Union
Americas	Dominican Republic	2000	-	-	-	1 410 013 [5]	0	0	0	0	0	0	0	0
		2001	-	-	-	5 000	0	0	0	0	5 000	0	0	0
		2002	-	-	-	0	0	0	0	0	0	0	0	0
		2003	-	-	-	20 000	0	0	0	0	20 000	0	0	0
		2004	-	-	-	0	0	0	0	0	0	0	0	0
		2005	-	-	-	0	0	0	0	0	0	0	0	0
		2006	-	-	-	0	0	0	0	0	0	0	0	0
		2007	-	-	-	0	0	0	0	0	3 470	0	0	0
		2008	-	-	-	17 595	0	0	0	0	39 303	0	54 174	0
		2009	1 396 348	-	-	208 995	148 559	0	0	0	58 538	0	14 503	-
		2010	1 207 483	-	-	217 761	-	0	0	0	0	0	150 031	-
	Ecuador	2001	-	-	-	3 156 000 [5]	-	-	-	-	-	-	-	-
		2002	-	-	-	180 000	0	0	89 381	-	-	-	-	0
		2003	-	-	-	225 000	0	0	200 000	-	-	-	-	0
		2004	-	-	-	220 000	0	0	110 000	-	-	-	-	0
		2005	-	-	-	200 000	0	0	116 114	-	-	-	-	0
		2006	-	-	-	2 922 372	2 742 372	0	116 114	-	-	-	-	0
		2007	-	-	-	8 426 252	567 000	-	120 000	-	-	-	-	-
		2008	-	-	-	3 941 711	220 000	-	82 000	100 000	-	-	0	-
		2009	-	-	-	2 428 604	400 000	0	0	0	80 000	0	-	-
		2010	2 701 041	-	-	2 290 771	531 945	-	-	-	-	-	-	-
	El Salvador	2000	-	-	-	1 300 000 [5]	-	-	-	-	-	-	-	-
		2001	-	-	-	0	0	0	-	-	-	-	-	0
		2002	-	-	-	0	0	0	-	-	-	-	-	0
		2003	-	-	-	0	0	0	-	-	-	-	-	0
		2004	-	-	-	0	0	0	-	-	-	-	10 000	0
		2005	-	-	-	0	0	0	-	-	-	-	20 000	0
		2006	-	-	-	0	0	0	-	-	-	-	30 000	0
		2007	-	-	-	1 829 000 [5]	-	-	-	-	-	-	-	-
		2008	-	-	-	1 920 000 [5]	-	-	-	-	-	-	-	-
		2009	-	-	-	3 057 500 [5]	0	0	-	0	0	0	-	-
	Guatemala	2000	-	-	-	702 703 [5]	0	-	-	-	-	-	-	-
		2005	2 710 226	-	-	2 681 975 [5]	-	-	-	-	-	-	-	-
		2006	4 597 397	-	-	2 392 626 [5]	-	-	-	-	-	-	-	-
		2007	1 393 228	-	-	3 380 000	2 355 753	-	-	-	-	-	-	-
		2008	3 325 400	-	-	3 380 000	1 849 992	0	0	0	-	0	0	-
		2009	1 343 648	-	-	-	-	0	0	0	-	0	0	-
		2010	45 736	-	-	-	-	0	0	0	-	0	0	-
	Guyana	2000	-	-	-	1 000 000 [5]	-	-	-	-	-	-	-	-
		2001	-	-	-	1 061 265 [5]	-	-	-	-	-	-	-	-
		2002	-	-	-	-	-	-	49 558	-	-	-	-	-
		2003	-	-	-	-	-	-	120 000	-	-	-	-	-
		2004	-	-	-	600 000 [5]	-	-	63 550	-	-	-	-	-
		2005	926 765	-	-	756 331 [5]	1 404 308	-	124 232	-	-	-	-	-
		2006	-	-	-	796 779 [5]	65 100	-	124 232	-	-	-	-	49 654
		2007	346 454	-	-	608 376 [5]	346 454	-	125 000	-	-	-	-	-
		2008	141 763	-	-	320 840	337 620	0	119 000	0	25 000	0	25 000	14 000
		2009	1 329 110	-	-	341 775	-	0	140 000	0	10 000	0	34 000	-
		2010	573 070	-	-	661 500	-	0	110 000	0	10 000	0	10 000	-

Annex 2 – Funding for malaria control, 2010 (continued)

WHO Region/ Sub-region	Country/Area	Year	Contributions reported by donors: Global Fund[1]	PMI[2]	The World Bank[3]	Government	Global Fund	The World Bank	PMI/USAID	Other bilaterals	WHO	UNICEF	Other Contributions[4]	European Union
Americas	Haiti	2001	-	-	-	5 000 000	-	-	-	-	-	-	-	-
		2004	2 643 772	-	-	4 094 000	4 094 000	-	-	-	-	-	-	-
		2005	267 081	-	-	3 296 000	3 296 000	-	-	-	-	-	-	-
		2006	3 633 293	-	-	2 674 000	2 674 000	-	-	-	-	-	-	-
		2007	2 764 914	-	-	2 707 000	2 707 000	-	-	-	-	-	-	-
		2008	3 322 684	-	-	2 085 000	2 085 000	-	-	-	-	-	-	-
		2009	1 000 764	-	-	-	-	-	-	-	-	-	-	-
	Honduras	2000	-	-	-	2 597 868 [5]	-	-	-	-	-	-	-	-
		2001	-	-	-	1 450 000	-	-	-	-	-	-	-	-
		2002	-	-	-	54 039	-	-	-	-	-	-	-	-
		2003	439 396	-	-	7 289 800	1 769 353	-	-	-	-	-	-	-
		2004	2 603 713	-	-	7 285 000	1 375 070	-	-	-	-	-	-	-
		2005	1 748 517	-	-	262 162 [5]	2 234 419	-	-	-	-	-	-	-
		2006	750 972	-	-	400 000	1 190 010	-	-	-	-	-	-	-
		2007	1 415 404	-	-	789 327 [5]	-	-	-	-	-	-	-	-
		2008	968 258	-	-	576 434 [5]	316 567	0	82 383	0	19 522	0	0	-
		2009	1 028 955	-	-	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	-
	Mexico	2000	-	-	-	17 652 182 [5]	0	-	-	-	-	-	-	-
		2001	-	-	-	19 249 927 [5]	0	-	-	-	-	-	-	-
		2002	-	-	-	19 576 235 [5]	0	-	-	-	-	-	-	-
		2003	-	-	-	19 163 797 [5]	0	-	-	-	-	-	-	-
		2004	-	-	-	19 989 185 [5]	0	-	-	-	-	-	-	-
		2005	-	-	-	21 672 256 [5]	0	-	-	-	-	-	-	-
		2006	-	-	-	22 892 761 [5]	0	-	-	-	-	-	-	-
		2007	-	-	-	24 942 706	0	0	0	0	0	0	0	-
		2008	-	-	-	21 097 815	0	0	0	0	0	0	0	-
		2009	-	-	-	22 875 348	0	0	0	0	0	0	0	-
		2010	-	-	-	23 140 145	0	0	0	0	0	0	0	-
	Nicaragua	2000	-	-	-	2 597 868 [5]	-	-	-	-	-	-	-	-
		2003	89 601	-	-	-	-	-	-	-	-	-	-	-
		2004	1 899 753	-	-	-	-	-	-	-	-	-	-	-
		2005	1 045 462	-	-	-	-	-	-	-	-	-	-	-
		2006	908 506	-	-	732 596	692 596	0	-	-	-	40 000	-	-
		2007	611 813	-	-	1 335 000 [5]	891 000	-	-	-	-	90 300	-	-
		2008	793 799	-	-	457 751	600 000	-	-	-	-	-	-	-
		2009	2 505 734	-	-	-	2 015 344	-	-	-	-	16 173	-	-
		2010	2 086 863	-	-	-	731 600	0	0	-	35 000	-	0	-
	Panama	2000	-	-	-	5 066 318 [5]	-	-	-	-	-	-	-	-
		2001	-	-	-	4 680 289 [5]	-	-	-	-	-	-	-	-
		2002	-	-	-	3 986 849 [5]	-	-	-	-	-	-	-	-
		2003	-	-	-	2 751 541 [5]	-	-	-	-	-	-	-	-
		2004	-	-	-	5 024 766 [5]	-	-	-	-	-	-	-	-
		2005	-	-	-	5 091 832 [5]	-	-	-	-	-	-	-	-
		2006	-	-	-	5 650 871 [5]	-	-	-	-	81 333	-	81 333	-
		2007	-	-	-	1 254 713	0	0	0	0	60 825	0	0	-
		2008	-	-	-	1 300 000	0	0	0	0	0	0	0	-
		2009	-	-	-	1 459 724	0	0	0	0	0	0	0	-
		2010	-	-	-	2 152 435	0	0	0	0	36 640	0	0	-
	Paraguay	2000	-	-	-	1 932 103 [5]	-	-	-	-	-	-	-	-
		2001	-	-	-	1 614 231 [5]	-	-	-	-	-	-	-	-

Annex 2 – Funding for malaria control, 2010 (continued)

WHO Region/ Sub-region	Country/Area	Year	Contributions reported by donors: Global Fund[1]	PMI[2]	The World Bank[3]	Government	Global Fund	The World Bank	PMI/USAID	Other bilaterals	WHO	UNICEF	Other Contributions[4]	European Union
Americas	Paraguay	2002	-	-	-	1 333 561 [5]	-	-	-	-	-	-	-	-
		2003	-	-	-	1 589 906 [5]	-	-	-	-	-	-	-	-
		2004	-	-	-	1 707 654 [5]	-	-	-	-	-	-	-	-
		2005	-	-	-	1 878 668 [5]	-	-	-	-	-	-	-	-
		2006	-	-	-	2 386 460 [5]	-	-	-	-	-	-	-	-
		2007	-	-	-	3 900 282	0	-	-	-	-	-	-	-
		2008	-	-	-	3 944 353	0	-	-	-	-	-	-	-
		2009	-	-	-	4 263 661	0	-	-	-	10 000	-	-	-
		2010	-	-	-	3 245 670	0	0	0	0	13 000	0	0	-
	Peru	2000	-	-	-	1 900 915 [5]	-	-	-	-	-	-	-	-
		2001	-	-	-	4 109 728 [5]	-	-	-	-	-	-	-	-
		2002	-	-	-	3 900 000 [5]	-	-	100 000	-	-	-	-	-
		2003	-	-	-	3 500 000 [5]	-	-	200 000	-	-	-	-	-
		2004	-	-	-	3 600 000 [5]	-	-	150 000	-	-	-	-	-
		2005	-	-	-	-	-	-	150 000	-	-	-	-	-
		2006	-	-	-	-	-	-	150 000	-	-	-	-	-
		2007	-	-	-	-	-	-	130 000	-	-	-	-	-
		2008	-	-	-	-	-	-	125 000	-	-	-	-	-
	Suriname	2000	-	-	-	65 778 [5]	-	-	-	-	-	-	-	-
		2001	-	-	-	636 000	-	-	-	-	-	-	-	636 000
		2002	-	-	-	536 000	-	-	49 558	-	-	-	-	536 000
		2003	-	-	-	606 000	-	-	170 000	-	-	-	-	606 000
		2004	-	-	-	606 000	-	-	90 000	-	-	-	-	586 000
		2005	1 511 350	-	-	606 000	-	-	129 810	-	-	-	-	-
		2006	848 802	-	-	-	-	-	129 810	-	-	-	-	-
		2007	1 037 217	-	-	-	-	-	90 000	-	-	-	-	-
		2008	875 248	-	-	-	-	-	100 000	-	-	-	-	-
		2009	1 736 185	-	-	-	-	-	-	-	-	-	-	-
		2010	835 305	-	-	-	-	-	-	-	-	-	-	-
	Venezuela (Bolivarian Republic of)	2001	-	-	-	5 411 675 [5]	-	-	-	-	-	-	-	-
		2002	-	-	-	200 000	-	-	99 558	-	-	-	-	-
		2003	-	-	-	20 834 228 [5]	-	-	200 000	-	-	-	-	-
		2004	-	-	-	48 142 544 [5]	-	-	116 000	-	-	-	-	-
		2005	-	-	-	2 446 124 [5]	-	-	94 491	-	-	-	-	-
		2006	-	-	-	2 446 124 [5]	-	-	94 491	-	-	-	-	-
		2007	-	-	-	2 446 124 [5]	-	-	-	-	-	-	-	-
		2008	-	-	-	2 446 124 [5]	-	-	-	-	-	-	-	-
		2009	-	-	-	8 700 000 [5]	18 363 180	1 283 389	17 300 000	0	290 000	939 300	300 000	-
		2010	-	-	-	12 089 014 [5]	0	0	0	104 109	0	0	0	-
Eastern Mediterranean	Afghanistan	2005	-	-	-	-	750 000	-	-	-	-	-	-	-
		2006	2 222 644	-	-	-	-	-	-	-	-	-	-	-
		2007	2 909 565	-	-	-	1 022 069	-	-	-	119 459	-	-	-
		2008	8 141 152	-	-	-	7 785 080	-	-	-	211 689	-	-	-
		2009	20 927 863	-	-	-	6 372 330	-	-	-	117 500	-	-	-
		2010	3 105 472	-	-	-	7 928 628	-	415 335	22 813	-	-	-	-
	Djibouti	2006	-	-	-	438 000 [5]	-	-	-	-	-	-	178 000	-
		2007	1 218 232	-	-	443 615 [5]	-	-	-	350 000	-	-	-	-
		2008	1 244 752	-	-	-	-	-	-	-	-	-	-	-
		2009	148 961	-	-	79 442 [5]	-	-	-	-	-	-	-	-
		2010	146 471	-	-	84 745 [5]	206 939	26 810	0	0	2 040	2 824	0	-

Annex 2 – Funding for malaria control, 2010 (continued)

WHO Region/ Sub-region	Country/Area	Year	Contributions reported by donors: Global Fund[1]	PMI[2]	The World Bank[3]	Government	Global Fund	The World Bank	PMI/USAID	Other bilaterals	WHO	UNICEF	Other Contributions[4]	European Union
Eastern Mediterranean	Iran (Islamic Republic of)	2004	-	-	-	6 637 500	-	-	-	-	32 000	-	-	-
		2005	-	-	-	6 811 000	-	-	-	-	-	-	-	-
		2006	-	-	-	6 811 000	-	-	-	-	123 000	-	-	-
		2007	-	-	-	7 500 000	-	-	-	-	-	-	-	-
		2008	2 797 683	-	-	7 500 000	664 575	-	-	-	50 000	-	-	-
		2009	374 798	-	-	8 000 000	3 372 294	-	-	-	25 000	-	-	-
		2010	2 226 429	-	-	9 690 000	2 326 659	-	-	-	13 000	-	-	-
	Iraq	2003	-	-	-	175 000	-	-	-	-	-	-	-	-
		2004	-	-	-	205 000	-	-	-	-	-	-	-	-
		2005	-	-	-	209 123	-	-	-	-	-	-	-	-
		2006	-	-	-	165 020	-	-	-	-	-	-	-	-
		2007	-	-	-	-	-	-	-	436 000	389 000	-	-	-
		2008	-	-	-	587 102	0	-	-	-	277 000	-	-	-
		2009	-	-	-	682 416	0	-	-	-	707 500	-	-	-
		2010	-	-	-	776 875	0	-	-	-	130 716	-	55 000	-
	Sudan*	2000	-	-	-	3 894 500 [5]	-	-	-	-	-	-	-	-
		2001	-	-	-	3 976 200 [5]	-	-	-	-	-	-	-	-
		2002	-	-	-	4 574 210 [5]	-	-	-	-	-	-	-	-
		2003	-	-	-	3 466 100 [5]	-	-	-	-	-	-	-	-
		2004	-	-	-	2 500 000	-	-	2 000 000	-	885 141	-	607 692	-
		2005	-	-	-	1 322 156	12 903 414	-	2 500 000	765 000	1 673 351	-	2 938 309	732 830
		2006	-	-	1 200 000	3 000 000	13 692 691	11 000 000	1 972 000	7 399 410	-	-	315 722	39 900
		2007	-	-	-	13 733 973	4 903 414	11 000 000	312 151	0	312 151	0	1 468 893	-
		2008	-	-	-	10 573 479	3 700 680	0	39 416	8 586 562	39 416	3 452 658	0	-
		2009	-	-	-	10 993 899	15 869 166	0	0	0	0	13 983 001	8 126 137	-
		2010	-	-	-	12 810 941	15 829 743	0	0	789 400	0	1 259 562	-	-
	Pakistan	2000	-	-	-	-	-	-	-	-	90 000	-	-	-
		2001	-	-	-	100 000	-	-	-	-	90 000	-	-	-
		2002	-	-	-	76 841	-	-	-	-	42 000	-	-	-
		2003	650 462	-	-	0	-	-	-	-	42 000	-	-	-
		2004	1 268 500	-	-	6 814 450	4 500 000	-	-	-	42 000	-	-	-
		2005	1 790 008	-	-	4 407 000	4 407 000	-	-	-	42 000	-	-	-
		2006	1 211 616	-	-	1 487 000	-	-	-	-	50 000	-	-	-
		2007	-	-	-	1 000 000	-	-	-	-	-	-	-	-
		2008	1 642 417	-	-	300 000	2 500 000	-	-	-	-	-	-	-
		2009	6 873 870	-	-	500 000	4 500 000	-	-	-	215 947	-	-	-
		2010	3 390 454	20 000 000	-	-	-	-	-	-	-	-	-	-
	Saudi Arabia	2004	-	-	-	16 530 000 [5]	-	-	-	-	-	-	-	-
		2005	-	-	-	20 853 000 [5]	-	-	-	-	-	-	-	-
		2006	-	-	-	27 285 333	-	-	-	-	28 000	-	-	-
		2007	-	-	-	27 360 000	0	-	-	-	16 000	-	-	-
		2008	-	-	-	28 203 753	0	-	-	-	-	-	-	-
		2009	-	-	-	28 850 000	0	-	-	-	31 000	-	-	-
		2010	-	-	-	28 000 000	0	-	-	-	36 000	-	-	-
	Somalia	2004	4 682 032	-	-	-	-	-	-	-	-	-	-	-
		2005	3 872 872	-	-	-	-	-	-	-	-	-	-	-
		2006	4 331 509	-	-	-	-	-	-	-	-	-	-	-
		2007	6 482 615	-	-	-	6 489 621	-	-	-	120 000	-	-	-
		2008	3 784 480	-	-	-	6 607 321	-	-	-	85 000	-	-	-
		2009	1 959 263	-	-	-	6 863 696	-	-	81 127	101 650	-	-	-
		2010	5 223 275	-	-	-	8 436 831	-	-	-	65 000	-	-	-

Annex 2 – Funding for malaria control, 2010 (continued)

WHO Region/ Sub-region	Country/Area	Year	Contributions reported by donors: Global Fund[1]	PMI[2]	The World Bank[3]	Government	Global Fund	The World Bank	PMI/USAID	Other bilaterals	WHO	UNICEF	Other Contributions[4]	European Union
Eastern Mediterranean	Yemen	2001	-	-	-	2 166 815 [5]	-	-	-	-	-	-	-	-
		2002	-	-	-	1 196 333 [5]	-	-	-	-	-	-	-	-
		2003	200 000	-	-	1 855 819 [5]	-	-	-	-	-	-	-	-
		2004	1 461 532	-	-	2 001 569 [5]	1 661 532	1 150 000	-	-	-	-	-	-
		2005	1 664 079	-	-	1 932 139 [5]	2 498 099	1 150 000	-	-	542 000	-	-	-
		2006	1 952 517	-	-	1 954 894 [5]	7 761 094	-	-	-	-	-	-	-
		2007	2 394 449	-	-	2 387 745 [5]	-	453 000	-	-	175 000	0	-	-
		2008	5 044 737	-	-	2 465 870 [5]	4 185 533	41 360	0	250 000	200 000	0	104 387	-
		2009	2 421 277	-	-	1 806 742	4 401 240	0	0	126 000	475 000	0	1 199 999	-
		2010	4 301 028	-	-	1 594 698	3 482 712	0	0	446 159	474 037	0	4 564 902	-
Europe	Armenia	2000	-	-	-	-	0	0	0	0	43 687	6 985	0	0
		2001	-	-	-	-	0	0	0	0	29 285	0	0	0
		2002	-	-	-	-	0	0	0	0	40 355	0	0	0
		2003	-	-	-	-	0	0	0	0	4 881	0	0	0
		2004	-	-	-	-	0	0	0	0	4 850	0	0	0
		2005	-	-	-	-	0	0	0	0	6 000	0	0	0
		2006	-	-	-	-	0	0	0	0	27 671	0	0	0
		2007	-	-	-	-	0	0	0	0	6 600	-	0	-
		2008	-	-	-	-	0	0	0	0	28 470	-	0	0
		2009	-	-	-	-	0	-	-	0	0	-	0	-
		2010	-	-	-	-	0	-	-	0	0	-	-	-
	Azerbaijan	2000	-	-	-	-	0	0	0	0	15 000	0	0	0
		2001	-	-	-	-	0	0	0	0	15 000	0	0	0
		2002	-	-	-	-	0	0	0	0	20 000	0	0	0
		2003	-	-	-	-	0	0	0	0	15 000	0	0	0
		2004	-	-	-	-	0	0	0	0	50 000	0	0	0
		2005	-	-	-	1 132 728 [5]	0	0	0	0	68 000	0	0	0
		2006	-	-	-	1 035 336 [5]	0	0	0	0	54 000	0	0	0
		2007	-	-	-	1 254 543	-	0	0	0	65 000	0	0	0
		2008	1 295 872	-	-	2 145 369	0	0	0	0	65 000	0	0	0
		2009	1 786 084	-	-	1 971 844	1 423 641	-	-	0	35 000	0	0	-
		2010	887 979	-	-	3 842 152	1 692 999	-	-	0	35 000	-	-	-
	Georgia	2000	-	-	-	-	0	0	0	0	60 000	0	0	0
		2001	-	-	-	44 000	0	0	0	0	44 000	0	0	0
		2002	-	-	-	30 000	0	0	0	0	30 000	0	0	0
		2003	-	-	-	0	0	0	0	0	0	0	0	0
		2004	360 950	-	-	438 900	438 900	0	0	0	0	0	0	0
		2005	284 750	-	-	206 800	206 800	0	0	0	0	0	0	0
		2006	160 600	-	-	160 600	160 600	0	0	0	0	0	0	0
		2007	882 530	-	-	46 960	155 362	0	0	0	5 000	-	0	0
		2008	705 430	-	-	47 124	833 900	0	0	0	38 280	-	0	0
		2009	-	-	-	53 974	250 431	-	-	0	25 000	-	0	-
		2010	713 331	-	-	20 464	740 798	-	-	0	3 000	-	-	-
	Kyrgyzstan	2000	-	-	-	0	0	0	0	0	0	0	0	0
		2001	-	-	-	0	0	0	0	0	0	0	0	0
		2002	-	-	-	98 900	0	0	0	0	0	0	0	0
		2003	-	-	-	98 900	0	0	0	0	0	0	0	0
		2004	-	-	-	289 800	0	0	0	0	0	0	0	0
		2005	-	-	-	170 500	0	0	0	0	0	0	0	0
		2006	933 345	-	-	933 345	933 345	0	0	0	0	0	0	0
		2007	759 045	-	-	68 000	759 045	0	0	0	0	-	0	0

Annex 2 – Funding for malaria control, 2010 (continued)

WHO Region/ Sub-region	Country/Area	Year	Contributions reported by donors: Global Fund[1]	PMI[2]	The World Bank[3]	Government	Global Fund	The World Bank	PMI/USAID	Other bilaterals	WHO	UNICEF	Other Contributions[4]	European Union
Europe	Kyrgyzstan	2008	1 013 420	-	-	68 500	647 245	0	0	0	0	-	0	0
		2009	172 070	-	-	70 000	546 245	-	-	0	0	-	0	-
		2010	1 166 939	-	-	70 000	1 394 485	-	-	0	0	-	-	-
	Russian Federation	2007	-	-	-	0 [5]	0	-	-	-	0	-	0	-
		2008	-	-	-	0 [5]	0	-	-	0	25 000	-	0	-
		2009	-	-	-	0 [5]	0	-	-	0	0	-	0	-
		2010	-	-	-	0 [5]	0	-	-	0	0	-	-	-
	Tajikistan	2002	-	-	-	-	-	-	-	-	-	-	-	250 000
		2003	-	-	-	-	-	-	-	250 000	-	-	-	-
		2004	-	-	-	-	-	-	-	250 000	-	-	-	100 000
		2005	-	-	-	-	-	-	-	250 000	-	-	-	-
		2006	1 221 833	-	-	-	1 425 218	-	-	-	20 000	-	-	-
		2007	1 550 168	-	-	-	1 346 783	-	-	-	40 000	-	-	-
		2008	1 822 811	-	-	-	1 464 503	-	-	-	75 000	-	-	-
		2009	3 905 034	-	-	363 439 [5]	1 332 959	-	-	-	13 000	-	-	-
		2010	1 819 594	-	-	393 734 [5]	3 353 900	-	-	-	13 000	-	-	-
	Turkey	2000	-	-	-	1 624 000	-	-	-	-	10 000	-	-	-
		2001	-	-	-	1 933 083	-	-	-	-	10 000	-	-	-
		2002	-	-	-	2 313 260	-	-	-	-	10 000	-	-	-
		2003	-	-	-	3 072 871	-	-	-	-	10 000	-	-	-
		2004	-	-	-	31 990 282	-	-	-	-	10 000	-	-	-
		2005	-	-	-	32 938 553	-	-	-	-	10 000	-	-	-
		2006	-	-	-	38 544 677	-	-	-	-	15 000	-	-	-
		2007	-	-	-	38 770 483	0	-	-	-	15 000	-	0	-
		2008	-	-	-	40 865 967	0	-	-	0	15 000	-	0	-
		2009	-	-	-	44 200 000	0	-	-	0	0	-	0	-
		2010	-	-	-	33 486 133	0	-	-	0	0	-	-	-
	Uzbekistan	2001	-	-	-	145 510	0	0	-	-	0	-	-	0
		2002	-	-	-	95 802	0	0	-	-	0	-	-	0
		2003	-	-	-	91 755	0	0	-	-	0	-	-	0
		2004	-	-	-	88 404	0	0	-	-	0	-	-	0
		2005	450 290	-	-	94 781	556 543	0	-	-	0	-	-	0
		2006	359 034	-	-	93 208	715 233	0	-	-	0	-	-	0
		2007	1 104 061	-	-	101 004	843 650	0	-	-	0	-	0	-
		2008	509 704	-	-	114 772	320 045	0	-	0	7 175	-	0	-
		2009	984 904	-	-	126 249	450 070	-	-	0	7 892	-	0	-
		2010	-	-	-	191 474	-	-	-	0	0	-	-	-
South-East Asia	Bangladesh	2002	-	-	-	75 000 [5]	-	114 138	-	-	147 242	-	-	-
		2003	-	-	-	55 000 [5]	-	45 000	-	-	-	-	-	-
		2004	-	-	-	101 500 [5]	-	46 500	-	-	589 700	-	-	-
		2005	-	-	-	250 000 [5]	-	200 000	-	-	-	-	-	-
		2006	-	-	-	891 000 [5]	-	724 000	-	-	-	-	-	-
		2007	7 805 224	-	-	548 385 [5]	9 006 492	723 881	-	-	230 000	-	-	-
		2008	8 370 698	-	-	528 209 [5]	9 580 687	700 000	-	-	220 000	-	-	-
		2009	3 521 417	-	-	642 129 [5]	7 769 852	887 995	-	-	230 000	-	-	-
		2010	5 120 836	-	-	1 094 385 [5]	5 369 344	-	-	-	135 790	-	-	-
	Bhutan	2003	-	-	-	169 723	-	-	-	100 000	-	-	-	-
		2004	-	-	-	16 122	-	-	-	100 000	31 550	-	-	-
		2005	503 587	-	-	168 977	577 700	-	-	200 000	11 550	-	-	-
		2006	405 429	-	-	183 165	688 700	-	-	215 250	34 800	-	-	-
		2007	339 056	-	-	183 165	571 775	0	0	173 913	-	0	0	-

Annex 2 – Funding for malaria control, 2010 (continued)

WHO Region/ Sub-region	Country/Area	Year	Contributions reported by donors: Global Fund[1]	PMI[2]	The World Bank[3]	Government	Global Fund	The World Bank	PMI/USAID	Other bilaterals	WHO	UNICEF	Other Contributions[4]	European Union
South-East Asia	Bhutan	2008	1 059 849	-	-	191 000	579 000	0	0	173 913	22 000	0	0	-
		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	-
	Democratic People's Republic of Korea	2001	-	-	-	200 000	-	-	-	-	-	-	-	-
		2002	-	-	-	700 000	-	-	-	-	-	-	-	-
		2003	-	-	-	690 000	-	-	-	-	-	-	-	-
		2004	-	-	-	700 000	-	-	-	-	-	-	-	-
		2005	-	-	-	759 493	-	-	-	-	-	-	-	-
		2006	-	-	-	1 000 000	-	-	-	-	-	-	-	-
		2007	-	-	-	1 000 000	0	-	-	-	-	-	1 200 000	-
		2008	-	-	-	1 000 000	-	-	-	0	1 100 000	-	1 200 000	-
		2009	-	-	-	1 200 000	0	-	-	0	1 300 000	-	1 200 000	-
		2010	7 942 321	-	-	1 800 000	8 913 265	-	-	-	42 467	-	-	-
	India	2000	-	-	-	42 004 444	-	-	-	-	-	-	-	-
		2001	-	-	-	37 904 255	-	16 266 608	-	-	-	-	-	-
		2002	-	-	-	36 607 438	-	13 969 726	-	-	-	-	-	-
		2003	-	-	-	39 393 603	-	18 535 966	-	-	-	-	-	-
		2004	-	-	-	47 833 333	-	1 372 056	-	-	-	-	-	-
		2005	856 717	-	-	55 907 838	912 325	9 512 474	-	-	-	-	-	-
		2006	12 562 309	-	-	62 746 667	8 227 900	22 400 000	-	-	-	-	-	-
		2007	-	-	-	64 097 391	15 727 050	29 500 000	-	-	-	-	-	-
		2008	34 286 405	-	-	53 360 000	13 863 557	28 619 974	-	-	-	-	-	-
		2009	-	-	-	60 222 222	9 184 373	9 480 000	-	-	-	-	-	-
		2010	8 519 368	-	-	91 551 356	13 179 273	10 265 300	-	-	-	-	-	-
	Indonesia	2003	1 435 987	-	-	-	1 435 987	-	-	-	-	-	-	-
		2004	4 556 562	-	-	1 726 788 [5]	4 556 562	-	-	-	460 000	-	-	-
		2005	5 762 398	-	-	4 402 565 [5]	5 762 318	-	-	-	-	250 000	-	-
		2006	3 655 692	-	-	3 386 554 [5]	3 655 692	-	-	-	406 000	16 000 000	-	-
		2007	2 079 182	-	-	3 131 418	2 079 162	-	-	-	-	3 000 000	-	-
		2008	20 841 603	-	-	2 135 753	13 199 217	0	0	-	406 000	2 800 000	0	-
		2009	34 331 236	-	-	5 594 019	17 661 982	0	0	-	103 000	3 300 000	0	-
		2010	36 712 224	-	-	5 787 267	31 659 696	0	0	26 311	200 000	2 027 122	0	-
	Myanmar	2005	3 091 409	-	-	-	-	-	-	-	-	-	-	-
		2007	-	-	-	314 000	-	-	-	-	700 000	2 451 360	643 496	-
		2008	-	-	-	314 000	-	-	-	2 400 000	300 000	4 167 142	2 425 633	-
		2009	-	-	-	375 000	-	-	-	2 000 000	300 000	1 607 882	3 815 436	-
		2010	13 180 805	-	-	2 250 000	-	-	-	2 294 000	300 000	1 300 000	-	-
	Nepal	2003	116 583	-	-	-	-	-	-	-	-	-	-	-
		2004	528 075	-	-	763 515	408 113	2 387 354	-	-	45 714	-	-	-
		2005	-	-	-	295 076	501 721	2 752 123	-	-	45 714	-	-	-
		2006	1 029 025	-	-	749 870	283 307	799 615	-	-	60 500	-	-	-
		2007	4 535 241	-	-	720 197	1 321 927	-	-	-	112 000	-	-	-
		2008	4 480 142	-	-	907 770	924 791	0	0	0	88 000	25 000	-	-
		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	93 000	0	0	-
	Sri Lanka	2001	-	-	-	268 222	-	258 222	-	-	-	-	-	-
		2002	-	-	-	0	-	-	-	-	-	-	-	-
		2003	2 399 223	-	-	2 781 600	2 700 000	-	-	-	-	-	-	-
		2004	1 706 498	-	-	5 221 100	5 197 000	-	-	-	-	-	-	-
		2005	649 756	-	-	748 720	730 140	-	-	-	-	-	-	-
		2006	122 367	-	-	1 830 635	1 808 135	-	-	-	-	-	-	-

Annex 2 – Funding for malaria control, 2010 (continued)

WHO Region/ Sub-region	Country/Area	Year	Contributions reported by donors: Global Fund[1]	PMI[2]	The World Bank[3]	Government	Global Fund	The World Bank	PMI/USAID	Other bilaterals	WHO	UNICEF	Other Contributions[4]	European Union
South-East Asia	Sri Lanka	2007	740 564	-	-	1 404 423	1 055 469	-	-	-	-	-	-	-
		2008	3 929 226	-	-	2 791 905	1 432 800	-	-	-	30 000	-	-	-
		2009	6 593 558	-	-	1 201 268	522 431	-	-	-	-	-	-	-
		2010	5 570 521	-	-	1 045 455	1 117 464	-	-	-	24 321	-	-	-
	Thailand	2001	-	-	-	4 700 000	-	-	-	-	-	-	-	-
		2002	-	-	-	88 674	-	-	-	-	-	-	-	-
		2003	-	-	-	117 000	-	-	-	-	-	-	-	-
		2004	660 000	-	-	825 693	625 000	-	-	-	-	-	-	-
		2005	1 305 633	-	-	54 000	199 967	-	-	-	-	-	-	-
		2006	1 171 755	-	-	38 667	2 175 959	-	-	-	-	-	-	-
		2007	1 337 893	-	-	1 660 984 [5]	895 388	-	-	-	-	-	-	-
		2008	5 977 700	-	-	2 827 000	3 513 961	-	-	-	-	-	-	-
		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	-	-	-
	Timor-Leste	2003	380 964	-	-	-	-	-	-	-	-	-	-	-
		2004	983 486	-	-	-	924 000	-	-	-	-	-	-	-
		2005	438 089	-	-	-	1 632 680	-	-	-	-	-	-	-
		2006	934 229	-	-	65 000	1 123 063	-	-	-	-	50 000	50 000	882 000
		2007	-	-	-	181 837	0	0	0	0	80 000	0	0	-
		2008	-	-	-	300 816	0	0	0	0	100 000	0	0	-
		2009	3 006 875	-	-	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	-
Western Pacific	Cambodia	2000	-	-	-	-	0	-	0	0	500 000	0	0	-
		2001	-	-	-	316 000 [5]	0	643 000	0	0	500 000	0	0	1 257 000
		2002	-	-	-	465 000 [5]	0	900 000	0	0	500 000	0	0	1 900 000
		2003	1 952 490	-	-	240 000 [5]	0	50 000	0	0	500 000	0	0	0
		2004	506 199	-	-	933 156 [5]	537 378	490 014	0	0	500 000	0	0	0
		2005	5 209 206	-	-	1 332 647 [5]	1 345 572	283 494	0	0	500 000	0	0	0
		2006	3 124 027	-	-	1 282 500 [5]	1 901 220	306 709	0	0	500 000	0	0	0
		2007	4 484 321	-	-	1 456 419 [5]	5 762 926	918 403	1 000 000	0	500 000	0	0	0
		2008	10 598 785	-	-	495 155	4 327 529	0	1 000 000	0	590 000	0	0	0
		2009	11 289 036	-	-	1 019 923	5 534 038	0	1 000 000	0	650 000	0	0	-
		2010	35 373 837	-	-	1 355 728	7 157 939	0	0	0	1 446 616	0	0	-
	China	2003	1 908 195	-	-	-	1 586 845	-	-	-	-	-	-	-
		2004	1 615 467	-	-	-	1 576 367	-	-	-	-	-	-	-
		2005	1 023 466	-	-	-	1 383 916	-	-	-	-	-	-	-
		2006	8 748 069	-	-	-	7 538 854	-	-	-	-	-	-	-
		2007	13 332 982	-	-	-	12 861 810	-	-	-	-	-	-	-
		2008	5 473 763	-	-	-	9 133 011	-	-	-	-	-	-	-
		2009	12 931 971	-	-	-	9 901 385	-	-	-	-	-	-	-
		2010	51 262 707	-	-	-	50 874 137	-	-	-	-	-	-	-
	Lao People's Democratic Republic	2001	-	-	-	3 227 858	-	377 642	-	2 080 000	33 073	-	-	737 143
		2002	-	-	-	682 793	-	-	-	-	28 665	-	-	654 128
		2003	1 198 226	-	-	3 258 515	768 515	-	-	2 440 000	50 000	-	-	-
		2004	1 269 544	-	-	2 471 668	2 471 668	-	-	-	-	-	-	-
		2005	6 356 531	-	-	4 691 324	4 691 324	-	-	-	50 000	-	-	-
		2006	3 943 599	-	-	4 132 726	4 132 726	-	-	-	-	-	-	-
		2007	7 267 767	-	-	540 829 [5]	5 210 285	0	0	0	0	0	0	-
		2008	7 840 252	-	-	594 912 [5]	7 242 608	0	0	0	0	0	0	-
		2009	5 252 504	-	-	-	6 424 803	0	0	0	21 300	0	0	-
		2010	2 637 721	-	-	97 690 [5]	815 252	0	0	0	45 925	0	0	-

Annex 2 – Funding for malaria control, 2010 (continued)

WHO Region/ Sub-region	Country/Area	Year	Contributions reported by donors: Global Fund[1]	PMI[2]	The World Bank[3]	Government	Global Fund	The World Bank	PMI/USAID	Other bilaterals	WHO	UNICEF	Other Contributions[4]	European Union
Western Pacific	Malaysia	2007	-	-	-	1 171 264	-	-	-	-	-	-	-	-
		2008	-	-	-	23 800 000	0	-	-	0	0	-	-	-
		2009	-	-	-	23 823 040	0	-	-	0	0	-	0	-
		2010	-	-	-	24 826 273	0	-	-	0	0	-	-	-
	Papua New Guinea	2001	-	-	-	90 092	-	-	-	-	-	-	-	-
		2002	-	-	-	85 681	-	-	-	-	-	-	-	-
		2003	-	-	-	34 150	-	-	-	-	-	-	-	-
		2004	2 185 723	-	-	63 800	2 185 723	-	-	-	-	-	-	-
		2005	3 256 526	-	-	114 985	3 256 526	-	-	-	-	-	-	-
		2006	372 986	-	-	59 511	372 986	-	-	-	-	-	-	-
		2007	2 957 519	-	-	54 480	2 957 519	-	-	-	-	-	-	-
		2008	6 385 835	-	-	64 336	6 385 835	-	-	-	-	-	-	-
		2009	26 381 002	-	-	156 [5]	4 417 383	-	-	-	2 179	-	-	-
		2010	2 535 493	-	-	142 766	1 028 735	-	-	-	-	-	3 260 803	-
	Philippines	2002	-	-	-	-	-	-	-	-	200 000	-	-	-
		2003	2 231 686	-	-	-	-	-	-	-	-	-	-	-
		2004	3 669 663	-	-	43 636 [5]	2 700 000	-	-	-	800 000	-	-	-
		2005	2 305 524	-	-	43 636 [5]	4 000 000	-	-	-	800 000	-	-	-
		2006	9 309 756	-	-	43 636 [5]	8 900 000	-	-	-	800 000	-	-	-
		2007	15 237 049	-	-	48 000 [5]	22 000 000	0	0	75 000	300 000	0	652 213	-
		2008	5 310 226	-	-	1 260 000 [5]	3 952 832	0	0	75 000	300 000	0	466 125	-
		2009	5 636 134	-	-	3 439 132	31 400 000	0	0	75 000	300 000	0	694 670	-
		2010	18 822 381	-	-	3 930 233 [5]	21 758 417	0	0	75 000	-	0	4 246 401	-
	Republic of Korea	2001	-	-	-	361 600	-	-	-	-	-	-	-	-
		2002	-	-	-	361 600	-	-	-	-	-	-	-	-
		2003	-	-	-	368 800	-	-	-	-	-	-	-	-
		2004	-	-	-	318 400	-	-	-	-	-	-	-	-
		2005	-	-	-	357 600	-	-	-	-	-	-	-	-
		2006	-	-	-	380 000	-	-	-	-	-	-	-	-
		2007	-	-	-	720 800	3 000 000	-	-	-	1 412 000	-	-	-
		2008	-	-	-	792 000	3 000 000	-	-	-	1 222 000	-	-	-
		2009	-	-	-	798 000	4 000 000	-	-	-	1 096 000	-	-	-
		2010	-	-	-	729 091	3 911 600	-	-	-	-	-	-	-
	Solomon Islands	2001	-	-	-	275 000	-	-	-	-	-	-	-	-
		2002	-	-	-	406 250	-	-	-	-	-	-	-	-
		2003	-	-	-	1 168 805	548 695	163 860	-	-	-	-	-	-
		2004	-	-	-	1 033 670	462 710	163 860	-	-	-	-	-	-
		2005	-	-	-	1 202 563	631 603	163 860	-	-	-	-	-	-
		2006	-	-	-	1 580 659	959 599	163 860	-	-	-	-	-	-
		2007	-	-	-	-	594 928	0	0	0	0	0	0	-
		2008	-	-	-	1 075 382	483 416	0	0	0	386 000	0	563 681	-
		2009	-	-	-	276 195	628 188	0	0	0	216 674	0	750 189	-
		2010	-	-	-	1 531 001 [5]	1 409 315	0	0	0	225 000	0	753 085	-

Annex 2 – Funding for malaria control, 2010 (continued)

WHO Region/ Sub-region	Country/Area	Year	Contributions reported by donors: Global Fund[1]	PMI[2]	The World Bank[3]	Government	Global Fund	The World Bank	PMI/USAID	Other bilaterals	WHO	UNICEF	Other Contributions[4]	European Union
Western Pacific	Vanuatu	2000	-	-	-	-	-	-	-	7 980	-	-	-	0
		2001	-	-	-	-	-	0	-	7 980	-	-	-	0
		2002	-	-	-	-	0	0	-	0	69 065	-	-	0
		2003	-	-	-	-	0	0	-	0	69 065	-	-	0
		2004	-	-	-	-	-	0	-	0	165 500	-	-	0
		2005	-	-	-	-	-	0	-	0	165 500	-	-	0
		2006	-	-	-	-	-	0	-	0	180 115	-	-	0
		2007	-	-	-	-	-	0	0	0	180 115	0	0	0
	Vanuatu	2008	-	-	-	846 280	264 300	0	0	0	267 615	0	1 282 500	0
		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	-
	Viet Nam	2000	-	-	-	3 329 338	-	1 045 679	-	-	-	-	-	3 600 000
		2001	-	-	-	3 300 766	-	3 361 566	-	-	-	-	-	3 000 000
		2002	-	-	-	2 618 144	-	914 452	-	-	-	-	-	3 500 000
		2003	-	-	-	2 596 054	-	3 617 536	-	-	-	-	-	-
		2004	3 218 217	-	-	4 467 705	-	-	-	-	-	-	-	-
		2005	6 608 531	-	-	4 747 436	7 324 769	-	-	-	-	-	-	-
		2006	2 528 426	-	-	4 384 866	6 063 633	-	-	-	-	-	-	-
		2007	4 508 974	-	-	4 344 588	4 208 566	0	0	-	20 000	0	0	-
		2008	8 395 846	-	-	4 599 534	2 760 895	0	0	-	70 000	0	0	-
		2010	4 899 235	-	-	4 476 190	8 588 884	0	0	-	85 000	0	0	-

[1] Source: The Global Fund web site (Malaria specific grants, Integrated and Health Systems Strengthening grants are not included).

[2] Source: The President's Malaria Initiative, Fifth Annual Report to Congress, April 2011.

[3] Source: The World Bank web site, funds for 3 years.

[4] Other Contributions: NGOs, foundations, etc.

[5] Budget not expenditure

*Data for Sudan only represents 15 northern states.

Annex 3.A : Recommended policies and strategies for malaria control, 2010

		Insecticide-treated nets			Indoor residual spraying		Treatment									Malaria in pregnancy
WHO region/subregion	Country/area	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	Radical (gametocidal) treatment of P.falciparum cases	IPTp used to prevent malaria during pregnancy
Africa	Algeria	N	N	-	Y	Y	NA	Y	Y	N	Y	N	Y	N	Y	N
	Angola	Y	Y	N	N	Y	Y	Y	Y	N	Y	Y	-	-	-	Y
	Benin	Y	N	N	N	Y	Y	N	Y	N	N	Y	-	-	-	Y
	Botswana	Y	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	N	Y	N	-	-	-	N
	Cameroon	Y	Y	Y	N	-	Y	N	N	N	N	Y	-	-	-	Y
	Cape Verde	N	N	N	N	-	Y	Y	Y	Y	Y	Y	-	-	-	N
	Central African Republic	Y	Y	Y	N	-	Y	Y	N	Y	Y	Y	-	-	-	Y
	Chad	Y	N	N	N	-	Y	Y	Y	Y	Y	N	-	-	-	Y
	Comoros	Y	N	N	N	-	Y	Y	N	N	N	N	-	-	-	Y
	Congo	Y	-	-	-	-	Y	-	-	-	Y	-	-	-	-	Y
	Côte d'Ivoire	Y	Y	Y	N	-	Y	N	N	N	N	N	-	-	-	Y
	Democratic Republic of the Congo	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	-	-	-	Y
	Equatorial Guinea	Y	-	Y	-	Y	Y	Y	Y	Y	Y	Y	-	-	-	-
	Eritrea	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	Y	-	-	N
	Ethiopia	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	-	-	-	N
	Gabon	Y	Y	N	N	-	Y	Y	N	Y	Y	Y	-	-	-	Y
	Gambia	Y	Y	N	Y	-	Y	Y	Y	N	Y	Y	-	-	-	Y
	Ghana	Y	Y	Y	N	Y	Y	Y	N	Y	N	Y	-	-	-	Y
	Guinea	Y	Y	Y	N	Y	Y	Y	Y	N	N	Y	-	-	-	Y
	Guinea-Bissau	Y	Y	Y	-	-	Y	Y	Y	-	-	Y	-	-	-	Y
	Kenya	Y	Y	Y	N	-	Y	Y	Y	N	Y	Y	-	-	-	Y
	Liberia	Y	Y	Y	N	-	Y	Y	Y	N	Y	Y	-	-	-	Y
	Madagascar	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	-	-	-	Y
	Malawi	Y	Y	Y	N	-	Y	N	N	N	N	Y	-	-	-	Y
	Mali	Y	N	N	N	Y	Y	Y	N	Y	Y	Y	-	-	-	Y
	Mauritania	Y	N	N	N	-	Y	Y	Y	Y	Y	Y	-	-	-	Y
	Mozambique	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	Y
	Namibia	Y	Y	N	Y	Y	Y	Y	Y	N	Y	Y	-	-	-	Y
	Niger	Y	N	N	N	-	Y	N	N	Y	Y	Y	-	-	-	Y
	Nigeria	Y	Y	Y	N	-	Y	Y	N	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	-	Y	Y	Y	Y	Y	-	Y	-	-	-	Y
	Sierra Leone	Y	Y	Y	N	-	Y	Y	Y	Y	Y	Y	-	-	-	Y
	South Africa	N	N	N	Y	Y	Y	Y	Y	N	Y	N	-	-	-	N
	Swaziland	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	N
	Togo	N	N	N	N	-	Y	Y	N	Y	N	Y	-	-	-	Y
	Uganda	Y	N	N	Y	Y	Y	Y	Y	N	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	Y	Y	-	-	-	Y
	Zambia	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	-	-	-	Y
	Zimbabwe	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	-	-	-	Y
Americas	Argentina	N	N	-	N	-	NA	-	Y	-	-	-	-	-	-	NA
	Bahamas	N	N	-	N	-	-	-	-	-	-	-	-	-	-	NA
	Belize	Y	Y	Y	N	-	NA	Y	Y	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	-	-	-	-	NA

Annex 3.A : Recommended policies and strategies for malaria control, 2010 (continued)

		Insecticide-treated nets			Indoor residual spraying		Treatment									Malaria in pregnancy
WHO region/subregion	Country/area	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	Radical (gametocidal) treatment of P.falciparum cases	IPTp used to prevent malaria during pregnancy
Americas	El Salvador	N	-	-	N	-	NA	Y	Y	-	-	N	-	-	-	NA
	French Guiana	N	Y	Y	N	-	NA	Y	-	N	-	N	-	-	-	NA
	Guatemala	Y	Y	Y	N	-	NA	Y	Y	Y	-	N	-	-	-	NA
	Guyana	Y	Y	Y	N	-	Y	Y	Y	N	Y	Y	-	-	-	NA
	Haiti	N	Y	Y	N	-	NA	Y	-	-	-	N	-	-	-	NA
	Honduras	Y	Y	Y	N	-	NA	Y	Y	N	-	N	-	-	-	NA
	Jamaica	-	N	-	N	-	-	-	-	-	-	-	-	-	-	NA
	Mexico	Y	Y	Y	N	-	NA	Y	Y	N	-	N	-	-	-	NA
	Nicaragua	Y	Y	-	N	-	NA	Y	Y	Y	-	N	-	-	-	NA
	Panama	N	N	N	N	-	NA	Y	Y	N	-	N	-	-	-	NA
	Paraguay	N	N	N	N	-	N	Y	Y	N	-	N	-	-	-	NA
	Peru	Y	Y	Y	N	-	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
Eastern Mediterranean	Afghanistan	Y	Y	Y	N	N	Y	Y	Y	Y	N	Y	-	-	-	NA
	Djibouti	Y	N	N	N	N	Y	Y	Y	N	Y	N	-	-	-	NA
	Iran (Islamic Republic of)	Y	Y	-	N	Y	Y	Y	Y	N	Y	Y	N	N	N	NA
	Iraq	N	Y	-	N	Y	Y	Y	Y	Y	Y	N	N	N	Y	NA
	Sudan*	Y	Y	Y	N	N	Y	Y	N	Y	Y	Y	-	-	-	NA
	Pakistan	Y	Y	N	N	Y	Y	-	Y	N	-	Y	-	-	-	NA
	Saudi Arabia	Y	N	-	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	NA
	Somalia	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	-	-	-	Y
	Yemen	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	-	-	-	NA
Europe	Armenia	N	N	-	N	N	NA	Y	Y	-	-	-	Y	Y	N	NA
	Azerbaijan	Y	N	-	N	Y	NA	Y	Y	-	-	-	N	-	-	NA
	Georgia	N	N	-	N	Y	NA	Y	Y	-	-	-	N	N	Y	NA
	Kyrgyzstan	Y	Y	-	N	Y	-	Y	Y	-	-	-	N	N	Y	NA
	Russian Federation	N	N	-	N	Y	-	-	Y	-	-	-	N	N	Y	NA
	Tajikistan	Y	Y	-	N	Y	Y	Y	Y	-	Y	-	N	-	-	NA
	Turkey	N	N	-	N	Y	NA	Y	Y	-	Y	-	N	N	Y	NA
	Uzbekistan	N	N	-	N	Y	-	Y	Y	-	-	-	N	N	Y	NA
South-East Asia	Bangladesh	Y	Y	Y	N	-	Y	Y	Y	Y	Y	Y	-	-	-	NA
	Bhutan	Y	Y	Y	N	-	Y	Y	Y	N	N	Y	-	-	-	NA
	Democratic People's Republic of Korea	Y	Y	-	N	Y	NA	-	Y	-	-	-	-	-	-	NA
	India	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	NA
	Indonesia	Y	N	Y	N	-	Y	Y	N	Y	Y	Y	-	-	-	NA
	Myanmar	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	-	-	-	NA
	Nepal	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	-	-	-	NA
	Sri Lanka	Y	Y	-	N	Y	Y	Y	Y	Y	Y	-	Y	N	N	NA
	Thailand	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	-	-	-	NA
	Timor-Leste	Y	Y	N	N	-	Y	Y	Y	Y	Y	Y	-	-	-	NA
Western Pacific	Cambodia	Y	Y	Y	N	-	Y	Y	Y	Y	N	Y	-	-	-	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	-	Y	Y	Y	N	N	NA
	Papua New Guinea	Y	Y	Y	N	Y	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	Y	-	-	Y	N	N	NA
	Solomon Islands	Y	Y	Y	N	-	Y	Y	Y	-	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	Y	-	-	-	NA

(Y) = Actually implemented.
(N) = Not implemented.
(-) = Question not answered or not applicable.
*The policies for Sudan only represents the northern states.

Annex 3B – Antimalarial drug policy, 2010

		P. falciparum				*P.vivax*
WHO region	**Country/area**	**Uncomplicated unconfirmed**	**Uncomplicated confirmed**	**Severe**	**Prevention during pregnancy**	**Treatment**
Africa	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)	-

Annex 3B – Antimalarial drug policy, 2010 (continued)

		P. falciparum				*P.vivax*
WHO region	**Country/area**	**Uncomplicated unconfirmed**	**Uncomplicated confirmed**	**Severe**	**Prevention during pregnancy**	**Treatment**
Americas	Argentina	-	-		-	CQ+PQ
	Bahamas	-	-	-	-	-
	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	-	AL	-	-	CQ+PQ
	Guatemala	-	CQ+PQ	CQ	-	CQ+PQ
	Guyana	-	AL+PQ	-	-	CQ+PQ
	Haiti	-	CQ+PQ	-	-	-
	Honduras	-	CQ+PQ	QN	-	CQ+PQ
	Jamaica	-	-	-	-	-
	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	-	-	CQ+PQ
	Venezuela (Bolivarian Republic of)	-	AS+MQ+PQ	AM;QN	-	CQ+PQ
Eastern Mediterranean	Afghanistan	CQ	AS+SP	AM;QN	-	CQ+PQ(14d)
	Djibouti	AS+SP	AS+SP	QN	-	CQ+PQ(14d)
	Egypt	-	AL	QN	-	CQ+PQ(14d)
	Iran (Islamic Republic of)	-	AS+SP	AS;QN	-	CQ+PQ(14d)
	Iraq	-	AL	QN	-	CQ+PQ(14d)
	Oman	-	AL+PQ	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)
	Sudan					
	North (low transmission)	AS+SP	AS+SP	AM;QN	SP(IPT)	AL
	South (high transmission)	AS+AQ	AS+AQ	QN	SP(IPT)	CQ
	Syrian Arab Republic	-	AL+PQ	QN	-	CQ+PQ(14d)
	Yemen	AS+SP	AS+SP	AM;QN	-	CQ+PQ(14d)
Europe	Armenia	-	-		-	CQ+PQ(14d)
	Azerbaijan	AS+SP	AS+SP	AS;QN	-	CQ+PQ(14d)
	Georgia	-	-	-	-	CQ+PQ(14d)
	Kyrgyzstan	-	-	-	-	CQ+PG(14d)
	Russian Federation	-	-	-	-	-
	Tajikistan	-	AL	QN	-	CQ+PQ(14d)
	Turkey	-	-	-	-	CQ+PQ(14d)
	Uzbekistan	-	-	-	-	CQ+PQ(14d)
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	CQ	AS+SP	AM;AS;QN	-	CQ+PQ(14d)
	Indonesia	-	AS-AQ/DHA-PP+PQ	AM;AS;QN	-	AS-AQ/DHA-PP+PQ(14d)
	Myanmar	-	AL;AS+MQ;DHA-PPQ	AM;AS;QN	-	CQ+PQ(14d)
	Nepal	CQ	AL	QN	-	CQ+PQ(14d)
	Sri Lanka	-	AL+PQ	QN	-	CQ+PQ(14d)
	Thailand	-	AS+MQ	AS;QN	-	CQ+PQ(14d)
	Timor-Leste	-	AL	AM;QN	-	CQ+PQ(14d)

Annex 3B – Antimalarial drug policy, 2010 (continued)

		P. falciparum				*P.vivax*
WHO region	**Country/area**	**Uncomplicated unconfirmed**	**Uncomplicated confirmed**	**Severe**	**Prevention during pregnancy**	**Treatment**
Western Pacific	Cambodia	-	AS+MQ;DHA-PPQ+PQ	AS+DHA-PPQ	-	CQ
	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+PQ(14d)
	Solomon Islands	-	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 4 – Operational coverage of insecticide treated nets, indoor residual spraying and antimalarial treatment, 2008-2010

WHO region	Country/area	Year	No. of ITN + LLIN sold or delivered	No. of LLIN sold or delivered	No. of ITN sold or delivered	% ITN coverage	No. of people protected by IRS	% IRS coverage	Any 1st-line treatment courses delivered (including ACT)	ACT treatment courses delivered	% Any antimalarial coverage total[1]	% ACT coverage total[2]
Africa	Algeria	2008	-	0	0	-	0	0.0	196	0	1	-
		2009	-	0	0	-	0	0.0	94	0	0	-
		2010	0	-	-	-	0	0.0	408	0	2	-
	Angola	2008	1 471 200	1 471 200	-	38	745 061	4.1	2 363 970	2 363 970	72	72
		2009	936 762	936 762	-	38	485 974	2.6	3 878 910	3 878 910	114	114
		2010	1 678 365	1 678 365	-	39	650 782	3.4	3 119 744	3 119 744	73	73
	Benin	2008	117 148	117 148	-	36	521 738	6.2	1 903 013	1 357 263	146	104
		2009	876 000	876 000	-	52	512 491	6.0	4 328 504	2 691 254	302	188
		2010	900 000	900 000	-	39	-	-	-	-	-	-
	Botswana	2008	35 300	35 300	-	5	212 054	16.7	44 508	44 508	163	163
		2009	33 760	33 760	-	10	236 078	18.3	40 867	40 867	180	180
		2010	84 000	84 000	-	21	250 961	19.2	27 593	27 593	148	148
	Burkina Faso	2008	724 547	724 547	0	10	-	-	2 408 905	2 408 905	64	64
		2009	1 103 049	1 103 049	0	21	0	0.0	3 947 012	3 947 012	88	88
		2010	6 892 018	6 892 018	-	95	113 163	0.7	7 989 808	7 989 808	145	145
	Burundi	2008	895 355	895 355	-	78	-	-	0	1 299 777	-	93
		2009	2 122 920	1 879 386	-	112	3 822	0.1	0	1 887 914	-	102
		2010	1 178 843	1 178 843	-	109	255 474	3.9	0	3 435 597	-	113
	Cameroon	2008	802 105	802 105	-	8	-	-	3 629 450	1 814 725	184	92
		2009	430 606	430 606	-	12	0	0.0	3 177 872	1 299 240	142	58
		2010	187 000	187 000	0	13	0	0.0	-	803 231	-	37
	Cape Verde	2008	0	0	0	-	2 500	2.0	35	31	100	89
		2009	-	-	-	-	-	-	64	60	99	92
		2010	0	0	0	-	175 060	135.7	4 835	3 492	10 287	7 430
	Central African Republic	2008	846 966	846 966	0	62	-	-	2 484 612	1 242 306	549	275
		2009	100 000	100 000	0	60	-	-	868 407	843 540	167	162
		2010	948 274	948 274	0	78	-	-	-	-	-	-
	Chad	2008	126 000	-	-	2	-	-	-	-	-	-
		2009	60 500	60 500	-	1	-	-	-	-	-	-
		2010	353 495	353 495	-	7	-	-	-	447 000	-	63
	Comoros	2008	20 000	20 000	-	5	-	-	281 636	121 920	607	263
		2009	61 000	61 000	-	20	-	-	414 980	184 980	835	372
		2010	259 558	259 558	-	83	0	0.0	1 339	5 249	3	11
	Congo	2008	-	-	300 000	14	-	-	-	-	-	-
		2009	-	-	-	-	-	-	-	-	-	-
		2010	-	-	-	-	-	-	-	-	-	-
	Côte d'Ivoire	2008	1 034 486	1 085 809	1 034 486	23	-	-	-	-	-	-
		2009	936 920	936 920	936 920	28	-	-	-	-	-	-
		2010	148 804	148 804	-	20	-	-	-	1 721 461	-	86
	Democratic Republic of the Congo	2008	5 653 162	5 653 162	0	30	82 975	0.1	4 377 646	2 653 991	73	44
		2009	7 853 284	7 853 284	0	43	94 160	0.1	9 208 416	9 208 416	89	89
		2010	11 730 299	11 730 299	0	69	98 118	0.1	10 315 190	10 315 190	91	91
	Equatorial Guinea	2008	69 208	69 208	-	63	302 657	45.7	63 037	47 698	92	70
		2009	11 806	11 806	-	65	393 122	57.7	88 989	70 057	103	81
		2010	-	-	-	21	-	-	-	-	-	-
	Eritrea	2008	134 399	134 399	0	14	251 641	5.1	22 662	22 662	199	390
		2009	270 233	270 233	0	20	124 005	2.4	150 000	150 000	655	1 282
		2010	102 918	102 918	0	17	177 762	3.4	285 253	285 253	494	966

Annex 4 – Operational coverage of insecticide treated nets, indoor residual spraying and antimalarial treatment, 2008-2010 (continued)

WHO region	Country/area	Year	No. of ITN + LLIN sold or delivered	No. of LLIN sold or delivered	No. of ITN sold or delivered	% ITN coverage	No. of people protected by IRS	% IRS coverage	Any 1st-line treatment courses delivered (including ACT)	ACT treatment courses delivered	% Any antimalarial coverage total[1]	% ACT coverage total[2]
Africa	Ethiopia	2008	3 316 696	3 316 696	-	66	28 206 375	53.0	8 000 000	8 000 000	207	300
		2009	1 875 681	1 875 681	0	41	28 373 630	52.2	9 561 391	8 387 321	206	261
		2010	13 798 161	13 798 161	0	62	27 029 473	48.6	-	9 205 141	-	215
	Gabon	2008	10 640	1 640	9 000	2	-	-	190 259	-	161	-
		2009	0	0	0	1	-	-	2 212 759	-	1 284	-
		2010	0	-	0	0	-	-	374 573	368 175	154	151
	Gambia	2008	428 625	290 935	137 690	58	-	-	2 376 650	1 188 325	449	225
		2009	173 778	160 537	13 241	57	816 253	48.5	1 848 230	924 115	371	185
		2010	0	0	0	47	387 274	22.4	427 903	427 903	354	354
	Ghana	2008	807 717	807 717	0	40	601 973	2.6	9 783 983	9 783 983	246	246
		2009	149 000	149 000	0	23	708 103	3.0	4 048 655	4 048 655	163	163
		2010	1 016 900	1 016 900	0	15	849 620	3.5	5 600 000	5 600 000	163	163
	Guinea	2008	246 000	246 000	0	13	33 905	0.4	-	-	-	-
		2009	3 024 459	3 024 459	0	66	37 048	0.4	2 231 777	2 231 777	192	192
		2010	73 862	73 862	0	60	35 333	0.4	24 783	827 028	2	53
	Guinea-Bissau	2008	81 091	81 091	-	44	-	-	110 627	110 627	81	81
		2009	92 975	92 975	-	32	-	-	241 388	241 388	159	159
		2010	-	-	-	21	-	-	-	-	-	-
	Kenya	2008	2 786 742	2 437 621	349 121	66	3 061 966	10.5	-	-	-	-
		2009	2 740 673	2 740 673	-	41	1 470 865	4.9	-	-	-	-
		2010	1 176 280	1 176 280	-	37	1 487 083	4.8	18 550 714	18 550 714	265	265
	Liberia	2008	714 500	-	-	35	-	-	-	-	-	-
		2009	761 000	761 000	0	36	160 000	4.2	-	-	-	-
		2010	883 400	883 400	0	74	420 532	10.5	-	-	-	-
	Madagascar	2008	907 739	907 739	0	33	6 564 056	33.6	541 670	541 670	358	358
		2009	1 948 405	1 948 405	0	50	6 909 916	34.3	398 413	398 413	143	143
		2010	4 913 638	4 839 275	0	67	9 805 575	47.3	422 536	422 536	161	161
	Malawi	2008	2 520 044	1 023 976	1 496 068	37	98 580	0.7	3 878 880	-	56	-
		2009	957 000	957 000	0	28	288 960	2.0	9 942 240	-	121	-
		2010	1 529 665	1 529 665	0	42	2 036 430	13.7	7 342 770	-	81	-
	Mali	2008	1 898 297	1 898 297	0	25	405 936	2.8	2 842 500	2 842 500	272	272
		2009	1 549 800	1 549 800	0	42	386 074	2.6	441 589	441 589	27	27
		2010	1 020 074	1 020 074	0	52	440 815	2.9	294 984	294 984	29	29
	Mauritania	2008	61 700	40 850	20 850	7	-	-	-	-	-	-
		2009	200 455	200 455	-	14	-	-	49 714	49 714	19	19
		2010	872 268	872 268	0	64	-	-	-	-	-	-
	Mozambique	2008	2 086 367	2 086 367	-	32	6 545 395	29.3	9 662 982	4 831 491	170	85
		2009	1 292 159	1 292 159	-	39	8 479 828	37.1	213 661	-	4	-
		2010	1 525 979	1 525 979	-	38	7 513 172	32.1	7 671 350	7 671 350	428	428
	Namibia	2008	397 282	312 382	84 900	64	233 440	14.7	186 665	186 665	113	113
		2009	87 900	87 900	0	48	487 372	30.2	78 625	78 625	72	72
		2010	87 900	87 900	0	53	566 419	34.5	87 520	87 520	271	271
	Niger	2008	700 000	350 000	350 000	46	0	0.0	3 627 753	1 593 782	689	303
		2009	2 612 516	0	2 612 516	40	0	0.0	1 990 366	1 510 247	606	460
		2010	2 530 809	1 747 037	783 772	33	0	0.0	716 132	2 225 253	109	339
	Nigeria	2008	6 700 000	6 700 000	-	14	-	-	24 000 000	12 000 000	555	277
		2009	19 300 000	19 300 000	-	31	330 000	0.2	18 397 352	9 198 676	281	140
		2010	17 301 049	17 301 049	-	49	200 000	0.1	9 980 728	9 980 728	169	169

Annex 4 – Operational coverage of insecticide treated nets, indoor residual spraying and antimalarial treatment, 2008-2010 (continued)

WHO region	Country/area	Year	No. of ITN + LLIN sold or delivered	No. of LLIN sold or delivered	No. of ITN sold or delivered	% ITN coverage	No. of people protected by IRS	% IRS coverage	Any 1st-line treatment courses delivered (including ACT)	ACT treatment courses delivered	% Any antimalarial coverage total[1]	% ACT coverage total[2]
Africa	Rwanda	2008	0	0	-	53	885 957	8.9	-	-	-	-
		2009	796 663	796 663	-	31	1 411 715	13.7	-	-	-	-
		2010	3 823 906	3 823 906	-	78	1 646 781	15.5	-	-	-	-
	Sao Tome and Principe	2008	9 834	9 834	0	657	0	0.0	7 358	3 679	293	146
		2009	34 339	34 339	0	684	137 394	84.5	9 932	4 966	166	83
		2010	47 403	47 403	0	100	65 442	39.6	0	6 111	-	177
	Senegal	2008	1 572 261	1 572 261	-	41	645 346	5.5	640 670	320 335	140	70
		2009	2 255 235	2 255 235	-	68	661 814	5.5	184 170	184 170	80	80
		2010	-	-	-	55	-	-	-	-	-	-
	Sierra Leone	2008	536 266	536 266	0	69	0	0.0	828 857	828 857	64	64
		2009	292 613	292 613	0	36	0	0.0	1 815 113	1 815 113	184	184
		2010	3 413 311	3 413 311	0	130	308 209	5.3	2 161 564	2 161 564	152	152
	South Africa	2008	-	-	-	-	4 000 000	81.1	-	-	-	-
		2009	-	-	-	-	4 000 000	80.4	10 500	10 500	172	172
		2010	-	-	-	-	5 000 000	99.7	-	-	-	-
	Swaziland	2008	20 000	20 000	-	36	344 886	107.1	0	0	-	-
		2009	25 000	25 000	-	41	348 555	106.5	0	0	-	-
		2010	63 018	63 018	-	59	-	-	0	3 120	-	148
	Togo	2008	1 683 279	1 683 279	0	56	0	0.0	1 600 000	800 000	254	128
		2009	167 231	167 231	0	58	0	0.0	1 087 154	1 067 694	168	167
		2010	247 263	247 263	-	63	0	0.0	-	-	-	-
	Uganda	2008	2 273 413	2 273 413	0	34	1 858 149	5.9	6 389 600	6 389 600	51	51
		2009	876 054	876 054	0	27	1 600 324	4.9	11 357 813	11 357 813	95	95
		2010	7 400 000	7 400 000	0	57	2 732 418	8.2	-	-	-	-
	United Republic of Tanzania	2008	3 665 894	981 985	2 683 909	-	1 308 194	-	-	-	-	-
		2009	14 000 297	7 629 112	6 371 185	-	3 391 198	-	-	-	-	-
		2010	-	-	-	-	-	-	-	-	-	-
	Mainland	2008	3 476 577	792 668	2 683 909	18	190 604	0.5	23 613 149	23 613 149	406	406
		2009	13 711 176	7 339 991	6 371 185	63	2 238 963	5.3	10 318 947	10 318 947	-	-
		2010	17 738 974	17 738 974	0	107	6 500 000	14.9	16 606 080	16 606 080	124	124
	Zanzibar	2008	213 837	213 837	0	68	1 117 590	87.1	281 250	281 250	5 964	-
		2009	289 121	289 121	0	72	1 152 235	87.2	188 675	188 675	5 658	-
		2010	29 853	29 853	0	70	1 030 944	75.7	43 675	45 715	1 816	-
	Zambia	2008	1 188 443	1 188 443	0	70	5 747 995	46.4	6 284 810	3 142 405	176	-
		2009	1 502 712	1 502 712	0	73	5 638 551	44.3	6 284 810	-	182	-
		2010	1 058 050	1 058 050	0	52	5 951 303	45.5	6 147 359	6 147 359	125	-
	Zimbabwe	2008	0	57 000	-	17	929 660	14.9	-	-	-	-
		2009	640 557	640 557	-	35	2 575 116	41.3	-	-	-	-
		2010	1 219 309	1 219 309	0	55	3 090 289	49.2	1 213 001	1 213 001	162	-
Americas	Argentina	2008	-	-	-	-	22 512	0.6	106	-	66	-
		2009	-	-	-	-	-	-	-	-	-	-
		2010	-	-	-	-	-	-	72	-	66	-
	Bahamas	2008	-	-	-	-	-	-	-	-	-	-
		2009	-	-	-	-	-	-	-	-	-	-
		2010	-	-	-	-	-	-	-	-	-	-
	Belize	2008	0	0	0	-	60 168	29.1	540	0	66	-
		2009	2 700	2 700	0	2	50 121	23.8	256	0	66	-
		2010	-	-	-	2	-	-	150	0	66	-

Annex 4 – Operational coverage of insecticide treated nets, indoor residual spraying and antimalarial treatment, 2008-2010 (continued)

WHO region	Country/area	Year	No. of ITN + LLIN sold or delivered	No. of LLIN sold or delivered	No. of ITN sold or delivered	% ITN coverage	No. of people protected by IRS	% IRS coverage	Any 1st-line treatment courses delivered (including ACT)	ACT treatment courses delivered	% Any antimalarial coverage total[1]	% ACT coverage total[2]
Americas	Bolivia (Plurinational State of)	2008	5 000	5 000	0	1	8 975	0.1	9 894	782	95	121
		2009	5 000	5 000	0	1	20 000	0.2	9 743	674	94	104
		2010	17 926	17 926	0	1	35 365	0.4	-	-	-	-
	Brazil	2008	17 874	17 874	0	0	326 466	0.7	-	-	-	-
		2009	37 599	37 599	0	0	379 260	0.8	-	-	-	-
		2010	94 458	94 458	0	1	500 292	1.0	-	-	-	-
	Colombia	2008	194 363	105 759	88 604	5	211 294	2.1	125 580	46 350	102	135
		2009	82 527	62 027	20 500	5	115 000	1.1	1 281 860	313 680	1 058	929
		2010	70 000	70 000	-	4	520 000	5.1	-	-	-	-
	Costa Rica	2008	0	0	0	-	3 135	0.2	9 660	0	655	-
		2009	2 603	2 303	300	0	18 500	1.1	2 620	0	655	-
		2010	6 000	6 000	0	1	16 400	1.0	-	-	-	-
	Dominican Republic	2008	6 000	6 000	0	0	17 092	0.2	1 840	2	66	0
		2009	0	0	0	0	1 253	0.0	1 643	0	66	-
		2010	83 918	83 918	0	2	53 057	0.7	2 479	3	48	0
	Ecuador	2008	111 950	111 950	0	5	293 475	4.0	4 986	491	67	49
		2009	122 429	117 200	5 229	8	334 006	4.5	-	10 000	-	1 189
		2010	68 860	68 860	0	7	163 572	2.2	1 753	500	61	130
	El Salvador	2008	0	0	0	-	116 012	2.3	97 872	0	194 261	-
		2009	-	-	-	-	65 775	1.3	103 031	0	337 427	-
		2010	-	-	-	-	-	-	-	-	-	-
	French Guiana	2008	4 042	4 042	-	3	35 469	16.1	-	-	-	-
		2009	2 668	2 668	-	5	39 231	17.4	-	-	-	-
		2010	2 565	2 565	-	7	-	-	-	-	-	-
	Guatemala	2008	427 277	61 277	-	16	12 410	0.1	12 410	0	113	-
		2009	427 277	0	-	15	27 460	0.3	27 460	0	254	-
		2010	8 077	8 077	-	1	148 855	1.4	148 855	-	1 355	-
	Guyana	2008	4 287	4 287	-	9	0	0.0	11 815	5 252	66	64
		2009	1 068	1 068	-	2	0	0.0	13 673	6 206	66	66
		2010	0	0	-	1	0	0.0	22 935	21 376	66	135
	Haiti	2008	125 713	125 713	0	4	-	-	-	-	-	-
		2009	-	-	-	4	-	-	-	-	-	-
		2010	-	-	-	2	-	-	-	-	-	-
	Honduras	2008	866	866	0	0	27 009	0.9	131 646	0	1 031	-
		2009	1 325	1 325	0	0	51 263	1.6	105 459	0	742	-
		2010	6 378	6 378	0	0	65 187	2.0	93 845	-	638	-
	Jamaica	2008	-	-	-	-	-	-	-	-	-	-
		2009	-	-	-	-	-	-	-	-	-	-
		2010	-	-	-	-	-	-	-	-	-	-
	Mexico	2008	0	0	0	-	148 905	2.7	92 308	0	2 565	-
		2009	0	0	0	-	98 875	1.8	-	0	-	-
		2010	-	-	-	-	106 875	1.9	-	0	-	-
	Nicaragua	2008	27 000	27 000	0	8	359 550	7.6	192 811	0	16 574	-
		2009	30 000	30 000	0	9	327 937	6.8	35 430	0	3 804	-
		2010	22 800	22 800	0	3	262 373	5.4	59 600	-	5 641	-
	Panama	2008	6 649	0	6 649	0	140 236	4.2	2 058	0	181	-
		2009	0	0	0	-	109 497	3.3	2 129	0	179	-
		2010	0	0	0	-	82 041	2.4	836	0	131	-

Annex 4 – Operational coverage of insecticide treated nets, indoor residual spraying and antimalarial treatment, 2008-2010 (continued)

WHO region	Country/area	Year	No. of ITN + LLIN sold or delivered	No. of LLIN sold or delivered	No. of ITN sold or delivered	% ITN coverage	No. of people protected by IRS	% IRS coverage	Any 1st-line treatment courses delivered (including ACT)	ACT treatment courses delivered	% Any antimalarial coverage total[1]	% ACT coverage total[2]
Americas	Paraguay	2008	1 000	1 000	0	0	47 525	1.1	342	7	64	12
		2009	0	0	0	0	178 635	4.1	91	-	66	-
		2010	0	0	0	0	36 035	0.8	27	-	66	-
	Peru	2008	-	-	-	0	235 615	1.8	82 182	6 738	128	75
		2009	-	-	-	0	-	-	-	-	-	-
		2010	-	-	-	-	-	-	-	-	-	-
	Suriname	2008	14 372	14 372	0	70	-	-	-	-	-	-
		2009	376	376	0	71	-	-	-	-	-	-
		2010	13 772	13 772	0	89	-	-	-	-	-	-
	Venezuela (Bolivarian Republic of)	2008	12 000	6 000	6 000	1	5 377 610	71.0	9 694	65 687	20	622
		2009	8 004	8 004	0	1	5 950 904	77.3	4 753	35 340	9	299
		2010	9 267	9 267	-	1	5 244 247	67.0	10 629	45 155	15	303
Eastern Mediterranean	Afghanistan	2008	916 723	916 723	0	8	-	-	7 102	7 102	1	20
		2009	317 631	317 631	0	9	-	-	12 277	12 277	3	41
		2010	922 956	922 956	0	13	-	-	-	-	-	-
	Djibouti	2008	135 484	135 484	0	66	-	-	-	-	-	-
		2009	57 516	57 516	0	80	-	-	-	-	-	-
		2010	28 300	28 300	0	90	0	0.0	-	-	-	-
	Iran (Islamic Republic of)	2008	50 000	50 000	-	1	-	-	-	-	-	-
		2009	80 000	80 000	-	2	-	-	-	-	-	-
		2010	120 000	120 000	-	4	222 470	1.9	4 113	7 245	136	2 297
	Iraq	2008	200 000	200 000	-	18	-	-	4	2	44	131
		2009	200 000	0	-	18	0	0.0	1	0	66	-
		2010	0	0	-	9	1 277 136	31.0	4	3	37	168
	Pakistan	2008	41 400	41 400	-	0	4 938 975	3.0	6 762 058	-	95	-
		2009	396 341	396 341	-	1	350 000	0.2	2 294 816	34 891	35	2
		2010	-	-	-	0	-	-	-	-	-	-
	Saudi Arabia	2008	250 000	250 000	-	3	-	-	2 982	1 491	200	142
		2009	250 000	250 000	-	6	2 457 965	17.0	3 240	1 840	139	112
		2010	81 050	81 050	-	7	2 500 000	16.9	3 000	1 600	155	117
	Somalia	2008	420 122	420 122	0	8	3 720	0.0	141 379	141 379	112	112
		2009	473 081	473 081	0	18	9 100	0.1	72 000	72 000	65	65
		2010	131 467	131 467	0	20	16 261	0.2	95 000	95 000	253	253
	Sudan											
	North (low transmission)	2008	1 806 540	1 756 540	50 000	-	2 281 687	-	3 073 996	3 073 996	-	-
		2009	3 470 931	3 470 931	0	-	1 685 439	-	2 379 910	2 379 910	-	-
		2010	1 166 240	1 166 240	0	-	2 480 360	-	2 285 901	2 339 473	-	-
	South (high transmission)	2008	1 064 066	1 064 066	-	22	-	-	-	-	-	-
		2009	3 479 013	3 479 013	-	92	-	-	-	-	-	-
		2010	-	-	-	90	-	-	-	-	-	-
	Yemen	2008	323 800	323 800	0	8	972 629	5.3	26 163	0	11	-
		2009	66 545	66 545	0	6	1 440 482	7.6	308 180	258 180	146	124
		2010	538 577	538 577	0	9	1 099 627	5.6	183 177	177 517	61	59

Annex 4 – Operational coverage of insecticide treated nets, indoor residual spraying and antimalarial treatment, 2008-2010 (continued)

WHO region	Country/area	Year	No. of ITN + LLIN sold or delivered	No. of LLIN sold or delivered	No. of ITN sold or delivered	% ITN coverage	No. of people protected by IRS	% IRS coverage	Any 1st-line treatment courses delivered (including ACT)	ACT treatment courses delivered	% Any antimalarial coverage total[1]	% ACT coverage total[2]
Europe	Armenia	2008	0	0	-	-	0	-	1	0	100	-
		2009	0	0	-	-	0	-	0	0	-	-
		2010	0	0	-	-	0	-	1	0	100	-
	Azerbaijan	2008	0	0	0	-	127 665	62.1	73	0	100	-
		2009	20 000	20 000	-	17	123 000	59.0	80	0	100	-
		2010	10 000	10 000	-	26	1 250 000	591.5	52	2	100	-
	Georgia	2008	0	0	-	-	50 426	114.8	8	1	100	-
		2009	0	0	-	-	51 828	118.5	7	5	100	-
		2010	0	0	-	-	28 335	65.1	0	0	-	-
	Kyrgyzstan	2008	88 000	20 000	68 000	4 694	313 003	7558.4	18	0	100	-
		2009	20 000	20 000	-	2 575	599 800	14300.4	4	0	100	-
		2010	70 000	70 000	-	4 665	335 000	7892.2	6	0	100	-
	Russian Federation	2008	0	0	-	-	0	-	96	0	66	-
		2009	0	0	-	-	0	-	107	0	66	-
		2010	0	0	-	-	0	-	102	0	66	-
	Tajikistan	2008	19 494	19 494	-	5	632 622	28.3	316	2	99	63
		2009	39 637	40 556	-	7	119 557	5.3	164	1	99	61
		2010	38 778	38 778	-	8	814 500	35.5	111	1	99	89
	Turkey	2008	0	0	-	-	327 375	2034.5	980	0	456	-
		2009	0	0	-	-	455 550	2794.7	4 507	7	5 366	44
		2010	0	0	-	-	390 460	2365.5	150	100	192	673
	Uzbekistan	2008	10 000	10 000	0	-	403 129	-	27	0	100	-
		2009	0	0	-	-	329 642	-	4	1	100	-
		2010	0	0	-	-	244 821	-	5	0	100	-
South-East Asia	Bangladesh	2008	1 863 940	1 200 000	663 940	7	-	-	274 674	110 280	163	90
		2009	283 819	-	283 819	5	-	-	-	0	-	-
		2010	500 000	500 000	-	6	-	-	68 802	58 135	123	143
	Bhutan	2008	20 392	10 000	10 392	42	97 494	18.8	1 617	1 288	303	419
		2009	26 915	20 339	6 576	14	142 922	27.1	1 995	1 895	118	195
		2010	100 671	99 697	974	44	140 503	26.2	780	266	135	80
	Democratic People's Republic of Korea	2008	0	0	30 000	1	0	0.0	23 409	0	138	-
		2009	40 000	40 000	-	1	762 175	6.4	18 679	0	126	-
		2010	300 000	300 000	-	5	2 000 000	16.8	15 392	0	40	-
	India	2008	7 240 000	0	7 240 000	1	53 773 347	5.5	1 532 497	622 000	100	76
		2009	9 235 000	2 235 000	7 000 000	2	66 810 733	6.7	1 563 344	825 000	100	98
		2010	2 517 000	2 517 000	0	1	53 432 930	5.3	1 495 817	2 875 000	94	335
	Indonesia	2008	1 460 000	1 460 000	0	6	10 000	0.0	268 226	268 226	29	58
		2009	1 320 000	1 320 000	0	5	0	0.0	280 779	280 779	41	83
		2010	2 402 610	2 402 610	0	9	60 000	0.1	671 681	671 681	29	59
	Myanmar	2008	693 858	112 865	580 993	5	11 284	0.0	187 102	187 102	19	26
		2009	1 287 743	211 568	1 076 175	9	8 471	0.0	544 378	544 378	60	82
		2010	674 892	329 421	345 471	5	12 709	0.0	266 769	266 769	27	37
	Nepal	2008	380 899	380 899	0	5	904 540	3.8	153 331	-	100	-
		2009	359 735	359 736	0	7	827 240	3.4	123 903	18 288	100	87
		2010	438 186	438 186	0	9	768 350	3.4	150 000	3 200	156	20
	Sri Lanka	2008	253 000	253 000	-	14	727 431	15.4	1 310	640	146	1 375
		2009	774 000	774 000	-	40	409 473	8.6	558	29	75	75
		2010	166 600	166 600	-	45	314 146	6.5	736	34	81	72

Annex 4 – Operational coverage of insecticide treated nets, indoor residual spraying and antimalarial treatment, 2008-2010 (continued)

WHO region	Country/area	Year	No. of ITN + LLIN sold or delivered	No. of LLIN sold or delivered	No. of ITN sold or delivered	% ITN coverage	No. of people protected by IRS	% IRS coverage	Any 1st-line treatment courses delivered (including ACT)	ACT treatment courses delivered	% Any antimalarial coverage total[1]	% ACT coverage total[2]
South-East Asia	Thailand	2008	152 781	46 200	106 581	1	650 742	1.9	10 580	5 480	27	34
		2009	846 420	348 346	498 074	5	624 800	1.8	79 170	40 740	176	223
		2010	597 497	201 566	395 931	5	568 799	1.6	51 161	26 471	103	131
	Timor-Leste	2008	79 226	79 226	0	33	0	0.0	178 000	34 406	117	32
		2009	0	0	0	29	0	0.0	160 502	41 946	139	51
		2010	166 605	166 605	0	39	58 425	5.2	-	38 828	-	43
Western Pacific	Cambodia	2008	344 808	214 973	129 835	11	0	0.0	191 091	81 090	325	185
		2009	933 918	702 810	231 108	31	0	0.0	129 037	106 202	154	170
		2010	239 603	217 351	22 252	28	0	0.0	16 344	182 046	34	510
	China	2008	1 209 127	581 992	627 135	0	-	-	253 327	12 200	187	88
		2009	826 389	219 316	607 073	0	8 768 609	1.3	227 932	11 500	1 561	772
		2010	692 126	114 529	577 597	0	24 561 489	3.6	-	-	-	-
	Lao People's Democratic Republic	2008	395 275	73 000	322 275	27	0	0.0	287 160	287 160	1 348	1 392
		2009	72 900	72 900	0	14	0	0.0	68 903	68 903	274	283
		2010	231 192	230 292	900	19	0	0.0	25 039	51 425	99	209
	Malaysia	2008	203 952	194 293	203 952	65	362 460	32.9	7 390	-	100	-
		2009	0	216 460	-	66	400 007	35.8	7 010	-	100	-
		2010	221 911	221 911	-	100	365 340	32.2	6 650	-	100	-
	Papua New Guinea	2008	438 441	438 441	-	26	-	-	110 000	110 000	6	8
		2009	341 438	341 438	-	22	17 808	0.3	-	-	-	-
		2010	878 831	878 831	-	44	-	-	-	-	-	-
Western Pacific	Philippines	2008	709 736	444 390	246 758	2	574 647	0.8	15 030	6 900	56	36
		2009	1 462 614	1 312 503	0	5	239 605	0.3	28 920	28 920	133	184
		2010	1 529 915	1 437 327	0	8	714 886	1.0	36 298	36 298	173	239
	Republic of Korea	2008	-	-	-	-	-	-	1 052	-	66	-
		2009	-	-	-	-	-	-	1 343	-	65	-
		2010	10 000	10 000	-	1	-	-	1 772	-	66	-
	Solomon Islands	2008	61 805	61 805	0	66	143 443	28.4	245 778	122 889	158	131
		2009	15 463	15 463	0	51	170 941	32.9	590 342	295 171	460	383
		2010	316 000	316 000	-	133	194 287	36.5	-	271 946	-	404
	Vanuatu	2008	47 241	47 241	0	79	-	-	208 213	0	626	-
		2009	25 284	25 284	0	79	-	-	100 000	20 000	328	127
		2010	91 281	91 281	0	124	-	-	49 600	49 600	215	417
	Viet Nam	2008	300 000	0	300 000	1	1 659 873	2.1	920 725	109 725	1 782	265
		2009	0	0	0	-	1 544 329	2.0	811 000	323 748	1 649	822
		2010	1 181 438	500 000	681 438	3	1 602 475	2.0	-	-	-	-

[1] Based on Probable and confirmed cases adjusting for reporting completeness using 1st-line treatment courses delivered as proxy indicator for treated cases

[2] Based on Probable and confirmed cases adjusting for reporting completeness and % of *P.falciparum* using ACT distributed as proxy indicator for treated cases

Annex 5 — Household surveys of mosquito nets ownership and usage, 2006-2010

WHO region/subregion	Country/area	Year	Source	Subgroup	% of HH with ≥ 1 any net	% of HH with ≥ 1 ever treated net	% of HH with ≥ 1 ITN	% Total population who slept under an ITN	% of children <5 years who slept under any net	% of children <5 years who slept under ever treated net	% of children <5 years who slept under an ITN	% of pregnant women who slept under any net	% of pregnant women who slept under ever treated net	% of pregnant women who slept under an ITN
Africa	Angola	2007	MIS 2007	Total	33	-	28	12	21	-	18	-	-	22
		2007	MIS 2007	Urban	34	-	29	11	19	-	17	-	-	15
		2007	MIS 2007	Rural	31	-	26	13	22	-	19	-	-	26
	Benin	2006	DHS 2006	Total	56	-	25	14	47	-	20	-	-	20
		2006	DHS 2006	Urban	66	-	29	18	55	-	25	-	-	25
		2006	DHS 2006	Rural	50	-	21	12	42	-	18	-	-	17
	Burkina Faso	2006	MICS 2006	Total	52	-	23	-	18	-	10	-	-	-
		2006	MICS 2006	Urban	65	-	45	-	33	-	24	-	-	-
		2006	MICS 2006	Rural	47	-	15	-	14	-	6	-	-	-
	Cameroon	2006	MICS 2006	Total	32	-	20	-	27	-	13	-	-	-
		2006	MICS 2006	Urban	33	-	20	-	32	-	14	-	-	-
		2006	MICS 2006	Rural	30	-	20	-	22	-	12	-	-	-
	Central African Republic	2006	MICS 2006	Total	36	-	17	-	33	-	15	-	-	-
		2006	MICS 2006	Urban	54	-	27	-	52	-	24	-	-	-
		2006	MICS 2006	Rural	26	-	12	-	22	-	10	-	-	-
	Côte d'Ivoire	2006	MICS 2006	Total	27	-	6	-	17	-	6	-	-	-
		2006	MICS 2006	Urban	22	-	6	-	16	-	8	-	-	-
		2006	MICS 2006	Rural	31	-	6	-	18	-	4	-	-	-
	Democratic Republic of the Congo	2007	DHS 2007	Total	28	-	9	4	-	-	6	-	-	-
		2007	DHS 2007	Urban	-	-	-	6	-	-	-	-	-	-
		2007	DHS 2007	Rural	-	-	-	3	-	-	-	-	-	-
	Equatorial Guinea	2007	Other Nat.	Total	-	-	26	-	-	-	42	-	-	-
		2008	Other Nat.	Total	-	-	64	-	-	-	-	-	-	-
	Ethiopia	2007	MIS 2007	Total	56	54	54	-	35	33	33	37	35	35
		2007	MIS 2007[a]	Total	69	-	65	-	-	-	42	-	-	43
		2007	MIS 2007	Urban	41	40	40	-	41	37	36	37	34	34
		2007	MIS 2007	Rural	59	57	56	-	34	33	33	37	36	34
	Gambia	2006	MICS 2006	Total	59	-	50	-	63	-	49	-	-	-
		2006	MICS 2006	Urban	49	-	13	-	55	-	38	-	-	-
		2006	MICS 2006	Rural	70	-	38	-	68	-	55	-	-	-
	Ghana	2006	MICS 2006	Total	30	-	19	-	33	-	22	-	-	-
		2006	MICS 2006	Urban	21	-	15	-	22	-	16	-	-	-
		2006	MICS 2006	Rural	37	-	22	-	38	-	25	-	-	-
		2008	DHS 2008	Total	45	-	33	17	-	-	28	-	-	-
		2008	DHS 2008	Urban	-	-	-	11	-	-	-	-	-	-
		2008	DHS 2008	Rural	-	-	-	18	-	-	-	-	-	-
	Guinea-Bissau	2006	MICS 2006	Total	79	-	44	-	73	-	39	-	-	-
		2006	MICS 2006	Urban	82	-	35	-	80	-	32	-	-	-
		2006	MICS 2006	Rural	78	-	49	-	71	-	42	-	-	-
	Kenya	2007	MIS 2007	Total	63	-	48	-	-	-	39	-	-	-
		2008	DHS 2008	Total	61	-	56	36	-	-	47	-	-	-
		2008	DHS 2008	Urban	-	-	-	46	-	-	-	-	-	-
		2008	DHS 2008	Rural	-	-	-	32	-	-	-	-	-	-
	Liberia	2009	MIS 2009	Total	49	-	47	22	-	-	-	-	-	-
		2009	MIS 2009	Urban	-	-	-	19	-	-	-	-	-	-
		2009	MIS 2009	Rural	-	-	-	24	-	-	-	-	-	-
	Madagascar	2008	DHS 2008	Total	62	-	57	36	-	-	-	-	-	-
		2008	DHS 2008	Urban	-	-	-	42	-	-	-	-	-	-
		2008	DHS 2008	Rural	-	-	-	34	-	-	-	-	-	-
	Malawi	2006	MICS 2006	Total	50	-	36	-	29	-	25	-	-	-
		2006	MICS 2006	Urban	72	-	56	-	52	-	43	-	-	-
		2006	MICS 2006	Rural	47	-	34	-	26	-	21	-	-	-

Annex 5 — Household surveys of mosquito nets ownership and usage, 2006-2010 (continued)

WHO region/subregion	Country/area	Year	Source	Subgroup	% of HH with ≥ 1 any net	% of HH with ≥ 1 ever treated net	% of HH with ≥ 1 ITN	% Total population who slept under an ITN	% of children <5 years who slept under any net	% of children <5 years who slept under ever treated net	% of children <5 years who slept under an ITN	% of pregnant women who slept under any net	% of pregnant women who slept under ever treated net	% of pregnant women who slept under an ITN
	Mali	2006	DHS 2006	Total	69	-	50	21	41	-	27	-	-	29
		2006	DHS 2006	Urban	72	-	54	22	41	-	29	-	-	22
		2006	DHS 2006	Rural	68	-	48	20	41	-	26	-	-	31
		2010	Other Nat.	Total	-	-	86	62	-	-	-	-	-	-
	Mauritania	2006	MICS 2006	Total	-	-	3	-	-	-	-	-	-	-
	Mozambique	2007	MIS 2007	Total	-	-	16	-	-	-	7	-	-	-
	Namibia	2007	DHS 2007	Total	25	-	22	5	-	-	-	-	-	-
		2007	DHS 2007	Urban	-	-	-	4	-	-	-	-	-	-
		2007	DHS 2007	Rural	-	-	-	7	-	-	-	-	-	-
	Niger	2006	CDC-MMP National Survey	Total	-	-	65	-	-	-	56	-	-	48
		2006	DHS 2006	Total	69	69	43	4	15	15	7	13	13	7
		2006	DHS 2006	Urban	76	75	37	9	32	32	15	30	30	15
		2006	DHS 2006	Rural	68	67	44	3	12	12	6	11	11	5
	Nigeria	2008	DHS 2008	Total	17	-	8	3	-	-	6	-	-	-
		2008	DHS 2008	Urban	-	-	-	3	-	-	-	-	-	-
		2008	DHS 2008	Rural	-	-	-	3	-	-	-	-	-	-
	Rwanda	2007	MIS 2007	Total	54	-	50	-	-	-	56	-	-	-
		2008	DHS 2008	Total	59	-	56	39	-	-	24	-	-	-
		2008	DHS 2008	Urban	-	-	-	45	-	-	-	-	-	-
		2008	DHS 2008	Rural	-	-	-	38	-	-	-	-	-	-
	Sao Tome and Principe	2006	MICS 2006	Total	49	-	36	-	53	-	42	-	-	-
		2006	MICS 2006	Urban	58	-	44	-	62	-	51	-	-	-
		2006	MICS 2006	Rural	37	-	25	-	41	-	29	-	-	-
		2007	MOH 2007	Total	-	-	78	-	-	-	54	-	-	-
		2009	DHS 2009	Total	-	-	37	47	-	-	-	-	-	-
	Senegal	2006	MIS 2006	Total	57	-	36	-	28	-	16	-	-	17
		2006	MIS 2006	Urban	47	-	34	-	23	-	15	-	-	12
		2006	MIS 2006	Rural	65	-	38	-	30	-	17	-	-	20
		2008	MIS 2008	Total	68	-	60	25	-	-	31	-	-	-
		2008	MIS 2008	Urban	-	-	-	22	-	-	-	-	-	-
		2008	MIS 2008	Rural	-	-	-	23	-	-	-	-	-	-
	Sierra Leone	2007	MIS 2007	Total	-	-	59	-	-	-	56	-	-	-
		2008	DHS 2008	Total	40	-	37	19	-	-	26	-	-	-
	Swaziland	2007	DHS 2007	Total	6	-	4	0	-	-	-	-	-	-
		2007	DHS 2007	Urban	-	-	-	1	-	-	-	-	-	-
		2007	DHS 2007	Rural	-	-	-	0	-	-	-	-	-	-
	Togo	2006	MICS 2006	Total	46	-	40	-	41	-	38	-	-	-
		2006	MICS 2006	Urban	44	-	37	-	39	-	36	-	-	-
		2006	MICS 2006	Rural	47	-	42	-	42	-	40	-	-	-
		2008	CDC-MoH	Total	-	-	56	-	-	-	35	-	-	-
	Uganda	2006	DHS 2006	Total	34	21	16	7	22	13	10	24	13	10
		2006	DHS 2006	Urban	61	36	26	15	49	29	21	49	27	23
		2006	DHS 2006	Rural	29	19	14	16	18	11	8	22	12	9
		2009	MIS 2009	Total	-	-	47	27	-	-	-	-	-	-
	United Republic of Tanzania	2010	DHS 2010	Total	64	-	72	48	-	-	-	-	-	-
	United Republic of Tanzania (Zanzibar)	2008	AIS/MIS 2008	Total	-	-	72	-	-	-	59	-	-	-
	Zambia	2006	MIS 2006	Total	50	-	44	-	27	-	23	-	-	24
		2006	MIS 2006	Urban	51	-	45	-	31	-	26	-	-	18
		2006	MIS 2006	Rural	50	-	44	-	24	-	21	-	-	27
		2007	DHS 2007	Total	64	-	53	22	-	-	28	-	-	-
		2007	DHS 2007	Urban	-	-	-	21	-	-	-	-	-	-
		2007	DHS 2007	Rural	-	-	-	23	-	-	-	-	-	-
		2008	MIS 2008	Total	-	-	62	-	-	-	41	-	-	-

Annex 5 — Household surveys of mosquito nets ownership and usage, 2006-2010 (continued)

WHO region/subregion	Country/area	Year	Source	Subgroup	% of HH with ≥ 1 any net	% of HH with ≥ 1 ever treated net	% of HH with ≥ 1 ITN	% Total population who slept under an ITN	% of children <5 years who slept under any net	% of children <5 years who slept under ever treated net	% of children <5 years who slept under an ITN	% of pregnant women who slept under any net	% of pregnant women who slept under ever treated net	% of pregnant women who slept under an ITN
Africa	Zimbabwe	2006	DHS 2006	Total	20	10	9	2	7	4	3	7	3	3
		2006	DHS 2006	Urban	34	14	11	4	16	7	5	16	7	6
		2006	DHS 2006	Rural	13	8	7	2	3	3	2	4	2	2
Americas	Guyana	2009	DHS 2009	Total	89	-	26	22	-	-	-	-	-	-
		2009	DHS 2009	Urban	-	-	-	1	-	-	-	-	-	-
		2009	DHS 2009	Rural	-	-	-	5	-	-	-	-	-	-
	Haiti	2006	DHS 2006	Total	7	-	-	-	-	-	-	-	-	-
Eastern Mediterranean	Afghanistan	2008	NMLCP	Total	42	-	31	-	-	-	6	-	-	10
		2009	MIS 2009	Total	27	-	20	3	5	-	4	6	-	5
		2009	MIS 2009	Urban	34	-	25	4	4	-	4	2	-	1
		2009	MIS 2009	Rural	23	-	17	3	5	-	4	8	-	7
	Djibouti	2006	MICS 2006	Total	26	-	18	-	9	-	1	-	-	-
		2006	MICS 2006	Urban	26	-	18	-	9	-	1	-	-	-
		2006	MICS 2006	Rural	22	-	12	-	8	-	1	-	-	-
		2009	MIS 2009	Total	49	32	-	14	27	20	-	28	25	25
		2009	MIS 2009	Urban	41	-	-	-	23	-	-	23	-	-
		2009	MIS 2009	Rural	68	-	-	-	33	-	-	33	-	-
	Pakistan	2007	DHS 2007	Total	6	-	1	0	-	-	0	-	-	2
		2007	DHS 2007	Urban	-	-	-	0	-	-	-	-	-	-
		2007	DHS 2007	Rural	-	-	-	0	-	-	-	-	-	-
	Somalia	2006	MICS 2006	Total	22	-	12	-	18	-	9	-	-	-
		2006	MICS 2006	Urban	27	-	16	-	25	-	15	-	-	-
		2006	MICS 2006	Rural	20	-	10	-	14	-	6	-	-	-
		2008	National Household Survey	Rural	57	-	42	-	-	-	-	-	-	-
	Sudan	2006	Sudan Household Health Survey	Total	37	-	18	-	-	-	28	-	-	-
		2009	MIS 2009	Total	55	-	41	11	21	-	16	21	-	16
		2009	MIS 2009	Urban	50	-	37	11	21	-	15	21	-	17
		2009	MIS 2009	Rural	58	-	45	12	22	-	17	22	-	16
	Yemen	2009	MIS 2009	Total	27	-	16	-	16	-	8	11	-	6
		2009	MIS 2009	Urban	13	-	9	2	7	-	4	2	-	1
		2009	MIS 2009	Rural	32	-	18	5	18	-	9	13	-	7
South-East Asia	India	2006	DHS 2006	Total	38	-	-	-	-	-	-	-	-	-
		2006	DHS 2006	Urban	32	-	-	-	-	-	-	-	-	-
		2006	DHS 2006	Rural	37	-	-	-	-	-	-	-	-	-
	Indonesia	2007	DHS 2007	Total	32	4	3	2	31	4	3	23	2	2
		2007	DHS 2007	Urban	-	-	-	1	-	-	-	-	-	-
		2007	DHS 2007	Rural	42	5	4	3	40	6	5	33	4	3
	Nepal	2006	DHS 2006	Total	58	-	-	-	-	-	-	-	-	-
Western Pacific	Cambodia	2007	CMS 2007	Rural	95	-	36	-	-	-	28	-	-	28
	Lao People's Democratic Republic	2008	IndoChina research / CMPE	Rural	97	-	56	-	-	-	43	-	-	50
	Viet Nam	2006	MICS 2006	Total	97	-	19	-	94	-	5	-	-	-
		2006	MICS 2006	Urban	92	-	5	-	88	-	12	-	-	-
		2006	MICS 2006	Rural	99	-	23	-	95	-	3	-	-	-

[a] Percentages calculated using the population at risk.

AIS = AIDS Indicator Survey.

CDC-MMP = Centers for Disease Control and Prevention - Malaria Measles Partnership.

DHS = Demographic and Health Survey.

MICS = Multiple Indicator Cluster Survey.

MIS = Malaria Indicator Survey.

Annex 6A – Reported malaria cases and deaths, 2010

		Population				Reported malaria cases								Inpatient malaria cases and deaths	
WHO region	Country/area	UN Population	At risk (low + high)	At risk (high)	Number of people living in active foci	Suspected malaria cases	Probable and confirmed malaria cases	Malaria case definition	Mic. slides/ RDTs taken	Mic. slides/ RDTs positive	*P. falciparum*	*P. vivax*	Imported cases	Cases at community level	Inpatient malaria cases	Malaria attributed deaths
Africa	Algeria	35 468 208	N/A	N/A	0	12 224	408	P+C	12 224	408	401	4	-	-	-	-
	Angola	19 081 912	19 081 912	19 081 912	N/A	3 687 574	2 783 619	S	2 586 825	1 682 870	-	-	-	-	166 879	8 114
	Benin	8 849 892	8 849 892	8 849 892	N/A	1 432 095	1 432 095	S	-	-	-	-	-	440 920	48 185	964
	Botswana	2 006 945	1 304 514	361 250	N/A	12 196	12 196	P+C	-	1 046	1 046	-	-	-	658	8
	Burkina Faso	16 468 714	16 468 714	16 468 714	N/A	5 723 481	5 409 156	S	1 118 864	804 539	-	-	-	233 060	336 463	9 024
	Burundi	8 382 849	6 538 622	2 011 884	N/A	4 255 301	2 919 866	S	3 098 882	1 763 447	-	-	-	-	114 623	2 677
	Cameroon	19 598 889	19 598 889	13 915 211	N/A	1 845 691	1 845 691	S	-	-	-	-	-	44 045	364 865	4 536
	Cape Verde	495 999	128 960	0	N/A	47	47	P+C	-	47	-	-	29	-	46	1
	Central African Republic	4 401 051	4 401 051	4 401 051	N/A	66 484	66 484	S	-	-	-	-	-	-	15 079	526
	Chad	11 227 208	11 114 936	8 981 766	N/A	506 000	466 034	S	506 000	-	-	-	-	-	18 776	-
	Comoros	734 750	734 750	690 665	N/A	103 670	47 364	S	92 844	36 538	33 791	528	-	-	22 562	53
	Congo	4 042 899	4 042 899	4 042 899	N/A	-	0	S	-	-	-	-	-	-	-	-
	Côte d'Ivoire	19 737 800	19 737 800	19 737 800	N/A	1 721 461	1 721 461	S	-	62 726	-	-	-	-	23 504	1 023
	Democratic Republic of the Congo	65 965 795	65 965 795	63 986 821	N/A	8 755 237	7 439 440	S	3 733 577	2 417 780	-	-	-	-	731 941	23 476
	Equatorial Guinea	700 401	700 401	700 401	N/A	-	0	S	-	-	-	-	-	-	-	-
	Eritrea	5 253 676	5 253 676	3 730 110	N/A	96 792	53 750	P+C	79 024	35 982	9 785	3 989	-	23 914	6 780	27
	Ethiopia	82 949 541	55 576 192	829 495	N/A	5 420 111	4 068 764	P+C	2 509 544	1 158 197	732 776	390 252	-	-	48 558	1 581
	Gabon	1 505 463	1 505 463	1 505 463	N/A	183 105	159 313	S	32 358	8 566	2 157	720	-	-	18 633	182
	Gambia	1 728 394	1 728 394	1 728 394	N/A	414 406	116 353	S	414 406	116 353	-	-	-	46 600	11 167	151
	Ghana	24 391 823	24 391 823	24 391 823	N/A	3 849 536	2 642 221	S	2 278 952	1 071 637	926 447	0	-	50 775	298 372	3 859
	Guinea	9 981 590	9 981 590	9 981 590	N/A	1 092 554	1 092 554	S	-	-	-	-	-	24 628	78 802	735
	Guinea-Bissau	1 515 224	1 515 224	1 515 224	N/A	-	0	S	-	-	-	-	-	-	-	-
	Kenya	40 512 682	30 789 638	14 584 566	N/A	6 071 583	4 585 712	S	2 384 402	898 531	898 531	-	-	-	199 992	26 017
	Liberia	3 994 122	3 994 122	3 994 122	N/A	2 675 816	2 263 973	S	1 334 016	922 173	212 927	0	-	0	208 294	1 422
	Madagascar	20 713 819	20 713 819	6 214 146	N/A	628 507	202 450	S	628 507	202 450	-	-	-	0	6 514	122
	Malawi	14 900 841	14 900 841	14 900 841	N/A	6 851 108	6 851 108	S	-	-	-	-	-	-	135 819	8 206
	Mali	15 369 809	15 369 809	13 832 828	N/A	2 171 542	1 018 846	S	1 380 178	227 482	-	-	-	19 743	532 490	3 006
	Mauritania	3 459 773	3 113 796	2 041 266	N/A	244 319	238 565	S	7 748	1 994	-	-	-	0	23 002	211
	Mozambique	23 390 765	23 390 765	23 390 765	N/A	4 238 469	1 522 577	S	4 238 469	1 522 577	-	-	-	-	90 021	3 354
	Namibia	2 283 289	1 643 968	1 529 804	N/A	39 855	25 889	P+C	14 522	556	556	0	-	0	1 957	63
	Niger	15 511 953	15 511 953	10 703 248	N/A	7 592 288	620 058	S	7 592 288	620 058	39 021	-	-	588 093	-	3 929
	Nigeria	158 423 182	158 423 182	158 423 182	N/A	3 873 463	3 873 463	S	45 924	551 187	523 513	-	-	-	488 814	4 238
	Rwanda	10 624 005	10 624 005	10 624 005	N/A	2 708 973	638 669	P+C	2 708 973	638 669	638 669	-	-	525 882	10 115	670
	Sao Tome and Principe	165 397	165 397	165 397	N/A	116 710	2 262	P+C	58 355	2 740	2 219	14	-	0	1 091	14
	Senegal	12 433 728	12 433 728	11 936 379	N/A	-	0	S	-	-	-	-	-	-	-	-
	Sierra Leone	5 867 536	5 867 536	5 867 536	N/A	2 327 928	934 028	S	2 327 928	934 028	218 473	-	-	968 637	20 784	8 188
	South Africa	50 132 817	5 013 282	2 005 313	N/A	8 060	8 060	P+C	276 669	8 060	2 181	0	4 185	-	2 809	83
	Swaziland	1 186 056	332 096	0	N/A	1 722	1 722	P+C	147	147	-	-	-	0	215	8
	Togo	6 027 798	6 027 798	6 027 798	N/A	1 053 599	617 101	S	1 053 599	617 101	224 080	0	-	598 617	43 277	1 507
	Uganda	33 424 683	33 424 683	30 082 215	N/A	13 208 169	11 084 045	S	3 705 284	1 581 160	1 565 348	15 812	-	-	657 391	8 431
	United Republic of Tanzania															
	Mainland	43 700 843	43 700 843	31 901 615	N/A	12 491 413	8 748 012	S	5 478 138	1 734 737	-	-	-	0	469 283	15 819
	Zanzibar	1 361 180	1 361 180	1 361 180	N/A	200 072	2 338	S	200 072	2 338	364	0	-	-	871	48
	Zambia	13 088 570	13 088 570	13 088 570	N/A	4 229 839	4 229 839	S	-	-	-	-	-	-	199 732	4 834
	Zimbabwe	12 571 454	6 285 727	6 285 727	N/A	912 618	648 965	P+C	513 032	249 379	249 379	-	-	0	4 145	255
Americas	Argentina	40 412 376	3 637 114	0	N/A	2 547	72	C	2 547	72	-	-	-	-	-	0
	Bahamas	342 877	0	0	N/A	27 272	1	C	27 272	1	-	-	1	-	-	0
	Belize	311 627	215 023	0	N/A	27 366	150	C	27 366	150	0	149	-	-	10	0
	Bolivia (Plurinational State of)	9 929 849	8 142 476	695 089	N/A	140 857	13 769	C	140 857	13 769	808	11 444	-	-	0	0
	Brazil	194 946 470	50 686 082	9 747 324	N/A	2 713 459	334 618	C	2 713 459	334 618	51 050	283 384	-	-	5 451	74
	Colombia	46 294 841	10 184 865	3 240 639	N/A	527 642	117 650	C	527 642	117 650	34 334	83 255	-	-	652	23
	Costa Rica	4 658 887	1 677 199	93 178	N/A	15 636	114	C	15 636	114	2	112	-	0	0	0

Annex 6A – Reported malaria cases and deaths, 2010 (continued)

		Population				Reported malaria cases									Inpatient malaria cases and deaths	
WHO region	Country/area	UN Population	At risk (low + high)	At risk (high)	Number of people living in active foci	Suspected malaria cases	Probable and confirmed malaria cases	Malaria case definition	Mic. slides/ RDTs taken	Mic. slides/ RDTs positive	*P. falciparum*	*P. vivax*	Imported cases	Cases at community level	Inpatient malaria cases	Malaria attributed deaths
Americas	Dominican Republic	9 927 320	7 941 856	893 459	N/A	495 637	3 414	C	495 637	3 414	2 480	2	-	81	-	15
	Ecuador	14 464 739	7 521 664	578 590	N/A	488 830	1 888	C	488 830	1 888	258	1 630	-	-	-	0
	El Salvador	6 192 993	5 140 184	1 795 968	N/A	115 256	24	C	115 256	24	2	22	-	-	-	0
	French Guiana	231 151	231 151	231 151	N/A	14 373	1 791	C	14 373	1 791	216	492	-	-	-	0
	Guatemala	14 388 929	10 935 586	2 877 786	N/A	237 075	7 198	C	237 075	7 198	35	7 163	-	-	-	0
	Guyana	754 493	701 678	264 073	N/A	212 863	22 935	C	212 863	22 935	14 401	8 402	-	-	1 043	15
	Haiti	9 993 247	9 993 247	4 696 826	N/A	270 427	84 153	C	270 427	84 153	-	-	-	-	-	-
	Honduras	7 600 524	3 192 220	1 976 136	N/A	149 607	9 629	C	149 607	9 629	973	8 656	-	-	-	2
	Jamaica	2 741 052	0	0	N/A	-	-	C	-	-	-	-	-	-	-	0
	Mexico	113 423 047	5 671 152	2 268 461	N/A	1 192 081	1 226	C	1 192 081	1 226	0	1 226	-	0	0	0
	Nicaragua	5 788 163	4 862 057	173 645	N/A	554 414	692	C	554 414	692	154	538	-	0	0	0
	Panama	3 516 820	3 411 315	351 682	N/A	141 038	418	C	141 038	418	20	398	-	0	26	-
	Paraguay	6 454 548	4 453 638	2 000 910	N/A	62 178	27	C	62 178	27	5	22	-	12	3	0
	Peru	29 076 512	13 665 961	9 886 014	N/A	989 842	29 276	C	989 842	29 276	2 353	26 878	-	-	-	-
	Suriname	524 636	57 710	57 710	N/A	17 361	791	C	17 361	791	209	331	-	-	13	1
	Venezuela (Bolivarian Republic of)	28 979 857	7 824 561	579 597	N/A	400 495	45 155	C	400 495	45 155	10 629	32 710	-	-	-	2
Eastern Mediterranean	Afghanistan	31 411 743	30 783 508	22 616 455	N/A	847 589	392 463	P+C	524 523	69 397	6 142	63 255	-	138 071	4 724	22
	Djibouti	888 716	444 358	0	N/A	-	3 962	P+C	0	1 019	1 019	0	-	0	-	0
	Egypt[2]	81 121 077	0	0	N/A	-	85	C	664 294	85	82	3	85	-	-	2
	Iran (Islamic Republic of)	73 973 630	N/A	N/A	2 309 557	-	3 031	C	614 817	3 031	339	2 610	1 184	-	-	-
	Iraq	31 671 591	N/A	N/A	0	-	7	C	1 849 930	7	2	4	7	-	-	-
	Morocco[1]	31 951 412	0	0	N/A	-	218	C	232 598	218	195	6	215	-	-	2
	Oman[2]	2 782 435	0	0	N/A	-	1 193	C	226 009	1 193	140	1 039	1 169	-	-	0
	Pakistan	173 593 383	171 857 449	26 039 007	N/A	8 601 835	4 281 356	P+C	4 561 070	240 591	73 857	143 136	-	-	-	-
	Saudi Arabia	27 448 086	N/A	N/A	3 153 729	-	1 941	C	944 723	1 941	883	1 023	1 912	-	-	0
	Somalia	9 330 872	9 330 872	6 531 610	N/A	220 698	24 553	P+C	220 698	24 553	5 629	0	-	280	1 964	6
	Sudan															
	North (low transmission)	34 078 834	34 078 834	28 285 432	N/A	2 398 239	1 465 496	P+C	1 653 300	720 557	-	-	-	-	116 736	1 023
	South (high transmission)	9 113 604	9 113 604	9 113 604	N/A	-	900 283	S	-	900 283	-	-	-	-	-	1 053
	Syrian Arab Republic[2]	20 410 606	0	0	N/A	-	23	C	19 151	23	22	0	23	-	-	0
	Yemen	24 052 514	19 482 536	14 912 559	N/A	835 018	198 963	P+C	742 752	106 697	77 271	966	-	-	3 153	92
	Armenia	3 092 072	N/A	N/A	0	31 026	1	C	31 026	1	1	0	1	-	-	-
Europe	Azerbaijan	9 187 783	N/A	N/A	69 101	456 652	52	C	456 652	52	2	50	2	-	-	-
	Georgia	4 352 244	N/A	N/A	43 300	2 368	0	C	2 368	0	0	0	0	-	-	-
	Kyrgyzstan	5 334 223	N/A	N/A	22 900	30 190	6	C	30 190	6	0	6	3	-	-	-
	Russian Federation	142 958 164	N/A	N/A	1 200	33 024	102	C	33 024	102	60	34	101	-	-	-
	Tajikistan	6 878 637	N/A	N/A	2 706 316	173 523	112	C	173 523	112	1	111	1	-	-	-
	Turkey	72 752 325	N/A	N/A	0	507 841	78	C	507 841	78	49	28	69	-	-	-
	Turkmenistan[1]	5 041 995	N/A	N/A	0	81 784	0	C	81 784	0	0	0	0	-	-	-
	Uzbekistan	27 444 702	N/A	N/A	3 820	921 364	5	C	921 364	5	0	5	2	-	-	-
	Bangladesh	148 692 131	50 555 325	10 408 449	N/A	1 228 396	55 873	P+C	614 198	91 227	52 012	3 824	-	37 532	2 726	37
South-East Asia	Bhutan	725 940	537 196	94 372	N/A	54 760	487	P+C	54 709	436	140	261	-	0	51	2
	Democratic People's Republic of Korea	24 346 229	N/A	N/A	14 992 000		13 520	P+C	25 147	13 520	0	13 520	127	-	-	-
	India	1 224 614 327	1 004 183 748	318 399 725	N/A	108 679 429	1 599 986	C	108 679 429	1 599 986	834 364	765 622	-	-	-	1 023
	Indonesia	239 870 937	105 543 212	88 752 247	N/A	2 783 649	1 849 062	P+C	1 164 406	229 819	110 037	108 263	-	0	-	432
	Myanmar	47 963 012	33 094 478	23 981 506	N/A	1 233 966	649 522	P+C	1 005 252	420 808	70 941	29 944	-	-	43 602	788
	Nepal	29 959 364	22 918 913	689 065	N/A	213 353	96 383	P+C	120 864	3 894	550	2 349	-	0	436	6
	Sri Lanka	20 859 949	N/A	N/A	4 876 833	1 001 107	684	C	1 001 107	684	6	668	52	-	-	-
	Thailand	69 122 234	34 561 117	5 529 779	N/A	1 777 977	32 480	C	1 777 977	32 480	9 401	13 401	-	-	10 213	80
	Timor-Leste	1 124 355	1 124 355	865 753	N/A	266 384	119 072	P+C	195 449	48 137	28 350	11 432	-	0	791	58

Annex 6A – Reported malaria cases and deaths, 2010 (continued)

		Population				Reported malaria cases									Inpatient malaria cases and deaths	
WHO region	Country/area	UN Population	At risk (low + high)	At risk (high)	Number of people living in active foci	Suspected malaria cases	Probable and confirmed malaria cases	Malaria case definition	Mic. slides/ RDTs taken	Mic. slides/ RDTs positive	*P. falciparum*	*P. vivax*	Imported cases	Cases at community level	Inpatient malaria cases	Malaria attributed deaths
Western Pacific	Cambodia	14 138 255	7 493 275	6 220 832	N/A	386 420	49 356	P+C	193 210	49 356	8 213	4 794	-	132 501	10 590	151
	China	1 341 335 152	684 080 928	13 413 352	N/A	7 118 649	7 855	P+C	7 115 784	4 990	1 269	3 675	-	-	-	19
	Lao People's Democratic Repul	6 200 894	3 658 527	2 232 322	N/A	280 549	23 047	P+C	278 302	20 800	4 393	122	-	-	3 126	24
	Malaysia	28 401 017	N/A	N/A	759 835	1 619 074	6 650	C	1 619 074	6 650	1 681	3 812	831	-	-	-
	Papua New Guinea	6 858 266	6 858 266	6 446 770	N/A	1 379 787	1 254 181	S	219 562	93 956	56 735	13 171	-	-	24 250	616
	Philippines	93 260 798	74 406 607	6 690 449	N/A	301 031	18 560	C	301 031	18 560	11 824	2 885	-	542	958	30
	Republic of Korea	48 183 584	N/A	N/A	3 573 849	1 772	1 772	C	-	1 772	25	1 745	51	-	-	-
	Solomon Islands	538 148	532 767	532 767	N/A	245 159	73 512	P+C	212 329	40 682	22 892	12 281	-	0	-	-
	Vanuatu	239 651	237 254	237 254	N/A	48 088	16 831	P+C	41 080	7 798	1 545	2 265	-	4 151	38	1
	Viet Nam	87 848 445	79 063 601	31 625 440	N/A	2 803 918	54 297	P+C	2 767 136	17 515	12 763	4 466	-	36 904	12 234	21

Regional Summary	UN Population	At risk (low + high)	At risk (high)	Number of people living in active foci	Suspected malaria cases	Probable and confirmed malaria cases		Mic. slides/ RDTs taken	Mic. slides/ RDTs positive	*P. falciparum*	*P. vivax*	Imported cases	Cases at community level	Inpatient malaria cases	Malaria attributed deaths
Africa	833 633 324	704 798 234	575 872 867	0	110 824 018	80 394 498		50 411 751	19 875 503	6 281 664	411 319	4 214	3 564 914	5 402 509	147 362
Americas	550 954 958	160 146 741	42 408 236	0	8 796 256	674 991		8 796 256	674 991	117 929	466 814	1	93	7 198	132
Eastern Mediterranean	551 828 503	275 091 162	107 498 668	5 463 286	12 903 379	7 273 574		12 253 865	2 069 595	165 581	212 042	4 595	138 351	126 577	2 200
Europe	277 042 145	0	0	2 846 637	2 237 772	356		2 237 772	356	113	234	179	0	0	0
South-East Asia	1 807 278 478	1 252 518 344	448 720 897	19 868 833	117 239 021	4 417 069		114 638 538	2 440 991	1 105 801	949 284	179	37 532	57 819	2 426
Western Pacific	1 627 004 210	856 331 225	67 399 185	4 333 684	14 184 447	1 506 061		12 747 508	262 079	121 340	49 216	882	174 098	51 196	862
	5 647 741 618	**3 248 885 706**	**1 241 899 853**	**32 512 440**	**266 184 893**	**94 265 103**		**201 085 690**	**25 323 515**	**7 792 428**	**2 088 909**	**10 050**	**3 914 988**	**5 645 299**	**152 982**

Notes:

C=Confirmed
P=Probable
S=Suspected
[1] Morocco and Turkmenistan are certified malaria free countries, but are included in this listing for historical purposes
[2] There is no local malaria transmission

Annex 6B – Malaria trends 1, 1990-2010

WHO region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Africa	Algeria	Probable and confirmed	152	229	106	84	206	107	221	197	0	701	541	435	307	427	163	299	117	288	196	94	408
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	27 733	26 411	18 803	17 059	16 686	18 392	13 869	14 745	11 964	15 635	12 224
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	541	435	307	427	163	299	117	288	196	94	408
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	506	427	299	421	160	297	116	261	193	94	-
	Angola	Probable and confirmed	243 673	1 143 701	782 988	722 981	667 376	156 603	0	893 232	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
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 458 123	2 118 053	2 172 036	1 947 349
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	889 572	1 029 198	1 295 535	1 106 534	1 120 410	1 324 264
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	106 801	506 756	541 291	906 916	639 476
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	53 200	237 950	271 458	453 012	358 606
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benin	Probable and confirmed	92 870	118 796	290 868	403 327	546 827	579 300	623 396	670 857	650 025	709 348	0	717 290	782 818	819 256	853 034	803 462	861 847	1 171 522	1 147 005	1 256 708	1 432 095
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	534 590	-
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	355 007	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Botswana	Probable and confirmed	10 750	14 364	4 995	55 331	29 591	17 599	80 004	101 887	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
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14 200	23 253	17 553	-
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	8 056	4 716	1 588	1 830	3 453	530	2 548	381	914	951	1 046
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	113	941	1 053	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9	13	73	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Burkina Faso	Probable and confirmed	496 513	448 917	420 186	502 275	472 355	501 020	582 658	672 752	721 480	867 866	0	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
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	30 006	32 796	31 256	52 874	73 262	122 047	127 120	138 414	137 632	177 879
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18 256	21 335	44 265	44 246	36 514	59 420	88 540
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	182 658	940 985
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	123 107	715 999
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Burundi	Probable and confirmed	92 870	568 938	773 539	828 429	831 481	932 794	974 226	670 857	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
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	308 095	312 015	327 138	353 459	363 395	327 464	649 756	860 606	690 748	893 314	1 599 908
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	251 925	406 738	330 915	472 341	273 324
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	141 975	241 038	185 993	292 308	163 539
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cameroon	Probable and confirmed	869 048	787 796	664 413	478 693	189 066	784 321	931 311	787 796	664 413	0	0	0	0	0	0	277 413	634 507	604 133	1 650 749	1 883 199	1 845 691
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	313 083	-	-	-
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cape Verde	Probable and confirmed	69	80	38	44	21	127	77	20	41	29	144	107	18	68	45	68	80	18	35	65	47
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	6 843	7 141	8 022	6 001	9 833	7 902	6 979	7 402	7 033	-	-
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	144	107	18	68	45	68	80	18	35	65	47
		RDT Examined	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	1 750	1 500	2 000	21 913	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	15	7	76	20	13	14	17	16	19	-	29
	Central African Republic	Probable and confirmed	174 436	125 038	89 930	82 072	82 057	100 962	95 259	99 718	105 664	127 964	89 614	140 742	0	78 094	129 367	131 856	114 403	119 477	152 260	175 210	66 484
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chad	Probable and confirmed	212 554	246 410	229 444	234 869	278 225	293 564	278 048	343 186	395 205	392 815	431 836	446 289	516 248	496 546	480 957	496 075	233 614	502 236	462 573	182 415	466 034
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	45 283	43 180	44 689	54 381	1 525	37 439	62 895	64 884	64 171	-	-
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	40 078	38 287	43 933	45 195	1 360	31 668	45 155	48 288	47 757	-	-
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	506 000
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Comoros	Probable and confirmed	0	0	0	12 012	13 860	15 707	15 509	0	3 844	9 793	0	0	0	0	43 918	29 554	54 830	53 511	46 426	49 679	47 364
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13 387	87 595
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12 874	6 086	20 559	-	-	5 982	35 199
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5 249
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 339
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Congo	Probable and confirmed	32 428	32 391	21 121	15 504	35 957	28 008	14 000	9 491	17 122	0	0	0	0	0	0	0	157 757	103 213	117 291	92 855	0
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	163 924	203 869	203 160	-
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	103 213	117 291	92 855	-
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Annex 6B – Malaria trends 1, 1990-2010 (continued)

WHO region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Africa	Côte d'Ivoire	Probable and confirmed	511 916	466 895	533 875	421 043	0	755 812	1 109 011	983 089	0	0	0	1 193 288	1 109 751	1 136 810	1 275 138	1 280 914	1 253 408	1 277 670	1 327 520	1 820 000	1 721 461
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19 661	34 755	-
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3 527	7 388	62 726
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Democratic Republic of the Congo	Probable and confirmed	0	0	0	0	0	0	198 064	0	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	7 439 440
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	897	1 531	1 735	2 438	2 684	2 971	2 050	740 615	1 618 091	1 873 816	2 374 930
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2 275	428	12 436	54 728
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	243	127	4 889	42 850
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Equatorial Guinea	Probable and confirmed	25 552	22 398	25 100	17 867	14 827	12 530	0	0	0	0	0	0	0	0	0	0	0	15 828	62 312	78 983	0
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10 752	11 815	15 960	-
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5 842	7 883	11 603	-
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	655	2 572	3 773	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	445	1 620	2 581	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Eritrea	Probable and confirmed	0	0	0	0	0	81 183	129 908	0	255 150	147 062	0	125 746	74 861	65 517	27 783	24 192	10 148	19 568	10 572	21 298	53 750
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	22 637	52 228	52 428	41 361	48 937	46 096	68 905	54 075	68 407	79 024
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	9 716	6 078	10 346	4 119	9 073	6 541	9 528	4 364	6 633	13 894
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7 520	6 566	0	0
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6 037	4 400	5 126	22 088
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Ethiopia	Probable and confirmed	0	0	206 262	305 616	358 469	412 609	478 411	509 804	604 960	647 919	0	2 555 314	2 929 685	3 582 097	5 170 614	3 901 957	3 038 585	2 557 152	2 332 645	3 043 203	4 068 764
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	392 377	427 795	463 797	578 904	538 942	447 780	451 816	458 561	927 992	1 158 197
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	-	-	-	-	262 877	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	108 324	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Gabon	Probable and confirmed	57 450	80 247	100 629	70 928	82 245	54 849	74 310	57 450	80 247	0	127 024	132 918	157 440	166 321	170 182	176 610	33 458	93 529	77 278	112 840	159 313
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100 107	129 513	136 916	142 406	151 137	1 623	30 299
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	50 810	53 167	62 976	58 212	70 075	70 644	33 458	45 186	40 701	660	8 276
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2 059
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	290
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Gambia	Probable and confirmed	222 538	215 414	188 035	0	299 824	135 909	266 189	325 555	0	127 899	0	481 590	620 767	540 165	395 043	329 426	427 598	439 798	508 846	479 409	116 353
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	290 842
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39 164	50 378	52 245
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	123 564
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	64 108
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Ghana	Probable 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	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
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1 100 238	2 431 048	2 031 674
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	475 441	655 093	472 255	476 484	956 359	962 599	1 029 384
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	143 879	468 449	247 278
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	138 124	141 771	42 253
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Guinea	Probable and confirmed	21 762	17 718	0	0	607 560	600 317	772 731	802 210	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
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16 554	21 150	-	-	-
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	4 800	6 238	16 561	107 925	103 089	50 452	41 228	28 646	33 405	20 932	-
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	16 554	21 150	-	20 866	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	12 999	15 872	-	14 909	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Guinea-Bissau	Probable and confirmed	81 835	64 123	56 073	158 748	0	197 386	6 457	10 632	2 113	197 454	246 316	202 379	194 976	162 344	187 910	166 431	128 978	120 105	128 758	143 011	0
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33 721	34 862	34 384	31 083	25 379	-
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14 659	15 120	14 284	11 299	11 757	-
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25 000	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Kenya	Probable and confirmed	0	0	0	0	6 103 447	4 343 190	3 777 022	0	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
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	43 643	96 893	59 995	-	-	-	-	-	2 384 402
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	20 049	39 383	28 328	-	-	-	839 904	-	898 531
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Liberia	Probable and confirmed	0	0	0	0	0	0	239 998	826 151	777 754	0	0	0	0	0	0	44 875	886 543	553 774	606 952	871 560	2 263 973
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8 718	165 095	123 939	238 752	327 392	335 973
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5 025	115 677	80 373	157 920	212 657	212 927
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	57 325	880 952	508 987	635 855	676 569	998 043
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39 850	645 738	411 899	449 032	626 924	709 246
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Annex 6B – Malaria trends 1, 1990-2010 (continued)

WHO region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Africa	Madagascar	Probable and confirmed	0	0	0	0	0	196 358	0	0	0	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
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	31 575	33 354	27 752	37 333	39 174	37 943	29 318	30 921	30 566	23 963	24 393
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	6 946	8 538	5 272	6 909	7 638	6 753	5 689	4 823	4 096	2 720	2 173
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	175 595	299 000	610 035	604 114
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43 674	89 138	212 390	200 277
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Malawi	Probable and confirmed	3 870 904	0	0	4 686 201	4 736 974	0	6 183 290	2 761 269	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
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mali	Probable and confirmed	248 904	282 256	280 562	295 737	263 100	95 357	29 818	384 907	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
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 380 178
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	227 482
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mauritania	Probable and confirmed	26 903	42 112	45 687	43 892	156 080	214 478	181 204	189 571	168 131	253 513	0	243 942	224 614	318 120	224 840	223 472	158 073	222 476	199 791	167 705	238 565
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	31 013	-	835	3 717	5 449
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 061	-	268	603	909
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	720	4 338	2 299
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	34	337	1 085
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mozambique	Probable and confirmed	0	0	0	0	0	0	12 794	0	194 024	2 336 640	0	0	0	0	0	0	0	6 155 082	4 831 491	4 310 086	1 522 577
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 950 933
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	141 663	120 259	93 874	644 568
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2 287 536
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	878 009
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Namibia	Probable and confirmed	0	0	0	380 530	401 519	275 442	345 177	390 601	353 110	429 571	0	538 512	445 803	468 259	610 799	339 204	265 595	172 024	132 130	87 402	25 889
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24 361	16 059	14 522
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	41 636	23 984	20 295	36 043	23 339	27 690	4 242	1 092	505	556
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Niger	Probable and confirmed	1 162 824	808 968	865 976	726 666	806 204	778 175	1 162 824	978 855	872 925	815 895	0	1 340 142	888 345	681 783	754 934	745 428	790 817	249 027	496 858	309 675	620 058
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	81 814	107 092	87 103	1 308 896	2 229 812	2 358 156	165 514
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	56 460	76 030	46 170	-	55 628	62 243	79 066	49 285
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21 230	12 567	1 308 896	530 910	312 802	7 426 774
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9 873	3 956	193 399	434 615	230 609	570 773
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nigeria	Probable and confirmed	1 116 992	909 656	1 219 348	981 943	1 175 004	1 133 926	1 149 435	1 148 542	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	2 989 950	2 834 174	4 295 686	3 873 463
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	150	380	-	-	-	-	-	143 079	335 201	523 513
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	45 924
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	144 644	27 674
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rwanda	Probable and confirmed	1 282 012	1 331 494	1 373 247	733 203	371 550	1 391 931	1 145 759	1 331 494	1 279 581	906 552	0	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
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	423 493	506 028	553 150	589 315	683 769	573 686	382 686	316 242	698 745	638 669
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sao Tome and Principe	Probable and confirmed	0	0	0	0	0	51 938	47 074	47 757	46 026	37 026	32 149	44 034	50 953	47 830	53 991	22 370	7 293	2 421	1 647	3 922	2 262
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	66 076	83 045	93 882	81 372	97 836	68 819	58 672	49 298	38 583	59 228	48 366
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	31 975	42 086	50 586	42 656	46 486	18 139	5 146	2 421	1 647	3 798	2 233
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	140 478	60 649	9 989
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4 611	2 384	507
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Annex 6B – Malaria trends 1, 1990-2010 (continued)

WHO region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Africa	Senegal	Probable and confirmed	0	0	0	0	450 071	628 773	0	861 276	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	0
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	195 487	48 324	43 026	-
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	44 959	14 261	15 261	28 272	23 171	38 746	49 366	78 278	24 830	19 614	-
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90 161	487 188	485 548	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40 054	217 096	146 319	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sierra Leone	Probable and confirmed	0	0	0	0	0	0	7 192	209 312	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
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	4 985	10 605	12 298	4 985	10 605	12 298	-	471 600	770 463	718 473
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	2 206	3 702	3 945	2 206	3 702	3 945	-	154 459	273 149	218 473
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3 452	4 675	-	235 800	544 336	1 609 455
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 106	987	-	154 459	373 659	715 555
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	South Africa	Probable and confirmed	6 822	4 693	2 872	13 285	10 289	8 750	27 035	23 121	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
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	26 506	15 649	13 459	13 399	7 755	12 098	6 327	7 796	-	3 787
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	276 669
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4 273
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3 313	4 185
	Swaziland	Probable and confirmed	0	0	0	0	0	0	38 875	23 754	4 410	30 420	29 374	12 854	10 129	7 203	5 140	6 066	7 807	6 338	5 881	6 639	1 722
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	24 123	13 997	12 564	6 754	4 587	3 985	0	0	0	0
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	1 395	670	342	574	279	155	84	58	106	0
		RDT Examined	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	147
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	147
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Togo	Probable and confirmed	810 509	780 825	634 166	561 328	328 488	0	352 334	366 672	368 472	412 619	0	498 826	583 872	490 256	516 942	437 662	566 450	516 640	602 908	618 842	617 101
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	231 860	321 171	420 053	478 354
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	117 720	152 724	192 966	224 087
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	188 225	318 895	314 250	575 245
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	103 390	192 138	198 372	393 014
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Uganda	Probable and confirmed	0	0	2 446 659	1 470 662	2 191 277	1 431 068	0	2 317 840	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
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	557 159	801 784	879 032	1 104 310	867 398	1 045 378	979 298	1 301 337	1 581 160
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	United Republic of Tanzania	Probable 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	0	423 967	17 734	354 207	332 477	9 044 858	8 852 865	6 193 143	8 343 841	5 755 774	3 808 778	40	0
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	53 533	53 804	123 352	4 350 487	5 579 910	8 037 619	4 167 063	4 661 982	3 843 950	19 328	-
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	17 734	38 537	42 468	1 976 614	2 502 382	2 764 049	1 928 296	1 845 917	67	40	-
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	383	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	United Republic of Tanzania (Mainland)	Probable and confirmed	-	-	-	-	-	-	-	-	-	-	0	324 584	323 495	9 043 732	8 860 139	6 204 125	8 356 525	5 769 353	3 812 283	0	8 748 012
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	71 384	4 296 588	5 528 934	7 993 977	4 136 387	4 638 471	3 830 767	-	5 478 138
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	20 152	25 485	1 960 909	2 490 446	2 756 421	1 926 711	1 845 624	-	-	1 734 737
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2 404 762	0
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	United Republic of Tanzania (Zanzibar)	Probable and confirmed	-	-	-	-	-	-	-	-	-	-	17 734	18 385	16 983	15 705	11 936	7 628	1 585	293	4 585	3 242	2 338
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	53 533	53 804	51 968	53 899	50 976	43 642	30 676	23 511	56 579	60 691	63 949
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	17 734	18 385	16 983	15 705	11 936	7 628	1 585	293	77	211	364
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	173 311	121 248	136 123
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4 508	3 031	1 974
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Zambia	Probable and confirmed	1 933 696	2 340 994	2 953 692	3 514 000	3 514 000	2 742 118	3 215 866	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
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	-
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	-
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Annex 6B – Malaria trends 1, 1990-2010 (continued)

WHO region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Africa	Zimbabwe	Probable and confirmed	662 613	581 168	420 137	877 734	324 188	761 791	1 696 192	1 849 383	1 719 960	1 804 479	0	0	0	0	1 815 470	1 494 518	1 313 458	1 154 519	1 003 846	736 897	648 965
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	215 576	253 280	219 344	234 730	59 132	122 133	0
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33 980	37 908	39 404	116 518	16 394	57 014	0
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	59 132	122 133	513 032
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16 394	57 014	249 379
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Americas	Argentina	Probable and confirmed	1 660	803	643	758	948	1 065	2 048	592	339	222	440	215	125	122	115	252	212	387	106	86	72
		Microscopy examined	22 625	16 844	13 619	11 389	14 070	12 986	12 833	9 684	9 341	8 524	7 949	6 685	5 043	3 977	3 018	3 018	6 353	6 353	5 157	-	2 547
		Confirmed with microscopy	1 660	803	643	758	948	1 065	2 048	592	339	222	440	215	125	122	115	252	212	387	106	86	72
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bahamas	Probable and confirmed	4	3	2	2	0	3	0	8	21	30	2	4	1	3	2	1	49	6	14	-	1
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	22	-	-	34	17	9	546	-	35	-	27 272
		Confirmed with microscopy	4	3	2	2	0	3	0	8	21	30	2	4	1	3	2	1	49	6	14	-	1
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
		Imported cases	4	3	2	2	0	3	0	8	14	21	2	4	1	3	2	1	30	5	2	-	1
	Belize	Probable and confirmed	3 033	3 317	5 341	8 586	10 411	9 413	6 605	4 014	2 614	1 855	1 486	1 162	1 134	1 084	1 066	1 549	844	845	538	256	150
		Microscopy examined	17 204	25 281	24 135	47 742	50 740	37 266	35 113	26 598	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
		Confirmed with microscopy	3 033	3 317	5 341	8 586	10 411	9 413	6 605	4 014	2 614	1 855	1 486	1 162	1 134	1 084	1 066	1 549	844	845	538	256	150
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bolivia (Plurinational State of)	Probable and confirmed	19 680	19 031	24 486	27 475	34 749	46 911	64 012	51 478	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
		Microscopy examined	121 743	125 509	125 414	125 721	128 580	152 748	161 077	141 804	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
		Confirmed with microscopy	19 680	19 031	24 486	27 475	34 749	46 911	64 012	51 478	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
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5 000	6 000	6 000	1 500	5 000	981	7 394
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 300	730	-	-	509	1 517
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-
	Brazil	Probable and confirmed	560 396	614 431	609 860	483 367	564 406	565 727	455 194	405 051	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
		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	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
		Confirmed with microscopy	560 396	614 431	609 860	483 367	564 406	565 727	455 194	405 051	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
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	90 275	0
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Colombia	Probable and confirmed	99 489	184 156	184 023	129 377	127 218	187 082	135 923	180 898	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
		Microscopy examined	496 087	740 938	736 426	656 632	572 924	667 473	461 137	583 309	-	268 355	478 820	747 079	686 635	640 453	562 681	493 562	451 240	564 755	470 381	428 004	521 342
		Confirmed with microscopy	99 489	184 156	184 023	129 377	127 218	187 082	135 923	180 898	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
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25 000	22 754	8 362	6 300
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3 200	1 329	95	13
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	58	-	-
	Costa Rica	Probable and confirmed	1 151	3 273	6 951	5 033	4 445	4 515	5 480	4 712	5 148	3 998	1 879	1 363	1 021	718	1 289	3 541	2 903	1 223	966	262	114
		Microscopy examined	130 530	130 530	149 198	140 435	143 721	143 408	148 161	155 925	103 976	96 454	61 261	43 053	17 738	9 622	9 204	12 767	24 498	22 641	17 304	4 829	15 636
		Confirmed with microscopy	1 151	3 273	6 951	5 033	4 445	4 515	5 480	4 712	5 148	3 998	1 879	1 363	1 021	718	1 289	3 541	2 903	1 223	966	262	114
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dominican Republic	Probable and confirmed	356	377	698	987	1 670	1 808	1 414	816	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
		Microscopy examined	297 599	343 491	299 549	290 073	316 182	380 143	436 473	446 874	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
		Confirmed with microscopy	356	377	698	987	1 670	1 808	1 414	816	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
		RDT Examined	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	26 585
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	932
		Imported cases	-	-	-	-	-	-	-	-	-	-	322	210	507	532	524	1 376	1 031	518	172	-	-
	Ecuador	Probable and confirmed	71 670	59 400	41 089	46 859	30 006	18 128	11 914	16 365	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
		Microscopy examined	363 080	346 465	377 321	419 590	301 546	253 714	162 128	174 692	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
		Confirmed with microscopy	71 670	59 400	41 089	46 859	30 006	18 128	11 914	16 365	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
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2 758	4 992	7 800
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Annex 6B – Malaria trends 1, 1990-2010 (continued)

WHO region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Americas	El Salvador	Probable and confirmed	9 269	5 933	4 539	3 887	2 807	3 362	5 888	2 719	1 182	1 230	745	362	117	85	112	67	49	40	33	20	24
		Microscopy examined	230 246	190 540	202 446	172 624	139 587	169 267	164 491	166 895	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
		Confirmed with microscopy	9 269	5 933	4 539	3 887	2 807	3 362	5 888	2 719	1 182	1 230	745	362	117	85	112	67	49	40	33	20	24
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	12	10	-
	French Guiana	Probable and confirmed	5 909	3 573	4 072	3 974	4 241	4 711	4 724	3 195	3 462	5 307	3 708	3 823	3 661	3 839	3 038	3 414	4 074	4 828	3 320	3 462	1 791
		Microscopy examined	49 192	55 242	56 925	49 993	48 242	52 521	46 780	42 631	-	47 974	48 162	44 718	44 718	32 402	32 402	32 402	32 402	32 402	11 994	20 065	14 373
		Confirmed with microscopy	5 909	3 573	4 072	3 974	4 241	4 711	4 724	3 195	3 462	5 307	3 708	3 823	3 661	3 839	3 038	3 414	4 074	2 797	1 341	1 433	680
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2 031	1 979	2 029	1 111
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Guatemala	Probable and confirmed	41 711	57 829	57 560	41 868	22 057	24 178	20 268	32 099	47 689	45 098	53 311	35 824	35 540	31 127	28 955	39 571	31 093	15 382	7 198	7 080	7 198
		Microscopy examined	305 791	361 743	396 171	276 343	133 611	135 095	97 586	140 113	-	192 710	246 642	198 114	197 113	156 227	148 729	178 726	168 958	129 410	173 678	154 652	235 075
		Confirmed with microscopy	41 711	57 829	57 560	41 868	22 057	24 178	20 268	32 099	47 689	45 098	53 311	35 824	35 540	31 127	28 955	39 571	31 093	15 382	7 198	7 080	7 198
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3 000	2 000	2 000	2 000
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-
	Guyana	Probable and confirmed	22 681	42 204	39 702	33 172	39 566	59 311	34 075	32 103	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
		Microscopy examined	135 260	141 046	159 108	172 469	168 127	291 370	262 526	229 710	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
		Confirmed with microscopy	22 681	42 204	39 702	33 172	39 566	59 311	34 075	32 103	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
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	41	-	-
	Haiti	Probable and confirmed	4 806	25 511	13 457	853	23 140	-	18 877	5 870	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
		Microscopy examined	13 743	81 763	37 957	10 045	54 973	-	69 853	35 132	-	-	21 190	51 067	51 067	51 067	30 440	3 541 506	87 951	142 518	168 950	270 438	270 427
		Confirmed with microscopy	4 806	25 511	13 457	853	23 140	-	18 877	5 870	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
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	5	-	-
	Honduras	Probable and confirmed	53 099	73 352	70 838	51 977	61 736	74 346	91 799	67 870	44 337	51 911	35 125	24 149	17 223	14 123	17 293	16 008	11 880	10 512	8 368	9 313	9 629
		Microscopy examined	418 513	468 811	471 950	372 180	361 776	373 364	305 167	310 815	249 105	250 411	175 577	174 430	178 616	136 991	145 070	153 476	124 936	130 255	119 484	108 522	145 607
		Confirmed with microscopy	53 099	73 352	70 838	51 977	61 736	74 346	91 799	67 870	44 337	51 911	35 125	24 149	17 223	14 123	17 293	16 008	11 880	10 512	8 368	9 313	9 629
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2 500	2 500	-	0	4 000	4 000
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	57	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Jamaica	Probable and confirmed	0	3	6	6	3	5	14	4	3	5	7	6	7	9	141	88	194	199	22	22	-
		Microscopy examined	281	-	-	-	-	-	206	110	207	219	874	596	725	394	3 879	2 470	6 821	-	30 732	34 149	-
		Confirmed with microscopy	0	3	6	6	3	5	14	4	3	5	7	6	7	9	141	88	194	199	22	22	-
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	0	3	6	6	3	5	14	4	3	5	7	6	7	9	141	88	8	8	4	7	-
	Mexico	Probable and confirmed	44 513	26 565	16 170	15 793	12 864	7 423	6 293	5 046	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
		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	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
		Confirmed with microscopy	44 513	26 565	16 170	15 793	12 864	7 423	6 293	5 046	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
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 441	-	-
	Nicaragua	Probable and confirmed	35 785	27 653	26 866	44 037	41 490	69 444	75 606	51 858	34 108	38 294	23 878	10 482	7 695	6 717	6 897	6 642	3 114	1 356	762	610	692
		Microscopy examined	466 558	364 786	381 715	440 891	374 348	493 399	461 989	410 132	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
		Confirmed with microscopy	35 785	27 653	26 866	44 037	41 490	69 444	75 606	51 858	34 108	38 294	23 878	10 482	7 695	6 717	6 897	6 642	3 114	1 356	762	610	692
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11 563	16 173	10 000	9 000	18 500
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Panama	Probable and confirmed	381	1 115	727	481	735	730	476	505	1 039	936	1 036	928	2 244	4 500	5 095	3 667	1 663	1 281	744	778	418
		Microscopy examined	315 359	336 569	308 359	278 557	237 992	222 498	188 914	193 853	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
		Confirmed with microscopy	381	1 115	727	481	735	730	476	505	1 039	936	1 036	928	2 244	4 500	5 095	3 667	1 663	1 281	744	778	418
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0
		Imported cases	-	-	-	147	130	10	-	-	-	6	23	22	-	26	26	20	12	16	12	8	-

Annex 6B – Malaria trends 1, 1990-2010 (continued)

WHO region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Americas	Paraguay	Probable and confirmed	2 912	2 983	1 289	436	583	898	637	567	2 091	9 946	6 853	2 710	2 778	1 392	694	376	823	1 341	348	91	27
		Microscopy examined	98 417	127 807	149 523	164 146	96 885	86 664	68 151	83 104	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
		Confirmed with microscopy	2 912	2 983	1 289	436	583	898	637	567	2 091	9 946	6 853	2 710	2 778	1 392	694	376	823	1 341	341	91	27
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1 997	0	0
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	7	0	0
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Peru	Probable and confirmed	28 882	33 705	54 922	95 222	122 039	190 521	211 561	180 338	247 229	161 292	68 321	78 544	99 237	88 408	93 581	87 699	64 925	50 797	42 214	36 886	29 276
		Microscopy examined	90 040	109 654	123 147	158 325	295 824	833 614	1 162 230	1 299 929	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	892 990	989 842
		Confirmed with microscopy	28 882	33 705	54 922	95 222	122 039	190 521	211 561	180 338	247 229	161 292	68 321	78 544	99 237	88 408	93 581	87 699	64 925	50 797	42 214	36 886	29 276
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	64 953	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Suriname	Probable and confirmed	1 608	1 490	1 404	6 107	4 704	6 606	16 649	11 323	12 412	13 939	11 361	16 003	12 837	10 982	8 378	9 131	3 289	1 741	2 709	1 371	791
		Microscopy examined	18 594	18 399	13 765	26 079	29 148	38 613	68 674	94 508	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
		Confirmed with microscopy	1 608	1 490	1 404	6 107	4 704	6 606	16 649	11 323	12 412	13 939	11 361	16 003	12 837	10 982	8 378	9 131	3 289	1 104	2 086	689	544
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2 224	1 774	1 838	828
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	637	623	682	247
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 025	-
	Venezuela (Bolivarian Republic of)	Probable and confirmed	46 679	42 826	21 416	12 539	16 311	22 501	21 852	22 400	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
		Microscopy examined	361 194	375 473	336 571	290 483	210 890	302 487	285 326	271 989	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
		Confirmed with microscopy	46 679	42 826	21 416	12 539	16 311	22 501	21 852	22 400	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
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4 141	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	506	554	728	-
Eastern Mediterranean	Afghanistan	Probable and confirmed	317 479	297 605	-	123 425	88 302	186 912	303 955	202 767	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
		Microscopy examined	735 624	768 685	-	431 353	626 338	602 320	364 948	527 181	-	463 032	257 429	-	-	-	148 946	338 253	460 908	504 856	549 494	521 817	524 523
		Confirmed with microscopy	317 479	297 605	-	123 425	31 606	186 912	78 279	189 898	272 115	162 531	94 475	-	415 356	360 940	242 022	116 444	86 129	92 202	81 574	64 880	69 397
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Djibouti	Probable and confirmed	3 237	7 338	7 468	4 166	6 140	5 982	6 105	4 314	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
		Microscopy examined	11 463	26 758	28 636	-	25 366	-	-	-	-	-	-	-	-	-	-	1 913	-	3 461	2 896	-	-
		Confirmed with microscopy	3 237	7 335	7 468	-	6 140	-	-	4 314	-	-	-	-	-	5 036	122	413	1 796	210	119	2 686	1 019
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eastern Mediterranean	Egypt[2]	Probable and confirmed	75	24	16	17	527	322	25	11	13	61	17	11	10	45	43	23	29	30	80	94	85
		Microscopy examined	1 145 251	1 213 769	1 183 608	562 096	1 052 433	-	1 090 924	1 052 658	-	-	1 155 904	1 357 223	1 041 767	-	-	-	-	23 402	34 880	41 344	664 294
		Confirmed with microscopy	75	24	16	17	495	-	23	11	13	61	17	11	10	45	43	23	29	30	80	94	85
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	0	0	0	0	32	9	2	7	13	61	17	11	10	45	43	23	29	30	80	94	85
	Iran (Islamic Republic of)	Probable and confirmed	77 470	96 340	76 971	64 581	51 089	67 532	56 362	38 684	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
		Microscopy examined	2 226 412	2 699 845	3 227 770	3 959 288	4 074 869	-	3 556 000	3 244 334	-	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
		Confirmed with microscopy	77 470	96 340	76 971	64 581	51 089	67 532	56 362	38 677	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
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	6 701	8 431	12 024	8 162	7 052	-	-	18 852	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
	Iraq	Probable and confirmed	3 924	1 764	5 752	49 863	98 243	98 705	49 840	13 959	9 684	4 138	1 860	1 265	952	347	155	47	24	3	6	1	7
		Microscopy examined	-	941 988	1 166 378	-	1 553 231	-	1 650 864	1 480 948	-	-	-	997 812	1 072 587	681 070	913 400	944 163	970 000	844 859	1 105 054	1 493 143	1 849 930
		Confirmed with microscopy	3 924	1 764	5 752	-	98 243	-	31 737	9 594	9 684	4 138	1 860	1 265	952	347	155	47	24	3	6	1	7
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10 824	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-
		Imported cases	-	20	42	-	21	6	4	29	-	-	-	-	-	3	5	3	1	1	4	1	7
	Morocco[3]	Probable and confirmed	837	494	405	198	206	197	102	125	121	60	59	59	107	73	56	100	83	75	142	145	218
		Microscopy examined	1 347 400	982 321	898 625	761 837	724 364	1 047 890	461 605	461 802	421 946	376 920	277 671	335 723	345 173	405 800	405 601	-	-	367 705	292 826	290 566	232 598
		Confirmed with microscopy	837	494	405	198	206	197	102	125	121	60	56	59	107	73	56	100	83	75	142	145	218
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	51	89	54	63	50	31	49	49	53	43	56	59	88	69	55	100	83	75	142	145	215

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WHO region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Eastern Mediterranean	Oman[2]	Probable and confirmed	32 720	19 274	14 827	16 873	7 215	1 801	1 265	1 026	1 093	901	694	635	590	740	615	544	443	705	965	898	1 193
		Microscopy examined	270 748	250 447	211 887	251 630	295 194	464 091	531 123	485 184	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
		Confirmed with microscopy	32 720	19 274	14 827	16 873	7 215	1 801	1 265	1 026	1 093	901	694	635	590	740	615	544	443	705	965	898	1 193
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	2 800	637	662	897	979	872	688	633	584	734	615	544	443	701	957	898	1 169
	Pakistan	Probable and confirmed	79 689	66 586	99 015	92 634	108 586	111 836	98 035	77 480	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
		Microscopy examined	2 608 398	271 586	2 668 997	2 615 771	2 796 528	-	2 711 179	2 914 056	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	4 281 346
		Confirmed with microscopy	79 689	66 586	99 015	92 634	108 586	111 836	98 035	77 480	73 516	91 774	82 526	125 292	107 666	125 152	126 719	127 826	124 910	128 570	104 454	132 688	220 870
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	243 521	279 724
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	34 891	19 721
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	2 592	1 101	290	1 149	190	120	-	-
	Saudi Arabia	Probable and confirmed	15 666	9 962	19 623	18 380	10 032	18 751	21 007	20 631	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
		Microscopy examined	682 649	570 551	601 847	-	697 960	727 703	-	-	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
		Confirmed with microscopy	15 666	9 962	19 623	18 380	10 032	18 751	21 007	20 631	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
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	634	830	1 204	-	3 405	3 089	5 786	2 939	4 657	3 067	1 872	1 471	1 402	1 024	924	855	1 008	2 397	1 430	2 275	1 912
	Somalia	Probable and confirmed	-	-	-	3 049	-	-	-	-	-	9 055	10 364	10 364	96 922	23 349	36 732	28 404	49 092	50 444	82 980	72 362	24 553
		Microscopy examined	-	-	-	6 467	-	-	-	-	-	-	-	-	21 350	12 578	30 127	47 882	-	-	73 985	59 181	20 593
		Confirmed with microscopy	-	-	-	3 049	-	-	-	-	-	-	-	-	15 732	7 571	11 436	12 516	16 430	16 675	36 905	25 202	5 629
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200 105
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18 924
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sudan																						
	North (low transmission)[3]	Probable 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	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
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2 243 981	2 050 354	2 791 156	-
		Confirmed with microscopy	330 136	321 969	1 167 847	923 374	664 491	656 978	30 217	446 949	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
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 653 300
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	95 192
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	South (high transmission)	Probable and confirmed	-	-	-	-	-	-	-	-	-	-	-	237 712	462 056	646 673	515 958	337 582	116 473	101 008	136 492	325 634	900 283
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	116 555	-	-
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	52 011	-	900 283
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Syrian Arab Republic[2]	Probable and confirmed	107	54	456	966	583	626	345	130	60	43	42	79	27	24	13	28	34	37	51	39	23
		Microscopy examined	-	-	-	-	97 436	-	84 496	68 154	-	-	-	-	-	-	-	-	-	68 000	-	25 751	19 151
		Confirmed with microscopy	107	54	456	966	583	626	345	130	60	43	42	79	27	24	13	28	34	37	51	39	23
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	39	43	37	-	49	44	65	47	46	38	36	16	12	22	12	28	34	37	51	39	23
	Yemen	Probable and confirmed	11 384	12 717	29 320	31 262	37 201	500 000	416 246	1 394 495	-	2 781 640	1 394 495	-	187 159	265 032	158 561	200 560	217 270	223 299	158 608	138 579	198 963
		Microscopy examined	80 986	103 700	126 580	172 403	160 687	-	-	7 821 530	-	-	-	-	556 143	398 472	501 747	472 970	799 747	585 015	781 318	797 621	645 463
		Confirmed with microscopy	11 384	12 717	29 320	31 262	37 201	500 000	416 246	682 153	-	2 781 640	1 394 495	-	75 508	50 811	48 756	44 150	55 000	67 607	43 545	53 445	78 269
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	303	5 015	18 566	97 289
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	70	661	2 001	28 428
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Europe	Armenia	Probable and confirmed	0	0	0	0	196	502	347	841	1 156	616	141	79	52	29	47	7	0	1	1	0	1
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	356	174	165	126	220	209	230	658	30 761	31 467	31 026
		Confirmed with microscopy	0	0	0	0	196	502	347	841	1 156	616	141	79	52	29	47	7	0	1	1	0	1
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
		Imported cases	0	0	0	-	195	502	198	274	614	287	85	48	36	21	41	4	0	1	1	0	1
	Azerbaijan	Probable and confirmed	24	113	27	23	667	2 840	13 135	9 911	5 175	2 315	1 526	1 058	506	482	386	242	143	110	73	80	52
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	527 688	536 260	507 252	536 822	545 145	515 144	498 697	465 033	408 780	451 436	456 652
		Confirmed with microscopy	24	113	27	23	667	2 840	13 135	9 911	5 175	2 315	1 526	1 058	506	482	386	242	143	110	73	80	52
		RDT Examined	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	-	-
		Confirmed with RDT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
		Imported cases	-	-	-	-	-	-	-	-	0	4	0	3	1	2	0	0	2	2	1	2	2
	Georgia	Probable and confirmed	1	2	1	0	1	1	7	1	16	51	245	438	474	316	257	155	60	25	8	7	0
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	173	3 574	6 145	5 457	3 365	5 169	4 400	3 400	4 398	4 120	2 368
		Confirmed with microscopy	1	2	1	0	1	1	7	1	16	51	245	438	474	316	257	155	60	25	8	7	0
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
		Imported cases	1	2	1	0	1	1	4	1	2	16	1	1	1	8	3	1	2	1	2	6	0

Annex 6B – Malaria trends 1, 1990-2010 (continued)

WHO region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Europe	Kyrgyzstan	Probable and confirmed	1	1	2	0	6	3	26	13	11	5	12	28	2 743	468	93	226	318	96	18	4	6
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	70 500	72 020	69 807	144 070	79 895	114 316	74 729	62 444	40 833	33 983	30 190
		Confirmed with microscopy	1	1	2	0	6	3	26	13	11	5	12	28	2 743	468	93	226	318	96	18	4	6
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
		Imported cases	1	1	2	0	6	3	25	13	6	5	5	13	31	3	2	0	4	0	0	0	3
	Russian Federation	Probable and confirmed	216	169	160	209	335	425	611	831	1 081	792	795	898	642	533	382	205	143	122	96	107	102
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35 784	28 340	27 382	33 024
		Confirmed with microscopy	216	169	160	209	335	425	611	831	1 081	792	795	898	642	533	382	205	143	122	96	107	102
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
		Imported cases	209	169	160	195	359	421	601	798	1 018	715	752	764	503	461	382	165	132	112	88	107	101
	Tajikistan	Probable and confirmed	0	0	0	0	0	0	0	0	0	0	19 064	11 387	6 160	5 428	3 588	2 309	1 344	635	318	165	112
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	233 785	248 565	244 632	296 123	272 743	216 197	175 894	159 232	158 068	165 266	173 523
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	19 064	11 387	6 160	5 428	3 588	2 309	1 344	635	318	165	112
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	1	1	0	4	1	1
	Turkey	Probable and confirmed	0	0	0	0	0	0	0	0	0	0	11 432	10 812	10 224	9 222	5 302	2 084	796	358	215	84	78
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	11 432	10 812	10 224	9 222	5 302	2 084	796	358	215	84	78
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	-
		Imported cases	5	5	11	4	24	342	250	80	62	55	51	54	40	40	50	48	45	45	49	46	69
	Turkmenistan[1]	Probable and confirmed	1	17	11	3	9	10	14	14	137	49	24	8	18	7	3	1	1	0	1	0	0
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	50 105	50 075	59 834	72 643	71 377	56 982	58 673	65 666	75 524	94 237	81 784
		Confirmed with microscopy	1	17	11	3	9	10	14	14	137	49	24	8	18	7	3	1	1	0	1	0	0
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	1	4	6	2	8	10	11	10	22	39	6	3	3	1	0	0	1	0	1	0	0
	Uzbekistan	Probable and confirmed	28	12	25	36	21	27	51	52	74	85	126	77	74	74	66	102	76	89	27	4	5
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	735 164	691 500	735 164	812 543	893 187	917 843	924 534	858 968	883 807	916 839	921 364
		Confirmed with microscopy	28	12	25	36	21	27	51	52	74	85	126	77	74	74	66	102	76	89	27	4	5
		RDT Examined	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	-
		Imported cases	25	11	25	36	21	27	51	52	74	78	80	68	63	41	35	38	16	59	20	4	2
South-East Asia	Bangladesh	Probable and confirmed	53 875	63 578	115 660	125 402	166 564	152 729	100 864	68 594	437 928	386 153	437 838	320 010	313 859	489 377	386 555	290 418	164 159	59 866	168 885	79 853	55 873
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	250 258	275 987	245 258	185 215	220 025	209 991	266 938	336 505	397 148	461 262
		Confirmed with microscopy	53 875	63 575	115 660	125 402	166 564	152 729	100 783	68 594	60 023	63 723	55 599	54 216	62 269	54 654	58 894	48 121	32 857	58 659	50 004	25 203	55 873
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3 199	106 001	156 639	152 936
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 207	34 686	38 670	35 354
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bhutan	Probable and confirmed	9 497	22 126	28 900	28 116	39 852	23 188	15 696	9 029	7 693	12 237	5 935	5 982	6 511	3 806	2 670	1 825	1 868	793	450	1 421	487
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	76 445	65 974	74 696	61 246	54 892	60 152	66 079	51 446	47 268	62 341	54 709
		Confirmed with microscopy	33 973	67 699	73 986	78 260	97 415	83 889	76 019	68 153	62 033	77 461	76 445	5 982	6 511	3 806	2 670	1 825	1 868	793	329	972	436
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	1 241
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	90
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Democratic People's Republic of Korea	Probable and confirmed	0	0	0	0	0	0	0	0	1 085	7 980	204 428	300 000	241 192	60 559	33 803	11 507	9 353	4 795	16 989	14 845	13 520
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	143 674	129 889	32 083	-	-	-	7 985	24 299	34 818	25 147
		Confirmed with microscopy	-	-	-	-	-	-	-	-	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
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	450	853	523	127
	India	Probable 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	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	1 563 344	1 599 986
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	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	94 295 721	108 679 429
		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	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	1 563 344	1 599 986
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8 500 000	9 000 000	9 100 000	10 600 000
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Indonesia	Probable 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	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
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	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	903 608
		Confirmed with microscopy	175 049	140 352	110 004	146 339	146 376	143 363	179 878	131 084	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
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19 164	12 990	-	462 249	1 040 633	260 798
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	72 914	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Myanmar	Probable and confirmed	989 042	939 257	789 672	702 239	701 043	656 547	664 507	568 262	548 066	592 431	592 354	663 804	722 058	713 215	602 763	516 041	538 110	520 887	634 280	591 492	649 522
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	21 749	35 783	35 030	35 151	34 045	37 014	50 667	512 862	499 296	386 689	275 374
		Confirmed with microscopy	133 049	126 967	125 710	117 068	111 672	100 448	96 203	112 500	104 753	121 031	120 029	170 502	174 101	174 733	155 668	167 467	203 071	216 510	223 174	164 965	103 285
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	499 725	543 941	553 361	729 878
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	157 448	223 899	271 103	317 523
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Annex 6B – Malaria trends 1, 1990-2010 (continued)

WHO region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
South-East Asia	Nepal	Probable and confirmed	22 856	29 135	23 234	16 380	9 442	9 718	6 628	8 957	8 498	9 699	48 686	146 351	133 431	196 605	140 687	178 056	166 474	135 809	153 331	123 903	96 383
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	156 370	126 962	183 519	196 223	158 044	188 930	166 476	135 809	153 331	150 230	102 977
		Confirmed with microscopy	22 856	29 135	23 234	16 380	9 884	9 712	9 020	6 559	8 895	9 699	7 981	6 396	12 750	9 506	4 895	5 050	4 969	5 621	3 888	3 335	3 115
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17 887
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	779
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	1 198	1 280	1 132	805	641	618	880	660	610	-
	Sri Lanka	Probable and confirmed	287 384	400 263	399 349	363 197	273 502	142 294	184 319	218 550	211 691	264 549	210 039	66 522	41 411	10 510	3 720	1 640	591	198	670	558	684
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	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
		Confirmed with microscopy	287 384	400 263	399 349	363 197	273 502	142 294	184 319	218 550	211 691	264 549	210 039	66 522	41 411	10 510	3 720	1 640	591	198	670	558	684
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21	27	52
	Thailand	Probable and confirmed	273 880	198 383	168 370	115 220	102 119	82 743	87 622	97 540	131 055	125 379	78 561	63 528	44 555	37 355	26 690	29 782	30 294	33 178	26 150	29 462	32 480
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	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
		Confirmed with microscopy	273 880	198 383	168 370	115 220	102 119	82 743	87 622	97 540	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
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20 786	68 437	81 997
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2 419	6 135	9 511
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Timor-Leste	Probable and confirmed	0	0	0	0	0	0	0	0	10 332	0	15 212	83 049	86 684	33 411	202 662	130 679	164 413	121 905	143 594	108 434	119 072
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	60 311	83 785	79 459	97 781	96 485	114 283	92 870	96 828	109 806
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	15 212	-	26 651	33 411	39 164	43 093	37 896	46 869	45 973	41 824	40 250
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32 027	30 134	41 132	85 643
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5 944	5 287	5 703	7 887
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Western Pacific	Cambodia	Probable and confirmed	123 796	102 930	91 000	99 200	85 012	76 923	74 883	88 029	58 874	64 679	203 164	110 161	100 194	119 712	91 855	67 036	89 109	59 848	58 887	83 777	47 910
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	122 555	121 691	108 967	106 330	99 593	88 991	94 460	135 731	130 995	96 886	90 175
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	51 320	42 150	38 048	42 234	37 389	26 914	33 010	22 081	20 347	24 999	14 277
		RDT Examined	-	-	-	-	-	-	-	-	-	-	18 167	23 928	24 954	54 024	51 359	58 791	102 590	46 989	51 036	94 788	103 035
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	11 122	11 451	8 854	29 031	22 356	22 522	45 686	20 437	21 777	39 596	35 079
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	China	Probable and confirmed	117 359	101 600	74 000	59 000	62 000	47 118	33 382	26 800	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
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	21 237	25 520	28 491	27 197	21 936	35 383	29 304	16 650	9 287	4 990
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	556	621	1 714	2 632	2 097	1 192	780	-	-
	Lao People's Democratic Republic	Probable and confirmed	22 044	41 048	38 500	41 787	52 601	52 021	77 894	72 190	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
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	256 273	226 399	245 916	256 534	181 259	156 954	113 165	159 002	168 027	173 459	150 512
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	40 106	27 076	21 420	18 894	16 183	13 615	8 093	6 371	4 965	5 508	4 524
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	95 676	113 694	143 368	84 511	127 790
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10 289	11 087	14 382	9 166	16 276
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Malaysia	Probable and confirmed	50 500	39 189	36 853	39 890	58 958	59 208	51 921	26 649	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
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	12 705	12 780	11 019	6 338	6 154	5 569	5 294	5 456	7 390	7 010	6 650
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	2 002	1 224	1 038	868	788	588	697	829	873	584	831
	Papua New Guinea	Probable and confirmed	104 900	86 500	86 500	66 797	65 000	99 000	71 013	38 105	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
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	225 535	254 266	227 387	205 103	222 903	267 132	223 464	239 956	240 686	128 335	198 742
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	79 839	94 484	75 748	72 620	91 055	92 957	88 817	82 979	81 657	62 845	75 985
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10 756	7 643	5 955	25 150	20 820
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5 121	3 976	2 795	14 913	17 971
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Philippines	Probable and confirmed	86 200	86 400	95 778	64 944	61 959	56 852	40 545	42 005	50 709	37 061	36 596	34 968	37 005	48 441	50 850	46 342	35 405	36 235	23 655	19 198	18 560
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	444 668	418 182	377 340	526 874	446 104	581 871	378 535	403 415	278 652	352 006	301 031
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	36 596	34 787	37 005	48 441	50 850	46 342	35 405	36 235	23 655	19 316	18 560
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12 125	18 171	4 839	0	0	0
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	-	-
	Republic of Korea	Probable and confirmed	0	0	0	1	20	107	396	1 724	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
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	4 183	2 556	1 799	1 171	864	1 369	2 051	2 227	1 052	-	-
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	4 183	2 556	1 799	1 171	864	1 369	2 051	2 227	1 052	1 345	1 772
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	41	68	36	64	38	45	30	35	29	26	51
	Solomon Islands	Probable and confirmed	116 500	141 400	153 359	126 123	131 687	118 521	84 795	68 125	72 808	63 169	368 913	373 838	353 114	208 364	412 251	393 288	403 892	150 126	102 140	84 078	73 512
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	300 806	297 345	278 178	300 591	321 954	316 898	328 555	311 447	276 639	231 221	212 329
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	68 107	76 493	74 936	92 227	90 297	76 390	75 337	65 404	40 535	33 002	35 373
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	5 309
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Annex 6B – Malaria trends 1, 1990-2010 (continued)

WHO region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Western Pacific	Vanuatu	Probable and confirmed	28 805	19 466	13 330	10 469	3 771	8 318	5 654	6 099	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
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	31 668	36 576	54 234	54 524	53 524	61 092	40 625	38 214	30 267	22 559	29 180
		Confirmed with microscopy	28 805	19 466	13 330	10 469	3 771	8 318	5 654	6 099	6 181	5 152	6 768	7 647	14 339	15 240	14 653	9 834	8 055	5 471	3 473	3 341	4 017
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	2 065	11 900
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	574	3 781
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Viet Nam	Probable and confirmed	123 796	187 994	225 928	156 069	140 120	100 116	84 625	65 859	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
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	74 316	68 699	47 807	38 790	24 909	19 496	22 637	16 389	11 355	16 130	17 515
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	10 000	94 000	0	-	0	130 000	78 294	72 087	44 647	7 017
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Regional Summary (Probable and confimed malaria cases)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Africa	26 423 044	21 524 328	23 778 419	29 069 453	34 991 437	24 080 358	33 400 812	24 008 655	26 576 925	35 387 501	32 142 112	43 419 885	45 652 163	73 138 505	78 164 831	74 415 183	79 231 105	77 776 098	63 931 647	69 642 417	80 394 498
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	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	566 145	674 991
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	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
Europe	271	314	226	271	1 235	3 808	14 191	11 663	7 650	3 913	33 365	24 785	20 893	16 559	10 124	5 331	2 881	1 436	757	451	356
South-East Asia	5 139 813	5 401 912	5 082 295	4 895 358	5 502 015	5 565 875	5 842 511	4 956 622	5 287 116	4 926 354	5 057 021	6 511 207	5 846 967	5 968 464	6 331 175	4 422 348	4 180 952	3 526 781	3 422 966	3 057 782	4 417 069
Western Pacific	773 900	806 527	815 248	664 280	661 128	618 184	525 108	435 585	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	1 659 931	1 504 615
Total	41 443 994	36 422 559	40 443 046	45 915 350	51 252 273	38 906 720	46 522 310	36 311 438	39 055 393	49 404 809	50 546 248	61 499 398	63 499 601	91 210 621	93 108 902	89 726 260	93 903 468	92 487 844	78 382 640	82 469 568	94 265 103

Notes:

Cases reported before 2000 can be probable and confirmed or only confirmed cases depending on the country.

[1] Morocco and Turkmenistan are certified malaria free countries, but are included in this listing for historical purposes

[2] There no local transmission in these countries

[3] Data before 2001 including data from Pacific Islands transmitting
There is no local malaria transmission in these countries [1])

Annex 6C – Malaria trends 2, 1990-2010

WHO region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Africa	Algeria	Suspected	-	-	-	-	-	-	-	-	-	-	27 733	26 411	18 803	17 059	16 686	18 392	13 869	14 745	11 964	15 635	12 224
		No Pf	-	-	-	-	-	-	-	-	-	-	261	247	188	313	71	242	91	261	185	88	401
		No Pv	-	-	-	-	-	-	-	-	-	-	277	181	116	111	92	57	24	24	10	6	4
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	3
	Angola	Suspected	243 673	1 143 701	782 988	722 981	667 376	156 603	-	893 232	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
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benin	Suspected	92 870	118 796	290 868	403 327	546 827	579 300	623 396	670 857	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
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	534 590	-
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-
	Botswana	Suspected	10 750	14 364	4 995	55 331	29 591	17 599	80 004	101 887	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
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	381	914	951	1 046
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Burkina Faso	Suspected	496 513	448 917	420 186	502 275	472 355	501 020	582 658	672 752	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
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Burundi	Suspected	92 870	568 938	773 539	828 429	831 481	932 794	974 226	670 857	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
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cameroon	Suspected	869 048	787 796	664 413	478 693	189 066	784 321	931 311	787 796	664 413	-	-	-	-	-	-	277 413	634 507	604 153	1 650 749	1 883 199	1 845 691
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cape Verde	Suspected	69	80	38	44	21	127	77	20	41	29	6 843	7 141	8 022	6 001	9 833	7 902	8 729	8 902	9 033	21 913	47
		No Pf	-	-	-	-	-	-	-	-	-	-	144	107	18	68	45	68	80	18	35	65	-
		No Pv	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	-
	Central African Republic	Suspected	174 436	125 038	89 930	82 072	82 057	100 962	95 259	99 718	105 664	127 964	89 614	140 742	-	78 094	129 367	131 856	114 403	119 477	152 260	175 210	66 484
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chad	Suspected	212 554	246 410	229 444	234 869	278 225	293 564	278 048	343 186	395 205	392 815	437 041	451 182	517 004	505 732	481 122	501 846	251 354	518 832	478 987	182 415	506 000
		No Pf	-	-	-	-	-	-	-	-	-	-	20 977	19 520	21 959	21 532	665	14 770	21 354	24 282	24 015	-	-
		No Pv	-	-	-	-	-	-	-	-	-	-	19 101	18 767	21 974	23 663	695	16 898	23 801	24 006	23 742	-	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Comoros	Suspected	-	-	-	12 012	13 860	15 707	15 509	-	3 844	9 793	-	-	-	-	43 918	29 554	54 830	53 511	46 426	57 084	103 670
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5 771	33 791
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	79	528
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	132	880
	Congo	Suspected	32 428	32 391	21 121	15 504	35 957	28 008	14 000	9 491	17 122	-	-	-	-	-	-	-	157 757	163 924	203 869	203 160	-
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	103 213	117 291	92 855	-
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	-
	Côte d'Ivoire	Suspected	511 916	466 895	553 875	421 043	-	755 812	1 109 011	983 089	-	-	-	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
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Democratic Republic of the Congo	Suspected	-	-	-	-	-	-	198 064	-	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	8 755 237
		No Pf	-	-	-	-	-	-	-	-	-	-	889	1 517	1 727	2 418	2 659	2 844	2 043	1 642	1 196	-	-
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	6	7	110	3	7	27	-	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Annex 6C – Malaria trends 2, 1990-2010 (continued)

WHO region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Africa	Equatorial Guinea	Suspected	25 552	22 598	25 100	17 867	14 827	12 530	-	-	-	-	-	-	-	-	-	-	-	20 948	67 196	84 532	-
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5 842	7 883	11 603	-
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Eritrea	Suspected	0	0	0	0	0	81 183	129 908	0	255 150	147 062	0	138 667	121 011	107 599	65 025	64 056	49 703	80 428	62 449	77 946	96 792
		No Pf	-	-	-	-	-	-	-	-	-	-	-	8 994	5 335	8 998	3 480	7 506	5 750	3 006	1 519	3 358	9 785
		No Pv	-	-	-	-	-	-	-	-	-	-	-	722	743	1 348	639	1 567	791	6 508	2 832	3 244	3 989
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	57
	Ethiopia	Suspected	0	0	206 262	305 616	358 469	412 609	478 411	509 804	604 960	647 919	0	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
		No Pf	-	-	-	-	-	-	-	-	-	-	-	233 218	262 623	291 403	396 621	374 335	293 326	269 514	274 657	594 751	732 776
		No Pv	-	-	-	-	-	-	-	-	-	-	-	157 625	164 772	171 388	178 676	158 658	149 020	171 710	173 300	287 114	390 252
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0
	Gabon	Suspected	57 450	80 247	100 629	70 928	82 245	54 849	74 310	57 450	80 247	-	127 024	132 918	157 440	166 321	200 214	235 479	136 916	190 749	187 714	113 803	183 105
		No Pf	-	-	-	-	-	-	-	-	-	-	50 810	53 167	62 976	58 212	70 075	70 644	33 458	45 186	40 701	187	2 157
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23	720
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	2 015
	Gambia	Suspected	222 538	215 414	188 035	-	299 824	135 909	266 189	325 555	-	127 899	-	481 590	620 767	540 165	395 043	329 426	427 598	439 798	508 846	479 409	414 406
		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	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
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	457 424	918 105	924 095	926 447
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19 060	38 254	38 504	102 937
	Guinea	Suspected	21 762	17 718	-	-	607 560	600 317	772 731	802 210	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
		No Pf	-	-	-	-	-	-	-	-	-	-	4 800	6 238	16 561	4 378	103 069	50 452	41 228	28 646	33 405	20 932	-
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Guinea-Bissau	Suspected	81 835	64 123	56 073	158 748	-	197 386	6 457	10 632	2 113	197 454	246 316	202 379	194 976	162 344	187 910	185 493	148 720	140 205	148 542	156 633	-
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Kenya	Suspected	-	-	-	-	6 103 447	4 343 190	3 777 022	-	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
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	39 383	28 328	-	-	-	839 904	-	898 531
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Liberia	Suspected	-	-	-	-	-	-	239 998	826 151	777 754	-	-	-	-	-	-	66 043	1 171 175	694 428	874 607	1 035 940	2 675 816
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	44 875	761 095	80 373	157 920	212 657	212 927
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0
	Madagascar	Suspected	-	-	-	-	-	196 358	-	-	-	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
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Malawi	Suspected	3 870 904	-	-	4 686 201	4 736 974	-	6 183 290	2 761 269	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
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mali	Suspected	248 904	282 256	280 562	295 737	263 100	95 357	29 818	384 907	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
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mauritania	Suspected	26 903	42 112	45 687	43 892	156 080	214 478	181 204	189 571	168 131	253 513	-	243 942	224 614	318 120	224 840	223 472	188 025	222 476	201 044	174 820	244 319
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Annex 6C – Malaria trends 2, 1990-2010 (continued)

WHO region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Africa	Mozambique	Suspected	-	-	-	-	-	-	12 794	-	194 024	2 336 640	-	-	-	-	-	-	-	6 155 082	4 831 491	4 310 086	4 238 469
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Namibia	Suspected	0	0	0	380 530	401 519	275 442	345 177	390 601	353 110	429 571	0	538 512	445 803	468 259	610 799	339 204	265 595	172 024	155 399	102 956	39 855
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 092	505	556
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
	Niger	Suspected	1 162 824	808 968	865 976	726 666	806 204	778 175	1 162 824	978 855	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
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	53 637	74 129	44 612	54 515	60 998	77 485	39 021
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1 113	1 245	1 581	-
	Nigeria	Suspected	1 116 992	909 656	1 219 348	981 943	1 175 004	1 133 926	1 149 435	1 148 542	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
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	523 513
		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	1 279 581	906 552	0	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
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	316 242	698 745	638 669
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sao Tome and Principe	Suspected	0	0	0	0	0	51 938	47 074	47 757	46 026	37 026	66 250	84 993	94 249	86 546	105 341	73 050	60 819	49 298	358 122	239 754	116 710
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2 219
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14
	Senegal	Suspected	-	-	-	-	450 071	628 773	-	861 276	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	-
		No Pf	-	-	-	-	-	-	-	-	-	-	44 959	14 261	15 261	28 272	23 171	38 746	49 366	78 278	24 830	19 614	-
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sierra Leone	Suspected	-	-	-	-	-	-	7 192	209 312	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
		No Pf	-	-	-	-	-	-	-	-	-	-	-	2 206	3 702	3 945	2 206	3 702	3 945	-	-	273 149	218 473
		No Pv	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	-	-	-	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	South Africa	Suspected	6 822	4 693	2 872	13 285	10 289	8 750	27 035	23 121	26 445	51 444	64 624	26 506	15 649	13 459	13 399	7 755	14 456	6 327	7 796	6 072	277 756
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2 181
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
	Swaziland	Suspected	0	0	0	0	0	0	38 875	23 754	4 410	30 420	29 374	35 582	23 456	19 425	11 320	10 374	11 637	6 338	5 881	6 639	1 722
		No Pf	-	-	-	-	-	-	-	-	-	-	-	1 395	670	342	574	279	155	84	58	106	-
		No Pv	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	-
	Togo	Suspected	810 509	780 825	634 166	561 328	328 488	-	352 334	366 672	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
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	117 131	151 960	191 357	224 080
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	195	7

Annex 6C – Malaria trends 2, 1990-2010 (continued)

WHO region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Africa	Uganda	Suspected	-	-	2 446 659	1 470 662	2 191 277	1 431 068	-	2 317 840	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
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	546 016	785 748	861 451	1 082 224	850 050	1 024 470	959 712	1 275 310	1 565 348
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15 812
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
	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	-	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	19 328	-
		No Pf	-	-	-	-	-	-	-	-	-	-	17 734	18 385	16 983	15 705	11 936	7 628	1 585	293	67	40	-
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mainland	Suspected	-	-	-	-	-	-	-	-	-	-	-	324 584	369 394	11 379 411	11 898 627	11 441 681	10 566 201	8 562 200	7 643 050	2 404 762	12 491 413
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32 078
	Zanzibar	Suspected	-	-	-	-	-	-	-	-	-	-	53 533	53 804	51 968	53 899	50 976	43 642	30 676	23 511	229 890	181 939	200 072
		No Pf	-	-	-	-	-	-	-	-	-	-	17 734	18 385	16 983	15 705	11 936	7 628	1 585	293	77	211	364
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
	Zambia	Suspected	1 933 696	2 340 994	2 953 692	3 514 000	3 514 000	2 742 118	3 215 866	-	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
		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	1 719 960	1 804 479	0	0	0	0	1 997 066	1 709 890	1 493 398	1 272 731	1 089 322	867 135	912 618
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	249 379
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Americas	Argentina	Suspected	22 625	16 844	13 619	11 389	14 070	12 986	12 833	9 684	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
		No Pf	1	3	0	1	1	0	0	0	0	0	1	0	0	0	0	1	1	2	0	0	-
		No Pv	1 659	800	643	757	947	1 065	2 048	592	339	222	439	215	125	122	115	251	211	385	130	86	-
		No Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
	Bahamas	Suspected	4	3	2	2	0	3	0	8	21	30	22	4	1	34	17	9	546	6	35	-	27 272
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	-	-	13	-	-
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	-	-	0	-	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	-	-	1	-	-
	Belize	Suspected	17 204	25 281	24 135	47 742	50 740	37 266	35 113	26 598	27 000	19 395	18 559	18 173	15 480	15 480	17 358	25 119	25 755	22 134	25 550	26 051	150
		No Pf	40	131	165	251	420	475	455	126	222	52	20	6	0	0	6	32	10	0	0	0	-
		No Pv	2 987	3 181	5 175	8 332	9 991	8 938	6 150	3 887	2 392	1 801	1 466	1 156	1 134	1 084	1 060	1 517	834	845	540	256	-
		No Other	6	5	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	-
	Bolivia (Plurinational State of)	Suspected	121 743	125 509	125 414	125 721	128 580	152 748	161 077	141 804	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
		No Pf	652	1 103	2 757	5 375	4 833	3 374	4 252	5 381	11 414	7 557	2 536	808	727	793	695	1 080	1 785	1 622	836	574	808
		No Pv	19 028	17 928	21 729	22 100	29 916	43 537	59 760	46 097	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
		No Other	0	0	0	0	0	0	0	0	0	0	0	0	0	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	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
		No Pf	252 191	265 597	267 054	176 379	197 009	203 402	135 132	95 084	105 945	121 228	131 616	81 333	80 188	88 174	110 422	155 169	145 858	93 591	49 358	50 933	51 050
		No Pv	308 184	348 722	342 650	289 656	367 251	361 560	318 331	296 686	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
		No Other	21	112	156	180	146	765	1 731	1 206	1 461	888	932	574	826	298	216	211	228	149	88	112	184

Annex 6C – Malaria trends 2, 1990-2010 (continued)

WHO region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Americas	Colombia	Suspected	496 087	740 938	736 426	656 632	572 924	667 473	461 137	583 309	190 553	268 355	478 820	747 079	686 635	640 453	562 681	493 562	451 240	589 755	493 135	436 366	527 642
		No Pf	35 490	70 868	69 274	42 508	34 070	62 687	37 315	66 261	100 890	25 389	51 730	100 242	88 972	75 730	55 158	43 472	46 147	54 509	22 392	22 141	34 334
		No Pv	63 855	113 173	114 690	86 816	93 108	124 354	98 573	114 544	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
		No Other	144	115	59	53	40	41	35	105	0	319	0	0	0	0	0	0	0	0	0	0	48
	Costa Rica	Suspected	130 530	130 530	149 198	140 435	143 721	143 408	148 161	155 925	103 976	96 454	61 261	43 053	17 738	9 622	9 204	12 767	24 498	22 641	17 304	4 829	15 636
		No Pf	5	22	16	8	3	16	65	45	15	15	12	1	2	14	5	3	32	11	0	1	2
		No Pv	1 146	3 251	6 935	5 025	4 442	4 499	5 415	4 667	5 133	3 983	1 867	1 362	1 008	704	1 284	3 538	2 667	1 212	966	261	112
		No Other	0	0	0	0	0	0	0	0	0	0	0	0	0	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	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
		No Pf	334	367	694	983	1 664	1 807	1 112	812	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
		No Pv	22	10	4	4	5	1	2	4	7	5	7	4	4	1	2	8	6	3	1	0	2
		No Other	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ecuador	Suspected	363 080	346 465	377 321	419 590	301 546	253 714	162 128	174 692	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
		No Pf	21 871	13 868	15 970	21 646	10 241	4 738	1 886	3 091	21 448	50 158	48 974	37 491	20 015	10 724	5 891	2 212	1 596	1 158	396	551	258
		No Pv	49 799	45 532	25 119	25 213	19 765	13 390	10 028	13 274	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
		No Other	0	0	0	0	0	0	0	0	0	0	0	0	0	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	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
		No Pf	18	18	6	4	5	6	4	5	11	9	9	2	0	2	1	2	1	2	1	1	2
		No Pv	9 251	5 915	4 533	3 883	2 798	3 356	5 884	2 714	1 171	1 221	744	360	117	83	111	65	48	38	32	19	22
		No Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	French Guiana	Suspected	49 192	55 242	56 925	49 993	48 242	52 521	46 780	42 631	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
		No Pf	2 607	1 745	2 796	3 154	3 809	4 137	3 980	2 349	2 658	4 567	3 051	3 166	2 547	3 080	2 437	1 777	1 847	845	406	424	216
		No Pv	3 292	1 663	1 151	720	415	545	687	715	552	564	657	657	954	759	600	1 637	2 227	1 804	925	789	492
		No Other	10	71	125	100	17	29	57	131	210	214	214	0	160	0	0	71	27	23	10	6	5
	Guatemala	Suspected	305 791	361 743	396 171	276 343	133 611	135 095	97 586	140 113	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
		No Pf	1 008	1 616	1 480	2 094	423	671	130	879	1 049	1 708	1 474	1 044	1 841	1 310	852	1 062	804	196	50	56	35
		No Pv	40 703	56 070	56 080	39 774	21 634	23 490	20 140	31 220	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
		No Other	0	0	0	0	0	17	0	0	0	0	36	0	0	0	0	48	0	0	0	0	0
	Guyana	Suspected	135 260	141 046	159 108	172 469	168 127	291 370	262 526	229 710	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
		No Pf	12 904	23 397	23 871	18 091	22 503	29 976	18 239	20 238	22 799	16 144	12 324	12 831	10 599	12 970	12 226	16 438	9 818	4 677	5 741	7 542	14 401
		No Pv	9 777	18 807	15 831	15 081	17 153	29 335	15 836	11 865	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
		No Other	0	0	0	0	0	0	0	0	0	0	0	0	0	3	446	1 291	686	267	147	102	132
	Haiti	Suspected	13 743	81 763	37 957	10 045	54 973	-	69 853	35 132	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
		No Pf	4 806	25 511	13 457	853	-	-	18 877	5 870	34 449	1 196	16 897	9 837	9 837	9 837	10 802	21 778	32 739	29 824	36 768	49 535	-
		No Pv	0	-	0	0	-	-	0	-	0	0	0	0	0	0	0	0	0	1	6	0	-
		No Other	0	-	0	0	-	-	0	-	0	0	0	0	0	0	0	0	0	0	0	0	-
	Honduras	Suspected	418 513	468 811	471 950	372 180	361 776	373 364	305 167	310 815	249 105	250 411	175 577	174 430	178 616	136 991	145 070	155 976	127 436	130 255	119 484	112 522	149 607
		No Pf	659	1 731	1 216	448	568	1 124	874	858	1 067	1 264	1 446	938	606	540	868	999	768	813	610	1 382	973
		No Pv	52 436	71 621	69 622	44 065	52 110	58 322	73 613	65 005	41 912	45 520	33 679	23 211	16 617	13 583	16 425	15 009	11 112	9 700	7 758	7 931	8 656
		No Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Jamaica	Suspected	281	3	6	6	3	5	206	110	207	219	874	596	725	394	3 879	2 470	6 821	199	30 732	34 149	-
		No Pf	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	21	17	-
		No Pv	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	1	4	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-

Annex 6C – Malaria trends 2, 1990-2010 (continued)

WHO region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Americas	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	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
		No Pf	62	278	129	202	63	73	87	67	159	96	131	69	19	44	49	22	16	4	0	1	0
		No Pv	44 451	26 287	16 041	15 591	12 801	7 243	6 206	4 979	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
		No Other	0	0	0	0	0	0	0	0	0	0	0	0	0	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	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
		No Pf	1 568	1 702	2 192	2 492	1 524	3 844	2 733	1 815	3 193	1 812	1 369	1 194	995	1 213	1 200	1 114	336	106	61	93	154
		No Pv	34 217	25 951	24 674	41 445	40 551	67 536	73 536	50 043	30 716	36 635	22 645	9 304	6 700	5 525	5 699	5 498	2 784	1 250	701	517	538
		No Other	0	0	0	0	0	0	0	0	0	0	0	0	0	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	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
		No Pf	105	118	113	20	18	18	25	179	125	40	45	39	337	627	882	766	62	48	4	3	20
		No Pv	276	997	614	461	717	712	451	326	914	896	991	889	1 907	3 873	4 213	2 901	1 601	1 233	740	775	398
		No Other	0	0	0	0	0	0	0	0	0	0	0	0	0	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	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
		No Pf	55	18	10	1	12	35	5	1	3	2	0	4	1	4	1	0	2	2	7	10	5
		No Pv	2 857	2 965	1 279	435	571	862	632	565	2 087	9 944	6 853	2 706	2 777	1 388	693	376	821	1 337	333	81	22
		No Other	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Peru	Suspected	90 040	109 654	123 147	158 325	295 824	833 614	1 162 230	1 299 929	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	892 990	989 842
		No Pf	131	187	793	9 634	21 203	37 591	50 009	53 016	84 289	67 215	20 618	17 687	21 174	19 154	20 905	15 058	8 437	7 766	4 487	3 910	2 353
		No Pv	28 693	33 502	54 129	85 504	100 801	152 868	161 375	127 287	162 695	94 077	47 690	61 680	78 000	66 588	72 676	72 611	56 488	43 031	33 895	32 976	26 878
		No Other	58	16	0	84	35	62	124	35	79	0	13	11	10	13	0	0	0	0	7	2	2
	Suriname	Suspected	18 594	18 399	13 765	26 079	29 148	38 613	68 674	94 508	73 481	65 087	63 377	67 369	68 070	43 241	56 975	59 855	45 722	33 992	29 911	35 117	17 361
		No Pf	1 584	1 402	1 326	5 930	4 384	6 249	14 942	9 251	10 193	11 685	10 648	13 217	9 752	8 782	6 738	6 931	2 331	547	838	289	209
		No Pv	21	33	25	84	240	256	744	1 125	1 699	1 371	1 673	1 229	1 648	1 047	915	1 611	733	509	639	397	331
		No Other	3	55	53	113	80	101	258	245	520	883	811	1 549	1 388	0	726	589	225	14	17	3	4
	Venezuela (Bolivarian Republic of)	Suspected	361 194	375 473	336 571	290 483	210 890	302 487	285 326	271 989	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
		No Pf	9 135	8 182	5 004	3 501	3 677	4 251	4 098	4 064	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
		No Pv	25 944	34 641	16 365	8 988	12 617	18 168	17 714	18 272	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
		No Other	3	3	47	50	17	82	40	64	65	7	1	8	12	46	63	38	23	51	579	1 087	60
Eastern Mediterranean	Afghanistan	Suspected	735 624	768 685	-	431 353	683 034	602 320	590 624	540 050	288 070	696 082	366 865	364 243	626 839	585 602	273 377	548 503	789 186	869 144	935 043	847 666	847 589
		No Pf	1 832	4 312	-	2 383	4 459	4 158	2 501	5 878	13 665	9 131	5 115	-	84 528	44 243	12 789	5 917	6 216	6 283	4 355	4 026	6 142
		No Pv	315 647	293 293	-	121 040	27 142	182 687	75 749	183 989	-	153 253	89 240	-	330 083	316 697	229 233	110 527	79 913	85 919	77 219	60 854	63 255
		No Other	0	0	-	0	0	0	0	0	-	0	-	-	0	0	0	0	0	0	0	0	0
	Djibouti	Suspected	11 463	26 761	28 636	4 166	25 366	5 982	6 105	4 314	5 920	6 140	4 667	4 312	5 021	5 036	2 142	3 969	6 457	7 945	6 305	2 686	-
		No Pf	3 072	7 165	7 296	-	6 048	-	-	-	-	-	-	-	-	-	-	413	1 796	210	119	-	1 019
		No Pv	165	170	172	-	92	-	-	-	-	-	-	-	-	-	-	0	0	0	0	-	0
		No Other	0	0	0	-	0	-	-	-	-	-	-	-	-	-	-	0	0	0	0	-	0
	Egypt2	Suspected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Pf	69	19	10	13	475	-	21	9	-	-	17	9	8	44	39	23	27	28	76	81	82
		No Pv	6	5	6	4	20	-	-	2	-	-	0	-	2	1	4	0	2	2	4	13	3
		No Other	0	0	0	0	0	-	-	0	-	-	0	-	0	0	0	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	4 523	3 247	2 546	2 158	2 382	4 475	1 380	2 219	1 199	1 266	938	485	339
		No Pv	40 600	50 253	49 310	37 917	-	-	-	-	28 416	-	-	17 145	13 176	19 087	12 441	16 747	14 710	14 322	10 337	5 485	2 610
		No Other	4	8	8	18	-	-	-	-	12	-	-	0	0	0	0	0	0	0	0	0	0

Annex 6C – Malaria trends 2, 1990-2010 (continued)

WHO region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Eastern Mediterranean	Iraq	Suspected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Pf	-	6	7	-	21	-	-	12	-	-	-	-	-	1	1	0	0	0	1	0	2
		No Pv	-	1 758	5 745	-	98 222	-	-	9 582	-	-	-	-	-	346	154	47	24	3	5	1	4
		No Other	-	0	0	-	0	-	-	0	-	-	-	-	-	0	0	0	0	0	0	0	0
	Morocco[1]	Suspected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Pf	36	65	38	46	28	22	38	41	51	34	47	50	84	62	47	93	69	65	113	134	195
		No Pv	801	429	361	148	167	172	60	78	68	17	3	2	20	5	3	-	-	4	13	3	6
		No Other	0	0	6	4	11	3	4	6	2	9	6	6	3	6	6	-	-	5	11	6	15
	Oman[2]	Suspected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Pf	30 907	17 817	13 958	16 149	6 543	1 282	754	552	523	456	316	283	266	299	158	153	100	93	94	160	140
		No Pv	1 777	1 426	845	694	669	513	500	469	551	416	366	336	315	428	449	385	341	602	870	718	1 039
		No Other	1	4	0	0	0	6	11	5	19	29	12	16	9	13	8	6	2	2	1	2	3
	Pakistan	Suspected	2 608 398	271 586	2 668 997	2 615 771	2 796 528	111 836	2 711 179	2 914 056	3 187 814	3 440 986	3 337 054	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	8 601 835
		No Pf	43 106	26 860	53 310	40 821	49 759	-	46 645	25 255	24 910	30 347	-	41 771	32 591	39 944	32 761	42 056	37 837	39 856	24 550	37 079	73 857
		No Pv	36 514	39 658	45 591	51 707	-	-	-	-	-	-	-	83 504	75 046	85 176	93 385	85 748	86 999	88 699	79 868	95 604	143 136
		No Other	0	0	0	0	-	-	-	-	-	-	-	0	0	-	538	0	-	15	36	0	0
	Saudi Arabia	Suspected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Pf	14 943	8 575	17 340	-	7 814	16 537	-	-	38 661	-	-	2 360	1 999	1 234	867	798	984	2 349	833	1 649	883
		No Pv	420	1 302	2 182	-	-	-	-	-	-	-	-	678	567	462	352	254	280	515	658	672	1 023
		No Other	303	80	101	-	-	-	-	-	-	-	-	28	42	28	13	6	12	0	0	12	24
	Somalia	Suspected	-	-	-	6 467	-	-	-	-	-	9 055	-	10 364	102 540	28 356	55 423	63 770	49 092	50 444	133 060	106 341	220 698
		No Pf	-	-	-	2 880	-	-	-	-	-	-	-	-	15 732	7 571	11 436	12 516	16 430	16 058	36 167	24 698	5 629
		No Pv	-	-	-	52	-	-	-	-	-	-	-	-	0	0	0	0	0	617	738	504	0
		No Other	-	-	-	103	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
	Sudan																						
	North (low transmission)[4]	Suspected	7 508 704	6 947 787	9 326 944	9 867 778	8 562 205	6 347 143	4 595 092	4 065 460	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	4 597 254	4 555 054	4 440 882	2 398 239
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	South (high transmission)	Suspected	-	-	-	-	-	-	-	-	-	-	-	237 712	462 056	646 673	515 958	337 582	116 473	101 008	201 036	325 634	-
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Syrian Arab Republic[2]	Suspected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		No Pf	-	24	15	-	-	-	27	19	-	-	-	-	-	-	-	17	27	35	46	38	22
		No Pv	-	26	438	-	145	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0
		No Other	-	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0
	Yemen	Suspected	80 986	103 700	126 580	172 403	160 687	500 000	416 246	8 533 872	-	2 781 640	-	-	667 794	612 693	611 552	629 380	962 017	740 940	900 735	899 320	835 018
		No Pf	11 170	12 345	-	-	34 735	-	-	553 937	-	-	-	-	73 667	47 782	47 306	42 627	53 887	64 991	42 702	52 836	77 271
		No Pv	178	318	-	-	-	-	-	-	-	-	-	-	1 659	1 474	1 297	1 442	1 019	2 339	745	589	966
		No Other	36	52	-	-	-	-	-	-	-	-	-	-	122	-	7	27	10	0	4	3	2
Europe	Armenia	Suspected	0	0	0	0	196	502	347	841	1 156	616	356	174	165	126	220	209	230	658	30 761	31 467	31 026
		No Pf	0	0	0	0	0	0	0	0	0	4	1	0	0	4	2	0	0	1	1	0	1
		No Pv	0	0	0	0	196	502	347	841	1 156	616	140	79	52	25	45	7	0	0	0	0	0
		No Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Annex 6C – Malaria trends 2, 1990-2010 (continued)

WHO region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Europe	Azerbaijan	Suspected	24	113	27	23	667	2 840	13 135	9 911	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
		No Pf	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	0	0	1	1	0	2
		No Pv	24	113	27	23	667	2 840	13 135	9 911	5 175	2 315	1 526	1 056	506	482	386	242	143	109	72	80	50
		No Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Georgia	Suspected	1	2	1	0	1	1	7	1	16	51	245	3 574	6 145	5 457	3 365	5 169	4 400	3 400	4 398	4 120	2 368
		No Pf	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	1	0	1	5	0
		No Pv	-	-	-	-	-	-	-	-	-	-	245	438	473	314	255	155	59	24	7	1	0
		No Other	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	1	0	1	0
	Kyrgyzstan	Suspected	1	1	2	0	6	3	26	13	11	5	70 500	72 020	69 807	144 070	79 895	114 316	74 729	62 444	40 833	33 983	30 190
		No Pf	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0
		No Pv	-	-	-	-	-	-	-	-	-	-	12	28	2 742	468	93	226	318	96	18	4	6
		No Other	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0
	Russian Federation	Suspected	216	169	160	209	335	425	611	831	1 081	792	795	898	642	533	382	205	143	35 784	28 340	27 382	33 024
		No Pf	136	109	-	85	86	69	80	97	-	63	60	-	48	51	43	31	41	42	47	62	60
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	76	46	40	34
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	3	5	5
	Tajikistan	Suspected	175	294	404	619	2 411	6 103	16 561	29 794	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
		No Pf	-	-	-	-	-	-	-	-	-	-	831	826	509	252	151	81	28	7	2	1	1
		No Pv	-	-	-	-	-	-	-	-	-	-	18 233	10 561	5 651	5 176	3 437	2 228	1 316	628	316	164	111
		No Other	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0
	Turkey	Suspected	8 680	12 218	18 676	47 210	84 345	82 096	60 884	35 456	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
		No Pf	-	-	-	-	-	-	-	-	-	-	7	11	12	12	13	32	29	29	23	16	49
		No Pv	-	-	-	-	-	-	-	-	-	-	11 424	10 799	10 209	9 209	5 289	2 052	767	329	191	65	28
		No Other	-	-	-	-	-	-	-	-	-	-	1	2	3	1	0	0	0	0	1	3	0
	Turkmenistan[1]	Suspected	1	17	11	3	9	10	14	14	137	49	50 105	50 075	59 834	72 643	71 377	56 982	58 673	65 666	75 524	94 237	81 784
		No Pf	0	0	0	0	0	0	0	0	0	0	-	-	0	0	0	0	0	0	0	0	0
		No Pv	-	-	-	-	-	-	-	-	-	-	24	8	18	7	3	1	1	0	1	0	0
		No Other	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0
	Uzbekistan	Suspected	28	12	25	36	21	27	51	52	74	85	735 164	691 500	735 164	812 543	893 187	917 843	924 534	858 968	883 807	916 839	921 364
		No Pf	0	3	9	6	2	0	2	0	-	3	1	0	1	0	0	0	3	2	0	1	0
		No Pv	-	-	-	-	-	-	-	-	-	-	125	77	72	74	66	102	73	87	27	3	5
		No Other	-	-	-	-	-	-	-	-	-	-	0	0	1	0	0	0	0	0	0	0	0
South-East Asia	Bangladesh	Suspected	53 875	63 578	115 660	125 402	166 564	152 729	100 864	68 594	437 928	386 153	437 838	516 052	527 577	679 981	512 876	462 322	341 293	270 137	526 701	569 767	1 228 396
		No Pf	34 061	30 282	51 775	54 973	81 015	75 860	54 278	42 342	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
		No Pv	19 814	33 293	63 885	70 429	85 549	76 869	46 505	26 252	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
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bhutan	Suspected	9 497	22 126	28 900	28 116	39 852	23 188	15 696	9 029	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
		No Pf	4 231	13 138	14 092	12 943	16 474	7 540	6 026	3 614	3 985	6 531	2 738	2 915	3 207	1 518	966	853	772	288	136	559	140
		No Pv	5 266	8 988	14 808	15 173	22 427	15 655	9 670	5 415	3 708	5 706	3 197	2 805	3 015	2 126	1 580	871	963	414	148	413	261
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0
	Democratic People's Republic of Korea	Suspected	0	0	0	0	0	0	0	0	1 085	7 980	204 428	372 875	272 037	76 104	45 066	16 094	15 423	10 626	30 719	38 684	27 019
		No Pf	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0
		No Pv	-	-	-	-	-	-	-	-	-	-	-	115 615	98 852	16 538	15 827	6 728	6 913	4 795	16 989	14 845	13 520
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0

Annex 6C – Malaria trends 2, 1990-2010 (continued)

WHO region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
South-East Asia	Democratic Republic of Timor-Leste	Suspected	0	0	0	0	0	0	0	0	10 332	0	15 212	83 049	120 344	83 785	242 957	185 367	223 002	215 402	215 338	198 867	266 384
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	26 651	33 411	39 164	43 093	37 896	34 174	34 406	29 252	28 350
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	11 148	15 392	16 158	15 523	13 477	12 544	11 295	12 160	11 432
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0
	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	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	103 395 721	108 679 429
		No Pf	752 118	918 488	876 246	852 763	990 508	1 173 599	1 179 561	1 007 366	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
		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	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
		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	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	2 783 649
		No Pf	8 544	7 544	6 888	11 433	9 646	2 967	6 178	7 490	10 866	21 003	89 289	85 596	98 430	81 591	98 729	127 594	160 147	-	127 813	95 557	110 037
		No Pv	166 505	132 808	103 116	134 906	136 730	140 396	173 700	123 594	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
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	240	705
	Myanmar	Suspected	989 042	939 257	789 672	702 239	701 043	656 547	664 507	568 262	548 066	592 431	592 354	663 804	722 058	713 215	602 763	516 041	538 110	1 159 516	1 230 444	1 095 474	1 233 966
		No Pf	112 928	107 079	106 695	100 570	95 791	83 397	78 910	72 753	85 658	100 831	95 489	130 092	134 087	136 020	116 955	124 835	149 399	149 931	167 562	118 364	70 941
		No Pv	20 112	19 877	19 005	16 154	15 832	17 051	17 293	15 853	19 052	20 421	21 742	35 783	35 125	34 597	35 050	38 553	50 667	62 057	52 256	40 167	29 944
		No Other	-	-	-	-	-	-	-	-	-	-	252	941	864	775	572	810	453	505	288	319	346
	Nepal	Suspected	22 856	29 135	23 234	16 380	9 442	9 718	6 628	8 957	8 498	9 699	197 075	266 917	304 200	383 322	293 836	361 936	327 981	265 997	302 774	270 798	213 353
		No Pf	1 853	5 066	2 954	1 609	1 200	844	951	252	776	1 089	560	428	2 165	1 195	743	1 181	1 358	1 295	792	575	550
		No Pv	21 003	24 069	20 280	14 771	8 684	8 868	8 069	6 307	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
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
	Sri Lanka	Suspected	287 384	400 263	399 349	363 197	273 502	142 294	184 319	218 550	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
		No Pf	57 736	76 541	82 655	77 970	47 638	119 056	44 957	54 694	42 396	63 878	59 650	10 600	4 848	1 273	549	134	27	7	46	21	6
		No Pv	223 245	323 722	316 694	285 227	225 864	23 238	139 362	163 856	169 295	200 671	150 389	55 922	36 563	9 237	3 171	1 506	564	191	623	529	668
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Thailand	Suspected	273 880	198 383	168 370	115 220	102 119	82 743	87 622	97 540	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
		No Pf	173 265	122 730	97 389	68 270	57 073	45 268	46 550	48 318	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
		No Pv	99 369	87 136	70 981	46 950	45 046	37 475	41 072	49 222	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
		No Other	-	-	-	-	-	-	-	-	-	-	47	40	40	32	29	59	35	16	10	23	20
Western Pacific	Cambodia	Suspected	123 796	102 930	91 000	99 200	85 012	76 923	74 883	88 029	58 874	64 679	281 444	202 179	187 213	208 801	183 062	165 382	207 463	200 050	198 794	210 856	386 420
		No Pf	-	-	-	-	-	-	-	-	-	-	46 150	37 105	33 010	36 338	31 129	17 482	24 779	16 518	15 095	17 442	8 213
		No Pv	-	-	-	-	-	-	-	-	-	-	4 505	4 408	4 386	5 179	5 709	9 004	7 551	4 987	4 625	6 362	4 794
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	China	Suspected	117 359	101 600	74 000	59 000	62 000	47 118	33 382	26 800	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
		No Pf	-	-	-	-	-	-	-	-	-	-	-	3 732	5 753	3 497	3 879	3 588	2 808	1 613	1 222	948	1 269
		No Pv	-	-	-	-	-	-	-	-	-	-	-	17 295	19 581	24 852	23 138	18 187	32 345	27 550	15 323	8 214	3 675
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	141	105	125	20
	Lao People's Democratic Republic	Suspected	22 044	41 048	38 500	41 787	52 601	52 021	77 894	72 190	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
		No Pf	-	-	-	-	-	-	-	-	-	-	38 271	25 851	20 696	18 307	15 648	13 106	18 058	6 171	4 697	5 328	4 393
		No Pv	-	-	-	-	-	-	-	-	-	-	1 689	1 204	712	574	491	473	316	193	247	176	122
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	21	0	1
	Malaysia	Suspected	50 500	39 189	36 853	39 890	58 958	59 208	51 921	26 649	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
		No Pf	-	-	-	-	-	-	-	-	-	-	6 000	5 643	5 486	2 756	2 496	2 222	1 790	1 778	2 268	1 885	1 681
		No Pv	-	-	-	-	-	-	-	-	-	-	5 953	6 315	4 921	3 127	3 167	2 729	2 774	2 862	3 820	3 379	3 812
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	615	1 011	1 502	984

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WHO region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Western Pacific	Papua New Guinea	Suspected	104 900	86 500	86 500	66 797	65 000	99 000	71 013	38 105	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
		No Pf	-	-	-	-	-	-	-	-	-	-	63 591	74 117	58 403	54 653	63 053	62 926	56 917	60 168	60 000	48 681	56 735
		No Pv	-	-	-	-	-	-	-	-	-	-	14 721	18 113	14 187	14 055	18 730	22 833	22 744	16 239	16 806	11 472	13 171
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2 787	1 444	1 024	1 990
	Philippines	Suspected	86 200	86 400	95 778	64 944	61 959	56 852	40 545	42 005	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
		No Pf	-	-	-	-	-	-	-	-	-	-	25 912	18 006	22 831	32 948	29 018	20 033	24 515	8 789	11 807	13 933	11 824
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6 482	8 839	3 622	4 806	4 951	2 885
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17	197	262	175
	Republic of Korea	Suspected	0	0	0	1	20	107	396	1 724	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
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	13	25
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2 227	1 052	1 343	1 745
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
	Solomon Islands	Suspected	116 500	141 400	153 359	126 123	131 687	118 521	84 795	68 125	72 808	63 169	601 612	594 690	556 356	416 728	643 908	633 796	657 110	396 169	338 244	282 297	245 159
		No Pf	-	-	-	-	-	-	-	-	-	-	46 703	50 806	50 090	64 910	64 449	54 001	54 441	48 612	29 492	19 580	22 892
		No Pv	-	-	-	-	-	-	-	-	-	-	21 322	25 649	24 822	27 399	25 927	22 515	20 971	16 653	11 173	8 544	12 281
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	139	84	0	-
	Vanuatu	Suspected	28 805	19 466	13 330	10 469	3 771	8 318	5 654	6 099	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
		No Pf	-	-	-	-	-	-	-	-	-	-	3 226	3 402	7 016	8 406	6 999	3 817	3 522	2 424	1 579	1 802	1 545
		No Pv	-	-	-	-	-	-	-	-	-	-	2 972	4 236	7 210	6 582	6 350	4 453	4 405	2 987	1 850	1 632	2 265
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	4	10
	Viet Nam	Suspected	123 796	187 994	225 928	156 069	140 120	100 116	84 625	65 859	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
		No Pf	-	-	-	-	-	-	-	-	-	-	57 605	52 173	36 583	29 435	19 023	14 231	17 911	11 470	8 901	12 719	12 763
		No Pv	-	-	-	-	-	-	-	-	-	-	15 935	15 898	10 846	9 004	5 681	5 102	4 497	4 737	2 348	3 206	4 466
		No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0

Notes

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] 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] National totals for some columns are incomplete, see details in the sub-sections

[4] Data before 2001 includes data from South (high transmission)

Annex 6D – Reported malaria deaths, 1990-2010

WHO region	Country/area	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Africa	Algeria	-	-	-	-	-	-	-	-	2	6	2	1	-	-	-	-	-	-	-	-	-
	Angola	-	-	-	-	-	-	-	-	-	25 572	9 510	9 473	14 434	38 598	12 459	13 768	10 220	9 812	9 465	10 530	8 114
	Benin	-	-	-	-	-	-	-	-	682	544	-	468	707	560	944	322	1 226	1 290	918	1 375	964
	Botswana	-	-	-	-	-	-	-	141	23	49	-	29	23	18	19	11	40	6	12	6	8
	Burkina Faso	-	-	-	-	-	-	-	-	2 624	2 808	-	4 233	4 032	4 860	4 205	5 224	8 083	6 472	7 834	7 982	9 024
	Burundi	-	-	-	-	-	-	-	-	-	-	691	417	483	425	689	776	434	167	595	1 183	2 677
	Cameroon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	836	930	1 811	7 673	4 943	4 536
	Cape Verde	-	-	-	-	-	-	-	-	-	-	-	0	2	4	4	2	8	2	2	2	1
	Central African Republic	-	-	-	-	-	-	-	-	374	484	439	535	-	417	859	668	865	578	456	667	526
	Chad	-	-	-	-	-	-	-	-	-	-	712	957	98	1 021	13	558	837	617	1 018	221	-
	Comoros	-	-	-	-	-	-	-	-	-	50	-	-	-	-	28	92	56	20	47	-	53
	Congo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	113	143	116	-
	Côte d'Ivoire	-	-	-	-	-	-	-	-	1 337	974	-	-	-	-	-	-	-	797	1 249	18 156	1 023
	Democratic Republic of the Congo	-	-	-	-	-	-	-	-	-	-	3 856	416	2 152	989	13 613	15 322	12 970	14 372	17 940	21 168	23 476
	Equatorial Guinea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	23	-
	Eritrea	-	-	-	-	-	-	-	-	404	169	-	133	86	79	24	49	47	42	19	23	27
	Ethiopia	-	-	-	-	-	-	-	-	-	-	-	1 681	1 607	2 138	3 327	1 086	1 357	991	1 169	1 121	1 581
	Gabon	-	-	-	-	-	-	-	-	-	-	2 016	1 693	1 141	692	466	353	238	216	156	197	182
	Gambia	-	-	-	-	-	-	-	-	-	-	-	275	259	192	153	426	150	424	403	240	151
	Ghana	-	-	-	-	-	-	-	-	2 798	2 826	6 108	1 717	2 376	2 103	1 575	2 037	3 125	4 622	3 889	3 378	3 859
	Guinea	-	-	-	-	-	-	-	-	13	13	626	517	440	586	528	490	-	472	441	586	735
	Guinea-Bissau	-	-	-	-	-	-	-	-	-	-	-	635	780	1 137	565	565	507	370	487	369	-
	Kenya	-	-	-	-	-	-	-	-	665	1 545	48 767	48 286	47 697	51 842	25 403	44 328	40 079	-	-	-	26 017
	Liberia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	41	877	310	345	1 706	1 422
	Madagascar	-	-	-	-	-	-	-	-	-	640	591	742	575	817	715	699	441	428	355	348	122
	Malawi	57 649	-	-	-	-	-	-	35 982	-	4 747	-	3 355	5 775	4 767	3 457	5 070	6 464	7 486	8 048	8 915	8 206
	Mali	-	-	-	-	-	-	-	-	-	583	748	562	826	1 309	1 012	1 285	1 914	1 782	1 227	2 331	3 006
	Mauritania	-	-	-	-	-	-	-	-	279	525	-	-	-	-	-	-	67	142	-	91	211
	Mozambique	-	-	-	-	-	-	-	-	896	1 189	-	-	-	-	-	-	-	5 816	4 424	3 747	3 354
	Namibia	-	-	-	-	-	250	469	547	404	531	-	1 728	1 504	1 106	1 185	1 325	571	181	152	68	63
	Niger	-	-	-	-	-	-	-	1 018	1 823	2 165	1 244	2 366	2 769	2 248	1 333	2 060	1 150	1 358	2 461	2 159	3 929
	Nigeria	2 284	1 947	1 068	710	1 686	3 268	4 773	4 603	6 197	4 123	-	4 317	4 092	5 343	6 032	6 494	6 586	10 289	8 677	7 522	4 238
	Rwanda	-	-	-	-	-	-	-	-	2 736	1 881	-	4 275	3 167	2 679	2 362	2 581	2 486	1 772	566	809	670
	Sao Tome and Principe	-	-	-	-	-	-	-	-	154	-	254	248	321	193	169	85	26	3	16	23	14
	Senegal	-	-	-	-	-	-	-	1 205	1 029	1 235	1 275	1 515	1 226	1 602	1 524	1 587	1 678	1 935	741	574	-
	Sierra Leone	-	-	-	-	-	-	-	-	-	-	-	328	461	157	126	50	90	324	871	1 734	8 188
	South Africa	35	19	14	45	12	44	163	104	198	406	424	81	96	142	88	63	87	37	43	45	83
	Swaziland	-	-	-	-	-	-	-	-	109	149	-	62	46	30	28	17	27	17	10	13	8
	Togo	-	-	-	-	-	-	-	-	475	766	-	1 394	1 661	1 130	1 183	1 024	819	1 236	2 663	1 556	1 507
	Uganda	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4 252	7 003	2 372	6 296	8 431
	United Republic of Tanzania[3]																					
	Mainland	-	-	-	-	-	-	-	-	-	-	-	838	441	14 943	19 547	18 075	20 825	12 529	12 405	819	15 819
	Zanzibar	-	-	-	-	-	-	-	-	-	-	379	390	374	308	312	247	137	64	92	80	48
	Zambia	4 863	4 998	3 315	4 689	5 775	-	-	-	-	8 580	-	9 369	9 021	9 178	8 289	7 737	6 484	6 183	3 781	3 862	4 834
	Zimbabwe	-	-	-	-	-	-	-	1 192	1 248	1 139	-	-	1 844	1 044	1 809	1 916	802	401	232	108	255
Americas	Argentina	0	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	-	0
	Bahamas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Belize	0	0	0	-	-	-	-	-	0	0	0	0	0	-	0	0	1	0	0	0	0
	Bolivia (Plurinational State of)	7	2	-	-	29	-	14	21	27	15	11	0	5	2	0	0	0	0	0	0	0
	Brazil	-	-	-	-	413	-	-	90	156	193	231	142	93	103	100	122	105	94	67	85	74
	Colombia	176	181	138	100	75	62	16	16	33	12	41	58	40	24	25	28	53	19	22	12	23
	Costa Rica	0	0	0	-	-	0	2	-	0	0	0	0	0	0	0	0	0	0	0	1	0
	Dominican Republic	2	0	7	-	11	14	5	5	14	13	6	17	11	12	16	16	10	17	11	14	15
	Ecuador	0	0	0	-	67	-	-	18	16	16	0	0	0	0	0	0	0	0	1	0	0
	El Salvador	0	0	-	-	-	-	-	-	0	-	0	0	0	0	0	0	0	0	0	0	0
	French Guiana	8	2	2	-	-	-	-	-	2	5	0	0	0	4	0	0	5	5	2	1	0
	Guatemala	180	127	-	-	-	-	-	0	9	0	0	0	0	0	2	4	2	3	0	0	0
	Guyana	-	4	14	-	150	-	-	32	34	-	-	-	-	-	8	22	20	10	10	11	15

Annex 6D – Reported malaria deaths, 1990-2010 (continued)

WHO region	Country/area	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Americas	Haiti	-	101	-	-	-	-	61	-	25	-	-	16	16	16	16	29	32	28	17	6	-
	Honduras	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	1	0	0	2	1	2
	Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Mexico	39	-	-	-	-	-	1	-	0	0	0	0	0	0	0	0	0	0	0	0	0
	Nicaragua	21	47	23	-	10	16	-	11	21	11	4	2	8	7	1	6	1	0	0	0	0
	Panama	1	1	1	0	0	0	0	0	0	0	1	1	2	4	2	1	1	1	1	0	-
	Paraguay	1	0	0	-	-	-	-	-	0	1	0	0	0	0	0	0	0	0	0	0	0
	Peru	-	-	-	-	39	39	46	59	52	49	20	25	12	-	12	-	-	0	2	2	-
	Suriname	1	4	-	10	20	20	14	10	7	-	24	23	16	18	7	2	0	1	0	0	1
	Venezuela (Bolivarian Republic of)	-	38	48	2	17	-	-	40	26	2	24	28	23	40	35	17	11	16	1	1	2
Eastern Mediterranean	Afghanistan	-	-	-	-	22	-	-	-	-	-	-	-	-	-	-	0	-	25	46	32	22
	Djibouti	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-	29	1	-	0	0
	Egypt[2]	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	0	0	2	2	2
	Iran (Islamic Republic of)	-	-	-	-	-	-	-	22	-	3	4	2	2	5	1	1	1	3	3	-	-
	Iraq	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	-
	Morocco[1]	-	-	-	-	0	-	-	0	-	-	-	-	-	-	-	1	2	2	1	1	2
	Oman[2]	-	-	-	-	1	2	2	-	-	-	-	-	-	-	-	0	0	0	2	2	0
	Pakistan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	52	9	24	-	-	-
	Saudi Arabia	-	-	-	-	-	-	-	6	28	-	-	0	0	0	0	0	0	2	0	0	0
	Somalia	-	-	-	-	-	-	-	-	-	-	-	-	8	54	79	15	58	45	49	45	6
	Sudan																					
	North (low transmission)[4]	1 434	1 898	1 935	2 404	2 464	2 759	1 944	1 825	1 958	2 622	2 162	2 252	2 125	2 479	1 814	1 789	1 193	1 254	1 125	1 142	1 023
	South (high transmission)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	263	254	1 053
	Syrian Arab Republic[2]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	1	1	1	0
	Yemen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	73	-	-	38	92
Europe	Armenia	-	-	-	-	-	-	-	-	0	0	-	0	0	0	0	0	0	0	0	0	-
	Azerbaijan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
	Georgia	0	0	0	0	0	0	0	0	-	0	-	0	0	0	0	0	0	0	0	0	-
	Kyrgyzstan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
	Russian Federation	1	1	4	1	3	2	3	4	3	3	2	3	2	4	5	3	4	2	2	1	-
	Tajikistan	-	-	-	-	-	-	-	7	0	-	-	0	0	0	0	0	0	0	0	0	-
	Turkey	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	1	-
	Turkmenistan[1]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
	Uzbekistan	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	-
South-East Asia	Bangladesh	50	132	402	382	1 278	1 393	794	469	528	552	484	470	598	574	505	501	508	228	154	47	37
	Bhutan	2	36	49	62	48	39	25	14	17	16	15	14	11	14	7	5	7	2	2	4	2
	Democratic People's Republic of Korea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	India	353	421	422	354	1 122	1 151	2 803	879	666	1 048	892	1 015	973	1 006	949	963	1 708	1 311	1 055	1 144	1 023
	Indonesia	-	-	-	-	-	-	148	199	45	-	833	-	-	-	508	88	494	-	669	900	432
	Myanmar	5 127	5 231	4 739	4 219	4 099	3 526	3 424	2 943	3 182	3 648	2 756	2 814	2 634	2 476	1 982	1 707	1 647	1 265	1 088	972	788
	Nepal	-	-	-	-	0	0	15	2	7	-	-	1	3	5	7	10	42	3	-	8	6
	Sri Lanka	14	19	9	7	50	5	26	61	115	-	77	52	30	4	1	0	1	1	0	-	-
	Thailand	1 287	1 747	1 050	997	908	856	826	764	688	740	625	424	361	204	230	161	113	97	101	70	80
	Timor-Leste	-	-	-	-	-	-	-	-	-	-	-	-	-	-	65	71	68	60	33	53	58

Annex 6D – Reported malaria deaths, 1990-2010 (continued)

WHO region	Country/area	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Western Pacific	Cambodia	1 020	1 163	1 408	1 100	1 009	614	745	811	621	891	608	476	457	492	382	296	396	241	209	279	151
	China	35	-	52	19	43	34	30	46	24	52	31	27	42	52	31	48	37	18	23	10	19
	Lao People's Democratic Republic	372	457	438	418	609	620	608	606	427	338	350	242	195	187	105	77	21	14	11	5	24
	Malaysia	43	-	25	23	28	35	40	25	27	21	35	46	38	21	35	33	21	18	30	26	-
	Papua New Guinea	457	-	500	448	281	415	514	390	651	567	617	562	647	537	619	725	668	559	628	604	616
	Philippines	913	924	864	811	784	643	536	514	561	755	536	439	71	162	167	145	124	73	56	24	30
	Republic of Korea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	-
	Solomon Islands	33	46	33	40	49	51	30	27	33	23	38	55	61	71	51	38	12	15	21	53	-
	Vanuatu	32	32	26	13	8	12	8	1	9	4	3	4	13	14	3	5	1	5	4	2	1
	Viet Nam	3 340	4 646	2 632	1 026	604	348	203	152	183	190	142	91	50	50	34	18	41	20	25	26	21

Regional Summary	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Africa	64 831	6 964	4 397	5 444	7 473	3 562	5 405	44 792	24 470	63 699	77 642	103 036	110 516	152 657	114 045	137 269	136 955	102 490	103 401	115 092	147 362
Americas	436	507	233	112	831	151	159	302	422	317	362	312	226	230	224	248	241	194	136	134	132
Eastern Mediterranean	1 434	1 898	1 935	2 404	2 487	2 761	1 954	1 853	1 986	2 625	2 166	2 254	2 135	2 538	1 894	1 860	1 367	1 357	1 492	1 517	2 200
Europe	1	2	4	2	3	2	3	11	3	3	2	3	2	4	5	3	4	4	5	2	0
South-East Asia	6 833	7 586	6 671	6 021	7 505	6 970	8 061	5 331	5 248	6 004	5 682	4 790	4 610	4 283	4 254	3 506	4 588	2 967	3 102	3 198	2 426
Western Pacific	6 245	7 268	5 978	3 898	3 415	2 772	2 714	2 572	2 536	2 841	2 360	1 942	1 574	1 586	1 427	1 385	1 321	964	1 007	1 029	862
Total	**79 780**	**24 225**	**19 218**	**17 881**	**21 714**	**16 218**	**18 296**	**54 861**	**34 665**	**75 489**	**88 214**	**112 337**	**119 063**	**161 298**	**121 849**	**144 271**	**144 476**	**107 976**	**109 143**	**120 972**	**152 982**

Less than 18% of countries reporting in Africa during 1990-1999

Notes:

Deaths reported before 2000 can be probable and confirmed or only confirmed deaths depending on the country.

[1] 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] National totals for some columns are incomplete, see details in the sub-sections

[4] Data before 2001 includes data from South Sudan

The *World Malaria Report 2011* summarizes information received from 106 malaria-endemic countries and territories and from malaria control partners. It highlights continued progress made in malaria prevention and control. International funding for malaria control rose to US$ 2 billion in 2011 but still remains significantly below the amount (over US$ 5 billion) that would be needed annually between 2010 and 2015 to achieve global malaria targets. The number of long-lasting insecticidal nets delivered to African malaria-endemic countries increased from 88.5 million in 2009 to 145 million in 2010, raising the percentage of African households with at least one mosquito net from 41% to 50% during the same period. Indoor residual spraying protected 77 million people in 2010, or 11% of the population at risk. There was also continued progress in rolling out parasitological testing. In the WHO African Region, 42% of suspected malaria cases in the public sector were confirmed with a diagnostic test, compared to less than 5% at the beginning of the last decade. In 2010, 181 million courses of artemisisin-based combination therapies were procured, up from 158 million in 2009. The report also carries updated information about drug and insecticide resistance, warning that control efforts should proactively address both of these challenges. For the first time, the annual report includes country profiles for all 99 countries and territories with ongoing malaria transmission.

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