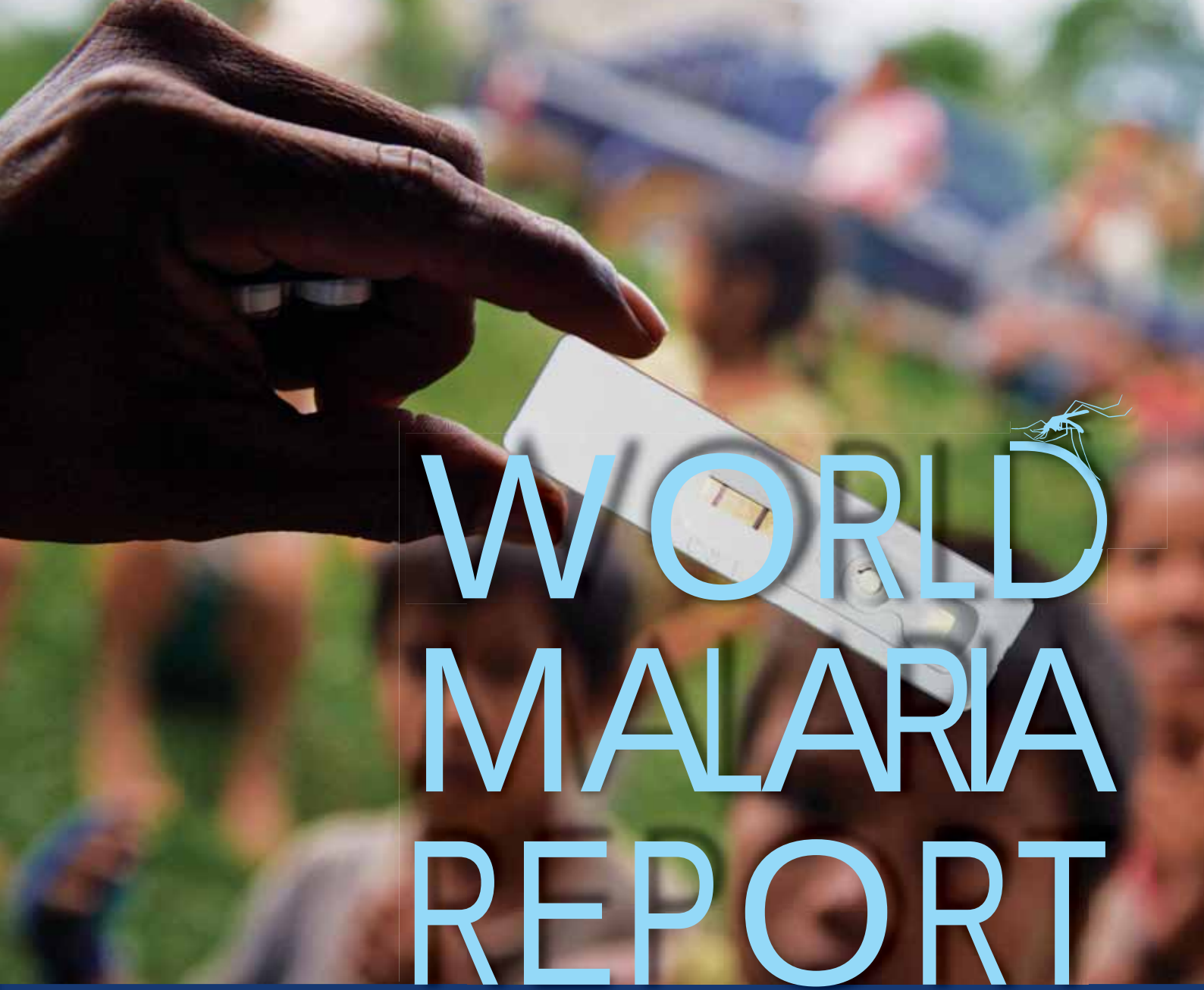

WORLD MALARIA REPORT 2010

World Health Organization

WHO Global Malaria Programme

WORLD MALARIA REPORT 2010

World Health Organization

WHO Library Cataloguing-in-Publication Data

World malaria report : 2010.

1.Malaria - prevention and control. 2 Malaria - economics. 3.Malaria - epidemiology. 4.Disease vectors. 5.Insecticide-treated bednets. 6.Antimalarials. 7.Drug resistance. 8.Case management - administration and organization. 9.World health. I.World Health Organization.

ISBN 978 92 4 156410 6 (NLM classification: WC 765)

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INTRODUCTION TO THE 2010 WORLD MALARIA REPORT

The 2010 World Malaria Report documents international success in fighting a disease that takes its heaviest toll on poor and vulnerable populations. As such, it contains valuable lessons on how the international community can achieve even greater advances against malaria and make inroads against other global threats.

Success in the fight against malaria comes largely as a result of a new approach involving a broad range of partners coming together in common cause. Sustained action and vigilance remain critical to winning the battle against a tenacious, ever-changing foe, which kills nearly 800,000 people each year.

Two years ago, I called for universal coverage of malaria-control interventions by the end of 2010, in order to bring an end to malaria deaths by 2015. The response was impressive. Enough insecticide-treated mosquito nets have been delivered to Sub-Saharan Africa to protect nearly 580 million people, and more than 75 million have received protection from indoor residual spraying. An additional 54 million nets are slated for delivery in the coming months, bringing the goal of universal coverage within reach.

There have also been compelling advances in places where the disease is endemic. Eleven African countries, backed by international partners, have cut malaria cases and deaths by half, and hundreds of thousands of lives have been saved across the continent. We are also seeing a correlation in certain instances between heightened malaria control and decreases in child mortality from all causes, showing yet again that malaria control is integral to reaching the Millennium Development Goals.

The *World Malaria Report 2010* shows what is possible when we join forces and embrace the mission of saving lives. If we heed the lessons highlighted in this report, we can achieve our goal of ending malaria deaths by the year 2015, accelerate progress toward the MDGs and usher in a better future for all.

Foreword

Dr Margaret Chan, *Director-General World Health Organization*

The findings in the ***World Malaria Report 2010*** further strengthen the business case for investing in malaria control. The accelerated drive to achieve universal coverage with today's tools, called for by the United Nations Secretary-General in 2008, continues to produce results. Nearly 289 million insecticide-treated mosquito nets (ITNs) will have been delivered to sub-Saharan Africa between 2008 and 2010, enough to protect 578 million people. In Africa, 75 million people, or 10% of the population at risk, were also protected in 2009 by indoor residual spraying. These are real achievements.

These prevention efforts are producing a measurable public health impact. The annual number of malaria cases and deaths continues to decline, especially in Africa. The number of countries that have successfully cut their malaria burden in half over the past decade continues to rise. For the first time, not a single case of falciparum malaria was reported in the WHO European Region in 2009. One by one, we are counting down the number of countries endemic for malaria. This year alone, I had the honour to certify both Morocco and Turkmenistan as being free from malaria, and was able to add the names of these countries to the *Official register of areas where malaria elimination has been achieved.*

Major changes in the way we tackle malaria are occurring quickly. This is the year when we finally declared that everyone with suspected malaria has a right to a confirmatory diagnostic test. The time for this change was overdue. For too long in too many places, fever has been equated with malaria. No more. Our efforts at prevention have produced real changes in malaria transmission, and most cases of fever, even in Africa, are no longer due to malaria. This is another clear marker of progress, and another sign of the way control strategies are constantly being refined. We have inexpensive, quality-assured rapid diagnostic tests that can be used all the way down to the community level.

In 2009, more than a third of suspected malaria cases reported in Africa were confirmed with a diagnostic test, a dramatic increase from the less than 5% at the beginning of the decade. A small number of African countries have been able to rapidly scale up malaria diagnostic testing at a national level. Not only has this resulted in saving the unnecessary use of hundreds of thousands of courses of ACTs annually, but has also allowed for the implementation of timely and accurate surveillance for malaria. This is a great leap forward. Only by knowing where our enemy lurks, identifying the places where we still have malaria, can we expect to defeat it.

While there is much to celebrate, the data in this report also underscore the fragility of our progress. Resurgences of malaria were observed in parts of at least three African countries. The exact reasons for these sharp increases are not known, but likely reflect some combination of natural variation and lapses in control measures. These programme failures are a pointed reminder of what could happen if we reduce our vigilance and do not follow through on our collective commitments. In many ways, sustaining the high coverage rates with malaria prevention and control measures may prove even more challenging than having achieved such coverage in the first place.

We cannot let this momentum slip. Significant recent gains, though fragile, must be sustained. The international community needs to ensure sufficient and predictable global funding to meet ambitious targets set for malaria control as part of the drive to reach the health-related Millennium Development Goals by 2015.

The will to sustain the gains that we have made in malaria must come not only from global health leaders and from politicians, but from affected communities. If communities can know the true burden of malaria, and can see the results of prevention and control efforts, then the will to eliminate and ultimately eradicate malaria will never fade.

Acknowledgements

Numerous people contributed to the production of the *World Malaria Report 2010.* The following collected and reviewed data from malaria endemic countries: Ahmad Walid Sediqi (Afghanistan); Yava Ricardo (Angola); Ara Keshishyan (Armenia); Viktor Gasimov (Azerbaijan); Mohammad Jahirul Karim (Bangladesh); Kim Bautista (Belize); Yacoubou Imorou Karimou (Benin); Thinley Yongzom (Bhutan); Marcos Ysrael Fernandez Encinas (Bolivia (Plurinational State of)); Simon Chihanga (Botswana); Oscar Mesones Lapouble (Brazil); Patrice Combary (Burkina Faso); Mbanye Hypax (Burundi); Duong Socheat (Cambodia); Célestin Kouambeng (Cameroon); Antonio Lima Moreira (Cape Verde); M'bary Siolo Mada Bebelou (Central African Republic); Moussa Abba Mahamat (Chad); Xia Zhi-Gui (China); Pablo E Chaparro N (Colombia); Amina Yssouf (Comoros); Jean Claude Batia (Congo); José Luis Garcés Fernandez (Costa Rica); San Koffi Moïse (Côte D'ivoire); Benjamin Atua, Kalindula, Baseane (Democratic Republic of The Congo); David Joa Espinal (Dominican Republic); Kim Yun Chol (Democratic People's Republic Of Korea); Johanes Don Bosco (Democratic Republic Of Timor-Leste); Enrique Castro Saavedra (Ecuador); Gloria Nseng Nchama (Equatorial Guinea); Tewolde G/Meskel (Eritrea); Worku Bekele (Ethiopia) National Malaria Control Programme (French Guiana); J. Solange Antimi (Gabon) Momodou Kalleh (Gambia); Merab Iosava (Georgia); Kofi Osae (Ghana); Ilse Gongora (Guatemala); Amadou Sadio Diallo (Guinea); Duarte Falcão (Guinea-Bissau); Karanchand Krishnallal (Guyana); National Malaria Control Programme (Haiti); Martin Ivan Sinclair (Honduras); GS Sonal (India); Desak Made Wismarini, Mkes (Indonesia); Leila Faraji, Ahmad Raeisi (Iran (Islamic Republic of)); Muthana Ibrahim (Iraq); National Malaria Control Programme (Kenya); Nurbolot Usenbayev (Kyrgyzstan); Kongxay Luangphengsouk (Lao Peoples Democratic Republic) Tolbert Geewleh Nyenswah (Liberia); Andry Joeliarijaona Rakotorahalahy (Madagascar); Misheck Luhanga (Malawi); Christina Rundi (Malaysia); Klenon Traoré (Mali); Ba Mamadou Dit Dialaw (Mauritania); Héctor Olguín Bernal (Mexico); Samuel Jose Alves Mabunda (Mozambique); Khin Mon Mon (Myanmar); P. Uusiku Uupindi (Namibia); GD Thakur (Nepal); Rolando Francisco Lopez Ampie (Nicaragua); Maazou Abani (Niger); EBA Coker (Nigeria); Muhammad Suleman Memon (Pakistan); Raul Medina (Panama); Leo Sora Makita (Papua New Guinea); Blanca Cousiño, Cynthia Viveros, Beatriz Espinola (Paraguay); Mario Baquilod (Philippines); Division Of Communicable Disease Control (Republic of Korea); Alla Baranova (Russian Federation); Corine Karema (Rwanda); Herodes S. Rompão (Sao Tome and Principe); Mohammed Alzahrani (Saudi Arabia); Mame Birame Diouf (Senegal); Musa Sillah-Kanu (Sierra Leone); Boaz Leornard (Solomon Islands); Fahmi E. Yusuf (Somalia); E Misiani, B Shandukani, Ma Groepe (South Africa); S. L. Deniyage (Sri Lanka); Abd Alla Ahmed Ibrahim Mohd (Sudan (North)); Robert Gama Hassan (Sudan (South)); Simon P. Kunene (Swaziland); Tagaikulov Boturkhon (Tajikistan); Saowanit Vijaykadga (Thailand); Liyè Ayo (Togo); Seher Topluoglu (Turkey); Sofia Aliyeva (Turkmenistan); Ebony Quinto (Uganda); Frank Chacky (United Republic of Tanzania (Mainland)); Abdullah Ali, Abdul-Wahid Al-Mafazy (United Republic of Tanzania (Zanzibar)); Tyo Inna, Lebedeva Natalya, Umarova P.H., Khusainova N. (Uzbekistan); George Taleo (Vanuatu); Nguyen Quang Thieu (Viet Nam); Adel Nasser Aljasari (Yemen); Freddie Masaninga; Mercy Mwanza (Zambia); National Malaria Control Programme (Zimbabwe); Jean Bosco Ahoranyezu (WHO/Rwanda); Henok Kebede Ejigu (WHO/Ethiopia); Derege Olana (WHO/Ethiopia); Rachel Eersel (WHO/Suriname); Gustavo Bretas (WHO/Ecuador); Aida Soto (WHO/Nicaragua); Antonieta Arias (WHO/Paraguay); Marco Fidel Suarez (WHO/Bolivia); Abdur Rashid (WHO/Cambodia); Xiaodong Zhang (WHO/China); Deyer Gopinath (WHO/LaoPDR); Harpal Singh (WHO/Malaysia); Zaixing Zhang (WHO/Papua New Guinea); Jeffrey Hii (WHO/Philippines); Jeunessa Sto Nino (WHO/Philippines); Larbi Kwabena (WHO/Solomon Islands); Walter Kazadi Mulombo (WHO/Solomon Islands); Nam Hee Chung (WHO/Republic of Korea); Lasse Vestergaard (WHO/Vanuatu); Dai Tran Cong (WHO/Viet Nam).

The following WHO staff in regional and subregional offices assisted in the design of data collection forms, the collection and validation of data, reviewed epidemiological estimates and country profiles, and prepared country vignettes: Nathan Bakyaita (AFRO); Etienne Magloire Minkoulou (AFRO); Georges Alfred Ki-Zerbo (AFRO); Amadou Bailo Diallo (AFRO/central IST); Khoti Gausi (AFRO/eastern and southern Inter-Country Support Team, ICST); Samson Katikiti (AFRO/ eastern and southern ICST); Abderrahmane Kharchi (AFRO/western IST); Jean-Olivier Guintran (AFRO/western IST); Rainier Escalada (AMRO); Prabjhat Singh (AMRO); Keith Carter (AMRO); Ghasem Zamani (EMRO); Amir Aman (EMRO/DCD/MCE); Hoda Atta (EMRO); Elkhan Gasimov (EURO); Karen Taksøe-Vester (EURO); Mikhail Ejov (EURO); Rakesh Rastogi (SEARO); Krongthong Thimasarn (SEARO); Bayo Fatunmbi (WPRO); Raymond Mendoza (WPRO) and Eva-Maria Christophel (WPRO).

Joshua Yukich of Tulane University undertook data analysis and prepared text for Chapter 3 on malaria financing. Manoj Menon of the US Centers for Disease Control undertook analysis of household survey data on ITN coverage in Chapter 4 on vector control. Abraham Flaxman, Nancy Fullman and Stephen Lim at the Institute of Health Metrics and Evaluation, University of Washington (USA) produced estimates of ITN coverage for African countries using data from household surveys, ITN deliveries by manufacturers and ITNs distributed by NMCPs. Tanya Shewchuk and others from ACT Watch prepared analysis and text on the availability of parasitological diagnosis and antimalarial medicines in Chapter 5 on diagnosis and treatment. Staff from the Global Fund assisted in the conduct of rapid impact assessments presented in Chapter 6 on the impact of malaria control. Madeleine Thomson, Pietro Ceccato, and Michael Bell at International Research Institute for Climate and Society, The Earth Institute at Columbia University, New York, and Hannah Gould and Steve Yoon at Centers for Disease Control and Prevention, Atlanta prepared analysis of the relationship between climate and disease trends in selected African countries. Li Liu, Hope Johnson, Jamie Perin and Bob Black of Johns Hopkins University, Baltimore, prepared estimates of malaria mortality for children living in sub-Saharan Africa. Colin Mathers (WHO) assisted in aligning the estimates of malaria deaths with the Global Burden of Disease Project.

Erin Eckert (Macro International Inc.), Rick Steketee (Malaria Control and Evaluation Partnership in Africa), Mathew Blakley, Ryuichi Komatsu, Eline Korenromp, Estifanos Shargie (Global Fund) reviewed drafts of chapters and made suggestions for their improvement.

The *World Malaria Report 2010* was produced by Maru Aregawi, Richard Cibulskis, Yosuke Kita, Mac Otten, and Ryan Williams on behalf of the WHO Global Malaria Programme. Other colleagues in the Global Malaria Programme also contributed to the production of chapters: Amy Barrette, David Bell, Andrea Bosman, Jo Lines, Kamini Mendis, Jose Nkuni, Sivakumaran Murugasampillay, Robert Newman, Peter Olumese, Aafje Rietveld, Pascal Ringwald, Silvia Schwarte. We also thank Lindsay Martinez for editing, and Simone Colairo-Valerio, Anne Damnon and Joan Griffith for administrative support.

Funding for the production of this Report was gratefully received from Amelior Foundation, the Global Fund, the Government of Japan, the Roll Back Malaria Partnership, and the United States Agency for International Development.

Abbreviations

ABER	Annual blood examination rate
ACT	Artemisinin-based combination therapy
AIDS	Acquired immunodeficiency syndrome
AMFm	Affordable Medicine Facility – malaria
AMP	Alliance for Malaria Prevention
API	Annual parasite incidence
CDC	US Centers for Disease Control and Prevention
CHERG	WHO Child Health Epidemiology Reference Group
DDT	Dichloro-diphenyl-trichloroethane
DHS	Demographic and health survey
G6PD	Glucose-6-phosphate dehydrogenase
GBD	Global burden of disease
Global Fund	The Global Fund to fight AIDS, Tuberculosis and Malaria
GMP	Global Malaria Programme, WHO
HIV	Human immunodeficiency virus
HMIS	Health management information system
IAEG	Inter-Agency and Expert Group on MDG Indicators
IEC	Information, education and communication
IHME	Institute for Health Metrics and Evaluation
IPTi	Intermittent preventive treatment in infants
IPTp	Intermittent preventive treatment in pregnancy
IRS	Indoor residual spraying
ITN	Insecticide-treated mosquito nets
LLIN	Long-lasting insecticide-treated mosquito nets
MDG	Millennium Development Goal
MERG	RBM Monitoring and evaluation reference group
MICS	Multiple indicator cluster survey
MIS	Malaria indicator survey
NGO	Nongovernmental organization
NMCP	National malaria control programme
ODA	Official development aid
OECD	Organisation for Economic Co-operation and Development
PATH	Program for Appropriate Technology in Health
PMI	The US President's Malaria Initiative
RBM	Roll Back Malaria Partnership
RDT	Rapid diagnostic test
SP	Sulfadoxine-pyrimethamine
SPR	Slide positivity rate
SUFI	Scaling Up for Impact
U5MR	Under five mortality rate
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VAMCM	Verbal autopsy multi-cause model
WER	*Weekly Epidemiological Record*
WHA	World Health Assembly
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

AFRO: WHO Regional Office for Africa

AMRO: WHO Regional Office for the Americas

EMRO: WHO Regional Office for the Eastern Mediterranean

EURO: WHO Regional Office for Europe

SEARO: WHO Regional Office for South-East Asia

WPRO: WHO Regional Office for the Western Pacific

Summary

The ***World Malaria Report 2010*** summarizes information received from 106 malaria-endemic countries/areas and other partners and it updates the analyses presented in the 2009 Report. It highlights continued progress made towards meeting international targets for malaria control to be achieved by 2010 and 2015. The report outlines the evolving situation of financing for malaria control, how these growing resources have resulted in increased coverage of WHO-recommended malaria control interventions, and the association between this rapid scale-up and substantial reductions in malaria burden.

International funding for malaria control has risen steeply in the past decade. Disbursements reached their highest ever levels in 2009 at US$ 1.5 billion, but new commitments for malaria control appear to have stagnated in 2010, at US$ 1.8 billion. Countries with smaller populations at risk continue to receive more funding per person at risk than more populous countries. The amounts committed to malaria, while substantial, still fall short of the resources required for malaria control, estimated at more than US$ 6 billion for the year 2010.

The increased financing has resulted in tremendous progress in increasing access to insecticide-treated mosquito nets (ITNs) in the past 3 years. By the end of 2010, approximately 289 million ITNs will have been delivered to sub-Saharan Africa, enough to cover 76% of the 765 million persons at risk of malaria. It is estimated that 42% of households in Africa owned at least one ITN in mid-2010, and that 35% of children slept under a ITN. The percentage of children using ITNs is still below the WHA target of 80% partly because up to the end of 2009, ITN ownership remained low in some of the largest African countries. Low rates of use reported in some surveys are primarily due to a lack of sufficient nets to cover all household members; household survey results suggest that most (80%) of the available ITNs are used.

While the rapid scale-up of ITN distribution in Africa represents an enormous public health achievement, it also represents a formidable challenge for the future in ensuring that the high levels of coverage are maintained. The lifespan of a long-lasting ITN is currently estimated to be 3 years. Nets delivered in 2006 and 2007 are therefore already due for replacement, and those delivered between 2008 and 2010 soon will be. Failure to replace these nets could lead to a resurgence of malaria cases and deaths.

IRS programmes have also expanded considerably in recent years, with the number of people protected in sub-Saharan Africa increasing from 13 million in 2005 to 75 million in 2009, corresponding to protection for approximately 10% of the population at risk in 2009.

Current methods of malaria vector 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. The widespread use of a single class of insecticides increases the risk that mosquitoes will develop resistance, which could rapidly lead to a major public health problem. The risk is of particular concern in Africa, where insecticidal vector control is being deployed with unprecedented levels of coverage and where the burden of malaria is greatest.

WHO now recommends that all cases of suspected malaria be confirmed with a diagnostic test prior to treatment. As the incidence of malaria decreases through much of sub-Saharan Africa, the need to differentiate malaria from non-malarial fevers becomes more pressing. The proportion of reported cases in Africa confirmed with a diagnostic test has risen substantially from less than 5% at the beginning of the decade to approximately 35% in 2009, but low rates persist in the majority of African countries and in a minority of countries in other regions. A small number of countries have shown that it is possible to scale up rapidly the availability of malaria diagnostic testing on a national scale, provided that attention is given to adequate preparation, training, monitoring, supervision and quality control. Such experiences have been linked with large savings in the use of artemisinin-based combination therapies (ACTs) and with improved malaria surveillance.

Information from manufacturers indicates that the number of ACTs procured has increased in every year since 2005. By the end of 2009, 11 African countries were providing sufficient courses of ACTs to cover more than 100% of malaria cases seen in the public sector; a further 8 African countries delivered sufficient courses to treat 50%–100% of cases. These figures represent a substantial increase since 2005, when only 5 countries were providing sufficient courses of ACT to cover more than 50% of patients treated in the public sector. However, information on access to treatment is generally incomplete, particularly for the significant proportion of patients treated in the private sector.

The use of oral artemisinin-based monotherapies threatens the therapeutic life of ACTs by fostering the spread of resistance to artemisinins. By November 2010, 25 countries were still allowing the marketing of these products and 39 pharmaceutical companies were manufacturing them. Most of the countries that still allow the marketing of monotherapies are located in the African Region and most of the manufacturers are in India.

The spread of resistance to antimalarial medicines over the past few decades has led to an intensification of efficacy monitoring to allow early detection of resistance. Despite the observed changes in parasite sensitivity to artemisinins, the clinical and parasitological efficacy of ACTs has not yet been compromised, even in the Greater Mekong sub-region. Nonetheless, both components of the drug combination are currently at risk and using an ACT with an ineffective partner medicine can increase the risk of development or spread of artemisinin resistance.

A total of 11 countries and one area in the WHO African Region showed a reduction of more than 50% in either confirmed malaria cases or malaria admissions and deaths in recent years. A decrease of more than 50% in the number of confirmed cases of malaria between 2000 and 2009 was found in 32 of the 56 malaria-endemic countries outside Africa, while downward trends of 25%–50% were seen in 8 other countries. Morocco and Turkmenistan were certified by the Director-General of WHO in 2010 as having eliminated malaria.

In 2009, the European Region reported no locally acquired cases of *P. falciparum* malaria for the first time.

It is estimated that the number of cases of malaria rose from 233 million in 2000 to 244 million in 2005 but decreased to 225 million in 2009. The number of deaths due to malaria is estimated to have decreased from 985 000 in 2000 to 781 000 in 2009. Decreases in malaria burden have been observed in all WHO Regions, with the largest proportional decreases noted in the European Region, followed by the Region of Americas. The largest absolute decreases in deaths were observed in Africa.

While progress in reducing the malaria burden has been remarkable, there was evidence of an increase in malaria cases in 3 countries in 2009 (Rwanda, Sao Tome and Principe, and Zambia). The reasons for the resurgences are not known with certainty. The increases in malaria cases highlight the fragility of malaria control and the need to maintain control programmes even if numbers of cases have been reduced substantially. The experiences in Rwanda and Zambia also indicate that monthly monitoring of disease surveillance data, both nationally and subnationally, is essential. Since many countries in sub-Saharan Africa had inadequate data to monitor disease trends, it is apparent that greater efforts need to be made to strengthen routine surveillance systems. Major epidemiological events could be occurring in additional countries without being detected and investigated.

Key points

Background and context

Malaria-endemic countries and the global community are scaling up effective interventions to attain both coverage and impact targets for 2010 and beyond.

1. On World Malaria Day 2008, the United Nations Secretary-General called for efforts to ensure universal coverage with malaria prevention and treatment programmes by the end of 2010.
2. The goal established by the World Health Assembly in 2005 and by the Roll Back Malaria (RBM) Partnership is to reduce the numbers of malaria cases and deaths recorded in 2000 by 50% or more by the end of 2010 and by 75% or more by 2015.
3. In September 2008, the RBM Partnership launched the Global Malaria Action Plan, which defines the steps required to accelerate achievement of the 2010 and 2015 targets for malaria control and elimination.

Policies and strategies for malaria control

To attain the 2010 and 2015 targets, countries must reach all persons at risk for malaria with an insecticide-treated mosquito net (ITN) or indoor residual spraying (IRS) and provide laboratory-based diagnosis for all suspected cases of malaria and effective treatment of all confirmed cases.

Prevention

4. In 2009, 23 countries in the WHO African Region and 42 in other WHO Regions had adopted the WHO recommendation to provide ITNs for all persons at risk for malaria, not just women and children; this represents an increase of 13 countries since 2008. A total of 83 countries, of which 39 are in the African Region, distribute ITNs free of charge.
5. IRS with WHO-approved chemicals (including DDT) remains one of the main interventions for reducing and interrupting malaria transmission by vector control in all epidemiological settings. In 2009, 71 countries, including 27 in the African Region, reported implementation of IRS and 17 countries reported using DDT for IRS.
6. Intermittent preventive treatment (IPT) is recommended for population groups in areas of high transmission who are particularly vulnerable to contracting malaria or suffering 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 2008. Papua New Guinea, in the Western Pacific Region, also adopted this policy in 2009. No country has yet adopted a national policy of IPT for infants (IPTi).

Diagnosis and treatment

7. Prompt parasitological confirmation by microscopy or with a rapid diagnostic test (RDT) is recommended for all patients with suspected malaria, before treatment is started. In 2008, 33 of 43 malaria-endemic countries in the African Region and 45 of 63 countries in other Regions reported having a policy of parasitological testing of suspected malaria cases in persons of all ages, and 77 of 86 countries with endemic *Plasmodium falciparum* reported a policy of treatment with an artemisinin-based combination therapy (ACT) for *P. falciparum* malaria.
8. Confirmed cases of uncomplicated *P. falciparum* malaria should be treated with an ACT. *P. vivax* malaria should be treated with chloroquine where it is effective, or an appropriate ACT in areas where *P. vivax* is resistant to chloroquine. Treatment of *P. vivax* should be combined with a 14-day course of primaquine to prevent relapse.
9. WHO recommends that oral artemisinin-based monotherapies be withdrawn from the market and replaced with ACTs. By November 2010, 25 countries were still allowing the marketing of these products (down from 37 in 2009) and 39 pharmaceutical companies were manufacturing them. Most of the countries that still allow the marketing of monotherapies are in the African Region, while most of the manufacturers of these medicines are in India.

Financing malaria control

The funds committed to malaria control from international sources have increased consistently between 2004 and 2009; funds remained at US$ 1.8 billion in 2010, substantially lower than the resources required to achieve global targets, estimated at more than US$ 6 billion for the year 2010.

10. International funds disbursed for malaria control are estimated to have increased from US$ 200 million in 2004 to US$ 1.5 billion million in 2009. Spending by national governments on malaria control appears to have risen in all WHO Regions between 2004 and 2009; thus large increases in donor financing do not appear to have resulted in an overall reduction in the level of domestic financing, although countries which had reduced their spending received more external financing than those which had increased their domestic spending on malaria.
11. Of 106 malaria-endemic countries and areas, 77 received external assistance for malaria control between 2000 and 2008. The highest per capita expenditure continued to be seen in countries with smaller populations at risk. External financing appears to be concentrated on programme activities, particularly the procurement of ITNs, antimalarial medicines and IRS. A larger proportion

of national government financing is directed towards human resources although significant amounts are also spent on anti-malarial medicines and IRS.

12. Countries in the pre-elimination and elimination phases appear to spend more per person at risk of malaria than countries in the control phase. While the additional spending is partly due to larger amounts of external financing, government financing exceeds that of external financing in countries in the pre-elimination and elimination stages.

Progress in preventing malaria

Coverage with ITNs is increasing rapidly in some countries of Africa, household ITN ownership having risen to 42% by mid-2010.

13. In less than 3 years between 2008 and 2010 a cumulative total of 254 million ITNs were delivered to sub-Saharan Africa, enough to cover 66% of the 765 million persons at risk. An additional 35 million ITNs are scheduled for delivery before the end of 2010, sufficient to cover a further 10% of the population at risk. However, considerably more work is required to ensure that ITNs reach all households where they are needed, and that persons at risk of malaria sleep under an ITN every night.

14. A model-based estimate showed that 42% of African households owned at least one ITN, and 35% of children < 5 years of age slept under an ITN in 2010. Household ITN ownership was estimated in this model to have reached ≥ 50% in 19 African countries in 2010.

15. Household surveys undertaken between 2007 and 2009 found that 11 countries (Equatorial Guinea, Ethiopia, Gabon, Mali, Rwanda, Senegal, Sao Tome and Principe, Senegal, Sierra Leone, Togo, and Zambia) had reached a household ITN ownership rate of more than 50%. The median percentage of children < 5 years of age sleeping under an ITN in these countries was 45%. Low rates of use reported in some surveys are primarily due to a lack of sufficient nets to cover all household members; a very high proportion (80%) of available ITNs is used.

16. Persons aged 5–19 years are least likely to use an ITN compared to those in the younger and older age groups. Women are slightly more likely to sleep under an ITN than men (ratio women: men = 1.1); this is partly because pregnant women are more likely to sleep under an ITN than other women. There is no difference in usage rates between female and male children < 5 years of age (ratio girls: boys = 0.99).

17. The number of people protected by IRS increased in sub-Saharan Africa from 13 million in 2005 to 75 million in 2009, a quantity which corresponds to protection for 10% of the population at risk in 2009.

18. In other WHO Regions, the number of ITNs delivered by manufacturers or distributed by NMCPs is smaller than in Africa (16.4 million 2009), but has been increasing at a similar rate. IRS implementation is relatively stable with 98 million people protected in 2009 (69 million in India). 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, possibly because of the more focal nature of malaria outside Africa.

19. 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. The widespread use of a single class of insecticide increases the risk that mosquitoes will develop resistance, which could rapidly lead to a major public health problem, particularly in Africa, where chemical vector control is being deployed with unprecedented levels of coverage and where the burden of malaria is greatest.

Progress on the prevention of malaria during pregnancy

Coverage with intermittent preventive treatment for pregnant women (IPTp) remains far from target levels, although a few countries have made notable progress.

20. The percentage of pregnant women who received the second dose of IPTp ranged from 2.4% in Angola to 62% in Zambia, according to households surveys in 8 countries for which data were available for 2007–2009. The weighted average, representing a population of 270 million, remained low, at 12%, due primarily to low coverage rates in Nigeria.

21. Data reported by NMCPs in 22 high-burden countries in the African Region indicate that the percentage of women attending antenatal clinics who received the second dose of IPTp was 55% (inter-quartile range 47%–61%).

Progress in the diagnosis and treatment of malaria

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

22. The percentage of reported suspected malaria cases receiving a parasitological test has increased between 2005 and 2009, particularly in the African Region (from 26% to 35%), Eastern Mediterranean Region (47% to 68%) 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%. Data from a limited number of countries suggest that both microscopy and RDTs are less widely available in the private sector than the public sector.

23. A small number of countries, including the Lao People's Democratic Republic and Senegal, have shown that it is possible to scale up rapidly the availability of malaria diagnostic testing nationwide, provided that attention is given to adequate preparation, training, monitoring, supervision and quality control.

24. The number of ACT treatment courses procured increased greatly from 11.2 million in 2005 to 76 million in 2006, and reached 158 million in 2009. By the end of 2009, 11 African countries were providing sufficient courses of ACTs to cover more than 100% of malaria cases seen in the public sector; a further 8 African countries delivered sufficient courses to treat 50%–100% of cases. These figures represent a substantial increase since 2005, when only 5 countries were providing sufficient courses of ACT to cover more than 50% of patients treated in the public sector. However, the number of ACTs distributed by NMCPs in the African Region in 2009 exceeded the number of RDTs procured more than five-fold, and the total number of tests carried out (microscopy + RDTs) by a factor of 2.4, indicating that many patients are receiving ACTs without confirmatory diagnosis.

25. By combining household survey data with health facility data it can be estimated that, on average, 65% of treatment needs are fulfilled for patients attending public health facilities. Estimates are more difficult to construct for patients who are treated in the private sector, but household surveys indicate febrile patients treated in the private sector are 25% less likely to receive an antimalarial than those visiting public sector facilities, while those that stay at home are 60% less likely.

26. The use of oral artemisinin-based monotherapies threatens the therapeutic life of ACTs by fostering the spread of resistance to artemisinin. By November 2010, 25 countries were still allowing the marketing of these products and 39 pharmaceutical companies were manufacturing these products. Most of the countries that still allow the marketing of monotherapies are located in the African Region and most of the manufacturers are in India.

27. Parasite resistance has rendered previous antimalarial medicines ineffective in most parts of the world, jeopardizing malaria control. The highly effective artemisinin derivatives and their partner drugs are vulnerable to the same risk. Resistance of *P. falciparum* to artemisinins was confirmed at the Cambodia-Thailand border in 2009 but despite the observed changes in parasite sensitivity to artemisinins, the clinical and parasitological efficacy of ACTs has not yet been compromised. Since 2008, containment activities to limit the spread of artemisinin-resistant parasites have been ongoing.

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 estimated number of deaths from nearly 1 million in 2000 to 781 000 in 2009.

28. A total of 11 countries and one area in the African Region showed a reduction of more than 50% in either confirmed malaria cases or malaria admissions and deaths in recent years (Algeria, Botswana, Cape Verde, Eritrea, Madagascar, Namibia, Rwanda, Sao Tome and Principe, South Africa, Swaziland, Zambia, and Zanzibar, United Republic of Tanzania). In all countries, the decreases are associated with intense malaria control interventions.

29. In 2009 there was evidence of an increase in malaria cases in three countries that had previously reported reductions (Rwanda, Sao Tome and Principe, and Zambia). The reasons for these resurgences are not known with certainty, but they highlight the fragility of progress in malaria control and the need to rigorously maintain control programmes even when cases have been reduced substantially.

30. In other WHO Regions, the number of reported cases of confirmed malaria decreased by more than 50% in 32 of the 56 malaria-endemic countries between 2000 and 2009 and downward trends of 25%–50% were seen in 8 other countries. In 2009, the European Region reported no locally acquired cases of *P. falciparum* malaria for the first time. The number of cases fell 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.

31. There were 8 countries in the pre-elimination stage of malaria control in 2009 and 10 countries are implementing elimination programmes nationwide (6 having entered the elimination phase in 2008). A further 9 countries (Armenia, Bahamas, Egypt, Jamaica, Morocco, Oman, Russian Federation, Syrian Arab Republic, and Turkmenistan) are in the phase of preventing re-introduction of malaria. Morocco and Turkmenistan were certified as free of malaria by the WHO Director-General in 2010.

32. It is estimated that the number of cases of malaria rose from 233 million in 2000 to 244 million in 2005 but decreased to 225 million in 2009. The number of deaths due to malaria is estimated to have decreased from 985 000 in 2000 to 781 000 in 2009. Decreases in malaria burden have been observed in all WHO Regions, with the largest proportional decreases noted in the European Region, followed by the Region of the Americas. The largest absolute decreases in deaths were observed in Africa.

Avant-propos

Dr Margaret Chan,
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L'analyse de rentabilité que l'on peut faire à la lumière des conclusions du ***Rapport 2010 sur le paludisme dans le monde*** apporte des arguments supplémentaires en faveur d'un investissement dans la lutte antipaludique. L'accélération du mouvement en vue d'assurer une couverture universelle au moyen des dispositifs actuels, que le Secrétaire général des Nations Unies a appelée de ses vœux en 2008, continue de porter ses fruits. Entre 2008 et 2010, près de 289 millions de moustiquaires imprégnées d'insecticide (MII) auront été fournies à l'Afrique subsaharienne, un nombre suffisant pour protéger 578 millions de personnes. En Afrique, 75 millions de personnes, soit 10 % de la population exposée au risque, ont également été protégées grâce à des pulvérisations intradomiciliaires d'insecticides à effet rémanent (PID). Ce sont là des résultats concrets.

Cet effort de prévention a des conséquences mesurables en termes de santé publique. Le nombre de cas et de décès imputables chaque année au paludisme poursuit son déclin, notamment en Afrique. Les pays qui sont parvenus à réduire de moitié leur charge de morbidité palustre au cours de la dernière décennie sont toujours plus nombreux. Pour la première fois, aucun cas de paludisme à falciparum n'a été signalé en 2009 dans la Région OMS de l'Europe. Nous voyons le nombre des pays d'endémie palustre se réduire pays par pays. Rien que cette année, j'ai eu l'honneur de certifier le Maroc et le Turkménistan exempts de paludisme et j'ai pu inscrire ces pays au *Registre des zones où l'élimination du paludisme a été réalisée*.

Des changements majeurs sont en train de faire évoluer rapidement notre façon de nous attaquer au paludisme. Cette année, nous avons enfin déclaré que tout cas suspect de paludisme avait droit à un diagnostic de confirmation. Il était grand temps de le faire. On a trop longtemps et en trop de lieux assimilé chaque cas de fièvre à un cas de paludisme. Ce temps est révolu. Nos efforts de prévention ont réellement modifié la transmission du paludisme et même en Afrique, la plupart des cas de fièvre ne sont plus dus au paludisme. Voilà encore un signe indiscutable de progrès qui traduit le perfectionnement constant de nos stratégies de lutte. Nous disposons de tests de diagnostic rapide, peu coûteux, de qualité garantie et qui peuvent être effectués à tous les niveaux, et même à celui de la communauté.

En 2009, plus d'un tiers des cas suspectés de paludisme notifiés en Afrique ont été confirmés par un test de diagnostic, ce qui représente une augmentation spectaculaire par rapport aux moins de 5 % que l'on enregistrait au début de la décennie. Dans un petit nombre de pays africains, on est parvenu à passer rapidement à l'échelon national en matière de diagnostic. Cela a permis non seulement d'économiser chaque année des milliers de traitements inutiles à l'aide d'associations thérapeutiques à base d'artémisinine (ACT), mais encore de donner les moyens de surveiller le paludisme en temps opportun et de manière fiable. C'est là une importante avancée. Ce n'est qu'en découvrant où se cache l'ennemi, en localisant les zones où il sévit encore, que nous pouvons espérer le vaincre.

S'il est vrai qu'il y a lieu de se réjouir, les données qui figurent dans ce rapport mettent en évidence la fragilité de nos progrès. Une résurgence du paludisme a été observée dans certaines zones d'au moins trois pays africains. Les raisons de cette forte augmentation ne sont pas connues avec exactitude, mais elles tiennent probablement à la conjugaison de variations naturelles et de défaillances dans les mesures de lutte. Ces échecs programmatiques nous rappellent ce qui pourrait arriver en devenant moins vigilants ou en ne donnant pas suite à nos engagements collectifs. A bien des égards, plus que d'être déjà parvenus à assurer un taux élevé de couverture par des mesures de prévention et de lutte antipalustre, c'est d'en assurer la durabilité qui risque de poser problème.

Nous ne pouvons pas laisser cette dynamique s'essouffler. Nos récents acquis sont importants mais fragiles et nous devons les pérenniser. Il faut que la communauté internationale assure, au niveau mondial, un financement qui soit à la fois prévisible et suffisant pour atteindre, dans le cadre des efforts déployés en vue de la réalisation en 2015 des objectifs sanitaires du millénaire pour le développement, les cibles ambitieuses qui ont été fixées en matière de lutte contre le paludisme.

Il faut que la volonté de maintenir les acquis de la lutte antipaludique émane non seulement des chefs de file de l'action sanitaire mondiale ou des responsables politiques, mais aussi des communautés concernées. Pour autant que ces communautés puissent se rendre compte de la charge réelle que le paludisme fait peser sur elles et des résultats obtenus grâce aux efforts déployés pour le prévenir et le juguler, la volonté d'éliminer et de finir par éradiquer cette maladie ne faiblira jamais.

Résumé

Le ***Rapport 2010 sur le paludisme dans le monde*** récapitule les informations communiquées par les 106 pays d'endémie palustre, ou émanant d'autres sources, et il met à jour les analyses qui figurent dans le rapport 2009. Il met en lumière les progrès ininterrompus accomplis vers la réalisation, en 2010 et 2015, des objectifs internationaux en matière de lutte antipaludique. Le rapport évoque également les changements intervenus dans la situation financière de la lutte antipaludique ; il montre comment les ressources croissantes dont elle dispose ont permis de diffuser plus largement les interventions recommandées par l'OMS et indique en quoi le recul notable de la charge de morbidité palustre est lié à ce passage rapide à l'échelle supérieure.

Les fonds d'origine internationale consacrés à la lutte antipaludique ont fortement augmenté au cours de la dernière décennie. C'est en 2009 que les dépenses ont atteint le montant le plus élevé jamais observé avec un total de 1,5 milliard US$, mais les nouveaux engagements en faveur de la lutte antipaludique ont visiblement stagné en 2010, avec un montant de 1,8 milliard US$. Les pays dont la population exposée au risque est peu nombreuse continuent à recevoir davantage de fonds par personne exposée au risque que les pays plus fortement peuplés. Les sommes consacrées au paludisme, pour importantes qu'elles soient, restent insuffisantes au regard des ressources nécessaires pour combattre la maladie, lesquelles sont évaluées à plus de 6 milliards US$ pour l'année 2010.

Ce financement accru a permis des progrès considérables dans l'accessibilité des moustiquaires imprégnées d'insecticides (MII) au cours des trois dernières années. Fin 2010, environ 289 millions de MII ont été fournies à l'Afrique subsaharienne, un nombre suffisant pour couvrir 76 % des 765 millions de personnes exposées au risque de paludisme. On estime qu'au milieu de l'année 2010, 42 % des ménages africains étaient en possession d'une MII et que 35 % des enfants dormaient sous une telle moustiquaire. Le pourcentage d'enfants utilisant une MII est encore inférieur au chiffre de 80 % préconisé par l'Assemblée mondiale de la Santé, en partie du fait que, jusqu'à fin 2009, il y avait encore peu de possesseurs de MII dans certains des plus grands pays d'Afrique. Les faibles taux d'utilisation relevés par certaines enquêtes s'expliquent principalement par le nombre insuffisant de moustiquaires pour équiper tous les membres d'un ménage; les résultats des enquêtes indiquent que la plupart (80 %) des MII disponibles sont utilisées.

Si la montée en flèche de la distribution de MII en Afrique représente un exploit considérable sur le plan de la santé publique, elle n'en constitue pas moins un formidable défi pour l'avenir, s'agissant du maintien d'un niveau élevé de couverture. On estime que la durée de vie d'une MII de longue durée (MILD) est actuellement de 3 ans. Les moustiquaires livrées en 2006 et 2007 doivent donc déjà être remplacées, et celles qui ont été livrées en 2008 et 2009 devront l'être bientôt. Le non remplacement de ces moustiquaires pourrait entraîner la réapparition de cas et de décès imputables au paludisme.

Les programmes de pulvérisations intradomiciliaires d'insecticides à effet rémanent (PID) ont connu un développement très important en Afrique subsaharienne au cours des dernières années, le nombre de personnes protégées passant de 13 millions en 2005 à 75 millions en 2009, soit un taux de couverture d'environ 10 % de la population exposée au risque en 2009.

Les méthodes actuelles de lutte antivectorielle dépendent en très grande partie d'une seule classe d'insecticides, les pyréthrinoïdes, qui sont les composés les plus couramment utilisés pour les PID et les seuls qui servent à imprégner les moustiquaires. En généralisant l'usage d'une seule et unique classe d'insecticides, on accroît le risque de voir apparaître, chez les moustiques vecteurs, une résistance qui pourrait devenir rapidement un problème majeur de santé publique. 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 et où la charge de morbidité palustre est la plus élevée.

L'OMS recommande désormais que tous les cas suspects de paludisme soient confirmés par un test de diagnostic préalablement à tout traitement. Maintenant que l'incidence du paludisme recule dans une grande partie de l'Afrique subsaharienne, la nécessité de différencier une fièvre palustre d'un état fébrile ayant une autre origine se fait plus pressante. En Afrique, la proportion de cas notifiés comme cas confirmés par un test de diagnostic a sensiblement augmenté, passant de moins de 5 % au début de la décennie à environ 35 % en 2009, mais cette proportion reste faible dans la plupart des pays d'Afrique et dans un petit nombre de pays des autres Régions. Dans un petit nombre de pays, on a montré qu'il était possible d'accroître rapidement la disponibilité des tests de diagnostic rapide à l'échelon national, en veillant à assurer une préparation, une formation, un suivi, un encadrement et un contrôle de qualité adéquats. En lien avec ces expériences, il y a eu d'importantes économies dans l'utilisation des combinaisons thérapeutiques à base d'artémisinine (CTA) et une meilleure surveillance du paludisme.

D'après les renseignements communiqués par les producteurs, le nombre de CTA délivrées augmente chaque année depuis 2005. Fin 2009, 11 pays africains fournissaient suffisamment de cures pour traiter plus de 100 % des cas de paludisme vus dans le secteur public et 8 autres en ont délivré suffisamment pour traiter de 50 à 100 % des cas. Ces chiffres traduisent une augmentation notable depuis 2005, année où seulement 5 pays fournissaient suffisamment de cures pour

traiter plus de 50 % des malades pris en charge par le secteur public. Cela étant, les informations relatives à l'accessibilité du traitement sont généralement incomplètes, notamment en ce qui concerne la proportion importante de malades qui sont traités dans le secteur privé.

Le recours aux monothérapies à base d'artémisinine par voie orale constitue une menace pour la durée de validité thérapeutique des CTA, dans la mesure où il favorise la propagation d'une résistance aux artémisinines. En novembre 2010, la commercialisation de ces produits était encore autorisée dans 25 pays et 39 firmes pharmaceutiques en fabriquaient. La plupart des pays où la commercialisation des monothérapies est encore autorisée appartiennent à la Région de l'Afrique et presque tous les producteurs se trouvent en Inde.

La résistance aux antipaludéens s'est étendue au cours des dernières décennies et cela a conduit à surveiller plus intensément l'efficacité de ces produits afin de déceler dans les plus brefs délais l'apparition d'une telle résistance. Malgré les changements que l'on observe dans la sensibilité des plasmodies aux artémisinines, l'efficacité clinique et parasitologique des CTA n'est pas encore compromise, même dans la sous-région du Grand Mékong. Les deux constituants de cette association médicamenteuse n'en sont pas moins menacés et utiliser une CTA comportant un médicament associé inefficace peut accroître le risque de faire apparaître ou de propager la résistance aux artémisinines.

Il y a 11 pays au total et un territoire dans la Région OMS de l'Afrique où le nombre des cas confirmés de paludisme ou des hospitalisations et des décès pour cause de paludisme a reculé de plus de 50 % au cours de ces dernières années. Entre 2000 et 2009, on a enregistré un recul de plus de 50 % des cas confirmés de paludisme dans 32 des 56 pays d'endémie palustre situés hors d'Afrique, une tendance descendante de l'ordre de 25 à 50 % étant observée dans 8 autres pays. En 2010, le Directeur général de l'OMS a certifié que le Maroc et le Turkménistan avaient éliminé le paludisme. La même année et pour la première fois, aucun cas de paludisme à falciparum n'a été notifié dans la Région OMS de l'Europe.

On estime que le nombre de cas de paludisme est passé de 233 millions en 2000 à 244 millions en 2005, mais qu'il a reculé à 225 millions en 2009. Selon les estimations, le nombre de décès imputables au paludisme a reculé de 985 000, en 2000, à 781 000 en 2009. Une baisse de la charge de morbidité palustre a été observée dans toutes les Régions de l'OMS. Proportionnellement, la baisse a été la plus marquée dans la Région de l'Europe, suivie par la Région des Amériques. En valeur absolue, c'est en Afrique que le nombre de décès a le plus reculé.

Si la réduction de la charge de morbidité palustre a remarquablement progressé, on a les preuves d'une augmentation des cas dans 3 pays en 2009 (Rwanda, Sao Tomé-et-Principe, Zambie). Les raisons de cette résurgence ne sont pas connues avec certitude. Cette augmentation des cas de paludisme souligne la fragilité des acquis de la lutte antipaludique et la nécessité de maintenir les programmes de lutte même si le nombre de cas a sensiblement reculé. Ce qui s'est passé au Rwanda et en Zambie montre également qu'un contrôle mensuel des données fournies par la surveillance de la morbidité, tant au niveau national qu'au niveau infranational, est essentiel. Beaucoup de pays de l'Afrique subsaharienne n'ayant pas suffisamment de données pour suivre les tendances de la morbidité, il est clair que de grands efforts sont encore à faire pour renforcer les systèmes de surveillance systématique. Des événements épidémiologiques majeurs pourraient se produire dans d'autres pays sans être décelés ni soumis à investigation.

Points essentiels

Historique et contexte

Les pays d'endémie palustre et la communauté internationale interviennent efficacement et à grande échelle pour atteindre, d'ici 2010 et au-delà, les cibles fixées en matière de couverture et d'impact.

1. Lors de l'appel qu'il a lancé en 2008 à l'occasion de la Journée mondiale du paludisme, le Secrétaire général des Nations Unies a souhaité que des efforts soient déployés afin d'assurer d'ici 2010 une couverture universelle par les programmes de prévention et de traitement de cette maladie.
2. En 2005, l'Assemblée mondiale de la Santé et le Partenariat "Faire reculer le paludisme" (RBM) se sont fixé pour but de réduire le nombre de cas et de décès imputables au paludisme d'au moins 50 % d'ici fin 2010 et d'au moins 75 % d'ici 2015 par rapport aux chiffres de 2000.
3. En septembre 2008, le Partenariat RBM a lancé un Plan mondial d'action contre le paludisme qui définit les mesures permettant d'atteindre plus rapidement les cibles fixées pour 2010 et 2015 en ce qui concerne l'endiguement et l'élimination du paludisme.

Politiques et stratégies de lutte antipaludique

Pour atteindre les cibles fixées pour 2010 et 2015, les pays doivent faire en sorte que toutes les personnes exposées au risque de paludisme aient accès aux moustiquaires imprégnées d'insecticide (MII) et aux pulvérisations intradomiciliaires d'insecticides à effet rémanent (PID), que tous les cas suspects de paludisme fassent l'objet d'un diagnostic en laboratoire, et que tous les cas confirmés soient traités efficacement.

Prévention

4. En 2009, 23 pays appartenant à la Région de l'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 risque de paludisme et pas uniquement aux femmes et aux enfants; cela représente 13 pays de plus qu'en 2008. Il y a au total 83 pays – dont 39 dans la Région de l'Afrique –, qui distribuent gratuitement des MII à toutes les personnes exposées au risque de paludisme.
5. Les pulvérisations intradomiciliaires (PID) à l'aide d'insecticides à effet rémanent agréés par l'OMS (y compris le DDT) constituent encore la principale mesure de lutte antivectorielle destinée à réduire ou interrompre la transmission du paludisme dans tous les contextes épidémiologiques. En 2009, 71 pays dont 27 situés dans la Région de l'Afrique, on indiqué procéder à des pulvérisations intradomicilaires, 17 de ces pays ayant recours au DDT pour ces opérations.
6. Un traitement préventif intermittent (TPI) est recommandé pour les groupes de population vivant dans des zones à forte transmission et qui sont particulièrement exposés à contracter le paludisme ou à souffrir de ses conséquences, notamment les femmes enceintes et les nourrissons. Sur 45 pays de l'Afrique subsaharienne, il y en a 35 qui, fin 2008, avaient adopté le TPI comme politique nationale. Dans la Région du Pacifique occidental, la Papouasie-Nouvelle Guinée a également adopté cette politique en 2009. Aucun pays n'a pour l'instant fait du TPI un élément de sa politique nationale dans le cas des nourrissons.

Diagnostic et traitement

7. Une prompte confirmation parasitologique par examen microscopique ou au moyen d'un test de diagnostic rapide (TDR) est recommandée avant tout traitement pour l'ensemble des cas suspects de paludisme. En 2008, 33 des 43 pays d'endémie palustre situés dans la Région de l'Afrique et 45 des 63 qui font partie d'autres Régions ont indiqué avoir pour politique de pratiquer des examens parasitologiques chez les cas suspects de paludisme appartenant à toutes les classes d'âge et 77 des 86 pays où *Plasmodium falciparum* est endémique ont déclaré que leur ligne de conduite était de traiter le paludisme à falciparum au moyen de combinaisons thérapeutiques à base d'artémisinine (CTA).
8. Les cas confirmés de paludisme simple à falciparum doivent être traités au moyen d'une association thérapeutique à base d'artémisinine. Le paludisme à vivax doit être traité par la chloroquine là où cet antipaludéen reste efficace ou par une CTA dans les zones où *P. vivax* est résistant à la chloroquine. Le traitement du paludisme à vivax doit être complété par l'administration de primaquine pendant 14 jours afin d'éviter les rechutes.
9. L'OMS recommande de retirer du marché les monothérapies à base d'artémisinine et de les remplacer par des CTA. En novembre 2010, 25 pays autorisaient encore la commercialisation de ces produits (ils étaient 37 en 2009) et 39 firmes pharmaceutiques les fabriquaient. La plupart des pays où la commercialisation des monothérapies est encore autorisée appartiennent à la Région de l'Afrique, tandis que la plupart des fabricants de ces médicaments se trouvent en Inde.

Financement de la lutte antipaludique

Les fonds qui sont affectés à la lutte antipaludique provenant de sources de financement internationales ont régulièrement augmenté entre 2004 et 2009, mais ils ont stagné en 2010 avec un montant de 1,8 milliard US$ et restent sensiblement inférieurs aux ressources nécessaires pour atteindre les cibles fixées au niveau mondial, ressources que l'on évalue à plus de 6 milliards US$ pour l'année 2010.

10. On estime que les fonds internationaux affectés à la lutte antipaludique sont passés de 200 millions US$ en 2004 à 1,5 milliard US$ en 2009. Il apparaît que les montants dépensés par les pouvoirs publics nationaux au titre de la lutte contre le paludisme ont augmenté dans toutes les Régions de l'OMS entre 2004 et 2009 ; il semble donc que la forte augmentation des fonds alloués par des donateurs n'ait pas eu pour effet de réduire globalement le financement par des fonds nationaux, encore que les pays qui avaient réduit leurs dépenses aient reçu davantage de fonds extérieurs que ceux qui avaient consacré davantage de fonds d'origine nationale à la lutte antipaludique.

11. Entre 2000 et 2008, sur les 106 pays ou territoires d'endémie palustre, 77 ont reçu une aide extérieure au titre de la lutte contre le paludisme. C'est dans les pays dont la population exposée au risque était la plus faible que l'on a encore observé les dépenses par habitant les plus élevées. On constate que le financement extérieur est axé sur les activités programmatiques, notamment la fourniture de MII et d'antipaludéens, ainsi que sur les PID. Les fonds alloués par les pouvoirs publics sont consacrés pour une plus grande part aux ressources humaines, mais des montants importants sont tout de même affectés aux antipaludéens et aux pulvérisations intradomiciliaires.

12. On observe que les pays qui se trouvent en phase de pré-élimination ou d'élimination dépensent davantage par personne exposée au risque que ceux qui sont en phase de lutte. L'accroissement des dépenses s'explique en partie par l'augmentation du financement extérieur, mais dans les pays qui sont en phase de pré-élimination ou d'élimination, le montant des fonds alloués par les pouvoirs publics dépasse celui du financement extérieur.

Progrès dans la prévention du paludisme

La couverture en moustiquaires imprégnées d'insecticide s'accroît rapidement dans certains pays d'Afrique et 42 % des ménages en étaient propriétaires au milieu de l'année 2010.

13. Entre 2008 et 2010, c'est-à-dire en moins de 3 ans, 254 millions de MII ont été fournies au total à l'Afrique subsaharienne, une quantité suffisante pour protéger 66 % des 765 millions d'habitants exposés au risque. Il est prévu d'en fournir 35 millions de plus avant la fin de 2010, ce qui permettra d'étendre la protection à encore 10 % de cette population. Il faudra néanmoins encore beaucoup d'efforts pour en doter tous les ménages qui en ont besoin et faire en sorte que tous ceux qui sont exposés au risque puissent dormir chaque nuit sous une moustiquaire imprégnée.

14. Selon une estimation par modélisation, 42 % des ménages africains étaient en possession d'au moins une MII et 35 % des enfants de moins de 5 ans dormaient en 2010 sous une moustiquaire imprégnée. On estime, selon ce modèle, que dans 19 pays d'Afrique, la proportion de ménages détenteurs de moustiquaires a atteint ≥ 50 % en 2010.

15. Les enquêtes effectuées auprès des ménages entre 2007 et 2009 révèlent que dans 11 pays (Ethiopie, Gabon, Guinée équatoriale, Mali, Rwanda, Sao Tomé-et-Principe, Sénégal, Sierra Leone, Togo et Zambie) la proportion des ménages possédant une MII avait atteint ≥ 50 %. Dans ces pays, le pourcentage médian d'enfants de moins de 5 ans dormant sous une moustiquaire imprégnée était de 45 %. Les faibles taux d'utilisation relevés par certaines enquêtes s'expliquent principalement par le nombre insuffisant de moustiquaires pour protéger tous les membres du ménage; la proportion de moustiquaires disponibles effectivement utilisées est très élevée (80%).

16. C'est dans la tranche d'âge de 5 à 19 ans que la probabilité d'utiliser une MII est la plus faible comparativement aux groupes plus jeunes ou plus âgés. Chez les femmes, la probabilité de dormir sous une moustiquaire imprégnée est légèrement plus élevée (rapport femmes/hommes : 1,1); cela tient en partie au fait que les femmes enceintes ont plus de chances de dormir sous une MII que les autres femmes. Il n'y a aucune différence dans le taux d'utilisation entre les filles et les garçons de moins de 5 ans (rapport filles/garçons: 0,99).

17. Le nombre de personnes protégées par des PID a augmenté en Afrique subsaharienne, passant de 13 millions en 2005 à 75 millions en 2009, ce qui signifie qu'en 2009, 10 % de la population exposée au risque était protégée.

18. Dans les autres Régions de l'OMS, le nombre de MII livrées par les fabricants ou distribuées par les programmes nationaux de lutte antipaludique est plus faible qu'en Afrique (16,4 millions en 2009), mais il augmente à un rythme similaire. La mise en œuvre des PID se maintient d'une façon générale à son niveau historique avec 98 millions de personnes qui étaient protégées par cette mesure en 2009 (69 millions en Inde). A l'exception de l'Inde, le pourcentage de la population qui bénéficie de ce genre de protection tend à être plus faible que dans les pays d' Afrique où ces pulvérisations sont effectuées, peut-être en raison du caractère plus focal de la maladie en dehors de l'Afrique.

19. Les méthodes actuelles de lutte antivectorielle dépendent en très grande partie d'une seule classe d'insecticides, les pyréthrinoïdes, qui sont les composés les plus couramment utilisés pour les PID et les seuls qui servent à imprégner les moustiquaires. En généralisant l'usage d'une seule et unique classe d'insecticides, on accroît le risque de voir apparaître, chez les moustiques vecteurs, une résistance qui pourrait devenir rapidement un problème majeur de santé publique,

notamment en Afrique, où la lutte antivectorielle au moyen d'insecticides est actuellement menée avec des niveaux de couverture sans précédent et où la charge de morbidité palustre est la plus élevée.

Progrès dans la prévention du paludisme au cours de la grossesse

En ce qui concerne la couverture des femmes enceintes par le traitement préventif intermittent (TPI) on est encore loin d'avoir atteint les cibles fixées, même si quelques pays ont accompli des progrès notables.

20. Le pourcentage de femmes enceintes ayant reçu la deuxième dose du traitement préventif intermittent allait de 2,4 % en Angola à 62 % en Zambie selon des enquêtes auprès des ménages effectuées dans 8 pays pour lesquels on possédait des données relatives à la période 2007–2009. La moyenne pondérée, qui correspond à une population de 270 millions de personnes, est restée faible, avec une valeur de 12 %, qui s'explique principalement par le faible taux de couverture enregistré au Nigéria.

21. Selon les données communiquées par les programmes nationaux de lutte antipaludique de 22 pays africains à forte charge de morbidité palustre, le pourcentage de femmes fréquentant les services de soins prénatals et ayant reçu la seconde dose du TPI était de 55 % (fourchette interquartile : 47%– 61 %).

Progrès dans le diagnostic et le traitement du paludisme

Le nombre de TDR et de CTA fournis est en augmentation et le pourcentage de cas suspects notifiés qui sont soumis à un examen parasitologique est passé de 67 % en 2005 dans l'ensemble du monde à 73 % en 2009. De nombreux cas sont encore traités sans diagnostic parasitologique préalable.

22. La proportion de cas suspects notifiés soumis à un examen parasitologique a augmenté entre 2005 et 2009, notamment dans la Région de l'Afrique (de 26 à 35 %), dans la Région de la Méditerranée orientale (de 47 à 68 %) et dans la Région de l'Asie du Sud-Est, Inde non comprise (de 58 à 95 %). Cette proportion reste faible dans la plupart des pays d'Afrique: dans 21 des 42 pays qui ont communiqué des informations sur cet examen, elle était inférieure à 20 %. D'après les données fournies par un nombre limité de pays, il semblerait que l'examen microscopique comme les TDR soient moins pratiqués dans le secteur privé que dans le secteur public.

23. Dans un petit nombre de pays, comme la République démocratique populaire lao et le Sénégal, on a montré qu'il était possible d'accroître rapidement la disponibilité des tests de diagnostic rapide à l'échelon national, en veillant à assurer une préparation, une formation, un suivi, un encadrement et un contrôle de qualité adéquats.

24. Le nombre de cures de CTA fournies a beaucoup augmenté, passant de 11,2 millions en 2005 à 76 millions en 2006, pour culminer à 158 millions en 2009. Fin 2009, 11 pays africains fournissaient un nombre suffisant de ces cures pour traiter plus de 100 % des cas de paludisme vus dans le secteur public et 8 autres pays de cette région en ont délivré suffisamment pour traiter 50 à 100 % des cas. Ces chiffres traduisent une augmentation notable depuis 2005, où il n'y avait que 5 pays qui fournissaient suffisamment de cures de CTA pour traiter plus de 50 % des malades soignés dans le secteur public. Toujours est-il que le nombre de CTA distribuées en 2009 par les programmes nationaux de lutte antipaludique dans la Région de l'Afrique a représenté plus de cinq fois celui des TDR fournis et 2,4 fois le nombre total de tests effectués (examen microscopique plus TDR), ce qui indique que de nombreux malades ont été traités par des CTA sans diagnostic de confirmation.

25. En regroupant les données issues des enquêtes auprès des ménages et celles des établissements de soins on peut estimer, qu'en moyenne, 65 % des besoins thérapeutiques sont satisfaits chez les malades qui fréquentent les établissements de soins du secteur public. Les estimations sont plus difficiles à établir s'agissant des malades traités dans le secteur privé, mais les enquêtes auprès des ménages révèlent que pour les sujets fébriles soignés dans ce secteur, la probabilité d'être traité par un antipaludéen est de 25 % inférieure à celle qu'ont les malades du secteur public de recevoir un tel produit ; quant aux malades qui restent chez eux leur probabilité de recevoir un antipaludéen est de 60 % inférieure.

26. L'utilisation de monothérapies à base d'artémisinine compromet la durée de validité thérapeutique des CTA en facilitant la propagation de la résistance à ces composés. En novembre 2010, 25 pays autorisaient encore la commercialisation de ces monothérapies et 39 firmes pharmaceutiques les fabriquaient. La plupart des pays qui autorisent encore la commercialisation des monothérapies se trouvent dans la Région de l'Afrique et la majorité des fabricants, en Inde.

27. Dans la plupart des régions du monde, la résistance des plasmodies a rendu les anciens antipaludéens inefficaces, mettant en péril la lutte antipaludique. Le même genre de risque menace les antipaludéens extrêmement efficaces que sont les dérivés de l'artémisinine et les médicaments qui leur sont associés. La résistance de *P. falciparum* aux artémisinines a été confirmée en 2009 à la frontière entre le Cambodge et la Thaïlande, mais malgré l'évolution de la sensibilité des plasmodies à ces produits, l'efficacité clinique et parasitologique des CTA n'est pas encore compromise. Depuis 2008, on s'active à contenir la propagation des plasmodies résistantes aux artémisinines.

Impact de la lutte antipaludique

Depuis 2000, les pays sont de plus en plus nombreux à enregistrer une diminution du nombre de cas confirmés de paludisme ou du nombre d'hospitalisations et de décès notifiés. Les efforts de lutte déployés au niveau mondial ont entraîné une diminution du nombre estimatif de décès, le chiffre passant de près de 1 million en 2000, à 781 000 en 2009.

28. Dans 11 pays et 1 territoire de la Région africaine, on a enregistré ces dernières années 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, Érythrée, Madagascar, Namibie, Rwanda, Sao Tomé-et-Principe, Swaziland, Zambie et Zanzibar en République Unie de Tanzanie). Dans tous ces pays, ce recul est lié à d'énergiques interventions de lutte antipaludique.

29. En 2009, on a constaté une augmentation du nombre de cas de paludisme dans 3 pays qui avaient auparavant fait état d'un recul de ces cas (Rwanda, Sao Tomé-et-Principe et Zambie). Les raisons de cette résurgence ne sont pas connues avec certitude, mais elle souligne la fragilité des progrès réalisés dans la lutte contre le paludisme et la nécessité de maintenir fermement les programmes de lutte antipaludique, même lorsque le nombre de cas a sensiblement diminué.

30. Dans les autres Régions OMS, le nombre notifié de cas confirmés a reculé de plus de 50 % entre 2000 et 2009 dans 32 des 56 pays d'endémie palustre, et une tendance descendante de l'ordre de 25 à 50 % a été observée dans 8 autres pays. En 2009 et pour la première fois, aucun cas de paludisme à falciparum n'a été signalé dans la Région de l'Europe. Le recul du nombre de cas a été le moins marqué dans les pays où les taux d'incidence étaient les plus élevés, ce qui montre qu'il faut être plus attentif aux pays qui recèlent la majeure partie de la charge de morbidité en dehors de l'Afrique.

31. En 2009, 8 pays se trouvaient en phase de pré-élimination et 10 mettaient en œuvre des programmes d'élimination à l'échelon national (8 étant entrés en phase d'élimination en 2008). Neuf autres pays (Arménie, Bahamas, Égypte, Fédération de Russie, Jamaïque, Maroc, Oman, République arabe syrienne et Turkménistan) ont interrompu la transmission et s'emploient à empêcher la réintroduction du paludisme. En 2010, le Directeur général de l'OMS a certifié que le Maroc et le Turkménistan étaient exempts de paludisme.

32. On estime que le nombre de cas de paludisme est passé de 233 millions en 2000 à 244 millions en 2005, mais qu'il est retombé à 225 millions en 2009. Selon les estimations, le nombre de décès des suites du paludisme est tombé de 985 000 en 2000 à 781 000 en 2009. Une diminution de la charge de morbidité a été observée dans toutes les Régions OMS, la baisse étant proportionnellement la plus marquée dans la Région de l'Europe, suivie par la Région des Amériques. En valeur absolue, c'est en Afrique que le recul le plus important du nombre de décès a été observé.

Prefacio

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Los datos del *Informe mundial sobre el paludismo 2010* refuerzan los argumentos para invertir en la lucha antipalúdica. La carrera para lograr una cobertura universal con las herramientas disponibles a día de hoy, por la que hizo un llamamiento el Secretario General de las Naciones Unidas en 2008, continúa dando frutos. Entre 2008 y 2010 se habrán distribuido casi 289 millones de redes mosquiteras tratadas con insecticida en el África subsahariana, suficientes para proteger a 578 millones de personas. En África 75 millones de personas, un 10% de la población a riesgo, recibieron también protección en 2009 mediante la fumigación intradomiciliaria con insecticidas. Estos resultados constituyen unos auténticos logros.

Estas labores de prevención están teniendo una incidencia mesurable en la salud pública. El número anual de casos de paludismo y muertes debidas a esta enfermedad continúa disminuyendo, especialmente en África. El número de países que durante la última década han conseguido reducir a la mitad la carga del paludismo que sufrían sigue aumentando. Por primera vez, en 2009 no se informó de ningún caso de paludismo debido a *Plasmodium falciparum* en la Región de Europa de la OMS. Uno por uno, se va reduciendo el número de países con paludismo endémico. Este mismo año tuve el honor de certificar que Marruecos y Turkmenistán se encuentran libres de paludismo, y pude añadir estos países a la lista oficial de las zonas donde se ha logrado eliminar esta enfermedad.

Están sucediendo rápidamente grandes cambios en la forma en que nos enfrentamos al paludismo. Este es el año en que por fin se declaró que toda persona con un presunto caso de paludismo tiene derecho a una prueba de diagnóstico que lo confirme. Este cambio llega más tarde de lo que debería. Durante demasiado tiempo se ha identificado como paludismo la fiebre en demasiados sitios. Esto se acabó. Nuestras iniciativas de prevención han provocado cambios reales en la transmisión del paludismo, y la mayoría de los casos de fiebre ya no se deben a éste, incluso en África. Ello constituye otro indicativo claro de progreso, y una señal de cómo se depuran constantemente las estrategias de control. Disponemos de pruebas de diagnóstico económicas, rápidas y de calidad garantizada que pueden utilizarse en todos los niveles, incluido el de la comunidad.

En 2009, más de una tercera parte de los presuntos casos de paludismo notificados en África se confirmaron con una prueba de diagnóstico, lo que representa un drástico incremento con respecto al porcentaje inferior al 5% correspondiente al principio de la década. Una pequeña cantidad de países africanos han podido extender las pruebas de diagnóstico del paludismo a nivel nacional. Ello no solo ha significado que cada año se evite el uso innecesario de centenares de miles de tratamientos con las terapias combinadas basadas en la artemisinina, sino que también ha permitido implantar una vigilancia antipalúdica precisa y puntual. Se trata de un gran salto adelante. Solo si sabemos dónde acecha nuestro enemigo e identificamos los lugares donde aún existe paludismo podemos tener esperanzas de derrotarlo.

Si bien hay mucho que podemos celebrar, los datos de este informe subrayan también la fragilidad de nuestros progresos. Se observó un resurgimiento del paludismo en partes de al menos tres países africanos. Se desconocen los motivos exactos de estos fuertes incrementos, pero probablemente reflejen alguna combinación de variación natural y fallos en las medidas de control. Los fracasos de estos programas son un claro recordatorio de lo que podría suceder si redujésemos la vigilancia y no cumpliésemos nuestros compromisos colectivos. En muchos sentidos, mantener las elevadas tasas de cobertura con medidas de control y prevención del paludismo puede constituir un desafío aún mayor que la propia consecución de dicha cobertura.

No podemos dejar que este impulso se detenga. Los significativos progresos logrados recientemente, a pesar de ser frágiles, deben mantenerse. La comunidad internacional debe garantizar una financiación suficiente y previsible para alcanzar las ambiciosas metas establecidas para el control del paludismo dentro de la carrera por cumplir los Objetivos de Desarrollo del Milenio relacionados con la salud para 2015.

La voluntad de mantener los progresos registrados en el terreno del paludismo no solo debe provenir de los líderes mundiales en el ámbito de la salud y de los políticos, sino también de las comunidades afectadas. Si estas pueden conocer la verdadera carga del paludismo y pueden ver los resultados de las labores de prevención y control, la voluntad para eliminar y erradicar el paludismo nunca desaparecerá.

Resumen

El *Informe mundial sobre el paludismo 2010* amalgama la información recibida de 106 países con paludismo endémico con la de otras fuentes, y actualiza los análisis presentados en el informe de 2009. También destaca la continuación de los progresos realizados en pos del cumplimiento de los objetivos internacionales de lucha antipalúdica a alcanzar en 2010 y 2015. Además, el informe destaca la evolución de la financiación para el control de la enfermedad, la forma en que estos crecientes recursos han dado lugar a una mayor cobertura de las intervenciones de lucha antipalúdica recomendadas por la OMS, y la asociación entre esta rápida ampliación y las sustanciales reducciones de la carga del paludismo.

La financiación internacional para el control de la enfermedad ha crecido marcadamente durante la última década. Los desembolsos alcanzaron su punto máximo histórico en 2009 con US$ 1500 millones, pero los compromisos nuevos para la lucha antipalúdica parecen haberse estancado en 2010 en US$ 1800 millones. Los países con poblaciones en riesgo de menor tamaño continúan recibiendo más financiación por persona a riesgo que los países más poblados. Aunque los fondos adjudicados al paludismo son sustanciales, siguen sin alcanzar las cifras necesarias para el control de la enfermedad, estimadas en más de US$ 6000 millones para el año 2010.

El incremento de la financiación ha dado pie a un tremendo progreso durante los últimos tres años en el acceso a redes mosquiteras tratadas con insecticida. A finales de 2010 se habrán distribuido aproximadamente 289 millones de redes mosquiteras tratadas con insecticida en el África subsahariana, suficientes para cubrir el 76% de los 765 millones de personas a riesgo de contraer paludismo. Se estima que el 42% de los hogares de África dispusieron a mediados de 2010 de al menos una red mosquitera tratada con insecticida, y que el 35% de los niños durmieron protegidos por uno. El porcentaje de niños que utilizan estas redes mosquiteras continúa hallándose por debajo de la meta del 80% fijada por la Asamblea Mundial de la Salud, en parte porque, en algunos de los mayores países africanos, el porcentaje de hogares provistos de al menos una red mosquitera continuó siendo bajo hasta finales de 2009. Las bajas tasas de uso reveladas por algunos estudios se deben a la falta de suficientes redes mosquiteras para cubrir a todos los miembros del hogar; los resultados de las encuestas domiciliarias sugieren que la mayoría (el 80%) de las redes mosquiteras tratadas con insecticida se utilizan.

Si bien la rápida ampliación de la distribución de redes mosquiteras tratadas con insecticida en África constituye un enorme logro de salud pública, conseguir que se mantengan los elevados niveles de cobertura representa un formidable desafío para el futuro. La vida útil de una red mosquitera tratada con insecticida de larga duración se estima actualmente en tres años. Por lo tanto, ya hay que reemplazar las redes distribuidas en 2006 y 2007, y pronto deberá hacerse lo mismo con las repartidas entre 2008 y 2010. No sustituir estas redes mosquiteras podría dar lugar a una resurgencia de los casos de paludismo y las muertes debidas a esta enfermedad.

Los programas de fumigación intradomiciliaria también se han expandido considerablemente durante los últimos años, y el número de personas protegidas en el África subsahariana ha pasado de 13 millones en 2005 a 75 millones en 2009, lo que corresponde a la protección de aproximadamente el 10% de la población a riesgo en 2009.

Los métodos actuales de control del vector del paludismo dependen en gran medida de un único tipo de insecticidas, los piretroides, que son los compuestos más utilizados para la fumigación intradomiciliaria y los únicos empleados para tratar las redes mosquiteras. El uso generalizado de un solo tipo de insecticida incrementa el riesgo de que los mosquitos desarrollen resistencia contra éste, lo que podría dar lugar rápidamente a un problema de salud pública de gran envergadura. Este riesgo resulta especialmente preocupante en África, donde se está desplegando el control del vector mediante insecticida con unos niveles de cobertura carentes de precedentes, y donde es mayor la carga del paludismo.

La OMS recomienda ahora que todos los presuntos casos de paludismo se confirmen con una prueba de diagnóstico antes de proceder a su tratamiento. A medida que la incidencia del paludismo disminuye en gran parte del África subsahariana, la necesidad de diferenciar esta enfermedad de otras fiebres no palúdicas se hace más urgente. La proporción de casos notificados en África que han sido confirmados por una prueba de diagnóstico ha aumentado de modo sustancial, desde menos del 5% a principios de la década hasta aproximadamente el 35% en 2009, pero en la mayoría de los países africanos y en una minoría de países de otras regiones esta tasa continúa siendo baja. Unos pocos países han mostrado que es posible ampliar rápidamente a escala nacional la disponibilidad de pruebas de diagnóstico para el paludismo, siempre y cuando se preste atención a la adecuada preparación, formación, seguimiento, supervisión y control de calidad. Dichas experiencias se han asociado a grandes reducciones del uso de terapias combinadas basadas en la artemisinina y a una mejor vigilancia del paludismo.

La información facilitada por fabricantes indica que la cantidad de terapias combinadas basadas en la artemisinina que se han administrado ha aumentado cada año desde 2005. A finales de 2009, 11 países africanos administraban suficientes terapias de este tipo para cubrir más del 100% de los casos de paludismo observados en el sector público, mientras que otros

ocho países africanos administraron suficientes terapias para tratar entre el 50% y el 100% de los casos. Estas cifras representan un incremento sustancial desde 2005, cuando solamente cinco países administraban suficientes terapias combinadas basadas en la artemisinina para cubrir a más del 50% de los pacientes tratados en el sector público. Sin embargo, la información sobre el acceso al tratamiento es, en general, incompleta, especialmente en lo referente al porcentaje de pacientes tratados en el sector privado.

El uso de monoterapias orales basadas en la artemisinina constituye una amenaza para la vida terapéutica de las terapias combinadas basadas en este principio activo, ya que fomentan la propagación de la resistencia a las artemisininas. En noviembre de 2010, 25 países todavía permitían la comercialización de estos productos y 39 empresas farmacéuticas continuaban fabricándolos. La mayoría de los países que siguen permitiendo la comercialización de monoterapias se encuentra en la región de África, y la mayoría de los fabricantes se halla en la India.

La propagación de la resistencia a los fármacos antipalúdicos durante las últimas décadas ha dado lugar a la intensificación del seguimiento de la eficacia para hacer posible la detección precoz de la resistencia. A pesar de los cambios observados en la sensibilidad del parásito a las artemisininas, la eficacia clínica y parasitológica de las terapias combinadas basadas en este principio activo todavía no se ha visto comprometida, incluso en la subregión del Gran Mekong. No obstante, ambos componentes de la combinación farmacológica se hallan a riesgo actualmente, y el empleo de una terapia combinada basada en la artemisinina asociada a un medicamento ineficaz puede aumentar el riesgo de desarrollo o propagación de la resistencia a la artemisinina.

Durante los últimos años, un total de 11 países y una zona de la Región de África de la OMS mostraron una reducción superior al 50% de o bien los casos confirmados de paludismo o los ingresos y defunciones por paludismo. Se detectó un descenso superior al 50% del número de casos confirmados de esta enfermedad entre 2000 y 2009 en 32 de los 56 países con paludismo endémico no africanos, y en otros ocho países se observaron reducciones de entre el 25% y el 50%. La Directora General de la OMS certificó en 2010 que Marruecos y Turkmenistán habían eliminado el paludismo. En 2009, la Región de Europa de la OMS informó por primera vez que no se había producido ningún caso (autóctono) de la enfermedad debido a *Plasmodium falciparum*.

Se estima que el número de casos de paludismo aumentó desde 233 millones en 2000 a 244 millones en 2005, pero descendió a 225 millones en 2009, y que el número de muertes debidas al paludismo disminuyó desde 985000 en 2000 a 781000 en 2009. Se han observado descensos en la carga del paludismo en todas las Regiones de la OMS; las mayores reducciones proporcionales se han registrado en la Región de Europa, seguida por la de las Américas. Los mayores descensos de muertes en términos absolutos se han computado en África.

El progreso en la reducción de la carga del paludismo ha sido destacable, pero hay pruebas de que en 2009 aumentaron los casos de paludismo en tres países (Rwanda, Santo Tomé y Príncipe, y Zambia). Los motivos de estas resurgencias no se conocen con certeza. Los incrementos de casos de paludismo ponen de relieve la fragilidad de la lucha antipalúdica y la necesidad de mantener programas de control aun si el número de casos se ha reducido de forma sustancial. Las experiencias de Rwanda y Zambia indican también que el seguimiento mensual de los datos de vigilancia de la enfermedad, tanto a nivel nacional como subnacional, es esencial. Dado que los datos epidemiológicos de muchos países del África subsahariana sobre la carga y tendencias de la enfermedad siguen siendo insuficientes, será necesario incrementar los esfuerzos para fortalecer los sistemas de vigilancia rutinaria. Es necesario evitar que ocurran importantes acontecimientos epidemiológicos en países sin que éstos sean detectados e investigados.

Puntos esenciales

Antecedentes y contexto

Los países con paludismo endémico y la comunidad mundial están ampliando las intervenciones efectivas para alcanzar los objetivos de cobertura e impacto para 2010 y el futuro.

1. En el Día Mundial de la Malaria 2008, el Secretario General de las Naciones Unidas hizo un llamamiento para garantizar una cobertura universal de los programas de prevención y tratamiento del paludismo para finales de 2010.
2. El objetivo establecido por la Asamblea Mundial de la Salud en 2005 y por la iniciativa Hacer Retroceder el Paludismo (Roll Back Malaria, o RBM) consiste en reducir en al menos un 50% a finales de 2010 y en un 75% en 2015 las cifras de casos de paludismo y muertes por esta enfermedad registradas en 2000.
3. En septiembre de 2008, la iniciativa RBM lanzó el Plan de Acción Mundial sobre el Paludismo, que define las medidas necesarias para acelerar la consecución de los objetivos de 2010 y 2015 relativos al control y la eliminación del paludismo.

Políticas y estrategias de lucha antipalúdica

Para cumplir las metas propuestas para 2010 y 2015, los países deben llegar a todas las personas a riesgo de contraer paludismo facilitándoles una red mosquitera tratada con insecticida o fumigación intradomiciliaria con insecticidas de acción residual, así como proporcionar pruebas de diagnóstico basadas en laboratorio para todos los presuntos casos de paludismo y un tratamiento efectivo para todos los casos confirmados.

Prevención

4. En 2009, 23 países de la Región de África y 42 de otras Regiones de la OMS habían adoptado la recomendación de la OMS relativa a proporcionar redes mosquiteras a todas las personas que corriesen riesgo de contraer paludismo, y no solo a mujeres y niños; ello representa un incremento de 13 países con respecto a 2008. Un total de 83 países, 39 de ellos en la Región de África, distribuyen las redes mosquiteras de forma gratuita.
5. La fumigación intradomiciliaria (IRS) con sustancias químicas aprobadas por la OMS (incluido el DDT) sigue siendo una de las principales intervenciones para reducir e interrumpir la transmisión del paludismo mediante el control del vector en todos los entornos epidemiológicos. En 2009, 71 países, 27 de ellos en la Región de África, notificaron la implantación de IRS y 17 países informaron de que usaban DDT para dichas fumigaciones.
6. Se recomienda el tratamiento preventivo intermitente (IPT) para los grupos de población que viven en áreas de alta transmisión y son especialmente vulnerables a contraer paludismo o a sufrir sus consecuencias, en particular mujeres embarazadas y lactantes. A finales de 2008, 35 de los 45 países del África subsahariana habían adoptado el tratamiento preventivo intermitente para mujeres embarazadas (IPTp) como política nacional. Papúa Nueva Guinea, en la Región del Pacífico Occidental, adoptó también esta política en 2009. Ningún país ha adoptado todavía una política nacional de IPT en niños (IPTi).

Diagnóstico y tratamiento

7. Se recomienda una confirmación parasitológica rápida mediante microscopio o con una prueba de diagnóstico rápido (RDT) para todos los pacientes con sospecha clínica de paludismo, antes de iniciar el tratamiento. En 2008, 33 de los 43 países de la Región de África con paludismo endémico y 45 de los 63 países de otras regiones declararon la realización de pruebas de confirmación parasitológica en todos los casos presuntivos de paludismo, con independencia de la edad del paciente, y 77 de 86 países con *Plasmodium falciparum* endémico informaron de que mantenían una política de tratamiento combinado basado en la artemisinina para paludismo *P. falciparum*.
8. Los casos confirmados de *P. falciparum* sin complicaciones deben tratarse con terapia combinada basada en la artemisinina. El paludismo secundario a la infección por *P. vivax* debe tratarse con cloroquina allá donde este fármaco sea efectivo, o con una terapia combinada basada en la artemisinina apropiada en las zonas en las que *P. vivax* sea resistente a la cloroquina. El tratamiento de *P. vivax* debe combinarse con la administración de primaquina durante 14 días para prevenir la recaída.
9. La OMS recomienda que las monoterapias basadas en la artemisinina se retiren del mercado y se reemplacen con terapias combinadas basadas en este mismo principio activo. En noviembre de 2010, 25 países todavía permitían la comercialización de estos productos (por 37 en 2009) y 39 empresas farmacéuticas los fabricaban. La mayoría de los países que aún permiten la comercialización de monoterapias se halla en la Región de África, mientras que la mayoría de los fabricantes de estas medicinas se encuentra en la India.

Financiación de la lucha antipalúdica

Los fondos adjudicados al control de la enfermedad procedentes de fuentes internacionales aumentaron de forma consistente entre 2004 y 2009, pero se estancaron en US$ 1800 millones en 2010 y siguen siendo sustancialmente inferiores a los recursos necesarios para culminar los objetivos globales, que se estiman en un mínimo de US$ 6000 millones para el año 2010.

10. Se estima que los fondos internacionales disponibilizados para la lucha antipalúdica han aumentado desde US$ 200 millones en 2004 a US$ 1500 millones en 2009. El gasto de los gobiernos nacionales en el control de la enfermedad parece haber crecido en todas las Regiones de la OMS entre 2004 y 2009; así, los grandes incrementos en financiación otorgada por donantes no se ha debido a una reducción general del nivel de financiación nacional, aunque los países que han reducido su gasto recibieron más financiación externa que los que ampliaron su gasto doméstico en el paludismo.

11. De 106 países y zonas con paludismo endémico, 77 recibieron asistencia externa para control de la enfermedad entre los años 2000 y 2008. El mayor gasto per capita continuó produciéndose en los países con menores poblaciones en riesgo. La financiación externa se ha concentrado en actividades de programas, en particular la distribución de redes mosquiteras tratadas con insecticida, medicamentos antipalúdicos y fumigación intradomiciliaria con insecticidas residuales. Se destina una mayor proporción de la financiación de los gobiernos nacionales a los recursos humanos, aunque se gastan sumas significativas en medicamentos antipalúdicos y fumigación intradomiciliaria.

12. Los países que se encuentran en las fases de preeliminación y de eliminación tienden a gastar más por persona a riesgo de contraer paludismo que los países que se hallan en la fase de control. Si bien el aumento del gasto se debe en parte a la mayor financiación externa, la financiación gubernamental supera a la externa en los países en fase de preeliminación y de eliminación.

Progresos en la prevención del paludismo

La cobertura con redes mosquiteras tratadas con insecticida está creciendo rápidamente en algunos países de África; el porcentaje de hogares que poseen al menos una red mosquitera aumentó hasta el 42% a mediados de 2010.

13. En menos de tres años, entre 2008 y 2010, se distribuyó en el África subsahariana un total de 254 millones de redes mosquiteras tratadas con insecticida, suficientes para cubrir al 66% de los 765 millones de personas a riesgo. Se ha programado la distribución de otros 35 millones de redes mosquiteras tratadas antes de que termine 2010, suficientes para cubrir un 10% más de la población a riesgo. No obstante, todavía es preciso un trabajo considerable para que lleguen redes mosquiteras tratadas con insecticida a todos los hogares que las necesitan, y para que las personas a riesgo de contraer paludismo duerman protegidas bajo una red todas las noches.

14. Una estimación basada en un modelo mostró que en 2010 el 42% de los hogares africanos poseía al menos una red mosquitera tratada con insecticida, y el 35% de los niños menores de cinco años dormía protegido por redes mosquiteras de este tipo. El porcentaje de hogares que disponían de al menos una red mosquitera tratada con insecticida se estimó, en este modelo, en ≥ 50% en 19 países africanos en 2010.

15. Las encuestas domiciliarias efectuadas entre 2007 y 2009 determinaron que 11 países (Guinea Ecuatorial, Etiopía, Gabón, Malí, Rwanda, Santo Tomé y Príncipe, Senegal, Sierra Leona, Togo y Zambia) habían alcanzado un porcentaje ≥ 50% de hogares provistos de al menos una red mosquitera tratada con insecticida. La proporción mediana de niños menores de 5 años de edad que dormían protegidos por una red de este tipo en estos países era del 45%. Las bajas tasas de utilización reveladas por algunos estudios se deben principalmente a la carencia de redes mosquiteras suficientes para cubrir a todos los miembros del hogar; un porcentaje muy alto (80%) de las redes mosquiteras tratados con insecticida se utilizan.

16. Las personas de entre 5 y 19 de edad son las que menos tienden a utilizar las redes mosquiteras tratadas con insecticida, en comparación con las pertenecientes a los grupos de edad superior e inferior. Las mujeres tienen una tendencia ligeramente mayor que los hombres a dormir protegidas por una red tratada (proporción mujeres:hombres = 1,1); ello se debe en parte a que las mujeres embarazadas tienden más a dormir protegidas por una red mosquitera que las demás mujeres. No existe diferencia alguna de uso entre niños y niñas (ratio niñas:niños = 0,99).

17. El número de personas protegidas por fumigación intradomiciliaria con insecticidas residuales creció en el África subsahariana desde 13 millones en 2005 hasta 75 millones en 2009, una cantidad que corresponde a una protección del 10% de la población a riesgo en 2009.

18. En otras Regiones de la OMS, el número de redes mosquiteras tratadas con insecticida entregadas por fabricantes o distribuidas por programas nacionales de lucha antipalúdica es menor que en África (16,4 millones en 2009), pero ha aumentado a un ritmo similar. La aplicación de la fumigación intradomiciliaria con insecticidas residuales se mantiene en general en los niveles históricos, con 98 millones de personas protegidas en 2009 (69 millones en la India). Con la excepción de la India, el porcentaje de la población protegida por fumigación intradomiciliaria tiende a ser menor que en los países africanos que emplean esta técnica, posiblemente debido a la naturaleza más focal que tiene la enfermedad fuera de África.

19. Los métodos actuales de lucha antipalúdica dependen sobremanera de una sola clase de insecticidas, los piretroides, que son los compuestos más utilizados para la fumigación de interiores y constituyen la única clase de insecticida utilizado para tratar las redes mosquiteras. El uso generalizado de un solo tipo de insecticida incrementa el riesgo de que los mosquitos desarrollen resistencia contra éste, lo que podría dar lugar rápidamente a un importante problema de salud pública, especialmente en África, donde se está desplegando el control químico del vector con unos niveles de cobertura jamás vistos y donde es mayor la carga del paludismo.

Progresos en la prevención del paludismo durante el embarazo

La cobertura con tratamiento preventivo intermitente para mujeres embarazadas (IPTp) sigue hallándose lejos de los niveles fijados como objetivo, aunque algunos países han realizado un progreso notable.

20. El porcentaje de mujeres embarazadas que recibieron la segunda dosis de IPTp osciló entre el 2,4% de Angola y el 62% de Zambia, según las encuestas domiciliarias practicadas en ocho países sobre los que había datos disponibles para el período 2007–2009. La media ponderada, que representa una población de 270 millones de personas, permaneció en un nivel bajo, el 12%, debido principalmente a las bajas tasas de cobertura en Nigeria.

21. Los datos notificados por los programas nacionales de lucha antipalúdica de 22 países con alta carga de la Región de África indican que el porcentaje de mujeres asistentes a centros de atención prenatal que recibieron la segunda dosis de IPTp fue del 55% (rango intercuartil 47% – 61%).

Progresos en el diagnóstico y el tratamiento del paludismo

El número de pruebas de diagnóstico rápido y tratamientos combinados basados en la artemisinina que se administran está creciendo, y el porcentaje de casos presuntivos de paludismo que son objeto de una prueba parasitológica ha aumentado del 67% en 2005 en todo el mundo al 73% en 2009. Muchos casos todavía se tratan sin diagnóstico parasitológico.

22. El porcentaje de casos presuntivos de paludismo notificados que son objeto de una prueba parasitológica creció entre 2005 y 2009, en particular en la Región de África (desde el 26% hasta el 35%), la Región del Mediterráneo Oriental (del 47% al 68%) y la Región de Asia Sudoriental, excluyendo la India (del 58% al 95%). Las tasas siguen siendo bajas en la mayoría de los países africanos: en 21 de los 42 países que informaron sobre las pruebas el porcentaje de casos con confirmación parasitológica fue inferior al 20%. Los datos de un número limitado de países sugieren que tanto la confirmación mediante microscopía como las pruebas de diagnóstico rápido son menos disponibles en el sector privado que en el público.

23. Una pequeña cantidad de países, incluyendo Senegal y República Democrática Popular de Laos, ha demostrado que es posible ampliar rápidamente la disponibilidad de pruebas de diagnóstico del paludismo a nivel nacional, siempre y cuando se preste atención a la adecuada preparación, formación, seguimiento, supervisión y control de calidad.

24. El número de tratamientos combinados basados en la artemisinina administrados experimentó un fuerte aumento desde 11,2 millones en 2005 a 76 millones en 2006, llegando a 158 millones en 2009. A finales de 2009, 11 países africanos administraban suficientes tratamientos combinados de este tipo para cubrir más del 100% de los casos de paludismo observados en el sector público; mientras que otros ocho países africanos administraron suficientes tratamientos para cubrir entre un 50% y el 100% de los casos. Estas cifras representan un incremento sustancial desde 2005, cuando solamente cinco países administraban suficientes tratamientos para cubrir a más del 50% de los pacientes tratados en el sector público. Sin embargo, el número de tratamientos combinados basados en la artemisinina distribuidos por programas nacionales de lucha antipalúdica en la Región de África en 2009 fue más de cinco veces mayor que el número de pruebas de diagnóstico rápido efectuadas, y 2,4 veces superior al número total de pruebas efectuadas (sumando microscopía y pruebas diagnósticas rápidas), lo que indica que muchos pacientes reciben tratamientos combinados basados en la artemisinina sin diagnóstico confirmatorio.

25. Al combinar los datos de encuestas domiciliarias con los datos provenientes de los centros sanitarios puede estimarse que, en promedio, se cubren el 65% de las necesidades de tratamiento de los pacientes que acuden a centros de salud públicos. Para los pacientes tratados en el sector privado resulta más difícil realizar estimaciones, pero las encuestas domiciliarias indican que los pacientes con fiebre tratados en el sector privado tienen un 25% menos de probabilidades de recibir un medicamento antipalúdico que los que visitan centros del sector público, mientras que quienes se quedan en su domicilio tienen un 60% menos de probabilidades de recibirlo.

26. El uso de monoterapias orales basadas en la artemisinina constituye una amenaza para la vida terapéutica de las terapias combinadas basadas en este fármaco, ya que fomentan la propagación de la resistencia a éstos. En noviembre de 2010, 25 países todavía permitían la comercialización de estos productos y 39 empresas farmacéuticas los fabricaban. La mayoría de los países que todavía permiten la comercialización de monoterapias se encuentran en la Región de África, y la mayor parte de los fabricantes se halla en la India.

27. La resistencia por parte del parásito ha convertido en ineficaces otros medicamentos antipalúdicos previamente usados para el tratamiento en la mayor parte del mundo, poniendo en peligro el control de la enfermedad. Los derivados de la artemisinina —que son altamente efectivos— y sus fármacos asociados son vulnerables al mismo riesgo. La resistencia del *P. falciparum* a las artemisininas quedó confirmada en la frontera entre Camboya y Tailandia en 2009, pero, a pesar de los cambios observados en la sensibilidad del parásito a las artemisininas, la eficacia clínica y parasitológica de los tratamientos combinados basados en este compuesto todavía no ha quedado comprometida. Desde 2008 se llevan a cabo actividades de contención contra los parásitos resistentes a la artemisinina.

El impacto del control del paludismo

Un número creciente de países ha registrado descensos en el número de casos confirmados de paludismo y/o ingresos y defunciones por esta enfermedad que se declararon desde 2000. Las actividades globales de lucha antipalúdica han provocado una reducción del número estimado de muertes desde casi 1 millón en 2000 hasta 784000 en 2009.

28. Un total de 11 países y una zona de la Región de África mostraron una reducción superior al 50% en o bien los casos de paludismo confirmados o los ingresos y defunciones por esta enferme-

dad durante los últimos años (Argelia, Botswana, Cabo Verde, Eritrea, Madagascar, Namibia, Ruanda, Santo Tomé y Príncipe, Sudáfrica, Suazilandia, Zambia y Zanzíbar en la República Unida de Tanzania). En todos los países, los descensos están asociados a un gran despliegue de intervenciones para el control del paludismo.

29. En 2009 se evidenció un incremento en los casos de paludismo en tres países que previamente habían notificado reducciones (Ruanda, Santo Tomé y Príncipe, y Zambia). Los motivos de estas resurgencias no se conocen con certeza, pero subrayan la fragilidad de los progresos en la lucha antipalúdica y la necesidad de mantener rigurosamente los programas de control aun cuando los casos hayan disminuido sustancialmente.

30. En otras Regiones de la OMS, el número de casos declarados de la enfermedad descendió en más del 50% en 32 de los 56 países con paludismo endémico entre 2000 y 2009, y se observaron tendencias a la disminución de entre 25%–50% en otros ocho países. En 2009, la Región de Europa declaró por primera vez la ausencia total de casos (autóctonos) de *P. falciparum*. El número de casos disminuyó menos en los países con mayores tasas de incidencia, lo que indica que debe prestarse mayor atención a los países que sufren más carga del paludismo fuera de África.

31. En 2009 había ocho países en la fase de preeliminación de la lucha antipalúdica y diez países que aplicaban programas de eliminación de alcance nacional (ocho de los cuales entraron en la fase de eliminación en 2008). Otros nueve países (Armenia, las Bahamas, Egipto, Jamaica, Marruecos, Omán, la Federación de Rusia, la República Árabe de Siria y Turkmenistán) han interrumpido la transmisión y se hallan en la fase de prevención de la reintroducción del paludismo. Marruecos y Turkmenistán fueron certificados en 2010 como libres de la enfermedad por la Directora General de la OMS.

32. Se estima que el número de casos de paludismo aumentó de 233 millones en 2000 a 244 millones en 2005, pero luego descendió a 225 millones en 2009. Se estima también que el número de muertes debidas a la enfermedad disminuyó de 985000 en 2000 a 781000 en 2009. Se han observado reducciones de la carga del paludismo en todas las Regiones de la OMS, y los mayores descensos proporcionales se han registrado en la Región de Europa, seguida por la de las Américas. Las mayores disminuciones de defunciones en términos absolutos se observaron en África

Chapter 1.
Introduction

The ***World Malaria Report 2010*** summarizes information received from 106 malaria-endemic countries/areas, including 7 that are in the prevention of reintroduction phase, and 2 countries that were certified as free of malaria in 2010 (Morocco and Turkmenistan). It highlights progress made in meeting the World Health Assembly (WHA) targets for malaria control to be achieved by 2010 and 2015, and new goals on malaria elimination set out in the Global Malaria Action Plan (2008).

The principal data source for the *World Malaria Report* is national malaria control programmes (NMCPs) in endemic countries. Standard forms were sent to each country in the control, pre-elimination and elimination phases (99 countries) in April 2010 (see Annex 1). The form requested information on: *(i)* populations at risk, *(ii)* vector species, *(iii)* number of cases, admissions and deaths with parasite species breakdown, *(iv)* completeness of outpatient reporting, *(v)* policy implementation, *(vi)* commodities distributed and interventions undertaken, *(vii)* results of household surveys, and (*viii*) malaria financing. **Table 1.1** summarizes the percentage of countries responding by WHO Region and month.

Information from household surveys was used to complement data submitted by NMCPs, notably the Demographic and Health Surveys, Multiple Indicator Cluster Surveys and Malaria Indicator Surveys. These surveys provide information on the percentage of the population that sleep 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 US President's Malaria Initiative (PMI).

Data were analysed and interpreted by WHO staff at headquarters and regional offices. Numerous enquiries were also made to WHO country offices and NMCPs to aide interpretation of country information. Assistance in data analysis and interpretation was also provided by ACT Watch, the Institute of Health Metrics and Evaluation (IHME), US Centers for Disease Control and Prevention (CDC), the Global Fund, MEASURE / DHS, and PATH. The final report was also reviewed by these agencies.

Chapter 2 summarizes global internationally agreed goals for 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 how funds allocated for malaria have been spent and the different levels of expenditure incurred as countries move from control to elimination.

TABLE 1.1

PERCENTAGE OF FORMS RECEIVED BY MONTH BY WHO REGION, 2010

WHO REGION	May	June	July	August	September	October	November	Total countries
African	0%	0%	30%	88%	98%	98%	98%	43
Americas	0%	0%	81%	81%	81%	81%	90%	21
Eastern Mediterranean	0%	0%	78%	89%	89%	89%	89%	9
European	0%	100%	100%	100%	100%	100%	100%	6
South-East Asia	0%	10%	100%	100%	100%	100%	100%	10
Western Pacific	40%	100%	100%	100%	100%	100%	100%	10
TOTAL	**4%**	**17%**	**64%**	**90%**	**94%**	**94%**	**96%**	**99**

Note: Forms are expected from each country in the control, pre-elimination and elimination phases of malaria control. Forms were also received from Armenia, Russian Federation and Turkmenistan, all of which are in the prevention of reintroduction phase.

Chapter 4 considers the policies that national programmes have adopted for ITN implementation and the progress made towards universal access to ITNs. It also reviews the adoption of policies and the coverage achieved by IRS programmes.

Chapter 5 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 then reviews the adoption of policies and implementation of programmes for improving access to effective treatment for malaria and to intermittent preventive treatment of malaria in pregnancy. Finally it reviews latest trends in drug resistance, the progress made in withdrawing oral artemisinin-based monotherapies from the market, and efforts to contain artemisinin resistance on the Cambodia-Thailand border.

Chapter 6 considers the type of evidence that can be used to determine whether the burden of malaria has changed over time and whether changes are associated with malaria control interventions. It then summarizes the trends of malaria cases and assesses the evidence that malaria control activities have had an impact on malaria disease burden in each WHO Region. It concludes by presenting estimates of the number of cases and deaths by WHO Region and worldwide for the period 2000–2009.

Profiles of 24 countries that are showing decreases in malaria cases, as highlighted in the main text of the report, are then presented. Following the profiles, **Annexes** give data by country for the malaria-related indicators.

In each of the following chapters, the report presents a critical review of the evidence, and of the conclusions that can be drawn from it. These conclusions are provided in order to stimulate improvements in policy, financing, implementation, and monitoring and evaluation. The purpose of the *World Malaria Report* is to support the development of effective national malaria control programmes.

Chapter 2.
Goals, policies and strategies for malaria control and elimination

This chapter summarizes internationally agreed goals for malaria control and the policies and strategies recommended by WHO to achieve them. It has four sections: 1) goals and targets; 2) policies and strategies; 3) malaria elimination; and 4) indicators to track progress.

2.1 Goals and targets for malaria control and elimination

The vision of the RBM Partnership is "a world free from the burden of malaria" *(1)*. From 2007, the United Nations (through the MDGs), the World Health Assembly and the RBM Partnership had consistent goals for intervention coverage and impact for 2010 and 2015 *(2–4)*. These goals have evolved in recent years, largely due to substantial progress in malaria control, with goals and targets becoming increasingly ambitious (**Table 2.1**).

In April 2008 the United Nations Secretary-General put forward a vision of halting malaria deaths by ensuring universal coverage of malaria interventions by the end of 2010 *(5)*. The aim was for indoor residual spraying (IRS) and long-lasting insecticide-treated mosquito nets (LLINs) to be made available to all people at risk of malaria, especially women and children in Africa, and for all public health facilities to be able to provide effective malaria diagnosis and treatment.

In September 2008 the RBM Partnership added three additional targets as part of the Global Malaria Action Plan *(6)*. The first is to reduce the total number of malaria deaths worldwide to near-zero preventable deaths by 2015. This target is more ambitious than the previous target of a 75% reduction in the number of malaria deaths by 2015, although there is no global consensus on how to measure preventable deaths. The second is that malaria should be eliminated in 8–10 countries by 2015 and afterwards in all countries that were in the pre-elimination phase in 2008. The third goal is: "in the long term, eradicate malaria worldwide by reducing the global incidence to zero through progressive elimination in countries".

Malaria control forms part of MDG 6 and is central to achieving MDG 4, a two-thirds reduction in the mortality rate among children under 5 years of age. Without substantial progress in controlling malaria, which accounted for 8% of deaths < 5 globally in 2008 and 27% of deaths < 5 in Africa (7), MDG 4 will not be achieved.

TABLE 2.1

GOALS AND TARGETS FOR MALARIA CONTROL AND THE MDGs

United Nations, the World Health Assembly and the RBM Partnership targets to 2007	RBM Partnership goals and targets from 2008
Coverage of ≥ 80% by 2010 with four key interventions: • ITNs, • IRS for targeted households, • IPTp, • appropriate treatment with antimalarial medicines for patients with malaria.	Achieve universal coverage for all populations at risk of malaria using locally appropriate interventions for prevention and case management by 2010.
Reduce the number of malaria cases and deaths by ≥ 50% between 2000 and 2010 and by ≥ 75% between 2000 and 2015.	By 2010, halve the 2000 malaria burden and by 2015, reduce the number of cases by three-quarters and the number of preventable deaths to near zero.
	Eliminate malaria in 8 to 10 countries by 2015 and afterwards in all countries that are currently in the pre-elimination phase. In the long-term, eradicate malaria worldwide by reducing the global incidence to zero through progressive elimination in countries.
MDG 4 target: By 2015 reduce by two-thirds the mortality rate among children under five.	
MDG 6 target: By 2015 have halted and begun to reverse the incidence of malaria and other major diseases.	

2.2 Malaria control policies and strategies

The strategic approaches to malaria control fall into two major areas – prevention and case management. Taken together, these strategies work against both the transmission of the parasite from mosquito vector to humans (and from humans to mosquitoes) and the development of illness and severe disease in humans.

2.2.1 Malaria prevention through malaria vector control

The objectives of malaria vector control are two-fold:

- to protect people against infective malaria mosquito bites by reducing vector longevity, vector density and human-vector contact; and
- to reduce the intensity of local malaria transmission at community level, and hence the incidence and prevalence of infection and disease.

The overarching policy and strategy for vector control is "universal coverage with effective vector control". The two most powerful and most broadly applied interventions are LLINs and IRS. These interventions work by reducing the lifespan of female mosquitoes (so that they do not survive long enough to transmit the parasite) and by reducing human-vector contact. In some specific settings and circumstances, these core interventions 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, and to 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 *(8)*.

Malaria vector control, with LLIN, IRS or other interventions, is only effective if high coverage is achieved and sustained. This requires a sustained programme of vector control delivery operations that are performed 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 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:

1. Because high coverage rates are needed to realize the full potential of insecticide-treated nets (ITNs) and IRS, WHO recommends that all people at risk in areas targeted for malaria prevention should be covered with LLINs, i.e "universal coverage" *(9,10)*. It is currently proposed that one LLIN should be distributed for every two persons. This approach may require refinement for implementation at household level: for example, one option is to distribute to each household one LLIN for every two members of the household, rounding up in households with an odd number of members.
2. LLINs should be either provided free of charge or 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 *(9)*.
3. Universal coverage with LLINs is best achieved and maintained by a combination of delivery systems: mass distribution campaigns can achieve rapid initial coverage, but need to be supplemented by routine delivery to pregnant women through antenatal services and to infants at immunization clinics *(9)*.
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 *(9)*.
5. Only LLINs recommended by the WHO Pesticide Evaluation Scheme (WHOPES) should be procured by national malaria control programmes and partners for malaria control. These nets are designed to maintain their biological efficacy against vector mosquitoes for at least three years in the field under recommended conditions of use, obviating the need for regular insecticide treatment *(11,12)*.
6. IRS consists of 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 *(10)*. It 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 *(8)*. 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 machinery and the methods must be scrupulously maintained.
7. Currently 12 insecticides belonging to 4 chemical classes are recommended by WHOPES for IRS. 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. Special attention must be given to preserving susceptibility to pyrethroids, because they are the only class of insecticides currently used on LLINs.
8. Using the same insecticide for multiple successive IRS cycles is not recommended; instead, it is preferable to use a system of rotation with a different insecticide class being used each year *(13)*. In areas where IRS is the main vector control intervention, this rotation system may include a pyrethroid. In areas with high LLIN coverage, pyrethroids should not be used for IRS.
9. DDT has a comparatively long residual efficacy (≥ 6 months) as an insecticide for IRS. DDT use in agriculture is banned under the Stockholm Convention, but countries can use DDT for IRS for as long as necessary and in the quantities needed, provided that the guidelines and recommendations of WHO are met and until locally appropriate, cost-effective alternatives are available for a sustainable transition from DDT *(14)*.
10. The spread of insecticide resistance, especially pyrethroid resistance in Africa, is a major threat, and a substantial intensification of resistance monitoring is needed. Malaria vector bionomics and vector distribution maps need to be updated periodically through vector sentinel sites in different eco-epidemiological strata to ensure that the appropriate mix of malaria vector control interventions is being used *(8)*.

11. In most settings where IRS has been or is being deployed, ITNs or LLINs are already in use. Neither LLINs nor IRS alone will be sufficient to achieve and maintain interruption of transmission in holoendemic areas of Africa or in hyperendemic areas in other regions *(9)*. Some observational evidence indicates 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 *(15)*. However, using the combination should not be seen as a way of overcoming coverage gaps due to poor operational practice: before providing people with both IRS and LLINs, the priority should be to ensure that everyone at risk is effectively covered by one or the other. When using the combination of IRS and ITNs, a non-pyrethroid insecticide should be used for IRS.

2.2.2 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 the infection and thus preventing the progression of uncomplicated malaria to severe potentially fatal disease, and 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 of infection and infectivity.

The 2nd edition of the *WHO Guidelines for the treatment of malaria* was published in March 2010 *(16)*. 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. Treatment solely on the basis of clinical suspicion should only be considered when a parasitological diagnosis is not accessible[1].
2. Uncomplicated *P. falciparum* malaria should be treated with an artemisinin-based combination therapy (ACT)[2]. A single dose of primaquine is recommended in addition to an ACT for treatment of *P. falciparum* malaria as an anti-gametocyte medicine (particularly as a component of a pre-elimination or an elimination programme) provided the risks of haemolysis in patients with glucose-6-phosphate dehydrogenase (G6PD) deficiency have been considered.
3. *P. vivax* malaria should be treated with chloroquine in areas where it is effective, or an appropriate ACT 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 five ACTs currently recommended for use are artemether plus lumefantrine, artesunate plus amodiaquine, artesunate plus mefloquine, artesunate plus sulfadoxine-pyrimethamine (SP), 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 this will promote resistance to this critically important class of antimalarials.
6. Severe malaria should be treated with a parenteral artemisinin derivative or quinine, and followed by a complete course of an effective ACT as soon as the patient can take oral medications. When intravenous or intramuscular treatment is not feasible, e.g. in peripheral health posts, patients should receive pre-referral treatment with an artemisinin-based suppository and be transferred to a health facility capable of providing definitive treatment with parenteral antimalarial medicines.
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.

2.2.3 Diagnosis and treatment of malaria

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 they are parasitaemic, with the objective of reducing the malaria burden in the specific 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 two doses of sulfadoxine-pyrimethamine, 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 *(17)*.
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 three doses of SP along with the DTP2, DTP3 and measles immunization through the routine immunization programme (*18*).

2.2.4 Resistance to antimalarial medicines

Antimalarial drug resistance is a major public health problem which hinders the control of malaria. The measurement of drug resistance in malaria is complex, as four different tools are used: *(i)* therapeutic drug efficacy studies measure clinical and parasitological efficacy and are the primary source to inform the treatment policy of the national malaria control programme (NMCP); *(ii)* in vitro studies measure the intrinsic sensitivity of parasites to antimalarial drugs; *(iii)* molecular marker studies identify genetic mutations and subsequently confirm the presence of mutations in blood parasites;

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

2. Chloroquine remains effective against *P. falciparum* only in Central America; clinical studies have confirmed 100% efficacy in Honduras and Nicaragua.

and *(iv)* pharmacokinetic studies characterize drug absorption and drug action in the body. While each method provides a contribution towards a more complete understanding of antimalarial drug resistance, therapeutic efficacy studies remain the gold standard for guiding drug policy. NMCPs should monitor the therapeutic efficacy of antimalarial medicines over time in order to ensure early detection of changing patterns of resistance so that national malaria treatment policies for first- and second-line drugs can be revised and appropriate management of clinical cases assured.

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 prepared a protocol for assessing antimalarial drug efficacy in high transmission areas in 1996; it was updated in 2009 on the basis of expert consensus and feedback from the field *(19)*. WHO has also prepared a field manual on in vitro assays for the sensitivity of malaria parasites to antimalarial drugs *(20)* and a guideline on genotyping malaria parasites to distinguish between reinfection and recrudescence during therapeutic efficacy testing. Parasite genotyping is now becoming increasingly necessary due to the longer follow-up of patients *(21)*. The following recommendations are drawn from the 2009 edition of Methods for surveillance of antimalarial drug efficacy:

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 critical 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), longer follow-up periods are necessary.
4. The standard protocol to test the efficacy of medicines against *P. falciparum* may need adjustment for *P. vivax*. Since *P. vivax* infection relapses, many countries require primaquine therapy for radical cure. Administration of primaquine concurrently or soon after administration of chloroquine may conceal resistance to chloroquine alone, resulting in underestimation of the risk of therapeutic failure or resistance to chloroquine. Therefore, in certain cases primaquine therapy should be postponed until after the 28-day follow-up. Nonetheless, if local health policy includes mandatory administration of primaquine with chloroquine, the failure rate should be considered to be that of the combination regimen.
5. Countries should consider changing the first-line treatment for malaria if the total failure rate exceeds 10%; however, efficacy and failure rates should be assessed in the context of their 95% confidence intervals.

Over the last decade, most malaria-endemic countries shifted their national treatment policies to ACTs and efficacy studies are now conducted on combination therapies. Of particular concern is whether there is evidence of resistance to artemisinin. 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: *(i)* 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 *(ii)* 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 *(iii)* the presence of parasites at day 3 and recrudescence within 28–42 days (confirmed resistance).[3]

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. With rapid scale-up and sustained efforts, malaria transmission can be interrupted in low-transmission settings. However, in areas of moderate to high transmission malaria transmission can be greatly reduced, but interruption of transmission is likely

BOX 2.1

DEFINITIONS (*23,24*)

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.

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

to require new tools. The WHO position on malaria elimination is set out in a recent meeting report *(22, 23)* and is summarized below:

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%)[4] a "consolidation period" should be introduced, in which: *(i)* control achievements 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)[4] should be encouraged to proceed to malaria elimination, with falciparum elimination preceding vivax elimination where these species co-exist. Before making this decision, however, they 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 might require regional initiatives and support and will require strong political commitment.
3. Countries with an absence of locally acquired malaria cases for three consecutive years, and the systems in place to prove this, will be eligible to request WHO to initiate procedures to certify that they are malaria-free.
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 interest in 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 for vector control and other preventive measures, diagnosis, treatment and surveillance must be a priority.

2.4 Indicators

The United Nations Inter-agency and Expert Group on MDG Indicators has established the following specific indicators for malaria *(2)*:

6.6 Incidence and death rates associated with malaria

6.7 Proportion of children under 5 years sleeping under insecticide-treated mosquito nets

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 the 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 *(24)*. Similarly, indicator 6.8 does not yet reflect policy recommendations to provide a parasitological test for all fever cases.

Table 2.1 summarizes 30 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 (*3*), the resolution of the World Health Assembly in 2005 (*4*), the RBM Global Action Plan (*6*), the work of the RBM Malaria Monitoring and Evaluation Reference Group (MERG) (*25, 26*), and previous editions of the *World Malaria Report* (*24, 27*). Of the 30 indicators, 20 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, hence individual programmes would use only a sub-set of the 20 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 2009* are: *(i)* addition of indicators for low transmission settings; *(ii)* addition of an indicator that considers the prevalence of parasitaemia in populations of children under 5 as recommended by MERG; *(iii)* addition of an indicator that considers whether the number of ITNs recorded in household surveys is sufficient to cover all household members; *(iv)* addition of an indicator that considers the proportion of households with at least one ITN and/or sprayed by IRS in the last 12 months as endorsed by MERG; *(v)* addition of an indicator that considers the percentage of fever cases receiving a diagnostic test as endorsed by MERG; *(vi)* the case management indicator of the proportion of fever cases receiving an appropriate antimalarial medicine is replaced by the proportion of suspected malaria cases receiving appropriate treatment. Appropriate treatment is defined by national policy but will generally follow the break-down below:

Febrile children with a finger/heel stick	
With positive result: received antimalarial	*Appropriate*
With positive result: did not receive antimalarial	*Inappropriate*
With negative result: received antimalarial	*Inappropriate*
With negative result: did not receive antimalarial	*Appropriate*
Febrile children not receiving finger/heel stick	
Received antimalarial	*Appropriate*
Did not receive antimalarial	*Inappropriate*

The last change is considered necessary because WHO recommends that all persons suspected to have malaria should receive a parasitological test and because an increasing number of member states are expanding the availability of parasitological diagnosis through RDTs; hence it is no longer informative to determine whether all fever cases receive an antimalarial medicine.

4. 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.

TABLE 2.2

MALARIA INDICATORS, TARGETS AND SOURCES OF DATA

A. 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: ≥ 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 No. of active foci reported per year	No. of active foci reported per year	None	None	Routine surveillance system	
	1.4 No. of cases by classification	No. of cases by classification	None	Local (introduced, indigenous, relapsing), imported, induced	Routine surveillance system	
Malaria transmission						
	1.5 Malaria test positivity ratio	No. of laboratory-confirmed malaria cases	No. of suspected malaria cases with parasite-based test	Microscopy RDT, *Pf, Pv,* 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 malaria infection	*No. of children aged 6–59 months with malaria infection detected by microscopy*	*No. of children aged 6–59 months tested for malaria parasite by microscopy*		*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: ≥ 50% by 2010 and ≥ 75% by 2015 in comparison with 2000* [d,f]
	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*	
	In high transmission areas					
	1.9 All-cause < 5 mortality rate ($_5q_0$)	*No. of deaths in children < 5 years from all causes x 1000*	*No. of children born in time period*		*Household surveys, complete or sample vital registration systems*	*No specific malaria target set*

B. 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 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, < 5, migrant workers	Routine data on commodities distributed	≥ 80%
	2.3 Proportion of households with at least one ITN	*No. of households surveyed with at least one ITN*	*Total No. of households surveyed*		*Household survey*	
	2.4 Proportion of individuals with access to an ITN in a household [f]	*No. of individuals with access to an ITN in a household* [f]	*Total No. of individuals who slept in surveyed households the previous night*		*Household survey*	
	2.5 Proportion of individuals who slept under an ITN the previous night	*No. of individuals who slept under an ITN the previous night*	*Total No. of individuals who slept in surveyed households the previous night*	*All ages, < 5, pregnant women*	*Household survey*	*≥ 80%*
	2.6 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

CONTROL STRATEGY	INDICATOR	NUMERATOR	DENOMINATOR	BREAK-DOWN	DATA SOURCE	TARGET
	2.7 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%
	2.8 Proportion of households with at least one ITN and/or sprayed by IRS in the past 12 months	*No. of households that have at least one ITN and/or have been sprayed by IRS in the past 12 months*	*Total No. of households surveyed*		*Household survey*	
Diagnosis and treatment						
	2.9 Percentage of suspected malaria cases that receive parasitological test [g]	No. of suspected malaria cases that receive parasitological test[g]	No. of suspected malaria cases		Routine surveillance system or HMIS	≥ 90%
	2.10 Proportion of children < 5 with fever in the past 2 weeks who had a finger or heel stick	*Number of children < 5 who had a fever in the previous 2 weeks who had a finger/heel stick*	*Total number of children < 5 who had a fever in the previous 2 weeks*	*P.f., P.v. probable (not tested)*	*Household survey*	
	2.11 Percentage of outpatient cases that received appropriate antimalarial treatment according to national policy[h]	No. of malaria cases receiving appropriate antimalarial treatment at health facility[h]	No. of suspected malaria cases at health facility	*P.f., P.v.* not tested	Routine surveillance system, HMIS or special studies	100%
	2.12 Appropriate antimalarial treatment of children < 5 years within 24 h of onset of fever[i]	*No. of children < 5 receiving appropriate antimalarial treatment (according to national policy) within 24 h of onset of fever[i]*	*No. of children < 5 with fever in the past 2 weeks in surveyed households*		*Household survey*	*≥ 80%*
	In high transmission areas					
	2.13 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 visit in 1 year		Routine data from HMIS	*≥ 80%*
	2.14 Proportion of women who received intermittent preventive treatment for malaria during ANC visits during their last pregnancy	*No. of women who received two or more doses of a recommended ACT during ANC visits to prevent malaria during their pregnancy that led to a live birth within the past 2 years*	*Total number of women surveyed who delivered a live baby within the past 2 years*		*Household survey*	*≥ 80%*

C. 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	No. 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 facilities reports received each month[j]	No. of health facilities 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]	No. of private facilities in areas at risk for malaria reporting to national malaria surveillance system[k]	No. of private facilities in areas at risk for malaria		Routine surveillance system	

From references 23–27. *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 marks the readiness for transition from control stage to pre-elimination stage.

d. A new RBM target was introduced in the 2008 Global Malaria Action Plan: "near zero preventable malaria deaths" by 2015. This target is more ambitious than the target of 75% reduction in malaria deaths by 2015. There is no global consensus on how to measure preventable malaria deaths.

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. Ideally all suspected cases will be given a diagnostic test and only treated with an antimalarial if they test positive for *P.falciparum* or *P. vivax* cases not tested should be given an antimalarial according to national policy.

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 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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Chapter 3.
Financing malaria control

This chapter reviews the resource requirements for meeting global malaria control targets, and recent trends in international and domestic financing. It considers how money allocated for malaria has been spent and the different levels of expenditure incurred as countries move from control to elimination.

3.1 Resource requirements

Global resource requirements for malaria control were estimated in the Global Malaria Action Plan to exceed US$ 5 billion a year between 2010 and 2015 and US$ 4.75 billion between 2020 and 2025 (*1*)[1]. The amounts estimated for prevention and case management interventions are shown in **Table 3.1**. The reduced amounts in later years are primarily due to a projected reduction in need for diagnosis 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 diagnosis will not be reduced substantially; 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

3.2.1 Commitments for malaria control

Commitments represent firm obligations 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, or disbursements may be made based on performance against agreed targets (*2*). In some cases a donor organization may make a pledge, which is a non-binding announcement, to contribute a certain amount of funds.

Information on commitments was obtained from several sources. The Global Fund provides information on grant awards and funds committed on its web site.[2] The US President's Malaria Initiative (PMI) provides information on commitments in its annual report (*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

TABLE 3.1

GLOBAL RESOURCE REQUIREMENTS FOR MALARIA CONTROL estimated in the Global Malaria Action Plan (US$ million)

		2010	2015	2020	2025
Prevention					
	LLINs and ITNs	2091	1689	1807	1035
	IRS	1883	2026	2047	1531
	IPTp	8	9	9	10
	SUB-TOTAL	3982	3724	3863	2576
Case management					
	RDTs	975	368	109	43
	ACTs	356	164	107	41
	Chloroquine and primaquine	5	2	1	0
	Management of severe malaria	23	16	9	4
	SUB-TOTAL	1359	550	226	87
Programme support					
	Programme support	839	764	787	714
TOTAL (Global Malaria Action Plan estimates)		**6180**	**5038**	**4876**	**3378**

1. Kiszewski *et al.* 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. (Kiszewski A et al. Estimated global resources needed to attain international malaria control goals. *Bulletin of the World Health Organization*, 2007, 85:623–630.)

2. http://www.theglobalfund.org/en/commitmentsdisbursements/

aid flows.[3] The OECD database only provides information until 2008, hence commitments – principally made by UNICEF, the World Bank, the governments of Japan and of the United Kingdom – were assumed to remain at 2008 levels in 2009 and 2010.

Commitments by the major external financers of malaria control are shown in **Figure 3.1**. Funds have increased dramatically in the past decade but appear to have stagnated in 2010, at US$ 1.8 billion, principally because the lifetime budgets for approved Round 9 malaria proposals made in 2009 by the Global Fund (US$ 1.6 billion) were lower than in Round 8 (US$ 2.9 billion). The total amount of money approved reflects the total requested by countries in high quality proposals; in Round 9 the size of requests (US$ 3.55 billion) was smaller than in Round 8 (US$ 3.84 billion) while the proposal acceptance rate on technical basis was lower in Round 9 (55%) than Round 8 (68%). PMI commitments have grown substantially in the last 5 years and were higher in 2010 than in 2009. Commitments by other agencies are relatively small compared to the Global Fund and PMI, however several national governments, and other agencies, contribute resources to the Global Fund.

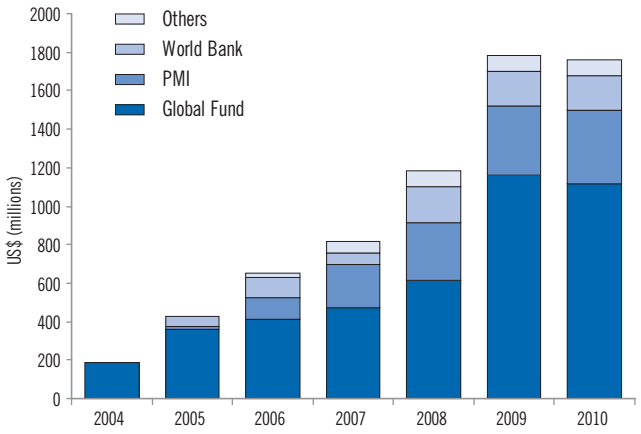

Figure 3.1 **Funding commitments of the Global Fund, the US President's Malaria Initiative, World Bank, and other agencies**

Notes: Global Fund grants that have entered Phase 2 and rolling continuation phases commitments up to 1 November 2010 were allocated to years according to grant start and end dates and assume a constant level of commitment throughout the life of the grant. For grants that are in Phase 1, commitments were allocated equally over two years commencing from grant signature; the remainder of the total life time budget was allocated equally over the subsequent three years. For grants approved but not yet signed, 10% of the approved grant was also allocated to 2010 to account for commitments that may be made between 1 November and the end of 2010. Commitments of the PMI were allocated to calendar years proportionally according to the number of months of a financial year falling in each calendar year. Data for the World Bank and other agencies are only available up to 2008 and have been assumed to remain constant for 2009 and 2010.

3.2.2 Disbursements to malaria-endemic countries

A disbursement is the transfer of funds which places resources at the disposal of a government or other implementing agencies. Expenditures are the use of funds to pay for commodities, buildings, equipment, services or salaries. 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; it is typically more complete than that on expenditures and forms the basis of most analyses in this report.

The Global Fund,[4] UNITAID, and PMI produce reports detailing disbursements for specific grants up to 2009. Information on disbursements from other sources was obtained from the OECD database, which contains information for the years 2004–2008. For these organizations levels of disbursement in 2009 were assumed to be equal to those in 2008.

International disbursements to malaria-endemic countries have vastly increased over the past decade with recent increases dwarfing the total amounts allocated in earlier years (**Fig. 3.2**). The Global Fund remains the single largest source of funding for malaria control globally. While PMI and other donors contribute significant sums through bilateral programmes, these accounted for less than 33% of total disbursed funding in the year 2009.

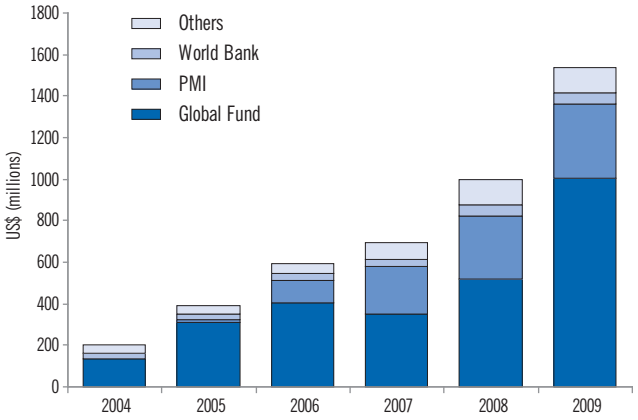

Figure 3.2 **Disbursements to malaria endemic countries, 2004–2009**

3.3 Domestic financing of malaria control

Country reports to WHO on government expenditure for malaria control were used to estimate national government spending. Such reports are usually restricted to malaria-specific expenditures incurred by NMCPs for commodities, programme supervision and management, training and behavioural change interventions.

Much of the support for malaria control activities derives from existing health systems in countries. This is true especially for the treatment of acute disease – where health workers, hospitals, clinics and other infrastructure are typically provided by the national governments or supported by non-governmental organizations. Such financing, though an integral component of financial support for malaria control, has not be included in this report, because spending on health systems and personnel is difficult to attribute specifically to malaria and data sources are fragmented.

3. http://stats.oecd.org/qwids/

4. http://www.theglobalfund.org/en/commitmentsdisbursements/

In addition, malaria prevention and treatment can be financed by private "out-of-pocket" expenditures. Such funding is not considered here because data are not readily available, although it can form a substantial portion of the available funding for malaria control globally. Ultimately this means that the financing situation presented in this section is incomplete and likely to provide an underestimate of the total financial resources available for malaria control. However, the sources excluded here are much less likely to be affected by the actions of countries and donors; thus there is some advantage in focusing on traceable government malaria expenditures since they are likely to provide the most reliable record of the levels of funding available for malaria control and, in particular, the changes over time.

Although information on domestic financing for malaria is incomplete, countries report spending on malaria control to WHO and some analysis of recent trends in spending at the regional level is possible. The *World Malaria Report 2009* (*3*) examined whether increases in external funding would lead to a reduction in domestic financing for malaria control – domestic funding should be at least maintained even with increased external finance in order to keep programmes sustainable and ensure that the increased financing from donors is additional. The evidence was mixed. A more consistent picture emerges from data in 2004–2009. Domestic financing has increased across all WHO regions (**Fig. 3.3**). However, when individual countries which increased or maintained spending on malaria relative to 2004 were compared to those with reduced spending, the latter had received more external financing (US$ 2.93 per person at risk per year on average) than those which increased their domestic spending (US$ 0.69 per person at risk per year).

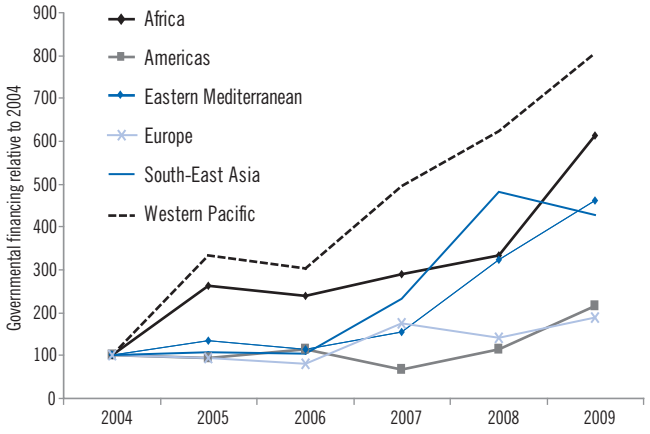

Figure 3.3 Trends in governmental financing for malaria control by WHO Region

Source: NMCP reports to WHO. Only data from 2004 onwards were included. Countries missing more than 2 of 6 data points for government spending between 2004 and 2009 were excluded. Missing values were imputed based on the average of the two adjacent years if the missing data were in the middle of the range; if the data points were at the end of the range the value for the most proximate year were used. Data were indexed to the year 2004 in each country, then averaged within each year across regions.

3.4 Categories of expenditure by source of funds

Figure 3.4 shows how funding from different sources is spent. National government proportions were calculated from reports on government expenditures for 2009 submitted by NMCPs to WHO. Only countries with reasonably complete datasets were included (32 countries for this analysis), and all countries were weighted equally. Information on Global Fund expenditures was obtained from the Global Fund's enhanced financial reporting system for years 2008 and 2009, and information on PMI expenditures from country operational plans for 2010.

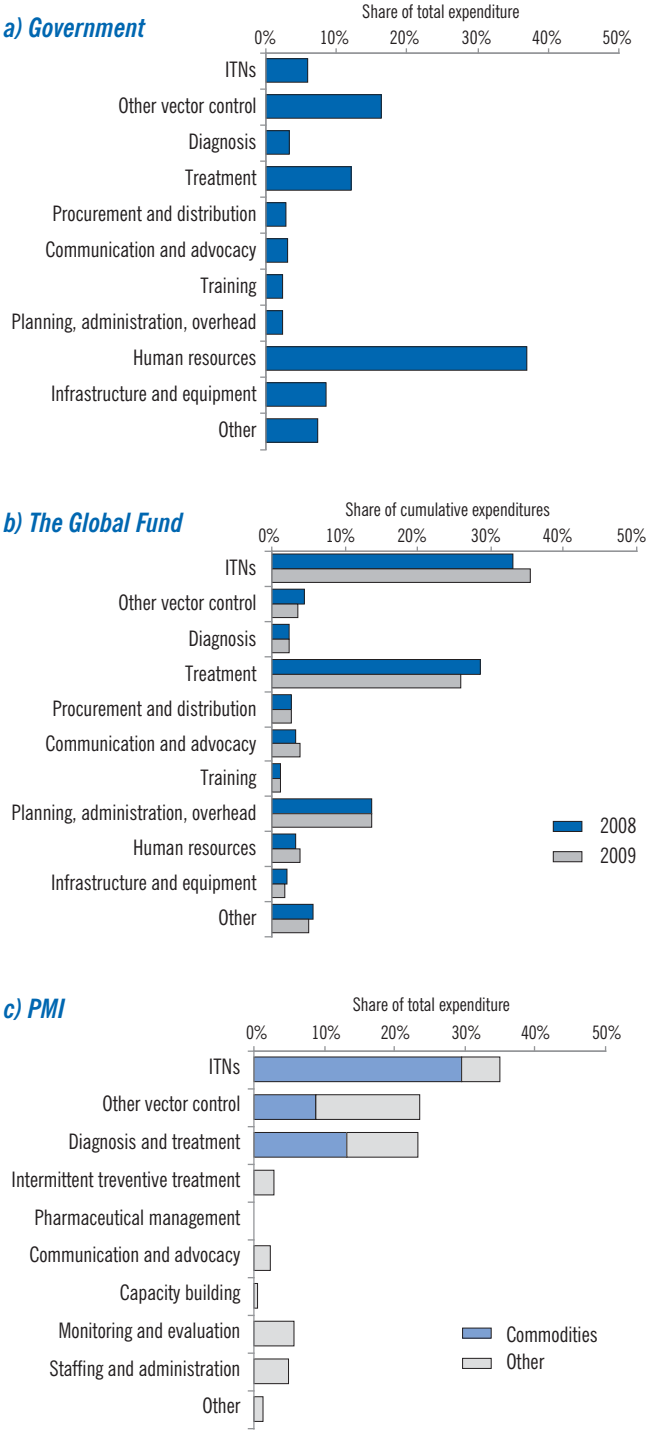

Figure 3.4 Use of funds from different sources

National government expenditure is generally focused on human resources, IRS programmes and antimalarial medicines, while the majority of Global Fund resources are used for ITNs, antimalarial treatment and programme management. Relatively small amounts are spent on diagnosis by the Global Fund and national governments. PMI expenditure patterns are similar to those of the Global Fund but with more emphasis on IRS (expenditures on diagnosis are not separated from expenditures on treatment). PMI expenditure on ITNs, IRS, diagnosis and treatment includes expenditures associated with programme implementation such as procurement and distribution costs as well as commodity costs. This pattern of expenditure is consistent with the analysis presented in the *World Malaria Report 2009* (*4*).

3.5 Disbursements by country

As total external assistance for malaria-endemic countries has expanded over the last decade so has the number of countries receiving such aid. In the year 2010, 106 countries and areas are considered to be endemic for malaria. The number of countries receiving external assistance for malaria increased from 53 in 2004 to 77 in 2008.

There is considerable variation in the amounts of external funding allocated to malaria-endemic countries. Larger amounts of money per capita are allocated to countries with smaller populations at risk, as noted in the *World Malaria Report 2009*. The amounts per capita increased for countries of all sizes but the gap in funding between smaller and more populous countries has not narrowed (**Fig. 3.5**).

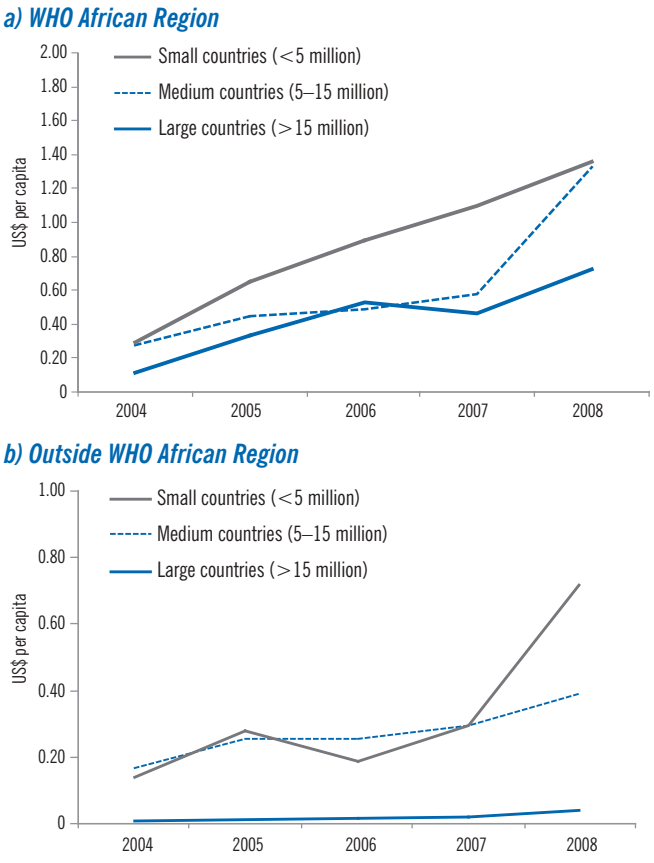

Figure 3.5 **Disbursements per person at risk by size of the population at risk by WHO Region**

3.6 Disbursements by stage of malaria control

WHO recognizes four stages in the progression of countries towards the elimination of malaria: control, pre-elimination, elimination, and prevention of reintroduction (*5*). **Figure 3.6** shows international financing for countries relative to these stages for the years 2004–2008 and government financing for 2004 per person at risk of malaria per year. No donor disbursement data or government financing data were available for countries in the prevention of reintroduction stage.

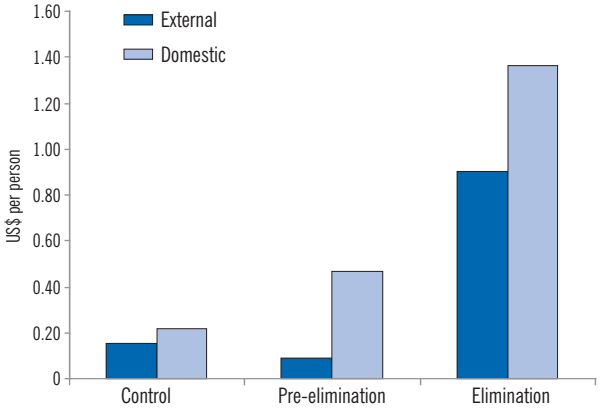

Figure 3.6 **Annual external and domestic financing by stage of malaria control**

Source: International disbursement data were derived from the OECD database (2004–2008) and government financing was based on country reports to the WHO (2004–2009). The sample includes 64 countries in the control stage for donor financing, 56 for government financing; for pre-elimination: 4 for donor funding and 1 for government financing; and for elimination: 5 for donor financing and 4 for government financing. Person years of risk was used to account for differing time periods of data from different sources.

Donor disbursements per person at risk were similar for control and pre-elimination countries, both below US$ 1. In the elimination phase, external funding per person at risk was higher, around US$ 4.5. The number of countries (nine) in the elimination phase, however, is small. Furthermore, data on donor disbursements are only available for 5 of these countries, all of which are in the WHO European Region. The analysis indicates that spending per person at risk may need to be higher as countries approach the elimination of malaria. This could be partly because the cost of programme implementation is higher in this Region owing to differences in purchasing power and other infrastructural differences but could also reflect the costs of maintaining well-functioning surveillance systems.

Countries in the pre-elimination and elimination phases have higher amounts of government spending per person at risk than countries in the control phase, and government funding exceeds that of external funding. This may be because countries in pre-elimination and elimination stages tend to have higher gross national incomes per capita and have more government financing available to fund health interventions in general. It may also reflect high levels of government commitment to attain the goal of elimination.

3.7 Conclusions

External funding for malaria control. External funding has risen steeply in the past decade. However, commitments for malaria control appear to have stagnated in 2010 owing to smaller amounts requested in high quality proposals and thereby approved in Round 9 of the Global Fund malaria grants in 2009 (US$ 1.6 billion) compared to Round 8 in 2008 (US$ 2.9 billion). The reduced amount has not been fully compensated by the increased amounts of funding provided by the PMI. The amounts committed to malaria still fall short of the resources required for malaria control, estimated at more than US$ 6 billion for the year 2010.

Funding by national governments. Spending on malaria control appears to have risen in all WHO regions in the countries that reported financial data. Large increases in donor financing therefore do not appear to have resulted in an overall reduction in the amount of domestic financing, although countries which had reduced their spending had received more external financing than those which increased their domestic spending.

Use of external and government funds. External financing appears to be concentrated on programme activities, particularly the procurement of ITNs, antimalarial medicines and IRS. A larger proportion of national government financing is directed towards human resources but significant amounts are also spent on antimalarial medicines and IRS.

Funding per person by population size. International disbursements for malaria increased between 2004 and 2008 to countries of all sizes. However those with smaller populations at risk continued to receive a greater amount of funding per person at risk than did the more populous countries. Outside the African Region the gap in funding between more populous countries and less populous countries has widened. In the WHO African Region the amount per capita provided to the least populous countries decreased in 2007.

Funding per person by phase of malaria control. Countries in the pre-elimination and elimination phases appear to spend more per person at risk of malaria than countries in the control phase. This finding is in line with other analysis which suggests that funding per person at risk will need to expand as countries progress towards elimination (*6*). While the increased spending is partly due to larger amounts of external financing, government financing exceeds that of external financing in countries in the pre-elimination and elimination stages.

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Chapter 4.
Vector control

This chapter considers the policies that national programmes have adopted for ITN implementation and the progress made towards universal access to ITNs. It also reviews the adoption of policies and the coverage achieved by IRS programmes. WHO does not collect data systematically on other vector control interventions such as larval control since these methods are only appropriate in a limited and specific set of environmental conditions.

4.1 ITN policy and implementation

4.1.1 Policy adoption

Adoption and implementation of policies for ITN programmes by WHO Region are shown in **Table 4.1**. Adoption of policies by country is shown in Annex 4. In 2009, 39 of 43 malaria-endemic countries in the WHO African Region, and 44 of 63 endemic countries in other Regions reported having a policy of providing ITNs free of charge. ITNs were being distributed to all age groups in 23 countries in the African Region, which represents approximately two-thirds of the countries responding to questions about ITN policy. The proportion of countries providing ITNs to all age groups is higher outside the African Region.

Several distribution channels are used in each Region. Antenatal clinics are the most widely used channel in the African Region, although greater amounts of ITNs are distributed through mass campaigns. Mass campaigns are the most commonly used channel in other WHO Regions.

4.1.2 Numbers of ITNs distributed

The Alliance for Malaria Prevention (AMP) collates information on the number of LLINs delivered by 7 manufacturers (Sumitomo/A-Z, Vestergaard-Frandsen, Clarke, BASF, Intection, Tana Netting, and Yorkool) which are believed to supply almost all ITNs delivered to countries in Africa. In Africa almost all ITNs distributed are long-lasting ITNs (LLINs).

The number of nets delivered by manufacturers increased from 5.6 million in 2004 to 88.5 million in 2009 in sub-Saharan Africa (from 5.4 million to 78.5 million in countries in the WHO African Region, which does not include Djibouti, Somalia and Sudan). In the first three quarters of 2010 a further 106 million ITNs were delivered. Thus, in less than three years between 2008 and 2010 a cumulative total of 254 million ITNs were supplied and delivered to sub-Saharan Africa, enough to cover 66% of the 765 million persons at risk (assuming 2 people sleeping under each ITN). It is expected that this percentage will have increased further by the end of 2010, with an additional 35 million ITNs scheduled for delivery in 2010.

More than 50% of the ITNs delivered between 2008 and 2010 were delivered to 7 countries: Democratic Republic of the Congo, Ethiopia, Kenya, Nigeria, Sudan, Uganda, and United Republic of Tanzania, which comprise 56% of the population at risk in sub-Saharan Africa (**Fig. 4.1**).

TABLE 4.1

ADOPTION OF POLICIES FOR ITN PROGRAMMES BY WHO REGION, 2009

POLICY	AFRICAN	AMERICAS	EASTERN MEDITERRANEAN	EUROPEAN	SOUTH-EAST ASIA	WESTERN PACIFIC	GRAND TOTAL
*Number of endemic countries/areas**	**43**	**23**	**12**	**8**	**10**	**10**	**106**
ITNs distributed free of charge	39	12	9	4	10	9	**83**
ITNs/LLINs sold at subsidized prices	28	4	1	1	0	2	**36**
ITNs/LLINs distributed to all age groups	23	13	8	3	10	9	**66**
ITNs/LLINs distributed through mass campaigns to all age groups	26	11	4		7	7	**55**
ITNs/LLINs distributed through mass campaigns to < 5 only	13	2	0		1	0	**16**
ITNs/LLINs distributed through antenatal clinics	38	5	5	2	4	3	**57**
ITNs/LLINs distributed through EPI clinics	29	0	1		2	2	**34**

* Includes countries in phase of prevention of re-introduction

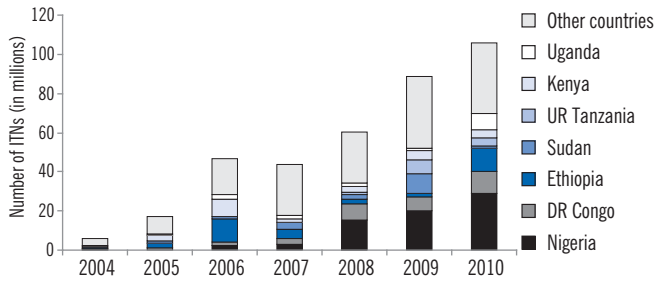

Figure 4.1 **Number of ITNs delivered by manufacturers to countries in sub-Saharan Africa, 2000–2009**

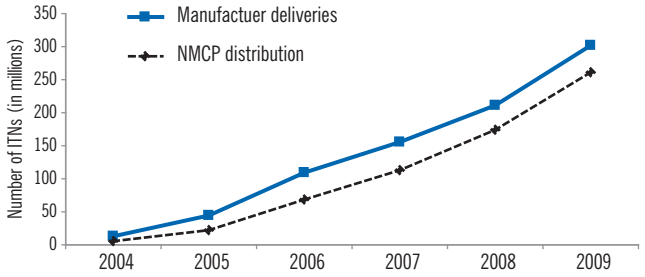

Figure 4.2 **Cumulative number of ITNs distributed in sub-Saharan Africa, 2000–2009**

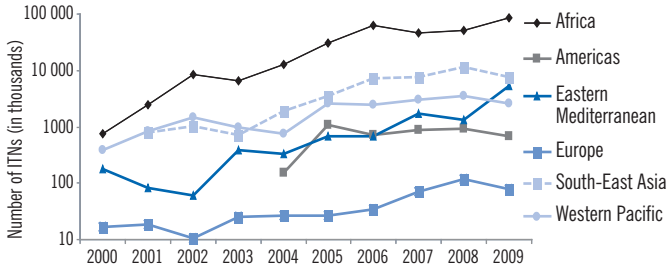

Figure 4.3 **Number of ITNs distributed by NMCPs by WHO Region, 2000-2009**

WHO receives information from NMCPs on the number of ITNs distributed each year, which may include ITNs delivered to regional warehouses, health facilities, and end-users. The number of nets distributed by NMCPs each year is lower than the number delivered by manufacturers (**Fig. 4.2**). The difference is at least partly due to a time lag between the arrival of nets in a country and their distribution by the NMCP; the interval between manufacturer delivery and NMCP distribution implied by the reported data was 5.2 months in 2008–2009, which may reflect the time required to organize and conduct mass campaigns or to distribute nets through antenatal clinics or other routine systems. The difference may also be partly due to under reporting by NMCPs.

For countries in other WHO Regions, information from manufacturers is less complete and not available before 2009, but 9.9 million ITNs were reported as delivered in 2009 and 16 million ITNs in the first three quarters of 2010. The largest numbers of ITNs were delivered to Indonesia (3.4 million), India (2.9 million), Papua New Guinea (2.2 million), Afghanistan (2.0 million), United Arab Emirates (1.9 million) and Pakistan (1.5 million). United Arab Emirates hosts a United Nations Humanitarian Response Depot hub and ITNs stored there will ultimately be transported for use in emergency situations in the region.

The number of ITNs distributed by NMCPs has risen steadily since 2000 (**Fig. 4.3**), even though some nets distributed by NMCPs in countries outside Africa do not appear to be captured by the AMP recording system, possibly because they are manufactured locally. The countries distributing most ITNs between 2007 and 2009 were India (17.2 million), China (2.8 million), Indonesia (2.3 million), Myanmar (2.3 million), Bangladesh (2.1 million), Afghanistan (1.6 million), and Cambodia (1.6 million).

4.1.3 Coverage achieved at national level

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. Nationally repre-

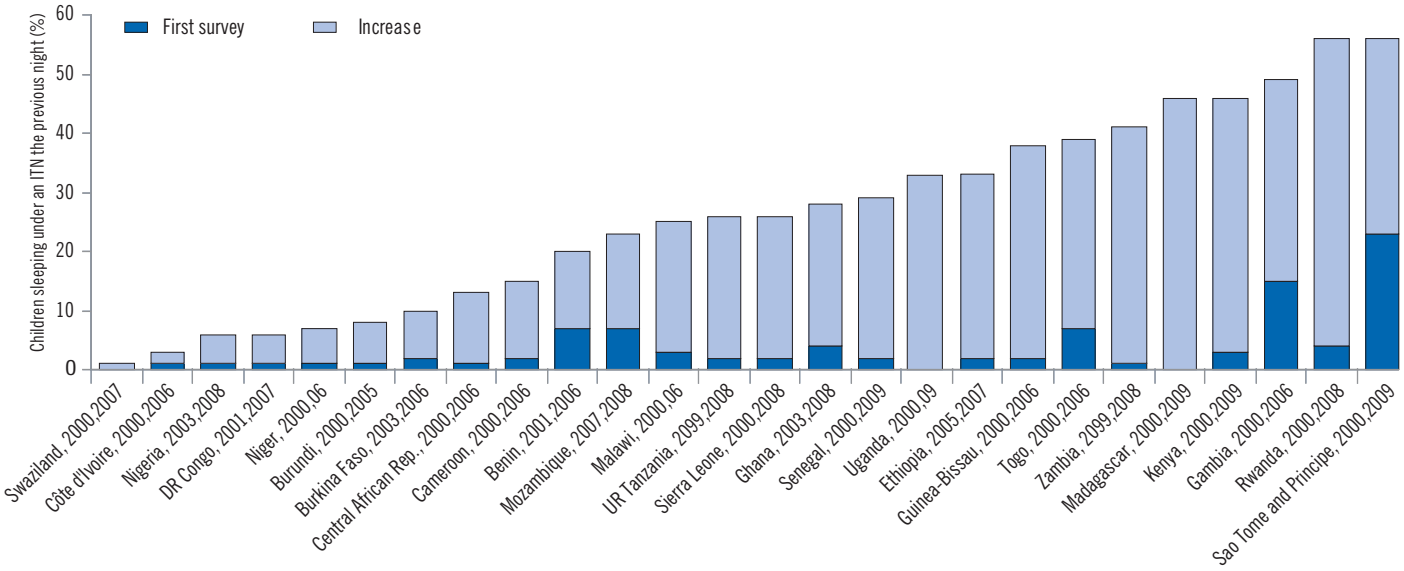

Figure 4.4 **Trends in percentage of children sleeping under an ITN for countries with more than one survey, 2000–2009**

sentative household survey information for 2007–2009 is shown in **Table 4.2**. The surveys cover 21 countries in the WHO African Region representing 59% of the population at risk. National surveys are not undertaken as frequently outside Africa due to the more focalized distribution of malaria in other parts of the world.

The weighted average of households owning an ITN within the African countries surveyed was 28%, while 20% of children < 5 years slept under an ITN the previous night. This weighted average is lower than might be expected because the most recent surveys for the Democratic Republic of the Congo and Nigeria, the most populous countries on this list, do not yet cover the period following large mass-distribution campaigns. In addition the proportion of the population sleeping under an ITN may be lower because many estimates are taken from household surveys (DHS) which are normally carried out during the dry season when malaria transmission is not at its most intense. For those countries with more than one household survey, the results indicate increasing rates of coverage (**Fig. 4.4**).

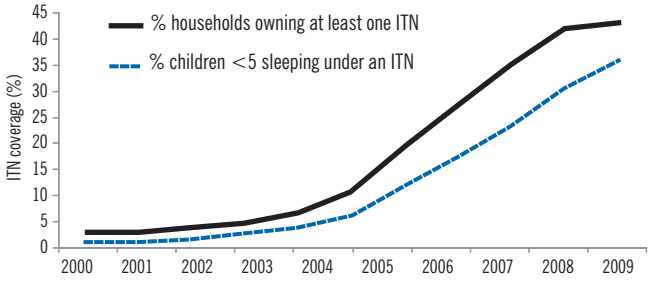

Figure 4.5 Trends in estimated ITN coverage, sub-Saharan Africa 2000–2009

In the absence of a recent household survey, it is possible to estimate ITN coverage by combining data from manufacturer 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 there has been no survey.

The percentage of households owning an ITN, and children sleeping under an ITN, for 44 sub-Saharan African countries are shown in **Table 4.3**. The estimates are for 30 June of each year, including 2010. The estimate for 2010 assumes that all nets delivered by manufacturers by June 2010 have been distributed by NMCPs (the average lag between manufacturer delivery and distribution by MoHs estimated to be 5.2 months as noted above). Overall, 41% of households were estimated to have owned an ITN in 2009, rising to 42% in 2010, representing a substantial increase from the 27% estimated in 2007. In 19 countries the proportion of households owning an ITN was estimated to have reached more than 50% in 2010. The proportion of children sleeping under a net in 2010 was estimated to be 35%, compared to 17% in 2007 (**Fig. 4.5**).

The results of the model are sensitive to the assumptions regarding the lifespan (decay of efficacy) of nets. The model assumes that on

TABLE 4.2

ITN COVERAGE FROM NATIONALLY REPRESENTATIVE HOUSEHOLD SURVEYS, 2007–2009

REGION / COUNTRY	% households with at least one ITN	% of population potentially covered by available ITNs	% of population sleeping under an ITN	% <5 sleeping under an ITN	% of pregnant women sleeping under an ITN	Type of survey
AFRICAN REGION						
Angola, 2006–2007	28	15	12	17	22	MIS
DR Congo, 2007	9	4	5	6	7	DHS
Equatrial Guinea, 2008	64					National
Ghana, 2008	33	24	17	28	20	DHS
Gabon, 2008	70			55		National
Kenya, 2008–2009	56	50	36	46	48	DHS
Liberia, 2009	47	26	22	26	32	MIS
Madagascar, 2008–2009	57	36	37	45	46	DHS
Mali, 2008	82			79		National
Mozambique, 2007	16			7		MIS
Namibia, 2006–2007	22	15	6	10	9	DHS
Nigeria, 2008	8	5	4	5	5	DHS
Rwanda, 2007–2008	57	41	41	56	60	DHS
Sao Tome and Principe, 2007	78			54		National
Senegal, 2008–2009	66	40	28	29	29	MIS
Sierra Leone, 2008	59			56		DHS
Swaziland, 2007	4	2	0	1	1	DHS
Togo, 2008	55			35		MOH-CDC
Uganda, 2009	47	32		33	77	MIS
UR Tanzania, 2008	39			25		AIS/MIS
Zambia, 2008	62			41	43	MIS
Weighted average	28	13	9	19	12	
SOUTH-EAST ASIAN REGION						
Indonesia, 2007	3	2	2	4	3	DHS

TABLE 4.3

ESTIMATES OF THE PROPORTION OF HOUSEHOLDS OWNING AT LEAST ONE ITN, SUB-SAHARAN AFRICA, 2000–2009

COUNTRY	% of population at risk	% of households owning at least one ITN											Uncertainy bounds 2010	
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	*Lower*	*Upper*
Angola	100%	5	7	7	6	5	6	14	20	21	22	23	11	45
Benin	100%	3	4	5	6	9	15	30	42	57	61	55	34	83
Botswana	65%	2	2	2	3	4	8	20	34	31	26	35	18	58
Burkina Faso	100%	2	3	5	8	10	14	22	27	35	55	49	41	64
Burundi	78%	6	6	6	6	9	12	18	21	23	27	31	17	64
Cameroon	100%	4	4	4	5	6	12	24	20	15	19	28	15	42
Central African Rep.	100%	4	4	4	5	6	10	15	20	26	26	21	13	36
Chad	99%	6	6	5	5	4	4	5	7	8	9	10	5	20
Comoros	100%	17	17	12	13	12	12	12	12	11	14	20	11	37
Congo	100%	1	1	2	2	3	6	7	8	8	8	9	4	23
Côte d'Ivoire	100%	3	3	3	3	3	2	5	9	9	9	11	5	26
DR Congo	100%	2	3	3	3	3	4	7	12	29	53	54	46	78
Djibouti	50%	2	2	3	3	4	6	10	36	80	82	64	46	120
Equatorial Guinea	100%	2	2	2	2	3	4	6	29	63	47	31	20	48
Eritrea	100%	26	45	64	78	78	75	71	67	71	59	69	56	79
Ethiopia	67%	0	1	1	2	2	5	22	57	99	91	72	48	100
Gabon	100%	1	1	2	2	3	5	13	38	70	66	54	39	73
Gambia	100%	26	25	23	23	24	36	43	35	39	49	57	32	77
Ghana	100%	2	2	2	4	6	10	16	27	38	47	47	37	69
Guinea	100%	1	1	1	1	1	1	3	5	8	10	10	5	22
Guinea-Bissau	100%	15	15	14	14	15	34	47	38	35	41	52	28	70
Kenya	76%	10	11	11	12	15	24	51	63	59	70	71	57	101
Liberia	100%	1	1	2	2	3	6	27	53	51	44	46	30	70
Madagascar	100%	3	3	3	3	5	29	58	67	66	57	51	39	70
Malawi	100%	2	3	8	23	31	30	38	34	29	38	51	29	71
Mali	100%	2	2	3	4	7	18	41	68	82	87	90	67	96
Mauritania	90%	1	1	1	1	2	3	5	8	9	8	9	4	17
Mozambique	100%	2	3	4	6	8	8	9	15	26	36	42	31	62
Namibia	72%	1	2	2	2	3	4	12	25	31	29	29	15	61
Niger	100%	7	7	8	10	14	33	59	58	49	63	61	56	74
Nigeria	100%	1	1	1	1	1	1	2	5	10	14	15	11	26
Rwanda	100%	2	2	3	4	7	17	41	52	56	58	58	33	83
Sao Tome and Principe	100%	33	34	27	27	26	19	36	77	76	64	82	63	93
Senegal	100%	7	8	9	11	16	20	29	33	42	50	57	24	89
Sierra Leone	100%	4	4	4	4	3	5	9	20	33	38	40	27	63
Somalia	100%	0	1	1	1	1	2	9	14	15	15	16	7	34
South Africa	10%	7	10	11	12	12	11	9	10	10	10	20	10	30
Sudan	100%	1	1	2	2	3	8	19	21	16	19	23	13	47
Swaziland	28%	2	3	4	5	5	7	12	14	18	21	25	14	57
Togo	100%	5	6	9	16	51	65	43	45	56	71	65	56	80
Uganda	100%	2	2	2	2	3	6	17	24	32	49	46	39	67
UR Tanzania	100%	2	2	3	7	16	19	26	38	37	45	72	66	75
Zambia	100%	6	9	12	13	16	29	45	54	65	77	84	65	92
Zimbabwe	50%	2	2	3	3	4	9	17	32	56	54	44	24	86
Sub-Saharan Africa	95%	3	3	4	5	7	11	19	27	34	41	42		
Uncertainty bounds	*Lower*	2	3	3	4	6	10	17	25	32	38	38		
	Upper	3	4	4	6	8	12	21	29	36	43	46		

Note: Estimates were derived from the model of Flaxman *et al.* (1) in which coverage is estimated using information from manufacturer reports on ITNs delivered to countries, NMCP reports on ITNs distributed within countries, and previous household surveys. The estimates are for June 30 in each year, including 2010. If data from a household survey are available for a particular year then household survey results and model results should be very similar, differing only if the survey was undertaken at a different time of year to June 30. It is assumed that ITNs have been delivered exclusively to populations at risk of malaria and coverage rates have been calculated for this population; for some countries coverage rates may therefore be higher than household survey results which are calculated for the total population, both at risk and not at risk. As three countries (Burundi, Central African Republic and Mozambique) did not have sufficient survey information in 2000–2006, prior assumptions were used to estimate coverage. For Nigeria, four recent state-level surveys were used to estimate coverage of LLINs distributed in state-by-state mass campaigns. Data from manufacturers provided by AMP for 2010 included only data from January to June 2010.

BOX 4.1

IMPACT OF DIFFERENT ASSUMPTIONS REGARDING DECAY OF ITN EFFICACY OVER TIME

ITN coverage is best estimated by a household survey in which respondents are asked about the mosquito nets they own and whether or not they slept under a net. Household surveys can only be undertaken every 3 to 5 years so the results available for any one country can be several years old. For that reason attempts have been made to estimate ITN coverage from the number of nets distributed by malaria control programmes using the formula below:

$$\%\ \text{of people potentially covered by ITNs} = \frac{\text{number of ITNs distributed in the past 3 years} \times 2}{\text{population at risk}}$$

This formula assumes that an ITN lasts for 3 years and that on average 2 people sleep under each net. It has the advantage that it takes into account the latest efforts of malaria control programmes to distribute nets and can therefore provide up-to-date information on their progress. A drawback is that the formula assumes that the efficacy of a net remains at 100% of its maximal value for 3 years, after which it abruptly drops to zero. Such a decay function, while computationally convenient, is unrealistic; efficacy (and retention) of nets is likely to decrease gradually, starting from the first day after distribution. Two other possible decay functions, each with an average lifespan for a net of 3 years (with a maximum life of 5 years), are represented in the figure below.

The way that the efficacy of a net is assumed to decay will not affect population estimates of coverage if a constant number of nets are distributed each year (since the average lifespan is the same). However, if programmes are expanding, the assumption that a net retains 100% efficacy for 3 years will produce slightly higher estimates of ITN coverage than would models using other decay functions. Conversely, if programmes are contracting, the assumption that a net retains 100% efficacy for 3 years will produce lower estimates of ITN coverage because other methods assume that nets distributed more than 3 years earlier continue to be effective.

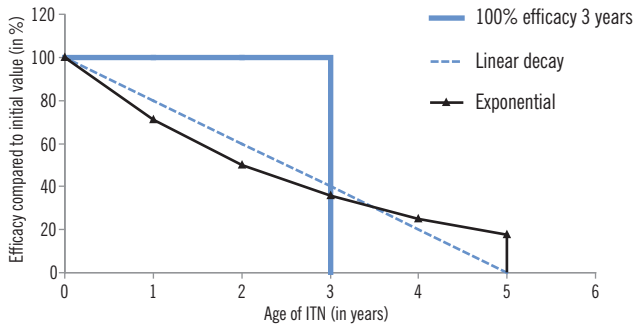

Figure Box 4.1 Different models for decay in efficacy of ITNs

BOX 4.2

BOTTLENECKS IN ACHIEVING UNIVERSAL ITN COVERAGE

Household surveys enable a number of indicators to be calculated in order to assess ITN coverage. The figure below shows several indicators calculated from the MIS in Liberia 2009 and from the DHS in Kenya 2008. By looking at indicators in combination it is possible to see where bottlenecks in achieving effective coverage are located (2).

In Liberia, 47% of households own at least one ITN. The ITNs available in households could potentially cover 26% of the population at a ratio of two people sleeping under each net. The proportion of people actually sleeping under an ITN is 22% suggesting that a high proportion of available nets are used. Only 5% of the population lives in households with enough ITNs to cover all occupants, but in such households everyone does sleep under a net. Thus it appears that in Liberia, where ITNs are provided they are in fact used. The bottlenecks are in reaching all households with an ITN (63% of households do not have any nets) and in providing enough nets for all household occupants.

In Kenya, 56% of households own at least one ITN. The ITNs available in households could potentially cover 50% of the population at a ratio of two people sleeping under each net. The proportion of people actually sleeping under an ITN is 36% suggesting that a lower fraction of available nets are used than in Liberia. About 20% of the population lives in households with enough ITNs to cover all occupants and in such households almost everyone does sleep under a net.

As in Liberia, a large proportion (45%) of Kenyan households did not own a single ITN in 2008. Hence it appears that the first priority would be to assure sufficient numbers of nets so that they are available for use; however, although usage rates are high, further benefit could be gained by increasing the regular use of existing ITNs.

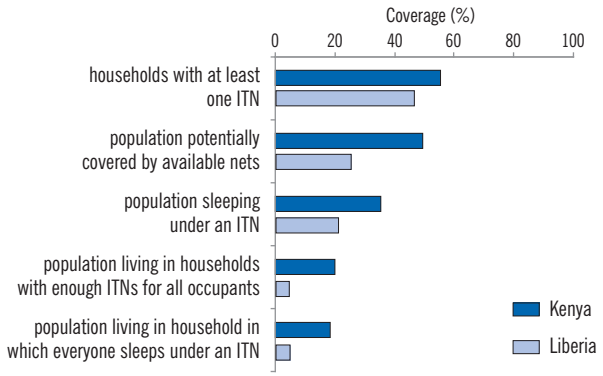

Figure Box 4.2 ITN coverage in Kenya and Liberia, 2008

average 4% of nets are discarded each year and that LLINs have a lifespan of exactly 36 months during which they retain full efficacy. The estimated lifespan of 3 years is based on the WHOPES testing process, which checks that a product retains a minimum standard of insecticidal activity for this period. However, the decay may be more gradual and continuous than previously thought, and also vary from place to place (**Box 4.1**). More attention is now being paid to monitoring LLIN durability in a variety of settings, and standardized methods are being developed. More detailed information on observed LLIN loss rates, and how these vary with net age and between locations, will enable the development of more realistic models for estimating coverage and for planning replacement needs.

4.1.4 Coverage and use of ITNs at population level

With the gains in malaria control over the past decade, programmes have advanced from providing ITN coverage only for the populations at greatest risk (children < 5 years of age, pregnant women, and other vulnerable groups) to seeking coverage for all persons at risk in the population. To meet this target several intermediate steps need to be accomplished: *(i)* ITN programmes need to have sufficient geographical reach to provide ITNs to all households; *(ii)* sufficient nets need to be provided to households to cover all people living in them[1], and *(iii)* people within households need to use the available nets. It is informative to examine to what extent the different steps

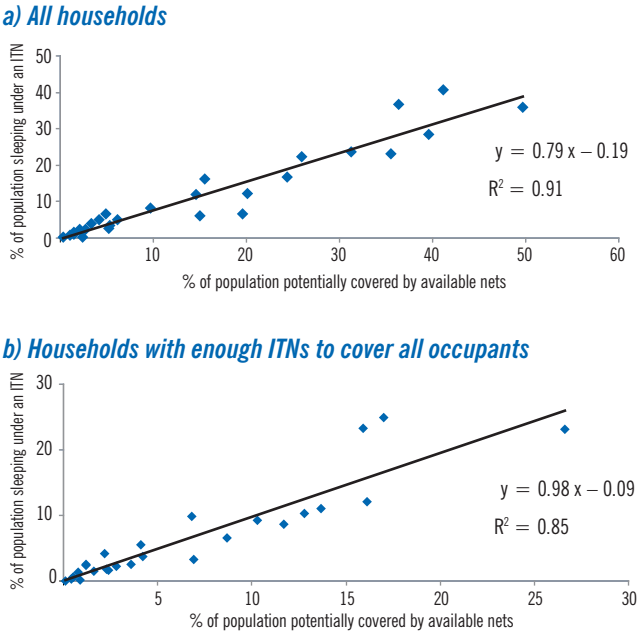

Figure 4.6 Relationship between proportion of population sleeping under an ITN and the proportion with access to an ITN

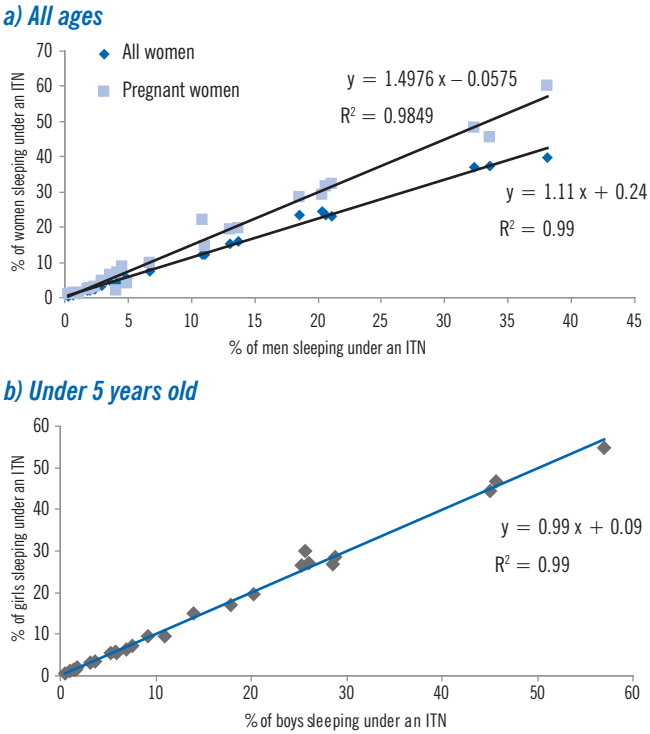

Figure 4.8 Differences in ITN use by sex

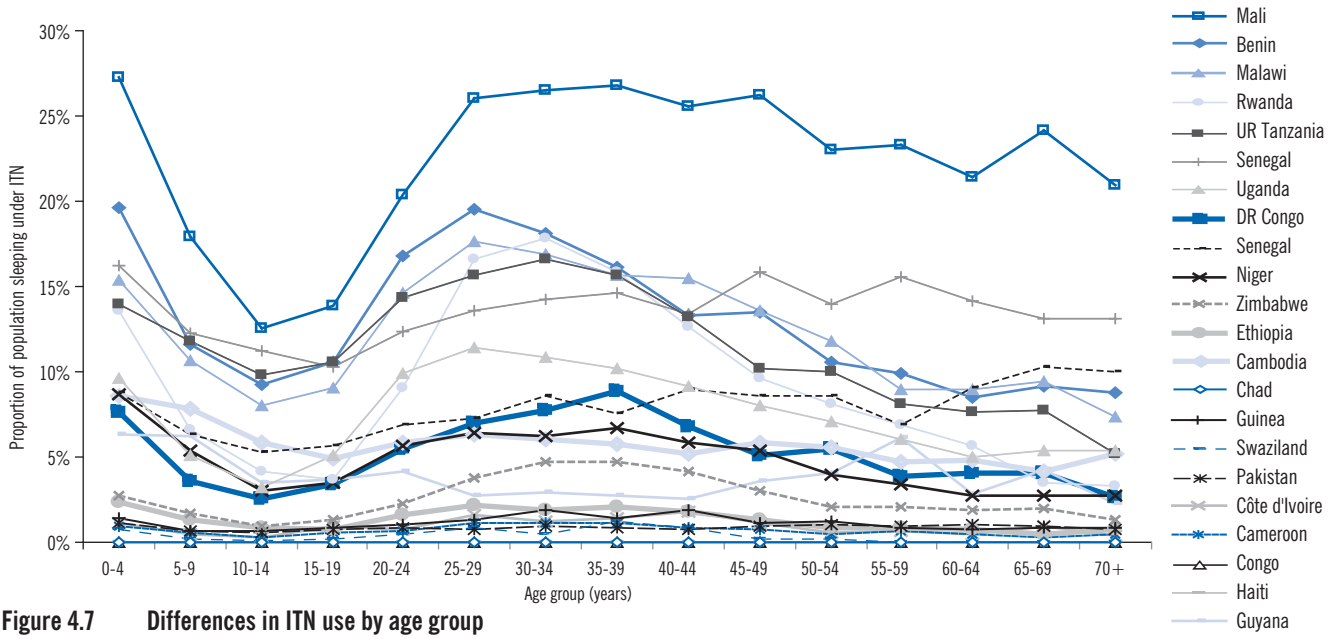

Figure 4.7 Differences in ITN use by age group

1. This is examined by calculating the indicator: % of population potentially covered by available ITNs. This is: (Number of ITNs in households x 2) ÷ (Population in households), with analysis conducted at household level to determine what number of people within each household can be protected by the nets available to a household assuming that two people can sleep under each ITN.

are achieved in a particular country and identify where bottlenecks may occur (**Box 4.2**).

In reviewing household surveys that provide the most recent results available on ITN coverage for 27 malaria-endemic countries between 2003 and 2009, it was evident that relatively low proportions of households own an ITN (median 16%, lower quartile 5%, upper quartile 45%); only 7 surveys were conducted during the massive expansion of ITN programmes from 2008 to 2010. However, within all surveys, a high proportion of available nets appear to be used (approximately 80%) assuming that one net can cover two people (**Fig. 4.6a**). Some countries such as Madagascar (2008) and Rwanda (2008) have higher 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*).

Relatively few people live in households with enough nets to cover all occupants (median of surveys in 2003–2009: 2%, lower quartile 1%, upper quartile 7%). However, in such households, the proportion of people sleeping under a net is close to the proportion of households with enough nets to cover all occupants (**Fig. 4.6b**). The high correlation between availability and use of nets could be because households with enough nets to cover all members were motivated to acquire sufficient nets and are therefore more likely to use them. In some cases the percentage of people living in households in which all members sleep under a net exceeds the percentage of households with enough nets to cover all occupants. Evidently in some households more than two people are sleeping under one net.

A consistent pattern emerges across countries showing that persons aged 5–19 years are least likely to use an ITN compared to those in the younger and older age groups (**Fig. 4.7**). This age distribution in use of nets is of concern since persons aged 5–19 are at significant risk of malaria, especially in settings where prevention and control efforts have shifted the malaria burden from very young children to the older age groups.

Across all age groups, women are slightly more likely to sleep under an ITN than men (**Fig. 4.8a**). The average ratio of women to men sleeping under a net is 1.1 to 1. This is partly because pregnant women are more likely to sleep under an ITN than other women (ratio pregnant women: men = 1.5). There is no difference in usage rates between female and male children < 5 years of age (**Fig. 4.8b**) (ratio girls:boys = 0.99).

4.2 IRS policy and implementation

4.2.1 Policy adoption

Adoption and implementation of policies for IRS programmes by WHO Region are shown in **Table 4.4**. Adoption of policies by country is shown in Annex 4.

IRS is recommended for the control of malaria by 71 countries, 32 of which are in Africa. It is the primary vector control intervention in Botswana, Mozambique, Namibia, South Africa, Swaziland and Zimbabwe. IRS is sometimes used for control of epidemics or in combination with ITNs in Africa. DDT is reported to be used for IRS in 16 countries, of which 13 are in Africa. The majority of countries report that they are undertaking insecticide resistance monitoring.

4.2.2 Coverage achieved

A total of 168 million people were protected by IRS in 2009 representing 5% of the global population at risk. The use of IRS for vector control has increased since 2002, particularly in the WHO African Region where 73 million people were protected in 2009 (**Fig. 4.9**). About 10% of the total population at risk in the African Region were protected by IRS in 2009, with rates exceeding 10% in Sao Tome and Principe (83%), South Africa (80%), Equatorial Guinea (79%), Ethiopia (50%), Gambia (47%), Zambia (43%), Zimbabwe (41%), Mozambique (36%), Madagascar (34%), Namibia (31%), Botswana (18%) and Rwanda (14%). IRS coverage in some African countries, including some highly endemic African countries, exceeds that in many countries outside Africa.

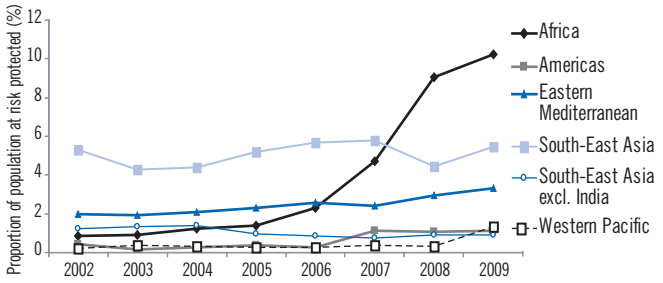

Figure 4.9 Proportion of population at risk protected by IRS

TABLE 4.4

ADOPTION OF POLICIES FOR IRS PROGRAMMES BY WHO REGION, 2009

POLICY	AFRICAN	AMERICAS	EASTERN MEDITERRANEAN	EUROPEAN	SOUTH-EAST ASIA	WESTERN PACIFIC	GRAND TOTAL
Number of endemic countries/areas	**43**	**23**	**12**	**8**	**10**	**10**	**106**
IRS is recommended by malaria control programme	32	14	4	7	8	6	**71**
IRS is used for prevention and control of epidemics	24	8	7	7	10	7	**63**
IRS and ITNs used together for malaria control in at least some areas	29	10	4	6	8	6	**63**
DDT is used for IRS	13				3		**16**
Insecticide resistance monitoring is undertaken	35	12	6	5	10	6	**74**

In other WHO Regions, IRS coverage exceeded 10% of the population at risk in only 10 countries or territories: Georgia (>100%), Kyrgyzstan (>100%), Turkey (>100%), Azerbaijan (60%), Malaysia (36%), Solomon Islands (32%), Belize (28%), Bhutan (27%), French Guiana (17%), and Saudi Arabia (17%). In some settings the low coverage is explained by the lower incidence of malaria and its more focal distribution, so that intensive vector control is not widely applied. While some countries have shown an increase in the proportion of the population protected by IRS, the rate of expansion has not been nearly as great as in many African countries.

4.3 Conclusions

Increasing access to ITNs. There has been tremendous progress in increasing access to ITNs in the past 3 years, with more than 254 million ITNs delivered by manufacturers to countries in Africa between 2008 and the third quarter of 2010. Model-based estimates suggest that there has also been a substantial increase in the percentage of households owning at least one ITN from 27% in 2007 to 42% in 2010.

Overall 35% of young children slept under an ITN in 2010. Low rates of use reported in some surveys are primarily due to a lack of sufficient nets to cover all household members; household survey results suggest that a very high proportion (80%) of available ITNs are used. Women are slightly more likely to sleep under an ITN than men (ratio women:men = 1.1) this is partly because pregnant women are more likely to sleep under an ITN than other women. There is no difference in usage rates between female and male children < 5 years of age (ratio girls:boys = 0.99).

The percentage of children using ITNs is still below the WHA target of 80% partly because up to the end of 2009, ITN ownership remained low in some of the largest African countries. Resources for further scale-up have subsequently been made available with more than 100 million ITNs delivered in the first three quarters of 2010, including 52 million to the three most populous countries in Africa (Democratic Republic of the Congo, Ethiopia and Nigeria).

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. Much of the progress to date has been achieved through mass campaigns and implementation through routine systems such as antenatal care and immunization programmes. Programmes need to be in place to ensure that those not benefiting from the campaigns also have access to nets. Moreover, strategies need to be developed to replace the large number of ITNs that have recently been delivered. 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 2006 and 2007 are therefore due for replacement, and those delivered between 2008 and 2010 soon will be. 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 73 million in 2009, a quantity which corresponds to protection for 10% of the population at risk.

In countries in other WHO Regions, the number of ITNs delivered by manufacturers or distributed by NMCPs is smaller than in Africa, but has been increasing at a similar rate. However, IRS implementation has not been expanding as rapidly as in Africa, 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 vector control may reflect the more focal nature of malaria outside Africa.

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, environmentally friendly, 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, which could rapidly lead to a major public health problem. The risk is of particular concern in Africa, where insecticidal vector control is being deployed with unprecedented levels of coverage and where the burden of malaria is greatest.

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Chapter 5.
Malaria diagnosis and treatment

This chapter considers 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 then reviews the adoption of policies and implementation of programmes for improving access to effective treatment for malaria and to intermittent preventive treatment of malaria in pregnancy. Finally it reviews latest trends in drug resistance, the progress made in withdrawing oral artemisinin-based monotherapies from the market, and efforts to contain artemisinin resistance on the Cambodia-Thailand border.

5.1 Diagnosis of malaria

5.1.1 Policy adoption

In early 2010, WHO updated the recommendation on malaria diagnostic testing for suspected malaria to include children < 5 years of age. With this revision, all persons of all ages in all epidemiological settings with suspected malaria should receive a parasitological confirmation of diagnosis by either microscopy or RDT. National adoption and implementation of policies for diagnosis of malaria by WHO Region are shown in **Table 5.1**. Adoption of policies by country is shown in Annex 4. In 2009, 33 of 43 malaria-endemic countries in the WHO African Region and 45 of 63 endemic countries in other Regions reported having adopted a policy of providing parasitological diagnosis for all age groups. A total of 16 African countries are now deploying RDTs at the community level, as are 22 additional countries in other Regions.

5.1.2 RDTs procured and distributed

The number of RDTs delivered by ministries of health has increased rapidly from less than 200 000 in 2005 to about 30 million in 2009 (**Fig. 5.1**), with most RDTs (44%) being used in the African Region followed by the South-East Asia Region (41%) and Eastern Mediterranean Region (11%). These totals, however, are likely to underestimate the quantity of RDTs distributed, as only 21 of the 43 endemic countries in the African Region reported these data in 2009. The number of patients receiving an RDT is generally lower than the number of RDTs delivered to health facilities, possibly because systems for reporting the number of patients tested with an RDT have not yet been well developed in many countries.

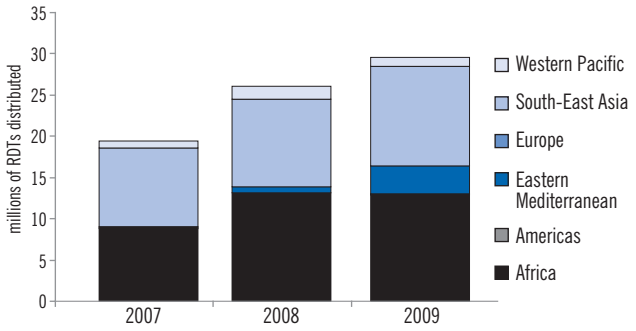


Figure 5.1 RDTs distributed by WHO Region

5.1.3 Microscopic examination undertaken

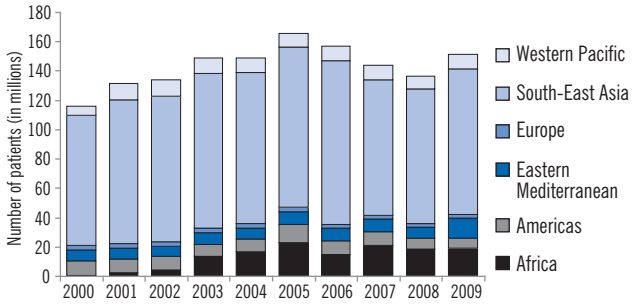
The number of patients tested using microscopic examination fell from a peak of 165 million in 2005 to 151 million in 2009 (**Fig. 5.2a**). The global total is dominated by India which accounted for 104 million slide examinations in 2005 and 94 million in 2009. Decreases in the number of patients examined by microscopy were reported in the Region of the Americas (50%), the European Region (20%) and the African Region (14%), while there was an increase in the Eastern Medi-

TABLE 5.1

ADOPTION OF POLICIES FOR MALARIA DIAGNOSIS BY WHO REGION

POLICY	AFRICAN	AMERICAS	EASTERN MEDITERRANEAN	EUROPEAN	SOUTH-EAST ASIA	WESTERN PACIFIC	GRAND TOTAL
Number of endemic countries/areas	**43**	**23**	**12**	**8**	**10**	**10**	**106**
Number of P. falciparum *endemic countries/areas*	**42**	**18**	**8**		**9**	**9**	**86**
Patients of all ages should receive diagnostic test	33	15	7	8	8	7	78
Only patients > 5 years old receive diagnostic test	5						5
RDTs are used at community level	16	7	5		5	5	38
Malaria diagnosis is free of charge in the public sector	25	13	9	8	10	9	74

a) Including India



b) Excluding India

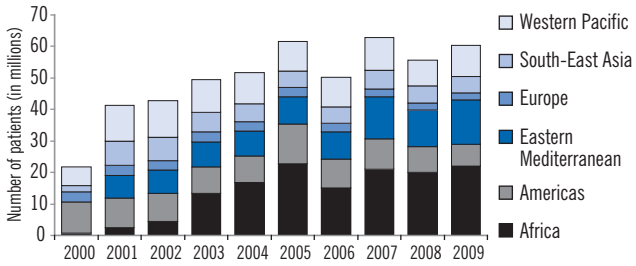


Figure 5.2 Number of patients examined by microscopy

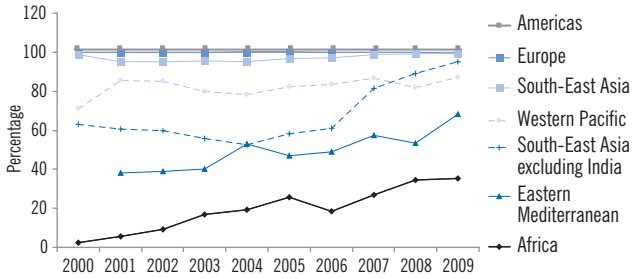
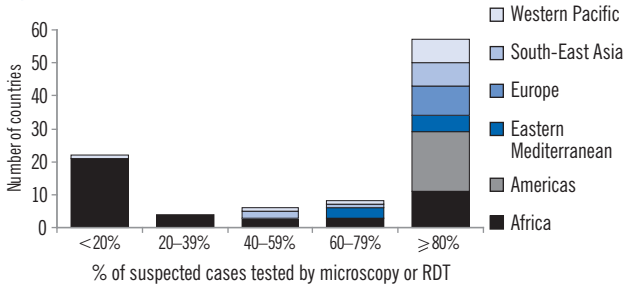


Figure 5.3 Proportion of suspected malaria cases attending public health facilities that receive a parasitological test by microsocpy or RDT

a) Number of countries



b) Number of suspected cases

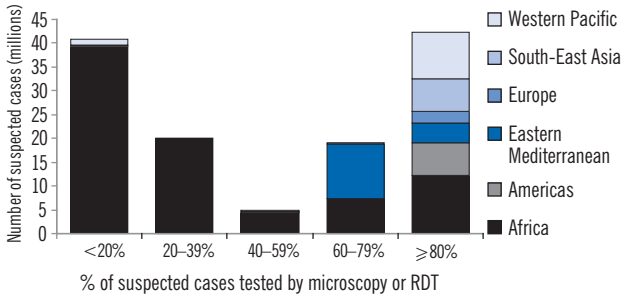


Figure 5.4 Number of countries and cases by rate of parasitological testing

terranean Region (63%) (**Fig. 5.2b**). Some of the decreases appear to be due to a reduction in case-loads, particularly in the American and European Regions, and to increased use of RDTs. However, these factors do not fully explain the decrease in patients examined by microscopy in some countries, where the data may reflect weakening of diagnostic systems or deterioration in reporting.

5.1.4 Parasitological testing in the public sector

The proportion of reported suspected cases receiving a parasitological test varies considerably by Region. It is highest in the American and European Regions followed by South-East Asia (**Fig. 5.3**). The value for the South-East Asia Region is heavily influenced by India; if countries other than India are considered then the percentage of cases tested is lower but does show an increasing trend over the past decade, as is also the case for the Eastern Mediterranean and African Regions.

Outside Africa, most countries within each Region are able to provide a diagnostic test for more than 80% of suspected cases (**Fig. 5.4a**), suggesting that interventions to scale up the availability of testing in public health facilities can be focussed on a small number of countries. Of 42 countries in the African Region that reported on testing, the percentage of cases tested was less than 20% in 21 countries. Examination of the numbers of cases affected by the low testing rates (**Fig. 5.4b**) suggests that, with the exception of India, larger countries tend to have lower testing rates. Most countries with high rates of testing have had a policy of confirming every malaria case for several years; some countries have recently expanded the availability of diagnostic testing with some success (**Boxes 5.1** and **5.2**).

In the African Region in 2009, the number of ACTs distributed by NMCPs exceeded the number of RDTs procured more than five-fold, and the total number of tests carried out (microscopy + RDTs) by a factor of 2.4, indicating that many patients are receiving ACTs without confirmatory diagnosis. Similarly, a review of African countries' estimates of needs for ACTs and RDTs set out in Global Fund proposals and PMI operational plans indicated that country estimates of need for ACTs between 2009 and 2011 exceeded the need for RDTs by a factor of 2.1 (*1*). This is partly because 12 of the 41 countries reviewed, including the populous countries of the Democratic Republic of the Congo and Nigeria, had targeted only persons ≥ 5 years of age for diagnostic testing, in keeping with the previous WHO recommendation, which was extant at the time the review was undertaken. The review also indicated that while most of the estimated needs for ACTs were financed, the funding gap for RDTs was larger. Hence shortfalls in the availability of diagnostic testing can be at least partly attributed to the relatively recent policy change as well as failures to plan for and finance the strategy, and not necessarily to inadequate implementation.

5.1.5 Availability of parasitological tests in the private sector

Data reported by ministries of health on the number of RDTs distributed and/or patients examined by microscopy generally cover the public sector only. However, approximately 40% of malaria patients worldwide seek treatment in the private sector, which includes regulated health facilities, pharmacies and other retail outlets (*2*). Information on the extent of parasitological testing in the private sector is sparse. Country-specific data collected by

BOX 5.1

EXPANDING ACCESS TO DIAGNOSTIC TESTING IN SENEGAL

Malaria is endemic throughout Senegal. Until 2007, confirmatory malaria diagnosis was limited to hospitals and, of 1.5 million fever cases treated as malaria, only 3% were confirmed as malaria by microscopy. From September 2007, RDTs were incorporated into a revised national policy for management of febrile illness and introduced in all public sector health facilities beyond hospital level, i.e. in 78 health centres, 1018 health posts and subsequently in all 1640 health huts.

The RDTs were initially piloted on a limited scale by the NMCP and the University of Cheikh Anta Diop in Dakar, during which training materials were developed based on generic job-aids and training manuals available from WHO. To ensure appropriate targeting of RDTs, febrile patients were considered for malaria testing only if signs of other possible causes of fever were absent (e.g. cough, sore throat, skin rash). If positive for malaria, patients were prescribed an antimalarial, and if negative, broad spectrum antibiotics (trimethoprim-sulfamethoxazole or amoxycillin) and antipyretics were prescribed.

As part of the wide-scale introduction of RDTs, health workers were trained by district and regional management teams assisted by the NMCP and the University. Data on malaria morbidity and RDT and ACT use are reported by all health units and entered by month into a simple database (Epi Info Version 6). District supervisers cross-check reported data against health facility records during quarterly or bi-annual supervisory visits, and data received from each district are reviewed at quarterly meetings of NMCP personnel and regional and district management staff. The quality of all malaria RDTs is checked after arrival in Senegal through lot-testing at the parasitology laboratory of the University of Anta Cheikh Diop prior to distribution to the field, based on the protocol of the *WHO Methods Manual* (*3*).

From 2007 to 2009 the total number of malaria-like fevers decreased from 1.4 million in 2007 to 584 000 in 2009, possibly as a result of revised case definitions of malaria-like fever. During this period the number of patients given a parasitological test rose from 124 000 in 2007 to 503 000 in 2009, covering 86% of malaria-like fevers. The number of confirmed malaria cases rose from 53 000 in 2007 to 175 000 in 2009 because of the increased use of testing.

During this period the number of treatment courses of ACT dispensed fell from 990 000 to 184 000. Whereas ACT treatment consumption in previous years had matched the total number of fever cases, by the end of 2009 it was close to the number of confirmed malaria cases. An estimated 0.5 million courses of inappropriately prescribed ACT were averted between 2008 and 2009.

The experience in Senegal demonstrates that parasitological diagnosis with RDTs can be introduced on a national scale and that with a high level of adherence to diagnostic results, dramatic reductions in ACT consumption can be achieved. Although cost savings in ACT procurement are partly offset by the cost of RDTs, the policy allows: *(i)* enhanced management of non-malarial febrile illness; *(ii)* greater certainty on the incidence of malaria throughout Senegal, enabling the NMCP to predict accurately the antimalarial drug requirements and target programme resources to areas with greatest malaria burden; and *(iii)* the NMCP to assess the impact of changes in malaria control interventions such as ITN and IRS.

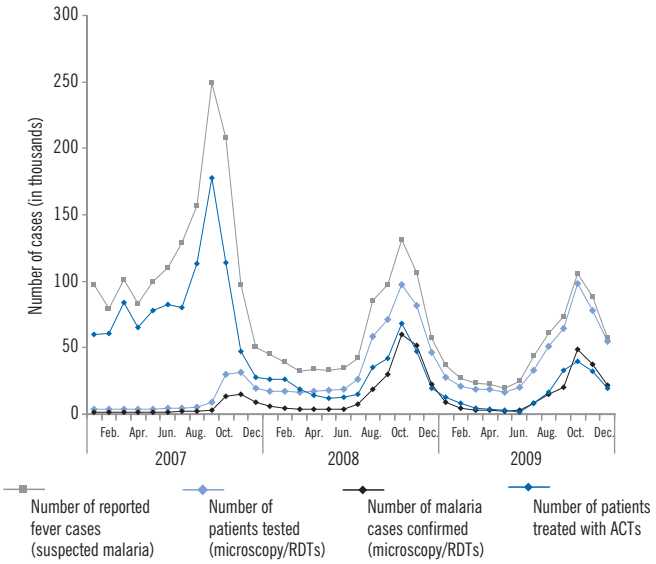


Figure Box 5.1 **Trends in suspected, tested, confirmed and treated cases, Senegal 2007–2009**

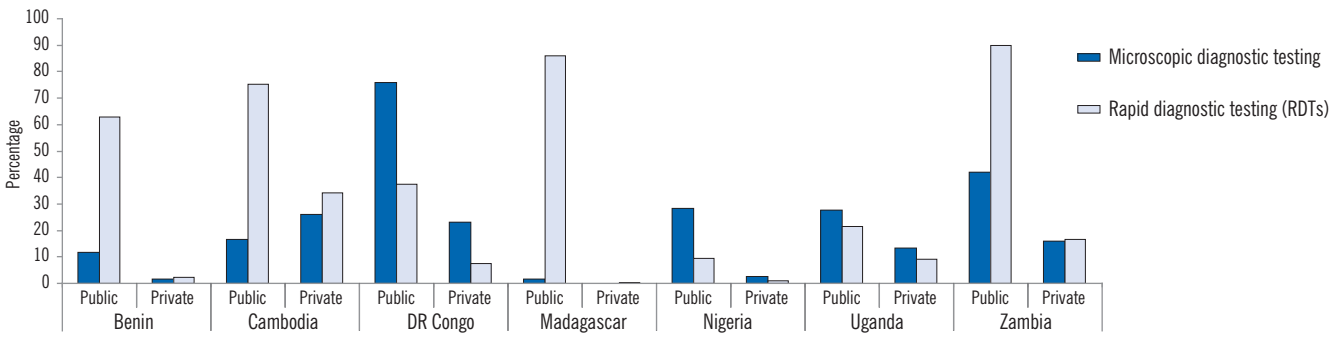


Figure 5.5 **Proportion of treatment outlets offering diagnostic testing service**

ACTwatch Group (Population Services International [PSI] and London School of Hygiene and Tropical Medicine [LSHTM]). Outlet Survey Results 2009 and 2010

BOX 5.2

EXPANDING ACCESS TO DIAGNOSIS AND TREATMENT IN LAO PEOPLE'S DEMOCRATIC REPUBLIC

Malaria has long been a leading cause of mortality and morbidity in the Lao People's Democratic Republic although the intensity of malaria transmission varies considerably across the country, ranging from very low in the plains along the Mekong River and in areas at high altitude, to intense in remote, hilly and forested areas.

Between 2005 and 2008, the national malaria programme introduced a strategy to improve case management at the community level by training approximately 12 000 village health volunteers in 6202 villages. These volunteers constitute the most peripheral level of the public health care system in Lao PDR. Volunteers are selected by the village committee to provide primary health care services, including diagnosis of malaria by RDT and administration of ACT, providing health education, distributing ITNs, and reporting morbidity and mortality data to health centres and the district health office.

The composition of cases has changed radically since the beginning of the decade. Whereas the vast majority used to be diagnosed only on a clinical basis ("probable cases") almost all cases of *P. falciparum* malaria are now confirmed. Although records of drug consumption are not available, confirmation of cases is likely to have reduced the consumption of ACTs.

While changing diagnostic practices make it difficult to discern trends, large reductions in numbers of cases are believed to have occurred as a result of increased ITN coverage (81% of children < 5 years slept under ITNs in 2009) and improved access to treatment. The number of recorded deaths from malaria has fallen from 350 in 2000 to 5 in 2009.

Diagnosis will be extended at village level to include *P. vivax* through the use of combination RDTs, and radical treatment is to be introduced in parallel to an expansion of a private-public mix initiative for malaria diagnosis and treatment in the private sector.

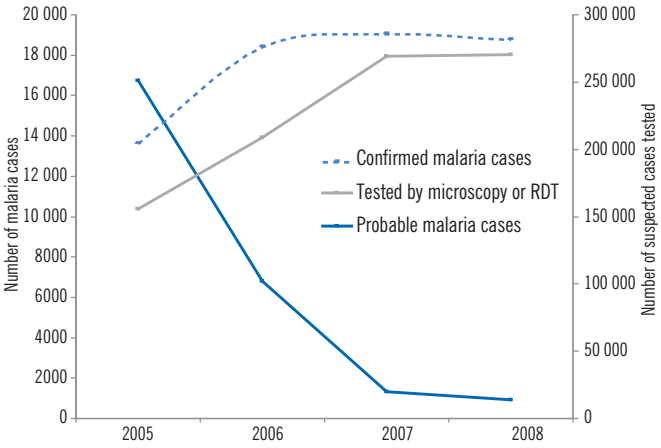


Figure Box 5.2 Trends in tested, probable and confirmed cases, Lao PDR, 2001–2008

ACT Watch[1] in 2009–2010 suggest that: *(i)* in four countries (Benin, Cambodia, Madagascar and Zambia) RDTs are available in more than 60% of public facilities; *(ii)* with few exceptions, both microscopy and RDTs are more widely available in the public sector; and *(iii)* apart for Cambodia, availability of RDTs in the private sector remains low (**Fig. 5.5**).

5.2 Treatment of malaria

5.2.1 Policy adoption for malaria treatment

By the end of 2009, ACTs had been adopted as national policy for first-line treatment in 77 of 86 countries with *P. falciparum*; chloroquine is still used in some countries in the Region of the Americas. By mid-2010, 70 countries were deploying these medicines within their general health services, with varying levels of coverage.[2] **Table 5.2** and Annex 4 summarize, respectively, the adoption of policies for the treatment of malaria by WHO Region and by country.

5.2.2 Quantity of ACTs procured and distributed

The number of ACT treatment courses procured increased greatly from 11.2 million in 2005 to 76 million in 2006, and reached 158 million in 2009. Procurement of four WHO-recommended ACTs by ministries of health from 2005 to 2009 is shown in **Figure 5.6**. Artemether-lumefantrine (AL) accounts for the largest volume of ACTs procured by the public sector (67%) in 2009.[3] The second ACT in terms of volumes procured is artesunate + amodiaquine, which increased from less than 1 million treatment courses in 2007 to 23.2 million in 2009.

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. In 2009, a changing trend was observed, with an increasing proportion procured for patients with a body weight over 35 kg and a corresponding decrease in supplies for young children weighing less than 15 kg)[4] (**Fig. 5.7**).

1. www.actwatch.info

2. 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.

3. 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.

4. Information on past AL sales for public sector use was obtained from manufacturers eligible for procurement by WHO in 2009, i.e. Ajanta, Cipla, Ipca, Novartis.

TABLE 5.2

ADOPTION OF POLICIES FOR MALARIA TREATMENT IN WHO REGIONS

POLICY	AFRICAN	AMERICAS	EASTERN MEDITERRANEAN	EUROPEAN	SOUTH-EAST ASIA	WESTERN PACIFIC	GRAND TOTAL
Number of endemic countries/areas	**43**	**23**	**12**	**8**	**10**	**10**	**106**
Number of P. falciparum *endemic countries/areas*	**42**	**18**	**8**		**9**	**9**	**86**
ACT is used for treatment of *P. falciparum*	42	9	8		9	9	77
ACT is free of charge for all age groups in public sector	24	6	9		6	7	52
ACT is free of charge only for < 5 years in public sector	5				2	1	8
ACT delivered at community level	25	2	1		4	4	36
Pre-referral treatment with quinine/artemether IM/ artesunate suppositories	32	2	7		7	6	54
Therapeutic efficacy monitoring is undertaken	25	6	5		5	7	48

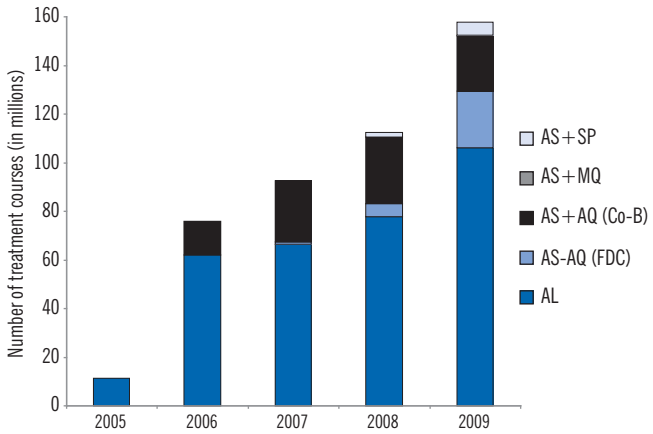


Figure 5.6 **ACT sales to the public sector (2005–2009) by artemisinin-based combination** (data provided by 7 companies eligible for procurement by WHO/UNICEF)

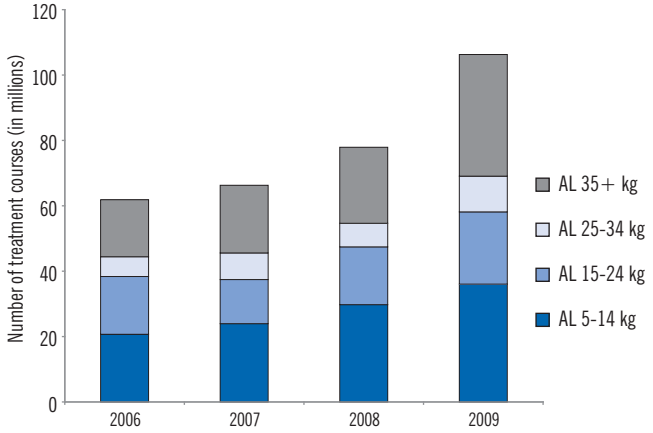


Figure 5.7 **Artemether-lumefantrine: public sector sales, 2006–2009**

BOX 5.3

ARTEMISININ MARKET SITUATION

The agricultural production of *Artemisia annua* and the extraction and supply of artemisinin are still characterized by market instability. The major investments and expansion in cultivation of *Artemisia annua* and production of artemisinin in 2006–2007 were not matched by a similar increase in demand for artemisinin by ACT manufacturers and suppliers of artemisinin-based active pharmaceutical ingredients. The resulting production surplus of artemisinin led to a reduction in the prices of artemisinin raw material, even falling below production costs, reaching as low as US$ 170 per kg by the end of 2007. This led to the withdrawal of many artemisinin producers from the market in 2008 and 2009, creating a progressive reduction in existing inventories and a relative decrease in supply. Together with the increasing global demand for ACTs, this produced a progressive increase in the spot prices of artemisinin, reaching US$ 350 per kg by the end of 2009.

To stabilize these market dynamics, in 2009 a UNITAID-funded initiative was introduced, the Assured Artemisinin Supply System (A2S2), to provide low interest rate credits to artemisinin extractors who are linked to ACT manufacturers eligible for procurement by WHO and UNICEF. Production of artemisinin-based antimalarial medicines will remain dependent on cultivation of *Artemisia annua*, as production of semi-synthetic artemisinin derived from yeast cultures will not become available until at least 2012, and will only cover part of the global market requirements.

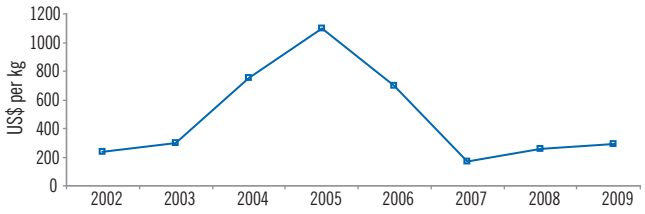


Figure Box 5.3 **Artemisinin indicative spot prices (US$/kg)**

Artemisinin production and pricing, J. Pilloy, presentation at WHO/MMV Artemisinin Conference 2009 - Ensuring Sustainable API Supply to Meet Global ACT Demand, 28-30 September 2009 (http://www.mmv.org/sites/default/files/uploads/docs/artemisinin/06 _ J _ Pilloy _ ARTEMISININ _ PRODUCTION _ and _ Pricing.pdf)

5.2.3 ACTs distributed by ministries of health

The number of ACTs distributed by NMCPs also appears to have increased between 2007 and 2009 but reporting by countries in incomplete so that totals do not match those delivered by manufacturers. Nevertheless, country reports indicate that by the end of 2009, 11 African countries were providing sufficient courses of ACTs to cover more than 100% of malaria cases seen in the public sector; a further 8 African countries delivered sufficient courses to treat 50%–100% of cases. These figures represent a substantial increase since 2005, when only 5 countries were providing sufficient courses of ACT to cover more than 50% of patients treated in the public sector.

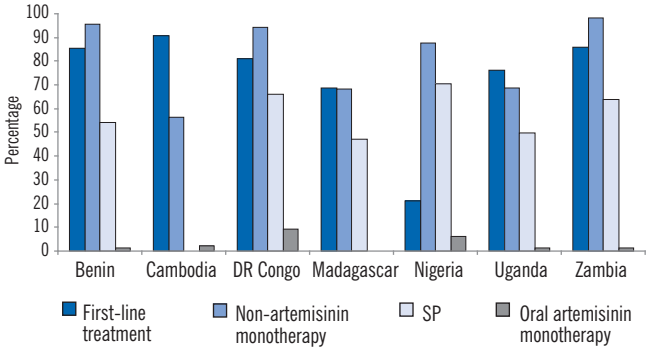
5.2.4 Availability of ACTs in treatment outlets

ACT Watch data summarizes the availability of antimalarial medicines in public and private sector treatment facilities[5] in 7 countries in 2009–2010). The results suggest that, although disruptions in supplies are common in both the public and private sectors,[6] there is wide variation in the availability of antimalarials by country and type of facility/outlet. In 4 countries, the first-line treatment is available in more than 80% of public health facilities and at lesser rates in the 3 other countries. In the private sector, there is 30% availability or less of the first-line treatment. Unfortunately, artemisinin monotherapies are also being stocked in some countries and in some instances are available in more than 30% of private outlets (**Fig. 5.8**).

In most countries, the private sector dispensed the predominant proportion of antimalarials. The first-line treatment represented less than 10% of the drugs dispensed through the private sector (except Cambodia at 17%) with non-artemisinin monotherapies representing the largest proportion of volumes. In the public sector, sulfadoxine-pyrimethamine accounts for the majority of non-artemisinin drugs dispensed (**Fig. 5.9**)

First-line treatments were found to be 4–22 times more expensive (median price US$ 4.96) than the most commonly dispensed drug, which for all countries is a non-artemisinin treatment (median price US$ 0.37). Since the price of an antimalarial will greatly affect its utilization, efforts are being made to reduce the price of ACTs to a consumer price equivalent to that of non-artemisinin therapies, by enabling wholesalers to buy ACTs at a subsidized price though a pilot initiative known as the Affordable Medicine Facility – malaria (AMFm) (**Box 5.4**).

a) In public sector health facilities



b) In private sector treatment outlets

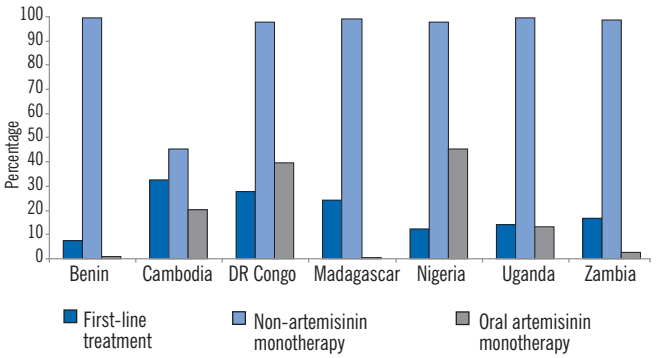


Figure 5.8 Availability of antimalarial medicines

First line treatment: DR Congo, Madagascar = ASAQ; Uganda, Zambia, Benin = AL; Nigeria = AL (with ASAQ as an alternate); Cambodia = ASMQ

ACTwatch Group (Population Services International [PSI] and London School of Hygiene and Tropical Medicine [LSHTM]). Outlet Survey Results 2009 and 2010.

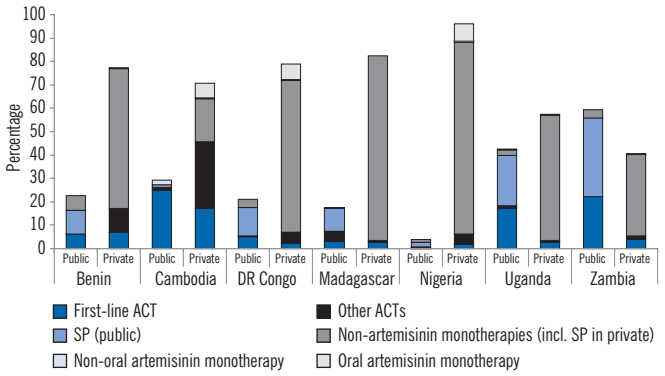


Figure 5.9 Relative volumes of antimalarials distributed by sector and drug type

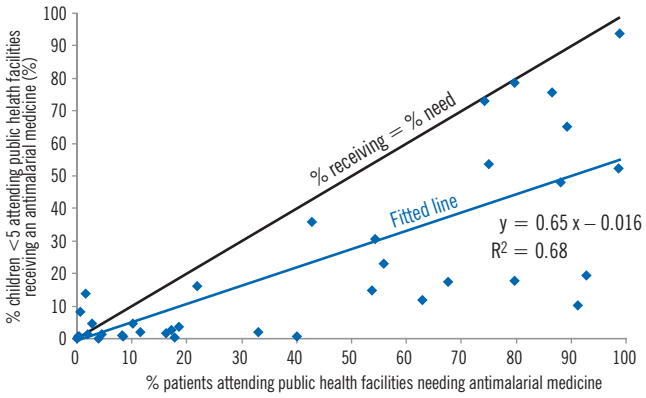


Figure 5.10 Proportion of children receiving antimalarial medicine in relation to percentage of patients requiring antimalarial medicine

5. Treatment outlets comprise any place where patients seek treatment for malaria such as hospitals, health centres, health posts, pharmacies, shops or kiosks.

6. Stock-out of first-line treatment for one week within past three months.

BOX 5.4

THE AFFORDABLE MEDICINES FACILITY – MALARIA

The Affordable Medicines Facility – malaria (AMFm) is a financing mechanism designed to expand access to ACTs. It is managed by the Global Fund and supported financially by the Bill & Melinda Gates Foundation, the United Kingdom Government, UNITAID and the Global Fund.

AMFm aims to increase the provision of high quality and affordable ACTs by: *(i)* negotiating a lower price for ACTs; *(ii)* paying a subsidy directly to manufacturers on behalf of buyers (a buyer "co-payment"); *(iii)* supporting interventions to encourage the appropriate use of ACTs (*4*). The price reductions and subsidies mean that buyers will only pay approximately US$ 0.05 for each course of ACTs. For patients who currently pay for treatment, this is expected to result in a significant reduction in the price of ACTs from about US$ 6–10 per treatment to about US$ 0.20–0.50. The increased availability of affordable ACTs is intended to save lives by making ACTs more readily available and reducing the use of less effective treatments to which malaria parasites are becoming increasingly resistant. It also aims to reduce the use of oral artemisinin monotherapies, thereby delaying the onset of resistance to that drug and preserving its effectiveness. The current AMFm model does not include the routine use of diagnostic testing, which could result in the overuse of ACTs among patients with non-malarial febrile illnesses, especially in countries with declining malaria transmission.

A pilot trial of AMFm has been launched in a small group of countries to enable lessons to be learnt before any expansion of the initiative to other malaria-endemic countries is envisaged. The countries participating are Cambodia, Ghana, Kenya, Madagascar, Niger, Nigeria, UR Tanzania (mainland and Zanzibar) and Uganda. The pilot study will operate for approximately 24 months and will be reviewed through an independent evaluation. The Global Fund Board will consider the results of the evaluation and determine whether to expand, accelerate, modify or suspend AMFm. It is expected that the Board will make this decision in 2012.

5.2.5 Utilization of antimalarial medicines to treat febrile children

Policy. A central question regarding the utilization of antimalarial medicines is whether people in need of these medicines actually receive them. The need for antimalarial medicines will depend on diagnostic practices and the treatment policies existing within a country. WHO recommends that antimalarial medicines should be given only to patients who have had a positive parasitological test. However, patients with suspected malaria who do not receive a parasitological test may be given an antimalarial medicine, depending on the treatment policy of the country. In high burden African countries most treatment policies allow for antimalarial medicines to be given to children < 5 years of age in situations where a diagnostic test cannot be provided.

Estimation of needs. The use of antimalarial medicines is recorded in household surveys but information on diagnostic testing, and therefore treatment needs, is not available in most of these surveys. It is however possible to combine information from household surveys with information from routine information systems to determine the percentage of patients tested and the percentage of positive tests, in order to estimate the needs for treatment. **Box 5.5** describes how a rough estimate of treatment needs for children attending public health facilities can be constructed.

Figure 5.10 summarizes information from 37 countries (18 in sub-Saharan Africa) in which household survey information on antimalarial use and concurrent information on diagnostic testing in public sector health facilities is available. It shows that the percentage of patients attending public health facilities who need an antimalarial medicine varies enormously by country and year, being lower in less endemic countries outside Africa where the percentage requiring an antimalarial is often less than 20%.

Meeting the treatment needs. Figure 5.10 shows also the percentage of febrile children that receive an antimalarial is correlated with the estimate of percentage of patients requiring an antimalarial[7] (R^2 = 0.68), i.e. countries with the lowest uptake of antimalarial medicines as measured through household surveys are often the countries where fewer febrile patients actually have malaria. However, there is a wide scatter of points, with most lying below the line that defines where treatment uptake is equal to need. Thus it appears that for many countries the number of children receiving antimalarial medicines is less than the predicted need (on average, treatment uptake is 65% of treatment need).

Some countries such as Chad (2004), Liberia (2007), Rwanda (2007), United Republic of Tanzania (2004), and Zimbabwe (2005) appeared to be fulfilling antimalarial needs (the percentage of children requiring an antimalarial being close to the percentage of patients receiving one). However, whereas almost all cases received a diagnostic test in Liberia and Rwanda, only 45% did so in United Republic of Tanzania and less than 1% in Chad. Hence the percentage of patients requiring an antimalarial in Chad and in United Republic of Tanzania could have been reduced if diagnostic testing were made more widely available in the public sector.

In some countries, such as Congo (2007), Sierra Leone (2008), and Uganda (2002), the percentage of children that received an antimalarial (< 20%) appears to be much less than the percentage requiring one (> 60%) suggesting shortfalls in the availability of antimalarial medicines in the public sector at the time of the survey.

Patients not using public sector health facilities. It is more difficult to determine what percentage of fever cases should receive an antimalarial among those attending private sector facilities, or among those who do not seek treatment in any health facility. It is nevertheless instructive to compare the percentage of febrile children receiving an antimalarial in the private sector with that observed for the public sector. **Figure 5.11** shows that febrile children attending private sector treatment facilities are generally only 75% as likely to receive an antimalarial medicine as those attending public sector facilities, and that the corresponding rate for children who are not treated in any health facility is 40%. Evidently, a significant proportion of those not treated in a health facility have access to antimalarial medicines at home. Information on the percentage of children receiving an ACT is less readily available, as relevant questions were not asked in household surveys until more recent years. However, children attending private sector facilities also appear less likely to

7. A high correlation is observed whether or not an adjustment is made for population at risk in the formula for M_s.

receive an ACT than in the public sector (on average about 70% as likely) while those not treated in a health facility are only 15% as likely to receive an ACT.

The lower proportion of children who received an antimalarial when treated at home may be appropriate if fevers are transient, or considered by caregivers to be less serious and not requiring medication, but may be of concern if the reason were lack of access to facilities or too high a cost for treatment. In settings where active case detection has been conducted, slide positivity rates are generally about 50% of the rates observed during passive case detection. Hence, the lower rate of treatment utilization among those who are not treated in a health facility may be appropriate. However, from the information available there is no assurance that children who receive antimalarial medicines are those who are parasite-positive and in need of treatment.

BOX 5.5

ESTIMATING NEEDS FOR ANTIMALARIAL MEDICINES IN THE PUBLIC SECTOR AND COMPARISON WITH USE

An estimate of the need for antimalarial medicines among patients attending public health facilities can be obtained from routine information on the percentage of patients receiving a parasitological test and the percentage testing positive. The estimated need can then be compared with the percentage of febrile children actually receiving an antimalarial medicine as recorded in a DHS or other heath survey.

For example, in Rwanda in 2005 health facility records indicated that 87% of suspected malaria cases attending public health facilities received a parasitological test, of which 48% tested positive. Hence, it can be estimated that 55% of children attending public health facilities in Rwanda required an antimalarial (13% who were not tested plus 87% x 48% who tested positive). This can be compared to the 31% of children attending public health facilities who actually received an antimalarial medicine. It therefore appears that the percentage of children receiving an antimalarial medicine compared to those needing one was 57% (31%/55%).

A comparison of the results in 2005 with those obtained in 2008 shows important developments over this period. The percentage of patients with suspected malaria who received a parasitological test increased to 100% while only 22% were test positive. Thus the percentage of patients attending public sector facilities that needed an antimalarial medicine was 100% x 22% or just 22%. The percentage of children attending public facilities who received an antimalarial was recorded as 16%. The percentage of need that had been fulfilled had therefore increased to 75% (16%/22%) despite the overall percentage of children receiving an antimalarial having decreased. This is largely because the percentage of suspected malaria cases testing positive for malaria had dropped from 48% to 22% owing to decreasing incidence of malaria as a result of control activities.

In general a national estimate of the percentage of patients requiring an antimalarial, M_f, in public health facilities can be calculated from routine data as:

$$M_f = (S_t \times T) + S_n$$

where: S_t = percentage of suspected cases tested

T = percentage of tests positive

S_n = percentage of suspected cases not tested and treated presumptively

This indicator can then be compared with the percentage receiving an antimalarial in public sector facilities, M_s as measured in a household survey:

$$M_s = A \div R$$

where: A = percentage of febrile children taken to public health facilities that receive an antimalarial medicine

R = population at risk of malaria

Such a comparison provides a rough assessment of whether the need for antimalarial medicines in public health facilities is being fulfilled. It does not consider the specific test results of individuals or the treatment they were given but simply examines statistics at an aggregate level. In addition household survey data are restricted to children under 5, whereas data on the percentage of suspected malaria cases that are test positive are usually only available for all age groups combined. Moreover the analysis does not consider whether health workers withheld a test because other symptoms were present and another diagnosis given.

It is more difficult to determine whether the percentage of febrile children receiving an antimalarial is appropriate for those treated in private sector facilities or those who are not treated in any health facility. More information is required on both the extent of parasitological diagnosis in the private sector and the proportion of tested cases which are positive. Information on the incidence of malaria among those who do not seek treatment is also required; some insight could be derived from malaria indicator surveys that undertake parasitological testing. Unfortunately datasets from many of such surveys are not readily available for analysis.

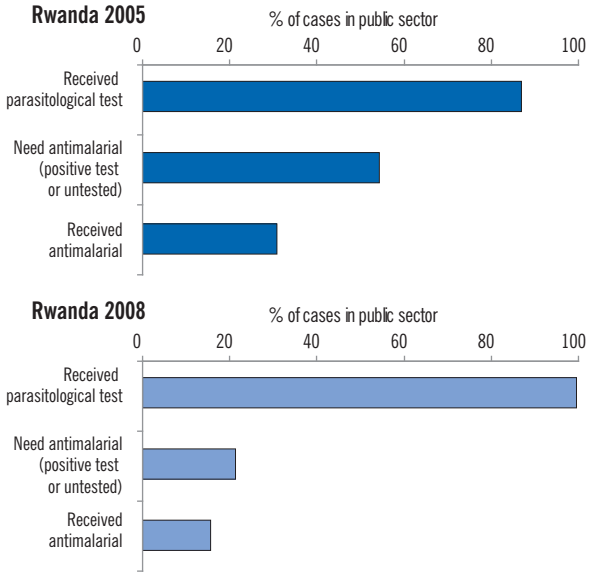


Figure Box 5.5 **Percentages of fever cases attending public sector facilities that *(i)* receive a diagnostic test, *(ii)* require an antimalarial medicine and *(iii)* receive one, Rwanda 2005 and 2008**

5.3 Intermittent preventive treatment

A total of 33 of 43 endemic countries in the African Region had adopted intermittent preventive treatment for pregnant women (IPTp) as national policy by the end of 2009, with two in the Eastern Mediterranean Region (Somalia and Sudan), and one in the Western Pacific Region (Papua New Guinea) (**Table 5.3**). No country has yet adopted a national policy of intermittent preventive treatment for infants (IPTi).

For 22 of the 35 high-burden countries, consistent data were available on both the second dose of IPTp (numerator) and the number of women who had attended antenatal care at least once (denominator) for 2009. The median percentage of women attending antenatal care receiving the second dose of IPTp was 55% (inter-quartile range 47%–61%) (**Fig. 5.12**). Thus half of women attending antenatal clinics received a second dose of IPTp in those countries responding.

Although not all pregnant women attend antenatal clinics, information on the percentage 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 2007–2009 were available for 8 countries in Africa representing a combined population of 270 million. In 2007–2009, the percentage of women who received two doses of treatment during pregnancy ranged from 2.4% in Angola to 62% in Zambia (**Fig. 5.13**); the weighted average remained low, at 12% due to low coverage rates in Nigeria.

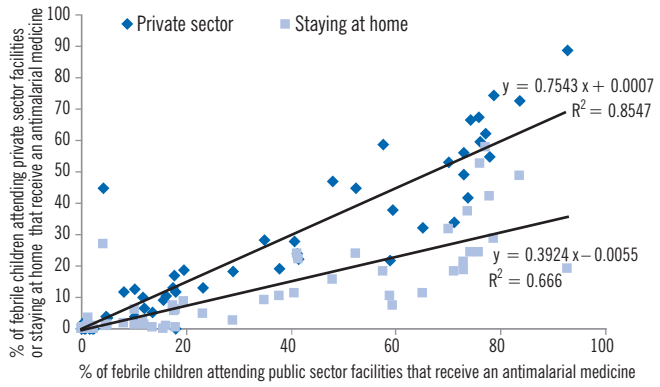


Figure 5.11 Proportion of febrile children receiving an antimalarial medicine by source of treatment

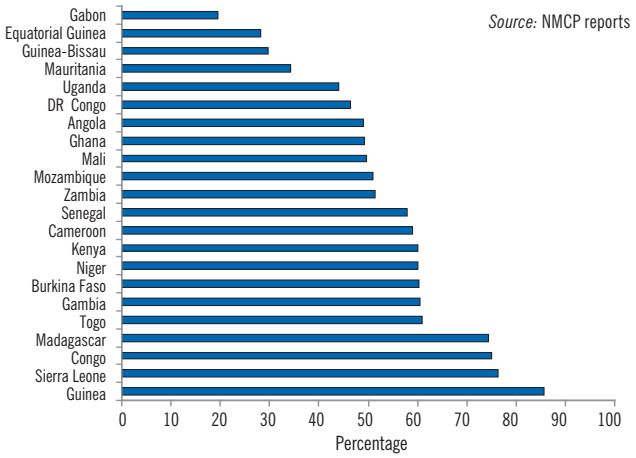


Figure 5.12 Proportion of women attending antenatal care receiving the second dose of IPT

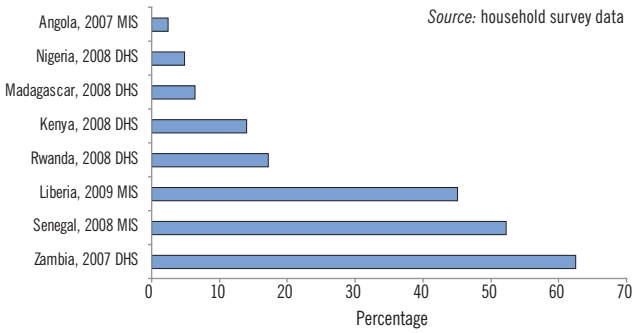


Figure 5.13 Proportion of all pregnant women receiving the second dose of IPT

TABLE 5.3

ADOPTION OF POLICIES FOR INTERMITTENT PREVENTIVE TREATMENT FOR PREGNANT WOMEN (IPTp)

POLICY	AFRICAN	AMERICAS	EASTERN MEDITERRANEAN	EUROPEAN	SOUTH-EAST ASIA	WESTERN PACIFIC	GRAND TOTAL
Number of endemic countries/areas	43	23	12	8	10	10	106
Number of P. falciparum *endemic countries/areas*	42	18	8		9	9	86
IPTp used to prevent malaria during pregnancy	33		2			1	36

5.4 Antimalarial drug resistance

5.4.1 Oral artemisinin-based monotherapy medicines

The use of oral artemisinin-based monotherapies threatens the therapeutic life of ACTs by fostering the 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 the use of ACTs instead, as endorsed by the World Health Assembly in 2007 (**Box 5.6**). It also calls upon manufacturers to cease production and marketing of oral artemisinin-based monotherapies.

WHO compiles data on both manufacturers' compliance and the regulatory action taken by malaria-endemic countries and the data are posted on the Internet.[8] Nearly all companies which have a consistent market share in public sector procurement funded by international agencies have de-listed oral artemisinin-based monotherapy medicines from their product catalogues. However, smaller companies mainly targeting private sector markets are less likely to comply with the WHO appeal. When responsible companies withdraw their monotherapy products, they leave "niche markets" which are rapidly exploited by other companies manufacturing monotherapies. One of the main reasons for the limited success in phasing out oral artemisinin-based monotherapy is the weak regulation of pharmaceutical markets in malaria-endemic countries. By November 2010, 25 countries were still allowing the marketing of these products and 39 pharmaceutical companies were manufacturing these products. Most of the countries that still allow the marketing of monotherapies are located in the African Region, while most of the manufacturers of these medicines are located in India (**Fig. 5.14**).

Greater collaboration and involvement of national regulatory authorities is required to ensure complete withdrawal of oral artemisinin-based monotherapies from all countries. Progress made by several pharmaceutical companies and regulatory authorities at country level shows that phasing out oral artemisinin-based monotherapy medicines from the markets is possible through a range of interventions. Based on their experience, a generic series of actions has been developed to remove oral artemisinin-based monotherapy medicines from the market (**Box 5.7**).

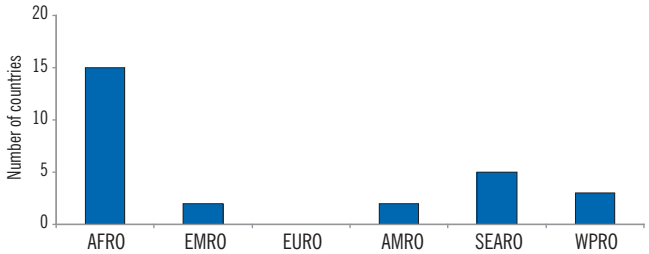


Figure 5.14 Number of countries allowing marketing of oral artemisinin-based monotherapies by WHO Region

8. 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

5.4.2 Drug efficacy monitoring

Therapeutic efficacy studies remain the gold standard for guiding drug policy. WHO compiles the results of efficacy tests conducted by national malaria programmes in the WHO Global Database on Antimalarial Drug Efficacy. The database, which now contains over 4000 studies conducted between 1996 and 2010, formed the basis of the *Global report on antimalarial drug efficacy and drug resistance: 2000–2010* (*5*), from which the following summary has been extracted.

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

- Among the 21 African countries that have adopted artesunate-amodiaquine, 6 countries have reported at least one study with a high level of treatment failure (> 10%). A high level of treatment failure for this combination was also observed in four Indonesian studies.
- The efficacy of artesunate-mefloquine is lowest in those areas where mefloquine resistance is prevalent, for example in the Greater Mekong region. In Africa and the Americas, the combination remains highly effective.
- Artesunate-sulfadoxine-pyrimethamine remains particularly effective in those countries that are using this combination as a first-line treatment. Failure rates remain high in those regions where resistance to sulfadoxine-pyrimethamine is high.
- Artemether-lumefantrine remains highly effective in most parts of the world, with the exception of Cambodia. More studies are needed to determine the current state of the efficacy of artemether-lumefantrine in Africa, as over 85% of the studies included in the database were completed in 2007 or earlier.
- Data on the therapeutic efficacy of dihydroartemisinin-piperaquine are limited and come mainly from studies carried out in some parts or Africa and in the Greater Mekong subregion. More studies are needed before drawing conclusions about its overall efficacy in endemic countries.

BOX 5.6

WORLD HEALTH ASSEMBLY RESOLUTION WHA60.18

In May 2007, the 60th World Health Assembly resolved to take strong action against oral artemisinin-based monotherapies and adopted resolution WHA60.18, which:

- urges Member States to cease progressively the provision in both the public and private sectors of oral artemisinin-based monotherapies, to promote the use of ACTs, and to implement policies that prohibit the production, marketing, distribution and the use of counterfeit antimalarial medicines;
- requests international organizations and financing bodies to adjust their policies so as progressively to cease to fund the provision and distribution of oral artemisinin monotherapies, and to join in campaigns to prohibit the production, marketing, distribution and use of counterfeit antimalarial medicines.

The full text of the resolution can be found on the Internet at: http://apps.who.int/gb/ebwha/pdf_files/WHA60/A60_R18-en.pdf.

BOX 5.7

RECOMMENDED STEPS TO REMOVE ORAL ARTEMISININ-BASED MONOTHERAPY MEDICINES FROM THE MARKET

ACTION	TASK	TIMELINE
Step 1	Agreement on time frame for phasing out oral artemisinin-based monotherapies in synchrony with large-scale implementation of artemisinin-based combination therapies (ACTs).	Immediate
Step 2	Suspension of new approvals of marketing authorizations for oral artemisinin-based monotherapies.	Immediate
Step 3	Suspension of import licences for artemisinin or its derivatives (as Active Pharmaceutical Ingredient (API) or Finished Pharmaceutical Products (FPP)) to domestic companies exclusively marketing oral artemisinin-based monotherapies.	3–4 months
Step 4	Large-scale deployment of ACTs in the public sector and communication to prescribers and consumers to move away from monotherapies, generally associated with external funding for procurement (e.g. from Global Fund or other sources). All subsequent timelines are conditional on this.	Time X
Step 5	Widespread availability and affordability of subsidized ACTs in the private sector, as expected in countries participating in the Affordable Medicine Facility.	Time Z
Step 6	Withdrawal of marketing authorization and of manufacturing licences for oral artemisinin-based monotherapies as FPPs.	6 months after time X
Step 7	Suspension of export license for oral artemisinin-based monotherapies as FPPs.	6 months after time X
Step 8	Complete elimination of oral artemisinin-based monotherapy medicines as FPPs from the market.	10–12 months after time X
Step 9	Active recall of oral artemisinin-monotherapies from the market.	3 months after time Z

BOX 5.8

THE ARTEMISININ RESISTANCE CONTAINMENT PROJECT

The first evidence of resistance to artemisinins on the Cambodia-Thailand border emerged from routine efficacy testing in 2006. This finding prompted WHO, the health ministries of Cambodia and Thailand, and other partners to develop a project aiming to contain and eliminate resistant parasites from the area. The Bill & Melinda Gates Foundation provided US$ 22.5 million to fund the first two years of activities, starting in 2009.

The project uses a combination of prevention and treatment methods and is implemented in two zones. Zone 1 covers populations in which artemisinin tolerance has been detected, including about 270 000 people in Cambodia and 110 000 people in Thailand. Zone 2 covers areas where there is as yet no evidence of tolerance, but the risk is high because it is close to Zone 1; it covers more than 4 million people in Thailand and 150 000 people in Cambodia.

The project has distributed more than 260 000 LLINs in Zone 1, allowing every person to sleep under a mosquito net each night. In Zone 2, where 320 000 LLINs have been distributed, 100% coverage has also been achieved in the high-risk villages.

The sale of artemisinin monotherapies was banned by the Cambodian Department of Drugs and Food in March 2009. Approximately 250 "justice police" were trained to enforce the law against counterfeit drugs and the ban on the sale of monotherapies. All private pharmacies, shops and outlets dispensing drugs in Pailin were registered and are regularly inspected. Workshops were held with retailers of antimalarial medicines to raise awareness of the ban and the problems associated with monotherapies.

All villages in Zone 1 and all high-risk villages in Zone 2 have access to early diagnosis and treatment provided free of charge by trained village malaria workers – about 2900 were trained in Cambodia and 326 in Thailand. The volunteer malaria workers also provide community-based education programmes, raising awareness about the use of mosquito nets, the dangers of fake drugs, and how to access reliable treatment. Education materials such as posters, brochures, and billboards have been produced in both Thai and Khmer, with the Khmer materials available on both sides of the border.

Systems to monitor the cross-border movements of Cambodians and Thais have been developed in order to track possible movement of the malaria parasites. The health departments of Cambodia and Thailand share information to coordinate actions and follow up cases.

An intense screening and treatment programme is being conducted in 20 high-risk villages in Pailin which screens all men, women and children in a village, even those not showing symptoms of malaria. Samples are sent by taxi to the Pasteur Institute in Phnom Penh where they are examined using PCR to determine whether malaria parasites are present. In the first seven villages screened – from May to late June 2010 – almost 2800 people were tested and only two cases of *P. falciparum* malaria were found. Six of the seven villages had no cases of *P. falciparum* malaria. Only one year previously these seven villages were among the most affected by malaria in the border area. Two other sources of data – from the Cambodian Ministry of Health and from the village malaria workers – also showed that cases of *P. falciparum* malaria in the zone targeted by the project had fallen dramatically. The interventions to combat malaria in the target area therefore appear to be having an impact.

For more details see: http://www.who.int/malaria/diagnosis _ treatment/arcp/en/index.html

The critical role of monitoring drug efficacy has been demonstrated on 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, AFRIM detected two cases of artemisinin resistance in Tasanh, Cambodia, providing the first evidence of artemisinin resistance. Since 2008, WHO has been coordinating containment activities in this area, making significant progress in limiting the spread of artemisinin-resistant parasites (**Box 5.8**).

An increase in the proportion of patients still parasitaemic on day 3 following treatment with ACTs has also been reported along the Thailand-Myanmar and China-Myanmar borders, and in one province in Viet Nam where the situation is less serious than at the Cambodia-Thailand border, but still merits careful monitoring. While these observations suggest that there are changes in parasite sensitivity to artemisinins, ACTs remain clinically and parasitologically effective even in the Greater Mekong subregion. It is not yet known whether clearance times will continue to become more prolonged, or how the prolonged clearance time might put the partner drug at risk for the development of resistance.

Treatment of P. vivax *malaria:* chloroquine remains the drug of choice in areas where chloroquine remains 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 (Borneo), 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. 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 (Borneo), 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*.

5.5 Conclusions

Availability of parasitological diagnosis: there have been significant increases in the availability of parasitological testing in the last few years but low rates persist in the majority of African countries and in a few other countries. A review of commodity procurement plans suggests that the gap between policy and implementation appears to be partly due to a failure to adequately plan for and finance the expansion of RDTs; bottlenecks in implementation may also contribute.

A small selection of countries have shown that it is possible to rapidly scale up the availability of malaria diagnostic testing nationwide within a relatively short period of time, provided that attention is given to adequate preparation, training, monitoring, supervision and quality control.

Cost implications of improved diagnosis: as the incidence of malaria decreases through much of sub-Saharan Africa the need to differentiate malaria from non-malarial fevers becomes more pressing. Countries that adopt universal testing will reduce their spending on ACTs but the savings will be offset by the cost of RDTs and alternative therapies and the increased time needed by health workers to examine patients. The total costs to the health system will depend on the cost of testing, the proportion of suspected malaria cases that are parasite positive, the sensitivity and specificity of tests, clinicians' adherence to test results, and the cost of treatment prescribed to parasite-positive and parasite-negative patients (*6*). Further work is needed to understand how costs will change as the availability of diagnostic testing is increased and to identify the factors NMCPs need to take into account when planning for expansion of RDT programmes.

Benefits of expanding diagnosis: several benefits accrue from increasing diagnostic testing: *(i)* patients will obtain appropriate diagnosis and treatment for their illness leading to lower mortality rates and reduced recovery times; *(ii)* excessive use of antimalarials can be reduced which will help to limit the development of resistance to ACTs; *(iii)* more accurate data on the incidence of confirmed malaria cases will enable interventions to be targeted to high priority areas and it will be possible to judge more accurately the success of programme implementation. The monetary value of such benefits is uncertain but there is consensus that these are worthwhile objectives for health systems.

Diagnostic testing in the private sector: the challenges involved in expanding access are likely to be greater in the private sector for several reasons: *(i)* the availability of testing is lower; *(ii)* the private sector is not so easily regulated by ministries of health; *(iii)* there is little experience of expanding diagnostic programmes in the private sector; *(iv)* incentives to use diagnostic tests and comply with test results will depend on costs which will often be borne directly by the patients. It may be more affordable for a patient to buy an ACT rather than seek an RDT particularly if the costs of ACTs in the private sector are reduced through subsidies. More information is needed on how to scale up availability of diagnostic testing in the private sector.

Community-based diagnosis and treatment: for some remote communities with little access to public sector or private sector health care providers, parasitological diagnosis and treatment of malaria will need to be provided by community based programmes. Very few such programmes operate on a large scale but the experience of Lao People's Democratic Republic and some other countries suggests that an existing cadre of village health workers can be trained in the use of RDTs and in large scale provision of appropriate treatment, resulting in dramatic changes in the way malaria case reporting is undertaken.

Access to treatment: information from manufacturers indicates that the number of ACTs procured has increased in every year since 2005. However there is little information on whether the quantities of antimalarial medicines available in public and private sectors are sufficient to meet the needs of patients. Data provided by malaria-endemic countries on medicines delivered are often incomplete.

Household survey data currently do not examine the question directly. If survey data are combined with health facility data then it is estimated that on average 65% of treatment needs are fulfilled for patients attending public health facilities. Estimates are more difficult to construct for patients visiting private sector treatment outlets and those that stay at home, but use of antimalarial medicines appears to be lower than for patients attending public sector facilities. The scarcity of information on access to treatment highlights the need to strengthen routine monitoring systems for diagnostic testing and treatment, to gather more direct information from household surveys, and to explore other methods to monitor access such as clinic exit interviews.

Combatting 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. Despite the observed changes in parasite sensitivity to artemisinins, the clinical and parasitological efficacy of ACTs has not yet been compromised, even in the Greater Mekong subregion. Nonetheless, both components of the combination are currently at risk and using an ACT with an ineffective partner medicine can increase the risk of development or spread of artemisinin resistance. 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 that threatens the continued efficacy of artemisinin.

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Chapter 6.
Impact of malaria control

This chapter considers the type of evidence that can be used to examine whether the incidence of malaria has changed over time and whether changes are associated with malaria control interventions. It then summarizes the trends of malaria cases and assesses the evidence that malaria control activities have had an impact on malaria disease burden in each WHO Region.

6.1 Assessing the impact of malaria interventions

6.1.1 Investigating trends in the incidence of malaria

The reported numbers of malaria cases and deaths are used as core indicators for tracking the progress of malaria control programmes – the working definition of a case of malaria is 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. First, case reports are recorded continuously over time and can thus reflect changes in the implementation of interventions or other factors. Secondly, routine case and death reports are often available for all geographical units of a country. Thirdly, they reflect the burden that malaria places on the health system. Changes in the numbers of cases and deaths reported by countries do not, however, necessarily reflect changes in the incidence of disease in the general population, because: *(i)* not all health facilities report each month, and so variations in case numbers may reflect fluctuations in the number of health facilities reporting rather than a change in underlying disease incidence; *(ii)* routine reporting systems often do not include patients attending private clinics or morbidity treated at home, so disease trends in health facilities may not reflect trends in the entire community; and *(iii)* not all malaria cases reported are confirmed by microscopy or RDT, so 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 undertaken, the numbers of malaria admissions (inpatient cases) and deaths are reviewed because the predictive value of diagnosis undertaken for an admitted patient is considered to be higher than outpatient diagnosis based only on clinical signs and symptoms. In such countries, the analysis may be heavily influenced by trends in severe malaria rather than trends in all cases.
- Monitoring the number of laboratory tests undertaken. It is useful to measure the annual blood examination rate, which is the number of parasitological tests (by microscopy or RDT) undertaken per 100 people at risk per year, to ensure that potential differences in diagnostic effort or completeness of reporting are taken into account. To discern decreases in malaria incidence, the annual blood examination rate should ideally remain constant or be increased.[1] In countries progressively reducing their malaria endemicity, the population at risk also reduces, becoming limited to residual and new foci where malaria transmission is present, or where there is potentially a high risk due to receptivity. In addition, it is useful to monitor the percentage of suspected malaria cases that were examined with a parasite-based test. When reviewing the number of malaria admissions and deaths, the health facility reporting rate (the proportion of health facilities that report) should remain constant and should be high, i.e. > 80%.
- Monitoring trends in the malaria (slide or RDT) positivity rate. This rate should be less severely distorted by variations in the annual blood examination rate than trends in the number of confirmed cases.
- Monitoring malaria admissions and deaths. For high-burden African countries, when the number of malaria admissions or deaths is being reviewed, it is also informative to examine the percentage of admissions or deaths due to malaria, as this proportion is less sensitive to variation in reporting rates than the number of malaria admissions or deaths.
- Monitoring the number of cases detected in the surveillance system in relation to the total number of cases estimated to occur in a country.[2] Trends derived from countries with high case detection rates are more likely to reflect trends in the broader

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

community. When examining trends in the number of deaths, it is useful to compare the total number of deaths occurring in health facilities with the total number of deaths estimated to occur in a country.

- Examining the consistency of trends. Unusual variation in the number of cases or deaths that cannot be explained by climate or other factors, or inconsistency between trends in cases and in deaths, can suggest deficiencies in reporting systems.
- Monitoring changes in the proportion of cases due to *P. falciparum* or the proportion of cases occurring in children < 5 years of age. While decreases in the incidence of *P. falciparum* malaria may precede decreases in *P. vivax* malaria, and there may be a gradual shift in the proportion of cases occurring in children < 5 years, unusual fluctuations in these proportions may point to changes in health facility reporting or to errors in recording.

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

6.1.2 Assessing coverage with malaria interventions

Data on the number of ITNs distributed by malaria programmes and populations covered by IRS are supplied annually by ministries of health to WHO as part of reporting for the *World Malaria Report*. Such information may contain inaccuracies or gaps, particularly for earlier years. Hence, if data for earlier years are missing, it might be inferred incorrectly that preventive activities have recently been intensified. Nevertheless, for many countries, data from ministries of health are the only source of information on preventive activities and are consistent over the years. Data from nationally representative household surveys are available for selected countries, but these surveys are usually not undertaken frequently enough to allow assessment of trends in intervention coverage or to provide contemporary information. For sub-Saharan African countries, data from nationally representative household surveys and information on ITNs procured and distributed by NMCPs were combined to form an estimate of the percentage of households owning at least one ITN in years when household surveys were not available (Section 4.1). Information on access to treatment is less complete than data on ITNs and IRS, as few countries supply information on the number of courses of antimalarial medicines distributed in relation to the number of cases treated in the public sector. Information on preventive activities or treatment provided by the private sector is almost entirely absent. It is therefore not always possible to obtain a complete picture of the extent of control activities in a country.

6.1.3 Establishing a link between malaria disease trends and control activities

In establishing a causal link between malaria disease trends and control activities, one should consider what the disease trends would have been without application of the control activities and then assess whether the decrease in malaria observed is greater than that expected without control activities. A realistic view of what would have happened without control activities (i.e. counterfactual) cannot be established from the data currently available; however, it can be expected that, without a change in control activities, the malaria incidence might fluctuate in response to short-term climate variations but would otherwise show little change, as improved living conditions, environmental degradation or long-term climate change have only gradual effects (although there may be local exceptions). Thus, a plausible link with control efforts can be established if the disease incidence decreases at the same time as control activities increase, if the magnitude of the decrease in malaria incidence is consistent with the magnitude of the increase in control activities (a 50% decrease in the number of cases is unlikely to occur if malaria control activities cover only 10% of the population at risk) and if the decreases in malaria incidence cannot readily be explained by other factors.

Countries and territories for which there is evidence from good quality surveillance data of a large, sustained decrease (e.g. > 50% or > 25%) in the number of cases since 2000 are presented in **Table 6.1** by WHO Region. Information on the scale of malaria control interventions is also summarized, to identify countries with preventive programmes covering > 50% of the population at high risk and countries that undertake extensive case detection and treatment. Countries in which there is evidence of both a sustained decrease in cases since 2000 and extensive control activities are highlighted as providing evidence of an impact of malaria control activities. Selected high-burden countries in the WHO African Region are discussed individually. For other WHO Regions, the results of the analysis are shown in a standard set of graphs, as described in **Box 6.1,** section 6.3.

6.2 African Region: high burden countries

Of the 35 high-burden countries in the WHO African Region, trends in confirmed malaria cases could be analysed in only 4 countries/areas that have had consistent reporting on parasitologically confirmed cases from 2000 to 2009, i.e. Eritrea, Rwanda, Sao Tome and Principe, and Zanzibar (United Republic of Tanzania). The majority of the other high burden countries in the Region have until recent years treated malaria in children < 5 years of age presumptively, and only have data on suspected malaria cases. Even if a country has increased parasitological diagnosis in recent years, such as Senegal, the lack of consistent historical data on confirmed cases before and after scale-up of interventions prevents an analysis of trends.

Owing to the absence of data on confirmed cases, data on malaria admissions and deaths were also analysed. Although in many instances cases are not confirmed by parasitological diagnosis they have a higher positive predictive value for malaria than outpatient

2. The *World Malaria Report 2008* described methods for estimating the total number of malaria cases in a country on the basis of the number of reported cases and taking into account variations in health facility reporting rates, care-seeking behaviour for fever as recorded in household surveys and the extent to which suspected cases are examined with laboratory tests.

TABLE 6.1

SUMMARY OF PROGRESS IN REDUCING NUMBER OF MALARIA CASES BETWEEN 2000 AND 2009

Decrease in cases >50%	Decrease in cases 25-50%	Limited evidence of decrease
AFRICAN REGION		
Algeria		Angola
Cape Verde		**Benin**
Botswana		**Burkina Faso**
Madagascar		Burundi
Namibia		Cameroon
Sao Tome and Principe		Central African Republic
South Africa		Chad
Swaziland		Congo
Eritrea		Côte d'Ivoire
Rwanda		**Democratic Rep. Congo**
Zambia		Equatorial Guinea*
		Ethiopia†
		Gabon
		Gambia*
		Ghana
		Guinea
		Guinea-Bissau
		Kenya*
		Liberia
		Malawi
		Mali
		Mauritania
		Mozambique
		Niger
		Nigeria
		Senegal
		Sierra Leone
		Togo
		Uganda
		United Rep. of Tanzania*
		Zimbabwe
REGION OF THE AMERICAS		
Argentina	**Brazil**	Costa Rica
Belize	Colombia	Dominican Republic
Bolivia (Plurinational State)	Guyana	French Guiana
Ecuador		Haiti
El Salvador		Peru
Guatemala		Panama
Honduras		Venezuela (Bolivarian Rep.)
Mexico		
Nicaragua		
Paraguay		
Suriname		
SOUTH-EAST ASIA REGION		
Bhutan	India	Bangladesh
Dem. People's Rep. Korea		Indonesia
Nepal		Myanmar
Sri Lanka		Timor-Leste
Thailand		
EUROPEAN REGION		
Azerbaijan		
Georgia		
Kyrgyzstan		
Tajikistan		
Turkey		
Uzbekistan		
EASTERN MEDITERRANEAN REGION		
Afghanistan		**Djibouti**
Iraq		Pakistan*
Iran (Islamic Rep.)		Somalia
Saudi Arabia		**Sudan***
		Yemen*
WESTERN PACIFIC REGION		
China	**Malaysia**	**Cambodia***
Lao People's Dem. Rep.	Phillipines*	Papua New Guinea
Republic of Korea	**Vanuatu**	
Solomon Islands		
Viet Nam		

Countries in bold show evidence of wide scale implementation of malaria control activities to >50% of the population at high risk. For high burden African countries Djbouti, Somalia and Sudan ITN coverage was derived from a model as described in Section 4.1

* The country reports some progress sub-nationally where interventions have been intensified.

† The number of reported cases and admissions has remained low since 2005.

suspected cases. Data were obtained from either: *(i)* health management information systems (Eritrea, Sao Tome and Principe, Rwanda, Zambia, and Zanzibar, United Republic of Tanzania[3]) or *(ii)* WHO rapid impact assessments which examined data from outpatient records and admissions and laboratory registers for randomly selected district hospitals for 2000–2009 (Ethiopia and Madagascar).

ERITREA. A large reduction in the malaria burden has been achieved in Eritrea in recent years. Although the numbers of probable and confirmed malaria cases decreased from 126 000 in 2001 to 22 000 in 2009 (83% decrease), microscopically confirmed malaria cases decreased by only 32% (from 9700 to 6600). This is because the cases examined by microscopy more than doubled over this period. The slide positivity rate fell from 43% to 8%, which may more reliably reflect a decrease in case incidence but the rate could be influenced by the inclusion of more cases with a lower probability of infection as the number of cases examined increases. The number of malaria admissions decreased from 10 900 to 4200 over the same period (61% decrease) and reported malaria deaths from 133 to 23 (83% decrease) (**Fig. 6.1**). The reduction in disease burden is associated with the scale-up of malaria control efforts in the country. More than a million ITNs were distributed over the years 2000–2006, and in 2004 about 80% of households living in areas at high risk for malaria owned a net. The NMCP delivered another 564 000 LLINs during 2007–2009, enough to cover 31% of the population at high risk, complemented by focal IRS, protecting on average 212 000 people at high risk per year since 2000. Enough ACTs were provided to treat all malaria

3. In recent years malaria control activities have led to reduced malaria transmission in Eritrea, Sao Tome and Principe, and Zanzibar (United Republic of Tanzania). These countries/areas may therefore be considered as having low transmission. However, they are included among the high-transmission countries since they were classified as such in 2000 before they intensified malaria control activities. Their receptivity for malaria transmission remains very high (given the abundance of vectors and climate suitability) and failure to maintain the intensity of malaria control efforts could result in resurgence of malaria with major public health consequences.

patients attending public health facilities. Although progress has been sustained since 2001 there was a small increase in confirmed cases, admissions and deaths in 2009.

ETHIOPIA. Although a functional surveillance system exists at the district level, aggregation of data at national level on malaria cases and deaths from all the health facilities is often incomplete and underestimates the true number of cases attending public health facilities. Therefore, a review of health facility records was conducted in all 62 hospitals located at altitudes < 2000 m (where malaria transmission occurs). A total of 44 hospitals maintained adequate records for the period 2002–2009. The numbers of malaria admissions and deaths in the hospitals follow a similar pattern to nationally reported data, rising to a peak in 2003 and subsequently falling (**Fig. 6.2**). Given the variable levels of admissions and deaths from 2002 to 2004, and the potential reasons for the variability, it is difficult to specify a baseline value for the number of admissions and deaths, and hence any percentage decrease in admissions and deaths to 2009. If the epidemic peak of 2003 is excluded, the annual numbers of malaria admissions and deaths for 2007–2009 are 31% and 50% lower than values for 2002 and 2004 respectively. The lower levels of admissions and deaths after 2004 are associated with an expansion in the malaria control programme; more than 25 million ITNs were delivered between 2005 and 2009 targeting 40 million people at high risk. The NMCP also undertakes IRS, which has increased in scale to protect 28 million in 2008 from a base of between 2.8 and 6 million from 2002 to 2007. ACTs were made available to all public facilities in 2004 and to community levels through health extension workers in 2007; these workers are mandated to diagnose malaria using RDTs and to treat confirmed malaria patients with ACTs. It is not known whether the lower levels of hospital admissions and deaths after 2004 would have occurred without these malaria interventions, but the major malaria epidemics of the past seem to have been avoided in the last 5 years. A slight increase in malaria admissions was recorded in 2009.

MADAGASCAR. The entire population of Madagascar, 19.6 million in 2009, is at some risk of malaria. About 1.4 million ITNs had been distributed between 2001 and 2005. Malaria control activities increased in scale from 2006 onward with 1.6 million ITNs delivered in 2006 followed by another 2 million over the period 2007–2009. Approximately 550 000 persons at risk were protected by IRS each year in 2005–2007. The number increased to 1.2 million per year in 2006 and 2007 and more than 6.5 million per year in 2008 and 2009. ACTs were adopted as policy for malaria treatment in 2006 and provided free of charge from 2007 with more than 500 000 treatment courses distributed in 2007 and 2008 and approximately 400 000 in 2009, sufficient to treat all patients reported to have attended public health facilities in 2008 and 2009.

Two data sets were analysed to examine malaria trends: *(i)* information from a WHO rapid impact assessment which collected data from 45 randomly selected health facilities in high-transmission areas and 15 in the transitional, epidemic-prone zone – of the 60 facilities, 35 had complete data for at least 8 years and were used for analysis – and *(ii)* routinely reported data from the national HMIS. Until 2006 the trend in malaria admissions followed that of non-malaria admissions, but in 2007 and subsequent years it was much lower (**Fig. 6.3**). Similar trends are seen in nationally reported data although the decreases have been larger in recent years.

RWANDA. The population of Rwanda was 10 million in 2009. During a nationwide campaign targeting children < 5 years of age in 2006, 1.96 million LLINs were distributed, and a further 1.16 million LLINs were distributed in 2007, increasing the percentage of the population potentially covered by nets to 70%. No ITNs were distributed in 2008; 800 000 were delivered in 2009. The number of people protected by IRS rose from 705 000 in 2007 to 1.4 million in 2009. ACTs were distributed nationwide between September and October 2006, at the same time as the mass distribution of LLINs. The DHS conducted in 2007–2008 showed that 56% of households owned an ITN and 56% of children < 5 slept under a net.

Rwanda recorded sharp decreases in the number of confirmed malaria cases, admissions and deaths in 2007 and for much of 2008 after the intensification of control activities (**Fig. 6.4, 6.5**). Towards the end of 2008 and early 2009, however, there was a nationwide increase in the number of confirmed malaria cases, admissions and deaths although the increase in admissions and deaths did not appear to be as large as that of the total number of cases. There was a 25% increase in the number of patients tested in 2009, but this is smaller than the 77% increase in confirmed malaria cases, and the slide positivity rate increased from 18% in 2008 to 25% in 2009. National-level rainfall and temperature anomalies were not associated with the resurgences[4]. A substantial proportion of LLINs were distributed 2–3 years ago and it is possible that the effectiveness of LLINs has become reduced with ageing of nets.

In response to the resurgence in uncomplicated malaria cases and to meet the universal LLIN coverage targets, the NMCP started mass distribution of new LLINs to selected districts according to malaria risk mapping (two per household), providing 184 000 in December 2009 and 581 000 in March 2010. In April 2010, a further 1.6 million new LLINs were distributed to all children < 5 years of age nationwide during a measles vaccination campaign. As a result of these initiatives the resurgence in malaria cases appears to have been reversed. From October to December 2010, another 2.1 million LLINs will be distributed to ensure that all households have two LLINs and that further increases in malaria cases and deaths are avoided.

SAO TOME AND PRINCIPE. The population of Sao Tome and Principe was 165 000 in 2009. IRS protected 140 000 people in 2005, 126 000 in 2006, 117 000 in 2007 and 137 000 in 2009. No IRS was undertaken in 2008. By 2007, nationwide ITN coverage was among the highest in Africa: 78% of households owned at least one ITN, and 54% of children < 5 years of age slept under an ITN. ACT was introduced for treatment of malaria in 2005, and the number of treatment courses distributed in 2005–2008 was enough to cover all reported cases.

The annual number of confirmed malaria cases in 2005–2008 was 84% lower than in 2000–2004, and in the same periods the slide

4. Data on the following climatic factors were examined: *(i)* Tropical Rainfall Measuring Mission (TRMM) rainfall estimates (*3*); *(ii)* satellite-based land surface temperature (LST) (*4*); and *(iii)* air temperature Climate Anomaly Monitoring System (CAMS) products (*5*). For each product, the average quarterly reading over the period of 2001–2008 was used to calculate a baseline, and this baseline was then used to calculate anomalies for the period 2001–2009. These anomalies were then compared with malaria case counts in each quarter by calculating Spearman rank correlations of case counts with each climatic variable in both real-time and with a one quarter lag. Additionally, multivariable regression analysis was used to simultaneously examine the effects of rainfall and temperature on malaria case increases.

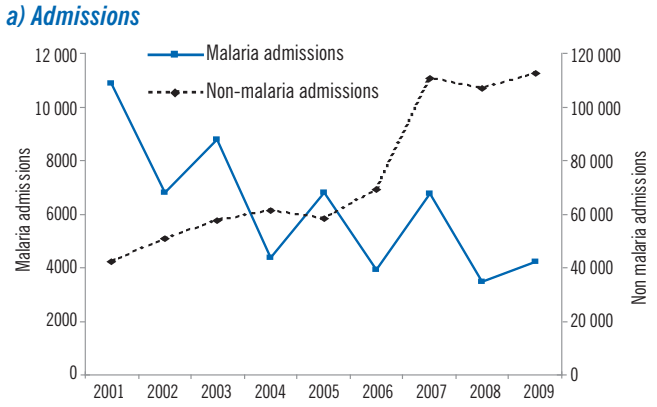


Figure 6.1 Malaria and non malaria admissions and deaths in Eritrea, 2001–2009

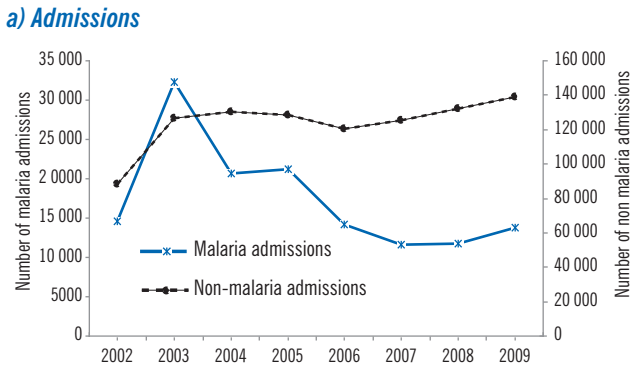


Figure 6.2 Malaria and non malaria admissions and deaths in Ethiopia, 2002–2009

NOTE: Data from 44 hospitals below 2000 m. Excludes Nov. and Dec. of each year owing to missing data in 2009

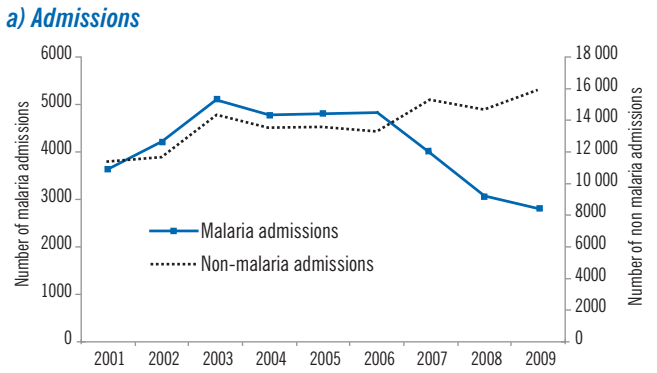


Figure 6.3 Malaria and non malaria admissions and deaths in Madagascar, 2001–2009

NOTE: Data from 35 health facilities. Excludes Nov. and Dec. of each year owing to missing data in 2009

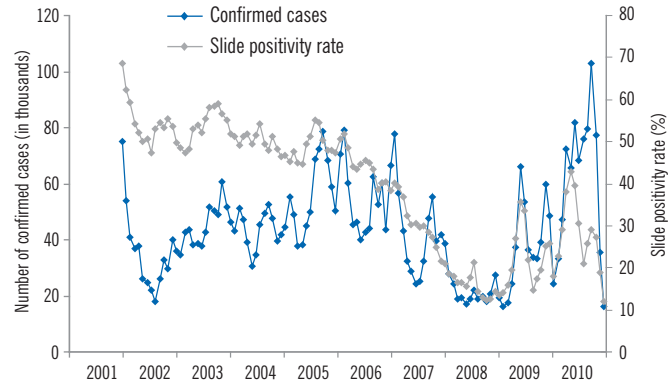


Figure 6.4 Confirmed malaria cases and slide positivity rate, Rwanda, 2001–2010

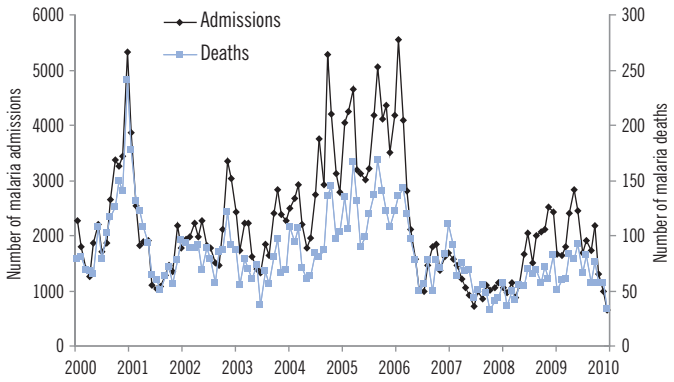


Figure 6.5 Malaria admissions and deaths, Rwanda, 2000–2010

positivity rate fell from 47% to less than 13% (**Fig. 6.6**). The annual number of admissions due to malaria was 87% lower in 2005–2008 than in 2000–2004, while the percentage of admissions for malaria fell from an average of 62% in 2000–2004 to 23% in 2005–2008. Similarly, the number of malaria reported deaths in 2005–2008 was 86% lower than in 2000–2004, and the percentage of deaths due to malaria in health facilities fell from 23% to 4%.

Until 2008, the data show a strong association between interventions and impact (*5*). However, in 2009 the number of confirmed malaria cases increased from 1647 to 3893, a 140% increase since 2008. Malaria-related admissions rose from 850 to 950 (up 44%) and malaria-related deaths from 16 to 23 (up 44%). The increase in 2009 followed a year when IRS had not been carried out, although the percentage of households owning at least one ITN remained high in 2009 (76% from a national survey). Once the increase in cases was detected by the surveillance system, emergency IRS was implemented and malaria cases decreased during the second half of 2009.[5]

ZAMBIA. Between 2001 and 2008 the number of admissions and deaths due to malaria had shown a consistent decrease (**Fig. 6.7**), which was associated with increased malaria control activities (*World Malaria Report 2009*). The magnitude of the decrease observed in health facility data was similar to changes observed in household survey data. For example, the numbers of malaria admissions and deaths among children < 5 years of age decreased by 57% and 62%, respectively, while the number of admissions for anaemia decreased by 47%. Parasite prevalence among children < 5 decreased by 53% between 2006 and 2008 (from 21.8% to 10.2%), and the percentage of children with severe anaemia (< 8 g/dl haemoglobin) decreased by 68% (from 13.3% to 4.3%). The consistency of trends between data sources suggested that the decreases were real and that health facility data could provide reliable information on changes in malaria incidence and mortality.

In 2009 the downward trend in malaria admissions and deaths levelled off nationally but there were small increases in malaria admissions in 5 of 9 provinces and a major resurgence in Eastern and Luapula provinces, where malaria admissions more than doubled when compared with 2008 numbers (**Fig. 6.8**). The change in malaria admissions has been paralleled by changes in parasite prevalence in children < 5 as measured by malaria indicator surveys undertaken in 2006, 2008 and 2010 (*6,7,8*) (**Fig. 6.9**). In Eastern province, parasite prevalence dropped from 22.8% in 2006 to 9.3% in 2008 but rose to 22.6% in 2010. In Luapula province, parasite prevalence decreased from 37.5% in 2006 to 21.8% in 2008, but rose to 53.5% in 2010. In other provinces the rise in parasite prevalence is less pronounced. The surveys in both provinces were conducted in May during each of the 3 years.

Household ITN ownership declined from 69.8% in 2008 to 50% in 2010 in Luapula province, but remained relatively high in Eastern province (74.8% in 2008 and 76.1% in 2010), so decreasing ITN coverage does not account for the malaria resurgence observed in both provinces. A large proportion of nets were delivered 2–3 years before the resurgence and it is possible that their effectiveness has deteriorated owing to decay of insecticide and physical deterioration of nets. Rainfall increased in both provinces in the quarter prior to the resurgence. The impact of malaria control on malaria admissions, cases and deaths was less in Luapula and Eastern provinces than in other provinces before the resurgence.

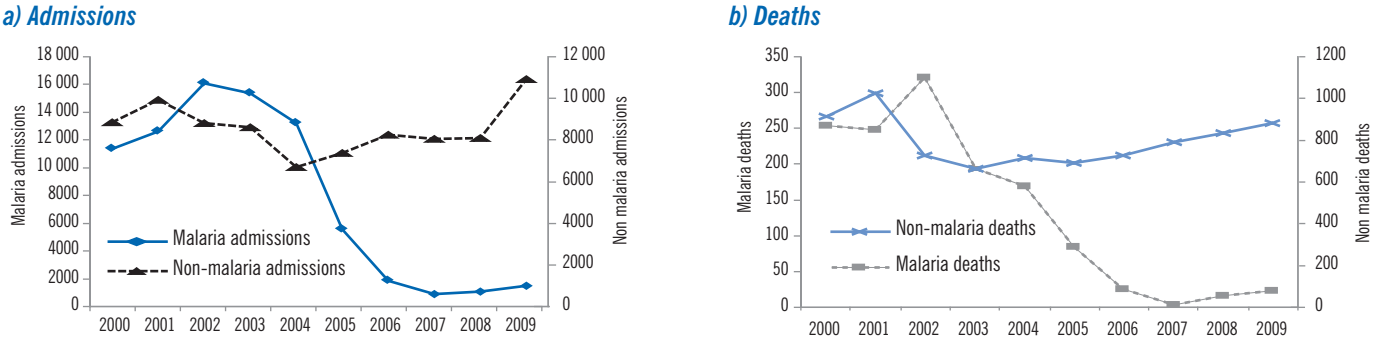


Figure 6.6 **Malaria and non-malaria admissions and deaths in Sao Tome and Principe, 2000–2009**

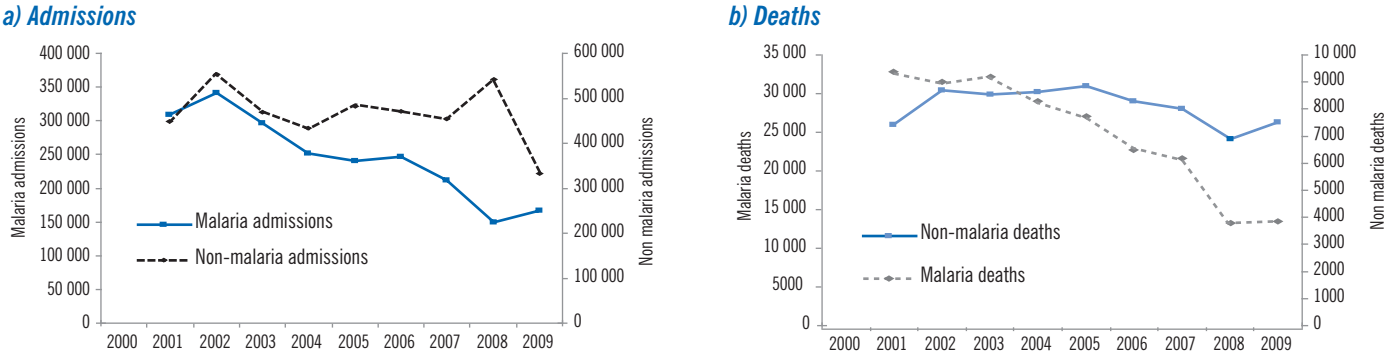


Figure 6.7 **Malaria and non-malaria admissions and deaths in Zambia, 2000–2009**

5. Lee *et al.* Potential threat of malaria epidemics in a low transmission area, as exemplified by São Tomé and Príncipe. *Malaria Journal 2010,* 9:264. http://www.malariajournal.com/content/9/1/264

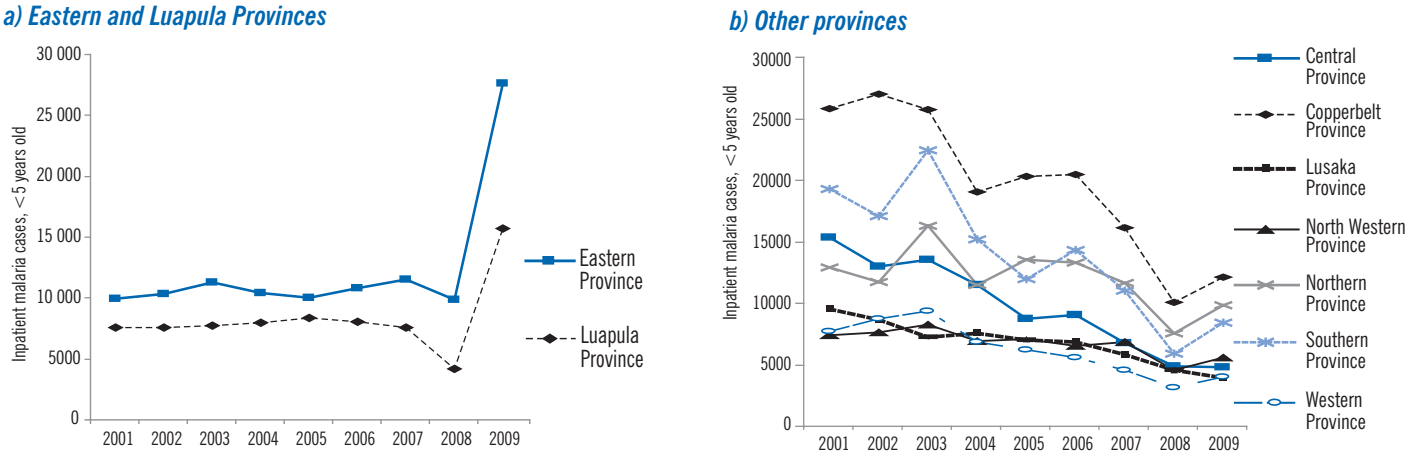


Figure 6.8 Malaria admissions <5 years of age, Zambia, 2001–2009 by province

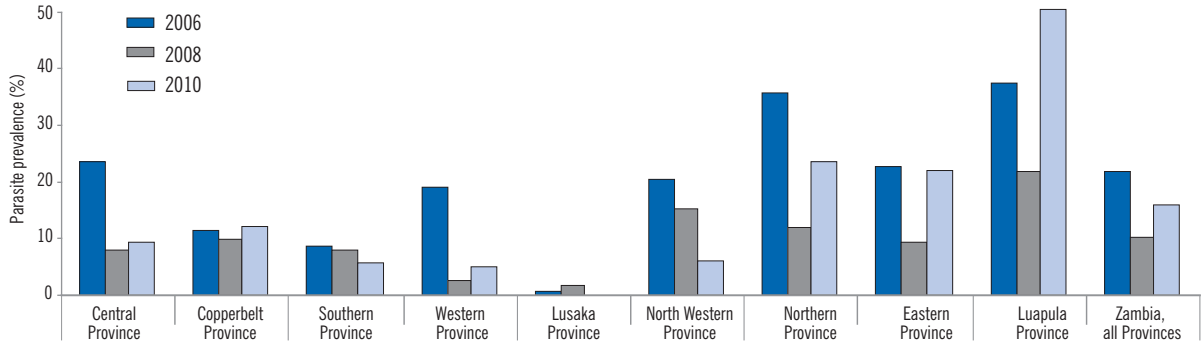


Figure 6.9 Parasite prevalence in children <5 years of age, Zambia 2006, 2008, and 2010

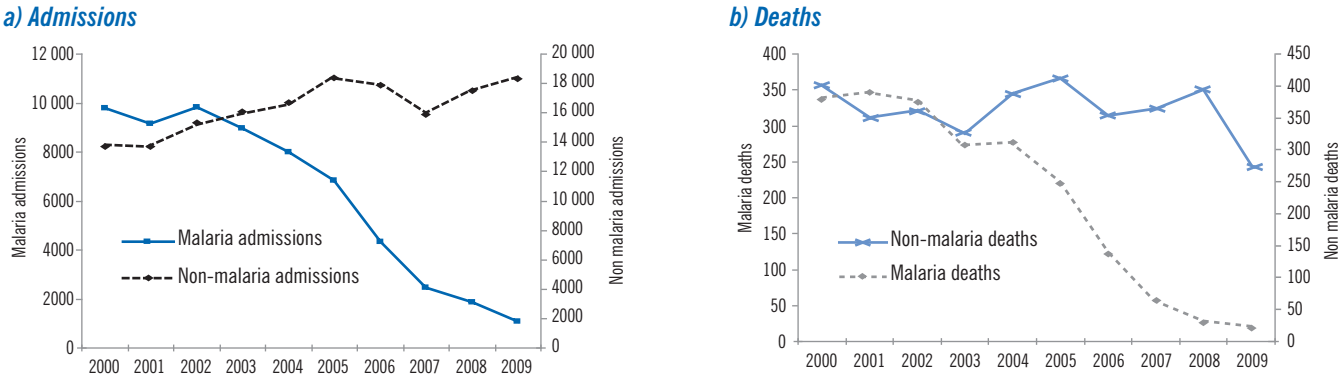


Figure 6.10 Malaria and non-malaria admissions and deaths in Zanzibar, United Republic of Tanzania 2000–2009

ZANZIBAR, UNITED REPUBLIC OF TANZANIA. The islands of Zanzibar (UR Tanzania) had a population of 1.3 million in 2009. ACTs have been made freely available in all public health facilities since September 2003. Approximately 245 000 LLINs were distributed in 2006, enough to cover 40% of the population, and a further 502 000 were distributed in 2007–2009, enough to cover the entire population. IRS has been carried out annually since 2006 with each round covering nearly all households.

The numbers of malaria admissions and deaths decreased substantially between 2003 and 2009. In 2007–2009, the numbers of malaria admissions and deaths were 81% lower than those recorded in 2000–2002 (**Fig. 6.10**). In contrast the number of admissions for conditions other than malaria was 21% higher. The numbers of malaria deaths recorded in 2007–2009 were 90% lower than in 2000–2002 while deaths from conditions other than malaria were just 7% lower.

The dramatic decrease in the number of admissions for malaria in Zanzibar was associated with high coverage of antimalarial interventions. The decrease could also be due in part to improved diagnosis of cases as RDTs began to be more widely used from 2005. Other evidence for an impact of malaria interventions comes from a detailed investigation in one district, where among children < 5 years there were substantial reductions in *P. falciparum* prevalence, malaria-related admissions, blood transfusions, crude mortality and malaria-attributed mortality following the introduction of ACTs in 2003 (*6*).

6.3 African Region: low-transmission countries

Of the countries in the African Region that are considered to have low levels of malaria transmission, Algeria is in the elimination phase and recorded only 93 indigenous cases between 2000 and 2009. In Botswana, Cape Verde, Namibia, South Africa, Swaziland and Zimbabwe, malaria is highly seasonal, and transmission is of much lower intensity than in the rest of sub-Saharan Africa. The vast majority of cases are due to *P. falciparum* (**Fig. 6.11b**). Five countries (Botswana, Cape Verde, Namibia, South Africa and Swaziland) recorded sustained decreases of more than 50% in the numbers of confirmed cases between 2000 and 2009 (**Fig. 6.11e**). Four of these countries also reported decreases in the number deaths due to malaria (**Table 6.2**). Cape Verde moved into the pre-elimination phase in 2010. In Zimbabwe, the number of confirmed malaria cases has fluctuated between 16 000 and 117 000 between 2004 and 2009, partly because of changes in the number of cases examined by microscopy. It is therefore not possible to identify any trends in malaria incidence in Zimbabwe. There was a large decrease in the number of recorded malaria deaths in Zimbabwe between 2002 and 2009, while the total number of deaths reported from all causes appears to have increased over this time.

The scale of IRS has remained fairly constant over the past 8 years; Botswana, Namibia, South Africa and Swaziland protected more than 70% of their populations at risk per year during 2007–2009. Zimbabwe has also increased the proportion of the population at risk protected by IRS to more than 60% in 2009. These countries have deployed sufficient courses of ACTs to treat all patients attending public health facilities.

In summary, 4 of the 5 low-transmission countries in southern Africa (Botswana, Namibia, South Africa and Swaziland) showed more than 50% decreases in the numbers of malaria cases between 2000 and 2009. Cape Verde also showed sustained decreases from 2000 to 2008 enabling it to enter the pre-elimination phase of malaria control. It recorded a rise in cases in 2009 which was principally due to increased case detection efforts. All of these countries implemented malaria interventions on a large scale. It is not possible to determine whether the number of cases in Zimbabwe is increasing, stable or decreasing, but preventive activities appeared to cover more than 50% of the population at high risk in 2008, and the number of malaria-related deaths has dropped substantially.

TABLE 6.2

NUMBER OF MALARIA DEATHS reported by low transmission countries, 2000–2009

	Botswana	Cape Verde	Namibia	South Africa	Swaziland	Zimbabwe
2000				424		
2001	29	0	1728	81	62	
2002	23	2	1504	96	46	1844
2003	18	4	1106	142	30	1044
2004	19	4	1185	88	28	1809
2005	11	2	1325	63	17	1916
2006	40	7	571	87	27	802
2007	6	2	181	37	17	401
2008	12	2	171	43	10	232
2009	6	2	46	45	13	14

BOX 6.1

EXPLANATION OF GRAPHS

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

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

Annual blood examination rate: number of slide examinations carried out each year in relation to the population at risk for malaria, expressed as a percentage (see technical notes).

Confirmed cases reported as a percentage of total estimated: total number of confirmed cases in relation to the estimated number of malaria cases in a country. The estimated number of cases is calculated by taking into account: *(i)* the completeness of reporting from health facilities, *(ii)* the extent to which people with fever use public health facilities for treatment, and *(iii)* the extent to which public health facilities undertake case confirmation (see technical notes). The width of the bars reflects uncertainty around the estimate of the number of cases.

Change in number of reported cases: the number of confirmed malaria cases is shown on the vertical axis, with each country indexed at 100 in 2000 (or a later year if data were not available for 2000); i.e. a value of 200 in 2005 indicates that the number of cases in 2005 was twice that reported in 2000 and represents a 100% increase. Countries with evidence of a decrease are generally those in which there has been a consistent decrease in the number of cases and consistency in reporting of malaria cases (e.g. stable annual blood examination rate). Countries for which there is little evidence of a decrease are those that do not show a decrease in the number of cases or where there have been irregular variations in surveillance data (e.g. annual blood examination rate falling, or unexplained variations in the percentage of cases due to *P. falciparum*).

IRS and ITNs delivered: the vertical scale shows the percentage of the population at risk for malaria potentially covered by preventive programmes with IRS and ITNs. It is assumed that each net delivered can cover two people, that conventional nets are re-treated regularly, and that each net is not replaced before 3 years. It is also assumed that IRS and ITNs target different populations. The percentage of the population potentially covered is therefore the maximum possible covered by the interventions delivered. 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 is calculated as: 100 x (number of ITNs delivered in past 3 years + number of people protected by IRS in current year) ÷ population at high risk. Note that this indicator can exceed 100% if interventions are also applied to populations at low risk or if some high-risk populations are covered both by ITNs and IRS.

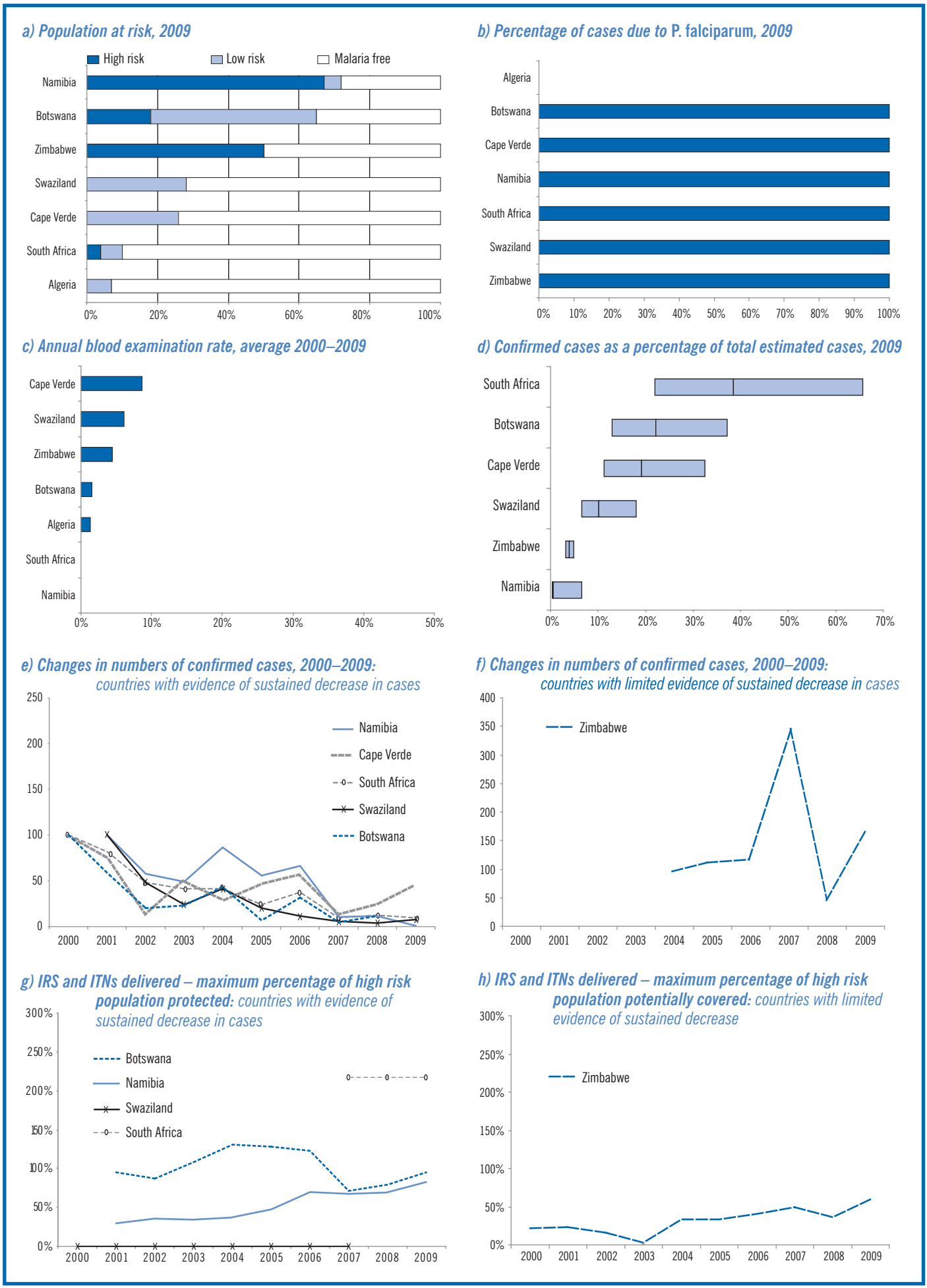


Figure 6.11 **WHO African Region – *low transmission countries***

6.4 Region of the Americas

Malaria transmission occurs in 23 countries and territories of the WHO Region of the Americas, with almost 20% of the total population at some degree of risk. Four of these countries (Argentina, El Salvador, Mexico, and Paraguay) are now in the elimination or pre-elimination phase; 2 countries (Bahamas, Jamaica) are preventing reintroduction of malaria after local outbreaks subsequent to importation of parasites.

Overall, *P. vivax* accounted for 80% of all cases reported in 2009, but the percentage of cases due to *P. falciparum* was almost 100% in the Dominican Republic and Haiti (**Fig. 6.12b**). Reported cases in the Region decreased from 1.18 million in 2000 to 526 000 in 2009. Four countries (Brazil, Colombia, Haiti and Peru) accounted for 90% of the cases in 2009. Reductions of more than 50% in the number of reported cases between 2000 and 2009 were seen in 11 countries (Argentina, Belize, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Paraguay, Plurinational State of Bolivia, and Suriname) (**Fig. 6.12e**). Three countries (Brazil, Colombia and Guyana) had smaller reductions (25%–50%) in the number of confirmed malaria cases between 2000 and 2009; Guyana registered a small increase in 2009 compared to 2008.

In 4 countries the scale of preventive activities is sufficient to cover 50% or more of the population at high risk (Ecuador, Guatemala, Nicaragua and Suriname). Brazil has greatly extended the availability of diagnosis and treatment through a network of more than 40 000 health workers who reach individual households.

The number of confirmed cases in French Guiana showed little change between 2000 and 2008 (no data were reported in 2009). Three countries (the Bolivarian Republic of Venezuela, the Dominican Republic, and Haiti) reported increased numbers of cases between 2000 and 2009, with the highest increase seen in Haiti (3 times more cases in 2009 compared to 2000). The risk of malaria may have further increased in Haiti in 2010 as a result of the earthquake in January and widespread use of temporary housing, although the risk will also depend on climatic conditions.

In summary, 9 countries, Argentina, Belize, Ecuador, El Salvador, Guatemala, Mexico, Nicaragua, Paraguay, and Suriname, experienced a decrease in the number of cases of more than 50%, associated with intense malaria programme activity.

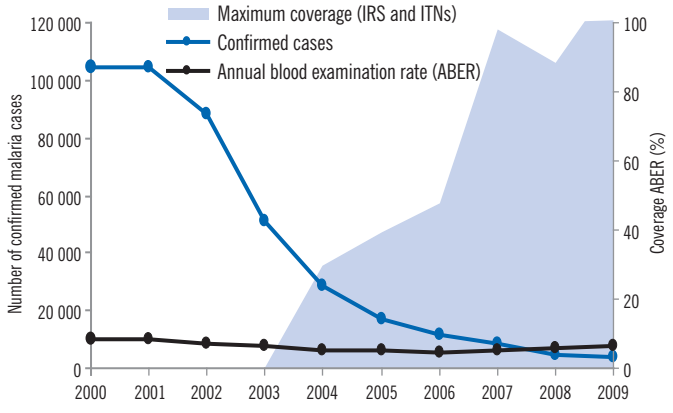
BOX 6.2

EXAMPLES OF SUCCESSFUL MALARIA CONTROL IN THE AMERICAS

ECUADOR. Confirmed malaria cases decreased from 105 000 in 2000 to 4120 in 2009, a reduction of 96%. The proportion of cases due to *P. falciparum* also decreased from 47% in 2000 to 13% in 2009. Today, only 4% of the 13.8 million population are at high risk for malaria (living in areas where incidence exceeds 1 case per 1000 per year). IRS has been the principal vector control method, covering an average of 344 500 people at risk per year in 2007–2009. The NMCP also distributed 458 000 LLINs free of charge in 2008–2009. These two interventions are sufficient to cover more than 100% of the population at high risk. Malaria diagnosis and treatment are provided free of charge for all age groups in the public sector; ACTs have been available for the treatment of *P. falciparum* malaria since 2005. Ecuador was awarded US$ 6.9 million from the Global Fund for Phase I of a project commencing in 2009. It also receives funds from UNICEF (US$ 80 000, 2009) and USAID (US$ 200 000, 2007–2008). The government has traditionally provided the majority of funding for malaria control (US$ 2.4 million in 2009), indicating strong national commitment to malaria control.

SURINAME. The number of confirmed malaria cases peaked in 2001 at 16 000 and has fallen steadily to 1700 in 2009, a 90% decrease. The number of reported malaria deaths fell from 24 in 2000 to zero in 2009, while the proportion of cases due to *P. falciparum* decreased from 84% to 22% in the same period. Today, only 11% of the 524 000 population is at risk of malaria. The annual blood examination rate was 54% in 2009 reflecting intensive efforts at case detection; the rate had been higher than 100% earlier in the decade, probably due to the high number of migrants from neighbouring countries treated in Suriname. The NMCP distributed 22 500 LLINs in 2007–2009, enough to cover 78% of the population at risk. IRS was also implemented selectively in focal areas. Suriname has benefited from substantial external funding for malaria control with US$ 4.5 million disbursed from Global Fund grants between 2006 and 2009.

a) Ecuador



b) Suriname

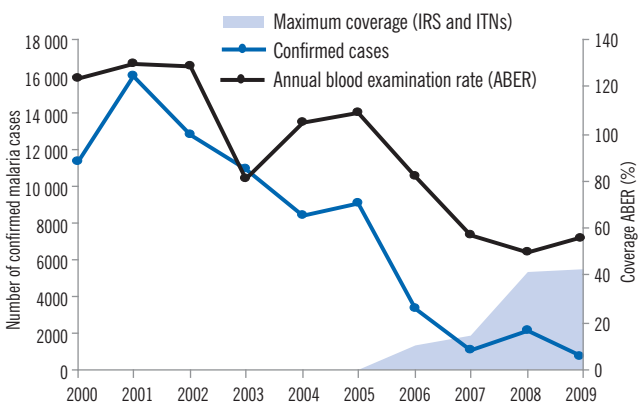


Figure Box 6.2 Trends in cases and malaria programme coverage, 2000–2009

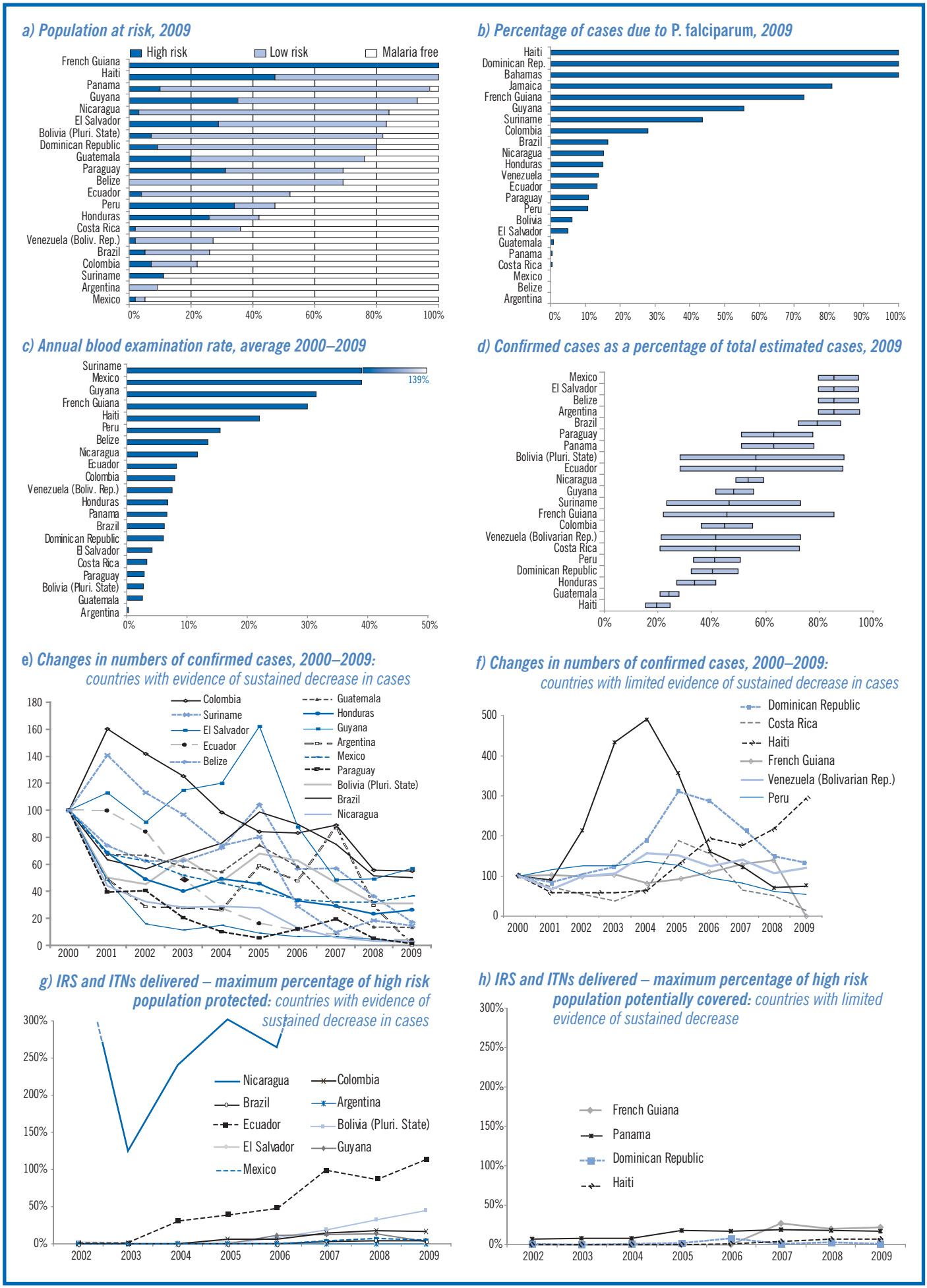


Figure 6.12 **WHO Region of the Americas**

6.5 South-East Asia Region

Of the 11 countries in the WHO South-East Asia Region, 10 are malaria-endemic; there has been no indigenous transmission of malaria in the Maldives since 1984. Approximately 60% of the total population in the Region is at some risk of malaria, with 20% at high risk (in areas with a reported incidence of more than 1 case per 1000 population per year). In 2009, 2.4 million parasitologically confirmed malaria cases and 3320 deaths were reported, a 7% decrease in cases since 2000. Three countries accounted for 94% of the reported cases in the Region in 2008 (India, 65%, Myanmar, 20% and Indonesia, 12%). Most cases in the Region are due to *P. falciparum*, although the proportion varies by country; transmission is due almost entirely to *P. falciparum* in Myanmar and Timor-Leste but exclusively to *P. vivax* in the Democratic People's Republic of Korea (**Fig. 6.13b**). Reductions of more than 50% in the number of reported cases in 2000–2009 were recorded in 5 countries (Bhutan, the Democratic People's Republic of Korea, Nepal, Sri Lanka and Thailand; **Fig. 6.13e**). The number of confirmed cases in India was 23% lower in 2009 than in 2000. There was evidence of widespread implementation of anti-malarial interventions in 3 countries that showed decreases in the number of cases (Bhutan, Sri Lanka and Thailand), although intervention coverage has been less than 50% in recent years in Sri Lanka and Thailand. Two countries in the pre-elimination stage actively follow up all suspected cases (Democratic People's Republic of Korea and Sri Lanka). The scale of preventive interventions appears to be limited in India and Nepal, with coverage of less than 30% of the population at high risk.

The remaining malaria-endemic countries reported either no change or an increase in the number of cases (Bangladesh, Indonesia, Myanmar and Timor-Leste), and the scale of control activities appeared to be small in relation to the total population at risk. Confirmed malaria cases in Myanmar increased by more than 16-fold between 2000 and 2009, due primarily to the increased availability of parasitological diagnosis by both microscopy and RDTs.

In summary, 4 countries (Bhutan, the Democratic People's Republic of Korea, Sri Lanka and Thailand) experienced a decrease in the number of malaria cases of more than 50% since 2000, associated with intensive malaria programme activity.

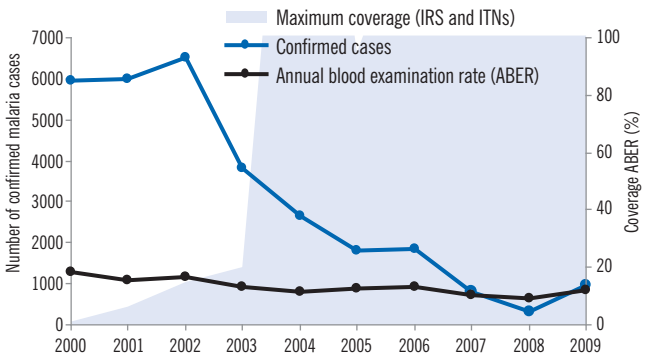
BOX 6.3

EXAMPLES OF SUCCESSFUL MALARIA CONTROL IN THE SOUTH-EAST ASIAN REGION

BHUTAN. Approximately 74% (493 000) of the total population (688 000) is at risk of malaria. Malaria occurs primarily in 15 districts that border India. The number of confirmed malaria cases has fallen from 5982 in 2000 to 972 in 2009, a decrease of 84%. In 2009, 58% of cases were due to *P. falciparum*. Only 4 malaria deaths were reported in 2009. An average of 145 000 people were protected each year with IRS in 2004–2009, and 132 000 ITNs were distributed. A household survey conducted in malaria endemic districts in 2009 indicated that 94% of households owned at least one ITN. ACTs were adopted for treatment of *P. falciparum* malaria in 2005 and are made available through public sector health facilities free of charge; there are few private sector treatment facilities in Bhutan. Government financing for malaria control averaged US$ 225 000 per year in 2005–2009. Over the same period disbursements from the Global Fund averaged US$ 600 000 per year and contributions from UN agencies and bilateral donors averaged US$ 204 000.

SRI LANKA. The number of confirmed malaria cases decreased from 210 000 in 2000 to 558 in 2009 and the proportion of cases due to *P. falciparum* from 28% to 5%. The number of reported deaths fell from 77 in 2000 to zero in 2009. A key strategy to reduce malaria cases has been the use of Malaria Mobile Clinics (MMCs) comprising at least 3 health personnel and a 4-wheel-drive vehicle to make services available to populations that do not have access to health facilities. Diagnosis was initially confirmed by trained microscopists but microscopy was supplemented with RDTs when MMCs were extended to areas lacking trained microscopists. IRS had been the principal method of vector control with an average of 50% of the population at risk protected in 2001–2004. ITNs were introduced as a complementary measure for populations at high risk. Government expenditures for malaria averaged US$ 1.6 million per year in 2005–2009 while disbursements from the Global Fund averaged US$ 2.4 million over the same period. The country is now in the pre-elimination phase of malaria control.

a) Bhutan



b) Sri Lanka

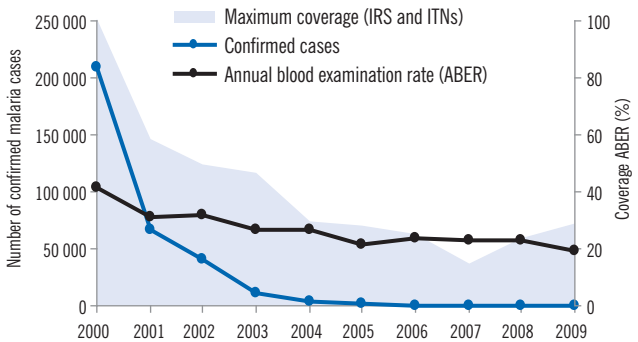


Figure Box 6.3 Trends in cases and malaria programme coverage, 2000–2009

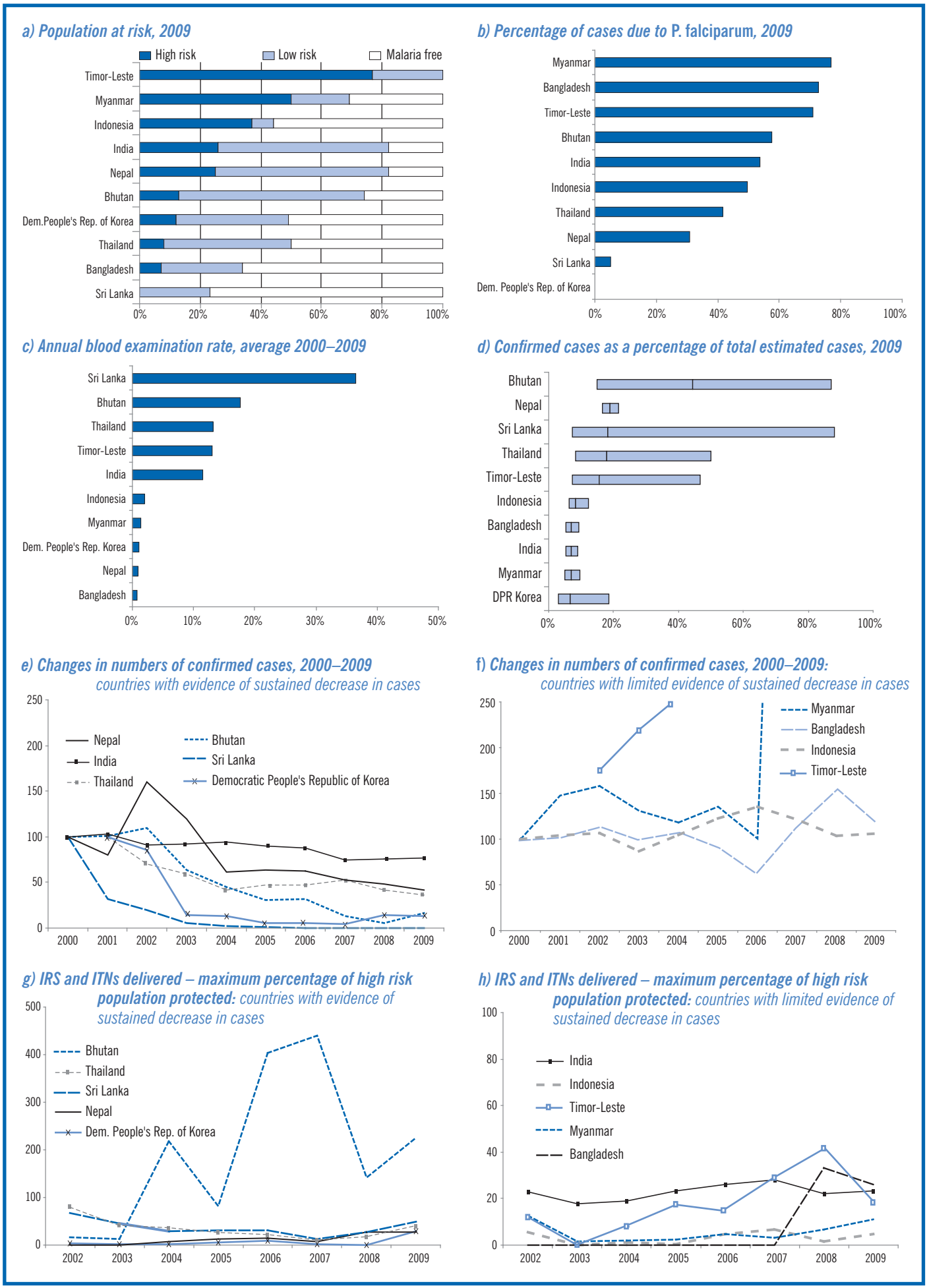


Figure 6.13 **WHO South-East Asia Region**

6.6 European Region

Indigenous malaria cases were reported in 5 countries in the WHO European Region in 2009: Azerbaijan, Georgia, Kyrgyzstan, Tajikistan and Turkey. Armenia and Turkmenistan continue to report zero locally-acquired cases and Turkmenistan was certified as malaria-free in October 2010. Uzbekistan reported zero local cases for the first time in 2009 while Tajikistan reported zero locally-acquired *P. falciparum* cases in 2009. Thus in 2009 all locally-acquired cases in the Region were due to *P. vivax*. Overall, the number of indigenous cases reported in the Region decreased from 32 385 in 2000 to 285 in 2009. All countries registered a decrease of more than 90% in the number of cases since 2000 except Kyrgyzstan that had a 67% reduction with only 4 cases in 2009, after a peak of 2744 cases in 2002 (**Fig. 6.14e**).

IRS is the primary means of vector control in all countries, applied with strict total coverage of all residual and new foci of malaria, aimed at interrupting transmission over the target area as soon as possible and preventing its re-establishment. The intensity of activity is evident in all of the countries – more than 80% coverage of preventive interventions in populations at high risk and more than 20% annual blood examination rate (**Fig. 6.14c,g**). ITNs are used as a supplementary intervention, particularly in Tajikistan. All suspected cases are examined by microscopy and all confirmed cases are treated; information on their origins is traced for further epidemiological classification of malaria foci.

Countries make concerted efforts to prevent the spread of malaria across neighbouring country borders. In 2005, all 9 malaria-affected countries in the Region at that time (including the Russian Federation) endorsed the Tashkent Declaration (*9*), the goal of which is to interrupt malaria transmission by 2015 and eliminate the disease in the Region. Since 2008, national and inter-country strategies on malaria have been revised to address cross-border collaboration and other new challenges for malaria elimination.

In summary, 5 of the 6 endemic countries reported local cases in 2009, all with sustained decreases of more than 50% in the number of cases since 2000. No indigenous *P. falciparum* cases were reported in 2009, for the first time since the resurgence of malaria in the early 1990s. All malaria-endemic countries in the Region have active control programmes.

BOX 6.4

CROSS-BORDER COLLABORATION ON MALARIA ELIMINATION: AZERBAIJAN – GEORGIA

Cross-border collaboration is of special importance in the context of malaria elimination, where there is a risk of spread of malaria between countries and neighbouring regions. Over 1 million people live in districts on the Azerbaijan–Georgia border, including over 600 000 in 7 districts in Azerbaijan and 416 000 in 6 districts in Georgia. There are close political, economic and cultural ties between the countries with ethnic Azerbaijanis living in Georgia and ethnic Georgians living in Azerbaijan and frequent population movements across the border.

Azerbaijan and Georgia both made a commitment to eliminate malaria by endorsing the Tashkent Declaration in December 2005. In 2008 both countries developed National Malaria Elimination Strategies and shifted national malaria programmes from control to elimination.

The first meeting on inter-country coordination on malaria elimination between Azerbaijan and Georgia was held in Baku on 19 March 2009, under the auspices of EURO. The meeting resulted in a Joint Statement on inter-country cooperation on malaria elimination in Azerbaijan and Georgia. The parties to the Joint Statement agreed to ensure regular exchange of information, synchronize action plans, ensure early notification of any changes, establish a joint working group, appoint focal points in each country, coordinate mobilization of additional resources, and take actions to create greater awareness of the successes of malaria elimination programmes. Joint activities started in May 2010 including IRS programmes in border areas.

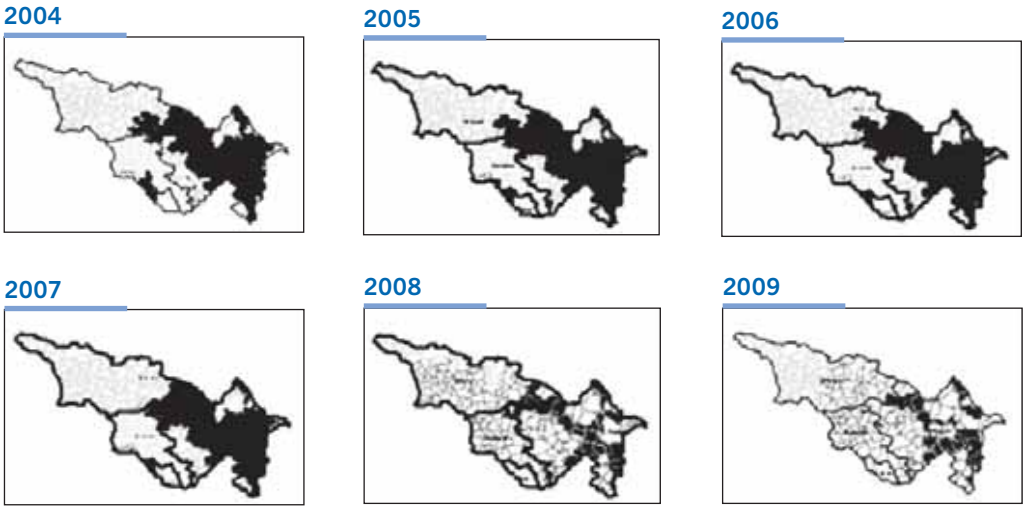


Figure Box 6.4 Distribution of malaria in Armenia, Azerbaijan and Georgia, 2004–2009

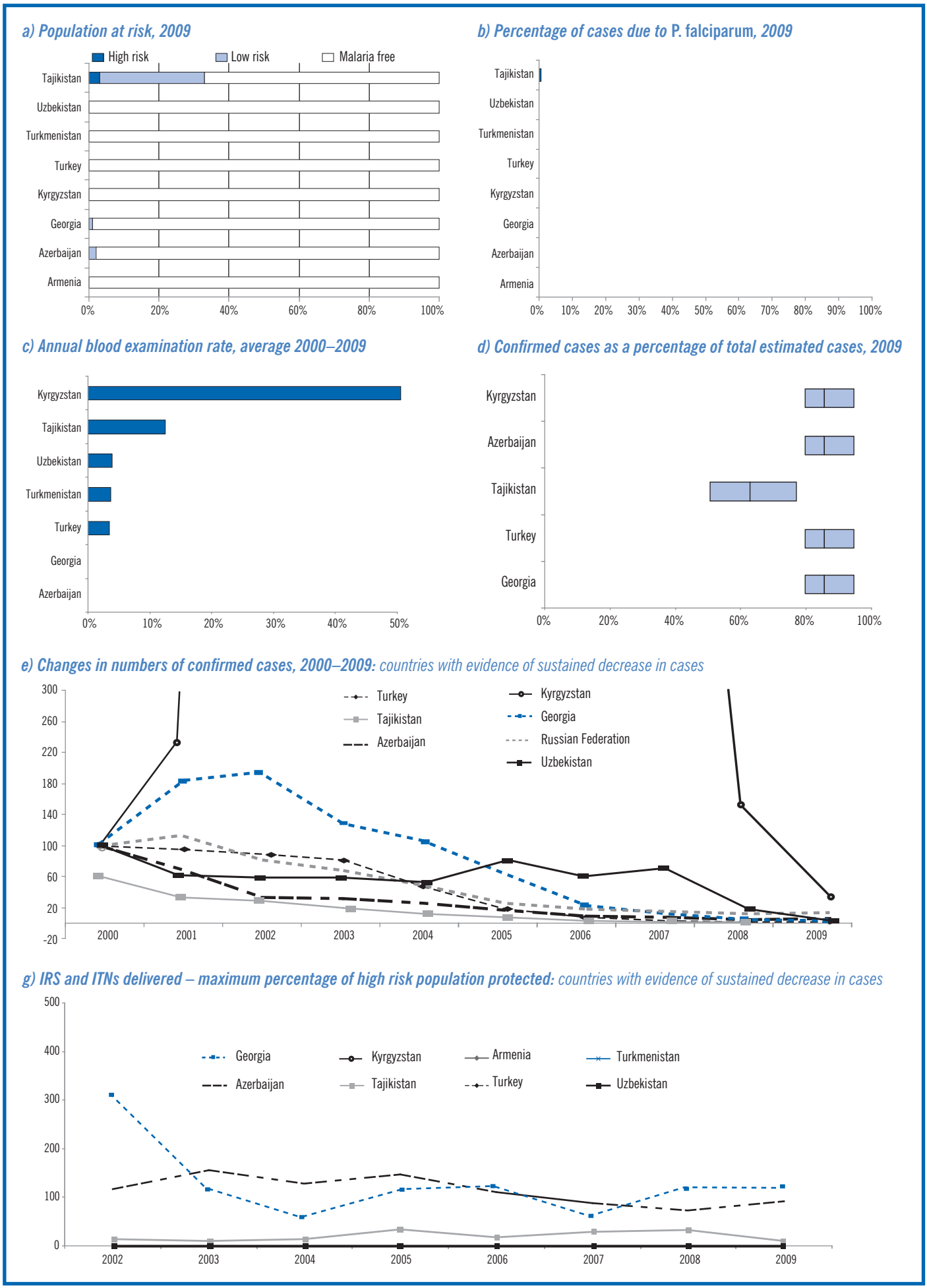


Figure 6.14 **WHO European Region**

6.7 Eastern Mediterranean Region

There are 6 countries with areas of high malaria transmission in the WHO Eastern Mediterranean Region (Afghanistan, Djibouti, Pakistan, Somalia, Sudan and Yemen), 3 countries with low, geographically limited malaria transmission and effective malaria programmes (Islamic Republic of Iran, Iraq and Saudi Arabia) and 4 countries that are in the phase of preventing re-introduction of malaria (Egypt, Morocco, Oman, and the Syrian Arab Republic). *P. falciparum* is the dominant species of parasite in Djibouti, Saudi Arabia, Somalia, Sudan and Yemen, but the majority of cases in Afghanistan and Pakistan, and a majority of cases in the Islamic Republic of Iran and in Iraq, are due to *P. vivax* (**Fig. 6.15b**). In 2009, the Region reported a total of 5.7 million probable and confirmed malaria cases of which only 1 million (18%) were confirmed parasitologically. Four countries accounted for 98% of the confirmed cases: Sudan, 70%; Pakistan, 17%; Afghanistan 6%; and Yemen, 5%.

Four countries reported reductions in malaria cases of more than 50% between 2000 and 2009 (Afghanistan, Islamic Republic of Iran, Iraq, and Saudi Arabia). Intensive control activities are carried out in the Islamic Republic of Iran, Iraq and Saudi Arabia, and these countries are now in the elimination or pre-elimination stage (**Fig. 6.15e**). Other countries in the Region have not reported consistent decreases in the number of cases (Djibouti, Pakistan, Somalia, Sudan and Yemen), although Sudan has extended the coverage of malaria preventive activities to more than 50% of the population at risk and has reported a reduction of cases in some parts of the country. Yemen has reported no local cases on Socotra Island and a reduction in parasite prevalence in Tihama populations. Data for Djibouti are only available for 2004–2008 and do not show a consistent trend.

In summary, 3 countries (Islamic Republic of Iran, Iraq, Saudi Arabia) showed evidence of a sustained decrease of more than 50% in the number of cases since 2000, associated with widespread implementation of malaria control activities.

BOX 6.5

CERTIFICATION OF MALARIA ELIMINATION IN MOROCCO

Recorded malaria in Morocco peaked at more than 350 000 cases in 1939 and remained high until 1947 when 303 000 cases and 548 deaths were reported. Since then the malaria burden has declined steadily in response to a combination of intensified control interventions, improved health service coverage and socio-economic development. Malaria has been a notifiable disease since 1967. Malaria due to *P. falciparum* was the first to disappear, with the last local case recorded in 1974, but transmission of *P. vivax* continued at low levels. In 1999, the Ministry of Health of Morocco, with the support of WHO/EMRO, re-oriented its malaria control programme towards elimination. Targeted control efforts and intensified surveillance temporarily interrupted local transmission (there were only 3 local cases due to *P. vivax* in 2000 and zero cases in 2001) but there was an outbreak in 2002 with 19 local cases in Chefchaouen province. Subsequent interventions and intensified surveillance brought the outbreak under control and the last local case of *P. vivax* was recorded in 2004. Since then, the country has recorded no locally-acquired cases of malaria, but receives an average of 109 imported cases annually, of which 88% are due to *P. falciparum*, mainly from sub-Saharan Africa. The programme has continued to spend approximately US$ 800 000 per year for maintaining interventions since 2007, 40% of this being for free diagnosis and treatment. In 2008, four years after interrupting local transmission, procedures towards certification of the achievement of malaria elimination were initiated. The country was certified free of malaria by the Director-General of WHO in May 2010. Increasing numbers of imported cases, illegal population movements and gradual attrition of malaria programme expertise are on-going challenges for the programme in keeping the country free of malaria, and preventing its reintroduction.

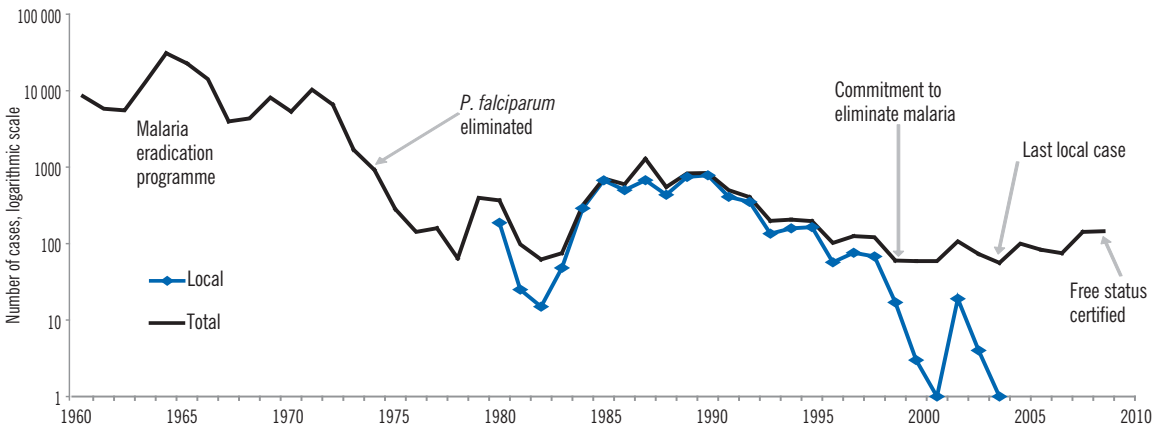
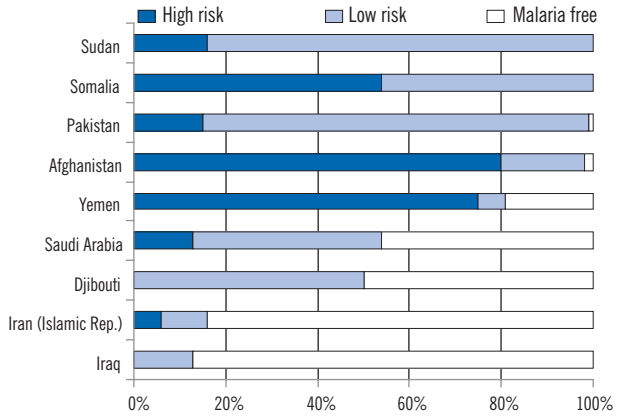
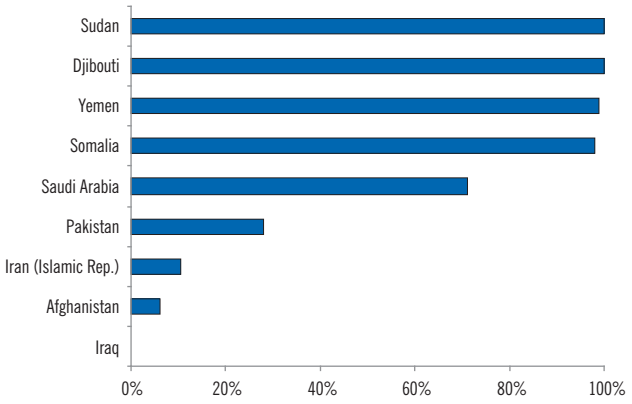


Figure Box 6.5 Trends in reported malaria cases in Morocco, 1960–2010

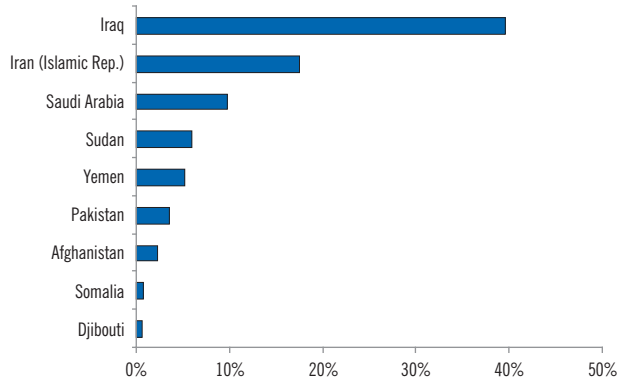
a) Population at risk, 2009



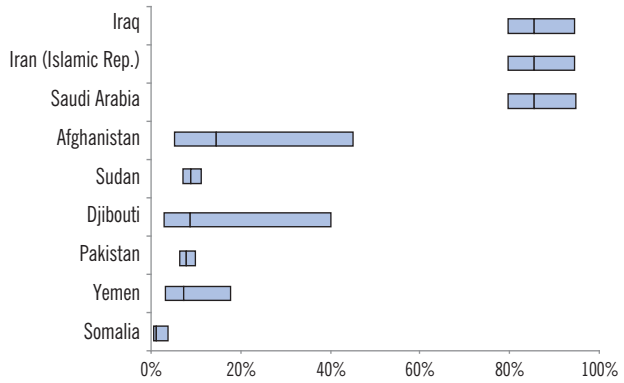
b) Percentage of cases due to P. falciparum, 2009



c) Annual blood examination rate, average 2000–2009

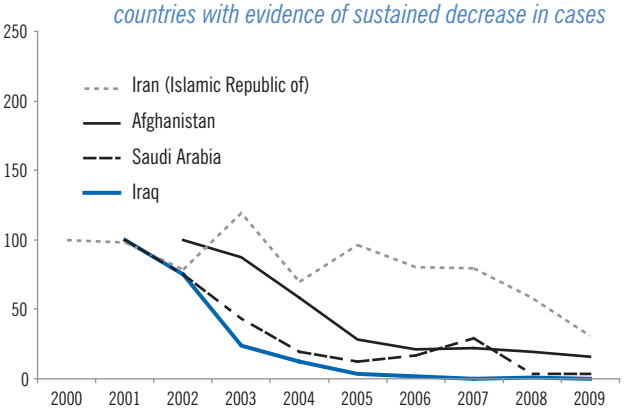


d) Confirmed cases as a percentage of total estimated cases, 2009



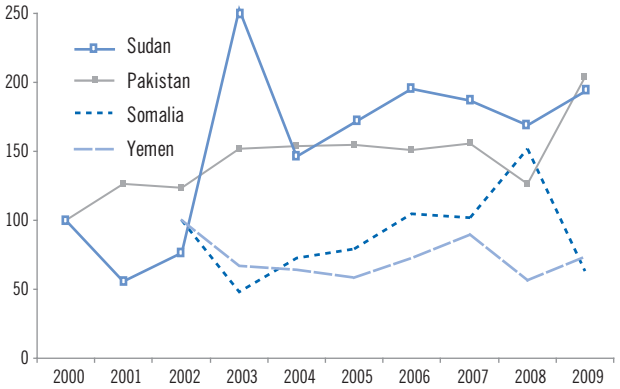
e) Changes in numbers of confirmed cases, 2000–2009

countries with evidence of sustained decrease in cases

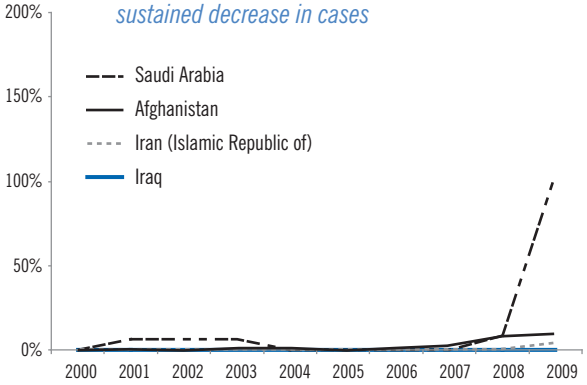


f) Changes in numbers of confirmed cases, 2000–2009

countries with limited evidence of sustained decrease in cases



g) IRS and ITNs delivered – maximum percentage of high risk population protected: *countries with evidence of sustained decrease in cases*



h) IRS and ITNs delivered – maximum percentage of high risk population protected: *countries with limited evidence of sustained decrease in cases*

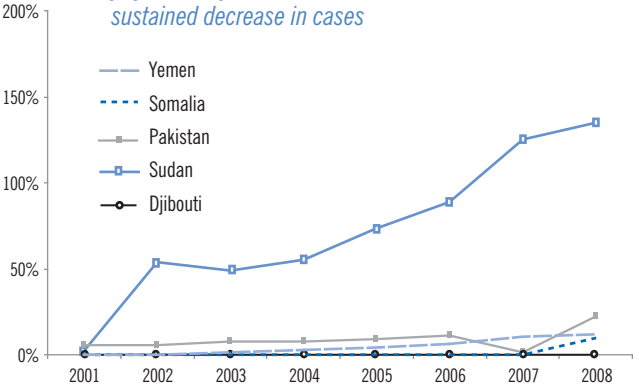


Figure 6.15 **WHO Eastern Mediterranean Region**

6.8 Western Pacific Region

Malaria transmission in the WHO Western Pacific Region is highly heterogeneous. It is intense and widespread in the Pacific countries (Papua New Guinea and Solomon Islands and, to a lesser extent, Vanuatu). It is highly focal in the countries and areas of the Greater Mekong sub-region, such as Cambodia, Yunnan (China), the Lao People's Democratic Republic and Viet Nam, occurring in remote forested areas and disproportionately affecting ethnic minorities and migrants. Malaria is restricted to particular geographical locations in Malaysia, the Philippines and the Republic of Korea. Most countries have both *P. falciparum* and *P. vivax*, but transmission is entirely due to *P. vivax* in the Republic of Korea and central areas of China (**Fig. 6.16b**).

Approximately 247 000 confirmed cases were reported from the Region in 2009. Three countries (Papua New Guinea, 31%, Cambodia, 26% and Solomon Islands, 13%) accounted for the 71% of the reported confirmed malaria cases in the Region, although this does not reflect the true burden because only 13% of suspected cases attending health facilities are given a diagnostic test in Papua New Guinea. Five countries reported decreases > 50% in the number of confirmed cases between 2000 and 2009 (China, the Lao People's Democratic Republic, the Republic of Korea, Solomon Islands, and Viet Nam). There is evidence of widespread implementation of malaria control activities in all of these countries, either by vector control or enhanced case management. Estimated coverage of vector control interventions appears to be low in Viet Nam which may reflect the focal nature of malaria in the country. In addition, household surveys indicate that more than 90% of households own a mosquito net in both Cambodia (DHS 2005) and Viet Nam (MICS 2006) although only 5% and 19% respectively sleep under an ITN. Hence, ITN coverage derived from public sector deliveries of ITNs may underestimate prevention efforts in these countries.

Three countries reported decreases of 25%–50% in the number of cases between 2000 and 2009 (Malaysia, Philippines and Vanuatu) (**Fig.6.16e**); there is widespread coverage of vector control interventions in Malaysia and Vanuatu. In both Cambodia and Papua New Guinea there was little change in confirmed cases although Cambodia reported a reduction in malaria deaths from 608 in 2000 to 279 in 2009 (54% decrease).

In summary, 5 countries showed evidence of a sustained decrease of > 50% in the number of cases associated with large scale implementation of malaria control activities (China, Lao People's Democratic Republic, Republic of Korea, Solomon Islands, and Viet Nam).

BOX 6.6

PROGRESSING WITH PRE-ELIMINATION OF MALARIA IN MALAYSIA

Malaria cases in Malaysia are concentrated in the deep forested areas of Sabah and Sarawak on the island of Borneo; the incidence is low on the mainland at less than 0.1 case per 1000 population. The number of reported cases fell from 12 705 in 2000 to 7010 in 2009, of which 8% were imported.

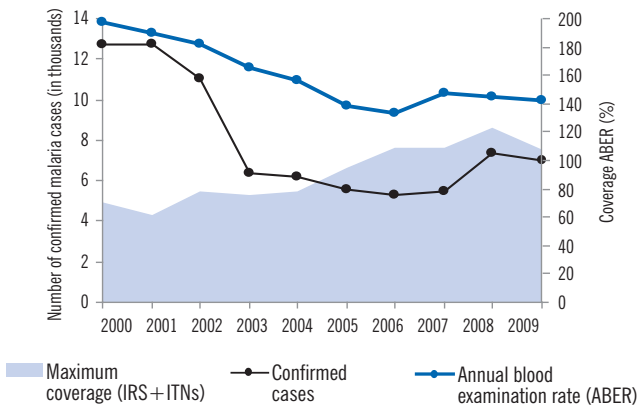
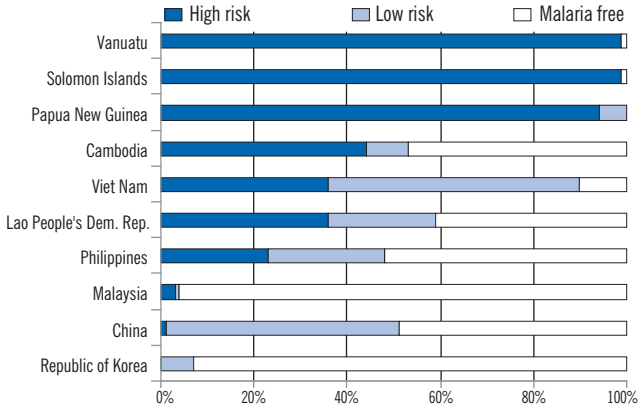


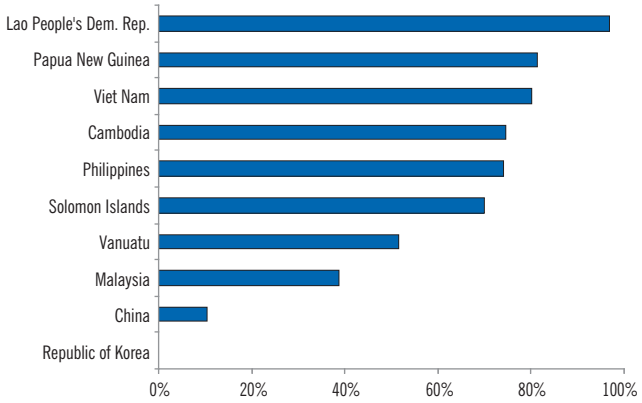
Figure Box 6.6 Trends in cases and malaria programme coverage in Malaysia, 2000–2009

With more than 1.5 million slides examined each year in a population at risk of approximately 1 million, the annual blood examination rate exceeds 100%; about 11% of cases are diagnosed through active case detection. Slide positivity rates have fallen from 0.7% in 2000 to 0.4% in 2008 as has the percentage of cases due to *P. falciparum* from 51% to 39%. In addition to early case detection and prompt treatment, Malaysia uses IRS and ITNs for malaria prevention and control. An average of 350 000 people were protected by IRS per year in 2007–2009 (35% of the population at risk) while 380 000 ITNs were delivered, sufficient to cover 75% of the population at risk assuming two people sleeping under each ITN. The NMCP is financed entirely by the Government of Malaysia. Reported expenditure in 2009 was US$ 24 million. Malaysia is in the pre-elimination phase of malaria control.

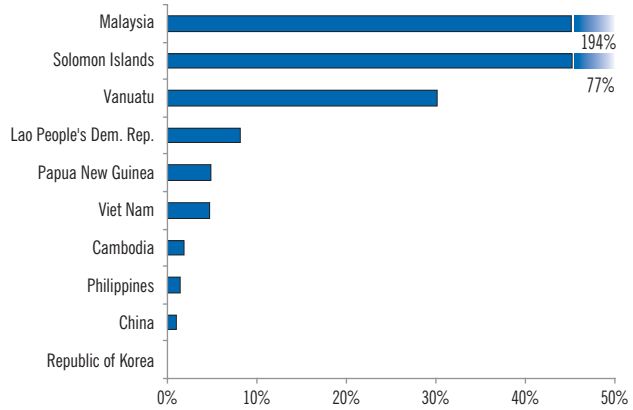
a) Population at risk, 2009



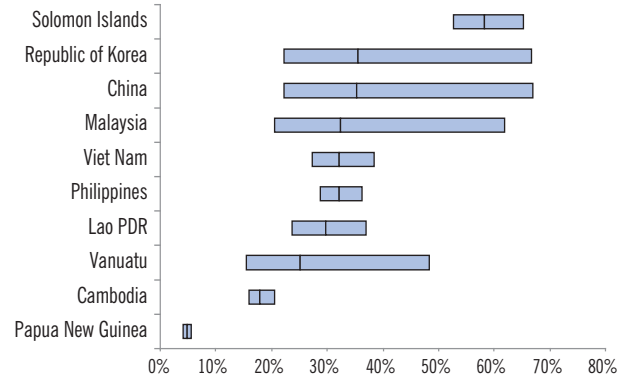
b) Percentage of cases due to P. falciparum, 2009



c) Annual blood examination rate, average 2000–2009

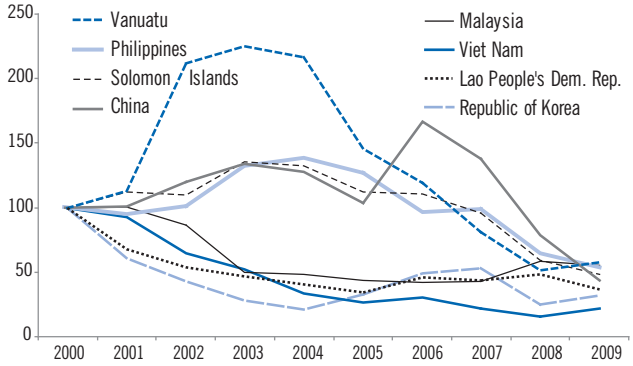


d) Confirmed cases as a percentage of total estimated cases, 2009



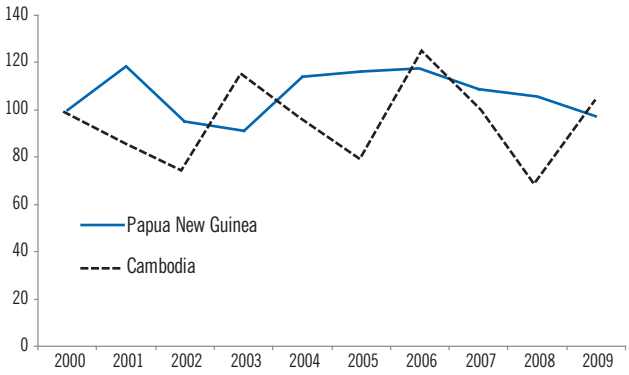
e) Changes in numbers of confirmed cases, 2000–2009

countries with evidence of sustained decrease in cases

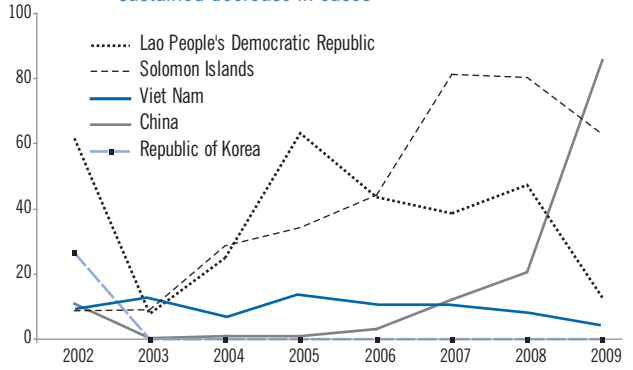


f) Changes in numbers of confirmed cases, 2000–2009

countries with limited evidence of sustained decrease in cases



g) IRS and ITNs delivered – maximum percentage of high risk population protected: countries with evidence of sustained decrease in cases



h) IRS and ITNs delivered – maximum percentage of high risk population protected: countries with limited evidence of sustained decrease in cases

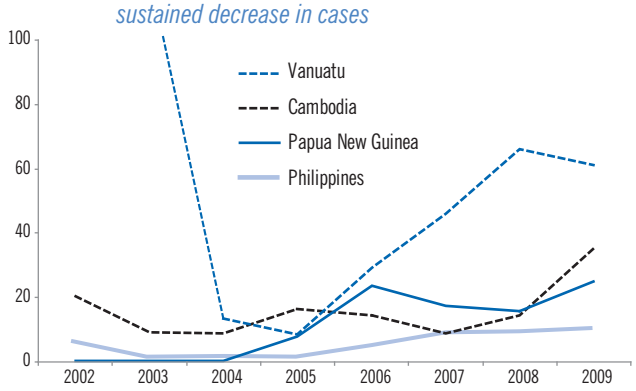


Figure 6.16 **WHO Western Pacific Region**

6.9 Malaria elimination and prevention of reintroduction

There has been continued progress towards malaria elimination in several countries in 2009 and 2010. Uzbekistan reported zero locally acquired cases in 2009 and no locally acquired *P. falciparum* cases were reported from the European Region in 2009. Morocco and Turkmenistan were certified free of malaria in 2010 and Cape Verde entered the pre-elimination stage in 2010. **Figure 6.17** shows the current classification of countries in the pre-elimination, elimination and prevention of reintroduction phases as of 1 December 2010.

For certification to be accorded, a defensible, plausible argument has to be made that, beyond reasonable doubt, the chain of local human malaria transmission by *Anopheles* mosquitoes has ended in the entire country at a given time, and that good quality surveillance systems are in place and capable of detecting local transmission if it occurred. The burden of proof of elimination falls on the country requesting certification. Inspection and evaluation are carried out by a team of experts led by WHO. The team makes a recommendation on certification based on an assessment of the current situation and the likelihood that elimination can be maintained. The final decision on granting certification rests with the WHO Director-General. Countries that obtain certification are added to the *WHO Official Register* of areas where malaria elimination has been achieved, and the certification is published in the WHO *Weekly Epidemiological Record*.

A total of 27 countries and territories have gone through the certification process over the past 27 years and are entered in the *WHO Official Register* as having eliminated malaria (**Table 6.3**). Certified countries continue reporting on an annual basis to WHO on the maintenance of their malaria-free status. Outbreaks of falciparum malaria in a normally or recently malaria-free country are reported to WHO immediately, so that WHO can provide assistance where needed and can alert international travellers visiting the affected areas that they should take suitable preventive measures. To protect international travellers, WHO posts reports of falciparum malaria outbreaks in "malaria-free" countries in the *Weekly Epidemiological Record* and on the *International travel and health* web site (www.who.int/ith).

An indication of the re-establishment of transmission would be the occurrence of three or more malaria infections that are linked in space and time to mosquito-borne transmission in the same geographical focus within the country, for two consecutive years for *P. falciparum*, and for three consecutive years for *P. vivax*. WHO reports such instances in the annual updates of *International travel and health*. The risk of re-establishment of transmission fluctuates with the degree of importation of parasites into an area (vulnerability), the likelihood that imported parasites will encounter favourable conditions for onward transmission (receptivity), and the watchfulness of the public health services for any occurrence of malaria in an area in which it had not existed or from which it had been eliminated, and the application of necessary measures against it (vigilance).

Over the period 1981–2007, the 11 countries in the European Region that were certified as having achieved malaria elimination reported a total of 35 754 imported malaria cases, i.e. 1324 cases annually on average (range: 728–2222). Almost half of these cases were reported by Italy (15 180, i.e. 562 annually on average, range 143–1006). Despite this high importation rate, Italy had only two instances of local transmission: one case in 1997 and two cases in 2007, all due to *P. vivax*.

The other country in this group with local mosquito-borne transmission since 1981 is Bulgaria: a total of 18 *P. vivax* malaria cases occurred in 1995–1996. Currently the most vulnerable country in the *Register* is the United Arab Emirates, which reported 18 240 imported malaria cases over the period 1999–2008 (range: 1322–2629 per year), linked to the high numbers of immigrant workers originating from endemic countries. For 2008, the importation rate amounted to nearly 6 malaria cases per 10 000 inhabitants, in a population of 4.485 million people. No local transmission has been reported in the United Arab Emirates since 1997.

6.10 Global estimates of malaria cases and deaths, 2000–2009

6.10.1 Methods

The global number of malaria cases in 2000–2009 was estimated by one of two methods.

1. *Countries outside the WHO African Region and low transmission countries in Africa*[6]. 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* (*10*), 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 then health service use was assumed to remain constant over time; analysis summarized in the *World Malaria Report 2008* indicated that the percentage of fever cases seeking treatment in public sector facilities varies little over time in countries with multiple surveys. For some countries NMCP data were missing or considered unreliable for selected years during the past decade (a total of 64 country years out of 690 country years). In such cases an estimate of the number of cases was constructed by sampling from the estimates for neighbouring years. Such a procedure results in an estimate that shows little change over time but which also produces a wide uncertainty interval around the point estimate.
2. *Other countries in the WHO African Region.* For some African countries the quality of surveillance data did not permit 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

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

TABLE 6.3

COUNTRIES ENTERED INTO THE *WHO Official register of areas where malaria elimination has been achieved*[1]

COUNTRY/AREA	REGISTRATION
Bolivarian Republic of Venezuela (northern part)	*June 1961*
Grenada and Carriacou	*November 1962*
Saint Lucia	*December 1962*
Hungary	*March 1964*
Spain	*September 1964*
Bulgaria	*July 1965*
China, *Province of Taiwan*	*November 1965*
Trinidad and Tobago	*December 1965*
Dominica	*April 1966*
Jamaica	*November 1966*
Cyprus	*October 1967*
Poland	*October 1967*
Romania	*October 1967*
Italy	*November 1970*
Netherlands	*November 1970*
United States of America and its outlying areas of Puerto Rico and the Virgin Islands	*November 1970*
Cuba	*November 1973*
Mauritius	*November 1973*
Portugal	*November 1973*
Former Socialist Federal Republic of Yugoslavia	*November 1973*
France, *Reunion*	*March 1979*
Australia	*May 1981*
Singapore	*November 1982*
Brunei Darussalam	*August 1987*
United Arab Emirates	*January 2007*
Morocco	*May 2010*
Turkmenistan	*October 2010*

1. Up to 1987, the *Register* was known as the *WHO Official register of areas where malaria eradication has been achieved.*

BOX 6.7

CERTIFICATION OF MALARIA ELIMINATION IN TURKMENISTAN

On 19 October 2010, Turkmenistan was added to the *WHO Official Register* of areas where malaria elimination has been achieved. Turkmenistan is the third country to be added to the list, after Morocco and the United Arab Emirates, since WHO certification procedures were re-initiated in 2004, after being abandoned in the 1980s.

By 1952 malaria in Turkmenistan was eliminated "as a major public health problem", and *P. falciparum* disappeared completely by the late 1950s. Over the period 1960–1980, sporadic cases of local *P. vivax* transmission were reported, and there was an increasing trend in imported malaria originating in Afghanistan during the 1980s. In the 1990s, the situation deteriorated because of neglect of the malaria problem and increased population movement. In 1998, 108 cases of malaria were detected in Kushka (now Serhetabad) *etrap* (district) of Mary *velayat* (province). To contain this outbreak, the most severe since 1960, the sanitary epidemiological service carried out emergency measures focussing on IRS and seasonal chemoprophylaxis.

In the 10 years 1999–2008, a total of 150 malaria cases were detected in Turkmenistan. The majority (78.6 %) of these occurred in relatively high risk areas in Mary (62 cases) and Lebap (56 cases) velayats (Tedjen-Murgab estuary and valley and Amudarya valley). The last autochthonous cases (i.e. acquired in Turkmenistan) were registered in 2004, and resulted in all probability from infections acquired during the 2002 or 2003 transmission seasons. By 2007, the Ministry of Health and Medical Industry decided to aim for certification of elimination, and in 2009, after 4 years without local transmission, procedures towards certification of the achievement of malaria elimination were launched. After following WHO standard operating procedures that include intensive external evaluation, certification was granted in October 2010.

PRE-ELIMINATION	ELIMINATION	PREVENTION OF RE-INTRODUCTION	Certified malaria-free and/or no ongoing local transmission for over a decade
Argentina	Algeria	Bahamas	
Cape Verde	Azerbaijan	Jamaica	
El Salvador	Georgia	Morocco →	Morocco
Paraguay	Iraq	Oman	
Iran (Islamic Republic of)	Kyrgyzstan	Russian Federation	
Malaysia	Republic of Korea	Syria	
Mexico	Saudi Arabia	Armenia	
DPR Korea	Tajikistan	Egypt	
Sri Lanka	Turkey	Turkmenistan →	Turkmenistan
	Uzbekistan		

In 2009, there were 8 countries in the pre-elimination stage; a ninth country, Cape Verde, was added in 2010. Morocco and Turkmenistan were certified as free of malaria by the Director-General of WHO in 2010.

Figure 6.17 Movement of countries between types of programme, 2009 and 2010

the expected impact of ITN and IRS programmes. The procedure was initially developed by the RBM Monitoring and Evaluation Reference Group in 2004 (*1*) and also described in *World Malaria Report 2008* (*10*).

The number of malaria deaths was estimated by one of two methods:

1. *Countries outside the WHO African Region and for low transmission countries in Africa*[7]. 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* (*10*). 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 Incremental Revision for 2004 (*11*). A case fatality rate of 0•45% is applied to the estimated number of *P. falciparum* cases for countries in the African Region and a case fatality rate 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 case fatality rate 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.
2. *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 (*12,13*). With an updated systematic review and addition of vital registration data from similar settings, the VAMCM now includes 123 study data points from 33 countries that meet the inclusion criteria . These data are mainly from high mortality and lower income countries. The VAMCM derives mortality estimates for malaria, as well as eight other causes (pneumonia, diarrhea, congenital malformation, other neonatal causes, injury, meningitis, measles, 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 2000–2009 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 method for estimating uncertainty differs from previously published work. The current round of estimates for 2000–2009 employs the bootstrap method 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.

7. Studies conducted in 1980 or later with a multiple of 12 months study duration, cause of death available for more than a single cause, with at least 25 deaths in children <5 years of age, each death represented once, and less than 25% of deaths due to unknown causes. Studies conducted in intervention groups in clinical trials, and verbal autopsy studies conducted without use of a standardized questionnaire or with inadequate description of methods were excluded from the analysis.

6.10.2 Disease burden and trends

Cases. In 2009 there were an estimated 225 million cases of malaria (5^{th}–95^{th} centiles, 169–294 million) worldwide (**Table 6.4**). down from an estimated 244 million cases in 2005. The global number of cases was estimated to have increased between 2000 and 2005 in line with population growth and decreased subsequently due to the impact of malaria control. The largest percentage reductions since 2005 were estimated to have occurred in the European Region (86%) followed by the Region of the Americas (42%) The vast majority of cases in 2009 (78%) were in the African Region, followed by the South-East Asia (15%) and Eastern Mediterranean Regions (5%).

Numbers for years prior to 2009 have been updated from previous publications. They are largely consistent with those given in the *World Malaria Report 2009* (*14*); they are accompanied by large uncertainty intervals, which overlap those of estimates published in previous years reports. Any differences with previously reported numbers, as observed for the Eastern Mediterranean and South-East Asia regions, should not be interpreted as evidence of a change in malaria burden but merely revisions to estimates which take into account updates to the number of reported cases or new household survey information.

Deaths. The global number of malaria deaths is estimated to have decreased from 985 000 in 2000 to 781 000 in 2009. The largest percentage decreases were seen in the Region of the Americas (48%); the largest absolute decline was observed in the African Region. It is estimated that 91% of deaths in 2009 were in the African Region, followed by the South-East Asia (6%) and Eastern Mediterranean Regions (2%). About 85% of deaths globally were in children under 5 years of age. The estimated numbers of deaths for prior years are consistent with those reported in the *World Malaria Report 2009* but are lower in the African Region principally because the effects of increased intervention are taken into account. The number of deaths in the South-East Asian Region is higher than previously estimated owing to increased estimates in India and Indonesia. The estimates are accompanied by large uncertainty intervals, which overlap those of previous estimates.

6.11 Conclusions

Reductions in malaria admissions and deaths in Africa. A total of 11 countries in the WHO African Region showed more than 50% reduction in either confirmed malaria cases or malaria admissions and deaths (**Table 6.1**). In all countries the decreases are associated with intense malaria control interventions. The trends shown in data routinely collected by NMCPs are consistent with those found in research studies in eastern, central and southern Africa (e.g. Eritrea, Equatorial Guinea, Ethiopia, Kenya, Rwanda, South Africa, UR Tanzania) and in the Gambia (*15–21*).

Resurgences in cases in Africa. There was evidence of an increase in malaria cases in three countries in 2009 that had previously shown decreases (Rwanda, Sao Tome and Principe, and Zambia). The reasons for these resurgences are not known with certainty. In Rwanda, national-level rainfall and temperature anomalies were

not associated with the resurgences. There was increased rainfall in Zambia, 2007–2008, but the increase in cases was pronounced in only two provinces. In Rwanda and Zambia a substantial proportion of ITNs were distributed 2–3 years before the resurgence and it is possible that the effectiveness of ITNs had become reduced owing to physical deterioration of nets and insecticide decay. Resistance to the pyrethroid insecticides used in ITNs is also a possible explanation, but information is not readily available as few countries undertake regular monitoring of insecticide resistance.

Actions needed to prevent and contain resurgences. Increases in malaria cases highlight the fragility of malaria control and the need to maintain control programmes even if numbers of cases have been reduced substantially. They also show that monthly monitoring of disease surveillance data both nationally and sub-nationally is essential. Since most countries in sub-Saharan Africa had inadequate data to monitor disease trends, greater efforts are needed to strengthen routine monitoring systems. Major epidemiological events could be occurring in other countries but are not being detected and investigated.

Reductions of cases outside Africa. A decrease of more than 50% in the reported number of cases of malaria between 2000 and 2009 was found in 32 of the 56 malaria-endemic countries outside Africa (**Table 6.3**), and downward trends of 25%–50% were seen in 8 other countries. The European Region has been the most successful with one country certified as malaria-free in 2010 and no cases of *P. falciparum* malaria in the entire Region in 2009 for the first time. In 27 of the 32 countries with more than 50% decreases in reported cases, the scale of preventive activities (ITNs and IRS) was sufficient to cover more than 50% of the population at high risk and/or the countries maintained strong systems for detecting and treating cases. In 5 of the 8 countries which had a decrease of 25%–50%, this was associated with intensified intervention. In contrast, only 2 of the 15 countries that showed no evidence of a decrease carried out large-scale implementation of malaria control activities.

Reductions in malaria outside Africa are greater in countries with lower burdens. The countries that recorded more than 50% decreases since 2000 in the numbers of cases accounted for only 14% of the total estimated cases outside Africa in 2000 (8.3 million cases out of 59 million estimated). The countries with the highest malaria burdens within each Region were less successful in reducing the numbers of cases of malaria nationally, which may be related to smaller per capita investments in malaria control.

Significant reductions in malaria burden are estimated to have occurred since 2000. The number of cases of malaria was estimated to have decreased globally from 244 million in 2005 to 225 million in 2009. The number of deaths due to malaria was also estimated to have decreased from 985 000 in 2000 to 781 000 in 2009. Decreases in malaria burden have been observed in all WHO Regions, with the largest percentage decreases noted in the European Region, followed by the Region of the Americas. The largest absolute decreases in cases and deaths were observed in Africa.

TABLE 6.4

ESTIMATES OF MALARIA CASES AND DEATHS BY WHO REGION, 2000–2009

CASES (in thousands)	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Uncertainty bounds	
											lower	*upper*
African	173 000	178 000	181 000	185 000	187 000	188 000	187 000	186 000	181 000	176 000	117 000	241 000
Americas	2 800	2 300	2 200	2 100	1 900	1 900	1 700	1 500	1 100	1 100	1 000	1 300
Eastern Mediterranean	15 000	16 000	17 000	16 000	14 000	12 000	12 000	12 000	13 000	12 000	10 000	15 000
European	47	34	27	22	13	7	4	2	1	1	1	1
South-East Asia	38 000	38 000	35 000	35 000	37 000	39 000	34 000	32 000	34 000	34 000	28 000	41 000
Western Pacific	2 800	2 500	2 200	2 500	2 800	2 300	2 500	2 100	1 900	2 300	2 000	2 500
World	233 000	236 000	237 000	241 000	243 000	244 000	238 000	233 000	231 000	225 000		
lower bound	181 000	181 000	182 000	184 000	185 000	185 000	179 000	175 000	171 000	169 000		
upper bound	302 000	304 000	308 000	313 000	314 000	317 000	310 000	304 000	298 000	294 000		

DEATHS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Uncertainty bounds	
											lower	*upper*
African	900 000	893 000	885 000	880 000	870 000	853 000	832 000	802 000	756 000	709 000	554 000	892 000
Americas	2 400	2 300	1 400	1 400	1 500	1 600	1 600	1 400	1 100	1 300	900	1 700
Eastern Mediterranean	18 000	18 000	21 000	19 000	17 000	17 000	16 000	15 000	16 000	16 000	12 000	26 000
European	0	0	0	0	0	0	0	0	0	0	0	1
South-East Asia	58 000	55 000	51 000	50 000	52 000	50 000	48 000	43 000	48 000	49 000	37 000	63 000
Western Pacific	6 800	5 800	5 200	5 900	6 500	4 900	5 400	4 700	4 200	5 300	3 400	7 300
World	985 000	974 000	963 000	957 000	947 000	927 000	904 000	867 000	826 000	781 000		
lower bound	797 000	785 000	775 000	769 000	765 000	744 000	725 000	694 000	662 000	628 000		
upper bound	1 228 000	1 214 000	1 199 000	1 191 000	1 174 000	1 153 000	1 120 000	1 075 000	1 024 000	968 000		

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PROFILES

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Methods for preparing the country profiles

This annex describes the methods used for preparing country profiles; they also apply to other sections of the report.

1. Epidemiological profile

Population

The total population of each country or area is taken from the World population prospects, 2009 revision (*1*). Disaggregated data on children < 5 years of age and on rural populations are also given, as these are the most affected groups in the malaria-endemic countries.

Population by malaria endemicity

The country or area population is subdivided into three levels of malaria endemicity, as reported by the NMCP:

1. Areas of high transmission, where the reported incidence of malaria due to all species was 1 or more per 1000 population per year in 2009.
2. Areas of low transmission, where the reported malaria case incidence from all species was < 1 per 1000 population per year in 2009 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.

Population at risk

The population at risk is the total population living in areas where malaria is endemic (low and high transmissions), excluding the population living in malaria-free areas. The population at risk is often used as the denominator in calculating operational coverage of malaria interventions, and hence in assessing current and future needs, taking into account the population already covered. For countries or areas in the pre-elimination and elimination stages, population at risk is defined by the countries based on the resident populations in foci where active malaria transmission occurs.

Maps of malaria, country profiles

Epidemiological maps for each country or areas are based on the number of cases per 1000 population in 2009. For countries or areas 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 confirmed malaria cases were 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. It should be noted that case incidence rates for 2009 do not necessarily reflect the endemicity of areas in previous years. If subnational data on population or malaria cases were lacking, an administrative unit was labelled "no data" on the map. In some cases, the subnational data provided by a malaria control programme did not correspond to a mapping area known to WHO. This may be the result of modifications to administrative boundaries or the use of names not verifiable by WHO.

Vector and parasite species

The species of mosquito responsible for malaria transmission in a country and the species of Plasmodium involved are listed according to information provided by WHO regional offices.

Trends in malaria morbidity and mortality

A table in the epidemiolical profile gives the reported number of cases tested by microscopy or RDT, the number positive and the number with a *P. falciparum* infection (including mixed *P. falciparum* and *P. vivax*).

The first graph shows four indicators:

- *Number of confirmed cases in all ages per 1000 population per year:* This indicator helps to asses changes in the incidence of malaria over the years, provided that there has been consistency in case reporting over time.

- *Annual blood examination rate (ABER):* the number of parasitological tests done (by microscopy and/or RDTs) divided by the total population at risk. This indicator reflects the proportion of the population that receives diagnostic testing. The number of confirmed cases detected by a programme is influenced by the extent of diagnostic testing (ABER). Ideally ABER should be constant or increasing.
- *Malaria test positivity rate:* the number of parasitologically positive cases per 100 cases examined by RDT or microscopy. This measures the prevalence of malaria parasites among people who seek care and are examined in health facilities.
- *Percentage of cases with* P. falciparum *infection:* the number of *P. falciparum* cases per 100 microscopically confirmed malaria cases. This measures the extent to which *P. falciparum* is prevalent in malaria patients. A decreasing trend over years may indicate progress in reducing or eliminating malaria due to *P. falciparum* (the most dangerous malaria species) as a major public health burden.

Malaria cases

NMCPs may report suspected, probable, and confirmed malaria cases. The relationship between these three types of case is shown in figure 1.

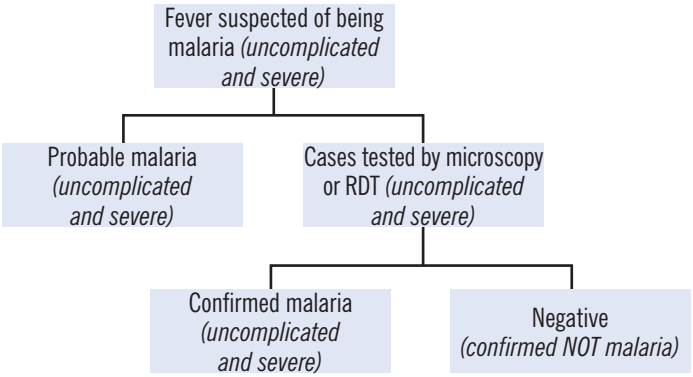

Figure 1 **Relationship between suspected, probable and confirmed malaria**

2. Intervention policies and targets

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. Policies and strategies are divided into those recommended by WHO and those recommended by others at country level.

a) WHO-recommended policies and strategies include (see also Chapter 2):

- provision of LLINs free of charge or highly subsidized to persons in all age groups at risk for malaria (*3*);
- use of IRS, including with DDT (*4*);
- use of IPTp in highly endemic countries with comparatively low levels of resistance to sulfadoxine-pyrimethamine (*5*);
- parasitological confirmation for cases in all age groups (*6*);
- provision of ACT, free of charge or highly subsidized in the public sector, for malaria cases infected with *P. falciparum* (*6*).
- pre-referral treatment with parenteral quinine or artemisinin derivatives or artesunate suppositories (*6*); and
- banning of oral artemisinin-based monotherapies (*6*).

b) Other policies or strategies are those adopted by countries after taking local epidemiological and other circumstances into account. "Yes" implies that the policy or strategy is adopted regardless of the scale of implementation; "No" implies that the policy is not adopted; and "Not applicable" implies that the policy is not relevant to the country situation. The year of adoption of a policy is that in which it was approved by a national malaria control programme. It does not take into account any change that may have occurred after the reports were received.

c) Antimalarial treatment policies are shown. Results of recent therapeutic efficacy tests are also shown where available. Data 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. Note that in the 2003 protocol, low-to-moderate transmission areas and intense transmission areas (mainly sub-Saharan Africa) had different definitions for late parasitological failure. Also, in areas of low-to-moderate transmission there was an absence of systematic PCR correction of the results.

3. Implementing malaria control

Coverage with ITNs, from survey data

The percentage of households that own at least one mosquito net, the percentage of persons who slept under a net and the percentage of children under 5 years of age who slept under a net 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 most 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) (*7*).

Coverage with ITNs and IRS, from programme data

Because many countries do not have recent national survey data, the numbers of mosquito nets distributed and houses sprayed were obtained from the NMCP and used to estimate operational coverage with ITNs and IRS.

Coverage with ITNs: operational or "administrative" coverage with ITNs was calculated as the number of ITNs distributed, divided by the population at risk (the sum of populations living in low- and high-transmission areas) divided by 2 (a ratio of one ITN for every two persons, following WHO recommendations) and multiplied by 100 (*2*). As, on average, LLINs are considered to have a useful lifespan of 3 years, the cumulative total of mosquito nets distributed over the past 3 years is taken as the numerator for any particular year. Other ITNs are considered to have an average lifespan of 1 year; some nets will be effective for longer if re-treated with insecticide. Therefore, the numerator for LLINs and ITNs is the sum of the cumulative LLINs distributed in the latest 3 years and the number of ITNs during the latest year. Re-treatment is not taken into account in this report and is in any case becoming less frequent following the introduction of long-lasting nets. Such operational estimates contain no information about the geographical distribution of ITNs or their distribution within households. ITNs may be clustered in certain subpopulations, thus depriving others at risk, and the number of ITNs delivered to a household may exceed or fall short of the recommended ratio of one net per two people.

Coverage with IRS: operational 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. Respondents were asked to convert, where necessary, records of the number of built structures sprayed to number of households, where the average household consists of more than one structure. The number of people protected by IRS, as reported by NMCPs, was taken as the numerator. 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.

For countries outside Africa, assuming that IRS and ITNs are deployed in mutually exclusive geographical areas focusing on populations at high risk, maximum attainable potential coverage of preventive interventions was calculated as the sum of the populations covered by IRS and by ITN divided by the total population at high risk.

Source of treatment for febrile children and antimalarial received, from survey data

Nationally representative household surveys such as MICS, DHS and MIS were used to estimate the percentage of febrile children receiving care *(i)* in public health facilities; *(ii)* in private facilities (including pharmacies and shops); and *(iii)* at home, including those that receive no medication. The type of antimalarial received by febrile children in these categories is also shown.

The results should be interpreted with the following provisos:

- Not all cases of fever are due to malaria, particularly in low-transmission areas, so 100% of febrile children cannot be expected to receive an antimalarial medicine, particularly if they are treated in a health facility and the laboratory diagnosis excludes malaria.
- Most MICS and DHS are conducted during the dry season, and the data may not reflect the year-round incidence of malarial disease or the provision of antimalarial treatment during the period of peak incidence.
- As it may be difficult to exclude some non-endemic areas from the analysis, the rates of antimalarial treatment relative to the estimated need may appear unduly low.
- Respondents to household surveys may not recall accurately the type of medicine given to children.
- Access to ACT may appear unduly low in countries where chloroquine is used to treat *P. vivax*, especially where *P. vivax* causes a high proportion of malaria cases.
- As ACT was introduced comparatively recently and no additional indicator on diagnosis is available, most surveys report only on the use of any (unspecified) antimalarial medicine.
- In the absence of diagnosis, care-givers and patients may consider other diseases as the cause of the fever and hence provide other medicines, such as paracetamol or antibiotics.

Access to effective treatment, from programme data

The graph on access to effective treatment from programme data shows three indicators:

- Percentage of suspected cases tested: 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 health facilities.
- Percentage of malaria cases receiving any antimalarial in the public sector: the number of antimalarial treatment courses delivered 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.
- Percentage of falciparum malaria cases receiving ACT in the public sector: 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.

The number requiring treatment in a year depends not only on the incidence of malaria but also on the rate of case confirmation. In countries in which all cases are confirmed, the number requiring treatment will be the number of confirmed cases. In countries where not all cases are confirmed, it will be the number of probable cases plus the number of confirmed cases.

4. Financing malaria control

Government and external financing

NMCP budgets and expenditures may be used to assess the extent to which the programmes can maintain or scale up access to malaria prevention, diagnosis and treatment. 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.

Breakdown of expenditure by intervention

The pie chart shows the proportion of all malaria funding from all sources, spent on different activities in 2009: ITNs, insecticides and spraying materials, IRS, diagnosis, antimalarial medicines, monitoring and evaluation; and human resources and technical assistance. All countries were requested to convert their local currencies into 2009 US$. The amounts have not been adjusted for purchasing power parity. When annual plans are completed as anticipated, the amounts shown should be about the same as the total amount received by the programme. Some divergence may occur, however, due to unexpectedly slow or fast disbursement of donor contributions or implementation or to changes in plans, prices and other factors. There may also 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. Despite the various uncertainties associated with these data, the graphs highlight major changes in programme funding and expenditure.

5. Sources of information

The sources of data are shown at the bottom of each graph. The WHO Global Malaria Programme has created a database containing the information used in compiling this Report. The data, together with profiles for all 106 malaria-endemic countries and territories, are available from www.who.int/topics/malaria/en/.

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AFGHANISTAN

Malaria in Afghanistan occurs at altitudes below 2000 metres, mainly in snow-fed river valleys where rice is grown. Nearly 80% of the population is at high risk and transmission is highly seasonal and unstable, occurring between April and November. There was a reduction in confirmed malaria cases from 116 444 in 2005 to 64 880 in 2009 (44% decline), while both the number of health facilities reporting and the annual blood examination rates increased. The percentage of *P. falciparum* cases decreased from 20% in 2000 to 6% in 2009 and the slide positivity rate has slightly reduced from 19% in 2006 to 12% in 2009. The programme delivered nearly 1.6 million LLINs in 2009. Although IRS is included in the national vector control policy, no data were reported on its implementation. The national programme delivered about 13 000 treatment courses of ACT in 2009 and ACTs were also provided by several NGOs to their respective implementing provinces through the basic package of health services, amounting 12 277 courses enough to treat all reported cases of *P. falciparum* malaria (4026 cases). Finance for malaria control in the country has increased to about US$ 8.2 million per year during 2008–2009, primarily funded by the Global Fund, with support also from UNICEF and USAID.

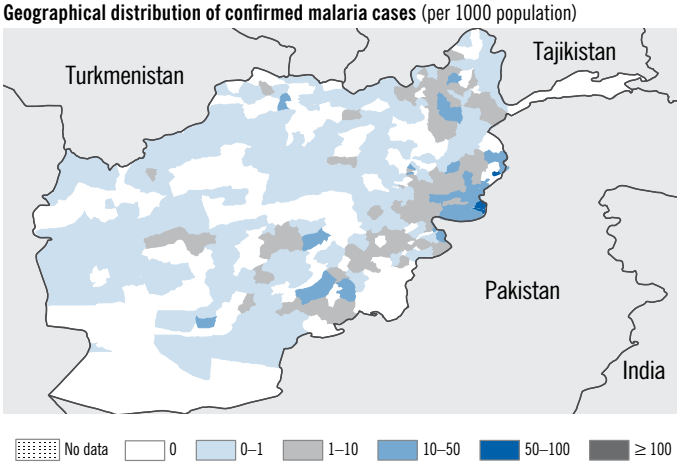
I. EPIDEMIOLOGICAL PROFILE

Population and epidemiological profile

Population (in thousands)*	**2009**	**%**
All ages	28 150	
< 5 years	5 031	18
Rural	21 287	76
Population by malaria endemicity (in thousands)	**2009**	**%**
High transmission (≥1 case per 1000 population)	20 159	72
Low transmission (0–1 cases per 1000 population)	7 516	27
Malaria-free (0 cases)	475	2
Vector and parasite species		
Major *Anopheles* species	*stephensi, pulcherrimus, superpictus, culicifacies*	
Major *Plasmodium* species	*vivax, falciparum*	

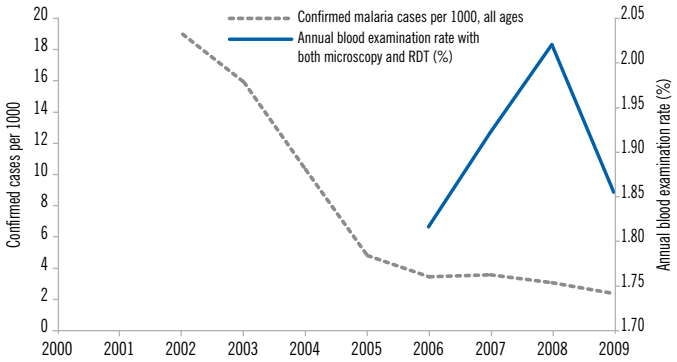
** UN Population Division estimates*

Geographical distribution of confirmed malaria cases (per 1000 population)

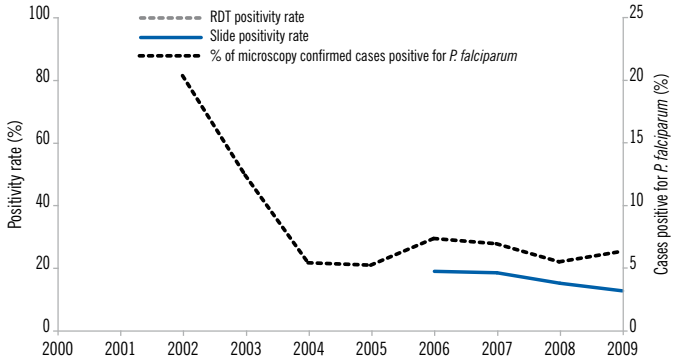


Trends in malaria morbidity and mortality

Confirmed malaria cases, per 1000 and annual blood examination rate



Malaria test positivity rate and % of microscopy confirmed cases positive for *P. falciparum*

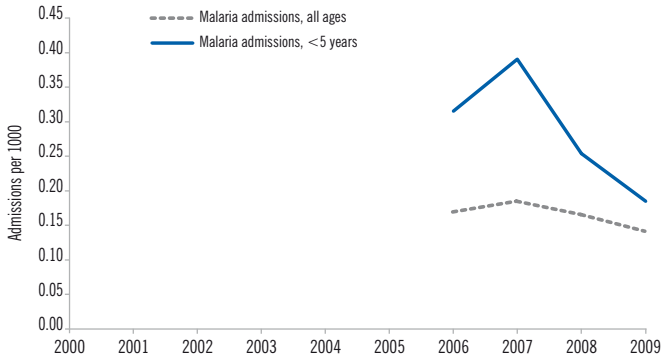


	All ages										< 5 years	
Year	All-cause outpatient consultations	Suspected cases (tested + probable)	Probable cases (not tested)	Total cases tested (microscopy + RDT)	Total confirmed cases (microscopy + RDT)	Malaria cases (confirmed + probable)	Examined by microscopy	Microscopy positive	*P. falciparum*	Examined by RDT	RDT positive	All-cause outpatient consultations	Malaria cases (confirmed + probable)
2000													
2001													
2002		626 839	212 228		414 611	626 839		414 611	83 783				
2003		585 602	224 662		360 940	585 602		360 940	44 243				
2004	3 091 320	273 377	31 355		242 022	273 377		242 022	12 789			820 076	27 411
2005	9 423 532	326 694	210 250		116 444	326 694		116 444	5 917			2 697 323	65 462
2006	13 354 717	789 186	328 278	460 908	86 129	414 407	460 908	86 129	6 216			3 750 736	76 341
2007	15 937 440	869 144	364 288	504 856	92 202	456 490	504 856	92 202	6 283			4 369 176	237 413
2008	23 916 509	930 609	381 115	549 494	81 574	462 689	549 494	81 574	4 355			7 179 433	258 205
2009	28 890 666	843 866	322 049	521 817	64 880	386 929	521 817	64 880	4 026			8 580 364	220 128

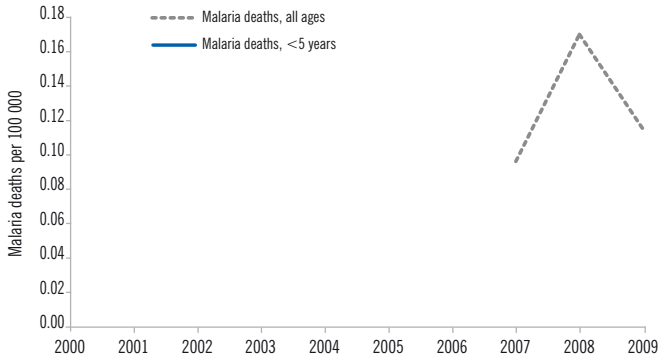
Note: Reporting completeness of outpatient health facilities (%) in 2009: 91.95%

I. EPIDEMIOLOGICAL PROFILE *(continued)*

Reported malaria admissions, per 1000 population



Reported malaria deaths, per 100 000 population



Admissions	All ages		<5 years	
Year	All-cause admissions	Malaria admissions	All-cause admissions	Malaria admissions
2000				
2001				
2002				
2003				
2004				
2005				
2006	94 635	4 233		1 467
2007	318 778	4 793	121 483	1 865
2008	472 242	4 434	140 763	1 239
2009	469 356	3 920	143 830	923

Deaths	All ages		<5 years	
Year	All-cause deaths	Malaria deaths	All-cause deaths	Malaria deaths
2000				
2001				
2002				
2003				
2004				
2005		0		
2006				
2007	6 095	25		
2008	8 334	46		
2009	8 197	32		

II. INTERVENTION POLICIES AND STRATEGIES

Intervention	WHO-RECOMMENDED POLICIES / STRATEGIES	YES or NO	Year adopted	OTHER POLICY / STRATEGY	YES or NO	Year adoped
Insecticide-treated nets (ITN)	ITNs/LLINs are distributed free of charge	YES	2005	ITNs/LLINs are distributed through antenatal clinics	YES	2005
	ITNs/LLINs are distributed to all age groups	YES	2005	ITNs/LLINs are distributed through EPI clinics	YES	2005
				ITNs/LLINs are distributed through mass campaigns to < 5 only	–	–
Indoor residual spraying (IRS)	IRS is recommended by malaria control programme	–	–	IRS is only used to prevent and control epidemics	YES	2005
	DDT is used for IRS	–	–	Where IRS is conducted, ITNs are also applied	–	–
				Insecticide resistance monitoring is undertaken	–	–
Intermittent preventive treatment (IPT)	IPT is used to prevent malaria during pregnancy	–	–			
Case management	Patients of all ages should receive diagnostic tests	YES	2000	Malaria diagnosis is free of charge in the public sector	YES	2000
	RDTs are used at community level	YES	2009	ACT is delivered by community agents	–	–
	ACT is free of charge for all age groups in the public sector	YES	2003	Therapetic efficacy monitoring is undertaken	YES	2003
	Pre-referral treatment with parenteral quinine or artemisinin derivatives or artesunate suppositories is provided	YES	2003			
	Oral artemisinin-based monotherapies are not registered	YES	2003			

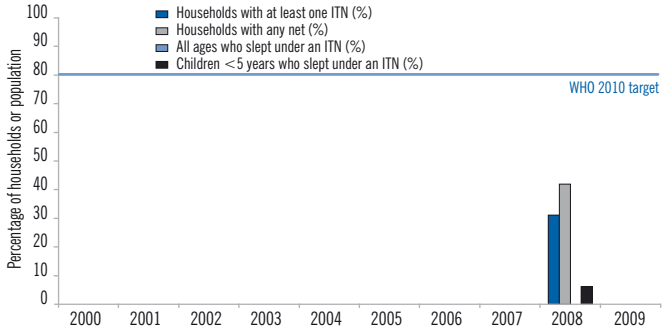
Antimalarial policy	Type of medicine	Year adopted
First-line treatment of *P. falciparum* (unconfirmed)	CQ	2004
First-line treatment of *P. falciparum* (confirmed)	AS+SP	2004
Treatment failure of *P. falciparum*	QN (7d) + D (7d), Clindamicine (7d)	2004
Treatment of severe malaria	QN/AM When patient can tolerate oral medication AS+SP (3d) or QN (7d) + D (7d) or Clindamicine (7d)	2004
Treatment of *P. vivax*	CQ+PQ (14d)	2004

Therapeutic efficacy studies (percentage of clinical and parasitological failure)

Name of first-line antimalarial medicine	Study year	No. of studies	Failure rate			Follow-up	*Remarks*
			Minimum	Median	Maximum		
Artesunate+sulfadoxine-pyrimethamine (AS+SP)	2004–2006	5	0.0	0.0	0.0	28 days	

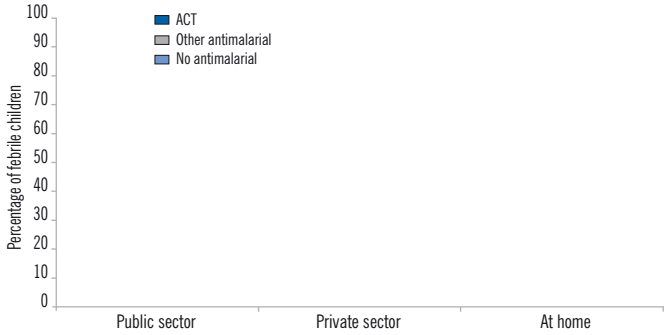
III. IMPLEMENTING MALARIA CONTROL

Coverage with ITNs from survey or model data



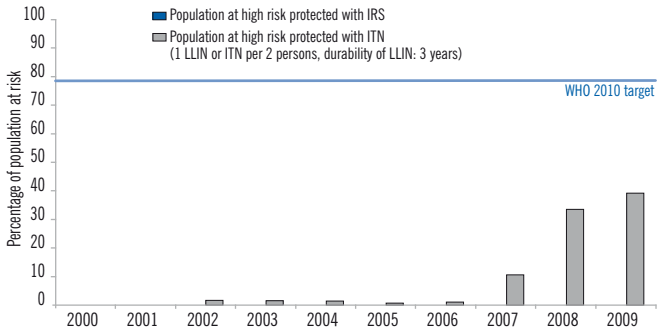
Sources: NMLCP.

Source of treatment for febrile children and antimalarial received from survey data

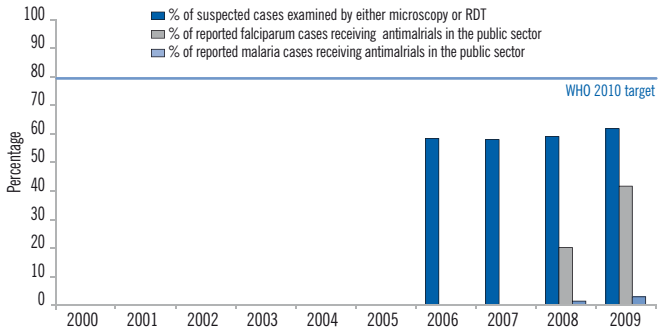


Sources:

Coverage with IRS and ITNs from programme data



Access to effective treatment from programme data: percentage of cases tested and number of ACT courses delivered relative to cases



Preventive interventions: programme and survey data

Year	No. of ITNs and/or LLINs delivered	No. of people protected by IRS	Pregnant women who slept under any net (%)	Pregnant women who slept under an ITN (%)
2000	0			
2001	0			
2002	0			
2003	0			
2004	0			
2005	0			
2006	40 000			
2007	345 245			
2008	916 723		6	5
2009	317 631			

Survey sources: NMLCP.

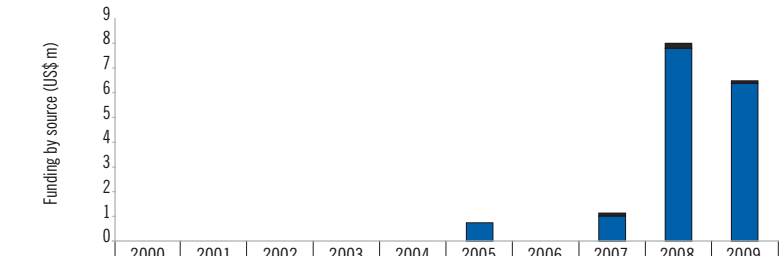
Diagnostics and treatment courses: programme and survey data

No. of RDTs delivered	No. of first-line treatment courses delivered	No. of ACT treatment courses delivered	Febrile children < 5 years (%)	Febrile children < 5 years treated in public health facility (%)
16 380	7 102	7 102	5	
126 000	12 277	12 277		

Survey sources: NMLCP.

IV. FINANCING MALARIA CONTROL

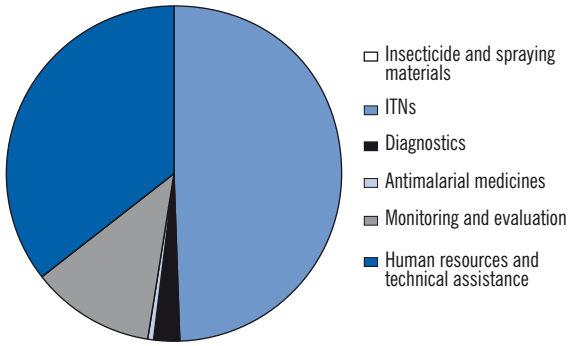
Governmental and external financing



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Other*	0	0	0	0	0	0	0	0	0	0
USAID/PMI	0	0	0	0	0	0	0	0	0	0
UNICEF	0	0	0	0	0	0	0	0	0	0
WHO	0	0	0	0	0	0	0	119 459	211 689	117 500
World Bank	0	0	0	0	0	0	0	0	0	0
Global Fund	0	0	0	0	0	750 000	0	1 022 069	7 785 080	6 372 330
Government**	0	0	0	0	0	0	0	0	0	0

** Bilaterals: DFID, JICA; and EU, UN agencies, etc.*
***Governmental expenditure may not include costs at sub-national level and costs related to health systems, human resources, etc.*

Breakdown of expenditure by intervention in 2009



AZERBAIJAN

The malaria situation deteriorated in Azerbaijan in the 1990s following cessation of preventive measures together with increased development activities and population movements. Malaria morbidity peaked at 13 135 cases by 1996 with the highest numbers reported in districts of Kura-Araz valley, bordering Iran (Islamic Republic). Over the course of 1997–2009, as a result of large-scale control efforts, the malaria situation in the country greatly improved: only 80 cases were detected in 2009; 78 of these were indigenous *P. vivax* cases. No case of indigenous *P. falciparum* has been documented since 1960. The decline in malaria cases is associated with application of IRS and prompt treatment of cases. IRS is implemented in endemic foci and all malaria cases are treated with chloroquine and primaquine. Malaria control is financed by the government and since 2009 funding has been complemented by the Global Fund and other partners. Azerbaijan has a strong political commitment to the Tashkent Declaration which was endorsed by the country in 2005. A national malaria elimination strategy for 2008–2013 and a plan of action were endorsed in 2008 and their implementation is in progress.

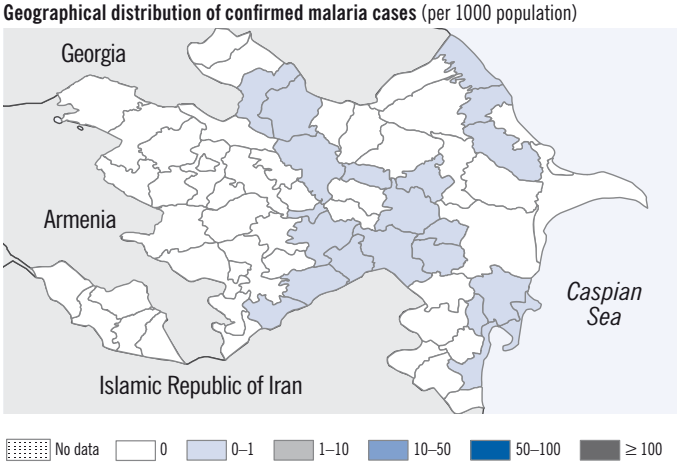
I. EPIDEMIOLOGICAL PROFILE

Population, endemicity and malaria burden

Population (in thousands)*	**2009**	**%**
All ages	8 832	
< 5 years	764	9
Rural	4 238	48
Population by malaria endemicity (in thousands)	**2009**	**%**
High transmission (≥1 case per 1000 population)	52	
Low transmission (0–1 cases per 1000 population)	203	2
Malaria-free (0 cases)	8 629	98
Vector and parasite species		
Major *Anopheles* species	*maculipennis, sacharovi*	
Major *Plasmodium* species	*vivax risk only*	

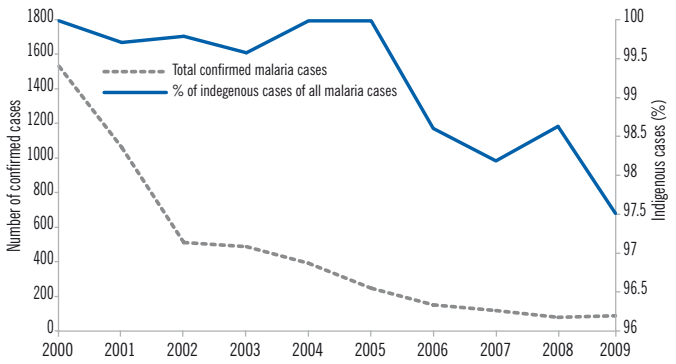
** UN Population Division estimates*

Geographical distribution of confirmed malaria cases (per 1000 population)



Trends in malaria morbidity and mortality

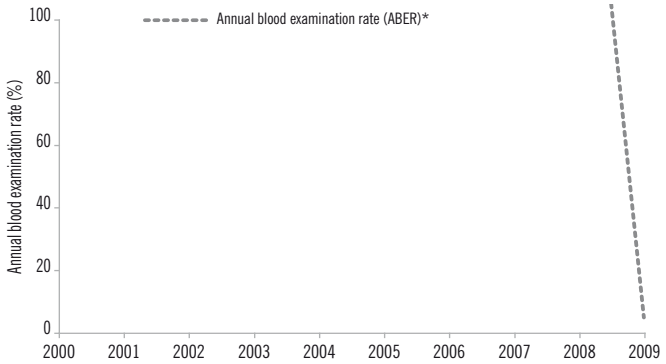
Confirmed indigeous malaria cases



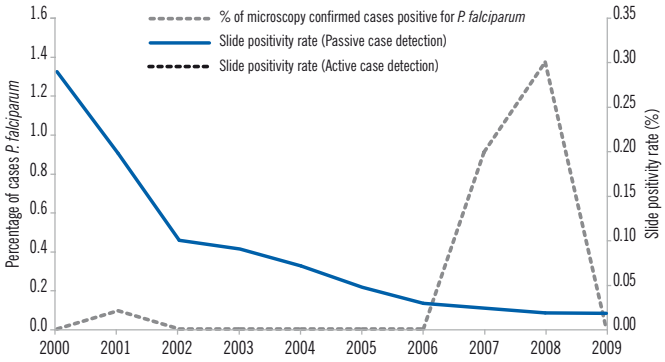
Year	Examined by microscopy	Microscopy positive	*P. falciparum*	Indigenous malaria cases	Malaria deaths
2000	527 688	1 526	0	1 526	0
2001	536 260	1 058	1	1 055	0
2002	507 252	506	0	505	0
2003	536 822	482	0	480	0
2004	545 145	386	0	386	0
2005	515 144	242	0	242	0
2006	498 697	143	0	141	0
2007	465 033	110	1	108	0
2008	408 780	73	1	72	0
2009	451 436	80	0	78	0

Note: Reporting completeness of outpatient health facilities (%) in 2009: 100%

Annual blood examination rate (both passive and active case detection)



** ABER value >100%*



II. INTERVENTION POLICIES AND STRATEGIES

Intervention	WHO-RECOMMENDED POLICIES / STRATEGIES	YES or NO	Year adopted	OTHER POLICY / STRATEGY	YES or NO	Year adoped
Insecticide-treated nets (ITN)	ITNs/ LLINs are distributed for free	YES	2009	ITNs/ LLINs are delivered at subsidized prices	–	–
	ITNs/ LLINs are distributed to all age groups	–	–			
Indoor residual spraying (IRS)	IRS is recommended by malaria control program	YES	1930	Insecticide resistance monitoring is undertaken	–	–
	DDT is used for IRS	–	–	Where IRS is conducted, ITNs are also applied	–	–
				Insecticide resistance monitoring is undertaken	–	–
Case management	Malaria diagnosis is free of charge in the public sector	YES	1930			
	Malaria treatment is permitted in the private sector	–	–			
	Malaria treatment is free of charge in the private sector	–	–			
	Radical treatment of *P.vivax* cases	YES	1956			
Surveillance	Foci and case investigation undertaken	–	–			
	Case reporting from private sector is mandatory	–	–			

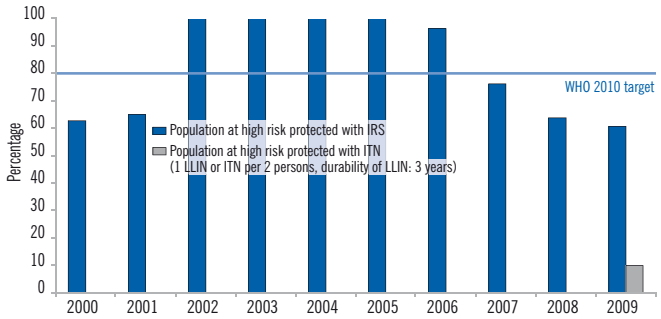
Antimalarial policy	Type of medicine	Year adopted
First-line treatment of *P. falciparum* (unconfirmed)	–	–
First-line treatment of *P. falciparum* (confirmed)	–	–
Treatment failure of *P. falciparum*	–	–
Treatment of severe malaria	–	–
Treatment of *P. vivax*	CQ+PQ (14d)	–

Therapeutic efficacy studies (percentage of clinical and parasitological failure)

Name of first-line antimalarial medicine	Study year	No. of studies	Failure rate			Follow-up	*Remarks*
			Minimum	Median	Maximum		

III. IMPLEMENTING MALARIA CONTROL

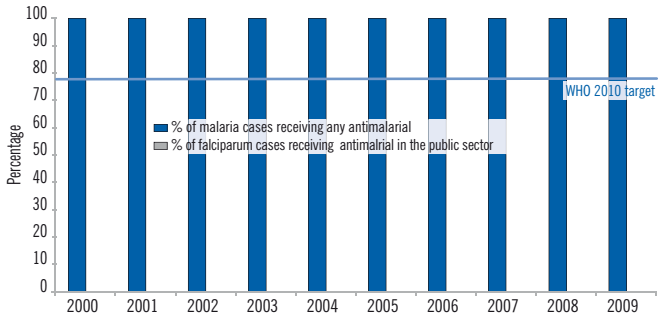
Coverage with IRS and ITNs from programme data



Year	No. of people protected by IRS	No. of ITNs and/or LLINs delivered
2000	116 710	0
2001	122 004	0
2002	192 920	0
2003	258 922	0
2004	213 761	0
2005	249 518	0
2006	188 643	0
2007	150 933	0
2007	127 665	0
2009	123 000	20 000

Source: MICS 2000.

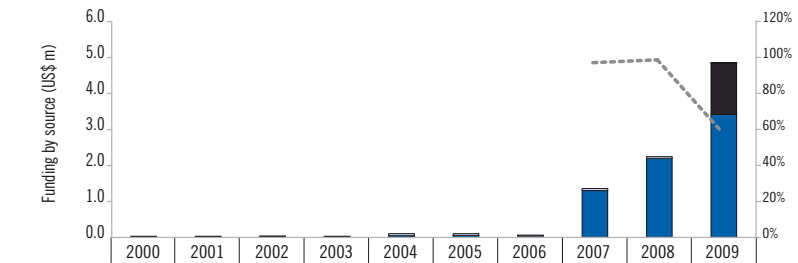
Access to effective treatment from programme data: percentage of cases tested and number of ACT courses delivered relative to cases



Year	No. of first-line treatment courses delivered	No. of ACT treatment courses delivered
2000	1 526	0
2001	1 058	0
2002	506	0
2003	482	0
2004	386	0
2005	242	0
2006	143	0
2007	110	0
2007	73	0
2009	80	0

IV. FINANCING MALARIA CONTROL

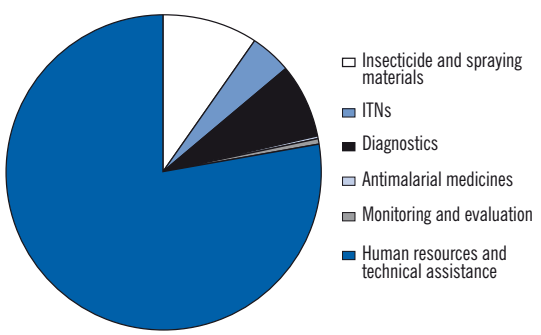
Governmental and external financing



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Other*	0	0	0	0	0	0	0	0	0	0
WHO	15 000	15 000	20 000	15 000	50 000	53 000	30 000	50 000	50 000	20 000
Global Fund	0	0	0	0	0	0	0	0	0	1 423 641
Total	15 000	15 000	20 000	15 000	50 000	53 000	30 000	1 304 543	2 195 369	3 415 485
Government** as % of total								96	98	58

** Bilaterals: DFID, JICA; and EU, UN agencies, etc.*
*** Governmental expenditure may not include costs at sub-national level and costs related to health systems, human resources, etc.*

Breakdown of expenditure by intervention in 2009



BHUTAN

Malaria is concentrated in five districts of Bhutan bordering India. All suspected malaria cases receive a parasitological examination and around 55% of confirmed malaria cases were caused by *P. falciparum* in 2009. Reported malaria cases fell from an annual average of 4455 during 2000–2005 to 972 cases in 2009, showing a decline of 78%, and malaria deaths fell from an annual average of 14 to just 4 deaths during same period. Vector control measures are implemented in the endemic districts, and almost all of the populations in the areas with highest risk of malaria are covered with IRS and ITNs /LLINs. Following the adoption of ACT as national policy in 2005, a sufficient quantity of ACT treatment courses is made available through the public sector free of charge. The total financing for malaria control during 2005–2009 remained at about US$ 1.2 million per annum, mainly funded by the Global Fund, UN agencies, NGOs and bilateral contributions. The contribution of the Government was around US$ 200 000 per annum during same period.

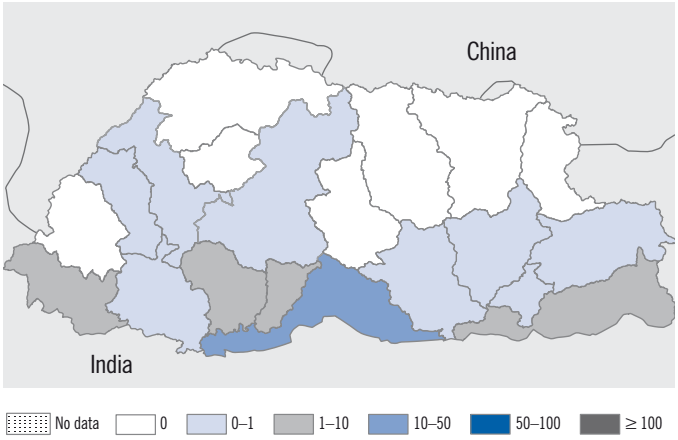
I. EPIDEMIOLOGICAL PROFILE

Population and epidemiological profile

Population (in thousands)*	**2009**	**%**
All ages	697	
< 5 years	70	10
Rural	448	64
Population by malaria endemicity (in thousands)	**2009**	**%**
High transmission (≥1 case per 1000 population)	293	42
Low transmission (0–1 cases per 1000 population)	222	32
Malaria-free (0 cases)	182	26
Vector and parasite species		
Major *Anopheles* species	*culicifacies, annularis, maculatus, philippinensis*	
Major *Plasmodium* species	*falciparum, vivax*	

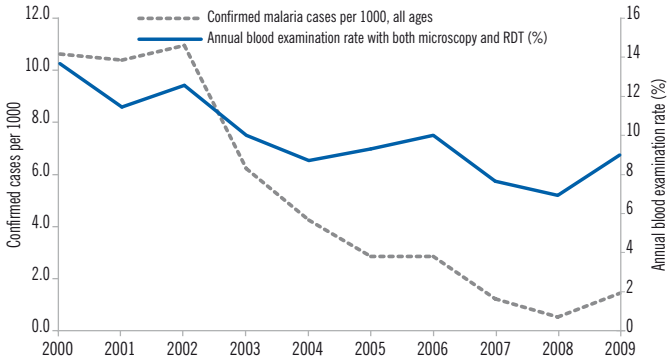
** UN Population Division estimates*

Geographical distribution of confirmed malaria cases (per 1000 population)

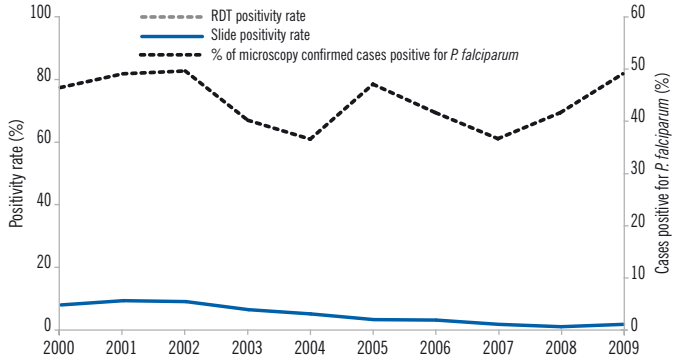


Trends in malaria morbidity and mortality

Confirmed malaria cases, per 1000 and annual blood examination rate



Malaria test positivity rate and % of microscopy confirmed cases positive for *P. falciparum*

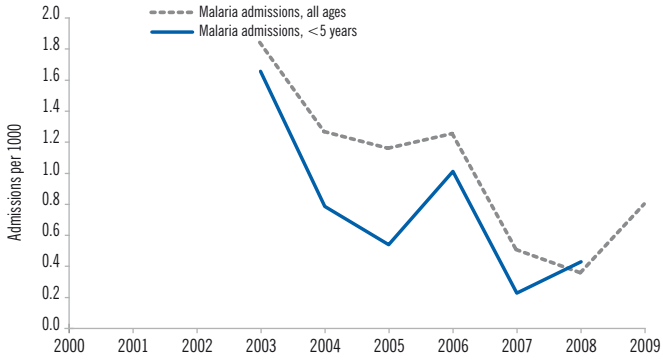


	All ages											< 5 years	
Year	All-cause outpatient consultations	Suspected cases (tested + probable)	Probable cases (not tested)	Total cases tested (microscopy + RDT)	Total confirmed cases (microscopy + RDT)	Malaria cases (confirmed + probable)	Examined by microscopy	Microscopy positive	*P. falciparum*	Examined by RDT	RDT positive	All-cause outpatient consultations	Malaria cases (confirmed + probable)
2000		76 445	0	76 445	5 935	82 380	76 445	5 935	2 738				
2001		65 974	0	65 974	5 982	71 956	65 974	5 982	2 915				
2002		74 696	0	74 696	6 511	81 207	74 696	6 511	3 207				
2003	1 021 956	61 246	0	61 246	3 806	3 734	61 246	3 806	1 518			186 214	372
2004	1 087 610	54 990	98	54 892	2 670	2 768	54 892	2 670	966			189 737	358
2005	1 143 128	60 152	0	60 152	1 825	1 647	60 152	1 825	853			199 973	163
2006	1 227 295	66 079	0	66 079	1 868	1 728	66 079	1 868	772			216 882	182
2007	1 219 497	52 060	614	51 446	793	1 407	51 446	793	288	0	0	194 965	38
2008	1 181 437	47 389	121	47 268	329	450	47 268	329	136	0	0	189 454	3
2009	1 306 245	62 790	449	62 341	972	1 421	62 341	972	559	0	0	201 423	52

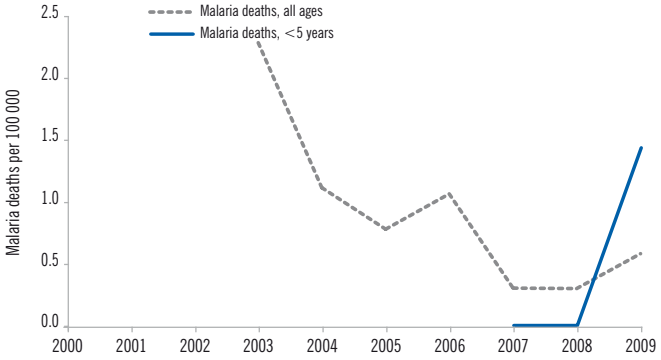
Note: Reporting completeness of outpatient health facilities (%) in 2009: 84.21%

I. EPIDEMIOLOGICAL PROFILE *(continued)*

Reported malaria admissions, per 1000 population



Reported malaria deaths, per 100 000 population



Admissions	All ages		<5 years	
Year	All-cause admissions	Malaria admissions	All-cause admissions	Malaria admissions
2000				
2001				
2002				
2003	44 635	1 127	6 486	120
2004	42 516	797	6 407	57
2005	37 142	747	6 396	39
2006	43 058	826	8 155	73
2007	43 881	337	9 173	16
2008	43 569	240	8 110	30
2009	55 652	552	8 314	

Deaths	All ages		<5 years	
Year	All-cause deaths	Malaria deaths	All-cause deaths	Malaria deaths
2000				
2001				
2002				
2003	509	14		
2004	574	7		
2005	565	5		
2006	565	7		
2007	786	2		0
2008	721	2		0
2009	907	4		1

II. INTERVENTION POLICIES AND STRATEGIES

Intervention	WHO-RECOMMENDED POLICIES / STRATEGIES	YES or NO	Year adopted	OTHER POLICY / STRATEGY	YES or NO	Year adoped
Insecticide-treated nets (ITN)	ITNs/LLINs are distributed free of charge	YES	2006	ITNs/LLINs are distributed through antenatal clinics	–	–
	ITNs/LLINs are distributed to all age groups	YES	2006	ITNs/LLINs are distributed through EPI clinics	–	–
				ITNs/LLINs are distributed through mass campaigns to < 5 only	–	–
Indoor residual spraying (IRS)	IRS is recommended by malaria control programme	YES	1964	IRS is only used to prevent and control epidemics	–	–
	DDT is used for IRS	NO	–	Where IRS is conducted, ITNs are also applied	–	–
				Insecticide resistance monitoring is undertaken	–	–
Intermittent preventive treatment (IPT)	IPT is used to prevent malaria during pregnancy	–	–			
Case management	Patients of all ages should receive diagnostic tests	YES	1964	Malaria diagnosis is free of charge in the public sector	YES	1964
	RDTs are used at community level	–	–	ACT is delivered by community agents	–	–
	ACT is free of charge for all age groups in the public sector	YES	2005	Therapetic efficacy monitoring is undertaken	YES	2006
	Pre-referral treatment with parenteral quinine or artemisinin derivatives or artesunate suppositories is provided	–	–			
	Oral artemisinin-based monotherapies are not registered	–	–			

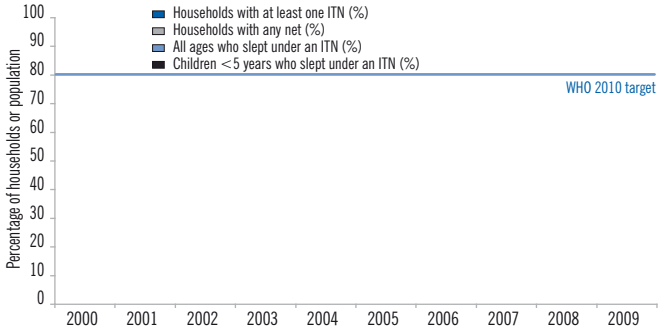
Antimalarial policy	Type of medicine	Year adopted
First-line treatment of *P. falciparum* (unconfirmed)	–	–
First-line treatment of *P. falciparum* (confirmed)	AL	2006
Treatment failure of *P. falciparum*	QN	2006
Treatment of severe malaria	AM; QN	2006
Treatment of *P. vivax*	CQ+PQ (14d)	2006

Therapeutic efficacy studies (percentage of clinical and parasitological failure)

Name of first-line antimalarial medicine	Study year	No. of studies	Failure rate			Follow-up	*Remarks*
			Minimum	Median	Maximum		

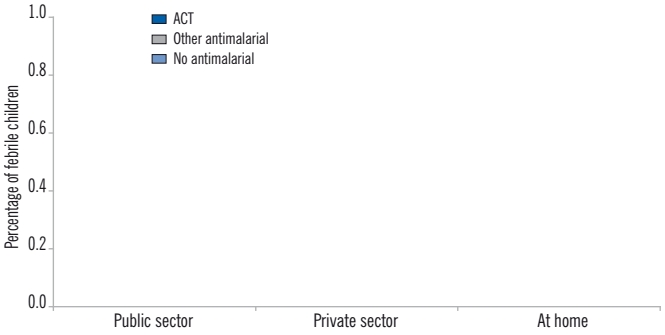
III. IMPLEMENTING MALARIA CONTROL

Coverage with ITNs from survey or model data



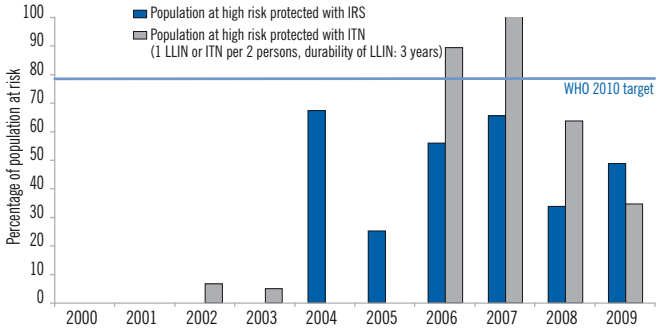
Sources:

Source of treatment for febrile children and antimalarial received from survey data

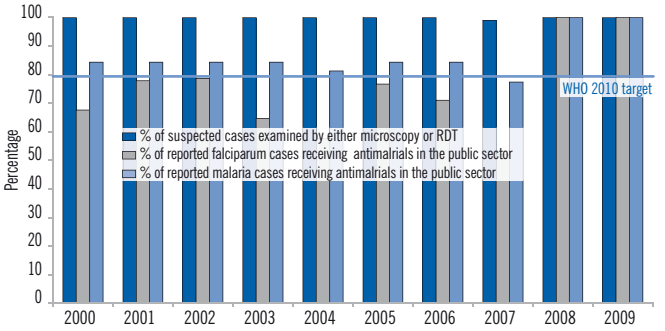


Sources:

Coverage with IRS and ITNs from programme data



Access to effective treatment from programme data: percentage of cases tested and number of ACT courses delivered relative to cases



Preventive interventions: programme and survey data

Year	No. of ITNs and/or LLINs delivered	No. of people protected by IRS	Pregnant women who slept under any net (%)	Pregnant women who slept under an ITN (%)
2000	1 000			
2001	4 000			
2002	6 559			
2003	5 048			
2004	0	179 117		
2005	0	68 582		
2006	96 161	155 899		
2007	67 142	185 905		
2008	20 392	97 494		
2009	30 731	142 922		

Survey sources:

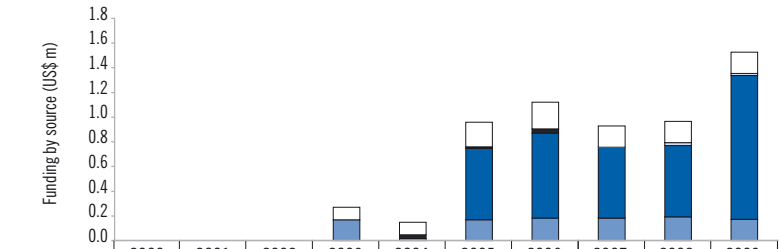
Diagnostics and treatment courses: programme and survey data

No. of RDTs delivered	No. of first-line treatment courses delivered	No. of ACT treatment courses delivered	Febrile children < 5 years (%)	Febrile children < 5 years treated in public health facility (%)
	5 935	2 738		
	5 982	3 177		
	6 511	3 496		
	3 806	1 680		
	2 670	1 090		
	1 825	954		
	1 868	905		
3 384	1 292	499		
3 384	1 617	1 288		
2 976	1 995	1 895		

Survey sources:

IV. FINANCING MALARIA CONTROL

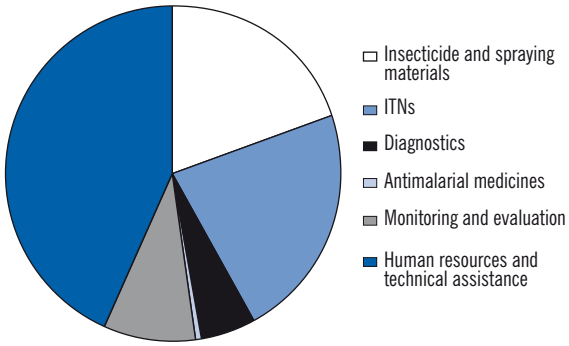
Governmental and external financing



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Other*	0	0	0	100 000	100 000	200 000	215 250	173 913	173 913	173 913
USAID/PMI	0	0	0	0	0	0	0	0	0	0
UNICEF	0	0	0	0	0	0	0	0	22 000	17 192
WHO	0	0	0	0	31 550	11 550	34 800	0	0	0
World Bank	0	0	0	0	0	0	0	0	0	0
Global Fund	0	0	0	0	0	577 700	688 700	571 775	579 000	1163 706
Government**	0	0	0	169 723	16 122	168 977	183 165	183 165	191 000	172 826

** Bilaterals: DFID, JICA; and EU, UN agencies, etc.*
*** Governmental expenditure may not include costs at sub-national level and costs related to health systems, human resources, etc.*

Breakdown of expenditure by intervention in 2009



BOTSWANA

In Botswana approximately 28% of the population is at high risk and 37% is at low risk of malaria while the remaining population in the south is free of malaria. Malaria transmission is highly seasonal occurring between December and April. With improving diagnosis in the last three years, all suspected cases are tested parasitologically and almost all cases are caused by *P. falciparum*. The number of confirmed malaria cases reported annually has declined by 71% from 3362 during 2000–2005 to only 951 cases in 2009. Malaria deaths have also been reduced from 21 to 6 deaths during the same period. IRS has been the principal mosquito control method, protecting 270 000 people per year during 2001–2009. To complement IRS, the programme delivered 40 000 ITNs/LLINs during 2001–2008 to the population at high risk. The national malaria programme provided 42 000 treatment courses of ACT per year in 2008 and 2009, which was more than enough to treat all malaria cases in the public sector. Information on funding for malaria control was not provided.

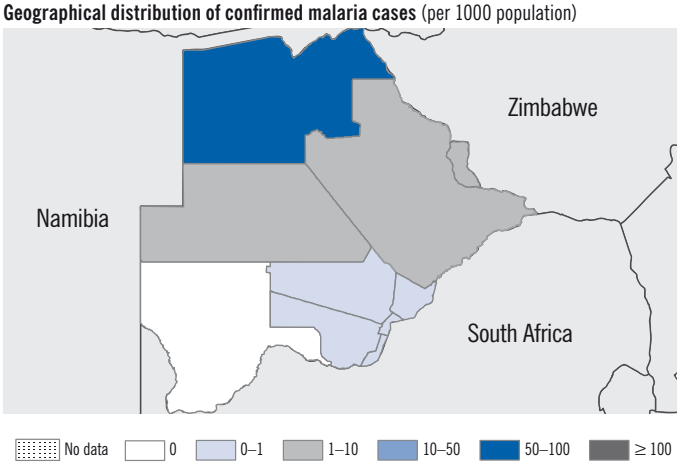
I. EPIDEMIOLOGICAL PROFILE

Population and epidemiological profile

Population (in thousands)*	**2009**	**%**
All ages	1 950	
< 5 years	224	11
Rural	772	40
Population by malaria endemicity (in thousands)	**2009**	**%**
High transmission (≥1 case per 1000 population)	538	28
Low transmission (0–1 cases per 1000 population)	724	37
Malaria-free (0 cases)	688	35
Vector and parasite species		
Major *Anopheles* species	*gambiae, arabiensis, funestus*	
Major *Plasmodium* species	*falciparum*	

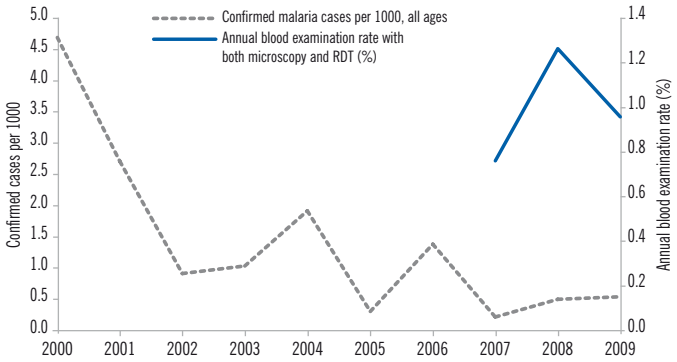
** UN Population Division estimates*

Geographical distribution of confirmed malaria cases (per 1000 population)

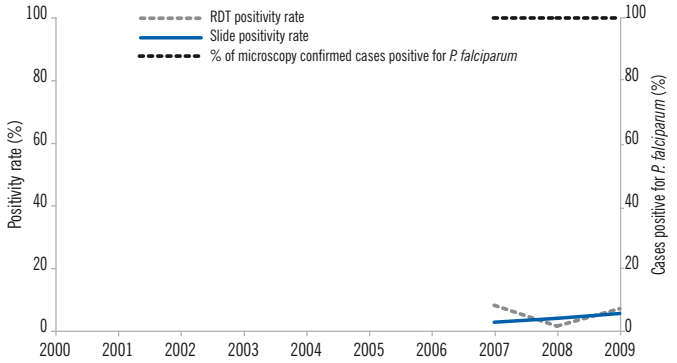


Trends in malaria morbidity and mortality

Confirmed malaria cases, per 1000 and annual blood examination rate



Malaria test positivity rate and % of microscopy confirmed cases positive for *P. falciparum*

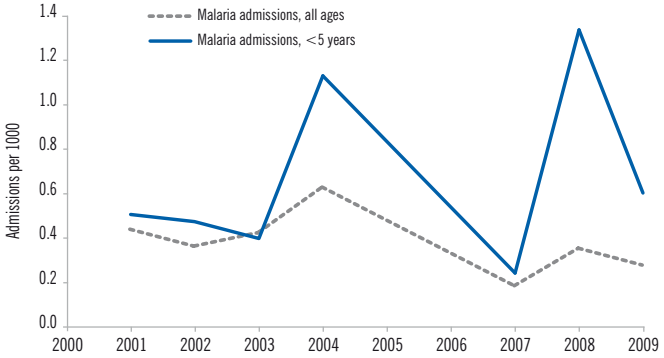


	All ages										< 5 years	
Year	All-cause outpatient consultations	Suspected cases (tested + probable)	Probable cases (not tested)	Total cases tested (microscopy + RDT)	Total confirmed cases (microscopy + RDT)	Malaria cases (confirmed + probable)	Examined by microscopy	Microscopy positive	*P. falciparum*	Examined by RDT	RDT positive	All-cause outpatient consultations	Malaria cases (confirmed + probable)
2000		71 555	63 499		8 056	71 555		8 056					
2001	3 744 190	48 281	43 565		4 716	48 281		4 716				677 840	8 396
2002	3 430 188	28 907	27 319		1 588	28 907		1 588				628 725	4 992
2003	3 494 558	23 657	21 827		1 830	23 657		1 830				624 312	4 412
2004	3 261 166	22 404	18 951		3 453	22 404		3 453				157 078	2 144
2005		11 242	10 712		530	11 242		530					
2006		23 514	20 966		2 548	23 514		2 548					7 729
2007		30 906	16 593	14 313	390	16 983	14 200	381	381	113	9		5 967
2008		41 153	16 959	24 194	927	17 886	23 253	914	914	941	13		5 540
2009		32 460	13 854	18 606	1 024	14 878	17 553	951	951	1 053	73		4 482

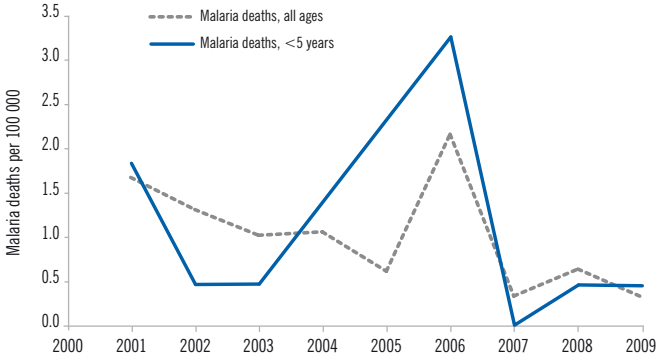
Note: Reporting completeness of outpatient health facilities (%) in 2009: 65,5%

I. EPIDEMIOLOGICAL PROFILE *(continued)*

Reported malaria admissions, per 1000 population



Reported malaria deaths, per 100 000 population



Admissions	All ages		<5 years	
Year	All-cause admissions	Malaria admissions	All-cause admissions	Malaria admissions
2000				
2001	96 796	756	26 548	110
2002	97 980	631	1 921	102
2003	98 452	749	16 654	85
2004	102 980	1 128	15 973	241
2005				
2006				
2007		339		52
2008		666		294
2009		528		134

Deaths	All ages		<5 years	
Year	All-cause deaths	Malaria deaths	All-cause deaths	Malaria deaths
2000				
2001	9 387	29	1 921	4
2002	10 125	23	1 749	1
2003	10 756	18	1 925	1
2004	11 041	19	1 615	
2005		11		
2006		40		7
2007		6		0
2008		12		1
2009		6		1

II. INTERVENTION POLICIES AND STRATEGIES

Intervention	WHO-RECOMMENDED POLICIES / STRATEGIES	YES or NO	Year adopted	OTHER POLICY / STRATEGY	YES or NO	Year adoped
Insecticide-treated nets (ITN)	ITNs/LLINs are distributed free of charge	YES	2009	ITNs/LLINs are distributed through antenatal clinics	YES	2008
	ITNs/LLINs are distributed to all age groups	YES	1997	ITNs/LLINs are distributed through EPI clinics	YES	2008
				ITNs/LLINs are distributed through mass campaigns to < 5 only	–	–
Indoor residual spraying (IRS)	IRS is recommended by malaria control programme	YES	1950	IRS is only used to prevent and control epidemics	YES	1950
	DDT is used for IRS	YES	1950	Where IRS is conducted, ITNs are also applied	YES	1997
				Insecticide resistance monitoring is undertaken	YES	1990
Intermittent preventive treatment (IPT)	IPT is used to prevent malaria during pregnancy	–	–			
Case management	Patients of all ages should receive diagnostic tests	YES	2007	Malaria diagnosis is free of charge in the public sector	YES	–
	RDTs are used at community level	–	–	ACT is delivered by community agents	–	–
	ACT is free of charge for all age groups in the public sector	YES	2008	Therapetic efficacy monitoring is undertaken	YES	2000
	Pre-referral treatment with parenteral quinine or artemisinin derivatives or artesunate suppositories is provided	YES	1998			
	Oral artemisinin-based monotherapies are not registered	–	–			

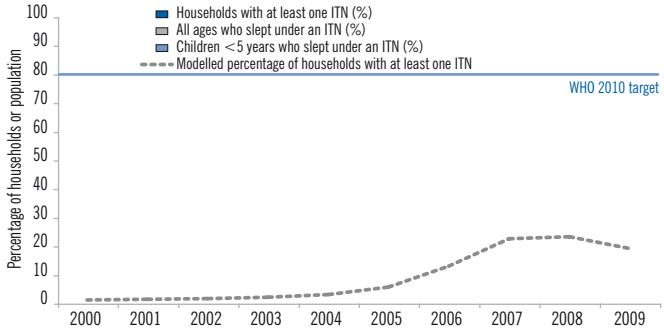
Antimalarial policy	Type of medicine	Year adopted
First-line treatment of *P. falciparum* (unconfirmed)	AL	2007
First-line treatment of *P. falciparum* (confirmed)	AL	2007
Treatment failure of *P. falciparum*	QN	2007
Treatment of severe malaria	QN	2007
Treatment of *P. vivax*	–	–

Therapeutic efficacy studies (percentage of clinical and parasitological failure)

Name of first-line antimalarial medicine	Study year	No. of studies	Failure rate			Follow-up	*Remarks*
			Minimum	Median	Maximum		

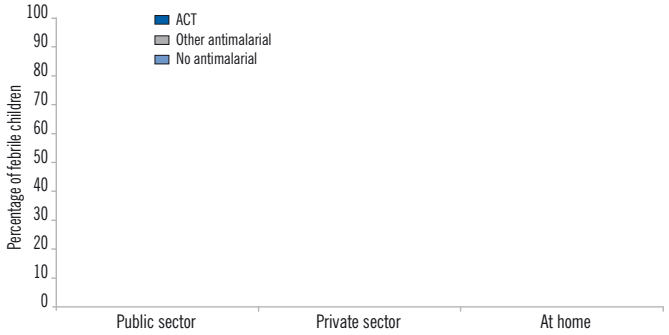
III. IMPLEMENTING MALARIA CONTROL

Coverage with ITNs from survey or model data



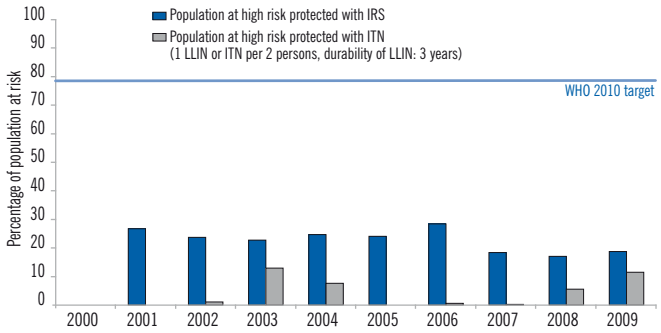
Sources:

Source of treatment for febrile children and antimalarial received from survey data

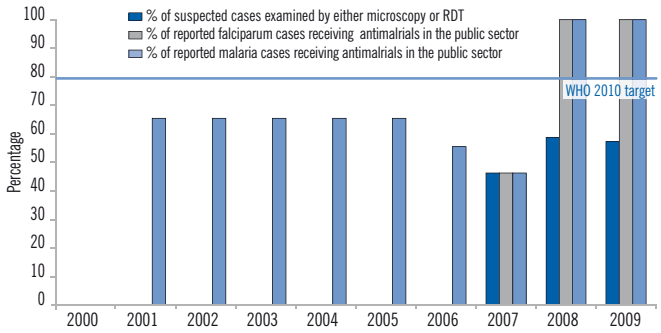


Sources:

Coverage with IRS and ITNs from programme data



Access to effective treatment from programme data: percentage of cases tested and number of ACT courses delivered relative to cases



Preventive interventions: programme and survey data

Year	No. of ITNs and/or LLINs delivered	No. of people protected by IRS	Pregnant women who slept under any net (%)	Pregnant women who slept under an ITN (%)
2000	0			
2001	0	302 429		
2002	6 666	272 527		
2003	75 892	264 259		
2004	45 190	289 259		
2005	0	285 806		
2006	4 000	342 574		
2007	0	225 332		
2008	35 300	212 054		
2009	33 760	236 078		

Survey sources:

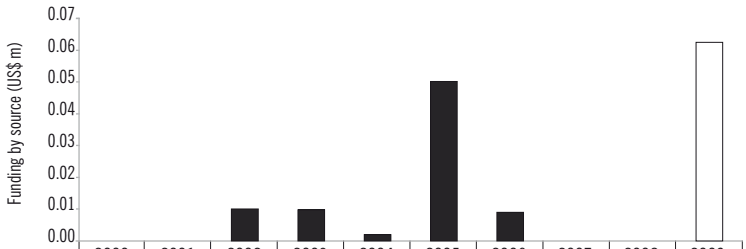
Diagnostics and treatment courses: programme and survey data

No. of RDTs delivered	No. of first-line treatment courses delivered	No. of ACT treatment courses delivered	Febrile children < 5 years (%)	Febrile children < 5 years treated in public health facility (%)
	48 281	0		
	28 907	0		
	23 674	0		
	22 404	0		
	11 242	0		
	19 938	0		
266	12 015	12 015		
1 218	44 508	44 508		
1 197	40 867	40 867		

Survey sources:

IV. FINANCING MALARIA CONTROL

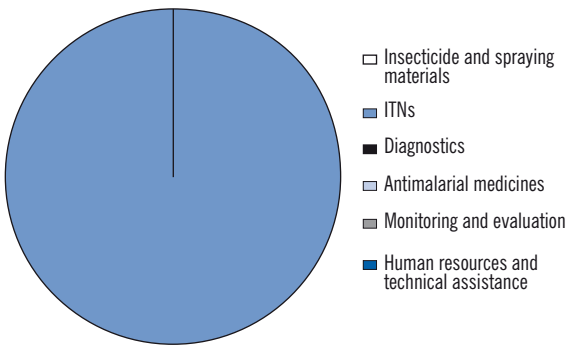
Governmental and external financing



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Other*	0	0	0	0	0	0	0	0	0	62 500
USAID/PMI	0	0	0	0	0	0	0	0	0	0
UNICEF	0	0	0	0	0	0	0	0	0	0
WHO	0	0	10 000	9 795	2 000	50 110	9 000	0	0	0
World Bank	0	0	0	0	0	0	0	0	0	0
Global Fund	0	0	0	0	0	0	0	0	0	0
Government**	0	0	0	0	0	0	0	0	0	0

** Bilaterals: DFID, JICA; and EU, UN agencies, etc.*
***Governmental expenditure may not include costs at sub-national level and costs related to health systems, human resources, etc.*

Breakdown of expenditure by intervention in 2009



CAPE VERDE

In Cape Verde, 58% of the population lives in areas where there is a low risk of malaria; the rest of the country is malaria-free. All suspected malaria cases are tested parasitologically and almost all cases are caused by *P. falciparum*. The annual blood examination rate was ~7% from 2000–2008, but increased to 30% in 2009 as the country moved to the pre-elmination phase of malaria control. Total confirmed malaria cases decreased from 126 during 2000–2001 to 65 cases in 2009. Larviciding is the main vector control strategy; only 2500 people were protected with IRS. The programme provides a sufficient quantity of ACT treatment courses to treat all confirmed cases. Although available information on funding is not detailed, about US$ 74 000 was provided by NGOs in 2009.

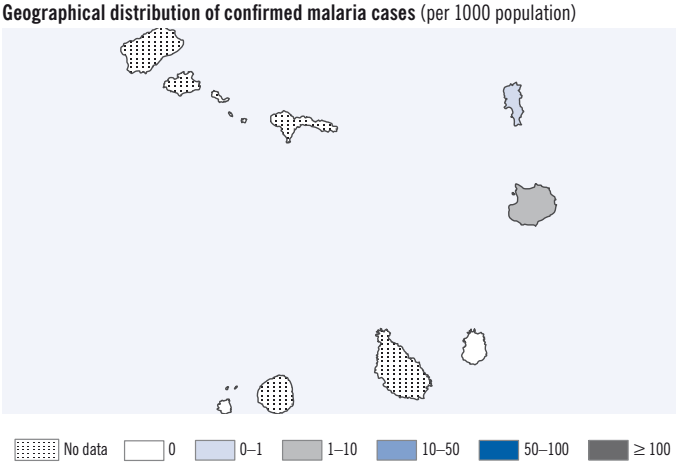
I. EPIDEMIOLOGICAL PROFILE

Population and epidemiological profile

Population (in thousands)*	**2009**	**%**
All ages	506	
< 5 years	59	12
Rural	200	40
Population by malaria endemicity (in thousands)	**2009**	**%**
High transmission (≥1 case per 1000 population)	0	0
Low transmission (0–1 cases per 1000 population)	292	58
Malaria-free (0 cases)	213	42
Vector and parasite species		
Major *Anopheles* species	*arabiensis, arabiensis, arabiensis, arabiensis*	
Major *Plasmodium* species	*falciparum*	

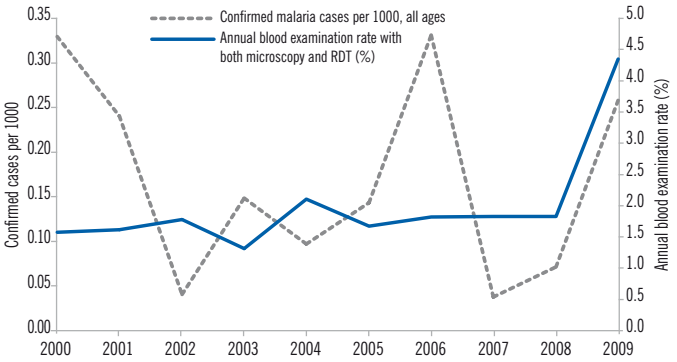
** UN Population Division estimates*

Geographical distribution of confirmed malaria cases (per 1000 population)

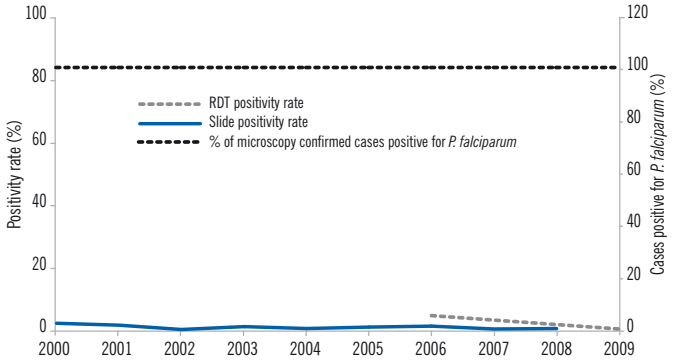


Trends in malaria morbidity and mortality

Confirmed malaria cases, per 1000 and annual blood examination rate



Malaria test positivity rate and % of microscopy confirmed cases positive for *P. falciparum*

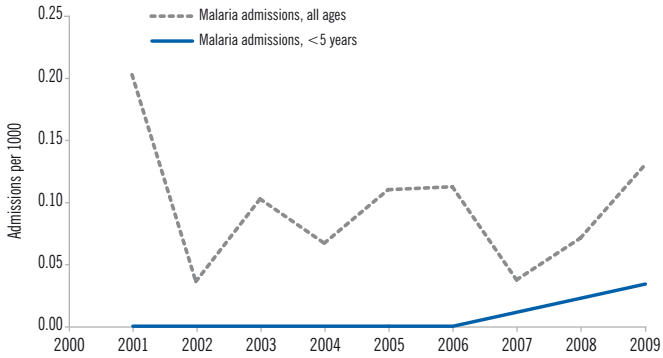


	All ages											< 5 years	
Year	All-cause outpatient consultations	Suspected cases (tested + probable)	Probable cases (not tested)	Total cases tested (microscopy + RDT)	Total confirmed cases (microscopy + RDT)	Malaria cases (confirmed + probable)	Examined by microscopy	Microscopy positive	*P. falciparum*	Examined by RDT	RDT positive	All-cause outpatient consultations	Malaria cases (confirmed + probable)
2000	475 303	6 843	0	6 843	144	144	6 843	144	144				
2001	469 402	7 141	0	7 141	107	107	7 141	107	107				
2002	481 001	8 022	0	8 022	18	18	8 022	18	18				
2003	479 003	6 001	0	6 001	68	68	6 001	68	68				
2004	473 596	9 833	0	9 833	45	45	9 833	45	45				
2005	471 987	7 902	0	7 902	68	68	7 902	68	68				
2006	472 536	8 729	0	8 729	80	80	6 979	80	80	1 750			
2007	474 659	8 902	0	8 902	18	18	7 402	18	18	1 500			
2008	486 302	9 033	0	9 033	35	35	7 033	35	35	2 000			
2009		21 913	0	21 913	65	65		65	65	21 913			

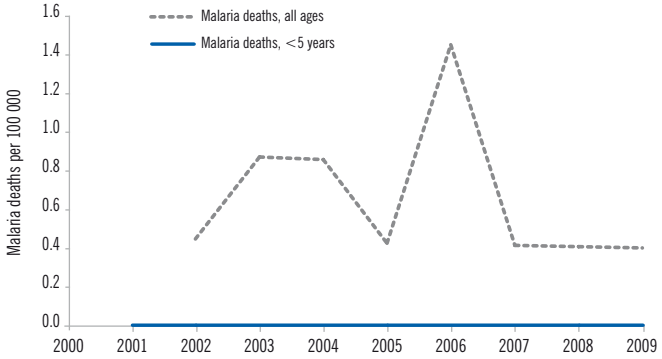
Note: Reporting completeness of outpatient health facilities (%) in 2009: 100%

I. EPIDEMIOLOGICAL PROFILE *(continued)*

Reported malaria admissions, per 1000 population



Reported malaria deaths, per 100 000 population



Admissions	All ages		<5 years	
Year	All-cause admissions	Malaria admissions	All-cause admissions	Malaria admissions
2000				
2001		90		0
2002		16		0
2003		47		0
2004		31		0
2005		52		0
2006	37 201	54		0
2007		18		
2008		35		
2009		65		2

Deaths	All ages		<5 years	
Year	All-cause deaths	Malaria deaths	All-cause deaths	Malaria deaths
2000				
2001	2 334	0	332	0
2002	2 434	2	315	0
2003	2 401	4	322	0
2004	2 456	4	302	0
2005	2 423	2	313	0
2006	2 349	7	298	0
2007	2 608	2		0
2008	2 747	2		0
2009	2 621	2		0

II. INTERVENTION POLICIES AND STRATEGIES

Intervention	WHO-RECOMMENDED POLICIES / STRATEGIES	YES or NO	Year adopted	OTHER POLICY / STRATEGY	YES or NO	Year adoped
Insecticide-treated nets (ITN)	ITNs/LLINs are distributed free of charge	NO	–	ITNs/LLINs are distributed through antenatal clinics	NO	–
	ITNs/LLINs are distributed to all age groups	NO	–	ITNs/LLINs are distributed through EPI clinics	NO	–
				ITNs/LLINs are distributed through mass campaigns to < 5 only	NO	–
Indoor residual spraying (IRS)	IRS is recommended by malaria control programme	NO	–	IRS is only used to prevent and control epidemics	NO	–
	DDT is used for IRS	NO	–	Where IRS is conducted, ITNs are also applied	NO	–
				Insecticide resistance monitoring is undertaken	NO	–
Intermittent preventive treatment (IPT)	IPT is used to prevent malaria during pregnancy	NO	–			
Case management	Patients of all ages should receive diagnostic tests	YES	1998	Malaria diagnosis is free of charge in the public sector	YES	1975
	RDTs are used at community level	YES	2008	ACT is delivered by community agents	–	–
	ACT is free of charge for all age groups in the public sector	YES	2008	Therapetic efficacy monitoring is undertaken	NO	–
	Pre-referral treatment with parenteral quinine or artemisinin derivatives or artesunate suppositories is provided	YES	–			
	Oral artemisinin-based monotherapies are not registered	NO	–			

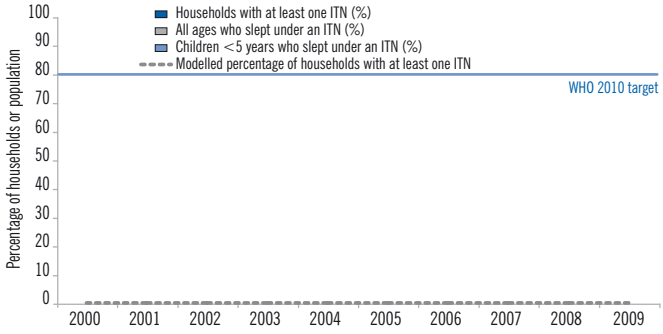
Antimalarial policy	Type of medicine	Year adopted
First-line treatment of *P. falciparum* (unconfirmed)	AL	2007
First-line treatment of *P. falciparum* (confirmed)	AL	2007
Treatment failure of *P. falciparum*	QN	–
Treatment of severe malaria	QN	–
Treatment of *P. vivax*	–	–

Therapeutic efficacy studies (percentage of clinical and parasitological failure)

Name of first-line antimalarial medicine	Study year	No. of studies	Failure rate			Follow-up	*Remarks*
			Minimum	Median	Maximum		

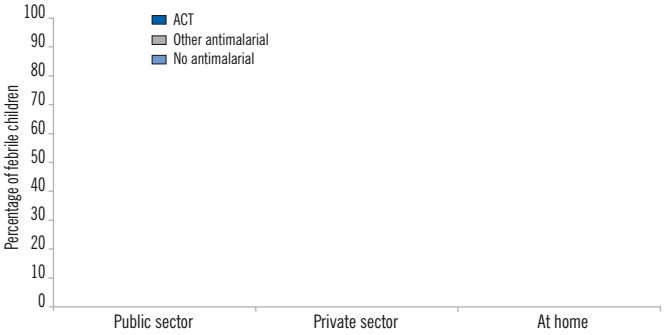
III. IMPLEMENTING MALARIA CONTROL

Coverage with ITNs from survey or model data



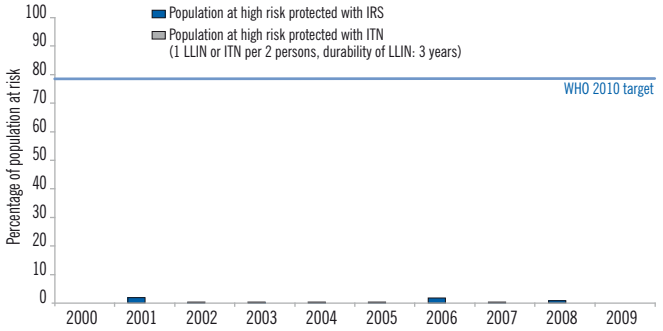
Sources:

Source of treatment for febrile children and antimalarial received from survey data

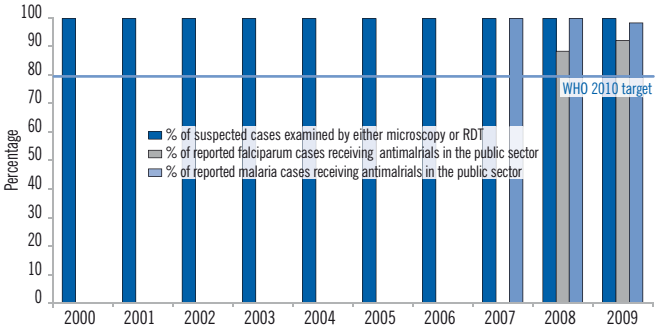


Sources:

Coverage with IRS and ITNs from programme data



Access to effective treatment from programme data: percentage of cases tested and number of ACT courses delivered relative to cases



Preventive interventions: programme and survey data

Year	No. of ITNs and/or LLINs delivered	No. of people protected by IRS	Pregnant women who slept under any net (%)	Pregnant women who slept under an ITN (%)
2000	0			
2001	0	5 000		
2002	0	1 000		
2003	0	1 000		
2004	0	1 000		
2005	0	1 000		
2006	0	5 000		
2007	0	1 000		
2008	0	2 500		
2009	0			

Survey sources:

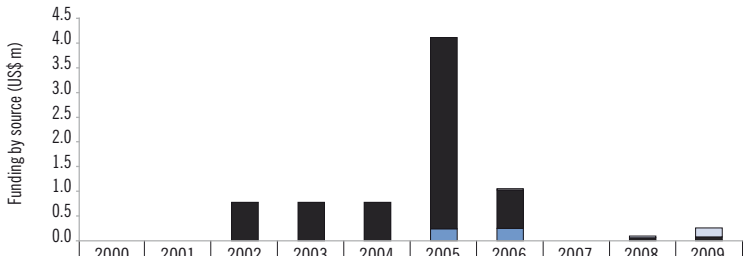
Diagnostics and treatment courses: programme and survey data

No. of RDTs delivered	No. of first-line treatment courses delivered	No. of ACT treatment courses delivered	Febrile children < 5 years (%)	Febrile children < 5 years treated in public health facility (%)
		0		
		0		
		0		
		0		
		0		
		0		
	18			
	35	31		
	64	60		

Survey sources:

IV. FINANCING MALARIA CONTROL

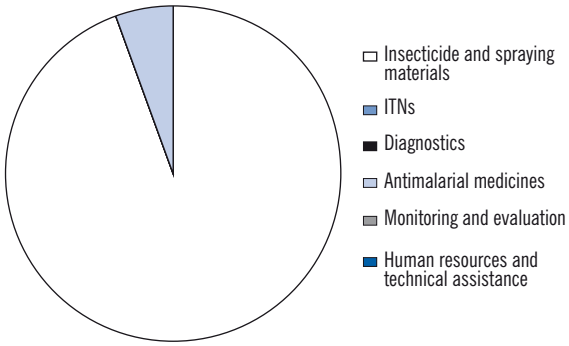
Governmental and external financing



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Other*	0	0	0	0	0	0	24 161	0	0	0
USAID/PMI	0	0	0	0	0	0	0	0	0	0
UNICEF	0	0	0	0	0	0	0	0	33 400	178 043
WHO	0	0	774 400	774 400	774 400	3 872 000	774 400	0	58 500	74 327
World Bank	0	0	0	0	0	0	0	0	0	0
Global Fund	0	0	0	0	0	0	0	0	0	0
Government**	0	0	0	0	0	239 930	252 410	3 884	4 778	5 370

** Bilaterals: DFID, JICA; and EU, UN agencies, etc.*
*** Governmental expenditure may not include costs at sub-national level and costs related to health systems, human resources, etc.*

Breakdown of expenditure by intervention in 2009



ECUADOR

There was a resurgence of malaria in Ecuador during 1996–2001, during which the number of cases peaked at over 100 000 in 2001. Since then, the incidence of malaria has fallen sharply and at present only 5% of the population remains at high risk. Reported cases decreased from an annual average of 65 678 during 2000–2005 to 4120 in 2009, a 94% decline. The percentage of *P. falciparum* cases has also fallen, from 47% in 2000 to 13% in 2009. Control efforts are targeted to areas where there is active malaria transmission. IRS is the principal vector control method, protecting on average almost 344 500 people (>60% coverage for populations at high risk) per year during 2007–2009. The programme also delivered approximately 234 000 ITN/LLINs during in 2008–2009, enough to cover 86% of the population at high risk. Funding for malaria control increased to an annual average of US$ 5.5 million during 2007–2009.

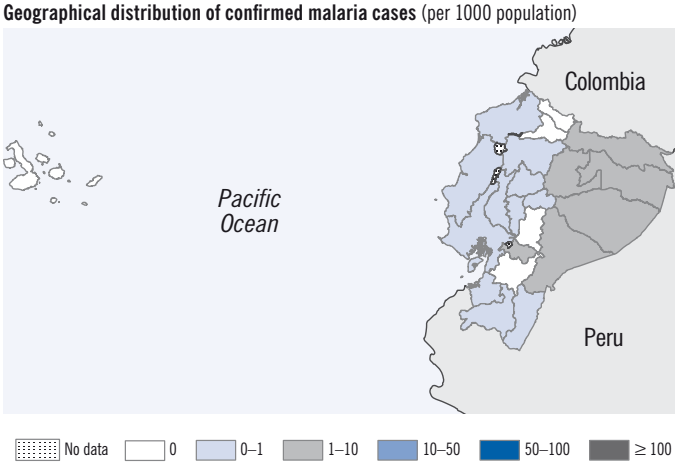
I. EPIDEMIOLOGICAL PROFILE

Population and epidemiological profile

Population (in thousands)*	**2009**	**%**
All ages	13 625	
< 5 years	1 381	10
Rural	4 590	34
Population by malaria endemicity (in thousands)	**2009**	**%**
High transmission (≥1 case per 1000 population)	700	5
Low transmission (0–1 cases per 1000 population)	6 332	46
Malaria-free (0 cases)	6 594	48
Vector and parasite species		
Major *Anopheles* species	*albimanus, neivai, pseudopunctipennis, punctimacula*	
Major *Plasmodium* species	*vivax, falciparum*	

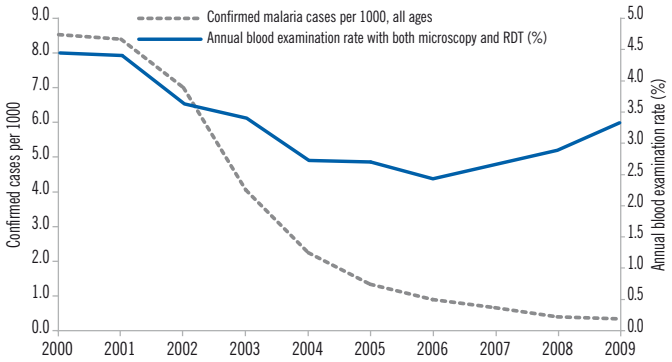
** UN Population Division estimates*

Geographical distribution of confirmed malaria cases (per 1000 population)

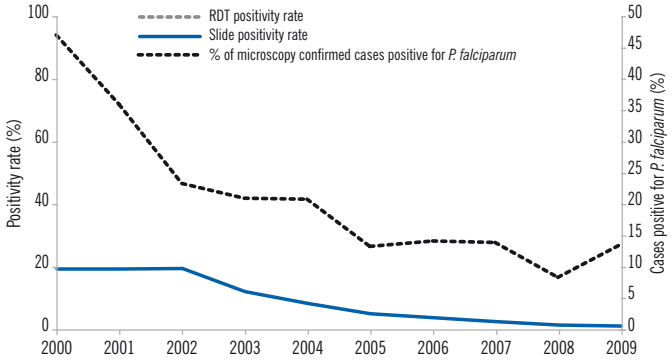


Trends in malaria morbidity and mortality

Confirmed malaria cases, per 1000 and annual blood examination rate



Malaria test positivity rate and % of microscopy confirmed cases positive for *P. falciparum*

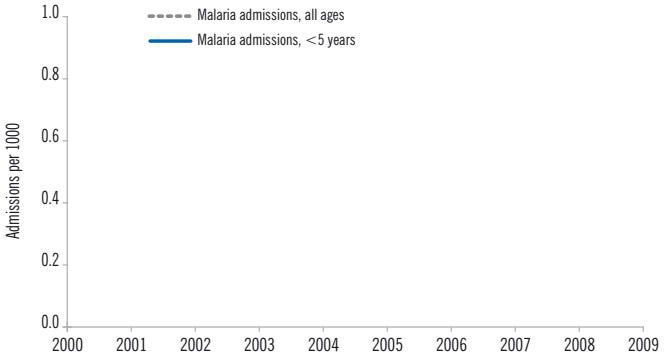


	All ages										< 5 years	
Year	All-cause outpatient consultations	Suspected cases (tested + probable)	Probable cases (not tested)	Total cases tested (microscopy + RDT)	Total confirmed cases (microscopy + RDT)	Malaria cases (confirmed + probable)	Examined by microscopy	Microscopy positive	*P. falciparum*	Examined by RDT	RDT positive	All-cause outpatient consultations	Malaria cases (confirmed + probable)
2000		544 820		544 820	104 570	104 570	544 820	104 570	48 947				
2001		546 848		546 848	104 434	104 434	546 848	104 434	37 269				
2002		455 812		455 812	88 038	88 038	455 812	88 038	20 330				
2003		432 033		432 033	51 345	51 345	432 033	51 345	10 656				
2004		349 539		349 539	28 621	28 621	349 539	28 621	5 891				
2005		350 147		350 147	17 062	17 062	350 147	17 062	2 220				
2006		318 307		318 307	11 459	11 459	318 307	11 459	1 596				
2007		352 426		352 426	8 464	8 464	352 426	8 464	1 158				
2008		387 558		387 558	4 891	4 891	384 800	4 891	396	2 758			423
2009		451 732		451 732	4 120	4 120	446 740	4 120	551	4 992			505

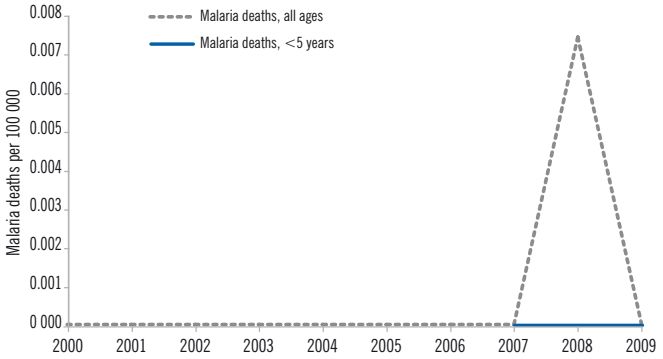
Note: Reporting completeness of outpatient health facilities (%) in 2009: 65.5%

I. EPIDEMIOLOGICAL PROFILE *(continued)*

Reported malaria admissions, per 1000 population



Reported malaria deaths, per 100 000 population



Admissions	All ages		<5 years	
Year	All-cause admissions	Malaria admissions	All-cause admissions	Malaria admissions
2000				
2001				
2002				
2003				
2004				
2005				
2006				
2007				
2008				
2009		0		0

Deaths	All ages		<5 years	
Year	All-cause deaths	Malaria deaths	All-cause deaths	Malaria deaths
2000		0		
2001		0		
2002		0		
2003		0		
2004		0		
2005		0		
2006		0		
2007		0		0
2008		1		0
2009		0		0

II. INTERVENTION POLICIES AND STRATEGIES

Intervention	WHO-RECOMMENDED POLICIES / STRATEGIES	YES or NO	Year adopted	OTHER POLICY / STRATEGY	YES or NO	Year adoped
Insecticide-treated nets (ITN)	ITNs/LLINs are distributed free of charge	YES	2004	ITNs/LLINs are distributed through antenatal clinics	NO	–
	ITNs/LLINs are distributed to all age groups	YES	2005	ITNs/LLINs are distributed through EPI clinics	NO	–
				ITNs/LLINs are distributed through mass campaigns to < 5 only	NO	–
Indoor residual spraying (IRS)	IRS is recommended by malaria control programme	YES	2005	IRS is only used to prevent and control epidemics	YES	2007
	DDT is used for IRS	NO	–	Where IRS is conducted, ITNs are also applied	YES	2005
				Insecticide resistance monitoring is undertaken	YES	2008
Intermittent preventive treatment (IPT)	IPT is used to prevent malaria during pregnancy	NO	–			
Case management	Patients of all ages should receive diagnostic tests	YES	1956	Malaria diagnosis is free of charge in the public sector	YES	1956
	RDTs are used at community level	YES	2006	ACT is delivered by community agents	NO	–
	ACT is free of charge for all age groups in the public sector	YES	2005	Therapetic efficacy monitoring is undertaken	YES	2009
	Pre-referral treatment with parenteral quinine or artemisinin derivatives or artesunate suppositories is provided	NO	–			
	Oral artemisinin-based monotherapies are not registered	NO	–			

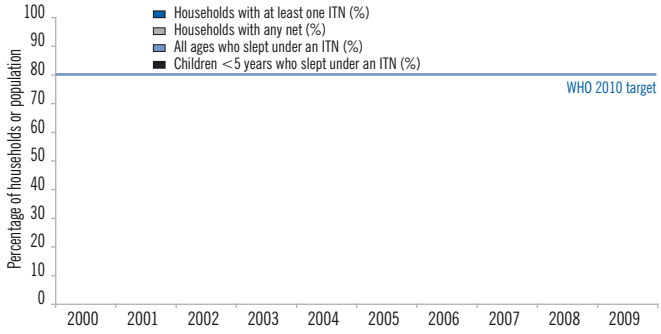
Antimalarial policy	Type of medicine	Year adopted
First-line treatment of *P. falciparum* (unconfirmed)	–	–
First-line treatment of *P. falciparum* (confirmed)	AS+SP	2004
Treatment failure of *P. falciparum*	AL	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	CQ+PQ	2004

Therapeutic efficacy studies (percentage of clinical and parasitological failure)

Name of first-line antimalarial medicine	Study year	No. of studies	Failure rate			Follow-up	*Remarks*
			Minimum	Median	Maximum		
Artesunate+sulfadoxine-pyrimethamine (AS+SP)	2003–2004	2	0.0	0.0	0.0	28 days	

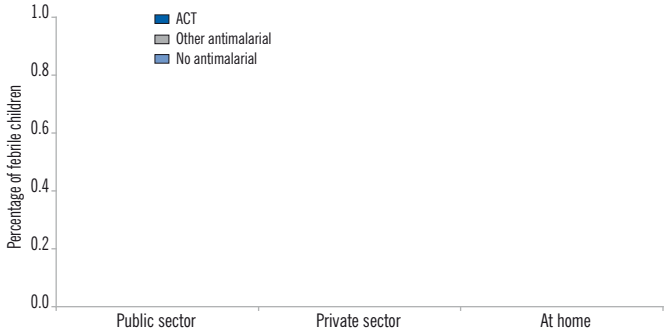
III. IMPLEMENTING MALARIA CONTROL

Coverage with ITNs from survey or model data



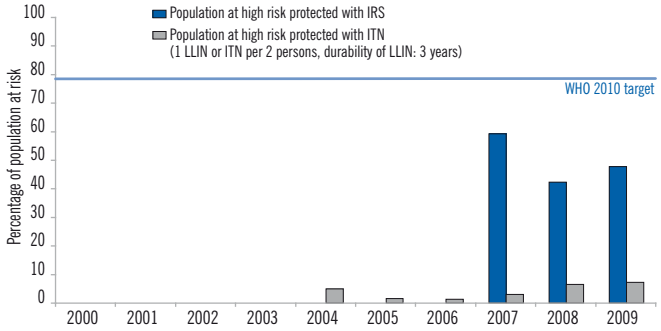
Sources:

Source of treatment for febrile children and antimalarial received from survey data

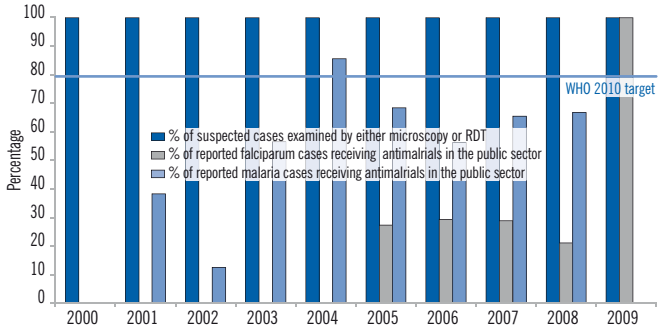


Sources:

Coverage with IRS and ITNs from programme data



Access to effective treatment from programme data: percentage of cases tested and number of ACT courses delivered relative to cases



Preventive interventions: programme and survey data

Year	No. of ITNs and/or LLINs delivered	No. of people protected by IRS	Pregnant women who slept under any net (%)	Pregnant women who slept under an ITN (%)
2000	0			
2001	0			
2002	0			
2003	0			
2004	15 000			
2005	48 000			
2006	42 000			
2007	0	406 060		
2008	111 950	293 475		
2009	117 200	334 006		

Survey sources:

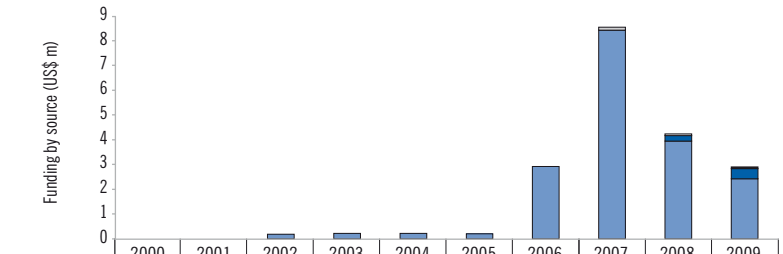
Diagnostics and treatment courses: programme and survey data

No. of RDTs delivered	No. of first-line treatment courses delivered	No. of ACT treatment courses delivered	Febrile children < 5 years (%)	Febrile children < 5 years treated in public health facility (%)
	61 145	0		
	16 844	0		
	44 371	0		
	37 400	0		
	17 832	2 212		
	9 863	1 596		
	8 464	1 158		
2 758	4 986	491		
4 992		10 000		

Survey sources:

IV. FINANCING MALARIA CONTROL

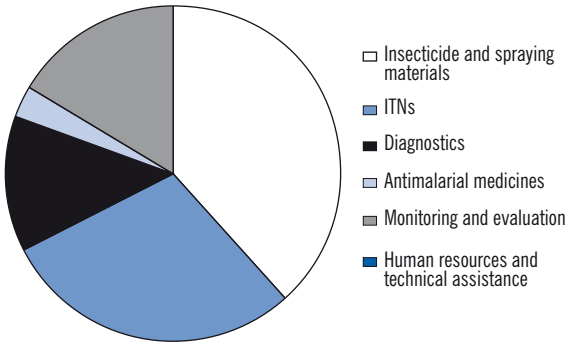
Governmental and external financing



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Other*	0	0	0	0	0	0	0	0	0	0
USAID/PMI	0	0	0	0	0	0	0	120 000	82 000	0
UNICEF	0	0	0	0	0	0	0	0	0	0
WHO	0	0	0	0	0	0	0	0	0	80 000
World Bank	0	0	0	0	0	0	0	0	0	0
Global Fund	0	0	0	0	0	0	0	0	220 000	400 000
Government**	0	0	180 000	225 000	220 000	200 000	2 922 372	8 426 252	3 941 711	2 428 604

** Bilaterals: DFID, JICA; and EU, UN agencies, etc.*
***Governmental expenditure may not include costs at sub-national level and costs related to health systems, human resources, etc.*

Breakdown of expenditure by intervention in 2009



ERITREA

In Eritrea, while approximately 70% of the population is at high risk of malaria, the number of cases (probable + confirmed) has decreased by 83% from 125 746 in 2001 to 21 298 in 2009. In the same period malaria admissions (inpatient cases) declined by 61% and deaths by 83%. The proportion of malaria cases due to *P. falciparum* has decreased from 87% in 2000–2005 to 51% in 2009. The reduction in disease burden is associated with the scale-up of malaria control efforts in the country. The national malaria control programme delivered 564 000 LLINs during 2007–2009, enough to cover 31% of the population at high risk; this was complemented with focal IRS, protecting on average 212 000 people at high risk per year since 2000. The programme provided 22 000 ACT treatment courses in 2008, enough to treat all malaria cases. External funding for malaria control has increased to US$ 4 million per year since 2007, most of which is provided by the Global Fund and WHO.

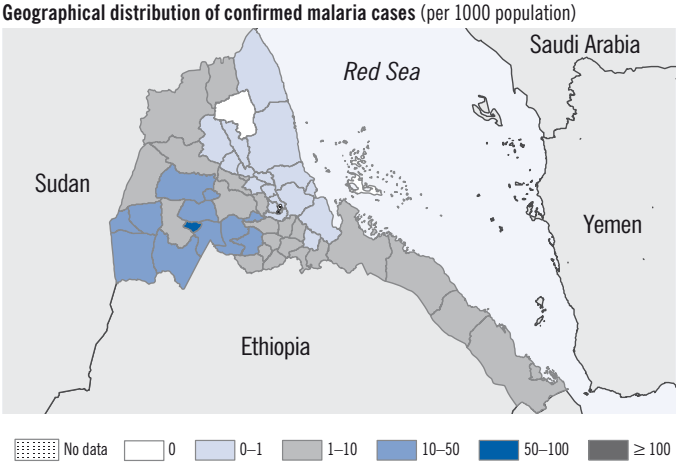
I. EPIDEMIOLOGICAL PROFILE

Population and epidemiological profile

Population (in thousands)*	**2009**	**%**
All ages	5 073	
< 5 years	832	16
Rural	4 003	79
Population by malaria endemicity (in thousands)	**2009**	**%**
High transmission (≥1 case per 1000 population)	3 579	71
Low transmission (0–1 cases per 1000 population)	1 495	29
Malaria-free (0 cases)	0	0
Vector and parasite species		
Major *Anopheles* species	*arabiensis*	
Major *Plasmodium* species	*falciparum, vivax*	

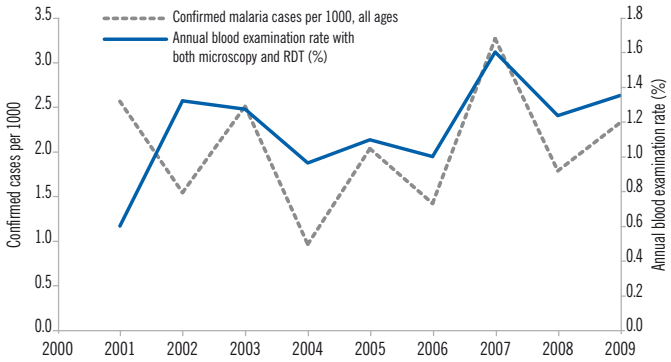
** UN Population Division estimates*

Geographical distribution of confirmed malaria cases (per 1000 population)

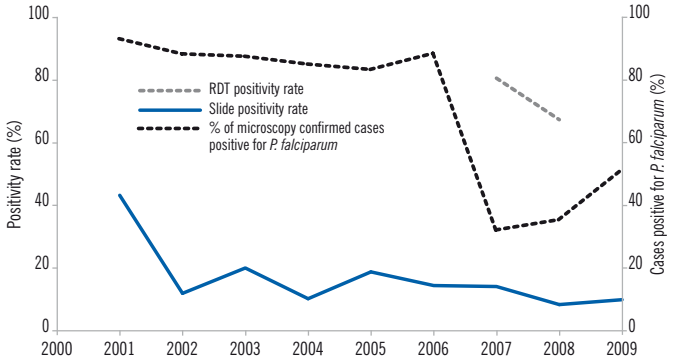


Trends in malaria morbidity and mortality

Confirmed malaria cases, per 1000 and annual blood examination rate



Malaria test positivity rate and % of microscopy confirmed cases positive for *P. falciparum*

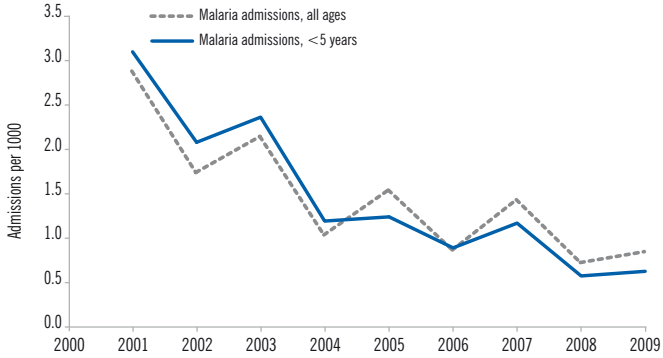


	All ages											< 5 years	
Year	All-cause outpatient consultations	Suspected cases (tested + probable)	Probable cases (not tested)	Total cases tested (microscopy + RDT)	Total confirmed cases (microscopy + RDT)	Malaria cases (confirmed + probable)	Examined by microscopy	Microscopy positive	*P. falciparum*	Examined by RDT	RDT positive	All-cause outpatient consultations	Malaria cases (confirmed + probable)
2000													
2001	1 619 610	138 667	116 030	22 637	9 716	125 746	22 637	9 716	8 994			433 596	25 895
2002	1 666 887	121 011	68 783	52 228	6 078	74 861	52 228	6 078	5 335			416 708	14 249
2003	1 566 486	107 599	55 171	52 428	10 346	65 517	52 428	10 346	8 998			443 424	15 774
2004	1 495 759	65 025	23 664	41 361	4 119	27 783	41 361	4 119	3 480			405 498	7 164
2005	1 467 919	64 056	15 119	48 937	9 073	24 192	48 937	9 073	7 506			389 098	4 956
2006	1 501 345	49 703	3 607	46 096	6 541	10 148	46 096	6 541	5 750			430 602	1 980
2007	1 991 476	80 428	4 003	76 425	15 565	19 568	68 905	9 528	3 006	7 520	6 037	451 692	2 814
2008	1 925 049	62 449	1 808	60 641	8 764	10 572	54 075	4 364	1 519	6 566	4 400	387 468	1 591
2009	2 022 943	77 946	9 539	68 407	11 759	21 298	68 407	6 633	3 358		5 126	565 948	3 653

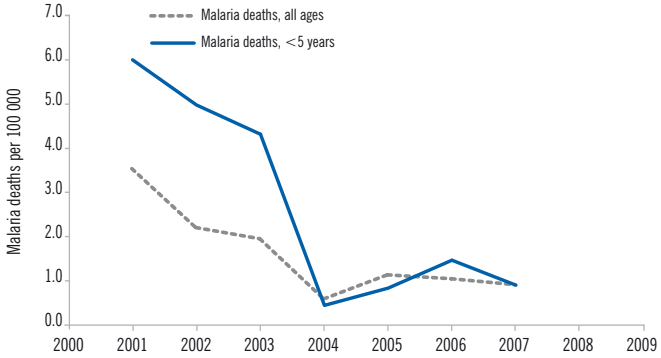
Note: Reporting completeness of outpatient health facilities (%) in 2009: 93%

I. EPIDEMIOLOGICAL PROFILE *(continued)*

Reported malaria admissions, per 1000 population



Reported malaria deaths, per 100 000 population



Admissions	All ages		<5 years	
Year	All-cause admissions	Malaria admissions	All-cause admissions	Malaria admissions
2000				
2001	53 020	10 886	11 039	1 913
2002	57 833	6 815	13 450	1 337
2003	66 429	8 798	17 055	1 588
2004	65 547	4 378	18 287	835
2005	64 999	6 812	17 576	905
2006	73 217	3 931	21 029	672
2007	117 476	6 774	21 086	914
2008	110 341	3 494	17 272	459
2009	116 631	4 218	19 886	514

Deaths	All ages		<5 years	
Year	All-cause deaths	Malaria deaths	All-cause deaths	Malaria deaths
2000				
2001	1 775	133	335	37
2002	2 052	86	456	32
2003	1 958	79	483	29
2004	1 124	24	607	3
2005	1 629	49	538	6
2006	1 775	47	679	11
2007	2 643	42	385	7
2008	2 334	19	303	3
2009	2 636	23	478	2

II. INTERVENTION POLICIES AND STRATEGIES

Intervention	WHO-RECOMMENDED POLICIES / STRATEGIES	YES or NO	Year adopted	OTHER POLICY / STRATEGY	YES or NO	Year adoped
Insecticide-treated nets (ITN)	ITNs/LLINs are distributed free of charge	YES	2002	ITNs/LLINs are distributed through antenatal clinics	YES	2001
	ITNs/LLINs are distributed to all age groups	YES	2000	ITNs/LLINs are distributed through EPI clinics	NO	–
				ITNs/LLINs are distributed through mass campaigns to < 5 only	YES	2000
Indoor residual spraying (IRS)	IRS is recommended by malaria control programme	YES	1995	IRS is only used to prevent and control epidemics	YES	1997
	DDT is used for IRS	YES	1997	Where IRS is conducted, ITNs are also applied	YES	1997
				Insecticide resistance monitoring is undertaken	YES	2000
Intermittent preventive treatment (IPT)	IPT is used to prevent malaria during pregnancy	–	–			
Case management	Patients of all ages should receive diagnostic tests	YES	1997	Malaria diagnosis is free of charge in the public sector	YES	1997
	RDTs are used at community level	YES	2008	ACT is delivered by community agents	YES	2008
	ACT is free of charge for all age groups in the public sector	YES	2007	Therapetic efficacy monitoring is undertaken	NO	–
	Pre-referral treatment with parenteral quinine or artemisinin derivatives or artesunate suppositories is provided	YES	2002			
	Oral artemisinin-based monotherapies are not registered	–	–			

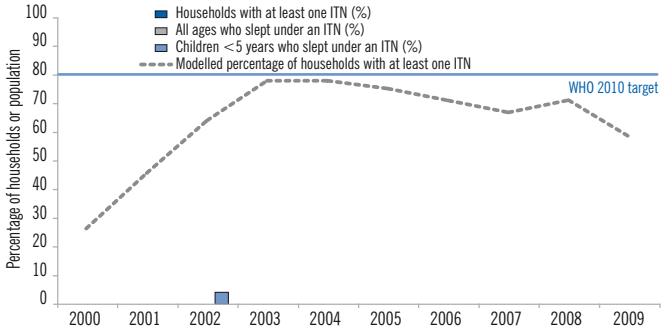
Antimalarial policy	Type of medicine	Year adopted
First-line treatment of *P. falciparum* (unconfirmed)	CQ+SP	2007
First-line treatment of *P. falciparum* (confirmed)	AS+AQ	2007
Treatment failure of *P. falciparum*	QN	2007
Treatment of severe malaria	QN	2007
Treatment of *P. vivax*	CQ+PQ	2007

Therapeutic efficacy studies (percentage of clinical and parasitological failure)

Name of first-line antimalarial medicine	Study year	No. of studies	Failure rate			Follow-up	*Remarks*
			Minimum	Median	Maximum		
Artesunate+amodiaquine (AS+AQ)	2006–2009	8	1.5	4.1	12.5	28 days	

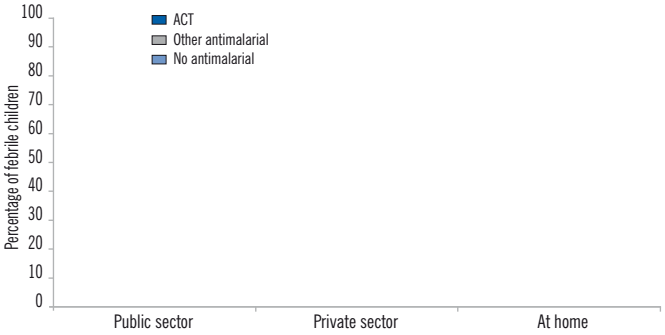
III. IMPLEMENTING MALARIA CONTROL

Coverage with ITNs from survey or model data



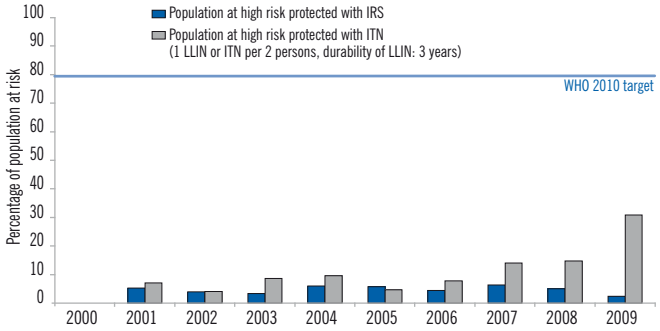
Sources: DHS 2002.

Source of treatment for febrile children and antimalarial received from survey data

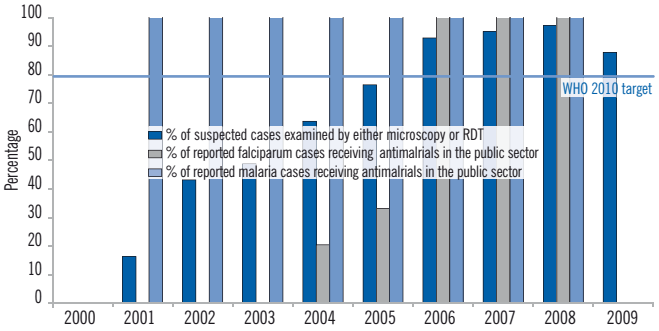


Sources:

Coverage with IRS and ITNs from programme data



Access to effective treatment from programme data: percentage of cases tested and number of ACT courses delivered relative to cases



Preventive interventions: programme and survey data

Year	No. of ITNs and/or LLINs delivered	No. of people protected by IRS	Pregnant women who slept under any net (%)	Pregnant women who slept under an ITN (%)
2000	0			
2001	141 766	202 652		
2002	84 782	159 551		3
2003	187 815	139 913		
2004	215 000	259 420		
2005	107 657	260 263		
2006	80 673	208 377		
2007	159 360	305 978		
2008	134 399	251 641		
2009	270 233	124 005		

Survey sources: DHS 2002.

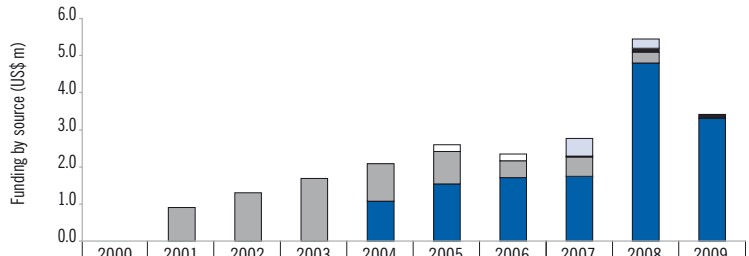
Diagnostics and treatment courses: programme and survey data

No. of RDTs delivered	No. of first-line treatment courses delivered	No. of ACT treatment courses delivered	Febrile children < 5 years (%)	Febrile children < 5 years treated in public health facility (%)
	275 746	0		
	429 133	0		
	410 000	0		
	302 470	3 117		
	290 500	4 400		
	250 810	25 000		
27 720	37 429	37 429		
106 800	22 662	22 662		
282 540	0			

Survey sources: DHS 2002.

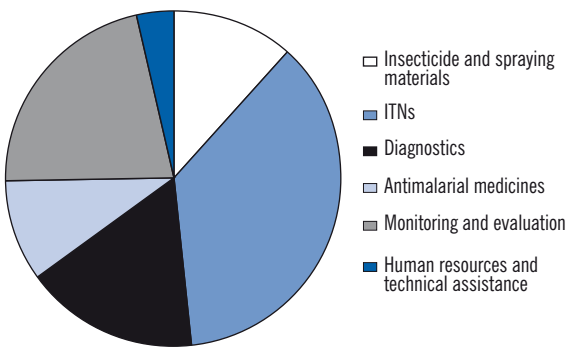
IV. FINANCING MALARIA CONTROL

Governmental and external financing



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Other*	0	0	0	0	0	180 000	180 000	0	0	0
USAID/PMI	0	0	0	0	0	0	0	0	0	0
UNICEF	0	0	0	0	0	0	0	476 600	254 037	0
WHO	0	0	0	0	0	0	0	30 000	100 000	105 000
World Bank	0	913 000	1 307 103	1 694 894	1 006 250	880 620	453 400	516 200	300 000	0
Global Fund	0	0	0	0	1 080 209	1 537 424	1 716 844	1 748 745	4 792 642	3 312 520
Government**	0	0	0	0	0	0	0	0	0	0

Breakdown of expenditure by intervention in 2009



** Bilaterals: DFID, JICA; and EU, UN agencies, etc.*
*** Governmental expenditure may not include costs at sub-national level and costs related to health systems, human resources, etc.*

ETHIOPIA

Malaria is endemic in Ethiopia with differing intensity of transmission, except in the central highlands which are malaria-free. The most recent epidemic occurred in 2003–2004. Approximately half of cases are caused by *P. falciparum*. In 2009, 3 million suspected malaria cases were seen and nearly 2.3 million (77%) were tested. The number malaria cases decreased from an annual average of 3 million during 2000–2005 to 1.75 million cases in 2009 (41% decline). In the same period the malaria admissions decreased from an average of 44 000 to 30 102 in 2009 (33% decline). Inpatient malaria deaths fell by 43% in all age groups and by 60% in children <5 years. A rapid impact assessment of all hospitals at altitudes < 2000 metres confirmed a similar level of impact. The percentage of households with one ITN increased from 3% in 2005 to 66% in 2007. With a shift from use of DDT to deltamethrine in 2009, IRS implementation was further expanded, protecting 28.3 million (50%) of the 56 million people at risk. Nearly 8 million ACT treatment courses delivered in both 2008 and 2009 were sufficient to treat all reported malaria cases in the public sector. Funding increased from US$ 2.7 million in 2001 to US$ 195 million in 2009, mainly funded by the government, Global Fund, PMI, World Bank, other United Nations and bilateral agencies.

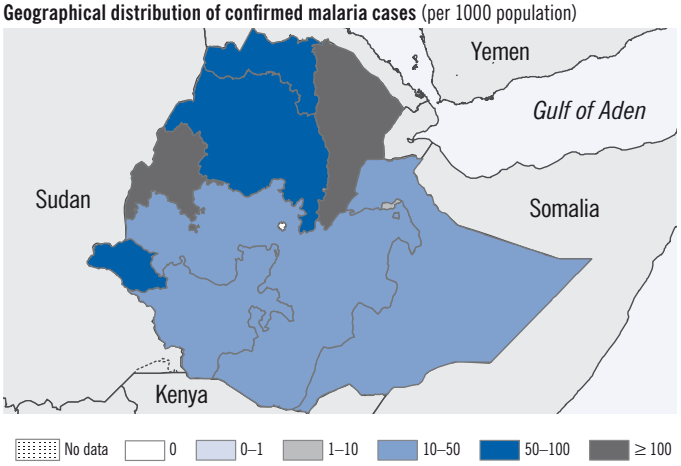
I. EPIDEMIOLOGICAL PROFILE

Population and epidemiological profile

Population (in thousands)*	**2009**	**%**
All ages	82 825	
< 5 years	13 581	16
Rural	68 554	83
Population by malaria endemicity (in thousands)	**2009**	**%**
High transmission (≥1 case per 1000 population)	22 528	27
Low transmission (0–1 cases per 1000 population)	33 792	41
Malaria-free (0 cases)	26 504	32
Vector and parasite species		
Major *Anopheles* species	*arabiensis, funestus, nili, pharoensis*	
Major *Plasmodium* species	*falciparum, vivax*	

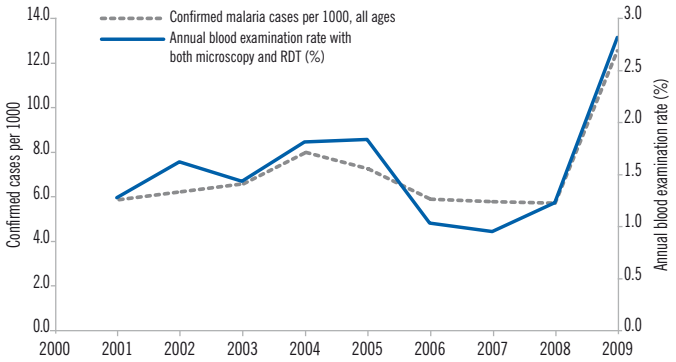
** UN Population Division estimates*

Geographical distribution of confirmed malaria cases (per 1000 population)

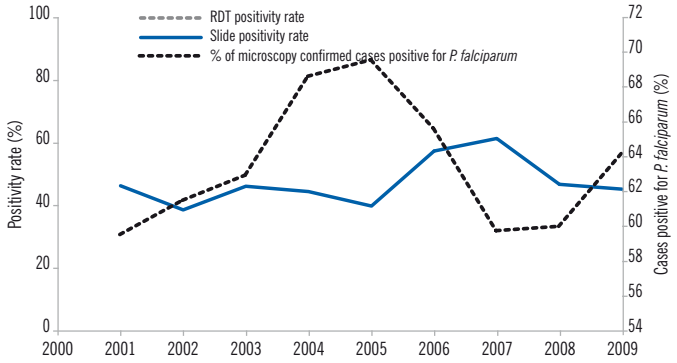


Trends in malaria morbidity and mortality

Confirmed malaria cases, per 1000 and annual blood examination rate



Malaria test positivity rate and % of microscopy confirmed cases positive for *P. falciparum*

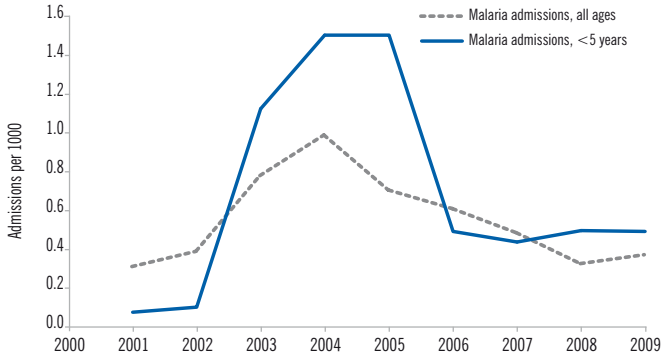


	All ages											< 5 years	
Year	All-cause outpatient consultations	Suspected cases (tested + probable)	Probable cases (not tested)	Total cases tested (microscopy + RDT)	Total confirmed cases (microscopy + RDT)	Malaria cases (confirmed + probable)	Examined by microscopy	Microscopy positive	*P. falciparum*	Examined by RDT	RDT positive	All-cause outpatient consultations	Malaria cases (confirmed + probable)
2000													
2001	11 097 537	3 014 879	2 162 937	851 942	392 377	2 555 314	851 942	392 377	233 218	0			428 089
2002	10 916 435	3 617 057	2 501 890	1 115 167	427 795	2 929 685	1 115 167	427 795	262 623	0			441 811
2003	11 660 924	4 129 225	3 118 300	1 010 925	463 797	3 582 097	1 010 925	463 797	291 403	0			522 491
2004	12 264 096	5 904 132	4 591 710	1 312 422	578 904	5 170 614	1 312 422	578 904	396 621	0			948 587
2005	14 353 595	4 727 209	3 363 015	1 364 194	538 942	3 901 957	1 364 194	538 942	374 335				554 262
2006	24 620 248	3 375 994	2 590 785	785 209	447 780	3 038 565	785 209	447 780	293 326				528 603
2007	24 737 524	2 844 963	2 105 336	739 627	451 816	2 557 152	739 627	451 816	269 514				268 854
2008	18 835 927	3 060 407	2 074 084	986 323	458 561	2 532 645	986 323	458 561	274 657			519 099	422 248
2009	23 498 667	4 335 001	2 006 887	2 328 114	1 036 316	3 043 203	2 065 237	927 992	594 751	262 877	108 324	1 353 087	299 887

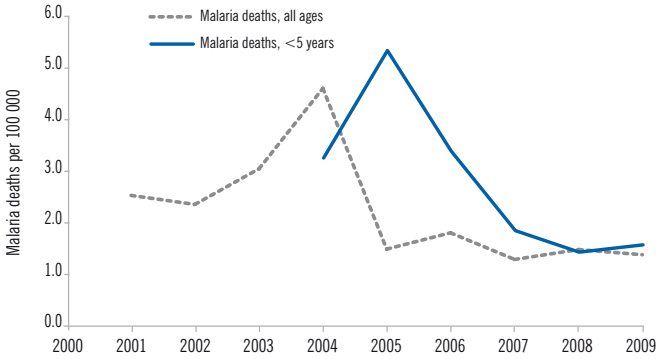
Note: Reporting completeness of outpatient health facilities (%) in 2009: 65.5%

I. EPIDEMIOLOGICAL PROFILE *(continued)*

Reported malaria admissions, per 1000 population



Reported malaria deaths, per 100 000 population



Admissions	All ages		<5 years	
Year	All-cause admissions	Malaria admissions	All-cause admissions	Malaria admissions
2000				
2001	225 820	20 432		848
2002	223 560	26 343		1 171
2003	303 640	54 654		13 682
2004	299 535	71 341		18 565
2005	260 123	52 044		18 880
2006	186 245	46 130		6 266
2007	209 699	37 546		5 668
2008	381 623	25 739	19 870	6 563
2009	205 002	30 102	46 238	6 620

Deaths	All ages		<5 years	
Year	All-cause deaths	Malaria deaths	All-cause deaths	Malaria deaths
2000				
2001	11 113	1 681		
2002	10 573	1 607		
2003	10 796	2 138		
2004	9 242	3 327		401
2005	6 918	1 086		670
2006	60 918	1 357		432
2007	37 508	991		239
2008	19 610	1 169	948	189
2009	10 281	1 121	1 798	212

II. INTERVENTION POLICIES AND STRATEGIES

Intervention	WHO-RECOMMENDED POLICIES / STRATEGIES	YES or NO	Year adopted	OTHER POLICY / STRATEGY	YES or NO	Year adoped
Insecticide-treated nets (ITN)	ITNs/LLINs are distributed free of charge	YES	2004	ITNs/LLINs are distributed through antenatal clinics	–	–
	ITNs/LLINs are distributed to all age groups	YES	2004	ITNs/LLINs are distributed through EPI clinics	–	–
				ITNs/LLINs are distributed through mass campaigns to < 5 only	YES	2001
Indoor residual spraying (IRS)	IRS is recommended by malaria control programme	YES	1960	IRS is only used to prevent and control epidemics	YES	1960
	DDT is used for IRS	YES	1960	Where IRS is conducted, ITNs are also applied	YES	1997
				Insecticide resistance monitoring is undertaken	YES	1997
Intermittent preventive treatment (IPT)	IPT is used to prevent malaria during pregnancy	NO	–			
Case management	Patients of all ages should receive diagnostic tests	YES	1997	Malaria diagnosis is free of charge in the public sector	YES	1960
	RDTs are used at community level	YES	2004	ACT is delivered by community agents	YES	2004
	ACT is free of charge for all age groups in the public sector	YES	2004	Therapetic efficacy monitoring is undertaken	YES	2003
	Pre-referral treatment with parenteral quinine or artemisinin derivatives or artesunate suppositories is provided	YES	1997			
	Oral artemisinin-based monotherapies are not registered	YES	–			

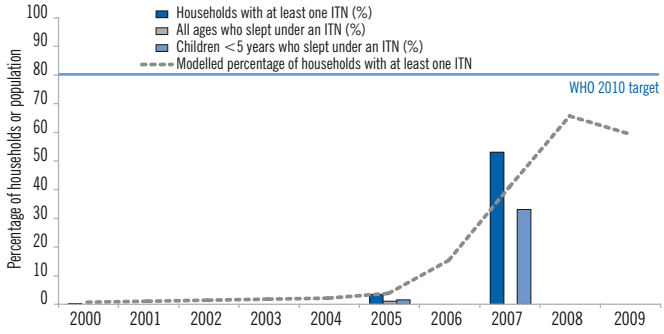
Antimalarial policy	Type of medicine	Year adopted
First-line treatment of *P. falciparum* (unconfirmed)	AL	2004
First-line treatment of *P. falciparum* (confirmed)	AL	2004
Treatment failure of *P. falciparum*	QN	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	CQ	2004

Therapeutic efficacy studies (percentage of clinical and parasitological failure)

Name of first-line antimalarial medicine	Study year	No. of studies	Failure rate			Follow-up	*Remarks*
			Minimum	Median	Maximum		
Artemether-lumefantrine (AL)	2003–2009	9	0.0	0.0	7.5	28 days	
Quinine (QN)	2006–2006	1	10.0	10.0	10.0	28 days	

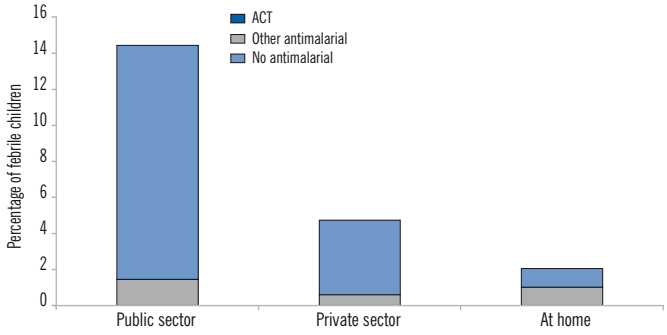
III. IMPLEMENTING MALARIA CONTROL

Coverage with ITNs from survey or model data



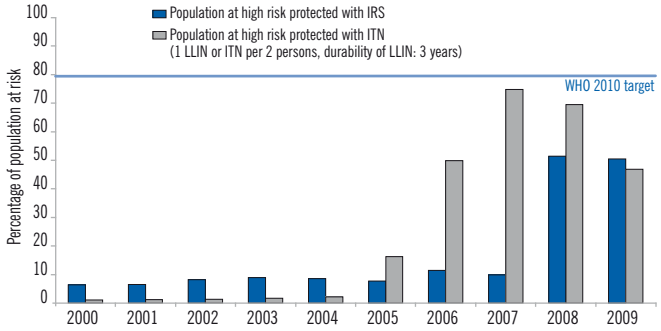
Sources DHS 2000, DHS 2005, MIS 2007.

Source of treatment for febrile children and antimalarial received from survey data

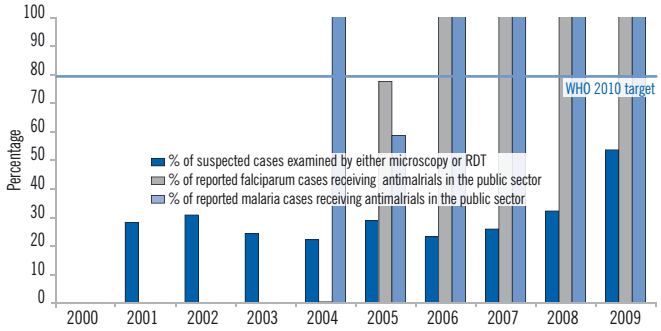


Sources: DHS 2005.

Coverage with IRS and ITNs from programme data



Access to effective treatment from programme data: percentage of cases tested and number of ACT courses delivered relative to cases



Preventive interventions: programme and survey data

Year	No. of ITNs and/or LLINs delivered	No. of people protected by IRS	Pregnant women who slept under any net (%)	Pregnant women who slept under an ITN (%)
2000	250 000	2 843 898		
2001	280 000	2 960 986		
2002	320 000	3 826 898		
2003	430 000	4 298 183		
2004	550 000	4 228 465		
2005	4 243 157	3 912 903	2	1
2006	9 070 718	5 984 485		
2007	7 178 443	5 303 213	37	35
2008	3 316 696	28 206 375		
2009	1 875 681	28 373 630		

Survey sources: DHS 2000, DHS 2005, MIS 2007.

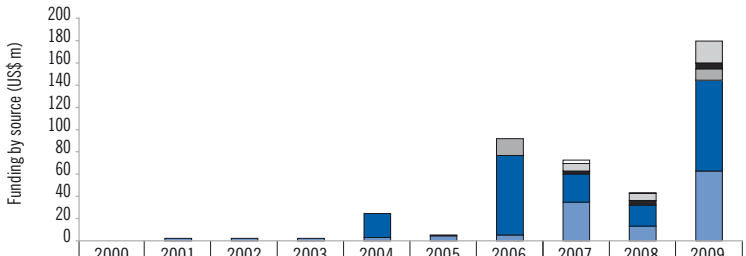
Diagnostics and treatment courses: programme and survey data

No. of RDTs delivered	No. of first-line treatment courses delivered	No. of ACT treatment courses delivered	Febrile children < 5 years (%)	Febrile children < 5 years treated in public health facility (%)
				14
	0	0		
	0	0		
	0	0		
	9 725 000	25 000		
	3 500 000	3 193 993		14
2 264 775	6 950 000	6 806 744		
7 066 500	9 483 040	4 032 640	22	
4 100 000	8 000 000	8 000 000		
2 441 050	9 561 391	8 387 321		

Survey sources: DHS 2000, DHS 2005, MIS 2007.

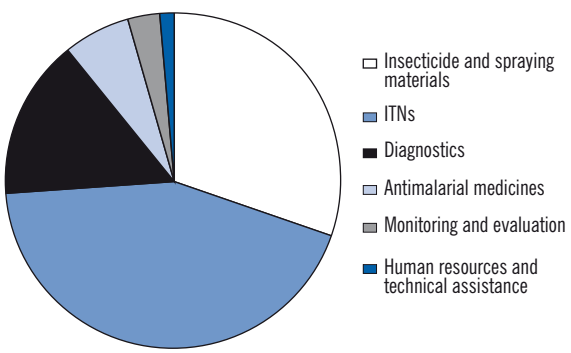
IV. FINANCING MALARIA CONTROL

Governmental and external financing



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Other*	0	0	0	0	0	0	0	2 947 894	164 372	0
USAID/PMI	0	0	0	0	0	0	0	6 587 000	6 587 000	19 700 000
UNICEF	0	0	0	0	0	0	0	0	0	280 000
WHO	0	0	0	0	0	0	0	3 000 808	4 200 000	5 000 000
World Bank	0	0	0	12 500	11 120	695 037	15 128 000	0	0	10 090 000
Global Fund	0	0	0	0	21 757 639	0	71 421 627	24 999 226	18 990 619	81 586 570
Government**	0	2 119 140	2 167 894	2 346 156	2 858 151	4 588 476	5 252 564	34 946 890	13 055 600	62 883 603

Breakdown of expenditure by intervention in 2009



** Bilaterals: DFID, JICA; and EU, UN agencies, etc.*
***Governmental expenditure may not include costs at sub-national level and costs related to health systems, human resources, etc.*

GEORGIA

Malaria reappeared in Georgia in 1996, after 25 years during which no malaria cases had been reported. Cases of *P. vivax* malaria were detected in 1996 in areas bordering Azerbaijan, and the numbers increased until 2002. However, since 2003 there has been a steady decrease, with only 7 cases reported in 2009, only one of which was indigenous. The decline in malaria cases is associated with increased malaria control activities, i.e. the application of IRS and prompt treatment of confirmed cases. IRS has been applied selectively in foci of highest risk, protecting about 17 000 people at risk per year. Epidemiological investigation is carried out on all reported malaria cases and all cases are treated with a full course of chloroquine and primaquine. Malaria control in Georgia is financed primarily by the government with additional support from the Global Fund and WHO. Political commitment to the principles of the Tashkent Declaration, endorsed in 2005, continues to grow in Georgia. A new national malaria elimination strategy with the goal of eliminating *P. vivax* malaria by 2013 and a relevant action plan were launched in 2008.

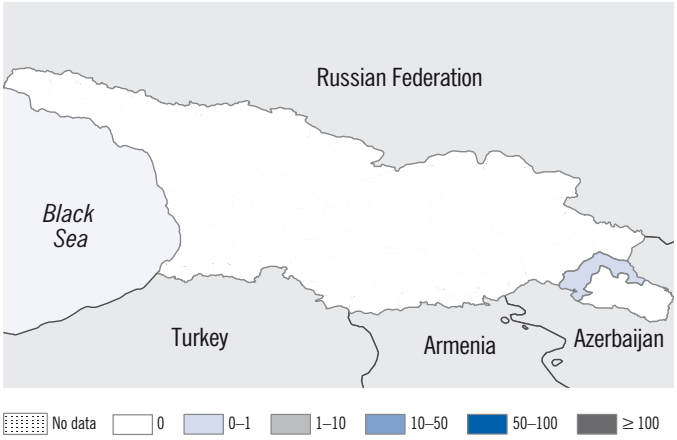
I. EPIDEMIOLOGICAL PROFILE

Population, endemicity and malaria burden

Population (in thousands)*	**2009**	**%**
All ages	4 260	
< 5 years	245	6
Rural	2 011	47
Population by malaria endemicity (in thousands)	**2009**	**%**
High transmission (≥1 case per 1000 population)	1	
Low transmission (0–1 cases per 1000 population)	43	1
Malaria-free (0 cases)	4 218	99
Vector and parasite species		
Major *Anopheles* species	*sacharovi*	
Major *Plasmodium* species	*vivax risk only*	

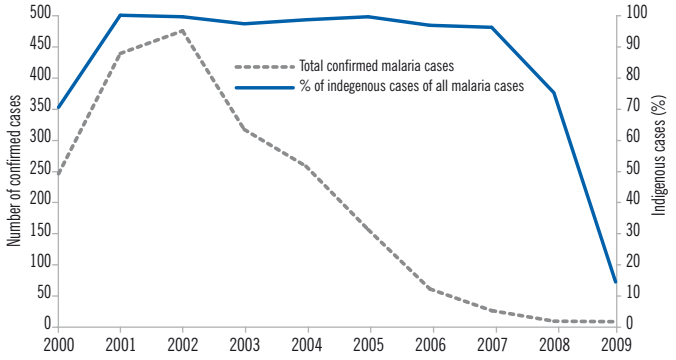
** UN Population Division estimates*

Geographical distribution of confirmed malaria cases (per 1000 population)



Trends in malaria morbidity and mortality

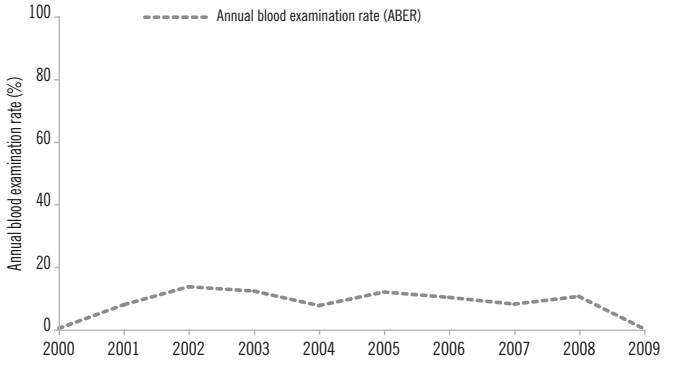
Confirmed indigeous malaria cases

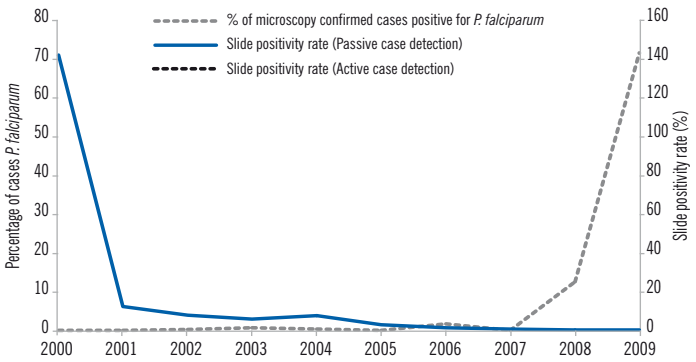


Year	Examined by microscopy	Microscopy positive	*P. falciparum*	Indigenous malaria cases	Malaria deaths
2000	173	245	0	172	
2001	3 574	438	0	437	0
2002	6 145	474	1	471	0
2003	5 457	316	2	307	0
2004	3 365	257	1	253	0
2005	5 169	155	0	154	0
2006	4 400	60	1	58	0
2007	3 400	25	0	24	0
2008	4 398	8	1	6	0
2009	4 120	7	5	1	0

Note: Reporting completeness of outpatient health facilities (%) in 2009: 100%

Annual blood examination rate (both passive and active case detection)





II. INTERVENTION POLICIES AND STRATEGIES

Intervention	WHO-RECOMMENDED POLICIES / STRATEGIES	YES or NO	Year adopted	OTHER POLICY / STRATEGY	YES or NO	Year adoped
Insecticide-treated nets (ITN)	ITNs/ LLINs are distributed for free	–	–	ITNs/ LLINs are delivered at subsidized prices	–	–
	ITNs/ LLINs are distributed to all age groups	–	–			
Indoor residual spraying (IRS)	IRS is recommended by malaria control program	YES	2000	Insecticide resistance monitoring is undertaken	–	–
	DDT is used for IRS	–	–	Where IRS is conducted, ITNs are also applied	Yes	2000
				Insecticide resistance monitoring is undertaken	–	–
Case management	Malaria diagnosis is free of charge in the public sector	YES	2000			
	Malaria treatment is permitted in the private sector	–	–			
	Malaria treatment is free of charge in the private sector	–	–			
	Radical treatment of *P.vivax* cases	YES	2000			
Surveillance	Foci and case investigation undertaken	–	–			
	Case reporting from private sector is mandatory	–	–			

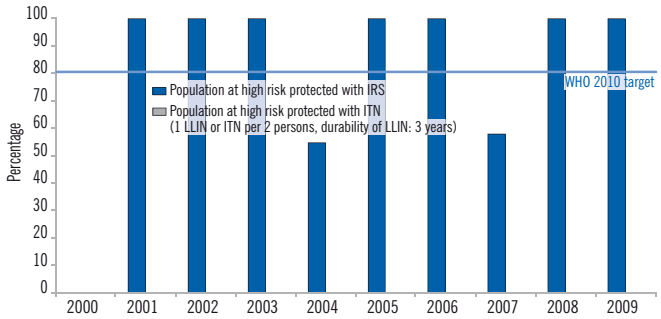
Antimalarial policy	Type of medicine	Year adopted
First-line treatment of *P. falciparum* (unconfirmed)	–	–
First-line treatment of *P. falciparum* (confirmed)	–	–
Treatment failure of *P. falciparum*	–	–
Treatment of severe malaria	–	–
Treatment of *P. vivax*	CQ+PQ (14d)	–

Therapeutic efficacy studies (percentage of clinical and parasitological failure)

Name of first-line antimalarial medicine	Study year	No. of studies	Failure rate			Follow-up	*Remarks*
			Minimum	Median	Maximum		

III. IMPLEMENTING MALARIA CONTROL

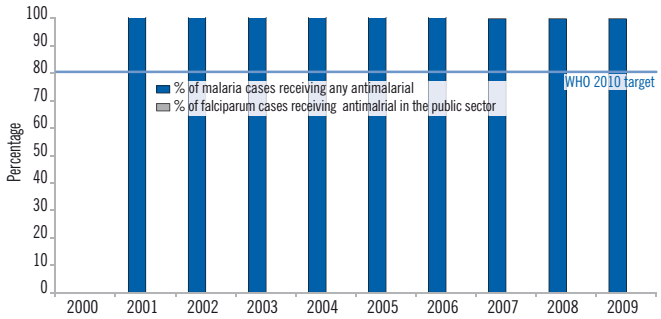
Coverage with IRS and ITNs from programme data



Year	No. of people protected by IRS	No. of ITNs and/or LLINs delivered
2000		0
2001	69 452	0
2002	103 876	0
2003	52 624	0
2004	24 732	0
2005	53 088	0
2006	52 800	0
2007	25 268	0
2007	50 426	0
2009	51 828	0

Source: .

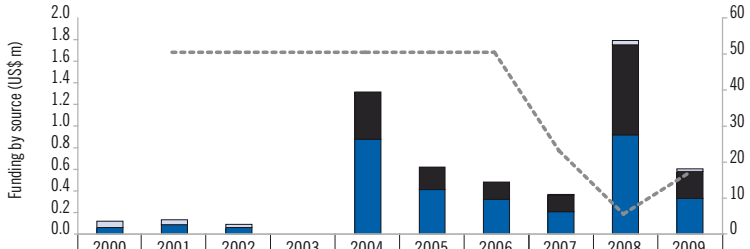
Access to effective treatment from programme data: percentage of cases tested and number of ACT courses delivered relative to cases



Year	No. of first-line treatment courses delivered	No. of ACT treatment courses delivered
2000		0
2001	500	0
2002	500	0
2003	1 000	0
2004	500	0
2005	300	0
2006	200	0
2007	25	0
2007	8	0
2009	7	0

IV. FINANCING MALARIA CONTROL

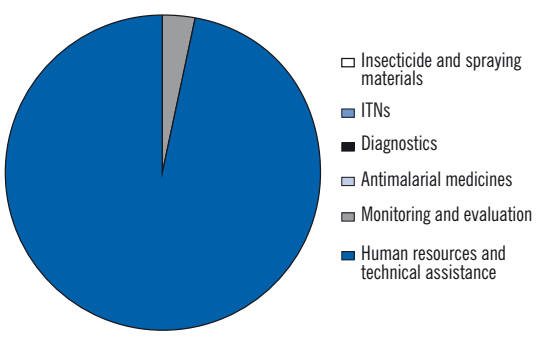
Governmental and external financing



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Other*	0	0	0	0	0	0	0	0	0	0
WHO	60 000	44 000	30 000	0	0	0	0	5 000	38 280	25 000
GFATM	0	0	0	0	438 900	206 800	160 600	155 362	833 900	250 431
Total	60 000	88 000	60 000	0	877 800	413 600	321 200	207 322	919 304	329 405
Government** as % of total		50	50		50	50	50	23	5	16

** Bilaterals: DFID, JICA; and EU, UN agencies, etc.*
*** Governmental expenditure may not include costs at sub-national level and costs related to health systems, human resources, etc.*

Breakdown of expenditure by intervention in 2009



INDIA

India reports approximately two-thirds of all confirmed malaria cases in the South-East Asia Region, with five states accounting for 60% of these cases: Orissa, Chhattisgarh, Madhya Pradesh, Jharkhand and West Bengal. Other highly endemic states include Arunachal Pradesh, Assam, Meghalaya and Tripura. In 2009, while the majority of the 103 million cases were examined by microscopy, only 9.1 million were examined by RDT. The number of confirmed cases has remained stable since 2007, with 1.5 million cases reported annually; about half of the confirmed cases are due to *P. falciparum*. The DHS carried out in 2005–2006 indicated that 38% of households owned a mosquito net, although IRS has been the main strategy for vector control, covering about 67 million people at risk in 2009. During 2007–2009, the programme delivered 21.2 million ITNs and 2.2 million LLINs, covering around 20% of population at high risk. In 2009, 1.5 million first-line treatment courses were delivered, including almost 825 000 courses of ACT, enough to treat over 90% of all *P. falciparum* malaria cases reported. The total funding for malaria rose from US$ 54 million in 2001 to about US$ 80 million in 2009. This increase is primarily due to an increase in the government funding which reached US$ 60 million in 2009, 76% of all malaria expenditure. Contributions from the Global Fund and the World Bank were US$ 9.1 million and US$ 9.4 million respectively.

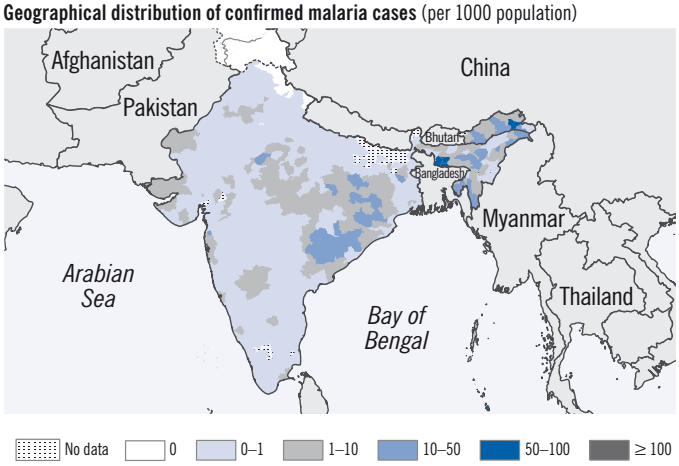
I. EPIDEMIOLOGICAL PROFILE

Population and epidemiological profile

Population (in thousands)*	**2009**	**%**
All ages	1 198 003	
< 5 years	126 114	11
Rural	841 525	70
Population by malaria endemicity (in thousands)	**2009**	**%**
High transmission (≥1 case per 1000 population)	272 190	23
Low transmission (0–1 cases per 1000 population)	709 668	59
Malaria-free (0 cases)	216 145	18
Vector and parasite species		
Major *Anopheles* species	*stephensi, culicifacies, fluviatilis, minimus*	
Major *Plasmodium* species	*falciparum, vivax*	

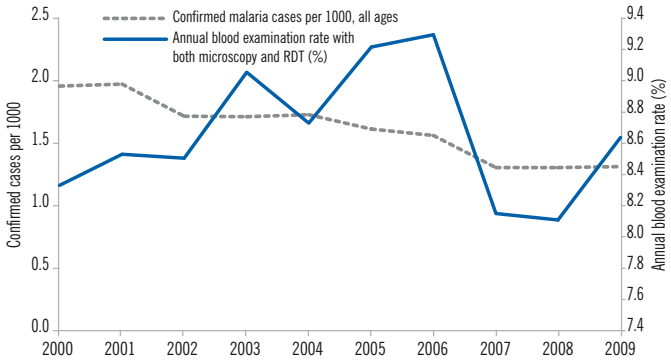
** UN Population Division estimates*

Geographical distribution of confirmed malaria cases (per 1000 population)

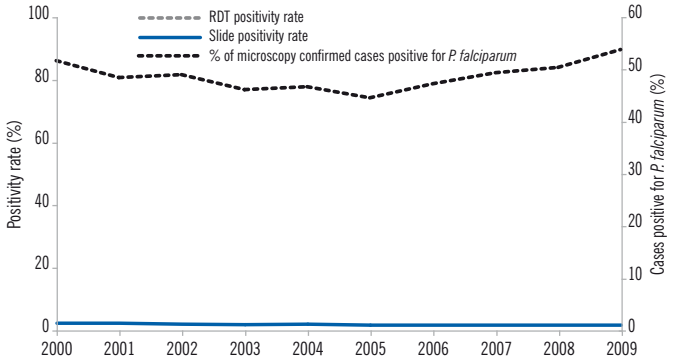


Trends in malaria morbidity and mortality

Confirmed malaria cases, per 1000 and annual blood examination rate



Malaria test positivity rate and % of microscopy confirmed cases positive for *P. falciparum*

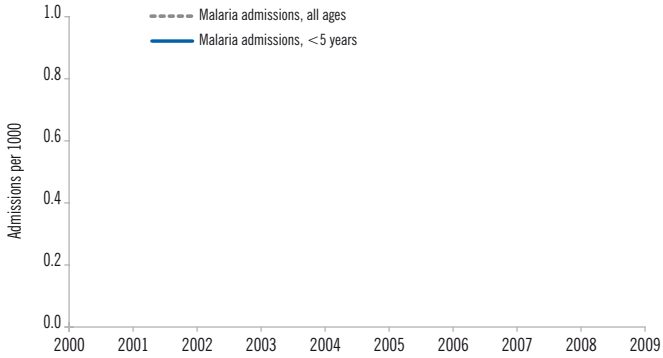


	All ages										< 5 years	
Year	All-cause outpatient consultations	Suspected cases (tested + probable)	Probable cases (not tested)	Total cases tested (microscopy + RDT)	Total confirmed cases (microscopy + RDT)	Malaria cases (confirmed + probable)	Examined by microscopy	Microscopy positive	*P. falciparum*	Examined by RDT	RDT positive	All-cause outpatient consultations	Malaria cases (confirmed + probable)
2000		86 790 375	0	86 790 375	2 031 790	2 031 790	86 790 375	2 031 790	1 045 170				153 500
2001		90 389 019	0	90 389 019	2 085 484	2 085 484	90 389 019	2 085 484	1 005 236				156 700
2002		91 617 725	0	91 617 725	1 841 227	1 841 227	91 617 725	1 841 227	897 446				150 605
2003		99 136 143	0	99 136 143	1 869 403	1 869 403	99 136 143	1 869 403	857 101				163 573
2004		97 111 526	0	97 111 526	1 915 363	1 915 363	97 111 526	1 915 363	890 152				196 064
2005		104 120 792	0	104 120 792	1 816 569	1 816 569	104 120 792	1 816 569	805 077				163 471
2006		106 606 703	0	106 606 703	1 785 109	1 785 109	106 606 703	1 785 109	838 555				142 463
2007		94 855 000	0	94 855 000	1 508 927	1 508 927	86 355 000	1 508 927	741 076	8 500 000			129 937
2008		95 734 579	0	95 734 579	1 532 497	1 532 497	86 734 579	1 532 497	768 030	9 000 000			132 431
2009		103 395 721	0	103 395 721	1 563 344	1 563 344	94 295 721	1 563 344	837 130	9 100 000			

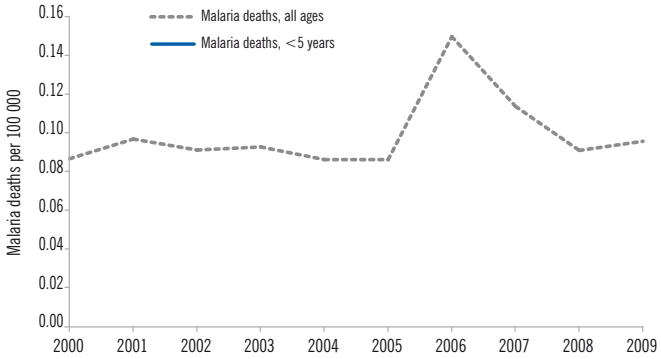
Note: Reporting completeness of outpatient health facilities (%) in 2009: 100%

I. EPIDEMIOLOGICAL PROFILE *(continued)*

Reported malaria admissions, per 1000 population



Reported malaria deaths, per 100 000 population



Admissions	All ages		<5 years	
Year	All-cause admissions	Malaria admissions	All-cause admissions	Malaria admissions
2000				
2001				
2002				
2003				
2004				
2005				
2006				
2007				
2008				
2009				

Deaths	All ages		<5 years	
Year	All-cause deaths	Malaria deaths	All-cause deaths	Malaria deaths
2000		892		
2001		1 015		
2002		973		
2003		1 006		
2004		949		
2005		963		
2006		1 708		
2007		1 311		
2008		1 061		
2009		1 133		

II. INTERVENTION POLICIES AND STRATEGIES

Intervention	WHO-RECOMMENDED POLICIES / STRATEGIES	YES or NO	Year adopted	OTHER POLICY / STRATEGY	YES or NO	Year adoped
Insecticide-treated nets (ITN)	ITNs/LLINs are distributed free of charge	YES	2001	ITNs/LLINs are distributed through antenatal clinics	YES	2003
	ITNs/LLINs are distributed to all age groups	YES	2001	ITNs/LLINs are distributed through EPI clinics	YES	2000
				ITNs/LLINs are distributed through mass campaigns to < 5 only	YES	2000
Indoor residual spraying (IRS)	IRS is recommended by malaria control programme	YES	1953	IRS is only used to prevent and control epidemics	YES	2000
	DDT is used for IRS	YES	1953	Where IRS is conducted, ITNs are also applied	YES	2001
				Insecticide resistance monitoring is undertaken	YES	1959
Intermittent preventive treatment (IPT)	IPT is used to prevent malaria during pregnancy	NO	–			
Case management	Patients of all ages should receive diagnostic tests	YES	1958	Malaria diagnosis is free of charge in the public sector	YES	1953
	RDTs are used at community level	YES	2006	ACT is delivered by community agents	YES	2006
	ACT is free of charge for all age groups in the public sector	YES	2006	Therapetic efficacy monitoring is undertaken	YES	1973
	Pre-referral treatment with parenteral quinine or artemisinin derivatives or artesunate suppositories is provided	YES	1977			
	Oral artemisinin-based monotherapies are not registered	YES	2009			

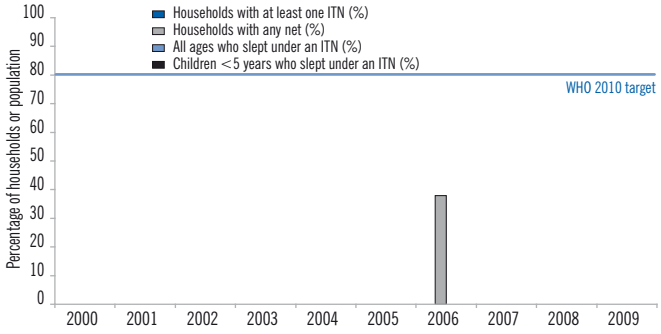
Antimalarial policy	Type of medicine	Year adopted
First-line treatment of *P. falciparum* (unconfirmed)	CQ	2007
First-line treatment of *P. falciparum* (confirmed)	AS+SP	2007
Treatment failure of *P. falciparum*	QN+D; QN+T	–
Treatment of severe malaria	AM; AS; QN	2007
Treatment of *P. vivax*	CQ+PQ(14d)	2007

Therapeutic efficacy studies (percentage of clinical and parasitological failure)

Name of first-line antimalarial medicine	Study year	No. of studies	Failure rate			Follow-up	*Remarks*
			Minimum	Median	Maximum		
Artesunate+sulfadoxine-pyrimethamine (AS+SP)	2005–2007	9	0.0	0.0	4.0	28 days	

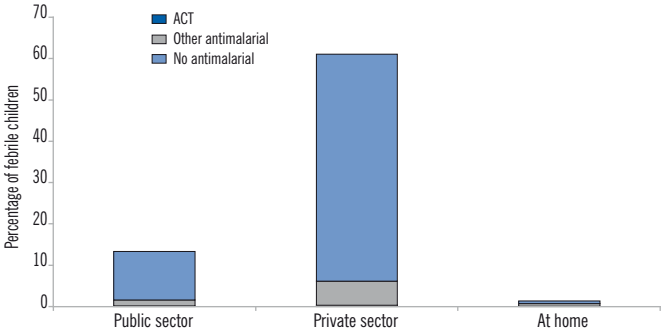
III. IMPLEMENTING MALARIA CONTROL

Coverage with ITNs from survey or model data



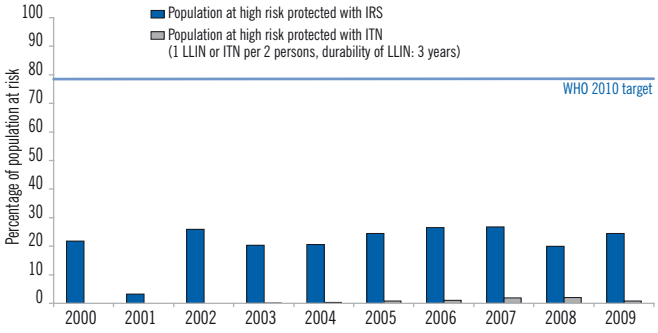
Sources: DHS 2006

Source of treatment for febrile children and antimalarial received from survey data

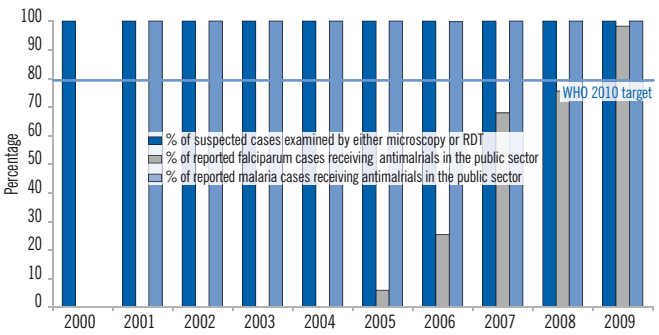


Sources: DHS 2005

Coverage with IRS and ITNs from programme data



Access to effective treatment from programme data: percentage of cases tested and number of ACT courses delivered relative to cases



Preventive interventions: programme and survey data

Year	No. of ITNs and/or LLINs delivered	No. of people protected by IRS	Pregnant women who slept under any net (%)	Pregnant women who slept under an ITN (%)
2000	0	51 650 476		
2001	175 000	7 787 823		
2002	90 000	63 575 991		
2003	230 000	50 754 459		
2004	1 200 000	52 118 040		
2005	2 720 000	62 935 123		
2006	3 950 000	69 457 913		
2007	7 000 000	70 853 795		
2008	7 240 000	53 773 347		
2009	2 235 000	66 810 733		

Survey sources: MICS 2000.

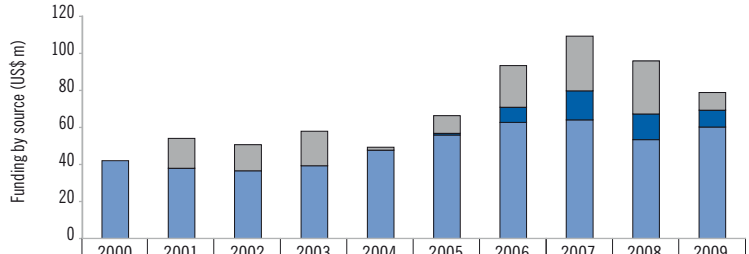
Diagnostics and treatment courses: programme and survey data

No. of RDTs delivered	No. of first-line treatment courses delivered	No. of ACT treatment courses delivered	Febrile children < 5 years (%)	Febrile children < 5 years treated in public health facility (%)
	2 085 484			
	1 842 019			
	1 869 403			
	1 915 363			
1 200 000	1 816 342	57 700		13
2 862 000	1 780 777	242 300		
8 500 000	1 508 927	550 000		
9 000 000	1 532 497	622 000		
9 600 000	1 563 344	825 000		

Survey sources: MICS 2000.

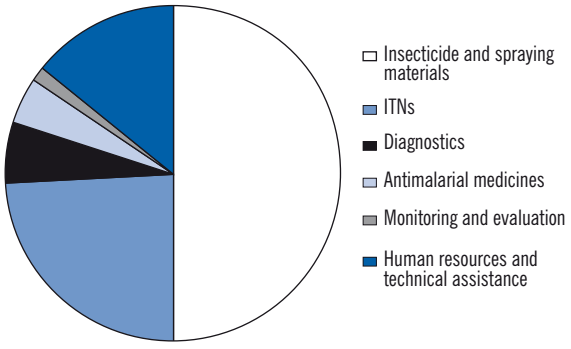
IV. FINANCING MALARIA CONTROL

Governmental and external financing



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Other*	0	0	0	0	0	0	0	0	0	0
USAID/PMI	0	0	0	0	0	0	0	0	0	0
UNICEF	0	0	0	0	0	0	0	0	0	0
WHO	0	0	0	0	0	0	0	0	0	0
World Bank	0	16 266 608	13 969 726	18 535 966	1 372 056	9 512 474	22 400 000	29 500 000	28 619 974	9 480 000
Global Fund	0	0	0	0	0	912 325	8 227 900	15 727 050	13 863 557	9 184 373
Government**	42 004 444	37 904 255	36 607 438	39 393 603	47 833 333	55 907 838	62 746 667	64 097 391	53 360 000	60 222 222

Breakdown of expenditure by intervention in 2009



** Bilaterals: DFID, JICA; and EU, UN agencies, etc.*
*** Governmental expenditure may not include costs at sub-national level and costs related to health systems, human resources, etc.*

LAO People's Democratic Republic

The intensity of malaria transmission in the Lao People's Democratic Republic varies considerably across the country from very low in the plains along the Mekong river and in areas of high altitude, to intense in hilly and forested areas. Approximately 1.9 million people live in high risk areas. All suspected cases are tested parasitologically and nearly 97% are due to *P. falciparum*. Confirmed malaria cases fell from 26 820 per year during 2001–2005 to 23 532 in 2009. There was also a large reduction in malaria admissions from 15 473 to 732, and in malaria deaths from 200 to just 5 deaths during same period (>95% reduction for both). The proportion of malaria admissions and deaths also fell sharply from 20% to less than 1%. The programme delivered 1 382 075 ITN/LLINs during 20007–2009, protecting 77% of the 2.28 million population at high risk. In 2005–2008, 12 400 village health volunteers in more than 6000 villages were trained in the use of *P. falciparum*-specific RDT and ACT. Following large-scale introduction of RDTs and ACT, information on malaria incidence is now available at village level, allowing village-based stratification. Funding for malaria increased since 2004, averaging US$ 4 million per year during 2007–2009 of which over 90% is from the Global Fund.

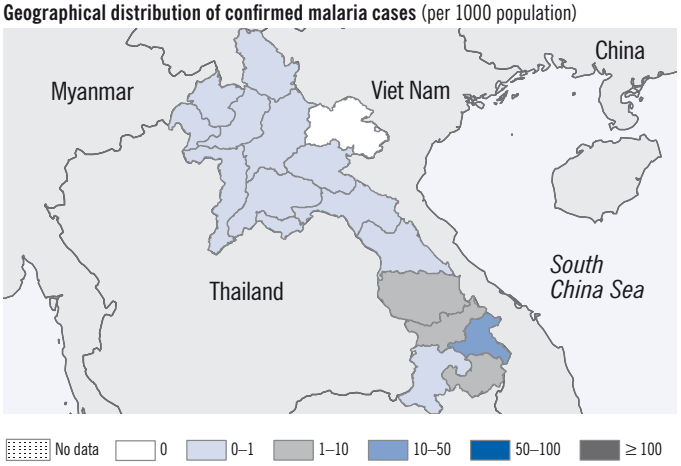
I. EPIDEMIOLOGICAL PROFILE

Population and epidemiological profile

Population (in thousands)*	**2009**	**%**
All ages	6 320	
< 5 years	789	12
Rural	4 296	68
Population by malaria endemicity (in thousands)	**2009**	**%**
High transmission (≥1 case per 1000 population)	2 254	36
Low transmission (0–1 cases per 1000 population)	1 462	23
Malaria-free (0 cases)	2 604	41
Vector and parasite species		
Major *Anopheles* species	*minimus, dirus, jeyporiensis, maculatus*	
Major *Plasmodium* species	*falciparum, vivax*	

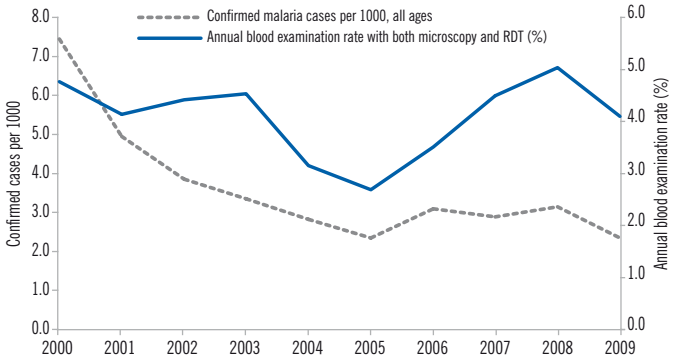
** UN Population Division estimates*

Geographical distribution of confirmed malaria cases (per 1000 population)

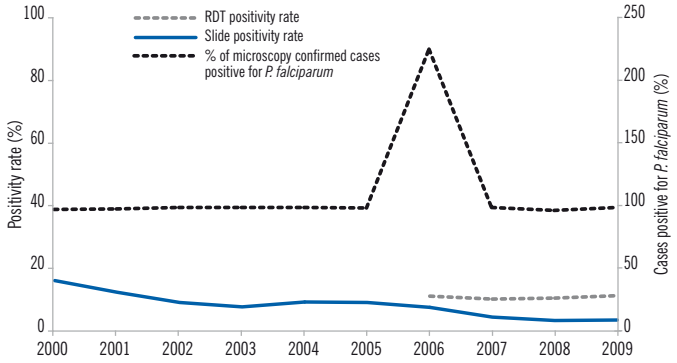


Trends in malaria morbidity and mortality

Confirmed malaria cases, per 1000 and annual blood examination rate



Malaria test positivity rate and % of microscopy confirmed cases positive for *P. falciparum*

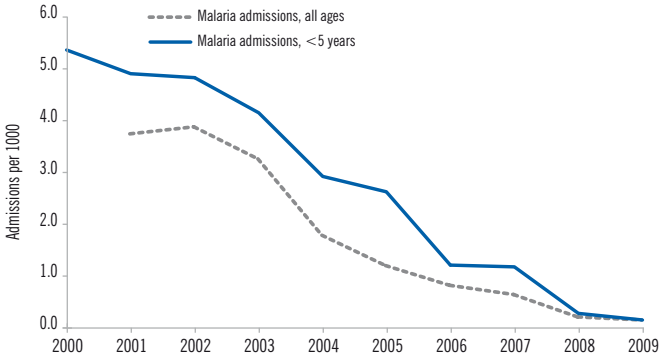


	All ages										< 5 years	
Year	All-cause outpatient consultations	Suspected cases (tested + probable)	Probable cases (not tested)	Total cases tested (microscopy + RDT)	Total confirmed cases (microscopy + RDT)	Malaria cases (confirmed + probable)	Examined by microscopy	Microscopy positive	*P. falciparum*	Examined by RDT	RDT positive	All-cause outpatient consultations	Malaria cases (confirmed + probable)
2000		496 070	239 797	256 273	40 106	279 903	256 273	40 106	38 271			80 711	5 654
2001	523 566	303 306	76 907	226 399	27 076	103 983	226 399	27 076	25 851			82 791	3 442
2002	457 101	309 688	63 772	245 916	21 420	85 192	245 916	21 420	20 696			87 189	2 883
2003	486 690	326 297	69 763	256 534	18 894	88 657	256 534	18 894	18 307			95 957	2 434
2004	553 773	218 884	37 625	181 259	16 183	53 808	181 259	16 183	15 648			131 093	2 639
2005	683 462	173 698	16 744	156 954	13 615	30 359	156 954	13 615	13 106			151 370	2 282
2006	829 506	210 927	2 086	208 841	18 382	20 468	113 165	8 093	18 058	95 676	10 289		2 239
2007		275 602	2 906	272 696	17 458	20 364	159 002	6 371	6 171	113 694	11 087		3 741
2008	1 333 985	311 395	0	311 395	19 347	18 566	168 027	4 965	4 697	143 368	14 382	280 956	4 104
2009	2 008 861	266 096	8 126	257 970	14 674	22 800	173 459	5 508	5 328	84 511	9 166	282 644	5 543

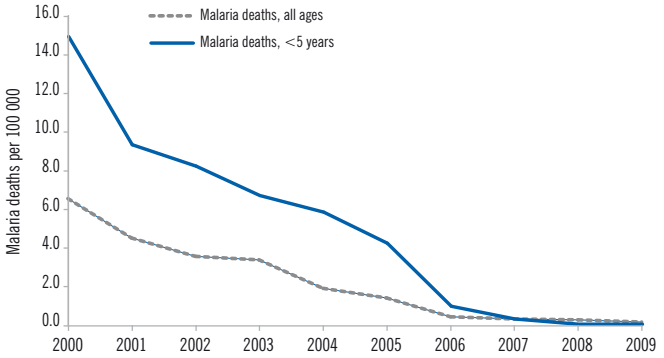
Note: Reporting completeness of outpatient health facilities (%) in 2009: 90.8%

I. EPIDEMIOLOGICAL PROFILE *(continued)*

Reported malaria admissions, per 1000 population



Reported malaria deaths, per 100 000 population



Admissions	All ages		<5 years	
Year	All-cause admissions	Malaria admissions	All-cause admissions	Malaria admissions
2000			16 916	4 550
2001	112 700	20 445	17 987	4 102
2002	119 282	21 538	18 268	3 939
2003	143 471	18 377	21 472	3 287
2004	136 322	10 154	28 210	2 250
2005	150 103	6 853	29 096	1 986
2006	117 037	4 728		909
2007		3 740		887
2008	219 171	1 110	13 117	205
2009	292 584	732	41 851	110

Deaths	All ages		<5 years	
Year	All-cause deaths	Malaria deaths	All-cause deaths	Malaria deaths
2000		350	282	127
2001	936	244	264	78
2002	952	195	250	67
2003	1 086	187	255	53
2004	1 132	105	360	45
2005		77	304	32
2006	1 477	21		7
2007		14		2
2008	1 773	11	433	0
2009	1 868	5	502	0

II. INTERVENTION POLICIES AND STRATEGIES

Intervention	WHO-RECOMMENDED POLICIES / STRATEGIES	YES or NO	Year adopted	OTHER POLICY / STRATEGY	YES or NO	Year adoped
Insecticide-treated nets (ITN)	ITNs/LLINs are distributed free of charge	YES	2003	ITNs/LLINs are distributed through antenatal clinics	–	–
	ITNs/LLINs are distributed to all age groups	YES	2000	ITNs/LLINs are distributed through EPI clinics	–	–
				ITNs/LLINs are distributed through mass campaigns to < 5 only	–	–
Indoor residual spraying (IRS)	IRS is recommended by malaria control programme	–	–	IRS is only used to prevent and control epidemics	–	–
	DDT is used for IRS	–	–	Where IRS is conducted, ITNs are also applied	–	–
				Insecticide resistance monitoring is undertaken	–	–
Intermittent preventive treatment (IPT)	IPT is used to prevent malaria during pregnancy	0	–			
Case management	Patients of all ages should receive diagnostic tests	YES	2003	Malaria diagnosis is free of charge in the public sector	YES	2005
	RDTs are used at community level	YES	2005	ACT is delivered by community agents	YES	2005
	ACT is free of charge for all age groups in the public sector	YES	2005	Therapetic efficacy monitoring is undertaken	YES	2000
	Pre-referral treatment with parenteral quinine or artemisinin derivatives or artesunate suppositories is provided	YES	2005			
	Oral artemisinin-based monotherapies are not registered	YES	2008			

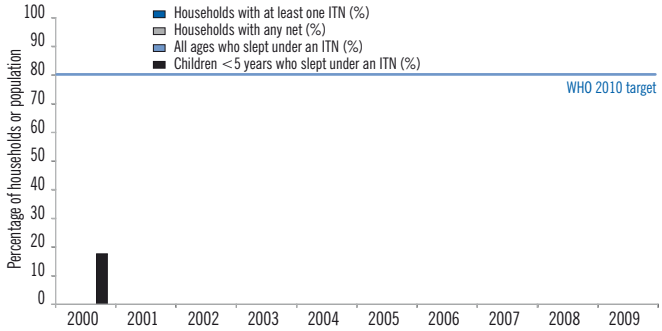
Antimalarial policy	Type of medicine	Year adopted
First-line treatment of *P. falciparum* (unconfirmed)	-	-
First-line treatment of *P. falciparum* (confirmed)	AL	2001
Treatment failure of *P. falciparum*	QN+D	2001
Treatment of severe malaria	AS+AL	2001
Treatment of *P. vivax*	CQ+PQ (14d)	2001

Therapeutic efficacy studies (percentage of clinical and parasitological failure)

Name of first-line antimalarial medicine	Study year	No. of studies	Failure rate			Follow-up	*Remarks*
			Minimum	Median	Maximum		
Artemether-lumefantrine (AL)	2002–2006	4	0.0	1.6	6.3	28 days	

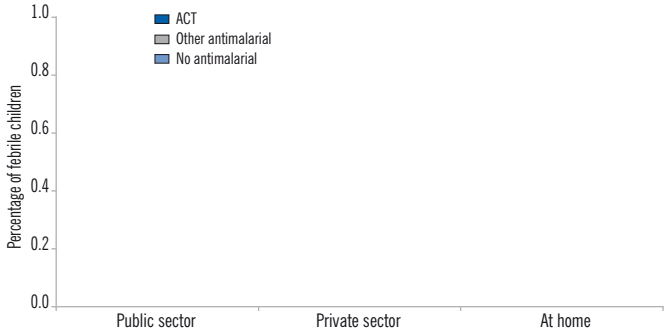
III. IMPLEMENTING MALARIA CONTROL

Coverage with ITNs from survey or model data



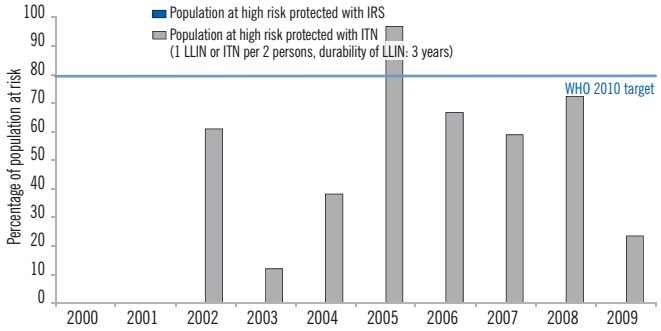
Sources: MICS 2000.

Source of treatment for febrile children and antimalarial received from survey data

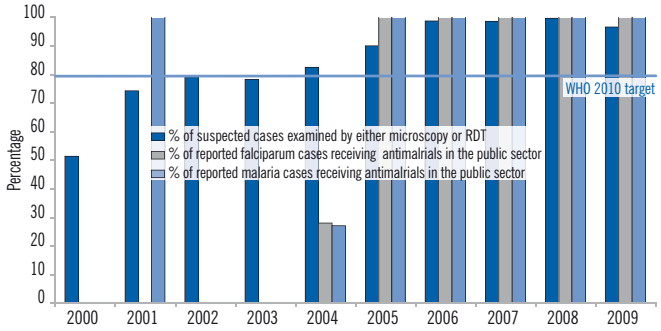


Sources:

Coverage with IRS and ITNs from programme data



Access to effective treatment from programme data: percentage of cases tested and number of ACT courses delivered relative to cases



Preventive interventions: programme and survey data

Year	No. of ITNs and/or LLINs delivered	No. of people protected by IRS	Pregnant women who slept under any net (%)	Pregnant women who slept under an ITN (%)
2000	37 484			
2001	452 240			
2002	400 981			
2003	80 000			
2004	259 600			
2005	670 000			
2006	320 000			
2007	422 900	0		
2008	395 275	0		
2009	72 900	0		

Survey sources: MICS 2000.

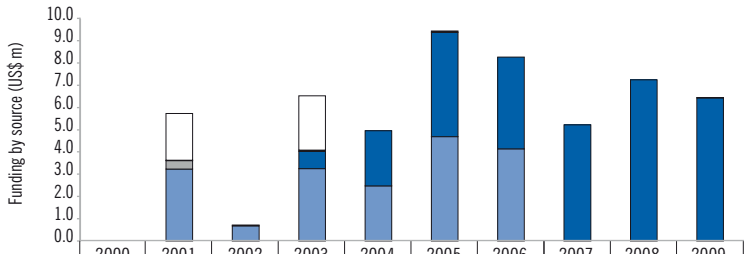
Diagnostics and treatment courses: programme and survey data

No. of RDTs delivered	No. of first-line treatment courses delivered	No. of ACT treatment courses delivered	Febrile children < 5 years (%)	Febrile children < 5 years treated in public health facility (%)
	2 946 000			
32 150	16 200	16 200		
200 000	77 760	77 760		
252 675	140 640	140 640		
525 800	328 320	164 160		
1 173 075	574 320	287 160		
199 075	137 806	68 903		

Survey sources: MICS 2000.

IV. FINANCING MALARIA CONTROL

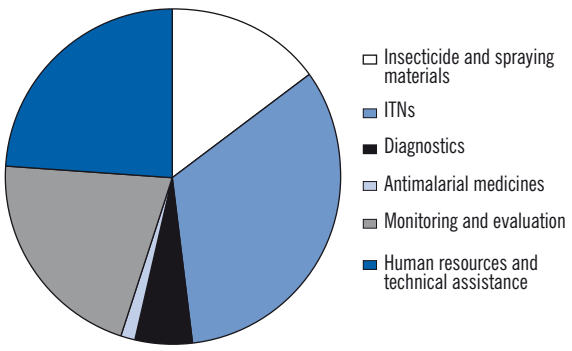
Governmental and external financing



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Other*	0	2 080 000	0	2 440 000	0	0	0	0	0	0
USAID/PMI	0	0	0	0	0	0	0	0	0	0
UNICEF	0	0	0	0	0	0	0	0	0	21 300
WHO	0	33 073	28 665	50 000	0	50 000	0	0	0	0
World Bank	0	377 642	0	0	0	0	0	0	0	0
Global Fund	0	0	0	768 515	2 471 668	4 691 324	4 132 726	5 210 285	7 242 608	6 424 803
Government**	0	3 227 858	682 793	3 258 515	2 471 668	4 691 324	4 132 726	0	0	0

** Bilaterals: DFID, JICA; and EU, UN agencies, etc.*
***Governmental expenditure may not include costs at sub-national level and costs related to health systems, human resources, etc.*

Breakdown of expenditure by intervention in 2009



MADAGASCAR

Malaria transmission in Madagascar occurs all year round in the north of the country; 75% of the population lives in low-transmission areas which are prone to epidemics and 25% live in areas of high risk. The reported outpatient malaria cases decreased from 1.6 million in 2000–2004 to 299 094 in 2009, a reduction of 81%, and inpatient malaria cases decreased by 69% and deaths by 75% in the same period. Some of the decline in reported cases and deaths may be due to incompleteness of reporting in 2009: a WHO-sponsored rapid impact assessment in 2010 in 45 of 111 randomly selected district hospitals found a decrease of 34% for inpatient malaria cases and 66% for inpatient malaria deaths in 2009 compared to 2001–2004. The national programme distributed nearly 6.2 million LLINs during 2007–2009, covering almost 57% of the population at risk, and applied IRS protecting 6.9 million people at risk (35%) in 2009. The programme delivered 398 413 treatment courses of ACT in 2009, sufficient for all malaria cases treated in the public sector. In the DHS in 2008, 59% of households had an ITN. Funding for malaria control has increased every year, from about US$ 4 million in 2004 to over US$ 28 million in 2008 and US$ 39 million in 2009, mainly from the Global Fund, United Nations agencies, the PMI and other bilateral agencies.

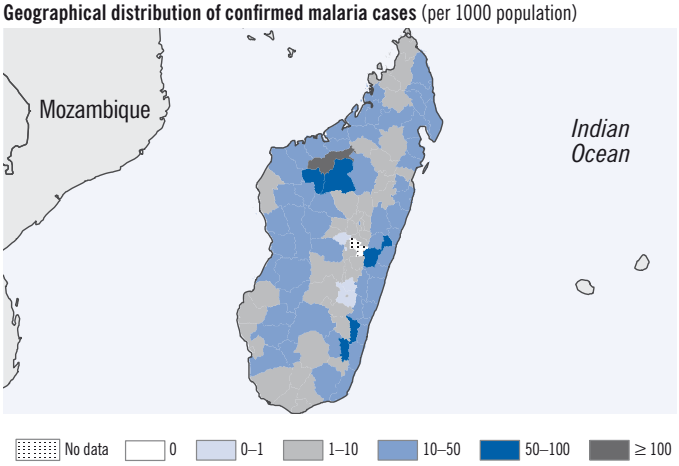
I. EPIDEMIOLOGICAL PROFILE

Population and epidemiological profile

Population (in thousands)*	**2009**	**%**
All ages	19 625	
< 5 years	3 104	16
Rural	13 773	70
Population by malaria endemicity (in thousands)	**2009**	**%**
High transmission (≥1 case per 1000 population)	5 187	26
Low transmission (0–1 cases per 1000 population)	14 438	74
Malaria-free (0 cases)	0	0
Vector and parasite species		
Major *Anopheles* species	*gambiae, arabiensis, funestus*	
Major *Plasmodium* species	*falciparum*	

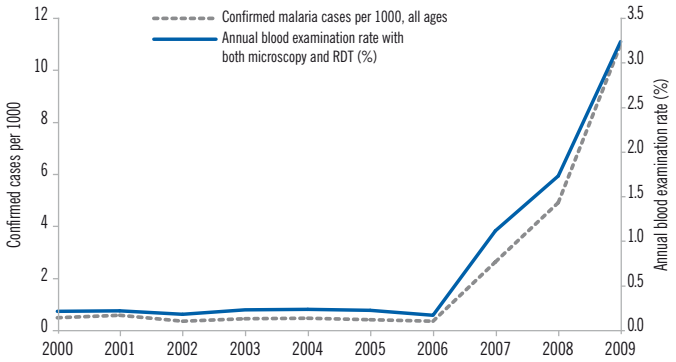
** UN Population Division estimates*

Geographical distribution of confirmed malaria cases (per 1000 population)

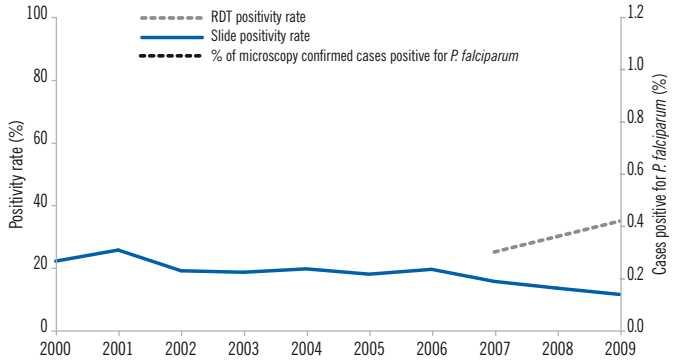


Trends in malaria morbidity and mortality

Confirmed malaria cases, per 1000 and annual blood examination rate



Malaria test positivity rate and % of microscopy confirmed cases positive for *P. falciparum*

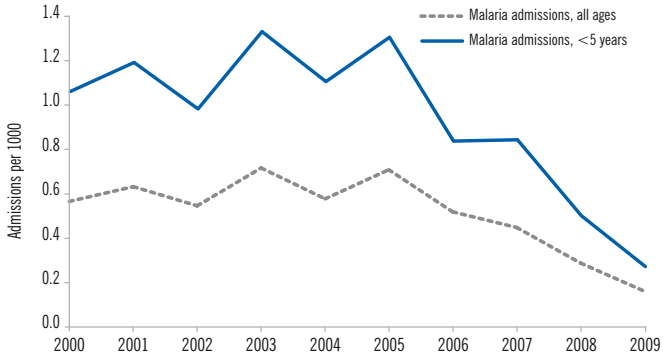


	All ages											< 5 years	
Year	All-cause outpatient consultations	Suspected cases (tested + probable)	Probable cases (not tested)	Total cases tested (microscopy + RDT)	Total confirmed cases (microscopy + RDT)	Malaria cases (confirmed + probable)	Examined by microscopy	Microscopy positive	*P. falciparum*	Examined by RDT	RDT positive	All-cause outpatient consultations	Malaria cases (confirmed + probable)
2000	7 425 845	1 392 483	1 360 908	31 575	6 946	1 367 854	31 575	6 946				2 435 584	553 350
2001	7 163 740	1 386 291	1 352 937	33 354	8 538	1 361 475	33 354	8 538				2 307 873	549 457
2002	8 189 035	1 598 919	1 571 167	27 752	5 272	1 576 439	27 752	5 272				3 641 821	612 724
2003	11 693 122	2 198 297	2 160 964	37 333	6 909	2 167 873	37 333	6 909				3 588 525	774 142
2004	8 091 929	1 458 408	1 419 234	39 174	7 638	1 426 872	39 174	7 638				2 451 234	534 201
2005	7 296 934	1 229 385	1 191 442	37 943	6 753	1 198 195	37 943	6 753				2 118 281	434 849
2006	6 991 184	1 087 563	1 058 245	29 318	5 689	1 063 934	29 318	5 689				1 957 387	370 356
2007	6 900 024	736 194	529 678	206 516	48 497	578 175	30 921	4 823		175 595	43 674	1 859 232	243 638
2008	7 129 320	352 870	23 304	329 566	93 234	116 538	30 566	4 096		299 000	89 138	1 891 894	116 073
2009	6 760 939	633 998		633 998	215 110	215 110	23 963	2 720		610 035	212 390	2 253 646	183 620

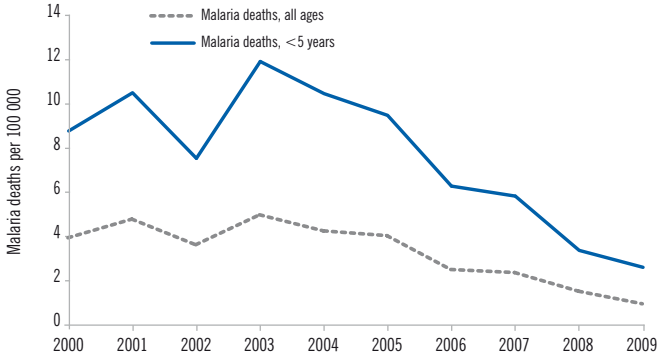
Note: Reporting completeness of outpatient health facilities (%) in 2009: 76,9%

I. EPIDEMIOLOGICAL PROFILE *(continued)*

Reported malaria admissions, per 1000 population



Reported malaria deaths, per 100 000 population



Admissions	All ages		<5 years	
Year	All-cause admissions	Malaria admissions	All-cause admissions	Malaria admissions
2000	84 020	8 514	12 528	2 883
2001	88 853	9 826	12 177	3 298
2002	80 604	8 730	11 376	2 758
2003	106 283	11 795	15 176	3 790
2004	93 960	9 753	12 085	3 192
2005	108 313	12 346	13 570	3 819
2006	88 303	9 246	10 387	2 479
2007	205 664	8 198	12 794	2 537
2008	216 586	5 367	9 094	1 521
2009	196 436	2 986	5 819	834

Deaths	All ages		<5 years	
Year	All-cause deaths	Malaria deaths	All-cause deaths	Malaria deaths
2000	4 023	591	1 107	238
2001	4 300	742	1 078	290
2002	3 897	575	1 975	211
2003	4 849	817	1 308	339
2004	4 148	715	1 058	302
2005	4 229	699	1 021	277
2006	3 357	441	717	186
2007	3 721	428	793	175
2008	2 830	276	566	102
2009	2 754	173	519	80

II. INTERVENTION POLICIES AND STRATEGIES

Intervention	WHO-RECOMMENDED POLICIES / STRATEGIES	YES or NO	Year adopted	OTHER POLICY / STRATEGY	YES or NO	Year adoped
Insecticide-treated nets (ITN)	ITNs/LLINs are distributed free of charge	YES	2004	ITNs/LLINs are distributed through antenatal clinics	YES	2005
	ITNs/LLINs are distributed to all age groups	YES	2009	ITNs/LLINs are distributed through EPI clinics	YES	2007
				ITNs/LLINs are distributed through mass campaigns to < 5 only	YES	2000
Indoor residual spraying (IRS)	IRS is recommended by malaria control programme	YES	1995	IRS is only used to prevent and control epidemics	YES	1998
	DDT is used for IRS	–	–	Where IRS is conducted, ITNs are also applied	YES	2007
				Insecticide resistance monitoring is undertaken	YES	1998
Intermittent preventive treatment (IPT)	IPT is used to prevent malaria during pregnancy	YES	2006			
Case management	Patients of all ages should receive diagnostic tests	YES	2006	Malaria diagnosis is free of charge in the public sector	YES	2006
	RDTs are used at community level	–	–	ACT is delivered by community agents	YES	2008
	ACT is free of charge for all age groups in the public sector	YES	2006	Therapetic efficacy monitoring is undertaken	YES	2009
	Pre-referral treatment with parenteral quinine or artemisinin derivatives or artesunate suppositories is provided	–	–			
	Oral artemisinin-based monotherapies are not registered	–	–			

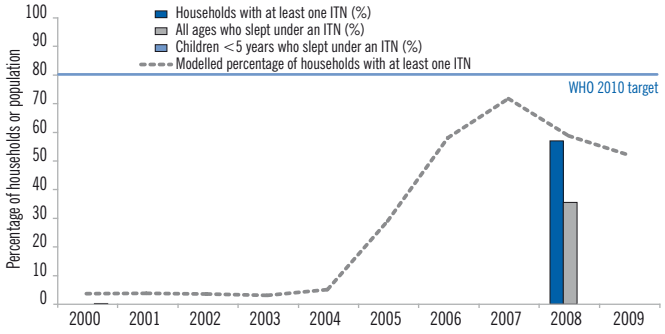
Antimalarial policy	Type of medicine	Year adopted
First-line treatment of *P. falciparum* (unconfirmed)	AS+AQ	2006
First-line treatment of *P. falciparum* (confirmed)	AS+AQ	2006
Treatment failure of *P. falciparum*	QN	2006
Treatment of severe malaria	QN	2006
Treatment of *P. vivax*	–	–

Therapeutic efficacy studies (percentage of clinical and parasitological failure)

Name of first-line antimalarial medicine	Study year	No. of studies	Failure rate			Follow-up	*Remarks*
			Minimum	Median	Maximum		
Artesunate+amodiaquine (AS+AQ)	2006–2007	10	0.0	0.0	8.7	28 days	

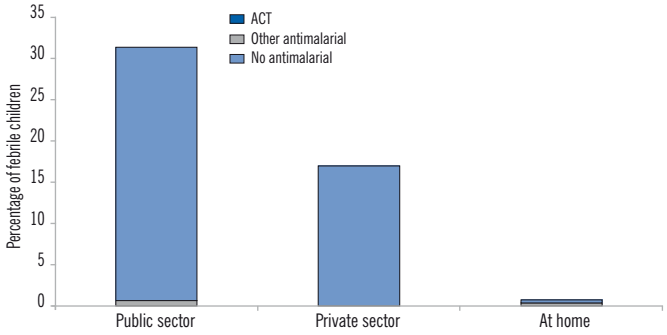
III. IMPLEMENTING MALARIA CONTROL

Coverage with ITNs from survey or model data



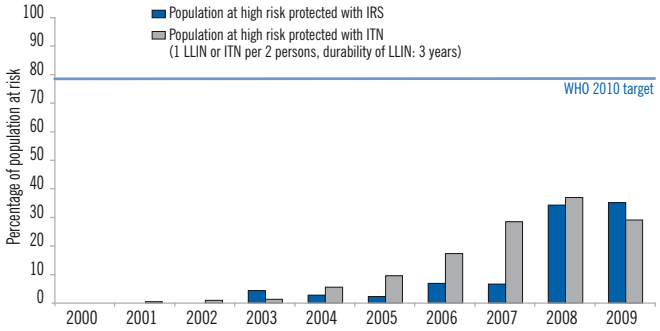
Sources: MICS 2000, DHS 2004, Other Nat.

Source of treatment for febrile children and antimalarial received from survey data

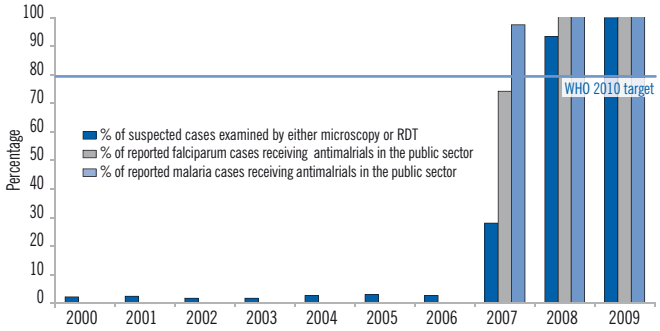


Sources: DHS 2008

Coverage with IRS and ITNs from programme data



Access to effective treatment from programme data: percentage of cases tested and number of ACT courses delivered relative to cases



Preventive interventions: programme and survey data

Year	No. of ITNs and/or LLINs delivered	No. of people protected by IRS	Pregnant women who slept under any net (%)	Pregnant women who slept under an ITN (%)
2000	0			
2001	41 060			
2002	77 139			
2003	115 051	736 145		
2004	488 700	485 395		
2005	869 450	409 155		
2006	1 614 187	1 250 000		
2007	3 359 244	1 241 344		
2008	907 739	6 564 056		
2009	1 941 636	6 909 916		

Survey sources: MICS 2000, DHS 2004.

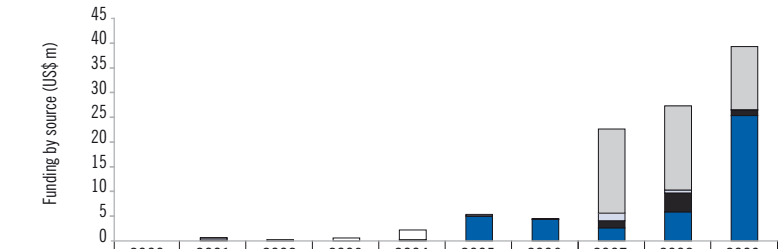
Diagnostics and treatment courses: programme and survey data

Year	No. of RDTs delivered	No. of first-line treatment courses delivered	No. of ACT treatment courses delivered	Febrile children < 5 years (%)	Febrile children < 5 years treated in public health facility (%)
2000					
2001					
2002					
2003					26
2004					
2005					
2006					
2007	651 120	733 098	558 000		
2008	1 648 880	541 670	541 670		31
2009	542 360	398 413	398 413		

Survey sources: MICS 2000, DHS 2004.

IV. FINANCING MALARIA CONTROL

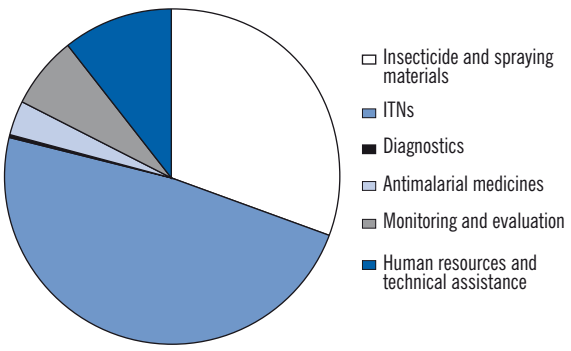
Governmental and external financing



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Other*	0	265 825	222 654	593 450	1 949 254	193 612	91 189	0	0	0
USAID/PMI	0	0	0	0	0	0	0	17 000 000	17 000 000	12 753 000
UNICEF	0	258 092	14 784	0	0	3 447	0	1 505 155	638 691	100 532
WHO	0	123 407	16 540	22 425	226 228	147 661	20 000	1 505 155	3 852 552	1 103 644
World Bank	0	0	0	0	0	0	90 000	0	0	0
Global Fund	0	0	0	0	0	4 984 782	4 322 427	2 609 988	5 814 063	25 329 554
Government**	3 124	3 124	3 481	5 023	14 183	8 298	8 925	10 205	19 387	19 000

** Bilaterals: DFID, JICA; and EU, UN agencies, etc.*
*** Governmental expenditure may not include costs at sub-national level and costs related to health systems, human resources, etc.*

Breakdown of expenditure by intervention in 2009



MALAYSIA

In Malaysia has progressed to the elimination phase, with only 4% of the population now at risk of malaria and the country. Since the 1960s the malaria control programme has been successful in eliminating malaria from most areas in Peninsular Malaysia, although it still occurs in the ethnic minority groups in the deep forested hinterland and in many forested areas in Sabah and Sarawa. The majority of cases are due to *P. vivax* and the percentage of cases due to *P. falciparum* fell from 44% during 2001–2005 to 27% in 2009. With >100% annual blood examination rate, all suspected cases are tested and all reported cases are confirmed. The average number of reported malaria cases fell from around 12 000 annually during 2000–2002 to 7000 in 2009. The programme delivered 126 000 LLINs during 2006–2009, sufficient to cover 17% of the total population at risk. IRS was implemented consistently over the last 10 years, protecting almost 335 000 people, 30% of the population at risk. Based on the substantial progress achieved in recent years, the country aims to eliminate malaria by the end of 2015. Malaysia does not depend on any external funding for malaria. Funding for malaria control in 2009 was US$ 24 million, provided entirely by the government.

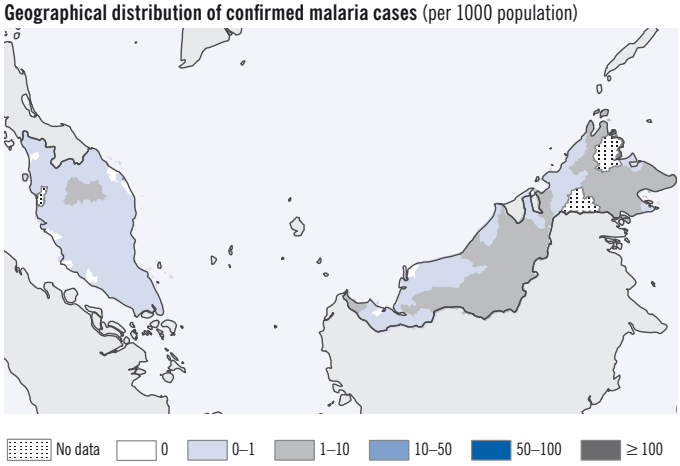
I. EPIDEMIOLOGICAL PROFILE

Population, endemicity and malaria burden

Population (in thousands)*	**2009**	**%**
All ages	27 468	
< 5 years	2 727	10
Rural	7 872	29
Population by malaria endemicity (in thousands)	**2009**	**%**
High transmission (≥1 case per 1000 population)	5 216	
Low transmission (0–1 cases per 1000 population)	1 099	4
Malaria-free (0 cases)	26 369	96
Vector and parasite species		
Major *Anopheles* species	*balabacensis, donaldi, leucosphyrus, maculatus*	
Major *Plasmodium* species	*vivax, falciparum*	

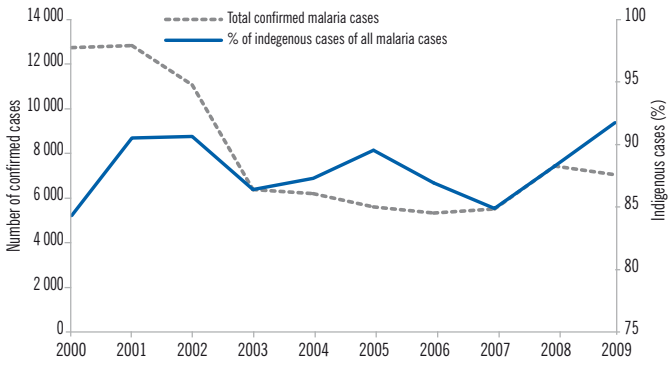
** UN Population Division estimates*

Geographical distribution of confirmed malaria cases (per 1000 population)



Trends in malaria morbidity and mortality

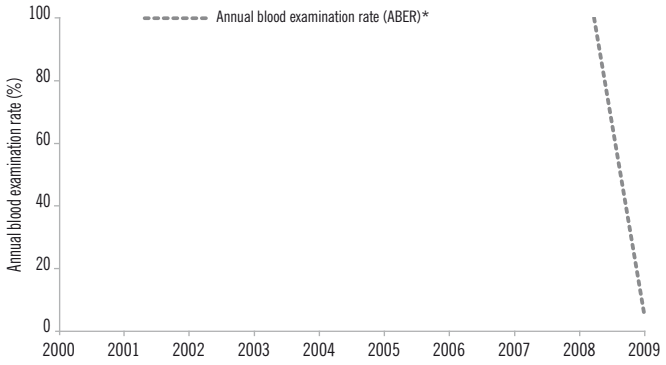
Confirmed indigeous malaria cases



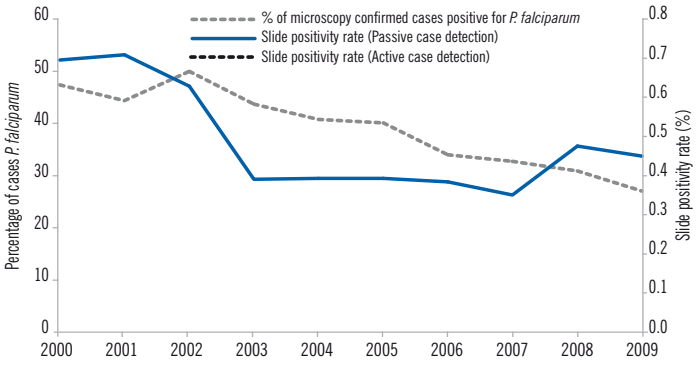
Year	Examined by microscopy	Microscopy positive	*P. falciparum*	Indigenous malaria cases	Malaria deaths
2000	1 832 802	12 705	6 000	10 703	35
2001	1 808 759	12 780	5 643	11 556	46
2002	1 761 721	11 019	5 486	9 981	39
2003	1 632 024	6 338	2 756	5 470	21
2004	1 577 387	6 154	2 496	5 366	35
2005	1 425 997	5 569	2 222	4 981	33
2006	1 388 267	5 294	1 790	4 597	21
2007	1 565 033	5 456	1 778	4 627	18
2008	1 562 148	7 390	2 268	6 517	29
2009	1 565 982	7 010	1 885	6 426	

Note: Reporting completeness of outpatient health facilities (%) in 2009: 100%

Annual blood examination rate (both passive and active case detection)



** ABER value >100%*



II. INTERVENTION POLICIES AND STRATEGIES

Intervention	WHO-RECOMMENDED POLICIES / STRATEGIES	YES or NO	Year adopted	OTHER POLICY / STRATEGY	YES or NO	Year adoped
Insecticide-treated nets (ITN)	ITNs/ LLINs are distributed for free	YES	1995	ITNs/ LLINs are delivered at subsidized prices	–	–
	ITNs/ LLINs are distributed to all age groups	YES	1995			
Indoor residual spraying (IRS)	IRS is recommended by malaria control program	YES	1961	Insecticide resistance monitoring is undertaken	YES	1961
	DDT is used for IRS	–	–	Where IRS is conducted, ITNs are also applied	YES	1995
				Insecticide resistance monitoring is undertaken	YES	1961
Case management	Malaria diagnosis is free of charge in the public sector	YES	1967			
	Malaria treatment is permitted in the private sector	–	–			
	Malaria treatment is free of charge in the private sector	YES	–			
	Radical treatment of *P.vivax* cases	YES	–			
Surveillance	Foci and case investigation undertaken	–	–			
	Case reporting from private sector is mandatory	–	–			

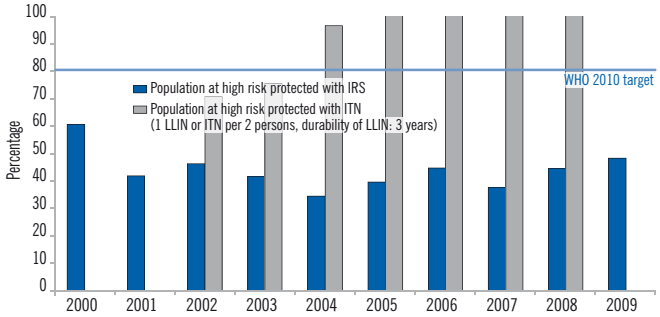
Antimalarial policy	Type of medicine	Year adopted
First-line treatment of *P. falciparum* (unconfirmed)	–	–
First-line treatment of *P. falciparum* (confirmed)	AS+MQ	–
Treatment failure of *P. falciparum*	QN+T	–
Treatment of severe malaria	QN+T	–
Treatment of *P. vivax*	CQ+PQ(14d)	–

Therapeutic efficacy studies (percentage of clinical and parasitological failure)

Name of first-line antimalarial medicine	Study year	No. of studies	Failure rate			Follow-up	*Remarks*
			Minimum	Median	Maximum		

III. IMPLEMENTING MALARIA CONTROL

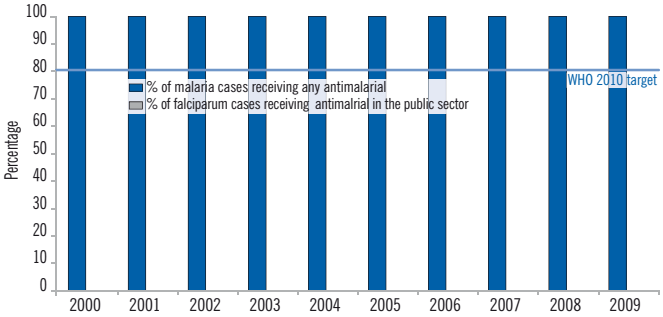
Coverage with IRS and ITNs from programme data



Year	No. of people protected by IRS	No. of ITNs and/or LLINs delivered
2000	424 885	87 061
2001	299 852	59 315
2002	338 213	87 816
2003	309 794	95 434
2004	261 321	124 281
2005	306 087	162 911
2006	351 685	149 259
2007	301 733	176 462
2007	362 460	204 455
2009	400 007	0

Source: .

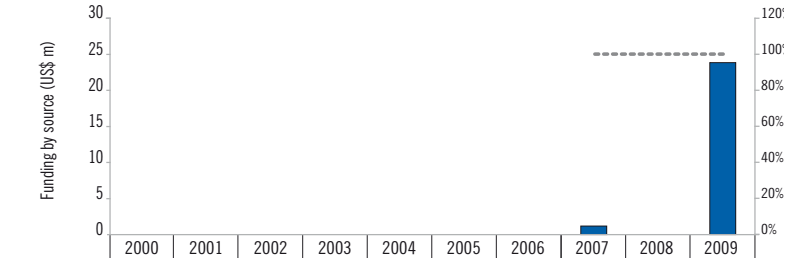
Access to effective treatment from programme data: percentage of cases tested and number of ACT courses delivered relative to cases



Year	No. of first-line treatment courses delivered	No. of ACT treatment courses delivered
2000	12 705	
2001	12 780	
2002	11 019	
2003	6 338	
2004	6 154	
2005	5 569	
2006	5 294	
2007	5 456	
2007	7 390	
2009	7 010	

IV. FINANCING MALARIA CONTROL

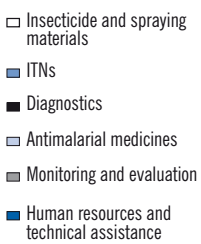
Governmental and external financing



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Other*	0	0	0	0	0	0	0	0	0	0
WHO	0	0	0	0	0	0	0	0	0	0
GFATM	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	1 171 264	0	23 823 040
Government** % of total								100		100

** Bilaterals: DFID, JICA; and EU, UN agencies, etc.*
*** Governmental expenditure may not include costs at sub-national level and costs related to health systems, human resources, etc.*

Breakdown of expenditure by intervention in 2009



NAMIBIA

Malaria transmission is confined to the north-east part of Namibia where malaria is endemic and about 72% of the population of the country is at risk, while the rest of the population lives in malaria-free areas. Seasonal peaks occur during January–April and almost all cases are caused by *P. falciparum*. The recent positive trends in morbidity and mortality due to malaria continued in 2009. The number of probable and confirmed malaria cases reported annually decreased from 480 515 during 2001–2005 to only 81 812 cases in 2009 (83% decline). During same period a similar trend was observed in the confirmed malaria admissions and deaths: malaria admissions decreased from 29 059 to 2264 (92% reduction) and malaria deaths fell from 1370 to 46 (96% reduction). The impact is linked to scaling up the coverage of interventions targeting the high risk population. The programme delivered 534 000 ITN/LLINs year during 2007–2009, enough to protect over 55% of the population at risk. IRS has also been consistently implemented since 2001, protecting 371 000 people (32%) per year. Funding has increased during 2005–2009 to US$ 2.4 million per year, mainly financed by the government (~75%) and the Global Fund.

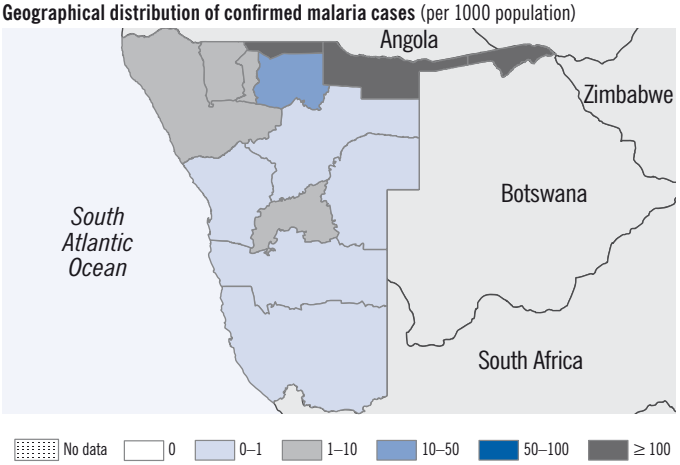
I. EPIDEMIOLOGICAL PROFILE

Population and epidemiological profile

Population (in thousands)*	**2009**	**%**
All ages	2 171	
< 5 years	279	13
Rural	1 360	63
Population by malaria endemicity (in thousands)	**2009**	**%**
High transmission (≥1 case per 1000 population)	1 489	69
Low transmission (0–1 cases per 1000 population)	81	4
Malaria-free (0 cases)	601	28
Vector and parasite species		
Major *Anopheles* species	*gambiae, arabiensis, funestus*	
Major *Plasmodium* species	*falciparum*	

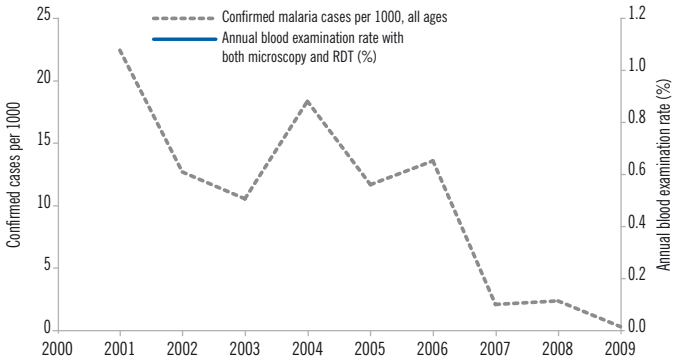
** UN Population Division estimates*

Geographical distribution of confirmed malaria cases (per 1000 population)

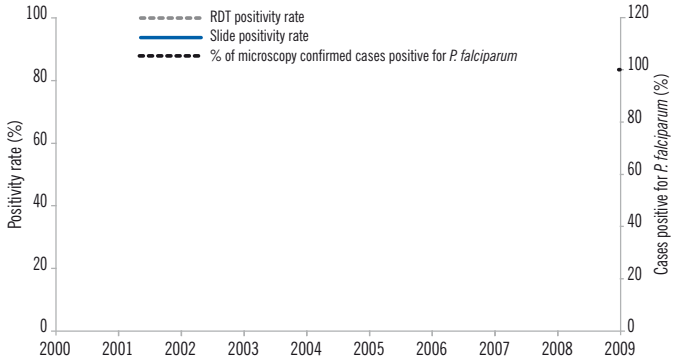


Trends in malaria morbidity and mortality

Confirmed malaria cases, per 1000 and annual blood examination rate



Malaria test positivity rate and % of microscopy confirmed cases positive for *P. falciparum*

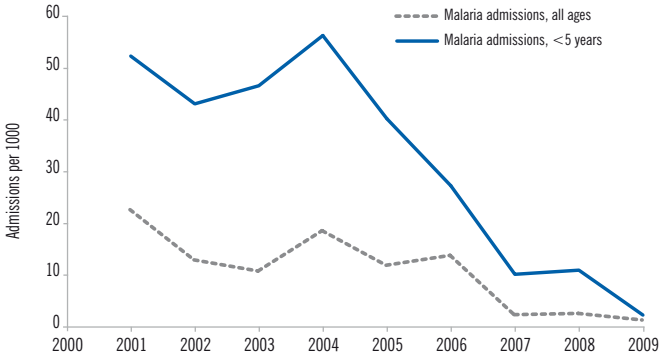


	All ages									< 5 years	
Year	All-cause outpatient consultations	Suspected cases (tested + probable)	Probable cases (not tested)	Total cases tested (microscopy + RDT)	Total confirmed cases (microscopy + RDT)	Malaria cases (confirmed + probable)	Examined by microscopy	Microscopy positive	*P. falciparum*	Examined by RDT	RDT positive	All-cause outpatient consultations	Malaria cases (confirmed + probable)
2000													
2001	2 202 714	538 512	496 876		41 636	538 512		41 636				531 320	127 589
2002	2 105 124	445 803	421 819		23 984	445 803		23 984				492 820	110 153
2003	2 191 779	468 259	447 964		20 295	468 259		20 295				519 782	122 723
2004	2 481 467	610 799	574 756		36 043	610 799		36 043				560 554	145 097
2005	2 319 881	339 204	315 865		23 339	339 204		23 339				522 572	87 291
2006	2 158 577	265 595	237 905		27 690	265 595		27 690				488 886	71 961
2007	5 116 390	172 024	167 782		4 242	172 024		4 242				1 105 584	59 249
2008	4 440 642	128 531	123 624		4 907	128 531		4 907				924 499	43 368
2009	821 865	81 812	81 307		505	81 812		505	505			245 725	28 509

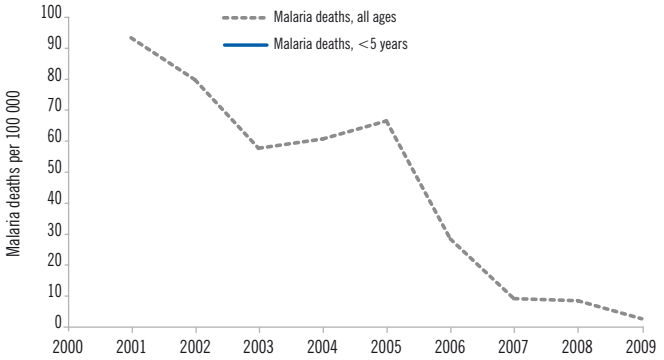
Note: Reporting completeness of outpatient health facilities (%) in 2009: 80%.

I. EPIDEMIOLOGICAL PROFILE *(continued)*

Reported malaria admissions, per 1000 population



Reported malaria deaths, per 100 000 population



Admissions	All ages		<5 years	
Year	All-cause admissions	Malaria admissions	All-cause admissions	Malaria admissions
2000				
2001	235 053	41 636	54 021	13 774
2002	262 819	23 984	50 127	11 379
2003	216 189	20 295	42 263	12 373
2004	249 450	36 043	46 329	15 056
2005	240 421	23 339	44 424	10 814
2006	381 946	27 690	66 973	7 372
2007	193 549	4 242	141 927	2 754
2008	138 074	4 907	98 209	2 994
2009	118 858	2 264	14 782	592

Deaths	All ages		<5 years	
Year	All-cause deaths	Malaria deaths	All-cause deaths	Malaria deaths
2000				
2001	13 106	1 728	3 394	
2002	12 639	1 504	2 907	
2003	13 076	1 106	2 842	
2004	14 702	1 185	2 985	
2005	15 107	1 325	3 327	
2006	26 155	571		
2007	11 813	181		
2008	8 291	171		
2009	6 703	46	709	8

II. INTERVENTION POLICIES AND STRATEGIES

Intervention	WHO-RECOMMENDED POLICIES / STRATEGIES	YES or NO	Year adopted	OTHER POLICY / STRATEGY	YES or NO	Year adoped
Insecticide-treated nets (ITN)	ITNs/LLINs are distributed free of charge	YES	1998	ITNs/LLINs are distributed through antenatal clinics	YES	1998
	ITNs/LLINs are distributed to all age groups	–	–	ITNs/LLINs are distributed through EPI clinics	YES	1998
				ITNs/LLINs are distributed through mass campaigns to < 5 only	YES	1998
Indoor residual spraying (IRS)	IRS is recommended by malaria control programme	YES	1965	IRS is only used to prevent and control epidemics	YES	1998
	DDT is used for IRS	YES	1998	Where IRS is conducted, ITNs are also applied	YES	1998
				Insecticide resistance monitoring is undertaken	YES	1998
Intermittent preventive treatment (IPT)	IPT is used to prevent malaria during pregnancy	YES	2007			
Case management	Patients of all ages should receive diagnostic tests	YES	1997	Malaria diagnosis is free of charge in the public sector	YES	1997
	RDTs are used at community level	–	–	ACT is delivered by community agents	–	–
	ACT is free of charge for all age groups in the public sector	YES	2010	Therapetic efficacy monitoring is undertaken	–	–
	Pre-referral treatment with parenteral quinine or artemisinin derivatives or artesunate suppositories is provided	YES	2005			
	Oral artemisinin-based monotherapies are not registered	–	–			

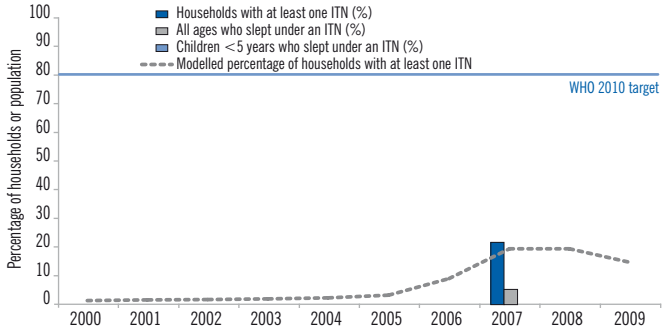
Antimalarial policy	Type of medicine	Year adopted
First-line treatment of *P. falciparum* (unconfirmed)	AL	2004
First-line treatment of *P. falciparum* (confirmed)	AL	2004
Treatment failure of *P. falciparum*	QN	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	–	–

Therapeutic efficacy studies (percentage of clinical and parasitological failure)

Name of first-line antimalarial medicine	Study year	No. of studies	Failure rate			Follow-up	*Remarks*
			Minimum	Median	Maximum		

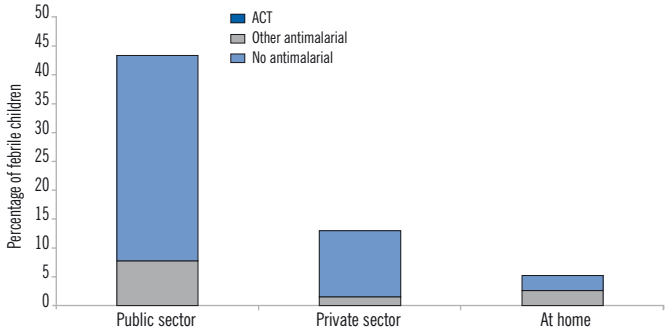
III. IMPLEMENTING MALARIA CONTROL

Coverage with ITNs from survey or model data



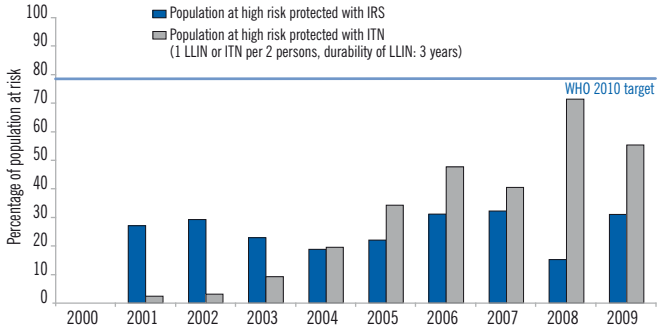
Sources: DHS 2000, DHS 2007.

Source of treatment for febrile children and antimalarial received from survey data

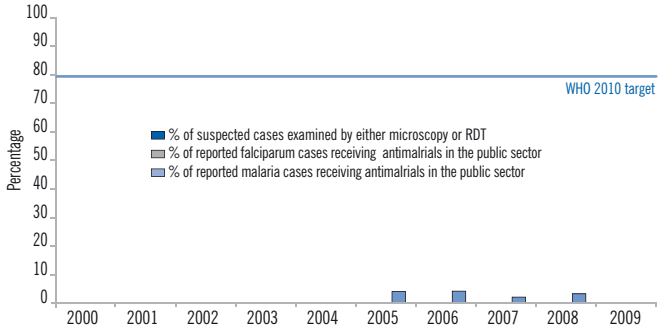


Sources: DHS 2007

Coverage with IRS and ITNs from programme data



Access to effective treatment from programme data: percentage of cases tested and number of ACT courses delivered relative to cases



Preventive interventions: programme and survey data

Year	No. of ITNs and/or LLINs delivered	No. of people protected by IRS	Pregnant women who slept under any net (%)	Pregnant women who slept under an ITN (%)
2000	0			
2001	16 836	364 172		
2002	21 460	400 403		
2003	66 000	320 566		
2004	99 500	267 517		
2005	144 100	319 441		
2006	171 600	461 863		
2007	58 500	487 372		
2008	397 282	233 440		
2009	78 064	487 372		

Survey sources: DHS 2000.

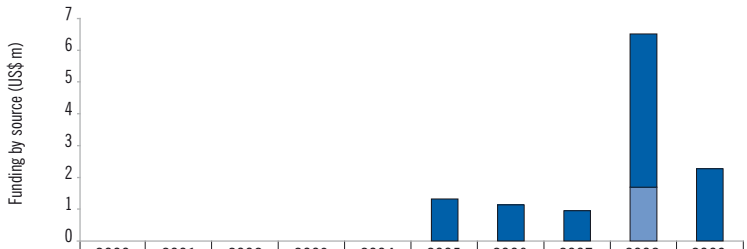
Diagnostics and treatment courses: programme and survey data

No. of RDTs delivered	No. of first-line treatment courses delivered	No. of ACT treatment courses delivered	Febrile children < 5 years (%)	Febrile children < 5 years treated in public health facility (%)
				55
	17 497			
	14 057			43
127 725	4 433			
131 300	5 193			
190 925				

Survey sources: DHS 2000, DHS 2007.

IV. FINANCING MALARIA CONTROL

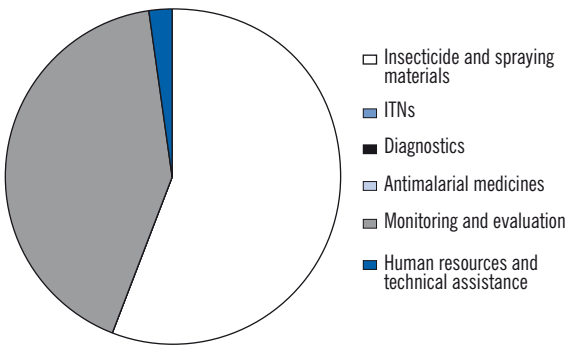
Governmental and external financing



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Other*	0	0	0	0	0	0	0	0	0	0
USAID/PMI	0	0	0	0	0	0	0	0	0	0
UNICEF	0	0	0	0	0	0	0	0	0	0
WHO	0	0	0	0	0	0	0	0	0	0
World Bank	0	0	0	0	0	0	0	0	0	0
Global Fund	0	0	0	0	0	1 323 641	1 135 789	947 674	4 826 069	2 267 472
Government**	0	0	0	0	0	0	0	0	1 690 211	0

** Bilaterals: DFID, JICA; and EU, UN agencies, etc.*
***Governmental expenditure may not include costs at sub-national level and costs related to health systems, human resources, etc.*

Breakdown of expenditure by intervention in 2009



RWANDA

The entire population of Rwanda is at risk of malaria, but transmission is most intense in the eastern and southwest parts of the country. Diagnostic capacity has progressively improved in recent years and the annual examination rate reached 14% in 2009. A nationwide seasonal resurgence of malaria cases occurred during both the 2008–2009 and 2009–2010 malaria seasons, which was 2–3 years after the nationwide campaign to provide LLINs for children <5 years of age in 2006. The resurgence of uncomplicated outpatient malaria cases was greater than that of severe malaria cases and deaths. Outpatient confirmed malaria cases doubled in 2009 compared to 2008 but interpretation of the data is confounded by a 61% increase in those tested in 2009. The test positivity rate among outpatients also rose from 14% in 2008 to 26% in 2009. The programme delivered 2 million LLINs during 2007–2009, enough to protect over 36% of the population at risk. Funding increased during 2005–2008 to US$ 27 million per year, mainly financed by the Global Fund, the World Bank, PMI and WHO. In 2009 the funding increased to US$ 40 million, provided entirely from the Global Fund.

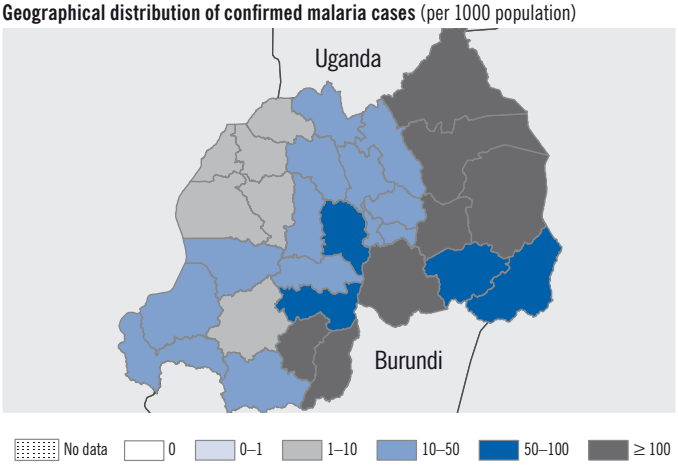
I. EPIDEMIOLOGICAL PROFILE

Population and epidemiological profile

Population (in thousands)*	**2009**	**%**
All ages	9 998	
< 5 years	1 694	17
Rural	8 142	81
Population by malaria endemicity (in thousands)	**2009**	**%**
High transmission (≥1 case per 1000 population)	3 767	38
Low transmission (0–1 cases per 1000 population)	6 230	62
Malaria-free (0 cases)	0	0
Vector and parasite species		
Major *Anopheles* species	*gambiae, arabiensis, funestus*	
Major *Plasmodium* species	*falciparum*	

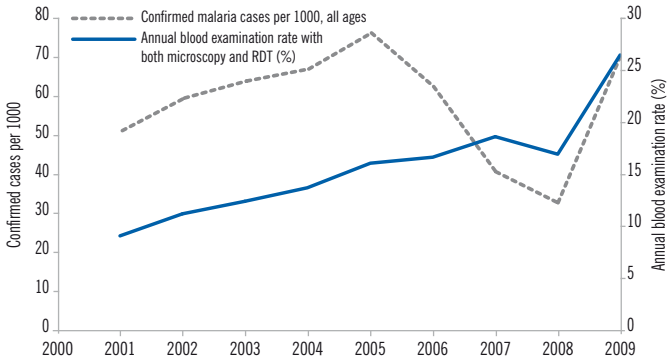
** UN Population Division estimates*

Geographical distribution of confirmed malaria cases (per 1000 population)

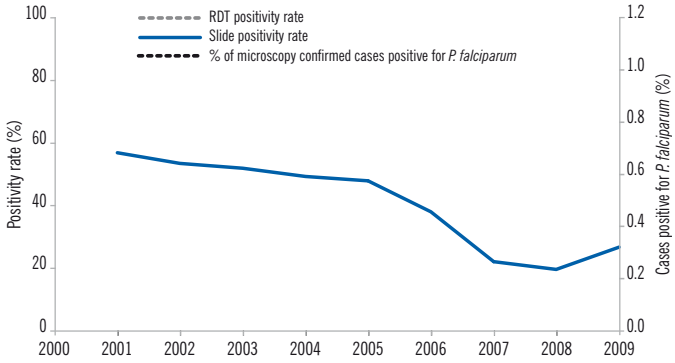


Trends in malaria morbidity and mortality

Confirmed malaria cases, per 1000 and annual blood examination rate



Malaria test positivity rate and % of microscopy confirmed cases positive for *P. falciparum*

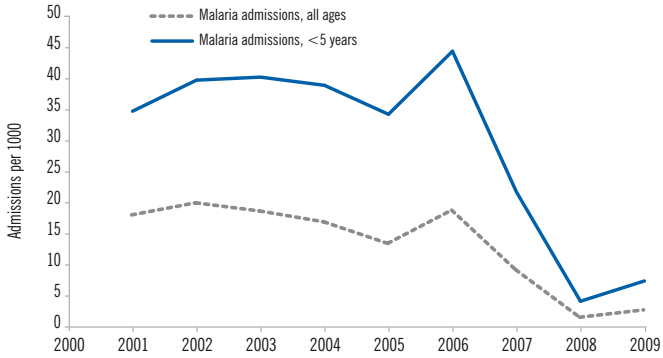


	All ages											< 5 years	
Year	All-cause outpatient consultations	Suspected cases (tested + probable)	Probable cases (not tested)	Total cases tested (microscopy + RDT)	Total confirmed cases (microscopy + RDT)	Malaria cases (confirmed + probable)	Examined by microscopy	Microscopy positive	*P. falciparum*	Examined by RDT	RDT positive	All-cause outpatient consultations	Malaria cases (confirmed + probable)
2000													
2001	2 421 782	1 329 106	580 300	748 806	423 493	1 003 793	748 806	423 493				648 206	290 653
2002	2 634 059	1 519 315	567 518	951 797	506 028	1 073 546	951 797	506 028				729 918	336 172
2003	3 076 264	1 735 774	664 255	1 071 519	553 150	1 217 405	1 071 519	553 150				868 421	395 319
2004	3 701 945	1 915 990	714 179	1 201 811	589 315	1 303 494	1 201 811	589 315				971 735	408 938
2005	4 538 627	2 409 080	970 477	1 438 603	683 769	1 654 246	1 438 603	683 769				1 227 681	512 934
2006	5 035 522	2 379 278	855 386	1 523 892	573 686	1 429 072	1 523 892	573 686				1 334 697	462 000
2007	6 419 230	2 318 079	563 883	1 754 196	382 686	946 569	1 754 196	382 686				1 643 402	404 641
2008	6 563 929	2 096 061	455 955	1 640 106	316 242	772 197	1 640 106	316 242				1 657 389	376 818
2009	7 979 703	3 186 306	548 838	2 637 468	698 745	1 247 583	2 637 468	698 745				1 972 815	527 836

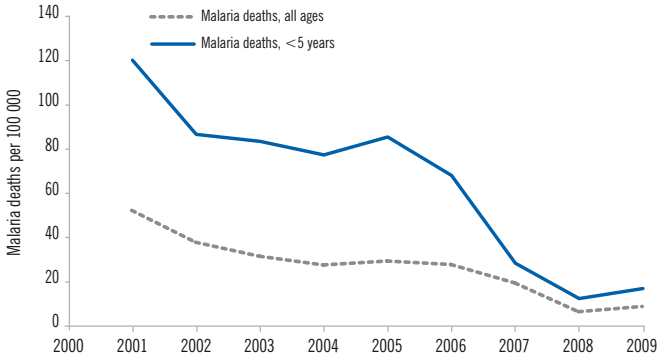
Note: Reporting completeness of outpatient health facilities (%) in 2009: 82%

I. EPIDEMIOLOGICAL PROFILE *(continued)*

Reported malaria admissions, per 1000 population



Reported malaria deaths, per 100 000 population



Admissions	All ages		<5 years	
Year	All-cause admissions	Malaria admissions	All-cause admissions	Malaria admissions
2000				
2001	281 800	147 659	78 878	47 809
2002	317 485	168 536	89 296	56 423
2003	306 943	159 921	92 253	58 297
2004	319 519	147 145	93 006	57 381
2005	260 946	118 626	80 198	51 687
2006	422 256	171 296	123 917	68 798
2007	386 246	85 138	92 567	34 562
2008	110 623	12 969	23 942	6 650
2009	169 817	24 997	39 355	12 398

Deaths	All ages		<5 years	
Year	All-cause deaths	Malaria deaths	All-cause deaths	Malaria deaths
2000				
2001	8 054	4 275	2 866	1 653
2002	6 701	3 167	2 322	1 229
2003	5 964	2 679	2 211	1 208
2004	5 930	2 362	2 192	1 139
2005	6 088	2 581	2 239	1 288
2006	6 855	2 486	2 330	1 054
2007	6 542	1 772	1 685	449
2008	3 466	566	1 138	197
2009	4 210	809	1 230	280

II. INTERVENTION POLICIES AND STRATEGIES

Intervention	WHO-RECOMMENDED POLICIES / STRATEGIES	YES or NO	Year adopted	OTHER POLICY / STRATEGY	YES or NO	Year adoped
Insecticide-treated nets (ITN)	ITNs/LLINs are distributed free of charge	YES	2004	ITNs/LLINs are distributed through antenatal clinics	NO	–
	ITNs/LLINs are distributed to all age groups	NO	–	ITNs/LLINs are distributed through EPI clinics	YES	2004
				ITNs/LLINs are distributed through mass campaigns to < 5 only	NO	–
Indoor residual spraying (IRS)	IRS is recommended by malaria control programme	YES	2007	IRS is only used to prevent and control epidemics	YES	1998
	DDT is used for IRS	–	–	Where IRS is conducted, ITNs are also applied	YES	2007
				Insecticide resistance monitoring is undertaken	YES	2007
Intermittent preventive treatment (IPT)	IPT is used to prevent malaria during pregnancy	–	–			
Case management	Patients of all ages should receive diagnostic tests	YES	2009	Malaria diagnosis is free of charge in the public sector	–	–
	RDTs are used at community level	YES	2008	ACT is delivered by community agents	YES	2007
	ACT is free of charge for all age groups in the public sector	–	–	Therapetic efficacy monitoring is undertaken	YES	2007
	Pre-referral treatment with parenteral quinine or artemisinin derivatives or artesunate suppositories is provided	YES	2001			
	Oral artemisinin-based monotherapies are not registered	–	–			

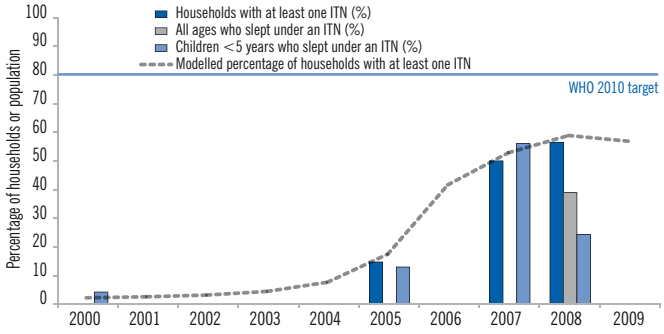
Antimalarial policy	Type of medicine	Year adopted
First-line treatment of *P. falciparum* (unconfirmed)	AL	2005
First-line treatment of *P. falciparum* (confirmed)	AL	2005
Treatment failure of *P. falciparum*	QN	2005
Treatment of severe malaria	AM ;QN	2005
Treatment of *P. vivax*	–	–

Therapeutic efficacy studies (percentage of clinical and parasitological failure)

Name of first-line antimalarial medicine	Study year	No. of studies	Failure rate			Follow-up	*Remarks*
			Minimum	Median	Maximum		
Artemether-lumefantrine (AL)	2004–2007	3	0.0	1.5	6.9	28 days	

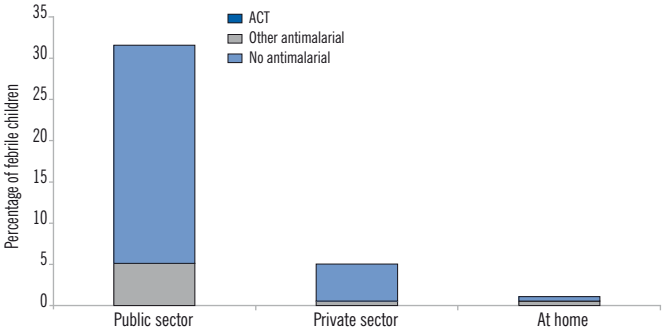
III. IMPLEMENTING MALARIA CONTROL

Coverage with ITNs from survey or model data



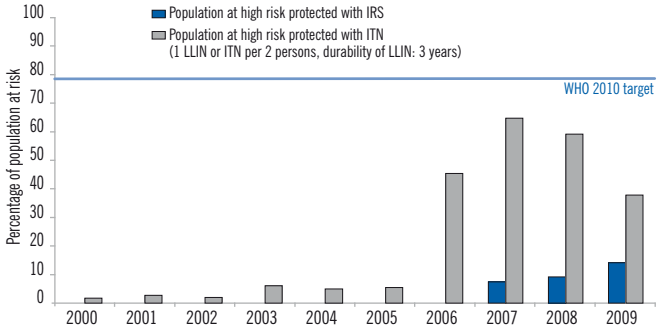
Sources: DHS 2000, MICS 2000, MIS 2007, DHS 2008.

Source of treatment for febrile children and antimalarial received from survey data

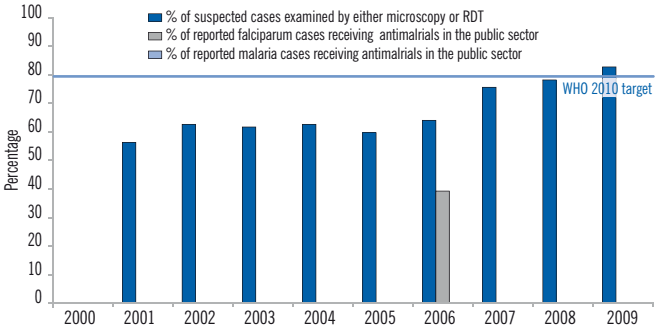


Sources: MIS 2007

Coverage with IRS and ITNs from programme data



Access to effective treatment from programme data: percentage of cases tested and number of ACT courses delivered relative to cases



Preventive interventions: programme and survey data

Year	No. of ITNs and/or LLINs delivered	No. of people protected by IRS	Pregnant women who slept under any net (%)	Pregnant women who slept under an ITN (%)
2000	72 715			
2001	115 309			
2002	88 010			
2003	269 210			
2004	223 926			
2005	253 700		20	17
2006	1 957 720			
2007	998 894	705 035		
2008	0	885 957		
2009	796 663	1 411 715		

Survey sources: DHS 2000, MICS 2000, MIS 2007, DHS 2008.

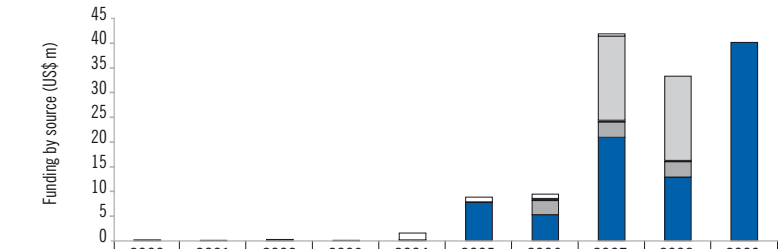
Diagnostics and treatment courses: programme and survey data

No. of RDTs delivered	No. of first-line treatment courses delivered	No. of ACT treatment courses delivered	Febrile children < 5 years (%)	Febrile children < 5 years treated in public health facility (%)
				12
				25
		684 990		
				32
			22	

Survey sources: DHS 2000, MICS 2000, MIS 2007, DHS 2008.

IV. FINANCING MALARIA CONTROL

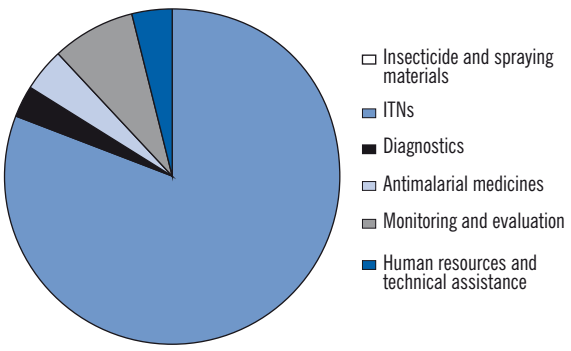
Governmental and external financing



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Other*	0	0	0	0	1 349 117	929 884	822 187	486 000	0	0
USAID/PMI	0	0	0	0	0	0	0	17 000 000	17 000 000	0
UNICEF	0	0	0	0	75 527	0	50 000			0
WHO	0	0	0	0	100 000	100 000	350 000	375 000	250 000	0
World Bank	0	0	0	0	0	0	2 916 666	3 083 332	3 083 332	0
Global Fund	0	0	0	0	0	7 802 000	5 243 000	20 900 000	12 884 983	40 117 815
Government**	186 000	86 000	275 000	120 000						

** Bilaterals: DFID, JICA; and EU, UN agencies, etc.*
*** Governmental expenditure may not include costs at sub-national level and costs related to health systems, human resources, etc.*

Breakdown of expenditure by intervention in 2009



SAO TOME AND PRINCIPE

In Sao Tome and Principe all cases of malaria are caused by *P. falciparum*. The annual blood examination rate is now more than 25% of the population following the introduction of RDTs. Malaria confirmed cases decreased from the annual average of 38 655 during 2000–2005 to 3893 cases in 2009 (90% decline). In the same period, malaria admissions fell from an annual average of 12 367 to 1514 in 2009 (88% decline) and malaria deaths also fell from 162 to 23. However, there was a doubling of outpatient confirmed cases and inpatient malaria cases in 2009 compared to 2008. The rebound in cases in 2009 may be linked to the absence of IRS which was not implemented during 2008. IRS was implemented from 2005 to 2007, protecting over 80% of the population. Distribution of courses of ACT was more than sufficient to treat all cases in the public sector in 2009. Funding has remained high during 2005–2009 at US$ 1.8 million per year, mainly financed by the Global Fund, bilateral funding, and other agencies. The government's contribution increased to 13% in 2009.

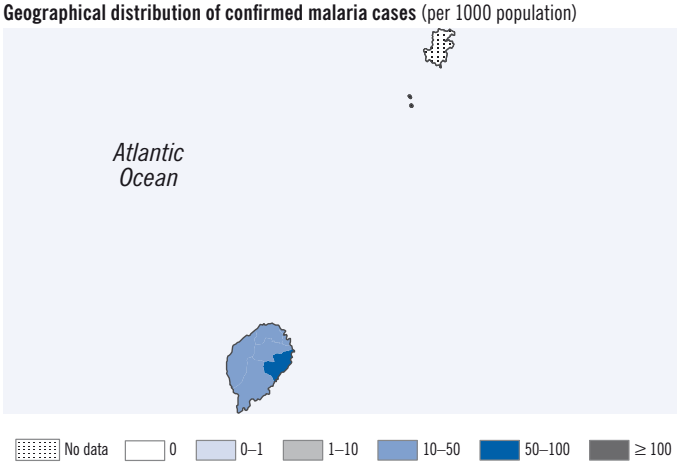
I. EPIDEMIOLOGICAL PROFILE

Population and epidemiological profile

Population (in thousands)*	**2009**	**%**
All ages	163	
< 5 years	23	14
Rural	63	39
Population by malaria endemicity (in thousands)	**2009**	**%**
High transmission (≥1 case per 1000 population)	156	96
Low transmission (0–1 cases per 1000 population)	7	4
Malaria-free (0 cases)	0	0
Vector and parasite species		
Major *Anopheles* species	*gambiae*	
Major *Plasmodium* species	*falciparum*	

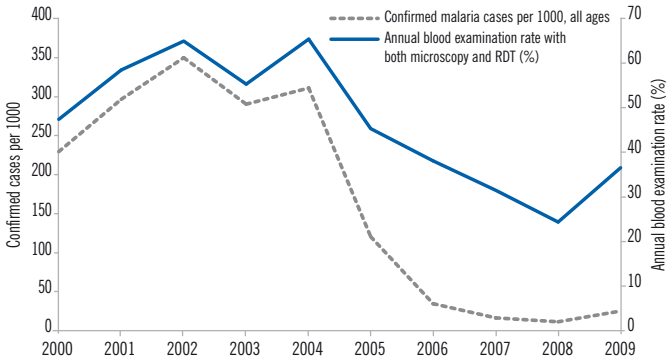
** UN Population Division estimates*

Geographical distribution of confirmed malaria cases (per 1000 population)

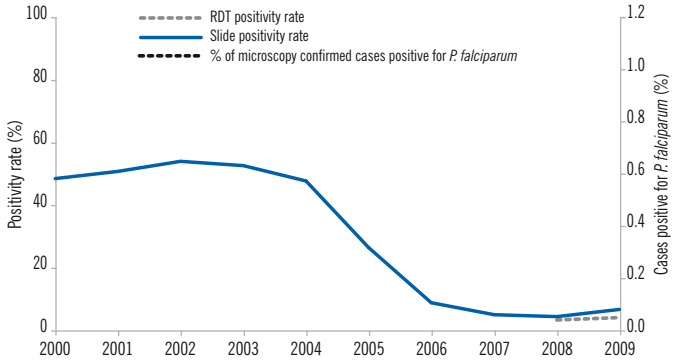


Trends in malaria morbidity and mortality

Confirmed malaria cases, per 1000 and annual blood examination rate



Malaria test positivity rate and % of microscopy confirmed cases positive for *P. falciparum*

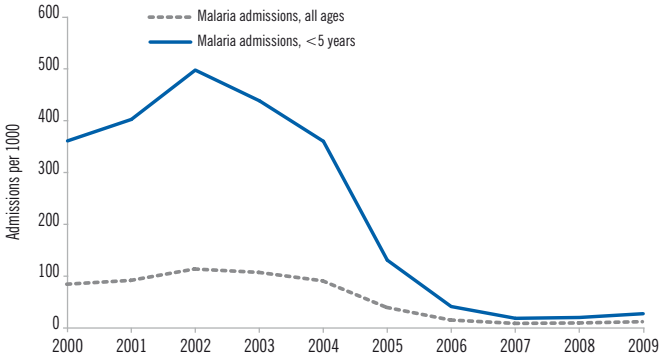


	All ages											< 5 years	
Year	All-cause outpatient consultations	Suspected cases (tested + probable)	Probable cases (not tested)	Total cases tested (microscopy + RDT)	Total confirmed cases (microscopy + RDT)	Malaria cases (confirmed + probable)	Examined by microscopy	Microscopy positive	*P. falciparum*	Examined by RDT	RDT positive	All-cause outpatient consultations	Malaria cases (confirmed + probable)
2000	66 250	66 250	174	66 076	31 975	32 149	66 076	31 975				23 619	11 969
2001	84 993	84 993	1 948	83 045	42 086	44 034	83 045	42 086				33 756	18 099
2002	94 249	94 249	367	93 882	50 586	50 953	93 882	50 586				37 968	20 778
2003	86 546	86 546	5 174	81 372	42 656	47 830	81 372	42 656				34 281	19 093
2004	105 341	105 341	7 505	97 836	46 486	53 991	97 836	46 486				41 536	21 660
2005	73 050	73 050	4 231	68 819	18 139	22 370	68 819	18 139				27 002	8 289
2006	60 819	60 819	2 147	58 672	5 146	7 293	58 672	5 146				23 330	2 560
2007	49 639	49 298	0	49 298	2 421	2 421	49 298	2 421				17 853	680
2008	38 658	38 583	0	38 583	1 647	1 647	38 583	1 647		140 478	4 611	15 465	386
2009	59 188	59 064	0	59 064	3 893	3 893	59 064	3 893		60 649	2 384	20 149	712

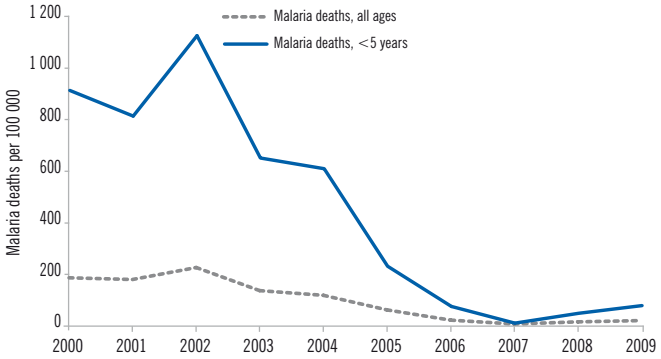
Note: Reporting completeness of outpatient health facilities (%) in 2009: 65.5%

I. EPIDEMIOLOGICAL PROFILE *(continued)*

Reported malaria admissions, per 1000 population



Reported malaria deaths, per 100 000 population



Admissions	All ages		<5 years	
Year	All-cause admissions	Malaria admissions	All-cause admissions	Malaria admissions
2000	20 209	11 339	9 949	7 826
2001	22 507	12 600	11 578	8 840
2002	24 896	16 077	14 085	11 095
2003	23 971	15 369	12 490	9 897
2004	19 955	13 239	11 512	8 226
2005	12 966	5 575	5 633	2 985
2006	10 135	1 873	4 451	932
2007	8 944	885	4 082	400
2008	9 151	1 049	4 167	436
2009	12 431	1 514	5 125	615

Deaths	All ages		<5 years	
Year	All-cause deaths	Malaria deaths	All-cause deaths	Malaria deaths
2000	1 169	254	498	198
2001	1 273	248	509	179
2002	1 049	321	560	251
2003	857	193	322	147
2004	886	169	357	139
2005	776	85	197	53
2006	755	26	155	17
2007	793	3	180	2
2008	850	16	211	11
2009	905	23	275	18

II. INTERVENTION POLICIES AND STRATEGIES

Intervention	WHO-RECOMMENDED POLICIES / STRATEGIES	YES or NO	Year adopted	OTHER POLICY / STRATEGY	YES or NO	Year adoped
Insecticide-treated nets (ITN)	ITNs/LLINs are distributed free of charge	YES	2005	ITNs/LLINs are distributed through antenatal clinics	YES	2006
	ITNs/LLINs are distributed to all age groups	–	–	ITNs/LLINs are distributed through EPI clinics	–	–
				ITNs/LLINs are distributed through mass campaigns to < 5 only	–	–
Indoor residual spraying (IRS)	IRS is recommended by malaria control programme	YES	2003	IRS is only used to prevent and control epidemics	YES	2004
	DDT is used for IRS	–	–	Where IRS is conducted, ITNs are also applied	YES	2004
				Insecticide resistance monitoring is undertaken	YES	2003
Intermittent preventive treatment (IPT)	IPT is used to prevent malaria during pregnancy	YES	2004			
Case management	Patients of all ages should receive diagnostic tests	YES	2001	Malaria diagnosis is free of charge in the public sector	YES	2008
	RDTs are used at community level	–	–	ACT is delivered by community agents	NO	–
	ACT is free of charge for all age groups in the public sector	YES	2010	Therapetic efficacy monitoring is undertaken	YES	2005
	Pre-referral treatment with parenteral quinine or artemisinin derivatives or artesunate suppositories is provided	YES	2004			
	Oral artemisinin-based monotherapies are not registered	YES	2009			

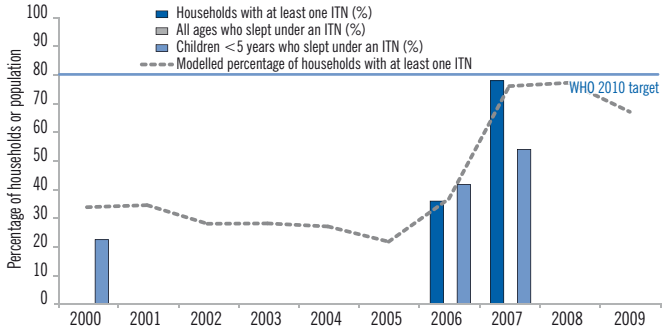
Antimalarial policy	Type of medicine	Year adopted
First-line treatment of *P. falciparum* (unconfirmed)	AS+AQ	2004
First-line treatment of *P. falciparum* (confirmed)	AS+AQ	2004
Treatment failure of *P. falciparum*	AL	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	–	–

Therapeutic efficacy studies (percentage of clinical and parasitological failure)

Name of first-line antimalarial medicine	Study year	No. of studies	Failure rate			Follow-up	*Remarks*
			Minimum	Median	Maximum		

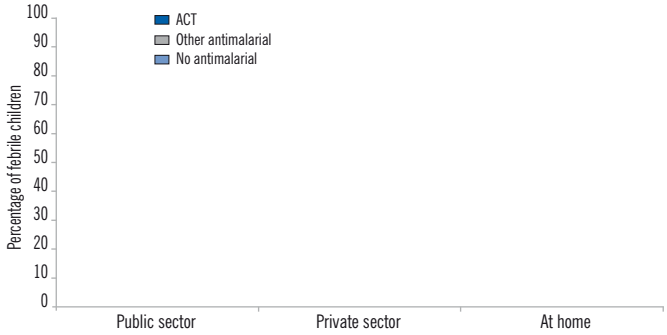
III. IMPLEMENTING MALARIA CONTROL

Coverage with ITNs from survey or model data



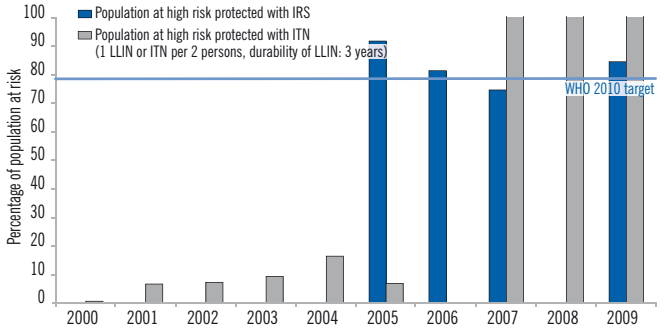
Sources: MICS 2000, MICS 2006, MOH 2007.

Source of treatment for febrile children and antimalarial received from survey data

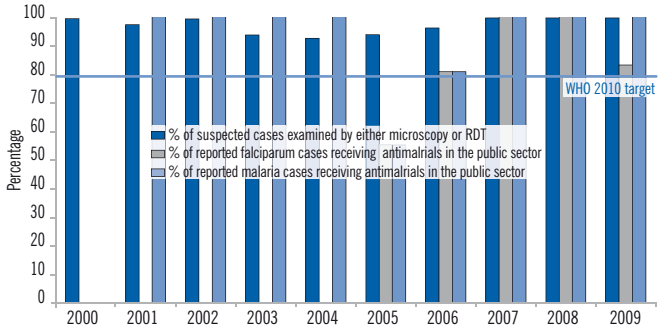


Sources:

Coverage with IRS and ITNs from programme data



Access to effective treatment from programme data: percentage of cases tested and number of ACT courses delivered relative to cases



Preventive interventions: programme and survey data

Year	No. of ITNs and/or LLINs delivered	No. of people protected by IRS	Pregnant women who slept under any net (%)	Pregnant women who slept under an ITN (%)
2000	500			
2001	4 845			
2002	5 430			
2003	7 045			
2004	12 599			
2005	5 450	139 816		
2006	207 859	126 019		
2007	573 799	117 428		
2008	787 385			
2009	0	137 394		

Survey sources: MICS 2000, MICS 2006.

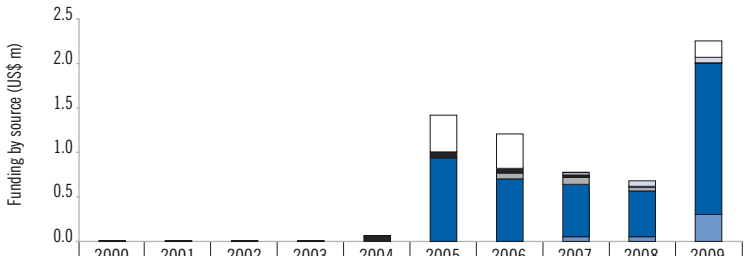
Diagnostics and treatment courses: programme and survey data

No. of RDTs delivered	No. of first-line treatment courses delivered	No. of ACT treatment courses delivered	Febrile children < 5 years (%)	Febrile children < 5 years treated in public health facility (%)
	84 993			
	94 249			
	86 546			
	105 196			
	18 940	18 940		
	9 037	9 037		
	10 902	5 451		
	7 358	3 679		
	9 932	4 966		

Survey sources: MICS 2000, MICS 2006.

IV. FINANCING MALARIA CONTROL

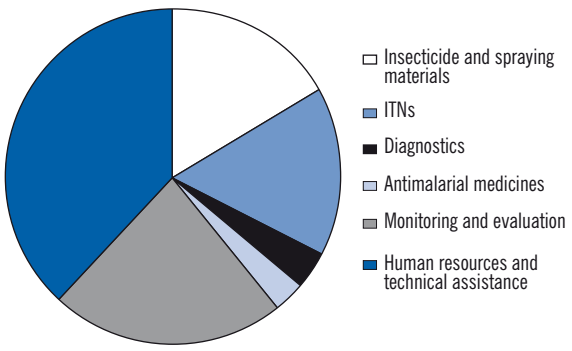
Governmental and external financing



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Other*	0	0	0	0	0	415 000	385 914	5 000	0	185 541
USAID/PMI	0	0	0	0	0	0	0	0	0	0
UNICEF	0	0	0	0	0	0	0	26 742	63 165	59 965
WHO	9 060	9 060	9 060	9 060	65 410	65 410	53 237	26 742	10 000	5 000
World Bank	0	0	0	0	0	0	66 000	79 000	40 000	0
Global Fund	0	0	0	0	0	939 449	703 167	589 781	514 393	1 699 172
Government**	0	0	0	0	0	0	0	51 537	54 267	303 802

** Bilaterals: DFID, JICA; and EU, UN agencies, etc.*
***Governmental expenditure may not include costs at sub-national level and costs related to health systems, human resources, etc.*

Breakdown of expenditure by intervention in 2009



SAUDI ARABIA

In Saudi Arabia some 14 million people (54%) are at risk of malaria. Malaria transmission tends to be highly seasonal and unstable with the peak occurring between October and April; over 70% of the cases are still due to *P. falciparum*, The most recent localized epidemics occurred during the years 1997 and 1998 in the south-western region of the country. The programme has been successful in reducing the numbers of indigenous cases to very low levels. While an annual average of 1700 confirmed malaria cases was reported during 2003–2009, the number of indigenous cases fell from 467 in 2006 to 58 cases in 2009, a reduction of 88%. Saudi Arabia shows strong political commitment to the Elimination of Malaria from the Arabian Peninsula, endorsed in 2005 by all bordering countries. Surveillance and cross-border collaborative activities have been intensified. The programme distributed nearly 500 000 LLINs in 2008–2009, targeting populations at risk in focal areas. In addition, focalized IRS was carried out, protecting nearly 2.5 million people at risk in 2009. Both ACT and other antimalarial treatments are plentiful and readily accessible. The government is the principal source of funding for malaria, providing almost US$ 30 million every year.

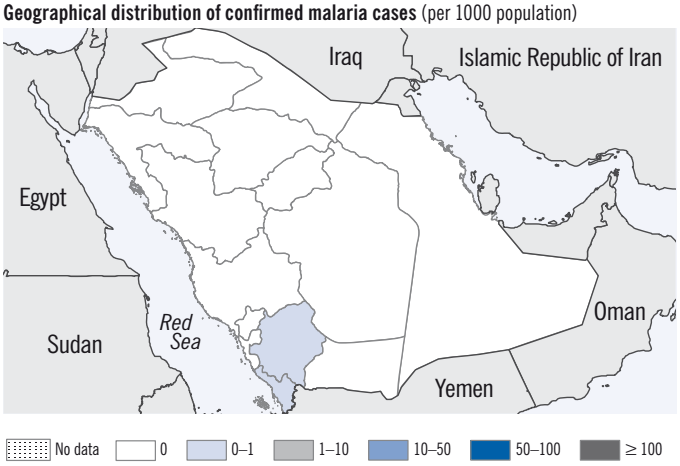
I. EPIDEMIOLOGICAL PROFILE

Population, endemicity and malaria burden

Population (in thousands)*	**2009**	**%**
All ages	25 721	
< 5 years	2 864	11
Rural	4 667	18
Population by malaria endemicity (in thousands)	**2009**	**%**
High transmission (≥1 case per 1000 population)		
Low transmission (0–1 cases per 1000 population)	13 889	54
Malaria-free (0 cases)	11 831	46
Vector and parasite species		
Major *Anopheles* species	*albitarsis, arabiensis, funestus, sergentii*	
Major *Plasmodium* species	*falciparum, vivax*	

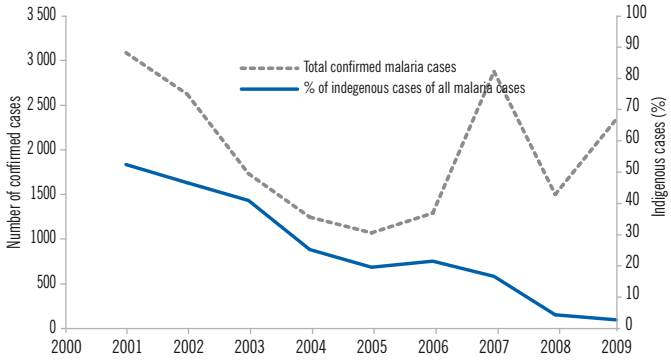
** UN Population Division estimates*

Geographical distribution of confirmed malaria cases (per 1000 population)



Trends in malaria morbidity and mortality

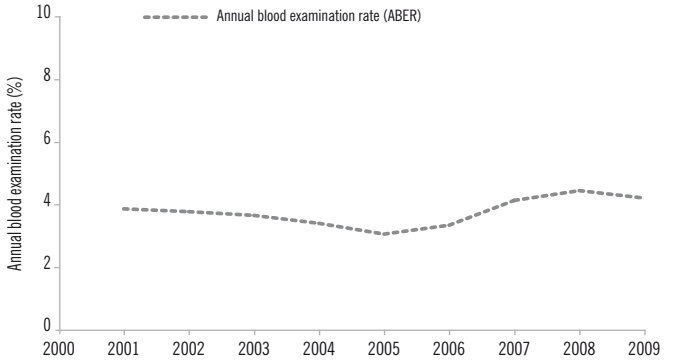
Confirmed indigeous malaria cases

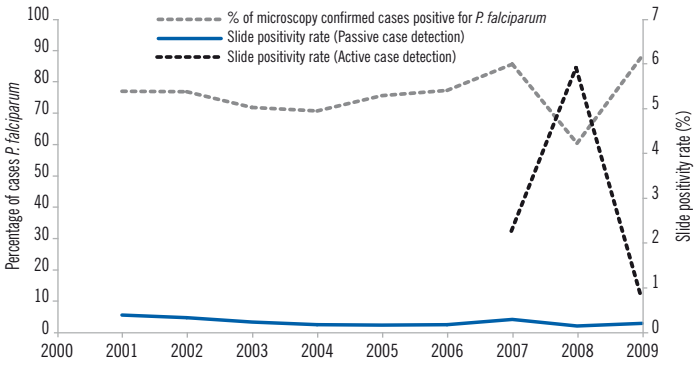


Year	Examined by microscopy	Microscopy positive	*P. falciparum*	Indigenous malaria cases	Malaria deaths
2000				0	
2001	821 860	3 074	2 360	1 603	0
2002	825 443	2 612	1 999	1 210	0
2003	819 869	1 724	1 234	700	0
2004	780 392	1 232	867	308	0
2005	715 878	1 059	798	204	0
2006	804 087	1 278	984	270	0
2007	1 015 781	2 864	2 349	467	2
2008	1 114 841	1 491	833	61	0
2009	1 078 745	2 333	1 649	58	0

Note: Reporting completeness of outpatient health facilities (%) in 2009: 100%

Annual blood examination rate (both passive and active case detection)





II. INTERVENTION POLICIES AND STRATEGIES

Intervention	WHO-RECOMMENDED POLICIES / STRATEGIES	YES or NO	Year adopted	OTHER POLICY / STRATEGY	YES or NO	Year adoped
Insecticide-treated nets (ITN)	ITNs/ LLINs are distributed for free	YES	2006	ITNs/ LLINs are delivered at subsidized prices	–	–
	ITNs/ LLINs are distributed to all age groups	YES	2006			
Indoor residual spraying (IRS)	IRS is recommended by malaria control program	YES	1999	Insecticide resistance monitoring is undertaken	YES	2000
	DDT is used for IRS	–	–	Where IRS is conducted, ITNs are also applied	–	–
				Insecticide resistance monitoring is undertaken	YES	2000
Case management	Malaria diagnosis is free of charge in the public sector	YES	1999			
	Malaria treatment is permitted in the private sector	YES	2004			
	Malaria treatment is free of charge in the private sector	–	–			
	Radical treatment of *P.vivax* cases	YES	1999			
Surveillance	Foci and case investigation undertaken	YES	2004			
	Case reporting from private sector is mandatory	YES	2009			

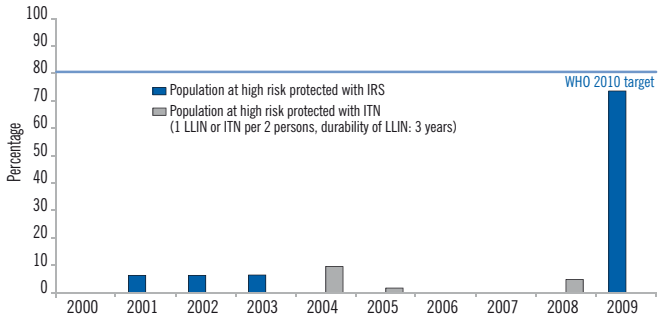
Antimalarial policy	Type of medicine	Year adopted
First-line treatment of *P. falciparum* (unconfirmed)	–	–
First-line treatment of *P. falciparum* (confirmed)	AS+SP	2007
Treatment failure of *P. falciparum*	AL	2007
Treatment of severe malaria	QN (7d) or AM	2007
Treatment of *P. vivax*	CQ+PQ (14d)	2007

Therapeutic efficacy studies (percentage of clinical and parasitological failure)

Name of first-line antimalarial medicine	Study year	No. of studies	Failure rate			Follow-up	*Remarks*
			Minimum	Median	Maximum		

III. IMPLEMENTING MALARIA CONTROL

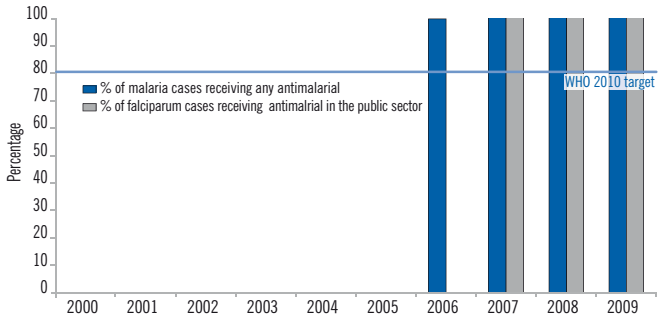
Coverage with IRS and ITNs from programme data



Year	No. of people protected by IRS	No. of ITNs and/or LLINs delivered
2000		0
2001	174 541	0
2002	180 370	0
2003	186 394	0
2004		460 000
2005		81 364
2006		0
2007		0
2007		250 000
2009	2 457 965	250 000

Source: .

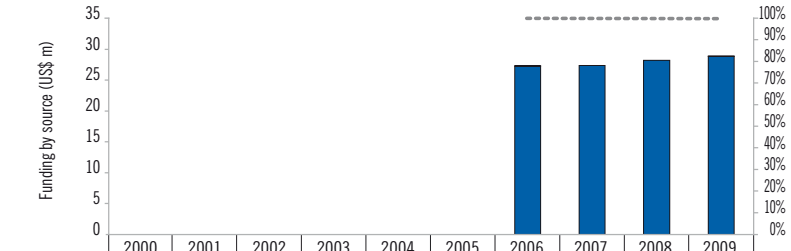
Access to effective treatment from programme data: percentage of cases tested and number of ACT courses delivered relative to cases



Year	No. of first-line treatment courses delivered	No. of ACT treatment courses delivered
2000		
2001		
2002		
2003		
2004		
2005		
2006	1 278	
2007	5 728	2 864
2007	2 982	1 491
2009	3 240	1 840

IV. FINANCING MALARIA CONTROL

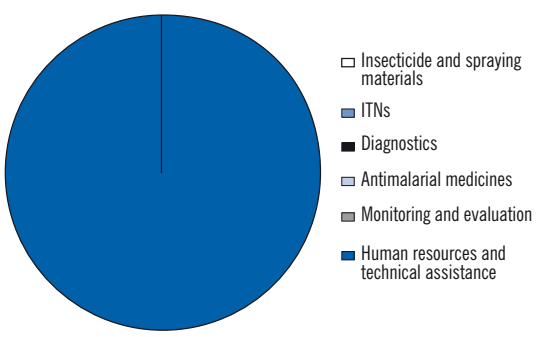
Governmental and external financing



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Other*	0	0	0	0	0	0	0	0	0	0
WHO	0	0	0	0	0	0	28 000	16 000	0	31 000
GFATM	0	0	0	0	0	0	0	0	0	0
Government**	0	0	0	0	0	0	27 313 333	27 376 000	28 203 753	28 850 000
Government** as % of total							100	100	100	100

** Bilaterals: DFID, JICA; and EU, UN agencies, etc.*
***Governmental expenditure may not include costs at sub-national level and costs related to health systems, human resources, etc.*

Breakdown of expenditure by intervention in 2009



SENEGAL

Malaria is endemic throughout Senegal, with seasonal transmission occurring from June to November; almost all cases are caused by *P. falciparum*. Inpatient malaria cases and deaths declined markedly between 2007 and 2008 and again in 2009. Much of the earlier decline could be related to the shift from probable to confirmed diagnosis following the nationwide introduction of RDTs in 2007. The national malaria control programme delivered 4.5 million LLINs during 2007–2009 covering 73% of the population at risk, and over 661 000 people (5% of the population at risk) were protected with IRS. In the post-campaign national survey in 2009, 82% of households had an ITN. The programme delivered about 320 000 ACT treatment courses in 2008 and 184 170 in 2009, sufficient to treat about half the reported malaria cases (probable + confirmed cases) in the public sector. Funding for malaria control increased from US$ 4 million in 2004 to US$ 33.5 million in 2009, with funding provided by the government, the Global Fund, the PMI, UNICEF and other agencies.

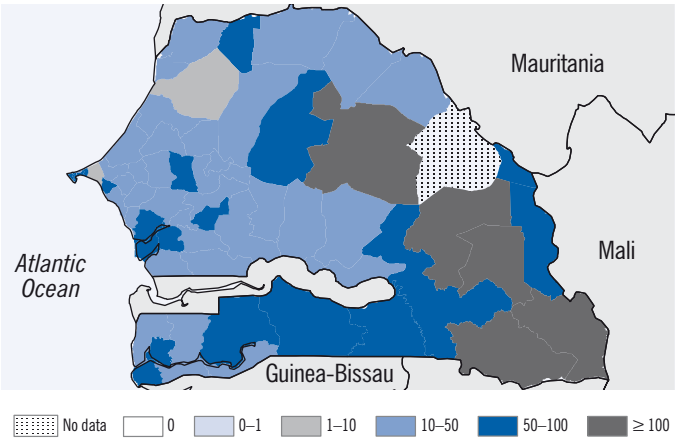
I. EPIDEMIOLOGICAL PROFILE

Population and epidemiological profile

Population (in thousands)*	**2009**	**%**
All ages	12 534	
< 5 years	2 094	17
Rural	7 196	57
Population by malaria endemicity (in thousands)	**2009**	**%**
High transmission (≥1 case per 1000 population)	12 104	97
Low transmission (0–1 cases per 1000 population)	430	3
Malaria-free (0 cases)	0	0
Vector and parasite species		
Major *Anopheles* species	*gambiae, arabiensis, funestus, pharoensis*	
Major *Plasmodium* species	*falciparum*	

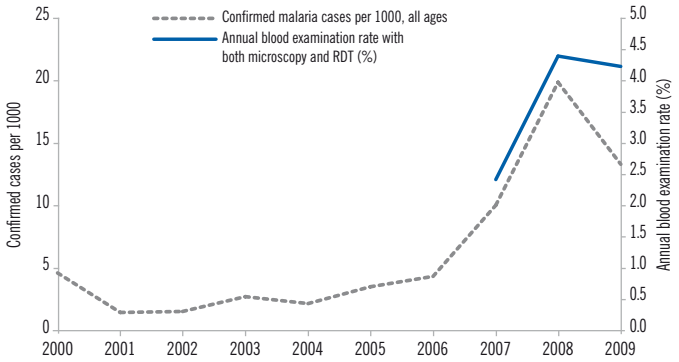
** UN Population Division estimates*

Geographical distribution of confirmed malaria cases (per 1000 population)

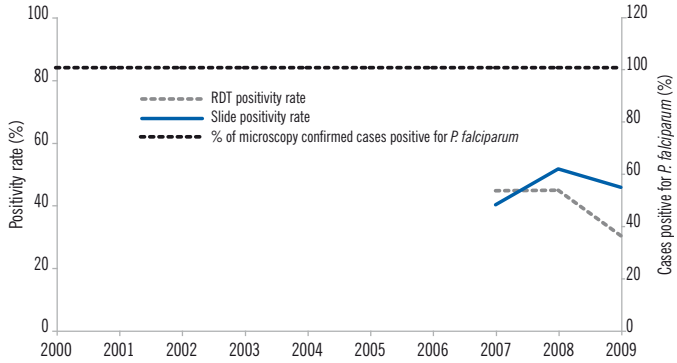


Trends in malaria morbidity and mortality

Confirmed malaria cases, per 1000 and annual blood examination rate



Malaria test positivity rate and % of microscopy confirmed cases positive for *P. falciparum*

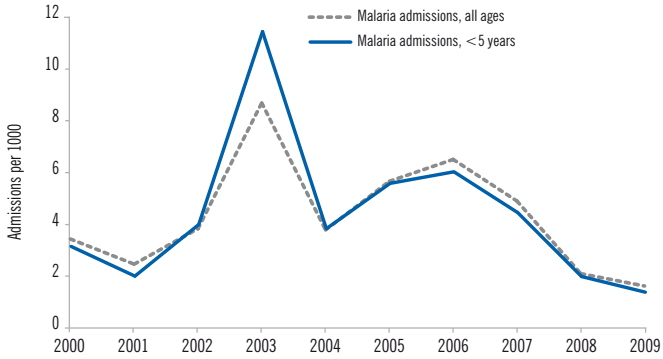


	All ages											< 5 years	
Year	All-cause outpatient consultations	Suspected cases (tested + probable)	Probable cases (not tested)	Total cases tested (microscopy + RDT)	Total confirmed cases (microscopy + RDT)	Malaria cases (confirmed + probable)	Examined by microscopy	Microscopy positive	*P. falciparum*	Examined by RDT	RDT positive	All-cause outpatient consultations	Malaria cases (confirmed + probable)
2000	3 463 849	1 123 377	1 123 377		44 959	1 123 377		44 959	44 959			1 096 685	299 210
2001	2 608 245	931 682	931 682		14 261	931 682		14 261	14 261			712 816	239 508
2002	2 878 312	960 478	960 478		15 261	960 478		15 261	15 261			813 345	267 341
2003	3 671 650	1 414 383	1 414 383		28 272	1 414 383		28 272	28 272			968 408	379 339
2004	3 744 390	1 195 402	1 195 402		23 171	1 195 402		23 171	23 171			985 149	324 620
2005	4 064 305	1 346 158	1 346 158		38 746	1 346 158		38 746	38 746			1 059 420	370 061
2006	4 632 716	1 555 310	1 555 310		49 366	1 555 310		49 366	49 366			1 191 498	408 588
2007	5 260 160	1 170 234	884 586	285 648	118 332	1 002 918	195 487	78 278	78 278	90 161	40 054	1 380 054	327 867
2008	5 131 635	737 414	201 902	535 512	241 926	443 828	48 324	24 830	24 830	487 188	217 096	1 264 561	167 194
2009	5 693 635	584 873	56 299	528 574	165 933	222 232	43 026	19 614	19 614	485 548	146 319	1 353 198	113 731

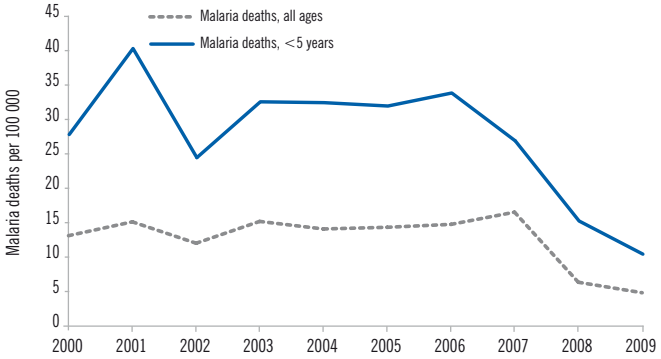
Note: Reporting completeness of outpatient health facilities (%) in 2009: 96,7%

I. EPIDEMIOLOGICAL PROFILE *(continued)*

Reported malaria admissions, per 1000 population



Reported malaria deaths, per 100 000 population



Admissions	All ages		<5 years	
Year	All-cause admissions	Malaria admissions	All-cause admissions	Malaria admissions
2000	96 347	33 465	18 629	5 365
2001	59 059	24 444	10 281	3 474
2002	105 462	39 315	22 840	7 074
2003	170 000	92 356	37 477	20 763
2004	107 214	40 993	20 301	7 060
2005	175 107	63 133	30 624	10 524
2006	214 449	74 669	34 660	11 662
2007	194 327	57 514	28 357	8 815
2008	189 165	24 830	28 058	3 995
2009	198 179	19 614	26 234	2 828

Deaths	All ages		<5 years	
Year	All-cause deaths	Malaria deaths	All-cause deaths	Malaria deaths
2000	3 441	1 275	1 379	477
2001	5 097	1 515	1 775	705
2002	4 678	1 226	1 318	435
2003	6 040	1 602	1 556	590
2004	6 172	1 524	1 606	600
2005	7 316	1 587	1 806	604
2006	9 077	1 678	2 361	656
2007	10 650	1 935	2 487	534
2008	10 316	741	2 769	310
2009	13 033	574	3 009	216

II. INTERVENTION POLICIES AND STRATEGIES

Intervention	WHO-RECOMMENDED POLICIES / STRATEGIES	YES or NO	Year adopted	OTHER POLICY / STRATEGY	YES or NO	Year adoped
Insecticide-treated nets (ITN)	ITNs/LLINs are distributed free of charge	YES	1998	ITNs/LLINs are distributed through antenatal clinics	YES	2005
	ITNs/LLINs are distributed to all age groups	YES	1998	ITNs/LLINs are distributed through EPI clinics	–	–
				ITNs/LLINs are distributed through mass campaigns to < 5 only	YES	2007
Indoor residual spraying (IRS)	IRS is recommended by malaria control programme	YES	2005	IRS is only used to prevent and control epidemics	–	–
	DDT is used for IRS	–	–	Where IRS is conducted, ITNs are also applied	YES	2007
				Insecticide resistance monitoring is undertaken	YES	2000
Intermittent preventive treatment (IPT)	IPT is used to prevent malaria during pregnancy	YES	2004			
Case management	Patients of all ages should receive diagnostic tests	YES	2007	Malaria diagnosis is free of charge in the public sector	YES	2007
	RDTs are used at community level	YES	2008	ACT is delivered by community agents	YES	2007
	ACT is free of charge for all age groups in the public sector	–	–	Therapetic efficacy monitoring is undertaken	–	–
	Pre-referral treatment with parenteral quinine or artemisinin derivatives or artesunate suppositories is provided	YES	2005			
	Oral artemisinin-based monotherapies are not registered	–	–			

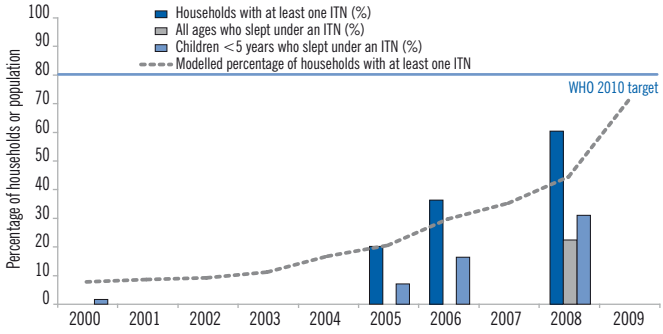
Antimalarial policy	Type of medicine	Year adopted
First-line treatment of *P. falciparum* (unconfirmed)	AS+AQ	2005
First-line treatment of *P. falciparum* (confirmed)	AL ;AS+AQ	2005
Treatment failure of *P. falciparum*	–	–
Treatment of severe malaria	QN	2005
Treatment of *P. vivax*	–	–

Therapeutic efficacy studies (percentage of clinical and parasitological failure)

Name of first-line antimalarial medicine	Study year	No. of studies	Failure rate			Follow-up	*Remarks*
			Minimum	Median	Maximum		
Artesunate+amodiaquine (AS+AQ)	2002–2008	7	0.0	0.0	0.5	28 days	
Artemether-lumefantrine (AL)	2002–2008	6	0.0	0.9	3.2	28 days	

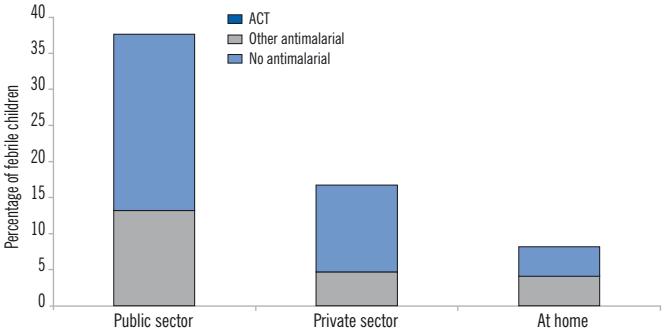
III. IMPLEMENTING MALARIA CONTROL

Coverage with ITNs from survey or model data



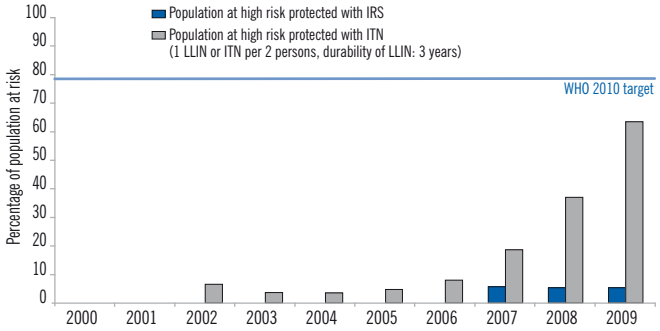
Sources: MICS 2000, DHS 2005, MIS 2006.

Source of treatment for febrile children and antimalarial received from survey data

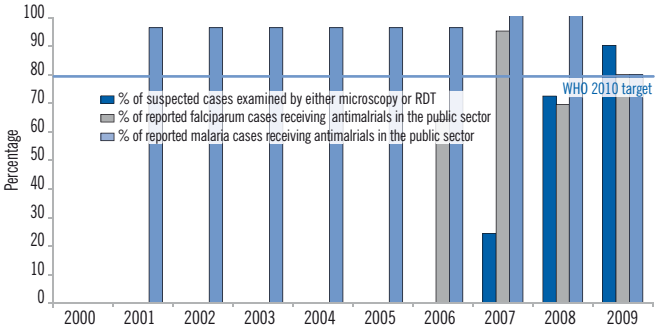


Sources: DHS 2005

Coverage with IRS and ITNs from programme data



Access to effective treatment from programme data: percentage of cases tested and number of ACT courses delivered relative to cases



Preventive interventions: programme and survey data

Year	No. of ITNs and/or LLINs delivered	No. of people protected by IRS	Pregnant women who slept under any net (%)	Pregnant women who slept under an ITN (%)
2000	0			
2001	0			
2002	350 000			
2003	125 409			
2004	223 731			
2005	402 706		14	9
2006	342 328			17
2007	735 000	678 971		
2008	1 572 261	645 346		
2009	2 255 235	661 814		

Survey sources: DHS 2005, MIS 2006.

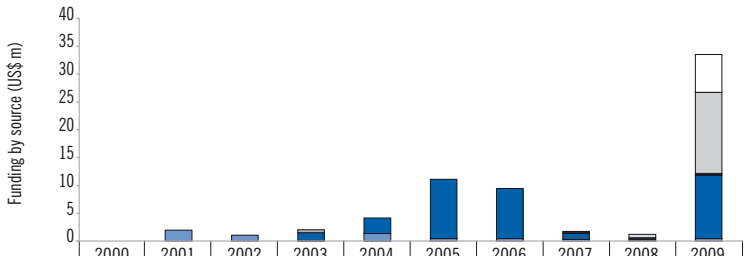
Diagnostics and treatment courses: programme and survey data

No. of RDTs delivered	No. of first-line treatment courses delivered	No. of ACT treatment courses delivered	Febrile children < 5 years (%)	Febrile children < 5 years treated in public health facility (%)
	931 682	0		
	960 478	0		
	1 414 383	0		
	1 195 402	0		
	1 346 158	0		38
	1 555 310	1 036 872	36	
94 987	1 980 282	990 141		
591 625	640 670	320 335		
1 043 925	184 170	184 170		

Survey sources: DHS 2005, MIS 2006.

IV. FINANCING MALARIA CONTROL

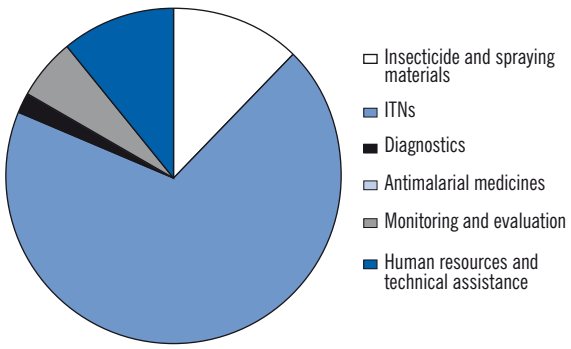
Governmental and external financing



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Other*	0	0	0	0	0	0	0	0	0	6 793 567
USAID/PMI	0	0	0	0	0	0	0	0	490 000	14 512 634
UNICEF	0	0	0	0	0	0	0	0	0	0
WHO	0	0	0	0	0	0	0	340 796	394 552	288 302
World Bank	0	0	0	467 480	0	0	0	0	0	0
Global Fund	0	0	0	1 428 571	2 857 143	10 634 063	8 958 051	1 067 834	0	11 436 555
Government**	0	1 925 760	1 078 220	109 780	1 324 770	460 000	444 221	327 621	176 000	449 813

** Bilaterals: DFID, JICA; and EU, UN agencies, etc.*
*** Governmental expenditure may not include costs at sub-national level and costs related to health systems, human resources, etc.*

Breakdown of expenditure by intervention in 2009



SOUTH AFRICA

Malaria is present in the three northern provinces of South Africa bordering Mozambique and Swaziland, with seasonal transmission during October–April. Only 4% of the population is at high risk of malaria and 6% at low risk, while 90% live in malaria-free areas. Almost all cases are caused by *P. falciparum*. Confirmed malaria cases have decreased from an annual average of 36 360 during 2000–2005 to 6072 cases in 2009 (83% reduction). Reported malaria deaths fell from 127 to 45 (65% decline) in the same period. The programme implemented IRS as its principal vector control intervention, protecting about 4 million people per year (78% coverage). South Africa was the first country in the African Region to introduce ACT in early 2001. The programme delivered 10 500 treatment courses of ACT in 2009, enough to treat all malaria cases. Historical data on funding were not provided; in 2009 US$ 200 000 was contributed by UN agencies and NGOs.

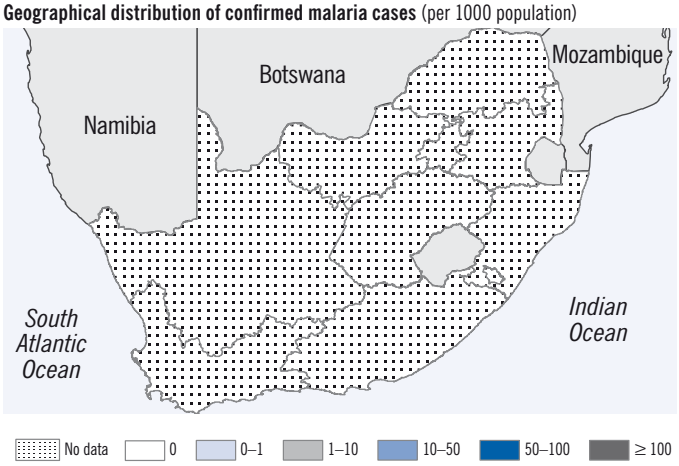
I. EPIDEMIOLOGICAL PROFILE

Population and epidemiological profile

Population (in thousands)*	**2009**	**%**
All ages	50 110	
< 5 years	5 175	10
Rural	19 435	39
Population by malaria endemicity (in thousands)	**2009**	**%**
High transmission (≥1 case per 1000 population)	2 045	4
Low transmission (0–1 cases per 1000 population)	3 068	6
Malaria-free (0 cases)	44 997	90
Vector and parasite species		
Major *Anopheles* species	*arabiensis*	
Major *Plasmodium* species	*falciparum*	

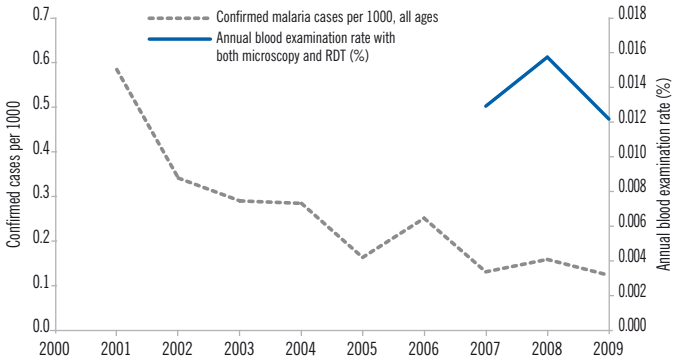
** UN Population Division estimates*

Geographical distribution of confirmed malaria cases (per 1000 population)

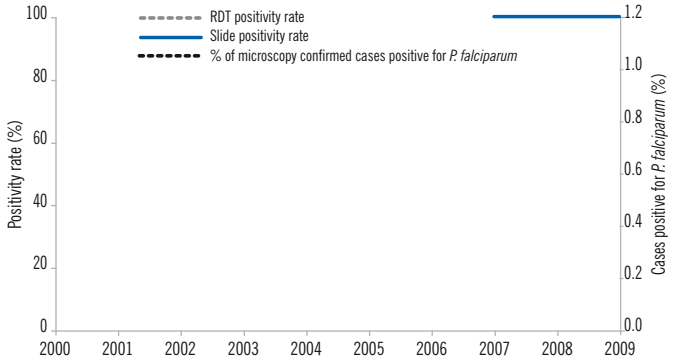


Trends in malaria morbidity and mortality

Confirmed malaria cases, per 1000 and annual blood examination rate



Malaria test positivity rate and % of microscopy confirmed cases positive for *P. falciparum*

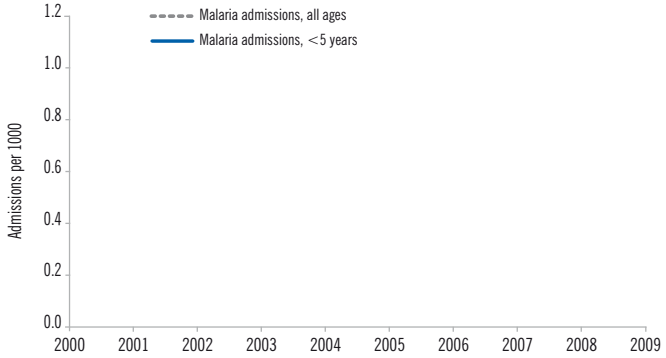


	All ages										< 5 years	
Year	All-cause outpatient consultations	Suspected cases (tested + probable)	Probable cases (not tested)	Total cases tested (microscopy + RDT)	Total confirmed cases (microscopy + RDT)	Malaria cases (confirmed + probable)	Examined by microscopy	Microscopy positive	*P. falciparum*	Examined by RDT	RDT positive	All-cause outpatient consultations	Malaria cases (confirmed + probable)
2000		64 624	64 624			64 624							2 422
2001		26 506	0		26 506	26 506		26 506					1 738
2002		15 649	0		15 649	15 649		15 649					1 151
2003		13 459	0		13 459	13 459		13 459					885
2004		13 399	0		13 399	13 399		13 399					671
2005		7 755	0		7 755	7 755		7 755					424
2006		14 456	2 358		12 098	14 456		12 098					754
2007		6 327	0	6 327	6 327	6 327	6 327	6 327					441
2008		7 796	0	7 796	7 796	7 796	7 796	7 796					524
2009		6 072	0	6 072	6 072	6 072	6 072	6 072					485

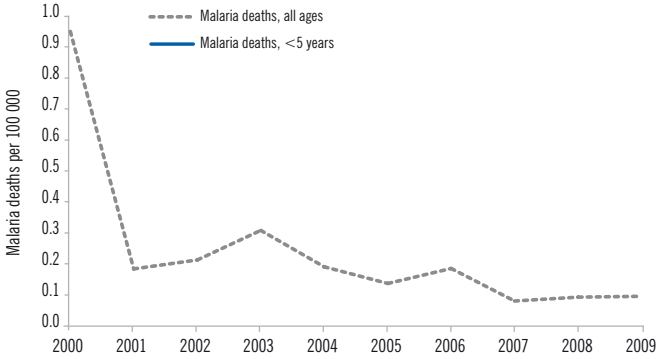
Note: Reporting completeness of outpatient health facilities (%) in 2009: 100%

I. EPIDEMIOLOGICAL PROFILE *(continued)*

Reported malaria admissions, per 1000 population



Reported malaria deaths, per 100 000 population



Admissions	All ages		<5 years	
Year	All-cause admissions	Malaria admissions	All-cause admissions	Malaria admissions
2000				
2001				
2002				
2003				
2004				
2005				
2006				
2007				
2008				
2009				

Deaths	All ages		<5 years	
Year	All-cause deaths	Malaria deaths	All-cause deaths	Malaria deaths
2000		424		
2001		81		
2002		96		
2003		142		
2004		88		
2005		63		
2006		87		
2007		37		
2008		43		
2009		45		

II. INTERVENTION POLICIES AND STRATEGIES

Intervention	WHO-RECOMMENDED POLICIES / STRATEGIES	YES or NO	Year adopted	OTHER POLICY / STRATEGY	YES or NO	Year adoped
Insecticide-treated nets (ITN)	ITNs/LLINs are distributed free of charge	–	–	ITNs/LLINs are distributed through antenatal clinics	–	–
	ITNs/LLINs are distributed to all age groups	–	–	ITNs/LLINs are distributed through EPI clinics	–	–
				ITNs/LLINs are distributed through mass campaigns to < 5 only	–	–
Indoor residual spraying (IRS)	IRS is recommended by malaria control programme	YES	–	IRS is only used to prevent and control epidemics	YES	1930
	DDT is used for IRS	YES	1945	Where IRS is conducted, ITNs are also applied	–	–
				Insecticide resistance monitoring is undertaken	YES	1997
Intermittent preventive treatment (IPT)	IPT is used to prevent malaria during pregnancy	–	–			
Case management	Patients of all ages should receive diagnostic tests	YES	–	Malaria diagnosis is free of charge in the public sector	YES	1997
	RDTs are used at community level	–	–	ACT is delivered by community agents	–	–
	ACT is free of charge for all age groups in the public sector	YES	–	Therapetic efficacy monitoring is undertaken	–	–
	Pre-referral treatment with parenteral quinine or artemisinin derivatives or artesunate suppositories is provided	–	–			
	Oral artemisinin-based monotherapies are not registered	–	–			

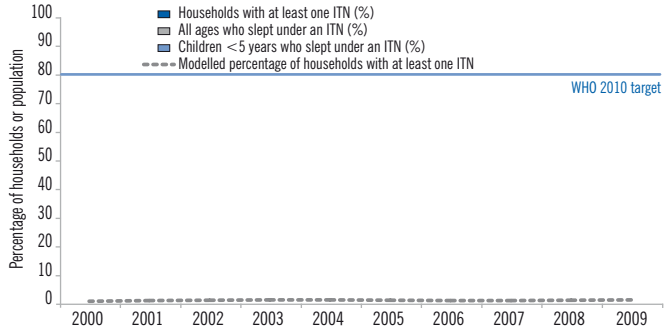
Antimalarial policy	Type of medicine	Year adopted
First-line treatment of *P. falciparum* (unconfirmed)	AL	2001
First-line treatment of *P. falciparum* (confirmed)	AL	2001
Treatment failure of *P. falciparum*	QN	2001
Treatment of severe malaria	QN	2001
Treatment of *P. vivax*	–	–

Therapeutic efficacy studies (percentage of clinical and parasitological failure)

Name of first-line antimalarial medicine	Study year	No. of studies	Failure rate			Follow-up	*Remarks*
			Minimum	Median	Maximum		
Artemether-lumefantrine (AL)	2002–2007	3	0.0	0.0	5.2	28 days	

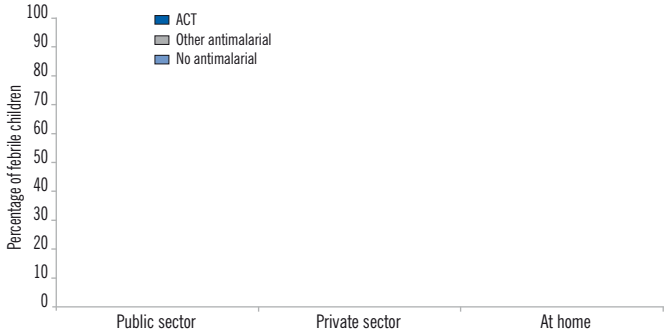
III. IMPLEMENTING MALARIA CONTROL

Coverage with ITNs from survey or model data



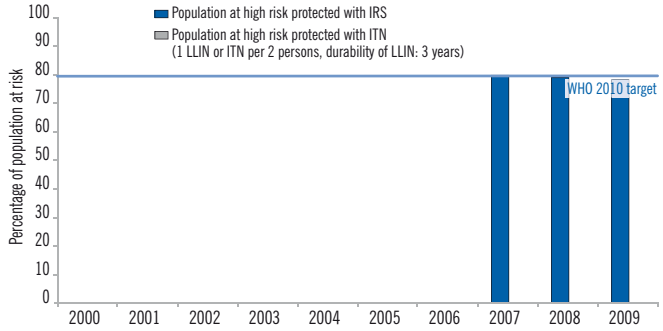
Sources:

Source of treatment for febrile children and antimalarial received from survey data

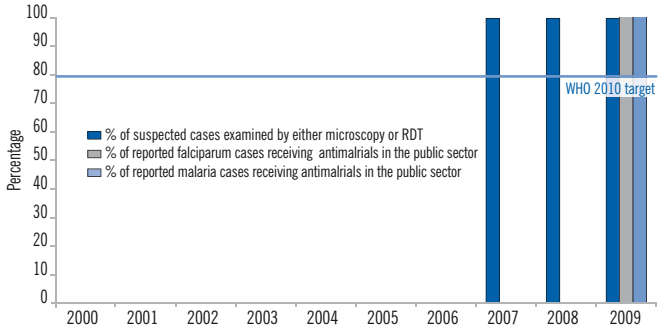


Sources:

Coverage with IRS and ITNs from programme data



Access to effective treatment from programme data: percentage of cases tested and number of ACT courses delivered relative to cases



Preventive interventions: programme and survey data

Year	No. of ITNs and/or LLINs delivered	No. of people protected by IRS	Pregnant women who slept under any net (%)	Pregnant women who slept under an ITN (%)
2000	0			
2001	0			
2002	0			
2003	0			
2004	0	4		
2005	0	4		
2006	0	4		
2007	0	4 000 000		
2008	0	4 000 000		
2009	0	4 000 000		

Survey sources:

Diagnostics and treatment courses: programme and survey data

No. of RDTs delivered	No. of first-line treatment courses delivered	No. of ACT treatment courses delivered	Febrile children < 5 years (%)	Febrile children < 5 years treated in public health facility (%)
403 325	10 500	10 500		

Survey sources:

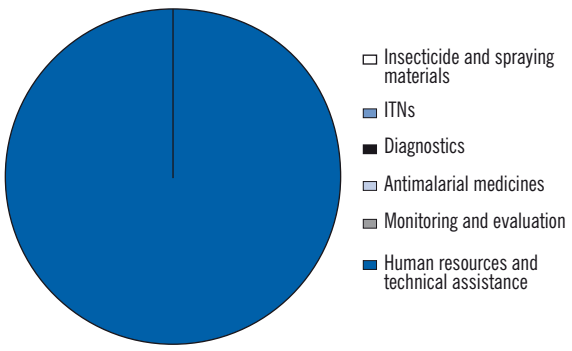
IV. FINANCING MALARIA CONTROL

Governmental and external financing

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Other*	0	0	0	0	0	0	0	0	0	0
USAID/PMI	0	0	0	0	0	0	0	0	0	0
UNICEF	0	0	0	0	0	0	0	0	0	0
WHO	0	0	0	0	0	0	0	0	0	100 000
World Bank	0	0	0	0	0	0	0	0	0	0
Global Fund	0	0	0	0	0	0	0	0	0	0
Government**	0	0	0	0	0	0	0	0	0	0

** Bilaterals: DFID, JICA; and EU, UN agencies, etc.*
***Governmental expenditure may not include costs at sub-national level and costs related to health systems, human resources, etc.*

Breakdown of expenditure by intervention in 2009



SRI LANKA

Malaria transmission occurs throughout the year in Sri Lanka. Both *P. falciparum* and *P. vivax* are prevalent, although the percentage of *P. falciparum* cases decreased from 14% during 2000–2005 to 4% in 2009. During same period, with 100% testing of suspected cases, 95% of the reported cases were indigenous and malaria cases declined from an annual average of 55 640 to just 558 cases. No malaria deaths have been reported since early 2008. The SPR has declined from 2% to <0.1%, indicating a significant reduction in transmission. Having achieved a substantial reduction in the malaria burden, Sri Lanka is once again in a position to envisage malaria elimination. This progress is associated with the scale-up of IRS during 2001–2004, protecting some 2 million people at risk (over 50% coverage), provision of appropriate treatment, and a strong surveillance system. Implementation of ITNs/ LLINs has increased as a supplementary vector control measure in the high risk areas. The programme delivered sufficient treatment courses of ACT (adopted as national policy in 2008) and mobile clinics have been introduced to provide for remote population groups. Financing for malaria control has averaged US$ 4.2 million annually since 2003, with a peak of US$ 10 million in 2004, mainly financed by the government and the Global Fund. The contribution of the government has increased in recent years and exceeded 70% in 2009.

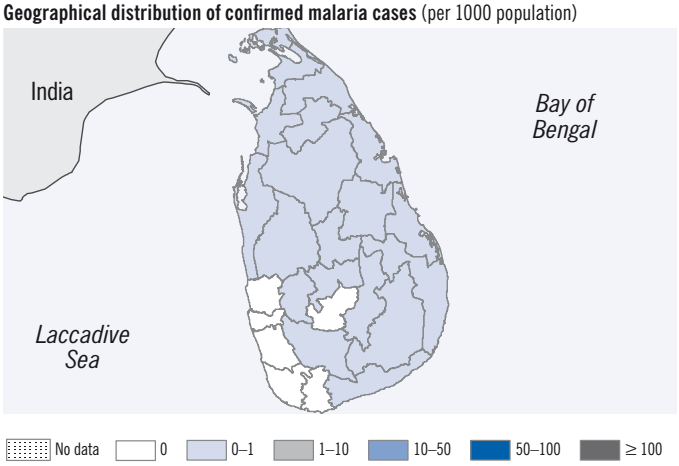
I. EPIDEMIOLOGICAL PROFILE

Population, endemicity and malaria burden

Population (in thousands)*	**2009**	**%**
All ages	20 238	
< 5 years	1 784	9
Rural	17 184	85
Population by malaria endemicity (in thousands)	**2009**	**%**
High transmission (≥1 case per 1000 population)	217	
Low transmission (0–1 cases per 1000 population)	4 655	23
Malaria-free (0 cases)	15 583	77
Vector and parasite species		
Major *Anopheles* species	*culicifacies, annularis, subpictus*	
Major *Plasmodium* species	*vivax, falciparum*	

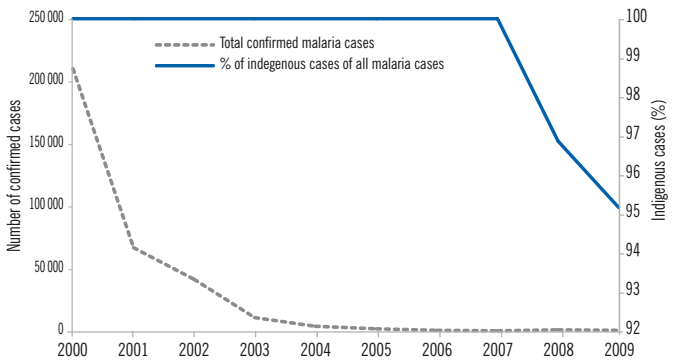
** UN Population Division estimates*

Geographical distribution of confirmed malaria cases (per 1000 population)



Trends in malaria morbidity and mortality

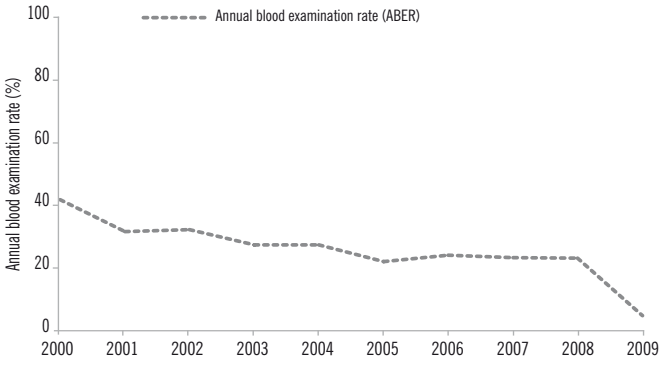
Confirmed indigeous malaria cases

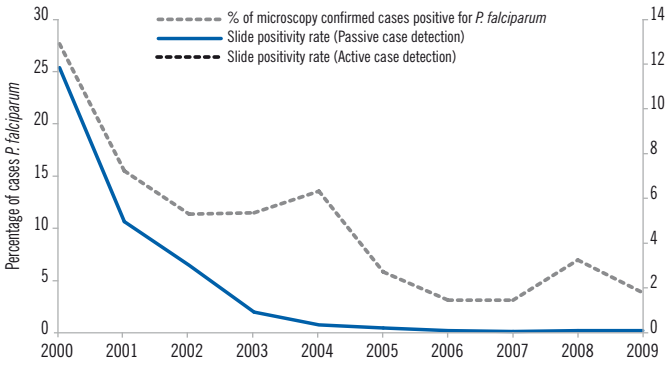


Year	Examined by microscopy	Microscopy positive	*P. falciparum*	Indigenous malaria cases	Malaria deaths
2000	1 781 372	210 039	59 650	210 039	77
2001	1 353 386	66 522	10 600	66 522	52
2002	1 390 850	41 411	4 848	41 411	30
2003	1 192 259	10 510	1 273	10 510	4
2004	1 198 181	3 720	549	3 720	1
2005	974 672	1 640	134	1 640	0
2006	1 076 121	591	27	591	1
2007	1 047 104	198	7	198	1
2008	1 047 104	670	47	649	0
2009	909 632	558	29	531	

Note: Reporting completeness of outpatient health facilities (%) in 2009: 74.83%

Annual blood examination rate (both passive and active case detection)





II. INTERVENTION POLICIES AND STRATEGIES

Intervention	WHO-RECOMMENDED POLICIES / STRATEGIES	YES or NO	Year adopted	OTHER POLICY / STRATEGY	YES or NO	Year adoped
Insecticide-treated nets (ITN)	ITNs/ LLINs are distributed for free	YES	1992	ITNs/ LLINs are delivered at subsidized prices	–	–
	ITNs/ LLINs are distributed to all age groups	YES	2004			
Indoor residual spraying (IRS)	IRS is recommended by malaria control program	YES	1946	Insecticide resistance monitoring is undertaken	YES	2000
	DDT is used for IRS	–	–	Where IRS is conducted, ITNs are also applied	YES	2000
				Insecticide resistance monitoring is undertaken	YES	2000
Case management	Malaria diagnosis is free of charge in the public sector	YES	1911			
	Malaria treatment is permitted in the private sector	–	–			
	Malaria treatment is free of charge in the private sector	–	–			
	Radical treatment of *P.vivax* cases	–	–			
Surveillance	Foci and case investigation undertaken	–	–			
	Case reporting from private sector is mandatory	–	–			

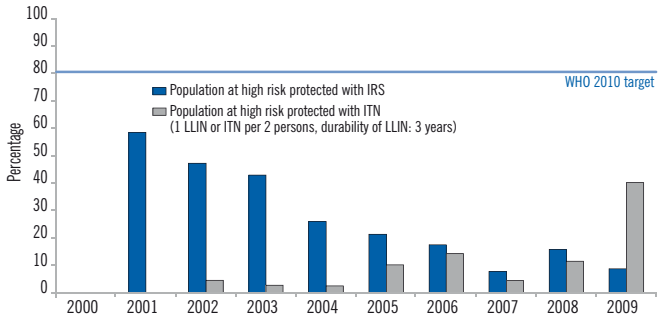
Antimalarial policy	Type of medicine	Year adopted
First-line treatment of *P. falciparum* (unconfirmed)	–	–
First-line treatment of *P. falciparum* (confirmed)	AL+PQ	2008
Treatment failure of *P. falciparum*	-	
Treatment of severe malaria	QN	2008
Treatment of *P. vivax*	CQ+PQ (14d)	2008

Therapeutic efficacy studies (percentage of clinical and parasitological failure)

Name of first-line antimalarial medicine	Study year	No. of studies	Failure rate			Follow-up	*Remarks*
			Minimum	Median	Maximum		

III. IMPLEMENTING MALARIA CONTROL

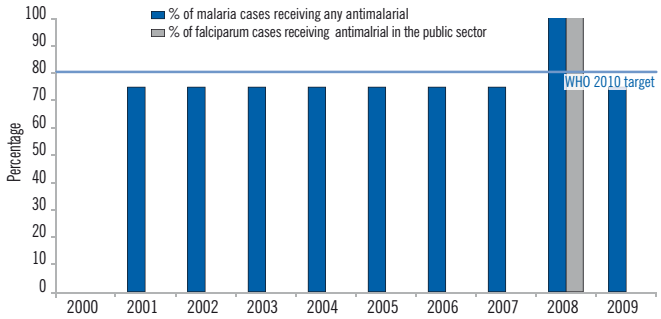
Coverage with IRS and ITNs from programme data



Year	No. of people protected by IRS	No. of ITNs and/or LLINs delivered
2000		0
2001	2 541 217	6 830
2002	2 064 062	100 000
2003	1 892 814	61 865
2004	1 155 353	14 001
2005	955 120	227 500
2006	792 355	100 000
2007	358 104	26 000
2007	727 431	268 250
2009	409 473	774 000

Source: .

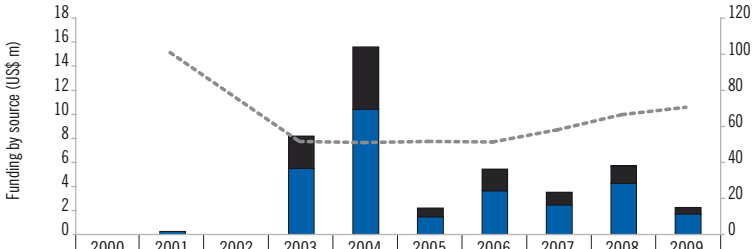
Access to effective treatment from programme data: percentage of cases tested and number of ACT courses delivered relative to cases



Year	No. of first-line treatment courses delivered	No. of ACT treatment courses delivered
2000		
2001	66 522	
2002	41 411	
2003	10 510	
2004	3 720	
2005	1 640	
2006	591	
2007	198	
2007	1 310	640
2009	558	

IV. FINANCING MALARIA CONTROL

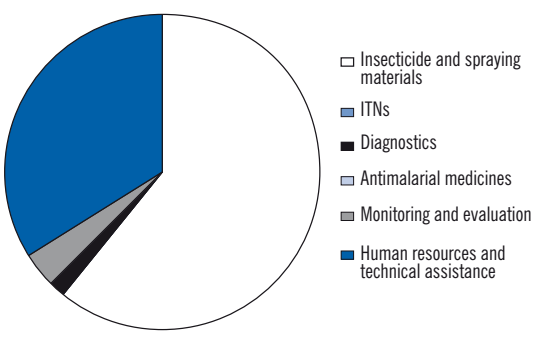
Governmental and external financing



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Other*	0	0	0	0	0	0	0	0	0	0
WHO	0	0	0	0	0	0	0	0	30 000	0
GFATM	0	0	0	2 700 000	5 197 000	730 140	1 808 135	1 055 469	1 432 800	522 431
Government**	0	268 222	0	5 481 600	10 418 100	1 478 860	3 638 770	2 459 892	4 254 705	1 723 699
Government** as % of total		100		51	50	51	50	57	66	70

** Bilaterals: DFID, JICA; and EU, UN agencies, etc.*
*** Governmental expenditure may not include costs at sub-national level and costs related to health systems, human resources, etc.*

Breakdown of expenditure by intervention in 2009



SURINAME

In Suriname the resurgence of malaria experienced in much of South America from the early 1990s continued for a relatively long period, from 1993 to 2005. Since then the incidence fell sharply following the scale-up of anti-malaria interventions. Currently, about 11% of the population is at risk of contracting malaria. The percentage of cases due to *P. falciparum* has shown a marked decline from 84% during 2000 to <42% in 2009. About 50% of the population at risk is tested parasitologically for malaria every year. With a 100% confirmation rate, the number of reported malaria cases decreased from an annual average of 11 449 cases during 2000–2005 to 1371 in 2009 (88% decline). Malaria admissions (inpatient cases) fell from 247 to 92 during same period. The number of reported malaria deaths also fell from 24 in 2000 to one death in 2009. These achievements are strongly associated with the scale-up of anti-malaria interventions. The programme has delivered a total of 22 490 LLINs during 2007–2009, enough to protect 79% of the population at high risk. No data were reported on IRS implementation in recent years. Although the programme did not report delivery of ACT in 2009, supply has probably been adequate to treat all *P. falciparum* cases. Information on funding of malaria control in 2009 was not provided.

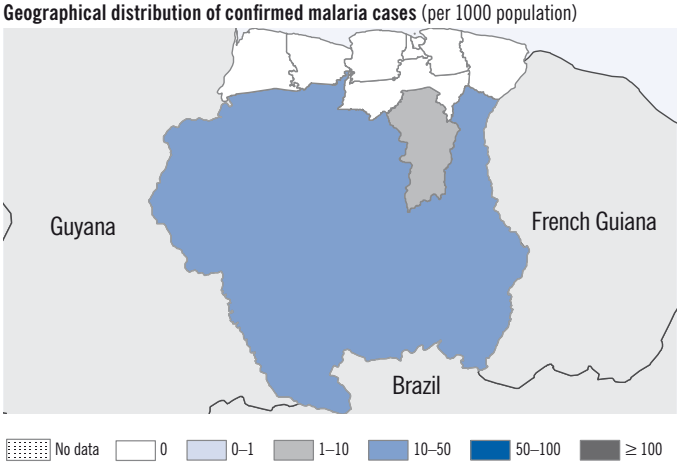
I. EPIDEMIOLOGICAL PROFILE

Population and epidemiological profile

Population (in thousands)*	**2009**	**%**
All ages	520	
< 5 years	48	9
Rural	128	25
Population by malaria endemicity (in thousands)	**2009**	**%**
High transmission (≥1 case per 1000 population)	65	13
Low transmission (0–1 cases per 1000 population)	0	0
Malaria-free (0 cases)	454	87
Vector and parasite species		
Major *Anopheles* species	*darlingi*	
Major *Plasmodium* species	*vivax, falciparum*	

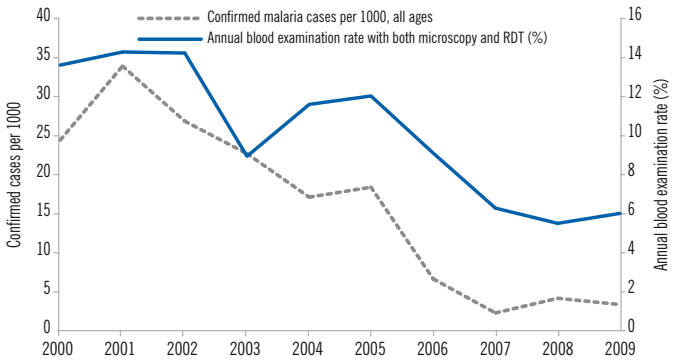
** UN Population Division estimates*

Geographical distribution of confirmed malaria cases (per 1000 population)

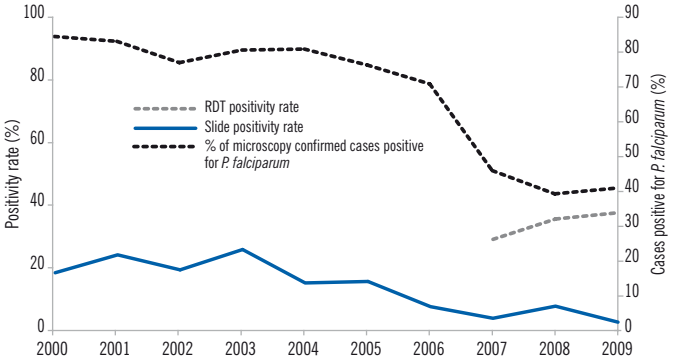


Trends in malaria morbidity and mortality

Confirmed malaria cases, per 1000 and annual blood examination rate



Malaria test positivity rate and % of microscopy confirmed cases positive for *P. falciparum*

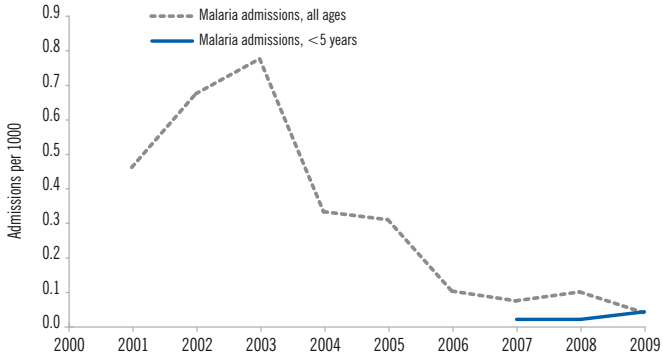


	All ages											< 5 years	
Year	All-cause outpatient consultations	Suspected cases (tested + probable)	Probable cases (not tested)	Total cases tested (microscopy + RDT)	Total confirmed cases (microscopy + RDT)	Malaria cases (confirmed + probable)	Examined by microscopy	Microscopy positive	*P. falciparum*	Examined by RDT	RDT positive	All-cause outpatient consultations	Malaria cases (confirmed + probable)
2000		63 377	0	63 377	11 361	11 361	63 377	11 361	9 489				
2001		67 369	0	67 369	16 003	16 003	67 369	16 003	13 138				
2002		68 070	0	68 070	12 837	12 837	68 070	12 837	9 752				
2003		43 241	0	43 241	10 982	10 982	43 241	10 982	8 740				
2004		56 975	0	56 975	8 378	8 378	56 975	8 378	6 693				
2005		59 855	0	59 855	9 131	9 131	59 855	9 131	6 877				
2006		45 722	0	45 722	3 289	3 289	45 722	3 289	2 298				
2007		31 768	0	33 992	1 104	1 104	31 768	1 104	498	2 224			129
2008		28 137	0	29 911	2 086	2 086	28 137	2 086	802	1 774			163
2009		29 603	0	35 117	1 371	1 371	33 279	689	277	1 838	682		115

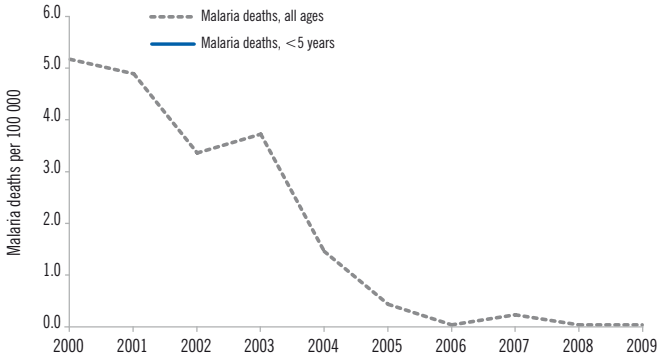
Note: Reporting completeness of outpatient health facilities (%) in 2009: 100%

I. EPIDEMIOLOGICAL PROFILE *(continued)*

Reported malaria admissions, per 1000 population



Reported malaria deaths, per 100 000 population



Admissions	All ages		<5 years	
Year	All-cause admissions	Malaria admissions	All-cause admissions	Malaria admissions
2000				
2001		217		
2002		323		
2003		377		
2004		163		
2005		153		
2006		50		
2007		36		1
2008		50		1
2009		19		2

Deaths	All ages		<5 years	
Year	All-cause deaths	Malaria deaths	All-cause deaths	Malaria deaths
2000	3 090	24		
2001	3 099	23		
2002	3 125	16		
2003	3 154	18		
2004	3 289	7		
2005	3 392	2		
2006	3 247	0		
2007	3 374	1		0
2008		0		0
2009		0		0

II. INTERVENTION POLICIES AND STRATEGIES

Intervention	WHO-RECOMMENDED POLICIES / STRATEGIES	YES or NO	Year adopted	OTHER POLICY / STRATEGY	YES or NO	Year adoped
Insecticide-treated nets (ITN)	ITNs/LLINs are distributed free of charge	YES	2006	ITNs/LLINs are distributed through antenatal clinics	YES	2006
	ITNs/LLINs are distributed to all age groups	YES	2006	ITNs/LLINs are distributed through EPI clinics	–	–
				ITNs/LLINs are distributed through mass campaigns to < 5 only	NO	–
Indoor residual spraying (IRS)	IRS is recommended by malaria control programme	YES	2006	IRS is only used to prevent and control epidemics	–	–
	DDT is used for IRS	–	–	Where IRS is conducted, ITNs are also applied	YES	2006
				Insecticide resistance monitoring is undertaken	–	–
Intermittent preventive treatment (IPT)	IPT is used to prevent malaria during pregnancy	–	–			
Case management	Patients of all ages should receive diagnostic tests	YES	1955	Malaria diagnosis is free of charge in the public sector	YES	1955
	RDTs are used at community level	YES	2005	ACT is delivered by community agents	YES	–
	ACT is free of charge for all age groups in the public sector	YES	–	Therapetic efficacy monitoring is undertaken	YES	–
	Pre-referral treatment with parenteral quinine or artemisinin derivatives or artesunate suppositories is provided	YES	–			
	Oral artemisinin-based monotherapies are not registered	–	–			

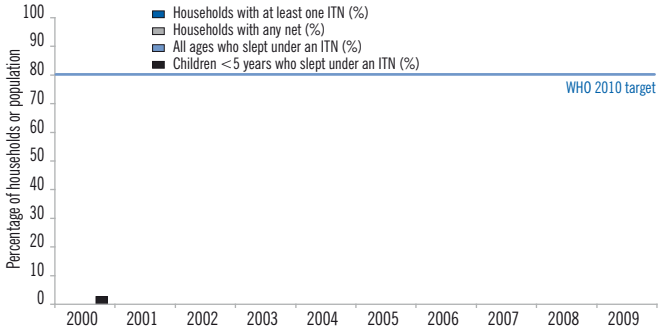
Antimalarial policy	Type of medicine	Year adopted
First-line treatment of *P. falciparum* (unconfirmed)	–	–
First-line treatment of *P. falciparum* (confirmed)	AL	2004
Treatment failure of *P. falciparum*	QN	2004
Treatment of severe malaria	–	–
Treatment of *P. vivax*	CQ+PQ	2004

Therapeutic efficacy studies (percentage of clinical and parasitological failure)

Name of first-line antimalarial medicine	Study year	No. of studies	Failure rate			Follow-up	*Remarks*
			Minimum	Median	Maximum		
Artemether-lumefantrine (AL)	2003–2006	3	1.9	2.0	4.7	28 days	

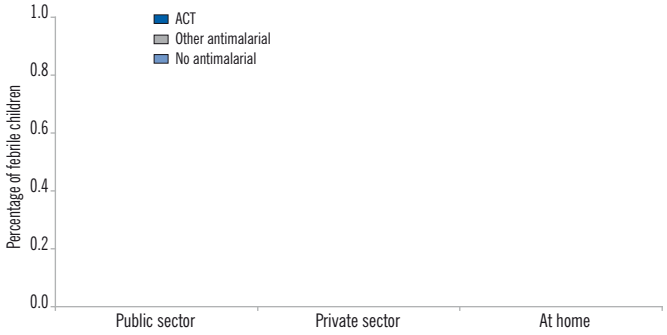
III. IMPLEMENTING MALARIA CONTROL

Coverage with ITNs from survey or model data



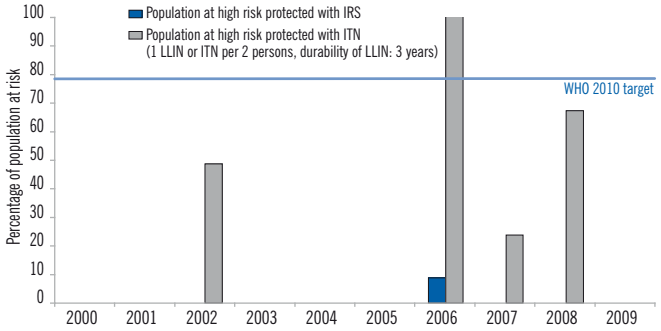
Sources: MICS 2000.

Source of treatment for febrile children and antimalarial received from survey data

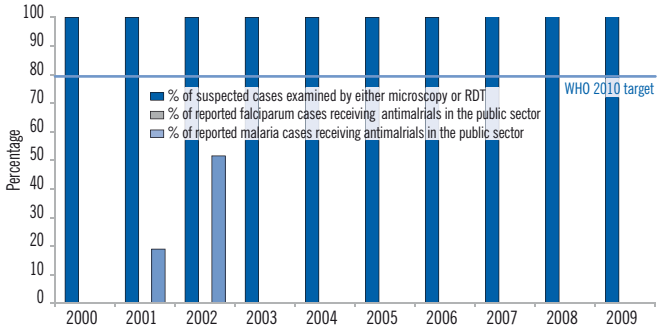


Sources:

Coverage with IRS and ITNs from programme data



Access to effective treatment from programme data: percentage of cases tested and number of ACT courses delivered relative to cases



Preventive interventions: programme and survey data

Year	No. of ITNs and/or LLINs delivered	No. of people protected by IRS	Pregnant women who slept under any net (%)	Pregnant women who slept under an ITN (%)
2000	0			
2001	0			
2002	15 000			
2003	0			
2004	0			
2005	0			
2006	47 504	5 627		
2007	7 742			
2008	752			
2009	376			

Survey sources:

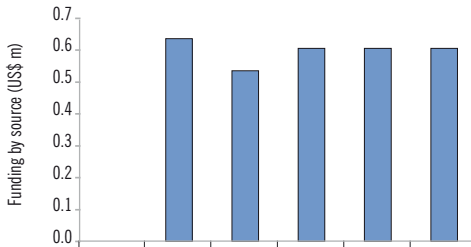
Diagnostics and treatment courses: programme and survey data

No. of RDTs delivered	No. of first-line treatment courses delivered	No. of ACT treatment courses delivered	Febrile children < 5 years (%)	Febrile children < 5 years treated in public health facility (%)
	3 000	0		
	6 600	0		

Survey sources:

IV. FINANCING MALARIA CONTROL

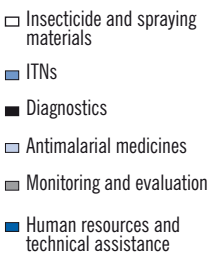
Governmental and external financing



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Other*	0	0	0	0	0	0	0	0	0	0
USAID/PMI	0	0	0	0	0	0	0	0	0	0
UNICEF	0	0	0	0	0	0	0	0	0	0
WHO	0	0	0	0	0	0	0	0	0	0
World Bank	0	0	0	0	0	0	0	0	0	0
Global Fund	0	0	0	0	0	0	0	0	0	0
Government**	0	636 000	536 000	606 000	606 000	606 000	0	0	0	0

** Bilaterals: DFID, JICA; and EU, UN agencies, etc.*
*** Governmental expenditure may not include costs at sub-national level and costs related to health systems, human resources, etc.*

Breakdown of expenditure by intervention in 2009



SWAZILAND

Malaria transmission is seasonal in Swaziland and occurs during November to May in all areas except the southeast part of the country. About 28% of the population is at low risk for malaria, with the rest living in malaria-free areas. Almost all cases are due to *P. falciparum*. Confirmed malaria cases have decreased from an annual average of 652 during 2000–2005 to only 106 cases in 2009 (84% decline). In the same period, malaria admissions decreased from 1026 to 230 and malaria deaths fell from 32 to 13 (over 60% reduction for both). Interventions are focalized, targeting the populations at risk. The programme delivered 79 000 LLINs in 2009, enough to cover 48% of the population at risk. Use of ACT as the first-line treatment was adopted as national policy in 2009 but no data were reported on its deployment. Funding for malaria has increased from about US$ 600 000 in 2007 to US$ 3.6 million in 2009, financed by the Global Fund and the government (26%).

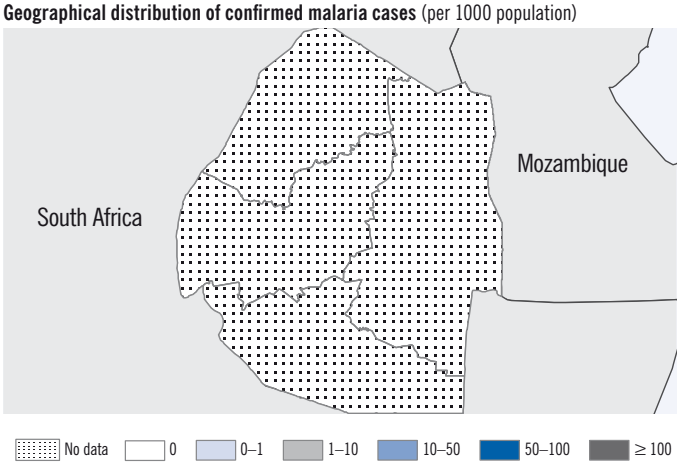
I. EPIDEMIOLOGICAL PROFILE

Population and epidemiological profile

Population (in thousands)*	**2009**	**%**
All ages	1 185	
< 5 years	160	14
Rural	887	75
Population by malaria endemicity (in thousands)	**2009**	**%**
High transmission (≥1 case per 1000 population)	0	0
Low transmission (0–1 cases per 1000 population)	333	28
Malaria-free (0 cases)	852	72
Vector and parasite species		
Major *Anopheles* species	*gambiae, arabiensis, funestus*	
Major *Plasmodium* species	*falciparum*	

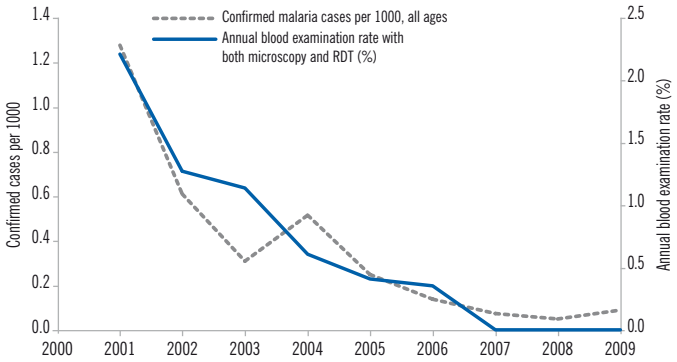
** UN Population Division estimates*

Geographical distribution of confirmed malaria cases (per 1000 population)

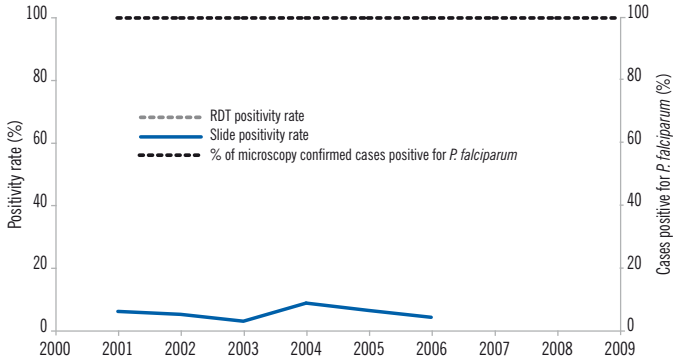


Trends in malaria morbidity and mortality

Confirmed malaria cases, per 1000 and annual blood examination rate



Malaria test positivity rate and % of microscopy confirmed cases positive for *P. falciparum*

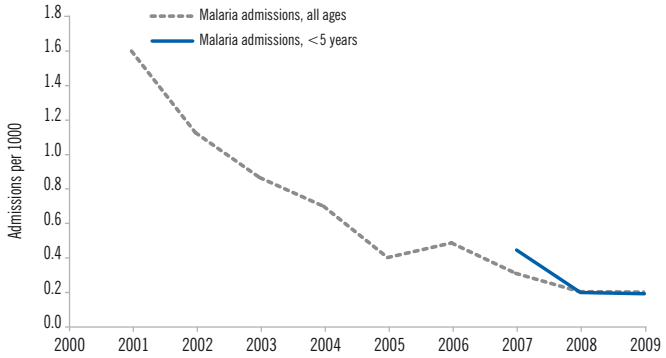


	All ages											< 5 years	
Year	All-cause outpatient consultations	Suspected cases (tested + probable)	Probable cases (not tested)	Total cases tested (microscopy + RDT)	Total confirmed cases (microscopy + RDT)	Malaria cases (confirmed + probable)	Examined by microscopy	Microscopy positive	*P. falciparum*	Examined by RDT	RDT positive	All-cause outpatient consultations	Malaria cases (confirmed + probable)
2000	1 357 937	29 374	29 374			29 374				0	0		
2001	1 466 166	35 582	11 459	24 123	1 395	12 854	24 123	1 395	1 395	0	0	114 444	
2002	1 382 743	23 456	9 459	13 997	670	10 129	13 997	670	670	0	0	120 963	
2003	1 268 607	19 425	6 861	12 564	342	7 203	12 564	342	342	0	0	124 765	
2004	1 429 411	11 320	4 566	6 754	574	5 140	6 754	574	574	0	0	112 399	
2005	1 917 100	10 374	5 787	4 587	279	6 066	4 587	279	279	0	0	109 564	
2006	653 656	11 637	7 652	3 985	155	7 807	3 985	155	155	0	0	100 568	
2007	1 724 438	6 338	6 254		84	6 338		84	84	0	0	443 633	1 245
2008	2 606 909	5 881	5 823		58	5 881		58	58	0	0	648 062	1 054
2009	2 773 150	6 639	6 533		106	6 639		106	106	0	0	647 675	1 296

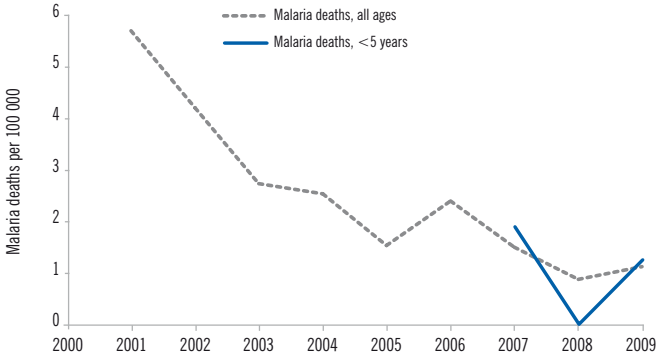
Note: Reporting completeness of outpatient health facilities (%) in 2009: 81.9%

I. EPIDEMIOLOGICAL PROFILE *(continued)*

Reported malaria admissions, per 1000 population



Reported malaria deaths, per 100 000 population



Admissions	All ages		<5 years	
Year	All-cause admissions	Malaria admissions	All-cause admissions	Malaria admissions
2000				
2001	61 258	1 737		
2002	56 231	1 229		
2003	44 493	949		
2004	36 147	770		
2005	22 562	443		
2006	19 628	543		
2007	61 401	347	8 030	70
2008	57 610	227	7 560	31
2009	61 186	230	7 750	30

Deaths	All ages		<5 years	
Year	All-cause deaths	Malaria deaths	All-cause deaths	Malaria deaths
2000				
2001	2 816	62	813	
2002	2 319	46	557	
2003	2 782	30	808	
2004	2 308	28	787	
2005	3 083	17	914	
2006	3 336	27	950	
2007	7 077	17	1 210	3
2008	6 280	10	1 266	0
2009	5 365	13	990	2

II. INTERVENTION POLICIES AND STRATEGIES

Intervention	WHO-RECOMMENDED POLICIES / STRATEGIES	YES or NO	Year adopted	OTHER POLICY / STRATEGY	YES or NO	Year adoped
Insecticide-treated nets (ITN)	ITNs/LLINs are distributed free of charge	YES	2003	ITNs/LLINs are distributed through antenatal clinics	YES	2003
	ITNs/LLINs are distributed to all age groups	YES	2010	ITNs/LLINs are distributed through EPI clinics	YES	2008
				ITNs/LLINs are distributed through mass campaigns to < 5 only	YES	2003
Indoor residual spraying (IRS)	IRS is recommended by malaria control programme	YES	1956	IRS is only used to prevent and control epidemics	YES	1998
	DDT is used for IRS	YES	1956	Where IRS is conducted, ITNs are also applied	YES	2003
				Insecticide resistance monitoring is undertaken	YES	1998
Intermittent preventive treatment (IPT)	IPT is used to prevent malaria during pregnancy	NO	–			
Case management	Patients of all ages should receive diagnostic tests	YES	2010	Malaria diagnosis is free of charge in the public sector	YES	2010
	RDTs are used at community level	YES	2010	ACT is delivered by community agents	NO	–
	ACT is free of charge for all age groups in the public sector	YES	2010	Therapetic efficacy monitoring is undertaken	YES	2010
	Pre-referral treatment with parenteral quinine or artemisinin derivatives or artesunate suppositories is provided	YES	2010			
	Oral artemisinin-based monotherapies are not registered	NO	–			

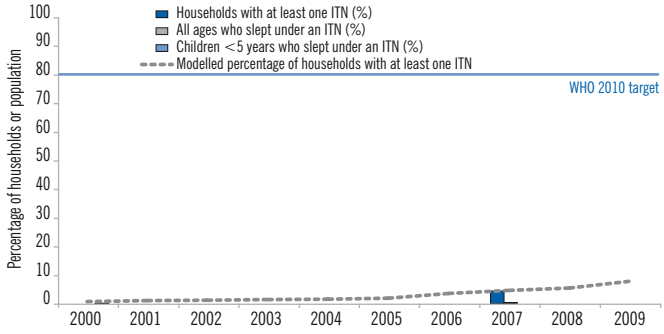
Antimalarial policy	Type of medicine	Year adopted
First-line treatment of *P. falciparum* (unconfirmed)	–	–
First-line treatment of *P. falciparum* (confirmed)	AL	2009
Treatment failure of *P. falciparum*	QN	2009
Treatment of severe malaria	QN	–
Treatment of *P. vivax*	–	–

Therapeutic efficacy studies (percentage of clinical and parasitological failure)

Name of first-line antimalarial medicine	Study year	No. of studies	Failure rate			Follow-up	*Remarks*
			Minimum	Median	Maximum		

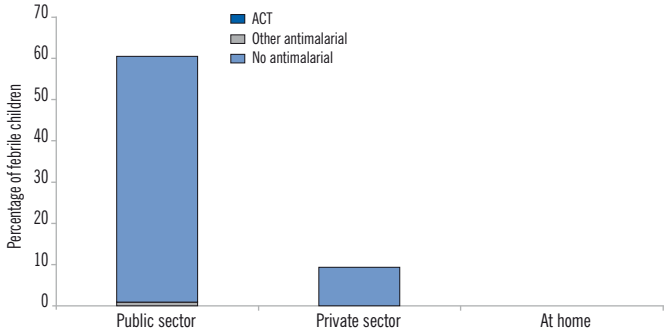
III. IMPLEMENTING MALARIA CONTROL

Coverage with ITNs from survey or model data



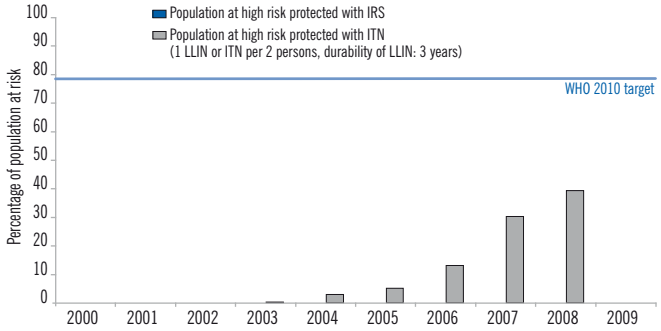
Sources: MICS 2000, DHS 2007.

Source of treatment for febrile children and antimalarial received from survey data

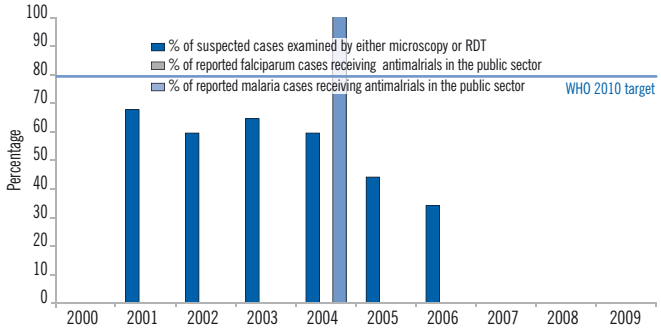


Sources: DHS 2007

Coverage with IRS and ITNs from programme data



Access to effective treatment from programme data: percentage of cases tested and number of ACT courses delivered relative to cases



Preventive interventions: programme and survey data

Year	No. of ITNs and/or LLINs delivered	No. of people protected by IRS	Pregnant women who slept under any net (%)	Pregnant women who slept under an ITN (%)
2000	0			
2001	0			
2002	0			
2003	358			
2004	4 532			
2005	5 890			
2006	16 000			
2007	29 236	93		
2008	20 000	94		
2009	25 000	95		

Survey sources:

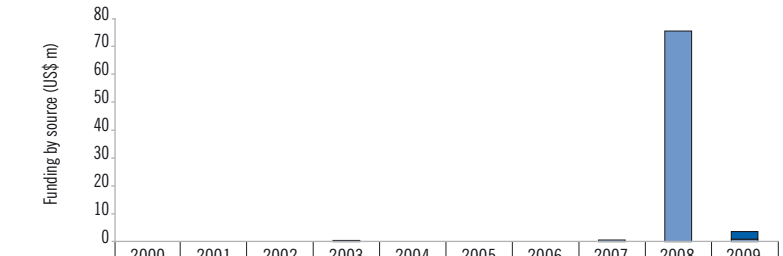
Diagnostics and treatment courses: programme and survey data

No. of RDTs delivered	No. of first-line treatment courses delivered	No. of ACT treatment courses delivered	Febrile children < 5 years (%)	Febrile children < 5 years treated in public health facility (%)
	180 000			
				61

Sources: DHS 2007

IV. FINANCING MALARIA CONTROL

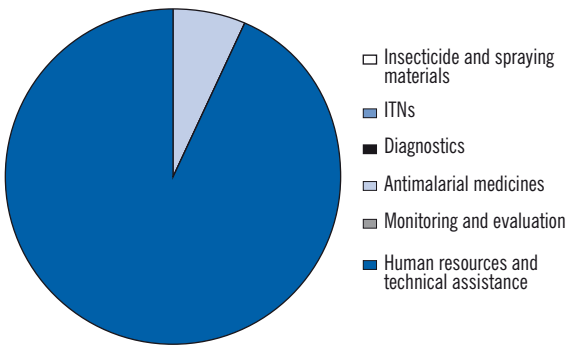
Governmental and external financing



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Other*	0	0	0	0	0	0	0	0	0	0
USAID/PMI	0	0	0	0	0	0	0	0	0	0
UNICEF	0	0	0	0	0	0	0	0	0	0
WHO	0	0	0	0	0	0	0	0	0	0
World Bank	0	0	0	0	0	0	0	0	0	0
Global Fund	0	0	0	400 000	0	0	0	0	0	2 680 392
Government**	0	0	0	0	0	0	0	611 990	75 517 688	964 009

** Bilaterals: DFID, JICA; and EU, UN agencies, etc.*
***Governmental expenditure may not include costs at sub-national level and costs related to health systems, human resources, etc.*

Breakdown of expenditure by intervention in 2009



United Republic of TANZANIA (ZANZIBAR)

Malaria transmission in Zanzibar, UR Tanzania, is perennial with seasonal peaks; most cases are caused by *P. falciparum*. Morbidity and mortality have been substantially reduced, with a decrease of ≥75% in the numbers of malaria cases, inpatient malaria cases and deaths in 2009 compared to the average for 2000–2004. This decline is strongly linked to the scale-up of LLINs, IRS and ACT from 2004. The programme delivered 500 000 LLINs during 2007–2009, enough to replace old nets for the entire population at risk, implemented IRS in several rounds protecting 90% of population at risk, and delivered ACTs. Detailed funding information was not provided but expenditure on malaria in 2009 was US$ 450 000 mainly funded by PMI and UNICEF.

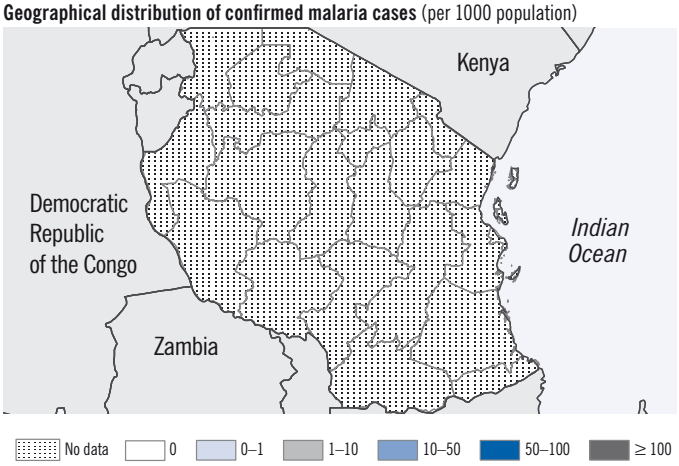
I. EPIDEMIOLOGICAL PROFILE

Population and epidemiological profile

Population (in thousands)*	**2009**	**%**
All ages	1 321	
< 5 years	235	18
Rural	979	74
Population by malaria endemicity (in thousands)	**2009**	**%**
High transmission (≥1 case per 1000 population)	1 321	100
Low transmission (0–1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Vector and parasite species		
Major *Anopheles* species	*gambiae*	
Major *Plasmodium* species	*falciparum*	

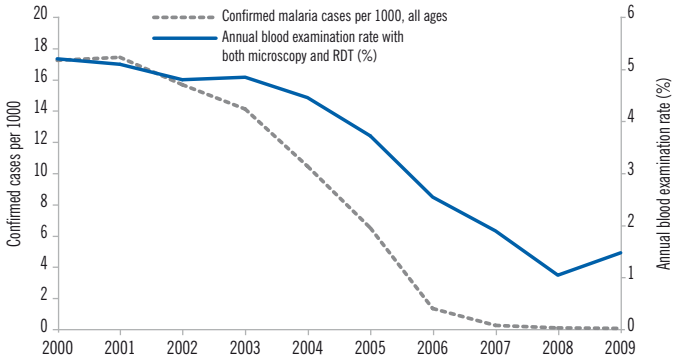
** UN Population Division estimates*

Geographical distribution of confirmed malaria cases (per 1000 population)

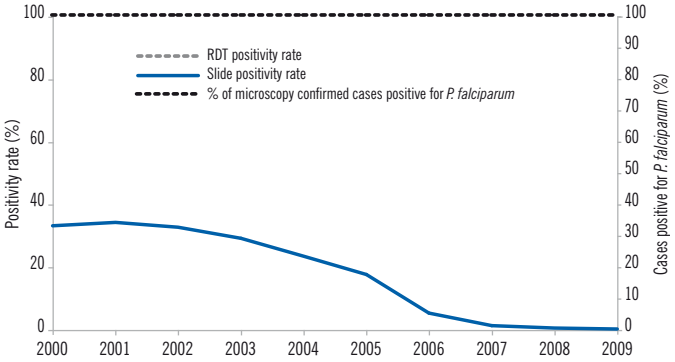


Trends in malaria morbidity and mortality

Confirmed malaria cases, per 1000 and annual blood examination rate



Malaria test positivity rate and % of microscopy confirmed cases positive for *P. falciparum*

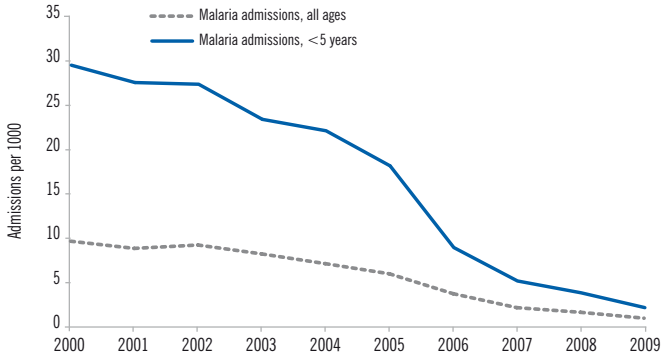


	All ages											< 5 years	
Year	All-cause outpatient consultations	Suspected cases (tested + probable)	Probable cases (not tested)	Total cases tested (microscopy + RDT)	Total confirmed cases (microscopy + RDT)	Malaria cases (confirmed + probable)	Examined by microscopy	Microscopy positive	*P. falciparum*	Examined by RDT	RDT positive	All-cause outpatient consultations	Malaria cases (confirmed + probable)
2000	116 932	53 533		53 533	17 734	17 734	53 533	17 734	17 734			54 921	23 350
2001	112 462	53 804		53 804	18 385	18 385	53 804	18 385	18 385			54 718	23 396
2002	116 030	51 968		51 968	16 983	16 983	51 968	16 983	16 983			53 546	22 200
2003	109 634	53 899		53 899	15 705	15 705	53 899	15 705	15 705			52 118	21 039
2004	112 496	50 976		50 976	11 936	11 936	50 976	11 936	11 936			53 396	16 424
2005	104 864	43 642		43 642	7 628	7 628	43 642	7 628	7 628			48 470	13 990
2006	102 831	30 676		30 676	1 585	1 585	30 676	1 585	1 585			46 110	8 650
2007	95 913	23 511		23 511	293	293	23 511	293	293			37 559	4 691
2008	110 542	13 183		13 183	67	67	13 183	67	67			41 411	4 689
2009	135 424	19 328		19 328	40	40	19 328	40	40	383	6	44 946	3 830

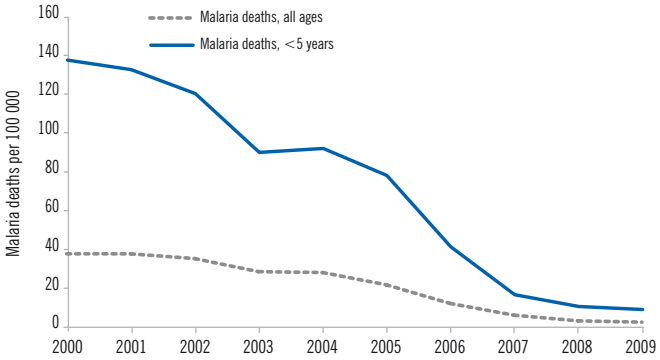
Note: Reporting completeness of outpatient health facilities (%) in 2009: 97.22%

I. EPIDEMIOLOGICAL PROFILE *(continued)*

Reported malaria admissions, per 1000 population



Reported malaria deaths, per 100 000 population



Admissions	All ages		<5 years	
Year	All-cause admissions	Malaria admissions	All-cause admissions	Malaria admissions
2000	23 525	9 806	10 552	5 407
2001	22 856	9 177	9 200	5 173
2002	25 132	9 815	10 835	5 273
2003	25 074	8 981	9 558	4 634
2004	24 721	7 994	11 564	4 500
2005	25 241	6 834	12 127	3 793
2006	22 245	4 336	7 873	1 916
2007	18 392	2 477	6 501	1 128
2008	19 402	1 878	5 250	861
2009	19 430	1 083	5 056	493

Deaths	All ages		<5 years	
Year	All-cause deaths	Malaria deaths	All-cause deaths	Malaria deaths
2000	736	379	490	252
2001	702	390	439	249
2002	696	374	420	232
2003	597	308	305	178
2004	657	312	321	187
2005	613	247	319	163
2006	451	137	243	88
2007	388	64	187	36
2008	379	29	186	23
2009	266	21	139	20

II. INTERVENTION POLICIES AND STRATEGIES

Intervention	WHO-RECOMMENDED POLICIES / STRATEGIES	YES or NO	Year adopted	OTHER POLICY / STRATEGY	YES or NO	Year adoped
Insecticide-treated nets (ITN)	ITNs/LLINs are distributed free of charge	YES	2005	ITNs/LLINs are distributed through antenatal clinics	–	–
	ITNs/LLINs are distributed to all age groups	YES	2008	ITNs/LLINs are distributed through EPI clinics	–	–
				ITNs/LLINs are distributed through mass campaigns to < 5 only	–	–
Indoor residual spraying (IRS)	IRS is recommended by malaria control programme	YES	2006	IRS is only used to prevent and control epidemics	–	–
	DDT is used for IRS	–	–	Where IRS is conducted, ITNs are also applied	YES	2006
				Insecticide resistance monitoring is undertaken	YES	2006
Intermittent preventive treatment (IPT)	IPT is used to prevent malaria during pregnancy	YES	2004			
Case management	Patients of all ages should receive diagnostic tests	YES	2006	Malaria diagnosis is free of charge in the public sector	YES	2004
	RDTs are used at community level	–	–	ACT is delivered by community agents	–	–
	ACT is free of charge for all age groups in the public sector	YES	2003	Therapetic efficacy monitoring is undertaken	–	–
	Pre-referral treatment with parenteral quinine or artemisinin derivatives or artesunate suppositories is provided	YES	2004			
	Oral artemisinin-based monotherapies are not registered	–	–			

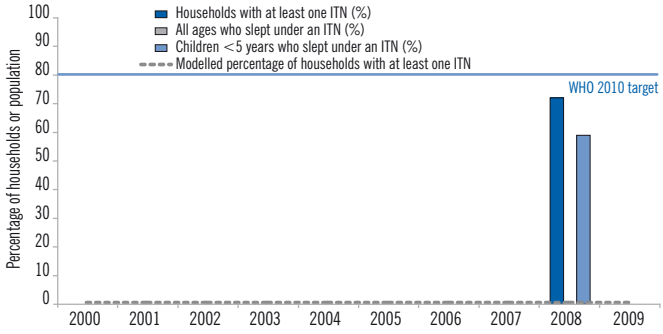
Antimalarial policy	Type of medicine	Year adopted
First-line treatment of *P. falciparum* (unconfirmed)	AS+AQ	2004
First-line treatment of *P. falciparum* (confirmed)	AS+AQ	2004
Treatment failure of *P. falciparum*	QN	2004
Treatment of severe malaria	QN	2004
Treatment of *P. vivax*	–	–

Therapeutic efficacy studies (percentage of clinical and parasitological failure)

Name of first-line antimalarial medicine	Study year	No. of studies	Failure rate			Follow-up	*Remarks*
			Minimum	Median	Maximum		
Artesunate+amodiaquine (AS+AQ)	2002–2005	2	10.8	12.1	13.4	42 days	

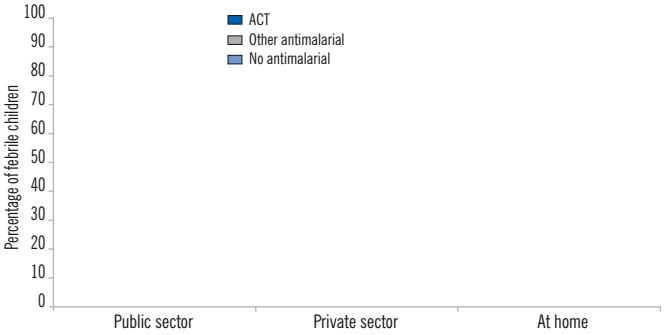
III. IMPLEMENTING MALARIA CONTROL

Coverage with ITNs from survey or model data



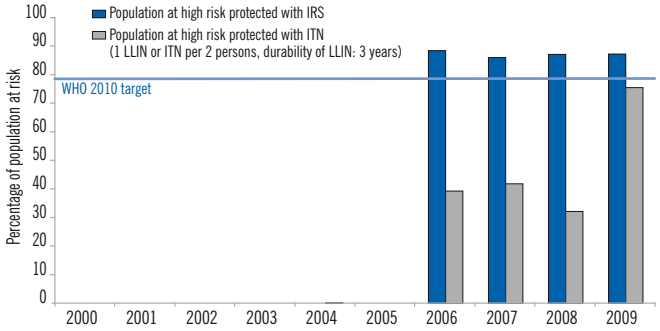
Sources: AIS/MIS 2008.

Source of treatment for febrile children and antimalarial received from survey data

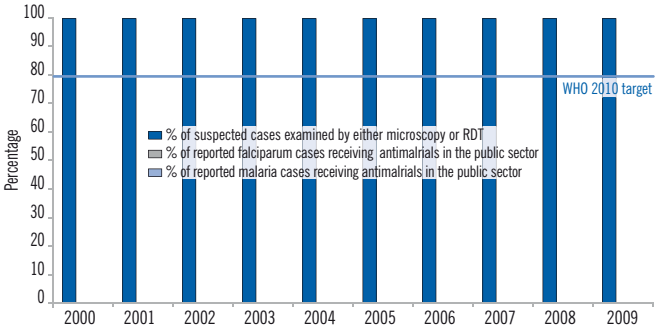


Sources:

Coverage with IRS and ITNs from programme data



Access to effective treatment from programme data: percentage of cases tested and number of ACT courses delivered relative to cases



Preventive interventions: programme and survey data

Year	No. of ITNs and/or LLINs delivered	No. of people protected by IRS	Pregnant women who slept under any net (%)	Pregnant women who slept under an ITN (%)
2000	0			
2001	0			
2002	0			
2003	0			
2004	1 500			
2005	0			
2006	244 970	1 071 361		
2007	23 520	1 071 194		
2008	189 317	1 117 590		
2009	289 121	1 152 235		

Survey sources:

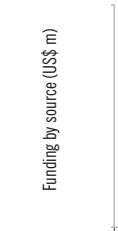
Diagnostics and treatment courses: programme and survey data

No. of RDTs delivered	No. of first-line treatment courses delivered	No. of ACT treatment courses delivered	Febrile children < 5 years (%)	Febrile children < 5 years treated in public health facility (%)
100 000				
150 000				
200 000				
200 000			12	
121 248				

Survey sources: AIS/MIS 2008.

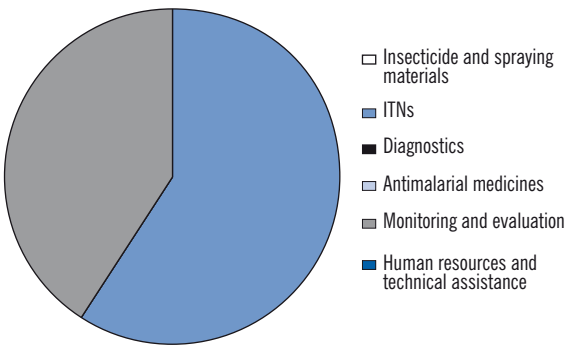
IV. FINANCING MALARIA CONTROL

Governmental and external financing



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Other*										
USAID/PMI										
UNICEF										
WHO										
World Bank										
Global Fund										
Government**										

Breakdown of expenditure by intervention in 2009



** Bilaterals: DFID, JICA; and EU, UN agencies, etc.*
*** Governmental expenditure may not include costs at sub-national level and costs related to health systems, human resources, etc.*

ZAMBIA

Malaria transmission in Zambia is seasonal, occurring from November to May, with most cases due to *P. falciparum*. Although diagnostic testing for suspected cases has been expanded following the introduction of RDTs in 2006, data on the testing rate are not yet available. However, suspected malaria cases decreased from the annual average of 3.9 million cases during 2000–2005 to 2.9 cases in 2009 (24% decline) – but inpatient malaria cases in all age groups and in children < 5 years of age increased by 11% and 15% respectively in 2009 compared to 2008, suggesting a possible resurgence of malaria. Analysis of subnational inpatient data indicate that the higher totals in 2009 resulted from increases in Luapula and Eastern provinces. The programme delivered 5.1 million LLINs during 2007–2009, enough to cover 80% of the population in 2009, and IRS has recently been expanded, protecting 5.6 million (44%) people in 2009. About 3.1 million ACT treatment courses were delivered in 2009. In the 2009 malaria indicator survey, 62% of households owned an ITN and 41% of children < 5 slept under an ITN. Funding for malaria has increased significantly, from less than US$ 5 million in 2002 to over US$ 22 million in 2009, mainly provided by the Global Fund, PMI, World Bank, United Nations agencies and NGOs.

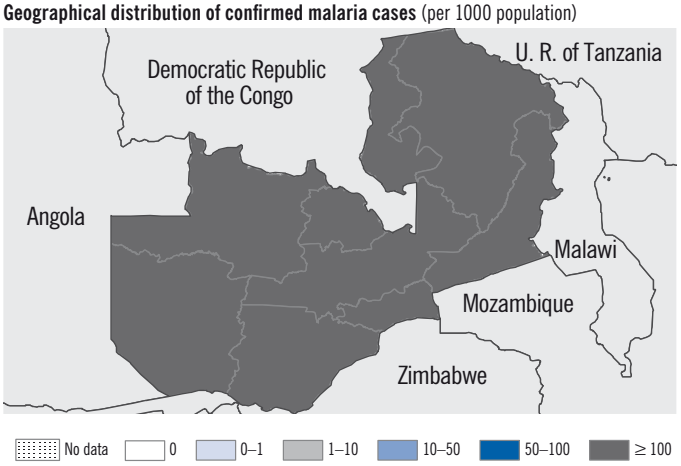
I. EPIDEMIOLOGICAL PROFILE

Population and epidemiological profile

Population (in thousands)*	**2009**	**%**
All ages	12 935	
< 5 years	2 327	18
Rural	8 342	64
Population by malaria endemicity (in thousands)	**2009**	**%**
High transmission (≥1 case per 1000 population)	12 935	100
Low transmission (0–1 cases per 1000 population)	0	0
Malaria-free (0 cases)	0	0
Vector and parasite species		
Major *Anopheles* species	*gambiae, arabiensis, funestus*	
Major *Plasmodium* species	*falciparum*	

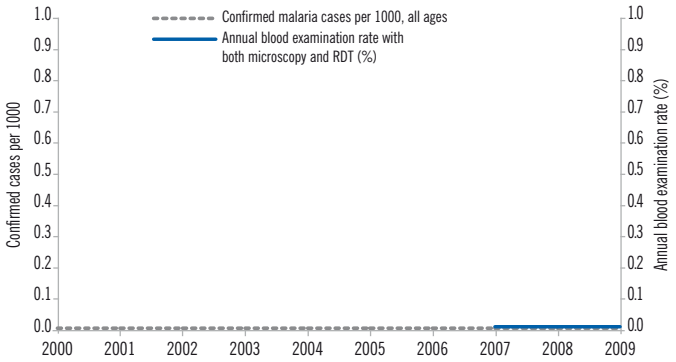
** UN Population Division estimates*

Geographical distribution of confirmed malaria cases (per 1000 population)

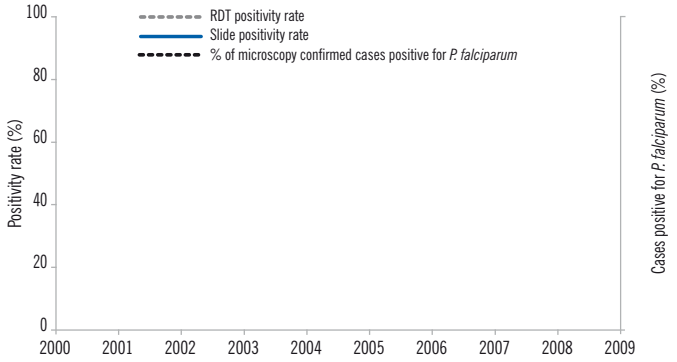


Trends in malaria morbidity and mortality

Confirmed malaria cases, per 1000 and annual blood examination rate



Malaria test positivity rate and % of microscopy confirmed cases positive for *P. falciparum*

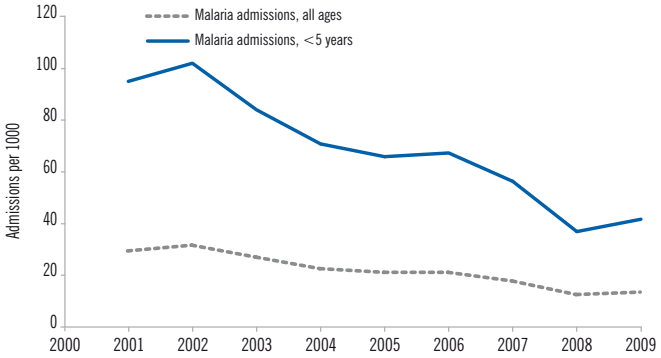


	All ages										< 5 years	
Year	All-cause outpatient consultations	Suspected cases (tested + probable)	Probable cases (not tested)	Total cases tested (microscopy + RDT)	Total confirmed cases (microscopy + RDT)	Malaria cases (confirmed + probable)	Examined by microscopy	Microscopy positive	*P. falciparum*	Examined by RDT	RDT positive	All-cause outpatient consultations	Malaria cases (confirmed + probable)
2000	9 230 639	3 337 796	3 337 796			3 337 796						4 856 786	2 016 333
2001	10 133 545	3 838 402	3 838 402			3 838 402						5 334 699	2 295 738
2002	10 347 966	3 760 335	3 760 335			3 760 335						5 299 233	2 230 107
2003	11 970 827	4 346 172	4 346 172			4 346 172						5 972 557	2 480 157
2004	11 252 589	4 078 234	4 078 234			4 078 234						5 534 795	2 324 580
2005	11 567 755	4 121 356	4 121 356			4 121 356						5 680 460	2 360 307
2006	13 283 617	4 731 338	4 731 338			4 731 338						5 872 543	2 434 135
2007	13 277 766	4 248 295	4 248 295	0		4 248 295	0	0		0	0	5 559 399	2 133 915
2008	11 565 345	3 080 301	3 080 301	0		3 080 301	0	0		0	0	4 675 281	1 508 448
2009	10 969 596	2 976 395	2 976 395	0		2 976 395	0	0		0	0	4 714 348	1 514 080

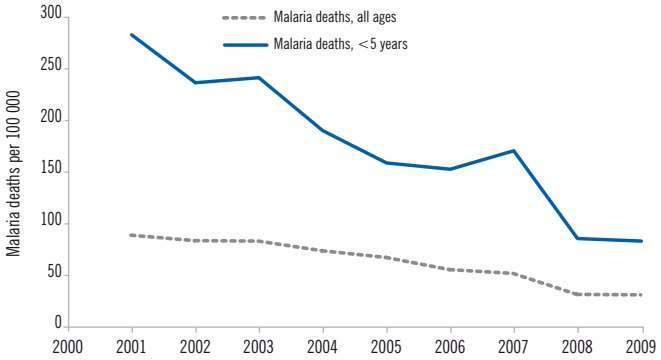
Note: Reporting completeness of outpatient health facilities (%) in 2009: 86,3%

I. EPIDEMIOLOGICAL PROFILE *(continued)*

Reported malaria admissions, per 1000 population



Reported malaria deaths, per 100 000 population



Admissions	All ages		<5 years	
Year	All-cause admissions	Malaria admissions	All-cause admissions	Malaria admissions
2000				
2001	757 255	308 662	379 811	184 917
2002	893 262	340 834	424 748	203 625
2003	766 078	296 602	348 864	171 408
2004	685 130	251 434	289 082	147 663
2005	722 712	240 952	300 804	140 329
2006	718 149	247 120	307 443	146 524
2007	666 705	212 049	280 266	125 188
2008	691 228	149 964	361 268	83 530
2009	499 926	166 760	256 007	96 114

Deaths	All ages		<5 years	
Year	All-cause deaths	Malaria deaths	All-cause deaths	Malaria deaths
2000				
2001	35 358	9 369	16 680	5 513
2002	39 482	9 021	16 377	4 718
2003	39 117	9 178	15 459	4 935
2004	38 466	8 289	13 569	3 972
2005	38 740	7 737	12 796	3 388
2006	35 541	6 484	12 469	3 330
2007	34 275	6 183	13 842	3 801
2008	27 954	3 781	10 280	1 941
2009	30 139	3 862	15 857	1 924

II. INTERVENTION POLICIES AND STRATEGIES

Intervention	WHO-RECOMMENDED POLICIES / STRATEGIES	YES or NO	Year adopted	OTHER POLICY / STRATEGY	YES or NO	Year adoped
Insecticide-treated nets (ITN)	ITNs/LLINs are distributed free of charge	YES	2005	ITNs/LLINs are distributed through antenatal clinics	YES	2001
	ITNs/LLINs are distributed to all age groups	YES	1998	ITNs/LLINs are distributed through EPI clinics	YES	2003
				ITNs/LLINs are distributed through mass campaigns to < 5 only	YES	2000
Indoor residual spraying (IRS)	IRS is recommended by malaria control programme	YES	–	IRS is only used to prevent and control epidemics	YES	2001
	DDT is used for IRS	YES	2001	Where IRS is conducted, ITNs are also applied	YES	2001
				Insecticide resistance monitoring is undertaken	YES	2000
Intermittent preventive treatment (IPT)	IPT is used to prevent malaria during pregnancy	YES	2001			
Case management	Patients of all ages should receive diagnostic tests	YES	2001	Malaria diagnosis is free of charge in the public sector	YES	2000
	RDTs are used at community level	YES	2007	ACT is delivered by community agents	YES	2007
	ACT is free of charge for all age groups in the public sector	YES	2003	Therapetic efficacy monitoring is undertaken	YES	2008
	Pre-referral treatment with parenteral quinine or artemisinin derivatives or artesunate suppositories is provided	YES	1998			
	Oral artemisinin-based monotherapies are not registered	YES	2003			

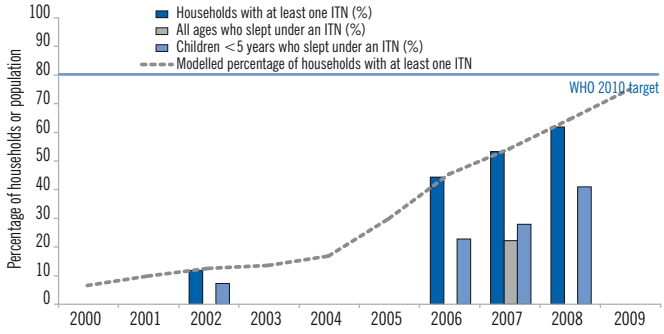
Antimalarial policy	Type of medicine	Year adopted
First-line treatment of *P. falciparum* (unconfirmed)	AL	2002
First-line treatment of *P. falciparum* (confirmed)	AL	2002
Treatment failure of *P. falciparum*	QN	2002
Treatment of severe malaria	QN	2002
Treatment of *P. vivax*	–	–

Therapeutic efficacy studies (percentage of clinical and parasitological failure)

Name of first-line antimalarial medicine	Study year	No. of studies	Failure rate			Follow-up	*Remarks*
			Minimum	Median	Maximum		
Artemether-lumefantrine (AL)	2004–2006	12	0.0	0.0	6.7	28 days	

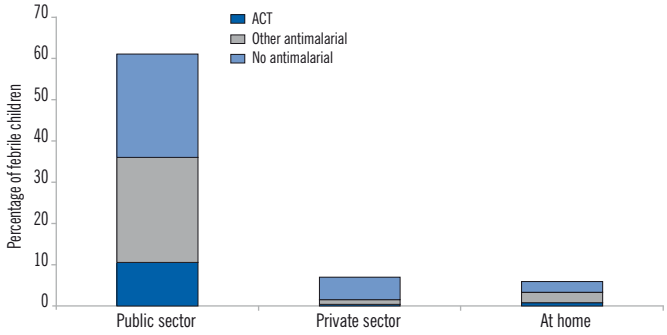
III. IMPLEMENTING MALARIA CONTROL

Coverage with ITNs from survey or model data



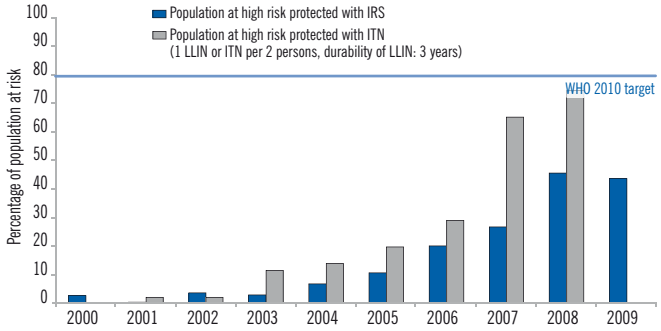
Sources: DHS 2002, DHS 2007, MIS 2008.

Source of treatment for febrile children and antimalarial received from survey data

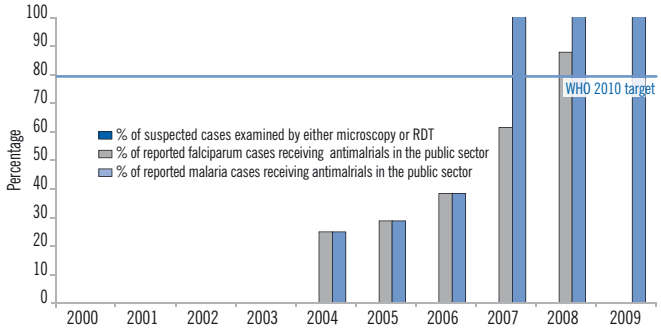


Sources: DHS 2007

Coverage with IRS and ITNs from programme data



Access to effective treatment from programme data: percentage of cases tested and number of ACT courses delivered relative to cases



Preventive interventions: programme and survey data

Year	No. of ITNs and/or LLINs delivered	No. of people protected by IRS	Pregnant women who slept under any net (%)	Pregnant women who slept under an ITN (%)
2000	0	279 321		
2001	115 891	37 890		
2002	112 020	391 926	17	9
2003	557 071	324 137		
2004	176 082	772 644		
2005	516 999	1 251 701		
2006	1 162 578	2 408 080		24
2007	2 458 183	3 288 475		
2008	1 188 443	5 747 995		
2009	1 502 712	5 638 551		

Survey sources: DHS 2002, DHS 2007, MIS 2008.

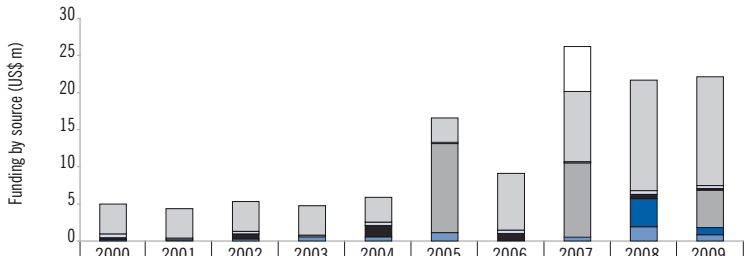
Diagnostics and treatment courses: programme and survey data

No. of RDTs delivered	No. of first-line treatment courses delivered	No. of ACT treatment courses delivered	Febrile children < 5 years (%)	Febrile children < 5 years treated in public health facility (%)
				62
	1 184 698	1 184 698		
	1 379 955	1 379 955		
400 000	2 111 348	2 111 348	33	
400 000	6 073 964	3 036 982	16	61
2 015 500	6 284 810	3 142 405	28	
1 969 000	6 284 810			

Survey sources: DHS 2002, DHS 2007, MIS 2008.

IV. FINANCING MALARIA CONTROL

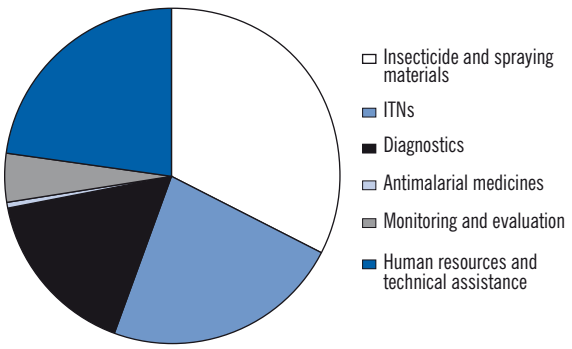
Governmental and external financing



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Other*	0	0	0	0	0	0	0	6 046 354	0	0
USAID/PMI	4 000 000	4 000 000	4 000 000	4 000 000	3 300 300	3 300 000	7 650 000	9 470 000	14 888 000	14 700 000
UNICEF	538 437	208 481	330 579	183 190	477 624	131 116	451 781	114 285	548 840	398 000
WHO	280 000	0	674 000	0	1 500 000	0	1 026 000	20 639	550 847	212 570
World Bank	0	0	0	0	0	12 000 000	0	10 000 000	0	5 000 000
Global Fund	0	0	0	0	0	0	0	38 875	3 817 916	986 834
Government**	160 000	160 000	302 860	588 571	588 571	1 160 000	0	497 078	1 900 000	848 745

** Bilaterals: DFID, JICA; and EU, UN agencies, etc.*
***Governmental expenditure may not include costs at sub-national level and costs related to health systems, human resources, etc.*

Breakdown of expenditure by intervention in 2009



ANNEXES

Annex 1: World Malaria Report 2010 questionnaires

Annex 2: Data completeness, 2009

Annex 3: Funding for malaria control, 2009

Annex 4.A: Recommended policies and strategies for malaria control, 2009

Annex 4.B: Antimalarial drug policy, 2009

Annex 5: Operational coverage of insecticide-treated nets, indoor residual spraying, and antimalarial treatment, 2007–2009

Annex 6.A: Household surveys of mosquito nets ownership and usage, 2006–2009

Annex 6.B: Household surveys of antimalarial treatment, 2006–2009

Annex 7.A: Reported malaria cases and deaths, 2009

Annex 7.B: Malaria trends 1, 1990–2009

Annex 7.C: Malaria trends 2, 1990–2009

Annex 7.D: Reported malaria deaths, 1990–2009

World Health Organization

World Malaria Report 2010

Form for countries in control phase

Please complete this form before June 30th 2010 and return to :

Please note, empty cells will be treated as missing data. Please use 0 for zero.

1. Contact information

Fill in details below:

Country	
Name of programme	
Name of person completing the form	
Function	
E-mail	
Phone	
Fax	

2. Population at risk

	2009
No. of people living in high risk areas (reported malaria incidence ≥ 1 per 1000 population)	
No. of people living in low risk areas (reported malaria incidence < 1 per 1000 population)	
No. of people living in malaria-free areas (no indigenous transmission)	
Total	

3. Vectors

Main malaria vectors	1.	Please select	3.	Please select	
in order of importance	2.	Please select	4.	Please select	

4. Total reported cases, admissions and deaths

			2007	2008	2009
Outpatients	All-causes[1]	All ages			
		Under 5 years			
	Malaria *(both confirmed & clinically diagnosed cases)*[2]	All ages			
		Under 5 years			
Admissions	All-causes	All ages			
		Under 5 years			
	Malaria	All ages			
		Under 5 years			
Deaths	All-causes	All ages			
		Under 5 years			
	Malaria	All ages			
		Under 5 years			
		Remarks			

[1] *New attendees to outpatients from all causes including malaria*

[2] *Exclude those diagnosed in community*

5. Completeness of outpatient reporting in 2009

Type of facility included in outpatient reports 2009:

Click boxes that apply

	Hospital	Health centre/ polyclinic	Health post/ clinic
Government	☐	☐	☐
Mission	☐	☐	☐
Private	☐	☐	☐
Other (specify)			

Reporting completeness 2009:

Of all health facilities supposed to report on outpatients each month, what percentage actually do so ?
If inpatient and death reporing rates likely to be different, then state this in the remarks.

	<50%	50-80%	>80%	Not sure
% of reports received from health facilities in 2009	○	○	○	○

Remarks

If possible provide exact reporting completeness for 2009:

	Monthly	Quartely	Annually
Frequency of outpatient reporting:	○	○	○

Total number of health facilities expected to report (b)

Total number of reports actually received in 2009 (c)

6a. Total confirmed cases

		2007	2008	2009
Microscopy *(all ages, both active & passive case detection, inpatients & outpatients)*	Examined			
	Positive			
	P.falciparum			
	P.vivax			
	Other species			
	Mixed			
RDTs *(all ages, both active & passive case detection, inpatients & outpatients. exclude cases detected in community)*	Examined			
	Positive			
	Remarks			

Annex 1. World Malaria Report 2010 questionnaire: Form for countries in control phase (3)

7. Cases diagnosed in community		2007	2008	2009
Malaria cases detected by community based treatment programs[2]				
RDT examinations				
RDTs positive				

[2] *Include both confirmed and clinically diagnosed cases*

8. Active case detection		2007	2008	2009
Microscopy	Examined			
	Positive			
RDT	Examined			
	Positive			

9. Policies implemented nationally		Implemented in 2009	Year started	Remarks
ITNs	ITNs/ LLINs are distributed for free	☐		
	ITNs/ LLINs are sold at subsidized prices	☐		
	ITNs/ LLINs are distributed to all age groups	☐		
	ITNs/ LLINs are distributed through antenatal clinics	☐		
	ITNs/ LLINs are distributed through EPI clinics	☐		
	ITNs/ LLINs distributed through mass campaigns to under 5 only	☐		
	ITNs/ LLINs distributed through mass campaigns to all age groups	☐		
IRS	IRS is recommended by malaria control program	☐		
	IRS is only used to prevent and control epidemics	☐		
	IRS and ITNs used together for malaria control in at least some areas	☐		
	DDT is used for IRS	☐		
	Insecticide resistance monitoring is undertaken	☐		
Diagnosis	Patients of all ages should get diagnostic test	☐		
	Only patients >5 years get diagnostic test	☐		
	Malaria diagnosis is free of charge in the public sector	☐		
	RDTs are used at community level	☐		
Treatment	ACT free of charge for <5 yrs in public sector	☐		
	ACT is free of charge for all age groups in public sector	☐		
	ACT is delivered by community agents	☐		
	Pre-referral Rx with parentral quinine/artimesinin derivatives or artesunate suppositories	☐		
	Oral artemisinin-based monotherapies are not registered	☐		
	Oral artemisinin-based monotherapies are not on sale in private sector	☐		
	Therapeutic efficacy monitoring undertaken	☐		

10. Interventions		2007	2008	2009
Total number of ITNs distributed:	Conventional ITNs			
	LLINs			
	Total nets			
	Number of kits distributed and retreatments done			
	Remarks (if any)			
Number of ITNs distributed by:	Mass campaign			
	Antenatal care			
	EPI/ well baby clinic			
	Other channels			
	Remarks (if any)			
IRS	Number of people targeted for IRS			
	Number of people protected by IRS			
	Remarks (if any)			
Diagnosis & Treatment	Total number of RDTs distributed			
	Total number of ACT treatment courses distributed			
	No. of full treatment courses of any 1st line antimalarial			
	Remarks (if any)			

11. Results of household surveys	2007	2008	2009
Title of survey			
Number of administartive units surveyed			
Type of administrative unit surveyed (province, district, etc)			
Number of households surveyed			
Location of households (urban / rural / both)	Please select	Please select	Please select
% of households with any net			
% of households with at least one ITN			
% of children <5 sleeping under any net last night			
% of children <5 sleeping under ITN last night			
% of pregnant women sleeping under any net last night			
% of pregnant women sleeping under ITN last night			
% of women with 2+ doses of SP in last pregnancy			
% of children <5 with fever			
% <5 with fever taking any antimalarial			
% <5 with fever taking antimalarial within 24 h			
% <5 with fever who took ACT			
% <5 with fever taking ACT within 24 h			
Remarks			

12. Malaria financing by year (US$)		2007	2008	2009
Government contribution	Total government budget			
	Health budget			
	Malaria budget			
	Malaria expenditure			
External contributions	Global Fund			
	World Bank			
	USAID / PMI			
	Other bilaterals (DFID, JICA, etc.)			
	UNICEF			
	WHO			
	Others (EU, other UN, NGOs, foundations, etc.)			

13. Expenditure breakdown 2009 (US$)	Government	Global Fund	USAID / PMI	Other Bilateral
Human Resources & Technical Assistance				
Training				
ITNs				
Insecticide & spraying materials				
Diagnostics				
Anti-malarial medicines				
Procurement & supply management				
Infrastructure & equipment				
Communication and advocacy				
Monitoring and Evaluation				
Planning, administration, overheads				
Other				
Total				
Amounts are budgets/ disbursements/ expenditure?	Please select	Please select	Please select	Please select

	World Bank	UNICEF	WHO	Other
Human Resources & Technical Assistance				
Training				
ITNs				
Insecticide & spraying materials				
Diagnostics				
Anti-malarial medicines				
Procurement & supply management				
Infrastructure & equipment				
Communication and advocacy				
Monitoring and Evaluation				
Planning, administration, overheads				
Other				
Total				
Amounts are budgets/ disbursements/ expenditure?	Please select	Please select	Please select	Please select

World Health Organization

World Malaria Report 2010

Form for countries in pre-elimination and elimination phases

Please complete this form before 30 June 2010 and return to:

Please note, empty cells will be treated as missing data. Please use 0 for zero.

1. Contact information

	Fill in details below:
Country:	
Name of programme:	
Name of person completing the form:	
Function:	
E-mail:	
Phone:	
Fax:	

2. Population at risk

	Population
Number of active foci	
Number people at living within active foci	
Number of people living in malaria-free areas	
Total population	

3. Vectors

Main malaria vectors	1. Please select	3. Please select
in order of importance	2. Please select	4. Please select

4. Reported cases and deaths

		2007	2008	2009
Cases *(All ages, both passive & active case detection)*	Slides examined			
	Positive			
	P.falciparum			
	P.vivax			
	Other species			
	Mixed			
Active case detection	Examined			
	Positive			
Case investigation	Indigenous cases			
	Introduced cases			
	Imported cases			
	Not classified/ other			
Deaths	Indigenous			
	Not classified/ other			
	Remarks			

5. Completeness of reporting in 2009

Type of facility included in outpatient reports 2009:

Click boxes that apply

	Hospital	Health centre/ polyclinic	Health post/ clinic
Government	☐	☐	☐
Mission	☐	☐	☐
Private	☐	☐	☐
Other (specify)			

Please estimate reporting completeness for 2009:

	Monthly	Quartely	Annually
Frequency of outpatient reporting:	○	○	○

Total number of health facilities expected to report (b)	
Total number of reports actually received in 2009 (c)	

6. Policies implemented nationally		Currently imple-mented?	Year started	Remarks
ITN	ITNs/LLINs are distributed given to all age groups	☐		.
	ITNs/LLINs are distributed free	☐		.
	ITNs/ LLINs are sold at subsidized prices	☐		.
IRS	IRS is the primary vector control intervention	☐		.
	DDT is used for IRS	☐		.
	Insecticide-resistance monitoring is undertaken	☐		.
Diagnosis & Treatment	Malaria diagnosis is free of charge in the public sector	☐		.
	Malaria treatment is permitted in the private sector	☐		.
	Malaria treatment is free of charge in the private sector	☐		.
	Radical treatment of *P.vivax* cases	☐		.
Surveillance	Foci and case investigation undertaken	☐		.
	Case reporting from private sector is mandatory	☐		.

Annex 1. World Malaria Report 2010 questionnaire: Form for countries in pre-elimination and elimination phases (3)

7. Interventions		2007	2008	2009
ITNs	Number of LLINs distributed			
	Remarks			
IRS	No. people targeted for IRS			
	No. people protected with IRS			
	Remarks			
Treatment	No. ACT treatment courses distributed			
	No. other 1st line treatment courses distributed			
	Remarks			

8. Malaria financing by year (US$)		2007	2008	2009
Government contribution	Total government budget			
	Health budget			
	Malaria budget			
	Malaria expenditure			
External contributions	GFATM			
	WHO			
	Others (bilaterals, NGOs, foundations, etc.)			

9. Expenditure breakdown 2009 (US$)	Govt	GFATM	WHO	Other
Human resources & Technical assitance				
Training				
ITNs				
Insecticide & spraying materials				
Diagnostics				
Anti-malarial medicines				
Procurement & supply management				
Infrastructure & equipment				
Communication and advocacy				
Monitoring and evaluation				
Planning, administration, overheads				
Other				
Total				
Amounts are budgets/ disbursements/ expenditure?	Please select	Please select	Please select	Please select

Annex 2 – Data completeness, 2009

WHO region	Country/area	Phase	Date form was submitted	Completeness Score%			Population at risk %	Cases, admissions and deaths %	Reporting completeness %	Total confirmed cases %	Cases diagnosed in community %	Active case detection %	Interventions %	Malaria financing by year %	Government expenditure %
				2007	2008	2009									
AFRO	Algeria	Elimination	-	-	-	-	-	-	-	-	-	-	-	-	-
	Angola	Control	06-Sep-10	43%	42%	49%	100%	93%	50%	50%	0%	0%	69%	27%	8%
	Benin	Control	14-Jul-10	62%	66%	81%	100%	93%	100%	88%	100%	100%	44%	64%	100%
	Botswana	Control	20-Aug-10	31%	35%	38%	100%	40%	50%	63%	0%	0%	50%	36%	8%
	Burkina Faso	Control	14-Jul-10	45%	51%	71%	100%	100%	100%	50%	100%	0%	94%	82%	15%
	Burundi	Control	20-Aug-10	57%	60%	62%	100%	100%	100%	63%	100%	100%	44%	45%	15%
	Cameroon	Control	14-Jul-10	52%	53%	75%	67%	100%	100%	25%	100%	0%	88%	73%	77%
	Cape Verde	Control	26-Aug-10	56%	57%	51%	100%	40%	100%	75%	0%	50%	63%	73%	0%
	Central Africa Republic	Control	23-Aug-10	43%	44%	47%	33%	100%	100%	0%	0%	0%	50%	73%	0%
	Chad	Control	07-Sep-10	26%	27%	26%	100%	47%	100%	0%	0%	0%	19%	27%	0%
	Comoros	Control	20-Aug-10	48%	48%	43%	33%	33%	100%	88%	33%	25%	38%	55%	15%
	Congo	Control	06-Sep-10	32%	32%	36%	0%	100%	100%	75%	0%	0%	19%	0%	0%
	Côte d'Ivoire	Control	14-Jul-10	31%	29%	26%	100%	87%	100%	0%	0%	0%	0%	0%	0%
	DR Congo	Control	14-Jul-10	90%	90%	94%	67%	100%	50%	100%	100%	100%	100%	100%	85%
	Equatorial Guinea	Control	20-Aug-10	43%	49%	47%	33%	100%	50%	63%	0%	0%	69%	18%	0%
	Eritrea	Control	14-Jul-10	62%	61%	65%	67%	100%	100%	88%	33%	0%	94%	55%	0%
	Ethiopia	Control	08-Sep-10	51%	52%	75%	100%	100%	100%	100%	100%	50%	75%	100%	0%
	Gabon	Control	14-Jul-10	40%	40%	40%	33%	100%	50%	75%	0%	0%	44%	0%	0%
	Gambia	Control	20-Aug-10	51%	52%	58%	100%	87%	100%	13%	33%	0%	81%	91%	0%
	Ghana	Control	20-Aug-10	56%	58%	65%	100%	100%	100%	13%	100%	100%	81%	64%	0%
	Guinea	Control	14-Jul-10	48%	48%	69%	100%	93%	100%	50%	100%	0%	75%	73%	38%
	Guinea-Bissau	Control	20-Aug-10	32%	43%	52%	100%	93%	100%	25%	100%	100%	44%	27%	0%
	Kenya	Control	20-Aug-10	21%	31%	35%	67%	40%	50%	0%	0%	0%	56%	73%	0%
	Liberia	Control	20-Aug-10	34%	38%	47%	100%	100%	100%	50%	0%	0%	63%	0%	0%
	Madagascar	Control	14-Jul-10	70%	71%	74%	100%	80%	100%	50%	100%	100%	94%	91%	15%
	Malawi	Control	20-Aug-10	43%	42%	39%	100%	80%	100%	0%	33%	0%	56%	9%	0%
	Mali	Control	20-Aug-10	26%	42%	40%	100%	53%	100%	0%	0%	0%	63%	55%	0%
	Mauritania	Control	14-Jul-10	21%	21%	34%	100%	67%	50%	50%	0%	0%	44%	0%	0%
	Mozambique	Control	20-Aug-10	31%	31%	30%	67%	73%	50%	13%	0%	0%	44%	0%	0%
	Namibia	Control	20-Aug-10	32%	35%	21%	100%	27%	100%	25%	0%	0%	19%	0%	0%
	Niger	Control	14-Jul-10	57%	55%	58%	67%	80%	100%	75%	33%	25%	63%	82%	0%
	Nigeria	Control	14-Jul-10	43%	43%	58%	100%	100%	50%	25%	0%	0%	81%	82%	8%
	Rwanda	Control	20-Aug-10	36%	30%	21%	0%	80%	50%	25%	0%	0%	0%	0%	0%
	Sao Tome and Principe	Control	20-Aug-10	52%	53%	52%	100%	100%	75%	25%	0%	50%	31%	82%	8%
	Senegal	Control	20-Aug-10	75%	79%	82%	67%	100%	100%	100%	100%	0%	81%	55%	92%
	Sierra Leone	Control	20-Aug-10	47%	53%	47%	100%	40%	50%	50%	33%	0%	100%	27%	8%
	South Africa	Control	20-Aug-10	16%	16%	21%	100%	27%	50%	0%	0%	25%	25%	18%	0%
	Swaziland	Control	20-Aug-10	78%	81%	83%	67%	100%	100%	75%	100%	100%	81%	100%	46%
	Togo	Control	14-Jul-10	64%	73%	79%	100%	100%	100%	100%	100%	0%	94%	55%	54%
	Uganda	Control	20-Aug-10	55%	55%	48%	100%	100%	100%	50%	0%	0%	69%	0%	0%
	UR Tanzania	Control	20-Aug-10	29%	30%	36%	67%	53%	50%	0%	0%	0%	56%	64%	0%
	Zambia	Control	20-Aug-10	56%	53%	60%	100%	100%	50%	0%	0%	100%	81%	82%	0%
	Zimbabwe	Control	20-Aug-10	47%	48%	47%	33%	73%	100%	25%	0%	0%	19%	64%	62%
AMRO	Argentina	Pre-elimination	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bahamas	Prevention of re-introduction	-	-	-	-	-	-	-	-	-	-	-	-	-
	Belize	Control	30-Jul-10	65%	65%	63%	100%	100%	50%	75%	100%	25%	31%	18%	92%
	Bolivia (Plurinational State of)	Control	30-Jul-10	62%	65%	68%	100%	75%	100%	88%	0%	50%	62%	55%	69%
	Brazil	Control	30-Jul-10	59%	52%	55%	100%	100%	75%	75%	0%	50%	31%	45%	8%
	Colombia	Control	30-Jul-10	42%	46%	41%	100%	75%	75%	63%	0%	0%	46%	18%	8%
	Costa Rica	Control	30-Jul-10	59%	58%	58%	100%	75%	50%	88%	100%	100%	85%	18%	0%
	Dominican Republic	Control	30-Jul-10	75%	75%	75%	100%	92%	25%	100%	100%	100%	100%	91%	0%
	Ecuador	Control	30-Jul-10	44%	55%	68%	100%	75%	50%	63%	0%	0%	62%	91%	85%
	El Salvador	Pre-elimination	30-Jul-10	87%	87%	87%	100%	75%	50%	100%	100%	100%	100%	73%	92%

Annex 2 – Data completeness, 2009 *(continued)*

WHO region	Country/area	Phase	Date form was submitted	Completeness Score%			Population at risk %	Cases, admissions and deaths %	Reporting completeness %	Total confirmed cases %	Cases diagnosed in community %	Active case detection %	Interventions %	Malaria financing by year %	Government expenditure %
				2007	2008	2009									
	French Guiana	Control	30-Jul-10	13%	13%	4%	0%	0%	50%	0%	0%	0%	8%	0%	0%
	Guatemala	Control	30-Jul-10	37%	38%	39%	100%	87%	75%	75%	0%	0%	23%	0%	0%
	Guyana	Control	30-Jul-10	31%	44%	37%	100%	25%	100%	100%	0%	50%	23%	27%	0%
	Haiti	Control	30-Jul-10	21%	18%	17%	0%	17%	50%	75%	0%	50%	0%	0%	0%
	Honduras	Control	30-Jul-10	25%	30%	41%	100%	58%	50%	75%	0%	0%	23%	27%	38%
	Jamaica	Prevention of re-introduction	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mexico	Pre-elimination	30-Jul-10	79%	79%	85%	100%	92%	100%	100%	100%	100%	100%	100%	15%
	Nicaragua	Control	30-Jul-10	51%	55%	51%	100%	67%	100%	75%	100%	100%	46%	18%	0%
	Panama	Control	30-Jul-10	90%	92%	82%	100%	58%	75%	100%	100%	100%	46%	100%	100%
	Paraguay	Pre-elimination	30-Jul-10	59%	63%	58%	100%	75%	50%	88%	0%	100%	15%	18%	92%
	Peru	Control	16-Nov-10	25%	30%	17%	67%	42%	50%	38%	0%	0%	0%	0%	0%
	Suriname	Control	10-Nov-10	30%	28%	30%	67%	50%	50%	100%	0%	50%	8%	0%	0%
	Venezuela (Bolivarian Rep.)	Control	00-Jan-00	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
EMRO	Afghanistan	Control	27-Jul-10	39%	48%	52%	100%	83%	100%	63%	100%	0%	62%	36%	0%
	Djibouti	Control	-	-	-	-	-	-	-	-	-	-	-	-	-
	Iran (Islamic Republic)	Pre-elimination	27-Jul-10	51%	56%	62%	100%	71%	100%	83%	0%	100%	20%	57%	54%
	Iraq	Elimination	02-Aug-10	69%	73%	78%	100%	100%	100%	100%	0%	100%	100%	43%	54%
	Pakistan	Control	29-Jul-10	49%	48%	62%	100%	17%	75%	100%	0%	100%	62%	55%	77%
	Saudi Arabia	Elimination	27-Jul-10	64%	64%	73%	100%	100%	100%	100%	0%	100%	100%	86%	15%
	Somalia	Control	27-Jul-10	27%	38%	38%	100%	42%	100%	50%	0%	0%	54%	36%	0%
	N. Sudan (low transmission)	Control	27-Jul-10	73%	72%	70%	100%	100%	100%	25%	0%	0%	85%	91%	62%
	S. Sudan (high transmission)	Control	27-Jul-10	8%	25%	15%	0%	67%	50%	0%	0%	0%	8%	0%	0%
	Yemen	Control	27-Jul-10	79%	85%	90%	100%	42%	100%	100%	100%	100%	100%	100%	100%
EURO	Armenia	Prevention of re-introduction	10-Jun-10	69%	67%	67%	100%	100%	100%	100%	0%	100%	100%	71%	0%
	Azerbaijan	Elimination	17-Jun-10	98%	98%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%
	Georgia	Elimination	03-Jun-10	98%	98%	98%	100%	100%	100%	100%	0%	100%	100%	100%	92%
	Kyrgyzstan	Elimination	22-Jul-10	98%	98%	98%	100%	100%	100%	100%	0%	100%	100%	86%	100%
	Russian Federation	Prevention of re-introduction	08-Jun-10	71%	71%	71%	100%	100%	100%	100%	0%	100%	100%	100%	0%
	Tajikistan	Elimination	23-Jun-10	98%	100%	98%	100%	100%	100%	100%	0%	100%	100%	86%	100%
	Turkey	Elimination	08-Jun-10	96%	96%	96%	100%	100%	100%	100%	0%	100%	100%	71%	100%
	Uzbekistan	Elimination	26-Jun-10	98%	98%	98%	100%	100%	100%	100%	0%	100%	100%	86%	100%
SEARO	Bangladesh	Control	21-Jun-10	42%	51%	32%	100%	50%	100%	88%	0%	0%	46%	36%	0%
	Bhutan	Control	13-Jul-10	92%	93%	75%	100%	92%	100%	75%	100%	100%	100%	100%	85%
	DPR Korea	Pre-elimination	13-Jul-10	96%	96%	96%	100%	100%	100%	100%	0%	100%	100%	71%	100%
	India	Control	13-Jul-10	63%	63%	54%	100%	17%	100%	75%	33%	0%	77%	55%	100%
	Indonesia	Control	21-Jul-10	49%	61%	39%	100%	25%	100%	100%	100%	100%	54%	55%	38%
	Myanmar	Control	30-Jul-10	41%	41%	28%	0%	100%	50%	100%	0%	0%	46%	0%	0%
	Nepal	Control	30-Jul-10	49%	49%	54%	100%	75%	75%	63%	0%	25%	54%	64%	69%
	Sri Lanka	Pre-elimination	13-Jul-10	64%	73%	71%	100%	79%	100%	83%	0%	100%	80%	57%	54%
	Thailand	Control	02-Jul-10	61%	63%	55%	100%	92%	50%	75%	67%	0%	69%	45%	69%
	Timor-Leste	Control	13-Jul-10	90%	90%	79%	100%	100%	100%	100%	0%	0%	100%	100%	100%
WPRO	Cambodia	Control	04-Jun-10	75%	83%	62%	100%	100%	100%	88%	67%	100%	62%	91%	54%
	China	Control	04-Jun-10	28%	28%	21%	100%	17%	100%	63%	0%	0%	38%	9%	0%
	Lao PDR	Control	07-Jun-10	87%	96%	70%	100%	100%	100%	100%	67%	100%	100%	73%	77%
	Malaysia	Pre-elimination	21-Jun-10	53%	53%	67%	100%	100%	100%	100%	0%	100%	80%	86%	0%
	Papua New Guinea	Control	27-May-10	45%	46%	31%	100%	50%	100%	100%	0%	0%	38%	36%	0%
	Philippines	Control	24-May-10	42%	44%	34%	100%	50%	100%	100%	67%	0%	46%	45%	0%
	Republic of Korea	Elimination	13-May-10	27%	27%	24%	67%	21%	33%	33%	0%	0%	20%	57%	0%
	Solomon Islands	Control	22-Jun-10	72%	80%	56%	100%	92%	75%	100%	100%	100%	100%	82%	8%
	Vanuatu	Control	17-Jun-10	68%	70%	46%	100%	100%	50%	100%	100%	100%	54%	82%	0%
	Viet Nam	Control	17-May-10	42%	41%	31%	100%	50%	50%	75%	0%	0%	54%	36%	0%

Annex 3 – Funding for malaria control, 2009

WHO Region/ Sub-region	Country	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	-	-	-	-	-	-	-	23,300	-	-	-	-
	Angola	2001	-	-	-	3,449,000	-	-	-	-	-	-	-	-
		2002	-	-	-	1,169,000	-	-	-	-	-	-	-	-
		2003	-	-	-	18,024,239	-	-	-	-	-	-	-	-
		2004	-	-	-	16,135,633	-	-	-	-	-	-	-	-
		2005	19,510,833	1,740,000	-	13,509,356	15,107,895	0	-	2,100,000	826,266	200,000	-	0
		2006	3,203,423	-	-	632,723	2,354,259	330,000	-	9,000,000	1,340,225	200,000	-	0
		2007	8,559,054	55,500,000	-	3,482,407	11,011,200	500,000	18,500,000	-	-	-	21,500,000	-
		2008	9,872,558	37,692,000	-	17,568,587	-	-	18,500,000	-	-	-	-	-
		2009	9,614,770	37,400,000	-	-	-	-	18,925,000	-	-	-	-	-
	Benin	2001	-	-	-	3,918,000	-	-	-	-	-	-	-	-
		2002	-	-	-	2,700,000	-	-	-	-	-	-	-	-
		2003	1,238,496	-	-	1,370,000	2,900,000	-	-	-	-	-	-	-
		2004	1,725,397	-	-	1,840,000	1,037,400	-	-	-	-	-	-	-
		2005	1,094,616	-	-	1,250,000	426,400	-	-	-	-	-	-	-
		2006	387,527	7,096,000	124,000,000	2,933,170	759,640	88,460	-	-	-	-	-	-
		2007	361,858	10,800,000	-	3,944,444	384,891	8,859,000	3,600,000	-	-	-	-	-
		2008	6,345,919	41,661,000	-	2,222,222	376,990	5,547,000	13,887,000	-	-	-	-	-
		2009	193,469	27,600,000	-	2,111,111	327,593	6,527,000	13,800,000	-	-	-	-	-
	Botswana	2002	-	-	-	-	-	-	-	-	10,000	-	-	-
		2003	-	-	-	-	-	-	-	-	9,795	-	-	-
		2004	-	-	-	-	-	-	-	-	2,000	-	-	-
		2005	-	-	-	242,858	-	-	-	-	50,110	-	-	-
		2006	-	-	-	242,858	-	-	-	-	9,000	-	-	-
		2007	-	-	-	256,825	-	-	-	-	-	-	-	-
		2008	-	-	-	1,308,890	-	-	-	-	-	-	-	-
		2009	-	-	-	737,500	-	-	-	62,500	-	-	-	-
	Burkina Faso	2001	-	-	-	56,393	0	0	-	-	-	-	-	0
		2002	-	-	-	95,868	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	1,119,648	0	12,000,000	-	-	-	-	-	0
		2007	-	-	-	1,058,476	0	0	-	-	-	-	-	0
		2008	7,283,872	-	-	58,662	813,399	-	-	-	-	-	-	-
		2009	14,812,697	-	-	23,192	7,609,268	-	-	15,621	61,152	13,940	21,815	-
	Burundi	2002	-	-	-	24,998,092	-	-	-	-	-	-	-	-
		2003	2,038,647	-	-	24,998,092	-	-	-	70,000	-	-	-	-
		2004	4,631,017	-	-	24,998,092	7,447,706	342,200	-	70,000	228,000	-	-	-
		2005	6,260,398	-	-	31,664,760	6,344,420	250,000	-	70,000	228,000	-	-	300,000
		2006	3,638,269	-	-	38,331,426	3,973,999	0	-	70,000	232,500	-	35,000	-
		2007	2,881,171	-	-	43,000	4,683,029	-	-	35,000	-	-	70,000	-
		2008	9,623,263	-	-	46,000	4,683,029	-	-	-	-	-	70,000	-
		2009	4,532,059	-	-	30,000	5,185,632	-	-	-	45,003	1,817,914	-	-
	Cameroon	2000	-	-	-	-	-	-	-	-	102,000	-	-	-
		2001	-	-	-	-	-	-	-	-	102,000	-	-	-
		2002	-	-	-	1,714,290	-	-	-	-	197,500	-	-	-
		2003	-	-	-	6,626,706	-	-	-	-	197,500	-	-	-
		2004	1,886,215	-	-	7,147,000	-	-	-	-	500,000	-	-	-
		2005	5,155,782	-	-	7,504,000	12,416,102	-	-	-	500,000	-	-	-

Annex 3 – Funding for malaria control, 2009 *(continued)*

WHO Region/ Sub-region	Country	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
		2006	8,606,164	-	-	7,880,000	4,472,742	-	-	-	100,000	-	-	-
		2007	5,122,854	-	-	20,825,646	6,754,170	-	-	-	100,000	-	-	-
		2008	6,046,764	-	-	15,023,247	11,506,022	-	-	-	300,000	-	-	-
		2009	9,610,844	-	-	8,545,999	8,529,662	0	0	0	300,000	-	0	-
	Cape Verde	2002	-	-	-	-	-	-	-	-	774,400	-	-	-
		2003	-	-	-	-	-	-	-	-	774,400	-	-	-
		2004	-	-	-	-	-	-	-	-	774,400	-	-	-
		2005	-	-	-	20,154,120	-	-	-	-	3,872,000	-	-	-
		2006	-	-	-	21,202,440	-	-	-	24,161	774,400	-	-	-
		2007	-	-	-	326,245	0	0	0	-	-	-	-	-
		2008	-	-	-	401,316	0	0	0	-	58,500	33,400	-	-
		2009	-	-	-	451,098	0	0	0	-	74,327	178,043	-	-
	Central African Republic	2000	-	-	-	-	0	0	0	0	-	-	0	0
		2001	-	-	-	72,000	0	0	0	0	-	-	0	0
		2002	-	-	-	90,000	0	0	0	0	-	-	0	4,000
		2003	-	-	-	90,000	0	0	0	0	-	-	0	4,000
		2004	-	-	-	10,000	0	0	0	0	-	-	0	90,000
		2005	1,872,782	-	-	10,000	6,329,201	0	0	0	-	-	0	90,000
		2006	4,217,076	-	-	10,000	4,263,623	0	0	0	-	-	0	100,000
		2007	4,287,672	-	-	10,000	2,082,761	0	0	0	33,333	991,505	0	0
		2008	2,294,055	-	-	19,000	3,992,312	600,000	0	3,300,000	33,333	1,000,644	0	0
		2009	-	-	-	19,000	-	600,000	0	-	33,333	33,333	-	-
	Chad	2002	-	-	-	1,714,290	-	-	-	-	-	-	-	-
		2003	-	-	-	6,626,706	-	-	-	-	-	-	-	-
		2004	-	-	-	7,147,000	-	-	-	-	-	-	-	-
		2005	-	-	-	7,504,000	-	-	-	-	30,000	-	-	-
		2006	-	-	-	7,880,000	-	-	-	-	-	-	-	-
		2008	-	-	-	-	-	-	-	-	-	30,000	-	-
		2009	4,644,509	-	-	-	5,262,314	-	-	-	77,083	-	3,958	-
	Comoros	2000	-	-	-	19,000	-	-	-	-	-	-	-	-
		2001	-	-	-	380,476	-	-	-	-	-	10,400	-	-
		2002	-	-	-	72,587	-	-	-	-	112,500	17,000	-	-
		2003	-	-	-	104,031	-	-	-	-	112,500	-	-	-
		2004	599,483	-	-	-	599,483	-	-	-	156,000	-	-	-
		2005	455,769	-	-	-	-	-	-	-	156,000	-	-	-
		2006	479,379	-	-	-	935,080	-	-	-	90,000	-	-	-
		2007	390,246	-	-	24,158	390,246	-	-	-	-	-	-	-
		2008	264,709	-	-	24,158	264,708	-	-	-	146,250	65,000	-	-
		2009	232,885	-	-	24,158	290,612	-	-	-	104,000	11,656	-	-
	Congo	2008	-	-	4,500,000	-	-	-	-	-	-	-	-	-
	Côte d'Ivoire	2002	-	-	-	1,129,683	-	-	-	-	-	-	-	-
		2003	-	-	-	2,352,953	-	-	-	-	-	-	-	-
		2004	-	-	-	2,341,786	-	-	-	-	-	-	-	-
		2006	-	-	-	2,427,239	-	-	-	-	-	-	-	-
		2007	4,325,690	-	-	-	-	-	-	-	-	-	-	-
		2009	16,210,042	-	-	-	-	-	-	-	-	-	-	-

Annex 3 – Funding for malaria control, 2009 *(continued)*

WHO Region/ Sub-region	Country	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
	Democratic Republic of the Congo	2004	1,441,186	-	-	-	-	-	-	-	-	-	-	-
		2005	18,579,231	-	30,000,000	-	20,020,417	-	-	-	-	-	-	-
		2006	6,471,520	-	-	-	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	-	-
	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	-	-	776,600	7,141,363	-	-	3,196,000	-	-	3,196,000	-
		2008	6,305,881	-	-	776,600	8,245,229	-	165,000	4,759,000	15,000	-	4,759,000	-
		2009	3,445,774	-	-	-	4,756,207	-	-	-	-	-	6,787,000	-
	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	180,000	-
		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	-
	Ethiopia	2001	-	-	-	-	0	0	-	-	-	-	-	0
		2002	-	-	-	-	0	0	-	-	-	-	-	0
		2003	17,891,589	-	-	-	0	12,500	-	-	-	-	-	0
		2004	-	-	-	-	21,757,639	11,120	-	-	-	-	-	0
		2005	20,023,422	-	-	-	-	695,037	-	-	-	-	-	0
		2006	70,074,800	5,126,000	43,000,000	-	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	-
	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	-	-	-	-	-	-	-
		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	-	-	1,276,856	450,693	-	-	-	-	-	-	-
		2009	3,891,808	-	-	-	-	-	-	-	-	-	-	-
	Gambia	2000	-	-	-	-	0	0	0	0	-	-	0	0
		2001	-	-	-	70,000	0	0	0	0	-	-	0	0
		2002	-	-	-	129,000	0	0	0	0	-	-	0	0
		2003	-	-	-	129,653	0	0	0	0	-	-	0	0
		2004	1,456,473	-	-	135,570	1,456,473	0	0	0	-	-	100,000	0
		2005	3,772,423	-	-	145,900	3,772,423	0	0	0	-	-	100,000	0
		2006	2,521,319	-	-	459,014	2,521,319	0	0	0	-	-	100,000	0
		2007	6,803,737	-	-	502,234	6,803,737	0	0	0	72,500	65,000	100,000	0
		2008	5,683,473	-	-	517,767	5,683,474	0	0	0	72,500	17,000	113,000	0
		2009	5,921,546	-	-	1,025,550	5,921,546	0	0	0	380,500	65,000	100,000	-

Annex 3 – Funding for malaria control, 2009 *(continued)*

WHO Region/ Sub-region	Country	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
	Ghana	2003	886,150	-	-	-	-	-	-	-	-	-	-	-
		2004	2,034,960	-	-	-	-	-	-	-	-	-	-	-
		2005	15,370,497	-	-	-	-	-	-	-	-	-	-	-
		2006	5,177,461	4,434,000	-	24,830,000	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	-	3,235,000	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	-	8,700,000	18,363,180	1,283,389	17,300,000	0	290,000	939,300	300,000	-
	Guinea	2001	-	-	-	-	-	7,500	-	-	-	-	-	-
		2002	-	-	-	-	-	-	-	177,240	268,000	2,063,000	-	-
		2003	177,112	-	-	-	-	-	-	-	303,000	2,063,000	-	-
		2004	1,220,983	-	-	-	2,089,204	-	-	-	594,500	-	-	-
		2005	3,406,208	-	-	-	-	-	-	-	594,500	-	-	-
		2006	-2,225,574	-	8,100,000	-	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	-	-	-	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	-
	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	1,641,482	-	-	-	1,279,343	-	-	-	100,000	486,579	-	-
	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	25,921,567	-	37,652,822	17,975,039	87,584	30,000	500,000	-
	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	-	-
	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	-	-

Annex 3 – Funding for malaria control, 2009 *(continued)*

WHO Region/ Sub-region	Country	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
	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	11,000,000	-	15,000,000	-	100,000	1,200,000	-	-
		2008	14,961,664	17,854,000	-	5,985,915	-	-	16,000,000	-	100,000	500,000	-	-
		2009	3,721,540	17,700,000	-	4,482,759	-	-	-	-	-	-	-	-
	Mali	2002	-	-	-	-	2,592,990	-	-	-	-	-	-	-
		2003	678,620	-	-	-	-	-	-	-	-	-	-	-
		2004	266,500	-	-	-	-	-	-	-	-	-	-	-
		2005	746,721	-	-	-	-	-	-	-	-	-	-	-
		2006	802,828	7,470,000	33,900,000	-	-	-	-	-	-	-	-	-
		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	-
	Mauritania	2001	-	-	-	-	0	-	-	-	-	-	-	0
		2002	-	-	-	-	0	-	-	-	-	-	-	0
		2003	-	-	-	-	3	-	-	-	-	-	-	0
		2004	432,745	-	-	-	0	-	-	-	-	-	-	0
		2005	248,254	-	-	-	0	0	-	-	-	-	-	0
		2006	600,105	-	22,600,000	-	14	0	-	-	-	-	-	0
		2007	1,346,380	-	-	-	-	-	-	-	-	-	-	-
		2008	1,342,027	-	-	-	-	-	-	-	-	-	-	-
		2009	541,854	-	-	-	-	-	-	-	-	-	-	-
	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	520,865	19,700,000	-	-	-	-	-	-	-	-	-	-
	Namibia	2001	-	-	-	-	0	-	-	-	-	-	-	-
		2002	-	-	-	-	0	-	-	-	-	-	-	-
		2003	-	-	-	-	0	-	-	-	-	-	-	-
		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	-	-	1,692,308	4,826,069	-	-	-	-	-	-	-
		2009	3,797,710	-	-	-	2,267,472	-	-	-	-	-	-	-
	Niger	2000	-	-	-	231,000,000	-	-	-	-	-	-	-	-
		2001	-	-	-	25,000	-	-	-	-	-	-	-	-
		2002	-	-	-	25,000	-	-	-	-	-	-	-	-
		2003	-	-	-	8,846	-	-	-	-	-	-	-	-
		2004	2,882,940	-	-	444,231	11,257,988	0	-	-	-	-	-	0
		2005	10,216,624	-	-	342,346	-	-	-	-	-	-	-	-
		2006	4,914,290	-	40,000,000	-	-	-	-	-	-	-	-	-
		2007	2,658,719	-	-	900,000	-	-	-	-	-	-	-	-
		2008	12,345,165	-	-	900,000	-	-	-	-	-	-	-	-
		2009	17,502,558	-	-	900,000	28,057,121	1,773,423,718	0	194,428	15,000	840,196	-	-

Annex 3 – Funding for malaria control, 2009 *(continued)*

WHO Region/ Sub-region	Country	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
	Nigeria	2000	-	-	-	-	-	-	-	-	500,000	500,000	-	-
		2001	-	-	-	2,020,000	0	0	-	-	550,000	550,000	-	-
		2002	-	-	-	4,000,000	0	0	-	-	700,000	700,000	-	-
		2003	-	-	-	3,530,000	0	0	-	-	855,000	855,000	-	-
		2004	8,851,119	-	-	390,625	0	0	-	-	800,000	800,000	-	-
		2005	5,784,648	-	-	1,953,125	15,000,000	0	-	-	850,000	850,000	-	-
		2006	13,107,787	-	720,000,000	10,000,000	16,000,000	2,000,000	-	-	1,000,000	1,000,000	-	-
		2007	28,022,180	-	-	11,000,000	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	-	-	-	-
		2009	224,403,482	-	-	200,000	42,019,322	17,500,000	16,000,000	18,210,725	306,321	37,247,310	-	-
	Rwanda	2004	7,428,843	-	-	98,000	-	-	-	1,349,117	100,000	75,527	-	-
		2005	4,395,064	-	-	100,000	7,802,000	-	-	929,884	100,000	-	-	-
		2006	32,601,503	5,916,000	-	100,000	5,243,000	2,916,666	-	822,187	350,000	50,000	486,000	-
		2007	1,391,593	20,000,000	-	300,000	20,900,000	3,083,332	17,000,000	486,000	-	-	393,186	-
		2008	19,260,378	33,724,000	-	500,000	12,884,983	3,083,332	17,000,000	-	-	-	-	-
		2009	42,472,309	48,900,000	-	-	40,117,815	-	-	-	0	-	-	-
	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	939,449	-	-	415,000	65,410	-	47,920	-
		2006	834,299	-	-	10,000	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	-	-	36,139	514,393	40,000	-	-	63,165	10,000	445,414	-
		2009	75,857	-	-	1,004,045	1,699,172	-	-	185,541	59,965	5,000	1,717	-
	Senegal	2001	-	-	-	2,705,267	0	-	-	-	-	-	-	-
		2002	-	-	-	2,705,267	0	-	-	-	-	-	-	-
		2003	500,000	-	-	2,705,267	1,428,571	467,480	-	-	-	-	-	-
		2004	1,026,770	-	-	2,705,267	2,857,143	-	-	-	-	-	-	-
		2005	10,634,063	-	-	2,705,267	10,634,063	-	-	-	-	-	-	-
		2006	8,958,051	6,504,000	49,800,000	2,705,267	8,958,051	-	-	-	-	-	-	-
		2007	1,063,231	16,700,000	-	-	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	-	595,000	11,436,555	-	14,512,634	6,793,567	288,302	-	-	-
	Sierra Leone	2005	2,043,498	-	-	158,667	6,784,566	191,833	-	-	-	-	-	-
		2006	3,985,298	-	-	174,533	3,155,047	-	-	-	-	-	-	1,047,500
		2007	927,301	-	-	164,138	1,187,379	460,620	-	2,950,000	-	650,000	-	-
		2008	4,840,240	-	-	180,552	5,126,487	5,141	-	-	778,590	-	-	-
		2009	2,794,509	-	-	198,586	4,884,763	-	-	-	-	-	-	-
	South Africa	2007	-	-	-	156,500,000	-	-	-	-	-	-	-	-
		2008	-	-	-	173,300,000	-	-	-	-	-	-	-	-
		2009	-	-	-	190,000,000	-	-	-	-	100,000	-	50,000	-
	Swaziland	2003	383,000	-	-	-	400,000	-	-	-	-	-	-	-
		2005	231,500	-	-	-	-	-	-	-	-	-	-	-
		2006	393,800	-	-	-	-	-	-	-	-	-	-	-
		2007	129,215	-	-	819,312	-	0	0	0	0	0	0	-
		2008	294,218	-	-	687,730	-	0	0	0	0	0	0	-
		2009	2,607,294	-	-	641,575	2,680,392	0	0	0	0	0	0	-

Annex 3 – Funding for malaria control, 2009 *(continued)*

WHO Region/ Sub-region	Country	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
	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	-
	Uganda	2000	-	-	-	3,166,060	-	-	-	-	-	-	-	-
		2001	-	-	-	3,311,458	-	-	-	-	-	-	-	-
		2002	-	-	-	4,007,349	-	-	-	-	-	-	-	-
		2003	-	-	-	4,130,696	-	-	-	-	-	-	-	-
		2004	9,749,358	-	-	4,224,945	12,000,000	-	-	-	-	-	-	-
		2005	31,149,704	510,775	-	9,863,636	40,899,062	-	-	-	-	-	-	-
		2006	27,715,494	-	-	15,318,182	47,854,144	-	9,500,000	-	-	-	-	-
		2007	5,175,831	21,500,000	-	17,827,273	-	-	19,000,000	-	-	-	-	-
		2008	6,335,768	21,822,000	-	19,445,544	-	-	21,752,000	-	-	-	-	-
		2009	40,985,476	21,600,000	-	-	-	-	-	-	-	-	-	-
	United Republic of Tanzania													
	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	56,897,271	-	-	838,226,415	-	-	-	-	-	-	-	-
		2009	58,558,606	-	-	616,085,000	46,300,000	25,000,000	34,000,000	1,000,000	50,000,000	-	-	-
	Zanzibar	2003	162,700	-	-	-	-	-	-	-	-	-	-	-
		2004	3,410,597	-	-	-	-	-	-	-	-	-	-	-
		2006	1,439,430	-	-	-	-	-	-	-	-	-	-	-
		2007	1,411,307	-	-	-	-	-	-	-	-	-	-	-
		2008	1,770,569	-	-	-	-	-	-	-	-	-	-	-
		2009	1,397,265	-	-	-	-	-	-	-	-	-	-	-
	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	-	460,380	38,875	10,000,000	9,470,000	6,046,354	20,639	114,285	-	-
		2008	15,423,129	74,395,000	40,000,000	2,000,000	3,817,916	-	14,888,000	-	-	550,847	-	-
		2009	8,510,296	58,800,000	-	42,658,830	986,834	5,000,000	14,700,000	-	398,000	212,570	-	-
	Zimbabwe	2000	-	-	-	4,675,225	-	-	-	-	-	-	-	-
		2001	-	-	-	4,853,126	-	-	-	-	-	-	-	-
		2002	-	-	-	4,756,132	-	-	-	-	-	-	-	-
		2003	1,415,000	-	-	4,621,854	-	-	-	-	-	-	-	-
		2004	-	-	-	3,425,175	1,415,000	-	-	-	-	-	-	-
		2005	3,861,938	-	-	2,975,145	3,861,937	-	-	-	-	-	-	-
		2006	724,675	-	-	2,231,175	1,439,313	-	-	-	-	-	-	-
		2007	9,047,742	-	-	1,945,150	6,780,000	-	0	0	-	-	-	-
		2008	-	-	-	1,675,435	1,100,000	-	200,000	300,000	-	-	-	-
		2009	35,355,230	-	-	1,200,000	2,800,000	-	0	500,000	-	-	-	-

Annex 3 – Funding for malaria control, 2009 *(continued)*

			Contributions reported by donors											
WHO Region/ Sub-region	Country	Year	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	Argentina	2001	-	-	-	2,580,000	-	-	-	-	-	-	-	-
		2002	-	-	-	2,580,000	-	-	-	-	-	-	-	-
		2003	-	-	-	2,580,000	-	-	-	-	-	-	-	-
		2004	-	-	-	2,580,180	-	-	-	-	-	-	-	-
		2005	-	-	-	2,580,180	-	-	-	-	-	-	-	-
		2006	-	-	-	2,287,066	-	-	-	-	-	-	-	-
	Belize	2005	-	-	-	100,000	-	-	-	-	-	-	-	-
		2006	-	-	-	100,000	-	-	-	-	-	-	-	-
		2007	-	-	-	87,993	-	-	-	-	-	-	-	-
		2008	-	-	-	170,494	-	-	-	-	-	-	-	-
		2009	-	-	-	172,801	-	-	-	-	-	-	-	-
	Bolivia (Plurinational State of)	2001	-	-	-	828,992	-	-	-	-	-	-	-	-
		2002	-	-	-	626,386	-	-	-	-	-	-	-	-
		2003	-	-	-	717,500	-	-	300,000	-	-	-	-	-
		2004	780,367	-	-	1,212,074	1,212,074	-	200,000	-	-	-	-	-
		2005	1,630,869	-	-	853,312	1,170,737	-	200,000	-	-	-	-	-
		2006	2,369,685	-	-	812,500	1,817,739	-	125,000	-	-	-	-	-
		2007	422,354	-	-	1,721,428	121,276	-	200,000	-	-	40,000	-	-
		2008	-	-	-	1,721,428	-	-	200,000	-	-	40,000	-	70,000
		2009	2,116,856	-	-	1,721,428	550,000	-	200,000	-	-	25,000	-	-
	Brazil	2001	-	-	-	21,517,299	-	-	-	-	-	-	-	-
		2002	-	-	-	21,411,765	-	-	111,505	-	-	-	-	-
		2003	-	-	-	40,695,955	-	-	200,000	-	-	-	-	-
		2004	-	-	-	40,695,955	-	-	190,000	-	-	-	-	-
		2005	-	-	-	73,469,000	-	-	164,252	-	-	-	-	-
		2006	-	-	-	78,535,000	-	-	164,252	-	-	-	-	-
		2007	-	-	-	106,000,000	0	350,000	243,204	-	-	-	-	0
		2008	-	-	-	106,000,000	0	-	65,000	-	-	-	-	-
		2009	4,858,206	-	-	106,000,000	134,611	-	65,000	-	-	-	-	-
	Colombia	2001	-	-	-	11,363,636	-	-	-	-	-	-	-	-
		2002	-	-	-	11,363,636	-	-	99,558	-	-	-	-	-
		2003	-	-	-	13,049,962	-	-	176,000	-	-	-	-	-
		2004	-	-	-	13,702,460	-	-	155,000	-	-	-	-	-
		2005	-	-	-	13,702,460	-	-	135,451	-	-	-	-	-
		2006	-	-	-	13,702,460	-	-	135,451	-	-	-	-	-
		2007	-	-	-	16,000,000	3,000,000	-	140,000	-	-	-	-	-
		2008	-	-	-	17,800,000	2,000,000	-	120,000	-	-	-	-	-
		2009	-	-	-	20,500,000	1,000,000	-	-	-	-	-	-	-
	Costa Rica	2001	-	-	-	2,500,000	-	-	-	-	-	-	-	-
		2002	-	-	-	2,880,000	-	-	-	-	-	-	-	-
		2003	-	-	-	3,840,000	-	-	-	-	-	-	-	-
		2004	-	-	-	2,980,000	-	-	-	-	-	-	-	-
		2005	-	-	-	3,250,000	-	-	-	-	-	-	-	-
		2006	-	-	-	4,940,000	-	-	-	-	-	-	-	-
		2007	-	-	-	5,750,000	-	-	-	-	-	-	-	-
		2008	-	-	-	6,720,000	-	-	-	-	-	-	-	-
		2009	-	-	-	6,240,000	-	-	-	-	-	-	-	-

Annex 3 – Funding for malaria control, 2009 *(continued)*

WHO Region/ Sub-region	Country	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
	Dominican Republic	2000	-	-	-	-	0	0	0	0	0	0	0	0
		2001	-	-	-	1,443,223	0	0	0	0	5,000	0	0	0
		2002	-	-	-	1,191,077	0	0	0	0	0	0	0	0
		2003	-	-	-	638,541	0	0	0	0	20,000	0	0	0
		2004	-	-	-	448,254	0	0	0	0	0	0	0	0
		2005	-	-	-	1,581,000	0	0	0	0	0	0	0	0
		2006	-	-	-	2,119,311	0	0	0	0	0	0	0	0
		2007	-	-	-	2,499,703	0	0	0	0	3,470	0	0	0
		2008	-	-	-	3,941,711	220,000	-	82,000	-	-	-	100,000	-
		2009	-	-	-	2,428,604	400,000	0	0	0	0	0	-	-
	El Salvador	2001	-	-	-	1,365,000	0	0	-	-	-	-	-	0
		2002	-	-	-	1,433,000	0	0	-	-	-	-	-	0
		2003	-	-	-	1,504,000	0	0	-	-	-	-	-	0
		2004	-	-	-	1,580,000	0	0	-	-	-	-	-	0
		2005	-	-	-	1,656,000	0	0	-	-	-	-	-	0
		2006	-	-	-	1,742,000	0	0	-	-	-	-	-	0
		2007	-	-	-	1,829,000	-	-	-	-	-	-	-	-
		2008	-	-	-	1,920,000	-	-	-	-	-	-	-	-
		2009	-	-	-	3,057,500	0	0	-	0	0	0	-	-
	Guatemala	2000	-	-	-	-	13,000,000	-	-	-	-	-	-	-
		2005	2,710,226	-	-	2,681,975	-	-	-	-	-	-	-	-
		2006	4,597,397	-	-	2,392,626	-	-	-	-	-	-	-	-
		2007	1,393,228	-	-	3,380,000	2,355,753	-	-	-	-	-	-	-
		2008	3,325,400	-	-	3,380,000	1,849,992	-	-	-	-	-	-	-
		2009	1,343,648	-	-	-	-	-	-	-	-	-	-	-
	Guyana	2001	-	-	-	1,061,265	-	-	-	-	-	-	-	-
		2002	-	-	-	-	-	-	49,558	-	-	-	-	-
		2003	-	-	-	-	-	-	120,000	-	-	-	-	-
		2004	-	-	-	115,236	-	-	63,550	-	-	-	-	-
		2005	926,765	-	-	756,331	1,404,308	-	124,232	-	-	-	-	-
		2006	-	-	-	68,774	65,100	-	124,232	-	-	-	-	49,654
		2007	346,454	-	-	608,376	-	-	125,000	-	-	-	-	-
		2008	141,763	-	-	560,600	337,620	-	119,000	119,000	-	-	-	14,000
		2009	1,329,110	-	-	-	-	-	140,000	-	10,000	-	34,000	-
	Haiti	2004	2,643,772	-	-	-	4,094,000	-	-	-	-	-	-	-
		2005	267,081	-	-	-	3,296,000	-	-	-	-	-	-	-
		2006	3,633,293	-	-	-	2,674,000	-	-	-	-	-	-	-
		2007	2,764,914	-	-	-	2,707,000	-	-	-	-	-	-	-
		2008	3,322,684	-	-	-	2,085,000	-	-	-	-	-	-	-
		2009	1,000,764	-	-	-	-	-	-	-	-	-	-	-
	Honduras	2001	-	-	-	2,352,572	-	-	-	-	-	-	-	-
		2002	-	-	-	81,250	-	-	-	-	-	-	-	-
		2003	439,396	-	-	388,888	1,769,353	-	-	-	-	-	-	-
		2004	2,603,713	-	-	4,850,000	1,375,070	-	-	-	-	-	-	-
		2005	1,748,517	-	-	4,850,000	2,234,419	-	-	-	-	-	-	-
		2006	750,972	-	-	789,327	1,190,010	-	-	-	-	-	-	-
		2007	1,415,404	-	-	-	-	-	-	-	-	-	-	-
		2008	968,258	-	-	-	-	-	-	-	-	-	-	-
		2009	1,028,955	-	-	417,477	966,154	-	-	-	4,000	-	-	-

Annex 3 – Funding for malaria control, 2009 *(continued)*

WHO Region/ Sub-region	Country	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
	Mexico	2001	-	-	-	17,157,485	-	-	-	-	-	-	-	-
		2002	-	-	-	19,576,235	-	-	-	-	-	-	-	-
		2004	-	-	-	28,060,594	-	-	-	-	-	-	-	-
		2005	-	-	-	11,743,099	-	-	-	-	-	-	-	-
		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	-
	Nicaragua	2003	89,601	-	-	-	-	-	-	-	-	-	-	-
		2004	1,899,753	-	-	-	-	-	-	-	-	-	-	-
		2005	1,045,462	-	-	-	-	-	-	-	-	-	-	-
		2006	908,506	-	-	-	692,596	0	-	-	-	-	-	-
		2007	611,813	-	-	-	800,000	-	-	-	-	-	-	-
		2008	793,799	-	-	457,751	600,000	-	-	-	-	-	-	-
		2009	2,505,734	-	-	-	2,015,344	-	-	-	-	16,173	-	-
	Panama	2001	-	-	-	49,621	-	-	-	-	-	-	-	-
		2002	-	-	-	34,183	-	-	-	-	-	-	-	-
		2003	-	-	-	131,836	-	-	-	-	-	-	-	-
		2004	-	-	-	93,440	-	-	-	-	-	-	-	-
		2005	-	-	-	776,471	-	-	-	-	-	-	-	-
		2006	-	-	-	425,226	-	-	-	-	81,333	-	-	-
		2007	-	-	-	1,181,604	0	0	0	0	60,825	0	0	-
		2008	-	-	-	712,833	0	0	0	0	0	0	0	-
		2009	-	-	-	820,799	0	0	0	0	0	0	0	-
	Paraguay	2007	-	-	-	3,900,282	0	-	-	-	-	-	-	-
		2008	-	-	-	3,944,353	0	-	-	-	-	-	-	-
		2009	-	-	-	4,263,661	0	-	-	-	-	-	-	-
	Peru	2001	-	-	-	4,109,728	-	-	-	-	-	-	-	-
		2002	-	-	-	3,900,000	-	-	100,000	-	-	-	-	-
		2003	-	-	-	3,500,000	-	-	200,000	-	-	-	-	-
		2004	-	-	-	3,600,000	-	-	150,000	-	-	-	-	-
		2005	-	-	-	-	-	-	150,000	-	-	-	-	-
		2006	-	-	-	-	-	-	150,000	-	-	-	-	-
		2007	-	-	-	-	-	-	130,000	-	-	-	-	-
		2008	-	-	-	-	-	-	125,000	-	-	-	-	-
	Suriname	2001	-	-	-	178,363	-	-	-	-	-	-	-	-
		2002	-	-	-	160,628	-	-	49,558	-	-	-	-	-
		2003	-	-	-	160,628	-	-	170,000	-	-	-	-	-
		2004	-	-	-	160,628	-	-	90,000	-	-	-	-	-
		2005	1,511,350	-	-	160,628	-	-	129,810	-	-	-	-	-
		2006	848,802	-	-	-	-	-	129,810	-	-	-	-	-
		2007	1,037,217	-	-	-	-	-	90,000	-	-	-	-	-
		2008	875,248	-	-	-	-	-	100,000	-	-	-	-	-
		2009	1,736,185	-	-	-	-	-	-	-	-	-	-	-
	Venezuela (Bolivarian Republic of)	2002	-	-	-	2,065,933	-	-	99,558	-	-	-	-	-
		2003	-	-	-	20,834,228	-	-	200,000	-	-	-	-	-
		2004	-	-	-	48,142,544	-	-	116,000	-	-	-	-	-
		2005	-	-	-	2,446,124	-	-	94,491	-	-	-	-	-
		2009	-	-	-	8,700,000	18,363,180	1,283,389	17,300,000	0	290,000	939,300	300,000	-

Annex 3 – Funding for malaria control, 2009 *(continued)*

WHO Region/ Sub-region	Country	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	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	-	-	-
	Djibouti	2006	-	-	-	438,000	-	-	-	-	-	-	178,000	-
		2007	1,218,232	-	-	443,615	-	-	-	350,000	-	-	-	-
		2008	1,244,752	-	-	-	-	-	-	-	-	-	-	-
		2009	148,961	-	-	-	-	-	-	-	-	-	-	-
	Iran (Islamic Republic of)	2004	-	-	-	6,704,500	-	-	-	-	32,000	-	-	-
		2005	-	-	-	6,950,000	-	-	-	-	-	-	-	-
		2006	-	-	-	6,950,000	-	-	-	-	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	-	-	-
	Iraq	2003	-	-	-	1,234,000	-	-	-	-	-	-	-	-
		2004	-	-	-	3,754,000	-	-	-	-	-	-	-	-
		2005	-	-	-	1,725,000	-	-	-	-	-	-	-	-
		2006	-	-	-	1,592,000	-	-	-	-	-	-	-	-
		2007	-	-	-	-	-	-	-	436,000	389,000	-	-	-
		2008	-	-	-	1,704,523,000	-	-	-	-	277,000	-	-	-
		2009	-	-	-	818,900,000	-	-	-	-	707,500	-	-	-
	Pakistan	2000	-	-	-	-	-	-	-	-	90,000	-	-	-
		2001	-	-	-	3,450,500	-	-	-	-	90,000	-	-	-
		2002	-	-	-	965,000	-	-	-	-	42,000	-	-	-
		2003	650,462	-	-	1,256,432	-	-	-	-	42,000	-	-	-
		2004	1,268,500	-	-	900,200	4,500,000	-	-	-	42,000	-	-	-
		2005	1,790,008	-	-	1,300,050	4,407,000	-	-	-	42,000	-	-	-
		2006	1,211,616	-	-	1,500,500	-	-	-	-	50,000	-	-	-
		2007	-	-	-	1,500,000	-	-	-	-	-	-	-	-
		2008	1,642,417	-	-	2,000,000	2,500,000	-	-	-	-	-	-	-
		2009	6,873,870	-	-	2,000,000	4,500,000	-	-	-	215,947	-	-	-
	Saudi Arabia	2004	-	-	-	16,530,000	-	-	-	-	-	-	-	-
		2005	-	-	-	20,853,000	-	-	-	-	-	-	-	-
		2006	-	-	-	27,285,333	-	-	-	-	28,000	-	-	-
		2007	-	-	-	27,360,000	0	-	-	-	16,000	-	-	-
		2008	-	-	-	27,345,844	0	-	-	-	-	-	-	-
		2009	-	-	-	27,800,000	0	-	-	-	31,000	-	0	-
	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	-	-	-

Annex 3 – Funding for malaria control, 2009 *(continued)*

WHO Region/ Sub-region	Country	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
	Sudan*	2000	-	-	-	3,894,500	-	-	-	-	-	-	-	-
		2001	-	-	-	3,976,200	-	-	-	-	-	-	-	-
		2002	-	-	-	4,574,210	-	-	-	-	-	-	-	-
		2003	-	-	-	3,466,100	-	-	-	-	-	-	-	-
		2004	4,903,414	-	-	4,000,000	-	-	2,000,000	-	885,141	-	607,692	-
		2005	11,382,445	-	-	4,278,544	12,903,414	-	2,500,000	765,000	1,673,351	-	2,938,309	732,830
		2006	7,877,068	-	53,100,000	6,185,187	13,692,691	11,000,000	1,972,000	7,399,410	-	-	315,722	39,900
		2007	11,131,052	-	-	17,394,010	4,903,414	11,000,000	312,151	0	312,151	-	1,468,893	-
		2008	34,517,515	-	-	13,445,129	3,700,680	0	39,416	8,586,562	39,416	3,452,658	-	-
		2009	30,527,113	-	-	26,269,514	15,869,166	0	0	0	0	13,983,001	8,126,137	-
	Yemen	2001	-	-	-	2,166,815	-	-	-	-	-	-	-	-
		2002	-	-	-	1,196,333	-	-	-	-	-	-	-	-
		2003	200,000	-	-	1,855,819	-	-	-	-	-	-	-	-
		2004	1,461,532	-	-	2,001,569	1,661,532	1,150,000	-	-	-	-	-	-
		2005	1,664,079	-	-	1,932,139	2,498,099	1,150,000	-	-	542,000	-	-	-
		2006	1,952,517	-	-	1,954,894	7,761,094	-	-	-	-	-	-	-
		2007	2,394,449	-	-	2,387,745	-	453,000	-	-	175,000	0	-	-
		2008	5,044,737	-	-	2,465,870	4,185,533	41,360	0	104,387	200,000	0	250,000	-
		2009	2,421,277	-	-	2,465,870	4,401,240	0	0	1,199,999	475,000	0	126,000	-
EUROPEAN	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	-
	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	0	0	0	0	68,000	0	0	0
		2006	-	-	-	1,035,336	0	0	0	0	54,000	0	0	0
		2007	-	-	-	2,145,369	-	0	0	0	65,000	0	0	0
		2008	1,295,872	-	-	1,254,543	0	0	0	0	65,000	0	0	0
		2009	1,786,084	-	-	1,971,844	1,423,641	-	-	-	35,000	0	0	-
	Georgia	2000	-	-	-	-	0	0	0	0	60,000	0	0	0
		2001	-	-	-	185,000	0	0	0	0	44,000	0	0	0
		2002	-	-	-	185,000	0	0	0	0	30,000	0	0	0
		2003	-	-	-	225,000	0	0	0	0	0	0	0	0
		2004	360,950	-	-	571,567	438,900	0	0	0	0	0	0	0
		2005	284,750	-	-	354,800	206,800	0	0	0	0	0	0	0
		2006	160,600	-	-	116,938	160,600	0	0	0	0	0	0	0
		2007	882,530	-	-	50,898	155,362	0	0	0	5,000	-	0	0
		2008	705,430	-	-	47,904	833,900	0	0	0	38,280	-	0	0
		2009	-	-	-	39,546	250,431	-	-	-	25,000	-	0	-

Annex 3 – Funding for malaria control, 2009 *(continued)*

WHO Region/ Sub-region	Country	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
	Sudan*	2000	-	-	-	3,894,500	-	-	-	-	-	-	-	-
		2001	-	-	-	3,976,200	-	-	-	-	-	-	-	-
		2002	-	-	-	4,574,210	-	-	-	-	-	-	-	-
		2003	-	-	-	3,466,100	-	-	-	-	-	-	-	-
		2004	4,903,414	-	-	4,000,000	-	-	2,000,000	-	885,141	-	607,692	-
		2005	11,382,445	-	-	4,278,544	12,903,414	-	2,500,000	765,000	1,673,351	-	2,938,309	732,830
		2006	7,877,068	-	53,100,000	6,185,187	13,692,691	11,000,000	1,972,000	7,399,410	-	-	315,722	39,900
		2007	11,131,052	-	-	17,394,010	4,903,414	11,000,000	312,151	0	312,151	-	1,468,893	-
		2008	34,517,515	-	-	13,445,129	3,700,680	0	39,416	8,586,562	39,416	3,452,658	-	-
		2009	30,527,113	-	-	26,269,514	15,869,166	0	0	0	0	13,983,001	8,126,137	-
	Yemen	2001	-	-	-	2,166,815	-	-	-	-	-	-	-	-
		2002	-	-	-	1,196,333	-	-	-	-	-	-	-	-
		2003	200,000	-	-	1,855,819	-	-	-	-	-	-	-	-
		2004	1,461,532	-	-	2,001,569	1,661,532	1,150,000	-	-	-	-	-	-
		2005	1,664,079	-	-	1,932,139	2,498,099	1,150,000	-	-	542,000	-	-	-
		2006	1,952,517	-	-	1,954,894	7,761,094	-	-	-	-	-	-	-
		2007	2,394,449	-	-	2,387,745	-	453,000	-	-	175,000	0	-	-
		2008	5,044,737	-	-	2,465,870	4,185,533	41,360	0	104,387	200,000	0	250,000	-
		2009	2,421,277	-	-	2,465,870	4,401,240	0	0	1,199,999	475,000	0	126,000	-
	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	-
	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	0	0	0	0	68,000	0	0	0
		2006	-	-	-	1,035,336	0	0	0	0	54,000	0	0	0
		2007	-	-	-	2,145,369	-	0	0	0	65,000	0	0	0
		2008	1,295,872	-	-	1,254,543	0	0	0	0	65,000	0	0	0
		2009	1,786,084	-	-	1,971,844	1,423,641	-	-	-	35,000	0	0	-
	Georgia	2000	-	-	-	-	0	0	0	0	60,000	0	0	0
		2001	-	-	-	185,000	0	0	0	0	44,000	0	0	0
		2002	-	-	-	185,000	0	0	0	0	30,000	0	0	0
		2003	-	-	-	225,000	0	0	0	0	0	0	0	0
		2004	360,950	-	-	571,567	438,900	0	0	0	0	0	0	0
		2005	284,750	-	-	354,800	206,800	0	0	0	0	0	0	0
		2006	160,600	-	-	116,938	160,600	0	0	0	0	0	0	0
		2007	882,530	-	-	50,898	155,362	0	0	0	5,000	-	0	0
		2008	705,430	-	-	47,904	833,900	0	0	0	38,280	-	0	0
		2009	-	-	-	39,546	250,431	-	-	-	25,000	-	0	-

Annex 3 – Funding for malaria control, 2009 *(continued)*

			Contributions reported by donors											
WHO Region/ Sub-region	Country	Year	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
	Kyrgyzstan	2000	-	-	-	0	0	0	0	0	0	0	0	0
		2001	-	-	-	57,450	0	0	0	0	0	0	0	0
		2002	-	-	-	58,950	0	0	0	0	0	0	0	0
		2003	-	-	-	58,900	0	0	0	0	0	0	0	0
		2004	-	-	-	59,095	0	0	0	0	0	0	0	0
		2005	-	-	-	63,190	0	0	0	0	0	0	0	0
		2006	933,345	-	-	67,900	933,345	0	0	0	0	0	0	0
		2007	759,045	-	-	68,000	759,045	0	0	0	0	-	0	0
		2008	1,013,420	-	-	68,500	647,245	0	0	0	0	-	0	0
		2009	172,070	-	-	70,000	546,245	-	-	-	0	-	0	-
	Russian Federation	2007	-	-	-	0	0	-	-	-	0	-	0	-
		2008	-	-	-	0	0	-	-	-	25,000	-	0	-
		2009	-	-	-	0	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	1,332,959	-	-	-	13,000	-	-	-
	Turkey	2000	-	-	-	1,614,000	-	-	-	-	10,000	-	-	-
		2001	-	-	-	1,923,083	-	-	-	-	10,000	-	-	-
		2002	-	-	-	2,303,260	-	-	-	-	10,000	-	-	-
		2003	-	-	-	3,062,871	-	-	-	-	10,000	-	-	-
		2004	-	-	-	31,980,282	-	-	-	-	10,000	-	-	-
		2005	-	-	-	32,928,553	-	-	-	-	10,000	-	-	-
		2006	-	-	-	38,529,677	-	-	-	-	15,000	-	-	-
		2007	-	-	-	38,755,483	0	-	-	-	15,000	-	0	-
		2008	-	-	-	40,850,967	0	-	-	-	15,000	-	0	-
		2009	-	-	-	44,200,000	0	-	-	-	0	-	0	-
	Uzbekistan	2001	-	-	-	181,887	0	0	-	-	0	-	-	0
		2002	-	-	-	112,708	0	0	-	-	0	-	-	0
		2003	-	-	-	98,661	0	0	-	-	0	-	-	0
		2004	-	-	-	104,005	0	0	-	-	0	-	-	0
		2005	450,290	-	-	108,944	556,543	0	-	-	0	-	-	0
		2006	359,034	-	-	104,728	715,233	0	-	-	0	-	-	0
		2007	1,104,061	-	-	109,830	843,650	0	-	-	0	-	0	-
		2008	509,704	-	-	120,813	320,045	0	-	-	7,175	-	0	-
		2009	984,904	-	-	132,894	289,760	-	-	-	7,892	-	0	-
SOUTH-EAST ASIA	Bangladesh	2002	-	-	-	75,000	-	114,138	-	-	147,242	-	-	-
		2003	-	-	-	55,000	-	45,000	-	-	-	-	-	-
		2004	-	-	-	101,500	-	46,500	-	-	589,700	-	-	-
		2005	-	-	-	250,000	-	200,000	-	-	-	-	-	-
		2006	-	-	-	891,000	-	724,000	-	-	-	-	-	-
		2007	7,805,224	-	-	548,385	9,006,492	723,881	-	-	230,000	-	-	-
		2008	8,370,698	-	-	528,209	9,580,687	700,000	-	-	220,000	-	-	-
		2009	3,521,417	-	-	555,358	7,769,852	887,995	-	-	230,000	-	-	-

Annex 3 – Funding for malaria control, 2009 *(continued)*

WHO Region/ Sub-region	Country	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
	Bhutan	2003	-	-	-	154,275	-	-	-	100,000	-	-	-	-
		2004	-	-	-	6,449,675	-	-	-	100,000	31,550	-	-	-
		2005	503,587	-	-	177,425	577,700	-	-	200,000	11,550	-	-	-
		2006	405,429	-	-	180,425	688,700	-	-	215,250	34,800	-	-	-
		2007	339,056	-	-	188,125	571,775	0	0	173,913	-	0	0	-
		2008	1,059,849	-	-	413,000	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	-
	Democratic People's Republic of Korea	2001	-	-	-	900,000	-	-	-	-	-	-	-	-
		2002	-	-	-	900,000	-	-	-	-	-	-	-	-
		2003	-	-	-	1,200,000	-	-	-	-	-	-	-	-
		2004	-	-	-	1,200,000	-	-	-	-	-	-	-	-
		2005	-	-	-	1,200,000	-	-	-	-	-	-	-	-
		2006	-	-	-	1,800,000	-	-	-	-	-	-	-	-
		2007	-	-	-	1,800,000	0	-	-	-	-	-	1,200,000	-
		2008	-	-	-	1,800,000	0	-	-	-	-	-	1,200,000	-
		2009	-	-	-	1,800,000	0	-	-	-	-	-	1,200,000	-
	India	2000	-	-	-	55,553,333	-	-	-	-	-	-	-	-
		2001	-	-	-	36,851,064	-	16,266,608	-	-	-	-	-	-
		2002	-	-	-	39,716,942	-	13,969,726	-	-	-	-	-	-
		2003	-	-	-	39,593,514	-	18,535,966	-	-	-	-	-	-
		2004	-	-	-	42,766,667	-	1,372,056	-	-	-	-	-	-
		2005	856,717	-	-	57,675,175	912,325	9,512,474	-	-	-	-	-	-
		2006	12,562,309	-	-	61,372,444	8,227,900	22,400,000	-	-	-	-	-	-
		2007	-	-	-	64,069,565	15,727,050	29,500,000	-	-	-	-	-	-
		2008	34,286,405	-	-	73,943,830	13,863,557	28,619,974	-	-	-	-	-	-
		2009	-	-	-	78,577,778	9,184,373	9,480,000	-	-	-	-	-	-
	Indonesia	2003	1,435,987	-	-	-	1,435,987	-	-	-	-	-	-	-
		2004	4,556,562	-	-	1,726,788	4,556,562	-	-	-	460,000	-	-	-
		2005	5,762,398	-	-	4,402,565	5,762,318	-	-	-	-	250,000	-	-
		2006	3,655,692	-	-	3,386,554	3,655,692	-	-	-	406,000	16,000,000	-	-
		2007	2,079,182	-	-	3,331,295	2,079,162	-	-	-	-	3,000,000	-	-
		2008	20,841,603	-	-	1,888,085	13,199,217	-	-	-	406,000	2,800,000	-	-
		2009	34,331,236	-	-	1,886,743	17,661,982	-	-	-	103,000	3,300,000	-	-
	Myanmar	2005	3,091,409	-	-	-	-	-	-	-	-	-	-	-
		2007	-	-	-	-	-	-	-	-	700,000	2,451,360	643,496	-
		2008	-	-	-	-	-	-	-	-	2,700,000	4,167,142	2,425,633	-
		2009	-	-	-	-	-	-	-	-	2,300,000	1,607,882	3,815,436	-
	Nepal	2003	116,583	-	-	-	-	-	-	-	-	-	-	-
		2004	528,075	-	-	1,069,614	408,113	2,387,354	-	-	45,714	-	-	-
		2005	-	-	-	930,857	501,721	2,752,123	-	-	45,714	-	-	-
		2006	1,029,025	-	-	909,000	283,307	799,615	-	-	60,500	-	-	-
		2007	4,535,241	-	-	961,457	1,321,927	-	-	-	112,000	-	-	-
		2008	4,480,142	-	-	961,457	924,791	-	-	-	88,000	25,000	-	-
		2009	573,709	-	-	961,457	1,305,661	-	-	-	88,000	-	742,500	-

Annex 3 – Funding for malaria control, 2009 *(continued)*

			Contributions reported by donors											
WHO Region/ Sub-region	Country	Year	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
	Sri Lanka	2001	-	-	-	2,750,473	-	258,222	-	-	-	-	-	-
		2002	-	-	-	2,750,473	-	-	-	-	-	-	-	-
		2003	2,399,223	-	-	148,120	2,700,000	-	-	-	-	-	-	-
		2004	1,706,498	-	-	4,117,528	5,197,000	-	-	-	-	-	-	-
		2005	649,756	-	-	3,873,427	730,140	-	-	-	-	-	-	-
		2006	122,367	-	-	3,053,110	1,808,135	-	-	-	-	-	-	-
		2007	740,564	-	-	4,042,612	1,055,469	-	-	-	-	-	-	-
		2008	3,929,226	-	-	4,144,123	1,432,800	-	-	-	30,000	-	-	-
		2009	6,593,558	-	-	1,190,000	522,431	-	-	-	-	-	-	-
	Thailand	2001	-	-	-	19,580,000	-	-	-	-	-	-	-	-
		2002	-	-	-	24,530,331	-	-	-	-	-	-	-	-
		2003	-	-	-	18,700,000	-	-	-	-	-	-	-	-
		2004	660,000	-	-	16,135,000	625,000	-	-	-	-	-	-	-
		2005	1,305,633	-	-	14,000,000	199,967	-	-	-	-	-	-	-
		2006	1,171,755	-	-	12,106,552	2,175,959	-	-	-	-	-	-	-
		2007	1,337,893	-	-	1,660,984	895,388	-	-	-	-	-	-	-
		2008	5,977,700	-	-	1,783,015	3,513,961	-	-	-	-	-	-	-
		2009	5,718,652	-	-	2,356,992	5,087,163	-	-	-	-	-	2,061,759	-
	Timor-Leste	2003	380,964	-	-	-	-	-	-	-	-	-	-	-
		2004	983,486	-	-	-	924,000	-	-	-	-	-	-	-
		2005	438,089	-	-	-	1,632,680	-	-	-	-	-	-	-
		2006	934,229	-	-	200,000	1,123,063	-	-	-	-	50,000	50,000	882,000
		2007	-	-	-	783,571	0	0	0	0	80,000	0	0	-
		2008	-	-	-	719,632	0	0	0	0	100,000	0	0	-
		2009	3,006,875	-	-	172,000	4,698,114	0	0	0	145,000	0	0	-
WESTERN PACIFIC	Cambodia	2000	-	-	-	-	0	-	0	0	500,000	0	0	-
		2001	-	-	-	316,000	0	643,000	0	0	500,000	0	0	1,257,000
		2002	-	-	-	465,000	0	900,000	0	0	500,000	0	0	1,900,000
		2003	1,952,490	-	-	240,000	0	50,000	0	0	500,000	0	0	0
		2004	506,199	-	-	933,156	537,378	490,014	0	0	500,000	0	0	0
		2005	5,209,206	-	-	1,332,647	1,345,572	283,494	0	0	500,000	0	0	0
		2006	3,124,027	-	-	1,282,500	1,901,220	306,709	0	0	500,000	0	0	0
		2007	4,484,321	-	-	1,456,419	5,762,926	918,403	1,000,000	0	500,000	0	0	0
		2008	10,598,785	-	-	1,508,603	4,327,529	0	1,000,000	0	590,000	0	0	0
		2009	11,289,036	-	-	1,480,254	5,534,038	0	1,000,000	0	650,000	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	-	-	-	9,346,491	-	-	-	-	-	-	-

Annex 3 – Funding for malaria control, 2009 *(continued)*

WHO Region/ Sub-region	Country	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
	Lao People's Democratic Republic	2001	-	-	-	-	-	377,642	-	2,080,000	33,073	-	-	737,143
		2002	-	-	-	335,813	-	-	-	-	28,665	-	-	654,128
		2003	1,198,226	-	-	369,394	768,515	-	-	2,440,000	50,000	-	-	-
		2004	1,269,544	-	-	406,334	2,471,668	-	-	-	-	-	-	-
		2005	6,356,531	-	-	446,967	4,691,324	-	-	-	50,000	-	-	-
		2006	3,943,599	-	-	491,663	4,132,726	-	-	-	-	-	-	-
		2007	7,267,767	-	-	540,829	5,210,285	0	0	0	0	0	0	-
		2008	7,840,252	-	-	594,912	7,242,608	0	0	0	0	0	0	-
		2009	5,252,504	-	-	-	6,424,803	0	0	0	21,300	0	0	-
	Malaysia	2009	-	-	-	24,001,810	0	-	-	0	0	-	0	-
	Papua New Guinea	2001	-	-	-	217,511	-	-	-	-	-	-	-	-
		2002	-	-	-	107,478	-	-	-	-	-	-	-	-
		2003	-	-	-	5,945	-	-	-	-	-	-	-	-
		2004	2,185,723	-	-	54,581	2,185,723	-	-	-	-	-	-	-
		2005	3,256,526	-	-	19,060	3,256,526	-	-	-	-	-	-	-
		2006	372,986	-	-	139,300	372,986	-	-	-	-	-	-	-
		2007	2,957,519	-	-	147	2,957,519	-	-	-	-	-	-	-
		2008	6,385,835	-	-	157	6,385,835	-	-	-	-	-	-	-
		2009	26,381,002	-	-	156	4,417,383	-	-	-	2,179	-	-	-
	Philippines	2002	-	-	-	-	-	-	-	-	200,000	-	-	-
		2003	2,231,686	-	-	-	-	-	-	-	-	-	-	-
		2004	3,669,663	-	-	63,000	2,700,000	-	-	-	800,000	-	-	-
		2005	2,305,524	-	-	63,000	4,000,000	-	-	-	800,000	-	-	-
		2006	9,309,756	-	-	63,000	8,900,000	-	-	-	800,000	-	-	-
		2007	15,237,049	-	-	48,000	22,000,000	0	0	75,000	300,000	0	652,213	-
		2008	5,310,226	-	-	1,600,000	3,952,832	0	0	75,000	300,000	0	466,125	-
		2009	5,636,134	-	-	3,700,000	31,400,000	0	0	75,000	300,000	0	694,670	-
	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	-	-	-

Annex 3 – Funding for malaria control, 2009 *(continued)*

WHO Region/ Sub-region	Country	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
	Solomon Islands	2001	-	-	-	0	-	-	-	-	-	-	-	-
		2002	-	-	-	0	-	-	-	-	-	-	-	-
		2003	-	-	-	0	548,695	163,860	-	-	-	-	-	-
		2004	-	-	-	0	462,710	163,860	-	-	-	-	-	-
		2005	-	-	-	209,873	631,603	163,860	-	-	-	-	-	-
		2006	-	-	-	150,252	959,599	163,860	-	-	-	-	-	-
		2007	-	-	-	-	594,928	0	0	0	0	0	0	-
		2008	-	-	-	3,613,227	483,416	0	0	0	386,000	0	563,681	-
		2009	-	-	-	279,388	628,188	0	0	-	216,674	0	750,189	-
	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

[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 Sustaining Momentum Against Malaria: Saving Lives in Africa Fourth Annual Report April 2010.
[3]Source: The World Bank web site, funds for 3 years.
[4]Other Contributions: NGOs, foundations, etc.
Data for Sudan only represents 15 northern states.

Annex 4A – Recommended policies and strategies for malaria control, 2009

		Insecticide-treated nets			Indoor residual spraying		Treatment									Malaria in pregnancy
WHO region/ sub-region	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 treatment of *P.vivax* cases	IPTp used to prevent malaria during pregnancy
AFRO	Algeria	N	N	-	N	Y	NA	Y	Y	N	Y	N	-	-	Y	N
	Angola	Y	Y	-	Y	Y	Y	Y	Y	-	Y	Y	-	-	-	Y
	Benin	Y	-	-	-	Y	Y	-	Y	-	-	Y	-	-	-	Y
	Botswana	Y	Y	Y	Y	Y	Y	Y	Y	-	Y	Y	-	-	-	-
	Burkina Faso	Y	Y	Y	-	-	Y	Y	Y	-	N	Y	-	-	-	Y
	Burundi	Y	Y	Y	-	-	Y	Y	-	-	Y	-	-	-	-	-
	Cameroon	Y	-	-	-	-	Y	-	-	-	-	Y	-	-	-	Y
	Cape Verde	N	N	N	N	-	Y	Y	Y	Y	Y	Y	-	-	-	N
	Central African Republic	Y	-	-	-	-	Y	Y	-	Y	Y	Y	-	-	-	Y
	Chad	Y	-	-	-	-	Y	Y	Y	Y	Y	-	-	-	-	Y
	Comoros	Y	-	-	-	-	Y	Y	-	-	-	-	-	-	-	Y
	Congo	Y	-	-	-	-	Y	-	-	-	Y	-	-	-	-	Y
	Côte d'Ivoire	Y	Y	Y	-	-	Y	-	-	-	N	-	-	-	-	Y
	DR Congo	Y	Y	Y	Y	Y	Y	Y	-	-	-	-	-	-	-	Y
	Equatorial Guinea	Y	-	Y	-	Y	Y	Y	Y	Y	Y	Y	-	-	-	-
	Eritrea	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	-	-	-	-
	Ethiopia	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	N
	Gabon	Y	Y	Y	N	-	Y	Y	N	N	Y	Y	-	-	-	Y
	Gambia	Y	Y	-	Y	-	Y	Y	Y	-	Y	Y	-	-	-	Y
	Ghana	Y	-	-	-	Y	Y	Y	-	Y	-	Y	-	-	-	Y
	Guinea	Y	Y	Y	-	Y	Y	-	-	-	-	Y	-	-	-	Y
	Guinea-Bissau	Y	Y	Y	-	-	Y	Y	Y	-	-	Y	-	-	-	Y
	Kenya	Y	Y	Y	-	-	Y	Y	Y	-	Y	Y	-	-	-	Y
	Liberia	Y	Y	Y	-	-	Y	Y	Y	-	Y	Y	-	-	-	Y
	Madagascar	Y	Y	Y	-	Y	Y	Y	Y	-	Y	-	-	-	-	Y
	Malawi	Y	-	Y	-	-	Y	-	-	-	-	Y	-	-	-	Y
	Mali	Y	-	-	-	Y	Y	Y	-	Y	Y	Y	-	-	-	Y
	Mauritania	Y	-	Y	-	-	Y	-	Y	-	Y	Y	-	-	-	Y
	Mozambique	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	Y
	Namibia	Y	-	-	Y	Y	Y	Y	Y	-	Y	Y	-	-	-	Y
	Niger	Y	N	N	N	-	Y	N	N	Y	Y	Y	-	-	-	Y
	Nigeria	Y	Y	Y	-	-	Y	Y	-	-	Y	Y	-	-	-	Y
	Rwanda	Y	N	Y	-	-	Y	Y	-	Y	-	Y	-	-	-	-
	Sao Tome and Principe	Y	-	Y	-	-	Y	Y	Y	-	-	Y	-	-	-	Y
	Senegal	Y	Y	Y	-	Y	Y	Y	Y	Y	-	Y	-	-	-	Y
	Sierra Leone	Y	Y	Y	-	-	Y	Y	Y	Y	Y	Y	-	-	-	Y
	South Africa	-	-	-	Y	Y	Y	Y	Y	-	Y	-	-	-	-	-
	Swaziland	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-	N
	Togo	-	-	-	-	-	Y	Y	-	Y	-	Y	-	-	-	Y
	Uganda	Y	-	-	Y	Y	Y	Y	Y	-	Y	Y	-	-	-	Y
	UR Tanzania	Y	Y	Y	-	-	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	Y	-	-	-	Y
AMRO	Argentina	-	-	-	N	-	NA	-	Y	-	-	-	-	-	-	NA
	Bahamas	-	-	-	N	-	-	-	-	-	-	-	-	-	-	NA
	Belize	Y	-	-	N	N	NA	Y	Y	N	N	N	N	N	N	NA
	Bolivia (Pluri. State)	Y	Y	Y	N	N	Y	Y	Y	Y	Y	-	N	N	N	NA
	Brazil	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	N	N	N	NA
	Colombia	Y	Y	Y	N	N	Y	Y	Y	Y	Y	-	N	N	N	NA
	Costa Rica	-	-	-	N	N	NA	Y	Y	-	N	N	N	N	N	NA
	Dominican Republic	Y	Y	Y	N	N	N	Y	Y	N	N	-	N	N	N	NA
	Ecuador	Y	Y	Y	N	N	Y	Y	Y	Y	Y	N	N	N	N	NA
	El Salvador	-	-	-	N	N	NA	Y	Y	-	N	N	N	N	N	NA
	French Guiana	-	Y	Y	N	N	NA	Y	-	Y	N	N	N	N	N	NA
	Guatemala	Y	Y	Y	N	N	NA	Y	Y	Y	N	N	N	N	N	NA
	Guyana	Y	Y	Y	N	N	Y	Y	Y	-	Y	Y	N	N	N	NA
	Haiti	-	Y	Y	N	N	NA	Y	-	-	N	N	N	N	N	NA
	Honduras	Y	Y	-	N	N	NA	Y	Y	Y	N	N	N	N	N	NA
	Jamaica	-	-	-	N	-	-	-	-	-	-	-	-	-	-	NA

Annex 4A – Recommended policies and strategies for malaria control, 2009 *(continued)*

		Insecticide-treated nets			Indoor residual spraying		Treatment									Malaria in pregnancy
WHO region/ sub-region	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 treatment of *P.vivax* cases	IPTp used to prevent malaria during pregnancy
	Mexico	N	Y	Y	N	N	NA	Y	Y	N	N	N	N	N	N	NA
	Nicaragua	Y	Y	–	N	N	NA	Y	Y	Y	N	N	N	N	N	NA
	Panama	–	–	–	N	N	NA	Y	Y	N	N	N	N	N	N	NA
	Paraguay	–	–	–	N	N	N	Y	Y	Y	Y	–	N	N	N	NA
	Peru	–	Y	Y	N	N	Y	Y	–	–	–	–	N	N	N	NA
	Suriname	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	N	N	N	NA
	Venezuela (Bolivarian Rep.)	Y	Y	Y	N	N	Y	Y	Y	N	Y	N	N	N	N	NA
EMRO	Afghanistan	Y	Y	Y	–	–	Y	Y	Y	Y	–	Y	–	–	–	NA
	Djibouti	Y	–	–	–	–	Y	–	Y	–	Y	–	–	–	–	NA
	Iran (Islamic Rep.)	Y	Y	–	–	Y	Y	Y	Y	–	Y	Y	–	–	Y	NA
	Iraq	Y	Y	–	–	Y	Y	Y	Y	Y	Y	–	–	–	Y	NA
	Pakistan	Y	Y	–	–	Y	Y	–	Y	–	Y	Y	–	–	–	NA
	Saudi Arabia	Y	Y	–	–	Y	Y	Y	Y	Y	Y	Y	Y	–	Y	NA
	Somalia	Y	Y	Y	–	–	Y	Y	Y	–	Y	Y	–	–	–	Y
	Sudan	Y	Y	Y	–	–	Y	Y	Y	Y	Y	Y	–	–	–	Y
	Yemen	Y	Y	Y	N	Y	Y	Y	Y	Y	–	Y	–	–	–	NA
EURO	Armenia	N	–	–	–	Y	NA	Y	Y	–	–	–	–	–	Y	NA
	Azerbaijan	Y	–	–	–	Y	NA	Y	Y	–	–	–	–	–	Y	NA
	Georgia	–	–	–	–	Y	NA	Y	Y	–	–	–	–	–	Y	NA
	Kyrgyzstan	Y	Y	–	–	Y	–	Y	Y	–	–	–	–	–	Y	NA
	Russian Federation	N	N	–	N	N	–	–	Y	–	–	–	N	N	Y	NA
	Tajikistan	Y	Y	–	–	Y	Y	Y	Y	–	Y	–	–	–	Y	NA
	Turkey	–	–	–	–	Y	NA	Y	Y	–	Y	–	–	–	Y	NA
	Uzbekistan	Y	Y	–	N	Y	–	Y	Y	–	–	–	–	–	Y	NA
SEARO	Bangladesh	Y	Y	Y	–	–	Y	Y	Y	Y	Y	Y	–	–	–	NA
	Bhutan	Y	Y	Y	N	–	Y	Y	Y	–	–	–	–	–	–	NA
	DPR Korea	Y	Y	–	–	Y	NA	–	Y	–	–	–	–	–	Y	NA
	India	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	–	–	–	NA
	Indonesia	Y	Y	Y	–	–	Y	Y	Y	–	Y	Y	–	–	–	NA
	Myanmar	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	–	–	–	NA
	Nepal	Y	Y	–	–	Y	Y	Y	Y	Y	–	Y	–	–	–	NA
	Sri Lanka	Y	Y	–	–	Y	Y	Y	Y	Y	Y	–	–	–	–	NA
	Thailand	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	–	–	–	NA
	Timor-Leste	Y	Y	Y	N	–	Y	Y	Y	N	Y	Y	–	–	–	NA
WPRO	Cambodia	Y	Y	–	–	–	Y	Y	Y	Y	–	Y	–	–	–	NA
	China	Y	Y	Y	–	–	Y	Y	Y	–	Y	–	–	–	–	NA
	Lao PDR	Y	Y	Y	–	–	Y	Y	Y	Y	Y	Y	–	–	–	NA
	Malaysia	Y	Y	–	–	Y	Y	Y	Y	–	Y	Y	Y	–	Y	NA
	Papua New Guinea	Y	Y	Y	Y	Y	Y	Y	Y	–	Y	Y	–	–	–	Y
	Philippines	Y	Y	Y	N	–	Y	Y	Y	Y	Y	Y	–	–	–	NA
	Republic of Korea	–	–	–	–	–	NA	Y	Y	Y	–	–	–	–	Y	NA
	Solomon Islands	Y	Y	Y	–	–	Y	Y	Y	–	Y	Y	–	–	–	NA
	Vanuatu	Y	Y	Y	–	–	Y	Y	Y	Y	–	Y	–	–	–	NA
	Viet Nam	Y	Y	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 4B – Antimalarial drug policy, 2009

		P. falciparum				*P.vivax*
WHO region	**Country/area**	**Uncomplicated unconfirmed**	**Uncomplicated confirmed**	**Severe**	**Prevention during pregnancy**	**Treatment**
AFRO	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)	-
	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	AL	QN	CQ+PG	-
	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 4B – Antimalarial drug policy, 2009 *(continued)*

		P. falciparum				*P.vivax*
WHO region	**Country/area**	**Uncomplicated unconfirmed**	**Uncomplicated confirmed**	**Severe**	**Prevention during pregnancy**	**Treatment**
AMRO	Argentina	-	-		-	CQ+PQ
	Bahamas	-	-	-	-	-
	Belize	-	CQ	-	-	CQ+PQ
	Bolivia (Plurinational State)	-	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;QN	-	-
	Ecuador	-	AS+SP	QN	-	CQ+PQ
	El Salvador	-	CQ+PQ	-	-	CQ+PQ
	French Guiana	-	AL	-	-	CQ+PQ
	Guatemala	-	-	-	-	CQ+PQ
	Guyana	-	AL+PQ	-	-	CQ+PQ
	Haiti	-	CQ+PQ	-	-	-
	Honduras	-	CQ+PQ	-	-	CQ+PQ
	Jamaica	-	-	-	-	-
	Mexico	-	CQ+PQ	-	-	CQ+PQ
	Nicaragua	-	CQ+PQ	QN+CL	-	CQ+PQ
	Panama	-	SP	MQ	-	CQ+PQ
	Paraguay	-	CQ+PQ	-	-	CQ+PQ
	Peru	-	AS+MQ	-	-	CQ+PQ
	Suriname	-	AL	-	-	CQ+PQ
	Venezuela (Bolivarian Republic)	-	AS+MQ+PQ	AM;QN	-	CQ+PQ
EMRO	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)	CQ+PQ(14d)
	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)
EURO	Armenia	-	-		-	CQ+PQ(14d)
	Azerbaijan	-	-	-	-	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)
SEARO	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+PQ;DHA-PPQ	AM;AS;QN	-	CQ+PQ(14d)
	Myanmar	-	AL;AS+MQ;DHA-PPQ	AM;AS;QN	-	CQ+PQ(14d)
	Nepal	CQ+PQ	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 4B – Antimalarial drug policy, 2009 *(continued)*

		P. falciparum				*P.vivax*
WHO region	**Country/area**	**Uncomplicated unconfirmed**	**Uncomplicated confirmed**	**Severe**	**Prevention during pregnancy**	**Treatment**
WPRO	Cambodia	-	AS+MQ;DHA-PPQ+PQ	AS+DHA-PPQ	-	CQ
	China	-	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
	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 = Clindamycin
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 5 – Operational coverage of insecticide treated nets, indoor residual spraying and antimalarial treatment, 2007–2009

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	% ACT coverage total
AFRO	Algeria	2007	-	-	-	-	-	-	297	-	1	-
		2008	-	-	-	-	-	-	152	-	1	-
		2009	-	-	-	-	-	-	-	-	-	-
	Angola	2007	1,495,165	1,495,165	-	26	612,776	3.5	2,031,760	2,031,760	58	58
		2008	1,471,200	1,471,200	-	42	745,061	4.1	2,363,970	2,363,970	72	72
		2009	936,762	936,762	-	10	485,974	2.6	3,878,910	3,878,910	114	114
	Benin	2007	1,560,000	1,500,000	60,000	37	-	-	4,328,504	-	324	-
		2008	117,148	117,148	-	37	521,738	6.0	1,903,013	1,357,263	146	104
		2009	876,000	876,000	-	56	512,491	5.7	4,328,504	2,691,254	1,035	643
	Botswana	2007	-	-	-	0	225,332	18.3	12,015	12,015	46	46
		2008	35,300	35,300	-	6	212,054	17.0	44,508	44,508	163	163
		2009	33,760	33,760	-	11	236,078	18.6	40,867	40,867	180	180
	Burkina Faso	2007	24,000	13,000	11,000	2	-	-	5,792,777	811,507	236	33
		2008	724,547	724,547	0	11	-	-	2,408,905	2,408,905	64	64
		2009	1,103,049	1,103,049	0	14	0	0.0	3,947,012	3,947,012	88	88
	Burundi	2007	1,203,763	1,203,763	-	39	-	-	4,527,030	2,263,515	318	159
		2008	895,355	895,355	-	67	-	-	4,012,722	2,006,361	270	135
		2009	2,122,920	2,122,920	-	130	3,822	0.1	1,887,914	1,887,914	103	103
	Cameroon	2007	244,425	-	244,425	3	-	-	5,133,570	2,566,785	1,479	740
		2008	802,105	802,105	-	8	-	-	3,629,450	1,814,725	184	92
		2009	430,606	430,606	-	13	0	0.0	3,177,872	1,299,240	142	58
	Cape Verde	2007	0	0	0	-	1,000	0.8	18	-	100	-
		2008	0	0	0	-	2,500	1.9	35	31	100	89
		2009	-	-	-	-	-	-	64	60	99	92
	Central African Republic	2007	498,050	498,050	0	23	-	-	2,384,532	1,192,266	672	336
		2008	846,966	846,966	0	62	-	-	2,484,612	1,242,306	549	275
		2009	-	-	-	61	-	-	868,407	843,540	167	162
	Chad	2007	83,000	-	-	2	-	-	-	-	-	-
		2008	126,000	-	-	2	-	-	-	-	-	-
		2009	60,500	60,500	-	1	-	-	-	-	-	-
	Comoros	2007	95,000	-	95,000	29	-	-	187,660	83,020	351	155
		2008	20,000	20,000	-	6	-	-	281,636	121,920	607	263
		2009	61,000	61,000	-	18	-	-	414,980	184,980	835	372
	Congo	2007	-	-	-	-	-	-	-	-	-	-
		2008	-	-	-	-	-	-	-	-	-	-
		2009	-	-	-	-	-	-	-	-	-	-
	Côte d'Ivoire	2007	169,832	-	169,832	5	-	-	1,197,517	476,203	81	32
		2008	1,034,486	-	1,034,486	13	-	-	-	-	-	-
		2009	-	-	-	-	-	-	-	-	-	-
	DR Congo	2007	1,793,337	1,793,337	0	6	0	0.0	2,656,541	1,308,237	53	26
		2008	5,653,162	5,653,162	0	23	82,975	0.1	4,377,646	2,653,991	73	44
		2009	7,853,284	7,853,284	0	46	94,160	0.1	9,208,416	9,208,416	89	89
	Equatorial Guinea	2007	163,656	163,656	-	51	143,876	22.4	26,151	19,811	151	114
		2008	69,208	69,208	-	21	302,657	45.9	63,037	47,698	92	70
		2009	11,806	11,806	-	24	393,122	58.1	88,989	70,057	103	81
	Eritrea	2007	159,360	159,360	0	10	305,978	6.4	37,429	37,429	178	348
		2008	134,399	134,399	0	15	251,641	5.1	22,662	22,662	199	390
		2009	270,233	270,233	0	11	124,005	2.4	0	-	-	-
	Ethiopia	2007	7,178,443	7,178,443	0	27	5,303,213	10.1	9,483,040	4,032,640	243	150
		2008	3,316,696	3,316,696	-	39	28,206,375	52.2	8,000,000	8,000,000	207	300
		2009	1,875,681	1,875,681	0	45	28,373,630	51.1	9,561,391	8,387,321	206	261

Annex 5 – Operational coverage of insecticide treated nets, indoor residual spraying and antimalarial treatment, 2007–2009 *(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	% ACT coverage total
	Gabon	2007	352,994	2,874	350,120	51	-	-	2,212,759	952,000	1,550	667
		2008	10,640	1,640	9,000	1	-	-	190,259	-	161	-
		2009	0	0	0	0	-	-	2,212,759	-	1,284	-
	Gambia	2007	217,822	70,006	147,816	31	-	-	1,848,230	-	404	-
		2008	428,625	290,935	137,690	64	-	-	2,376,650	1,188,325	487	243
		2009	173,778	160,537	13,241	20	816,253	47.9	1,848,230	924,115	414	207
	Ghana	2007	2,137,938	2,097,938	40,000	19	240,000	1.0	1,852,967	1,852,967	54	54
		2008	807,717	807,717	0	25	601,973	2.6	9,783,983	9,783,983	246	246
		2009	149,000	149,000	0	26	708,103	3.0	4,048,655	4,048,655	163	163
	Guinea	2007	312,500	312,500	-	13	47,519	0.5	-	-	-	-
		2008	246,000	246,000	-	5	33,308	0.3	-	-	-	-
		2009	3,024,459	3,024,459	-	65	-	-	2,231,777	2,231,777	196	196
		2007	91,700	91,700	-	36	-	-	-	-	-	-
		2008	81,091	81,091	-	45	-	-	110,627	110,627	81	81
		2009	92,975	92,975	-	12	-	-	241,388	241,388	159	159
	Kenya	2007	1,996,875	1,591,492	405,383	14	3,459,207	12.1	-	-	-	-
		2008	2,786,742	2,437,621	349,121	30	3,061,966	10.4	-	-	-	-
		2009	2,740,673	2,740,673	-	45	1,470,865	4.9	-	-	-	-
	Liberia	2007	342,639	-	-	19	-	-	-	-	-	-
		2008	714,500	-	-	38	160,000	4.2	-	-	-	-
		2009	761,000	761,000	0	38	300,000	7.6	-	-	-	-
	Madagascar	2007	2,716,356	2,716,356	0	29	1,241,344	6.7	733,098	558,000	98	74
		2008	907,739	907,739	0	38	6,564,056	34.3	541,670	541,670	358	358
		2009	1,941,636	1,941,636	0	20	6,909,916	35.2	398,413	398,413	143	143
	Malawi	2007	673,238	255,266	417,972	9	97,520	0.7	-	-	-	-
		2008	2,520,044	1,023,976	1,496,068	37	98,580	0.7	-	-	-	-
		2009	957,000	957,000	0	29	288,960	1.9	-	-	-	-
	Mali	2007	2,982,346	-	-	59	405,936	3.3	-	-	-	-
		2008	1,898,297	1,898,297	0	30	405,936	3.2	2,842,500	2,842,500	272	272
		2009	1,549,800	1,549,800	0	53	386,074	3.0	441,589	441,589	27	27
	Mauritania	2007	-	-	-	4	-	-	-	-	-	-
		2008	61,700	40,850	20,850	8	-	-	-	-	-	-
		2009	200,455	200,455	-	14	-	-	49,714	49,714	19	19
	Mozambique	2007	1,586,534	1,586,534	-	15	6,465,517	29.6	12,310,164	6,155,082	174	87
		2008	2,086,367	2,086,367	-	33	6,545,395	29.2	9,662,982	4,831,491	174	87
		2009	1,292,159	1,292,159	-	43	8,479,828	37.0	213,661	-	4	-
	Namibia	2007	58,500	30,000	28,500	41	487,372	32.4	4,433	-	2	-
		2008	397,282	312,382	84,900	52	233,440	15.2	5,193	-	3	-
		2009	78,064	78,064	-	50	487,372	31.2	-	-	-	-
	Niger	2007	710,000	350,000	360,000	48	0	0.0	2,593,994	1,431,358	983	542
		2008	700,000	350,000	350,000	51	0	0.0	3,627,753	1,593,782	573	252
		2009	2,612,516	-	2,612,516	34	0	0.0	1,990,366	1,510,247	606	460
	Nigeria	2007	3,225,594	1,003,573	2,222,021	4	3,000	0.0	26,019,950	13,000,000	574	287
		2008	6,700,000	6,700,000	-	10	-	-	24,000,000	12,000,000	584	292
		2009	19,300,000	19,300,000	-	35	330,000	0.2	18,397,352	9,198,676	316	158
	Rwanda	2007	998,894	998,894	-	66	705,035	7.5	-	-	-	-
		2008	0	0	-	-	885,957	9.1	-	-	-	-
		2009	796,663	796,663	-	16	1,411,715	14.1	-	-	-	-

Annex 5 – Operational coverage of insecticide treated nets, indoor residual spraying and antimalarial treatment, 2007–2009 *(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	% ACT coverage total
	Sao Tome and Principe	2007	573,799	573,799	-	728	117,428	74.5	10,902	5,451	295	148
		2008	787,385	787,385	-	1,700	-	-	7,358	3,679	293	146
		2009	-	-	-	-	137,394	84.4	9,932	4,966	167	84
	Senegal	2007	735,000	735,000	-	12	678,971	5.7	1,980,282	990,141	191	95
		2008	1,572,261	1,572,261	-	38	645,346	5.3	640,670	320,335	140	70
		2009	2,255,235	2,255,235	-	73	661,814	5.3	184,170	184,170	80	80
	Sierra Leone	2007	316,199	316,199	0	63	0	0.0	240,404	240,404	24	24
		2008	536,266	536,266	0	19	0	0.0	828,857	828,857	64	64
		2009	292,613	292,613	0	29	0	0.0	1,815,113	1,815,113	184	184
	South Africa	2007	-	-	-	-	4,000,000	81.3	-	-	-	-
		2008	-	-	-	-	4,000,000	80.5	-	-	-	-
		2009	-	-	-	-	4,000,000	79.8	10,500	10,500	173	173
	Swaziland	2007	29,236	29,236	-	18	93	0.0	0	0	-	-
		2008	20,000	20,000	-	30	94	0.0	0	0	-	-
		2009	25,000	25,000	-	45	95	0.0	0	0	-	-
	Togo	2007	43,946	43,946	0	4	0	0.0	1,110,408	555,204	206	104
		2008	1,683,279	1,683,279	0	52	0	0.0	1,600,000	800,000	254	128
		2009	167,231	167,231	0	56	0	0.0	1,087,154	1,067,694	168	167
	Uganda	2007	1,622,001	1,622,001	0	24	1,963,945	6.4	16,919,100	16,919,100	129	129
		2008	2,273,413	2,273,413	0	37	1,858,149	5.9	6,389,600	6,389,600	51	51
		2009	876,054	876,054	0	29	1,600,324	4.9	11,357,813	11,357,813	95	95
	UR Tanzania	2007	4,254,427	322,516	3,931,911	-	1,268,994	-	23,455,260	23,455,260	-	-
		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	-	-	-	-	-
	Mainland	2007	4,230,907	298,996	3,931,911	24	197,800	0.5	23,455,260	23,455,260	266	266
		2008	3,476,577	792,668	2,683,909	20	190,604	0.5	-	-	-	-
		2009	13,711,176	7,339,991	6,371,185	70	2,238,963	5.3	-	-	-	-
	Zanzibar	2007	23,520	23,520	-	43	1,071,194	85.9	-	-	-	-
		2008	189,317	189,317	-	71	1,117,590	87.1	-	-	-	-
		2009	289,121	289,121	-	76	1,152,235	87.2	-	-	-	-
	Zambia	2007	2,458,183	2,458,183	0	67	3,288,475	26.7	6,073,964	3,036,982	123	-
		2008	1,188,443	1,188,443	0	76	5,747,995	45.5	6,284,810	3,142,405	176	-
		2009	1,502,712	1,502,712	0	80	5,638,551	43.6	6,284,810	-	182	-
	Zimbabwe	2007	517,835	517,835	-	17	1,659,393	26.7	-	-	-	-
		2008	0	0	-	17	929,660	14.9	-	-	-	-
		2009	640,557	640,557	-	37	2,575,116	41.1	-	-	-	-
AMRO	Argentina	2007	-	-	-	-	26,320	0.7	355	-	60	-
		2008	-	-	-	-	22,512	0.6	106	-	53	-
		2009	-	-	-	-	-	-	-	-	-	-
	Bahamas	2007	-	-	-	-	-	-	-	-	-	-
		2008	-	-	-	-	-	-	-	-	-	-
		2009	-	-	-	-	-	-	-	-	-	-
	Belize	2007	0	0	0	-	86,655	42.6	845	0	66	-
		2008	0	0	0	-	49,848	24.0	540	0	66	-
		2009	2,700	2,700	0	3	60,168	28.4	-	0	-	-
	Bolivia (Plurinational State)	2007	14,000	14,000	0	1	50,000	0.6	14,610	1,622	94	167
		2008	5,000	5,000	0	1	125,000	1.6	9,894	782	95	121
		2009	5,000	5,000	0	1	249,001	3.1	9,743	674	94	104
	Brazil	2007	10,000	10,000	0	0	257,931	0.5	1,478,545	144,450	211	125
		2008	17,874	17,874	0	0	325,809	0.7	1,599,618	204,354	332	257
		2009	37,599	37,599	0	0	376,168	0.7	1,015,608	185,307	216	239
	Colombia	2007	87,394	87,394	0	2	143,640	1.5	155,132	33,240	79	61
		2008	194,363	105,759	88,604	6	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	1,059	930

Annex 5 – Operational coverage of insecticide treated nets, indoor residual spraying and antimalarial treatment, 2007–2009 *(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	% ACT coverage total
	Costa Rica	2007	0	0	0	-	0	0.0	12,230	0	655	-
		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	-
	Dominican Republic	2007	0	0	0	-	11,008	0.1	2,711	0	66	-
		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	-
	Ecuador	2007	95,000	95,000	0	3	406,060	5.9	8,464	1,158	66	29
		2008	111,950	111,950	0	6	293,475	4.2	4,986	491	67	21
		2009	122,429	117,200	5,229	9	334,006	4.7	-	10,000	-	513
	El Salvador	2007	0	0	0	0	166,171	3.3	40	0	66	-
		2008	0	0	0	-	116,012	2.3	33	0	66	-
		2009	-	-	-	-	65,775	1.3	20	0	66	-
	French Guiana	2007	-	-	-	-	48,830	22.8	-	-	-	-
		2008	-	-	-	-	35,469	16.1	-	-	-	-
		2009	-	-	-	-	39,231	17.4	-	-	-	-
	Guatemala	2007	427,277	427,277	-	25	38,425	0.4	2,152,557	0	9,166	-
		2008	427,277	427,277	-	25	12,410	0.1	1,817,097	0	16,535	-
		2009	427,277	427,277	-	24	27,460	0.3	-	0	-	-
	Guyana	2007	2,784	2,784	-	9	-	-	11,656	4,351	66	44
		2008	4,287	4,287	-	10	-	-	11,815	5,252	66	53
		2009	1,068	1,068	-	2	-	-	13,673	6,206	66	54
	Haiti	2007	149,049	89,049	60,000	3	-	-	96,442	-	212	-
		2008	125,713	125,713	0	4	-	-	-	-	-	-
		2009	-	-	-	4	-	-	-	-	-	-
	Honduras	2007	-	-	-	0	0	0.0	-	0	-	-
		2008	866	866	0	0	0	0.0	8,225	0	66	-
		2009	3,000	3,000	0	0	-	-	-	0	-	-
	Jamaica	2007	-	-	-	-	-	-	-	-	-	-
		2008	-	-	-	-	-	-	-	-	-	-
		2009	-	-	-	-	-	-	-	-	-	-
	Mexico	2007	0	0	0	-	94,985	1.8	-	0	-	-
		2008	0	0	0	-	148,905	2.7	92,308	0	2,565	-
		2009	0	0	0	-	98,875	1.8	-	0	-	-
	Nicaragua	2007	193,245	193,245	0	8	401,693	8.5	1,356	0	66	-
		2008	27,000	27,000	0	9	359,550	7.6	762	0	66	-
		2009	30,000	30,000	0	10	327,937	6.8	610	0	66	-
	Panama	2007	0	0	0	-	57,499	1.8	1,554	0	80	-
		2008	6,649	0	6,649	0	48,435	1.5	2,058	0	181	-
		2009	0	0	0	-	45,338	1.4	2,129	0	179	-
	Paraguay	2007	0	0	0	-	233,700	5.5	1,339	2	65	1
		2008	0	0	0	-	47,526	1.1	335	7	63	12
		2009	-	-	-	-	178,635	4.1	-	0	-	-
	Peru	2007	28,400	28,400	-	0	170,080	1.3	-	-	-	-
		2008	-	-	-	0	235,615	1.7	82,182	6,738	128	75
		2009	-	-	-	0	-	-	-	-	-	-
	Suriname	2007	7,742	7,742	0	28	-	-	-	-	-	-
		2008	14,372	14,372	0	78	-	-	-	-	-	-
		2009	376	376	0	79	-	-	-	-	-	-
	Venezuela (Bolivarian Rep.)											
		2008	12,000	6,000	6,000	1	5,377,610	70.8	65,687	9,694	134	-
		2009	8,004	8,004	0	1	5,950,904	77.1	35,340	4,753	65	-

Annex 5 – Operational coverage of insecticide treated nets, indoor residual spraying and antimalarial treatment, 2007–2009 *(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	% ACT coverage total
EMRO	Afghanistan	2007	345,245	345,245	-	3	-	-	-	-	-	-
		2008	916,723	916,723	-	10	-	-	7,102	7,102	1	20
		2009	317,631	317,631	-	11	-	-	12,277	12,277	3	42
	Djibouti	2007	-	-	-	11	-	-	-	-	-	-
		2008	45,000	45,000	-	32	-	-	-	-	-	-
		2009	-	-	-	21	-	-	-	-	-	-
	Iran (Islamic Republic of)	2007	40,000	-	-	1	-	-	-	-	-	-
		2008	50,000	-	-	1	-	-	-	-	-	-
		2009	80,000	80,000	-	1	-	-	-	-	-	-
	Pakistan	2007	90,000	90,000	-	1	-	-	4,513,876	-	65	-
		2008	41,400	41,400	-	0	4,938,975	2.8	6,762,058	-	95	-
		2009	396,341	396,341	-	1	350,000	0.2	2,294,816	34,891	35	2
	Saudi Arabia	2007	0	0	0	-	-	-	5,728	2,864	200	142
		2008	250,000	250,000	-	4	-	-	2,982	1,491	200	142
		2009	250,000	250,000	-	7	2,457,965	17.7	3,240	1,840	139	112
	Somalia	2007	456,000	-	-	10	720	0.0	-	-	-	-
		2008	420,122	420,122	-	9	3,720	0.0	141,379	141,379	164	164
		2009	473,081	473,081	-	20	9,100	0.1	72,000	72,000	84	84
	Sudan	2007	1,910,000	830,000	1,080,000	-	3,846,738	-	2,677,199	2,677,199	-	-
		2008	2,870,606	2,820,606	50,000	-	2,281,687	-	3,073,996	3,073,996	-	-
		2009	6,949,944	6,949,944	0	-	1,685,439	-	2,379,910	2,379,910	-	-
	North (low transmission)	2007	1,910,000	830,000	1,080,000	21	3,846,738	12.1	2,677,199	2,677,199	76	76
		2008	1,806,540	1,756,540	50,000	21	2,281,687	7.0	3,073,996	3,073,996	86	86
		2009	3,470,931	3,470,931	0	36	1,685,439	5.1	2,379,910	2,379,910	87	87
	South (high transmission)	2007	1,600,000	-	-	38	-	-	-	-	-	-
		2008	1,064,066	1,064,066	-	24	-	-	-	-	-	-
		2009	3,479,013	3,479,013	-	102	-	-	-	-	-	-
	Yemen	2007	244,560	244,560	0	7	872,481	4.8	34,500	0	10	-
		2008	323,800	323,800	0	8	972,629	5.2	26,163	0	11	-
		2009	66,545	66,545	0	7	1,440,482	7.5	758,180	258,180	359	124
EURO	Armenia	2007	0	0	-	-	0	-	1	0	100	-
		2008	0	0	-	-	0	-	1	0	100	-
		2009	0	0	-	-	0	-	0	0	-	-
	Azerbaijan	2007	0	0	0	-	150,933	76.0	110	0	100	-
		2008	0	0	0	-	127,665	63.6	73	0	100	-
		2009	20,000	20,000	-	20	123,000	60.5	80	0	100	-
	Georgia	2007	0	0	-	-	25,268	58.0	25	0	100	-
		2008	0	0	-	-	50,426	117.1	8	0	100	-
		2009	0	0	-	-	51,828	121.7	7	0	100	-
	Kyrgyzstan	2007	40,000	20,000	20,000	1,881	123,000	2891.3	96	0	100	-
		2008	88,000	20,000	68,000	5,014	313,003	7265.8	18	0	100	-
		2009	20,000	20,000	-	2,751	599,800	13749.2	4	0	100	-
	Russian Federation	2007	0	0	-	-	0	-	122	0	66	-
		2008	0	0	-	-	0	-	96	0	66	-
		2009	0	0	-	-	0	-	107	0	66	-
	Tajikistan	2007	26,438	26,438	-	4	552,912	24.6	642	7	101	110
		2008	19,494	19,494	-	5	632,622	27.7	320	2	101	63
		2009	39,637	39,637	-	7	119,557	5.1	165	1	100	61
	Turkey	2007	0	0	-	-	109,505	661.1	2,600	0	726	-
		2008	0	0	-	-	327,375	1952.2	980	0	456	-
		2009	0	0	-	-	455,550	2683.7	4,507	7	5,366	-
	Uzbekistan	2007	3,000	3,000	0	-	390,576	-	89	0	100	-
		2008	10,000	10,000	0	-	403,129	-	27	0	100	-
		2009	0	0	-	-	329,642	-	4	1	100	-

Annex 5 – Operational coverage of insecticide treated nets, indoor residual spraying and antimalarial treatment, 2007–2009 *(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	% ACT coverage total
SEARO	Bangladesh	2007	192,000	-	192,000	1	-	-	356,388	114,990	143	64
		2008	1,863,940	1,200,000	663,940	7	-	-	274,674	110,280	163	90
		2009	283,819	-	283,819	5	-	-	0	0	-	-
	Bhutan	2007	67,142	50,361	16,781	65	185,905	37.2	1,292	499	77	52
		2008	20,392	10,000	10,392	66	97,494	19.2	1,617	1,288	303	419
		2009	30,731	20,339	6,576	34	142,922	27.7	1,995	1,895	118	195
	DPR Korea	2007	0	20,000	50,000	2	0	0.0	7,436	0	155	-
		2008	0	0	30,000	1	0	0.0	23,409	0	138	-
		2009	40,000	40,000	-	1	762,175	6.5	18,679	0	126	-
	India	2007	7,000,000	0	7,000,000	1	70,853,795	7.4	1,508,927	550,000	100	68
		2008	7,240,000	0	7,240,000	1	53,773,347	5.6	1,532,497	622,000	100	76
		2009	9,235,000	2,235,000	7,000,000	2	66,810,733	6.8	1,563,344	825,000	100	98
	Indonesia	2007	250,000	-	250,000	5	200,000	0.2	121,130	121,130	8	17
		2008	585,101	585,101	-	5	10,000	0.0	268,226	268,226	29	58
		2009	1,421,129	1,421,129	-	4	0	0.0	280,779	280,779	41	83
	Myanmar	2007	639,396	153,753	539,643	2	10,479	0.0	226,397	-	29	37
		2008	693,858	112,865	580,993	5	11,284	0.0	187,102	-	19	25
		2009	1,287,743	211,568	1,076,175	9	8,471	0.0	544,378	-	60	79
	Nepal	2007	154,300	154,300	-	3	800,000	3.4	68,097	-	101	-
		2008	380,899	380,899	-	5	904,540	3.8	106,100	-	95	-
		2009	359,735	359,736	-	7	486,874	2.0	1,088,386	18,288	825	61
	Sri Lanka	2007	26,000	26,000	0	15	358,104	7.8	198	-	75	-
		2008	253,000	253,000	-	16	727,431	15.8	1,310	640	146	1,375
		2009	774,000	774,000	-	40	409,473	8.8	558	-	75	-
	Thailand	2007	140,200	8,200	-	0	493,224	1.5	33,178	16,667	66	79
		2008	112,412	46,200	66,212	1	650,742	1.9	26,150	12,254	66	74
		2009	679,566	348,346	331,220	4	624,800	1.8	23,327	9,688	48	48
	Timor-Leste	2007	95,914	95,914	0	29	0	0.0	247,576	34,174	108	21
		2008	79,226	79,226	0	36	0	0.0	178,000	34,406	117	32
		2009	0	0	0	31	0	0.0	160,502	41,946	139	51
WPRO	Cambodia	2007	277,278	120,598	156,680	7	0	0.0	242,658	150,819	406	338
		2008	344,808	214,973	129,835	12	0	0.0	191,091	81,090	325	185
		2009	933,918	702,810	231,108	32	-	-	129,037	106,202	154	170
	China	2007	815,174	168,533	646,641	0	-	-	388,472	66,952	291	628
		2008	1,209,127	581,992	627,135	0	-	-	253,327	12,200	187	113
		2009	826,389	219,316	607,073	0	8,768,609	1.3	227,932	11,500	1,573	996
	Lao PDR	2007	422,900	134,000	288,900	32	0	0.0	328,320	164,160	1,464	756
		2008	395,275	73,000	322,275	29	0	0.0	574,320	287,160	2,695	1,392
		2009	72,900	72,900	0	15	0	0.0	137,806	68,903	549	283
	Malaysia	2007	175,462	0	175,462	33	301,733	28.4	5,456	-	100	-
		2008	203,952	0	203,952	38	362,460	33.5	7,390	-	100	-
		2009	0	0	-	-	400,007	36.4	7,010	-	100	-
	Papua New Guinea	2007	53,500	53,500	-	23	24,699	0.4	-	-	-	-
		2008	438,441	438,441	-	29	-	-	110,000	110,000	6	8
		2009	341,438	341,438	-	25	17,808	0.3	-	-	-	-
	Philippines	2007	547,571	284,400	263,171	2	689,015	1.0	-	-	-	-
		2008	444,390	444,390	0	2	574,647	0.8	-	-	-	-
		2009	436,283	436,283	0	3	239,605	0.3	570	570	3	4
	Republic of Korea	2007	-	-	-	-	-	-	2,227	-	-	-
		2008	-	-	-	-	-	-	1,052	-	-	-
		2009	-	-	-	-	-	-	1,343	-	-	-
	Solomon Islands	2007	70,000	70,000	0	-	154,854	-	590,342	-	-	-
		2008	61,805	61,805	0	-	143,443	-	245,778	122,889	-	-
		2009	15,463	15,463	0	-	170,941	-	590,342	295,171	-	-
	Vanuatu	2007	29,154	29,154	0	-	-	-	230,691	-	-	-
		2008	47,241	47,241	0	-	-	-	208,213	-	-	-
		2009	25,284	25,284	0	-	-	-	-	-	-	-
	Viet Nam	2007	600,000	0	600,000	-	1,767,840	-	1,412,500	112,500	-	-
		2008	300,000	0	300,000	-	1,659,873	-	920,725	109,725	-	-
		2009	0	0	0	-	1,544,329	-	811,000	323,748	-	-

Annex 6A – Household surveys of mosquito nets ownership and usage, 2006–2009

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
AFRO	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	-	-	-
	Congo	2007	DHS 2007	Total	-	-	-	-	-	-	-	-	-	-
	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	-	-	-
	DR 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	53	-	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	15	-	-	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	-	-	48	-	-	-	39	-	-	-
		2008	DHS 2008	Total	61	-	56	35	-	-	39	-	-	-
		2008	DHS 2008	Urban	-	-	-	46	-	-	-	-	-	-
		2008	DHS 2008	Rural	-	-	-	32	-	-	-	-	-	-
	Liberia	2007	DHS 2007	Total	-	-	-	-	-	-	-	-	-	-
		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	Other Nat.	Total	-	-	59	-	-	-	60	-	-	-
		2008	DHS 2008	Urban	-	-	-	42	-	-	-	-	-	-
		2008	DHS 2008	Rural	-	-	-	34	-	-	-	-	-	-

Annex 6A – Household surveys of mosquito nets ownership and usage, 2006–2009 *(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
	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	-	-	-
	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
	Mauritania	2006	MICS 2006	Total	-	-	3	-	-	-	-	-	-	-
	Mozambique	2007	DHS 2007	Total	-	-	-	-	-	-	-	-	-	-
		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	-	-	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	-	-	-
	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	22	-	-	31	-	-	-
		2008	MIS 2008	Urban	-	-	-	22	-	-	-	-	-	-
		2008	MIS 2008	Rural	-	-	-	23	-	-	-	-	-	-
	Sierra Leone	2007	MIS 2007	Total	-	-	59	-	-	-	56	-	-	-
		2008	DHS 2008	Total	-	-	37	-	-	-	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	9	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
	UR Tanzania, Mainland	2008	AIS/MIS 2008	Total	-	-	-	-	-	-	-	-	-	-
	UR 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	-	-	-
	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

Annex 6A – Household surveys of mosquito nets ownership and usage, 2006–2009 *(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
AMRO	Dominican Republic	2007	DHS 2007	Total	-	-	-	-	-	-	-	-	-	-
	Guyana	2009	DHS 2009	Total	84	-	5	4	-	-	-	-	-	-
		2009	DHS 2009	Urban	-	-	-	1	-	-	-	-	-	-
		2009	DHS 2009	Rural	-	-	-	5	-	-	-	-	-	-
	Haiti	2006	DHS 2006	Total	7	-	-	-	-	-	-	-	-	-
EMRO	Afghanistan	2008	NMLCP	Total	42	-	31	-	-	-	6	-	-	10
	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
	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	-	-	-
	North	2006	Sudan Household Health Survey	Total	37	-	18	-	-	-	28	-	-	-
		2009	MIS 2009	Total	55	-	41	11	21	-	16	21	-	16
	Yemen	2008	MIS 2008	Total	27	-	16	5	16	-	6	11	-	6
SEARO	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	-	-	-	-	-	-	-	-	-
WPRO	Cambodia	2007	CMS 2007	Rural	95	-	36	-	-	-	28	-	-	28
	Lao PDR	2008	IndoChina research / CMPE	Rural	97	-	56	-	-	-	43	-	-	50
	Philippines	2008	DHS 2008	Total	-	-	-	-	-	-	-	-	-	-
	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	-	-	-

*Data updated by DHS since the original publication.

[a]Percentages calculated using the population at risk.

AIS = AIDS Indicator Survey
CDC / MMP = US Centers for Disease Control and Prevention / Malaria Measles Partnership
DHS = Demographic and Health Survey
MICS = Multiple Indicator Cluster Survey
MIS = Malaria Indicator Survey
NMLCP (National Malaria and Leishmaniasis Control Programme)

Annex 6B – Household surveys of antimalarial treatment, 2006–2009

WHO region	Country/area	Year	Source	Subgroup	(%) Under five with fever attending (public)	(%) Under five with fever attending (private)	(%) Under five with fever attending (No treatment)	(%) Under five fever getting antimalarial (public)	(%) Under five fever getting antimalarial (private)	(%) Under five fever getting antimalarial (No treatment)	(%) Under five fever getting ACT (public)	(%) Under five fever getting ACT (private)	(%) Under five fever getting ACT (No treatment)
AFRICA	Benin	2001	DHS 2001	Total	26.1	14.5	59.4	20.2	9.0	34.3	-	-	-
		2006	DHS 2006	Total	28.6	28.7	42.6	22.3	15.8	17.9	0.3	0.1	0.0
	Burkina Faso	2003	DHS 2003	Total	32.5	11.4	56.1	23.9	4.8	21.0	-	-	-
	Cameroon	2004	DHS 2004	Total	35.3	24.5	40.3	29.5	17.8	19.7	-	-	-
	Chad	2004	DHS 2004	Total	8.3	51.3	40.3	7.7	45.4	7.7	-	-	-
	Congo	2007	DHS 2007	Total	41.3	20.3	38.4	4.9	1.3	0.6	-	-	-
	DR Congo	2007	DHS 2007	Total	31.7	25.2	43.0	15.2	11.8	6.7	0.4	0.3	0.0
	Ethiopia	2000	DHS 2000	Total	13.9	9.3	76.8	2.2	0.9	0.0	-	-	-
		2005	DHS 2005	Total	14.4	4.7	80.8	1.5	0.6	1.0	-	-	-
	Ghana	2003	DHS 2003	Total	41.4	30.5	28.2	31.5	18.1	14.8	-	-	-
		2008	DHS 2008	Total	40.5	26.8	32.7	23.3	15.7	5.9	12.8	8.2	1.3
	Guinea	2005	DHS 2005	Total	32.9	20.2	46.9	24.0	9.9	9.9	-	-	-
	Kenya	2008	DHS 2008	Total	42.2	20.8	37.0	15.9	4.0	3.8	6.5	1.1	0.5
	Liberia	2007	DHS 2007	Total	37.2	36.3	26.5	29.2	27.0	7.6	5.4	3.1	1.2
	Madagascar	2003	DHS 2003	Total	26.5	15.8	57.7	13.8	7.1	13.7	-	-	-
		2008	DHS 2008	Total	31.3	17.0	51.7	0.7	0.0	0.4	-	-	-
	Malawi	2000	DHS 2000	Total	18.1	32.3	49.6	7.5	7.7	12.0	-	-	-
		2004	DHS 2004	Total	28.3	32.0	39.6	11.8	7.2	8.8	-	-	-
	Mali	2001	DHS 2001	Total	21.1	8.8	70.1	14.8	4.7	22.2	-	-	-
		2006	DHS 2006	Total	31.8	13.9	54.3	0.1	0.1	0.0	-	-	-
	Mozambique	2007	DHS 2007	Total	51.9	1.6	46.5	2.2	0.7	12.4	-	-	-
	Namibia	2001	DHS 2001	Total	54.8	6.9	38.3	12.7	0.9	1.8	-	-	-
		2007	DHS 2007	Total	43.4	13.0	43.7	7.8	1.5	2.6	-	-	-
	Niger	2006	DHS 2006	Total	28.6	34.1	37.3	18.6	11.0	4.3	-	-	-
	Nigeria	2003	DHS 2003	Total	26.3	49.8	23.8	15.6	18.8	1.7	-	-	-
		2008	DHS 2008	Total	30.1	38.5	31.5	1.5	1.3	0.4	-	-	-
	Rwanda	2001	DHS 2007	Total	11.6	7.4	81.0	2.0	1.0	6.2	-	-	-
		2005	DHS 2005	Total	25.0	22.0	53.0	7.2	4.0	1.5	-	-	-
		2007	MIS 2007	Total	31.6	5.0	63.4	5.1	0.5	0.5	-	-	-
	Senegal	2005	DHS 2005	Total	37.6	16.7	45.7	13.2	4.7	4.1	-	-	-
	Sierra Leone	2008	DHS 2008	Total	34.3	19.3	46.4	3.5	0.8	2.8	-	-	-
	Swaziland	2007	DHS 2007	Total	60.5	9.3	30.2	0.9	0.0	0.0	-	-	-
	Uganda	2002	DHS 2002	Total	23.5	60.7	15.8	4.6	11.4	1.4	-	-	-
		2006	DHS 2006	Total	32.3	50.2	17.6	23.9	33.4	4.3	2.4	0.7	0.0
	UR Tanzania	2004	DHS 2004	Total	54.7	27.9	17.3	39.9	15.6	3.2	-	-	-
	Zambia	2001	DHS 2001	Total	62.3	8.2	29.4	44.3	2.8	5.4	-	-	-
		2007	DHS 2007	Total	61.1	7.0	31.9	36.0	1.5	3.4	10.6	0.4	0.8
	Zimbabwe	1999	DHS 1999	Total	41.4	18.4	40.2	5.6	1.0	0.1	-	-	-
		2005	DHS 2005	Total	27.3	15.5	57.2	4.9	0.0	0.3	-	-	-

Annex 6B – Household surveys of antimalarial treatment, 2006–2009 *(continued)*

WHO region	Country/area	Year	Source	Subgroup	(%) Under five with fever attending (public)	(%) Under five with fever attending (private)	(%) Under five with fever attending (No treatment)	(%) Under five fever getting antimalarial (public)	(%) Under five fever getting antimalarial (private)	(%) Under five fever getting antimalarial (No treatment)	(%) Under five fever getting ACT (public)	(%) Under five fever getting ACT (private)	(%) Under five fever getting ACT (No treatment)
Americas	Colombia	2000	MCH SPA	Total	35.2	18.3	46.5	0.5	0.0	0.1	-	-	-
		2005	DHS 2005	Total	51.3	8.9	39.8	0.1	0.1	0.1	-	-	-
	Dominican Republic	2002	DHS 2002	Total	49.3	19.0	31.8	0.3	0.3	0.0	-	-	-
		2007	DHS 2007	Total	51.2	17.3	31.5	0.2	0.3	0.1	0.0	0.0	0.0
	Guyana	2005	DHS 2005	Total	49.4	20.5	30.1	1.1	0.0	0.0	-	-	-
	Haiti	2000	DHS 2000	Total	17.1	19.9	63.0	3.0	3.4	3.7	-	-	-
		2005	DHS 2005	Total	18.4	21.3	60.3	1.5	2.5	1.0	-	-	-
	Honduras	2005	DHS 2005	Total	40.2	14.5	45.2	0.3	0.0	0.2	0.1	0.0	0.0
	Nicaragua	2001	DHS 2001	Total	50.7	17.1	32.1	0.6	0.1	1.1	-	-	-
Eastern Mediterranean	Pakistan	2007	DHS 2007	Total	10.2	69.4	20.4	0.5	2.7	0.2	-	-	-
European	Armenia	2005	DHS 2005	Total	21.8	1.3	76.9	-	-	-	-	-	-
	Azerbaijan	2006	DHS 2006	Total	37.2	3.3	59.6	0.0	0.0	0.0	-	-	-
South-East Asia	India	2005	DHS 2005	Total	13.3	61.1	25.6	1.6	6.1	0.7	0.1	0.3	0.1
	Indonesia	2003	DHS 2003	Total	40.5	46.9	12.5	0.3	0.3	0.1	-	-	-
		2007	DHS 2007	Total	36.9	51.9	11.2	0.4	0.3	0.1	-	-	-
	Nepal	2006	DHS 2006	Total	23.4	34.8	41.8	0.1	0.0	0.0	-	-	-
Western Pacific	Cambodia	2005	DHS 2005	Total	22.3	58.4	19.2	0.0	0.2	0.0	0.0	0.0	0.0
	Philippines	2003	DHS 2003	Total	31.4	24.0	44.6	0.2	0.1	0.0	-	-	-
		2008	DHS 2008	Total	26.8	15.4	57.8	0.0	0.0	0.1	-	-	-

DHS = Demographic and Health Survey.

MIS = Malaria Indicator Survey.

MCH = Maternal and child health

SPA = Provision Assessment Survey

Annex 7A – Reported malaria cases and deaths, 2009

		Population			Reported malaria cases										Inpatient malaria cases and deaths	
WHO region	Country/area	UN Population	At risk (low + high)	At risk (high)	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
AFRO	Algeria	34,895,472	2,442,683	0	-	-	P+C	-	-	-	-	-	-	-	-
	Angola	18,497,632	18,497,632	18,497,632	3,726,606	2,221,076	S	3,078,952	1,573,422	-	-	-	-	151,608	10,530
	Benin	8,934,986	8,934,986	8,934,986	1,256,708	1,256,708	S	0	889,597	534,590	0	-	214,878	33,528	1,375
	Botswana	1,949,778	1,267,356	350,960	32,460	14,878	P+C	18,606	1,024	951	-	-	-	528	6
	Burkina Faso	15,756,929	15,756,929	15,756,929	4,537,600	4,399,837	S	320,290	182,527	-	-	-	0	231,786	7,982
	Burundi	8,303,329	6,476,597	1,992,799	2,583,428	1,757,387	S	2,010,683	1,184,642	-	-	-	-	71,700	714
	Cameroon	19,521,645	19,521,645	13,860,368	1,883,199	1,883,199	S	0	0	-	-	-	56,354	323,654	4,943
	Cape Verde	505,603	131,457	0	21,913	65	P+C	21,913	65	65	0	-	-	65	2
	Central African Republic	4,422,397	4,422,397	4,422,397	175,210	175,210	S	-	-	-	-	-	-	24,867	667
	Chad	11,206,152	11,094,090	8,964,922	182,415	182,415	S	-	-	-	-	-	-	4,571	221
	Comoros	676,036	676,036	635,474	57,084	49,679	S	13,387	5,982	5,771	79	-	-	-	-
	Congo	3,683,181	3,683,181	3,683,181	203,160	92,855	S	203,160	92,855	92,855	0	-	-	13,108	116
	Côte d'Ivoire	21,075,012	21,075,012	21,075,012	1,847,367	1,847,367	S	-	-	-	-	-	-	33,173	18,156
	DR Congo	66,832,000	66,832,000	64,827,040	7,839,435	6,749,112	S	2,969,028	1,878,705	-	-	-	-	579,376	21,168
	Equatorial Guinea	676,274	676,274	676,274	84,532	78,983	S	19,733	14,184	11,603	-	-	-	12,802	23
	Eritrea	5,073,278	5,073,278	3,602,027	77,946	21,298	P+C	68,407	11,759	3,358	3,244	-	26,879	4,218	23
	Ethiopia	82,824,732	55,492,570	828,247	4,335,001	3,043,203	P+C	2,328,114	1,036,316	594,751	287,114	-	559,740	30,102	1,121
	Gabon	1,474,588	1,474,588	1,474,588	113,803	112,840	S	1,623	660	187	23	-	-	5,848	197
	Gambia	1,705,211	1,705,211	1,705,211	479,409	479,409	S	-	50,378	-	-	-	78,268	13,589	240
	Ghana	23,837,261	23,837,261	23,837,261	3,694,671	1,899,544	S	2,899,497	1,104,370	924,095	0	-	67,317	277,047	3,378
	Guinea	10,068,721	10,068,721	10,068,721	812,471	812,471	S	20,866	35,841	20,932	-	-	14,854	44,174	586
	Guinea-Bissau	1,610,748	1,610,748	1,610,748	156,633	143,011	S	25,379	11,757	-	-	-	-	22,622	369
	Kenya	39,802,012	30,249,529	14,328,724	8,123,689	8,123,689	S	-	-	-	-	-	-	215,975	-
	Liberia	3,954,977	3,954,977	3,954,977	1,035,940	871,560	S	1,003,961	839,581	212,657	0	-	0	79,886	1,706
	Madagascar	19,625,029	19,625,029	5,887,509	633,998	215,110	S	633,998	215,110	-	-	-	0	2,986	173
	Malawi	15,263,415	15,263,415	15,263,415	5,455,423	5,455,423	S	-	-	-	-	-	64,199	193,448	6,527
	Mali	13,010,209	13,010,209	11,709,188	1,633,423	1,633,423	S	-	-	-	-	-	-	-	2,331
	Mauritania	3,290,631	2,961,568	1,941,472	174,820	167,705	S	8,055	940	-	-	-	-	16,458	91
	Mozambique	22,894,291	22,894,291	22,894,291	4,310,086	4,310,086	S	-	93,874	-	-	-	-	93,874	3,747
	Namibia	2,171,140	1,563,221	1,454,664	81,812	81,812	P+C	-	505	505	-	-	-	2,264	46
	Niger	15,290,101	15,290,101	10,550,170	4,716,312	309,675	S	4,716,312	309,675	77,485	-	-	398,249	-	2,159
	Nigeria	154,728,895	154,728,895	154,728,895	4,295,686	4,295,686	S	-	479,845	-	-	-	-	658,732	7,522
	Rwanda	9,997,614	9,997,614	9,997,614	3,186,306	1,247,583	P+C	2,637,468	698,745	-	-	-	378,700	24,997	809
	Sao Tome and Principe	162,757	162,757	162,757	59,064	3,893	P+C	59,064	3,893	-	-	-	-	1,514	23
	Senegal	12,534,228	12,534,228	12,032,859	584,873	222,232	S	528,574	165,933	19,614	-	-	51,870	19,614	574
	Sierra Leone	5,696,471	5,696,471	5,696,471	1,314,799	646,808	S	1,314,799	646,808	-	-	-	1,055,293	-	1,734
	South Africa	50,109,823	5,010,982	2,004,393	6,072	6,072	P+C	6,072	6,072	-	-	-	-	-	45
	Swaziland	1,184,937	331,782	0	6,639	6,639	P+C	0	106	106	0	-	0	230	13
	Togo	6,618,613	6,618,613	6,618,613	961,807	618,842	S	734,303	391,338	191,357	0	-	289,346	40,846	1,556
	Uganda	32,709,864	32,709,864	29,438,878	12,086,399	9,775,318	S	3,612,418	1,301,337	1,275,310	-	-	-	385,464	6,296
	UR Tanzania[3]	43,739,052	43,739,052	-	19,328	40	S	19,328	40	40	-	-	-	21,967	840
	Mainland	42,417,835	42,417,835	30,965,020	-	-	S	-	-	-	-	-	-	20,884	819
	Zanzibar	1,321,217	1,321,217	1,321,217	19,328	40	S	19,328	40	40	-	-	-	1,083	21
	Zambia	12,935,371	12,935,371	12,935,371	2,976,395	2,976,395	S	0	0	-	-	-	-	166,760	3,862
	Zimbabwe	12,522,784	6,261,392	6,261,392	802,016	736,897	P+C	122,133	57,014	-	-	-	-	176	14

Annex 7A – Reported malaria cases and deaths, 2009 *(continued)*

		Population			Reported malaria cases									Inpatient malaria cases and deaths	
WHO region	Country/area	UN Population	At risk (low + high)	At risk (high)	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
AMRO	Argentina	40,276,378	3,624,874	0	-	-	C	-	-	-	-	-	-	-	-
	Bahamas	341,716	0	0	-	-	C	-	-	-	-	-	-	-	-
	Belize	306,778	211,677	0	26,051	256	C	26,051	256	0	256	-	0	5	0
	Bolivia (Pluri. State)	9,862,861	8,087,546	690,400	133,614	9,743	C	133,614	9,743	561	8,660	-	-	-	0
	Brazil	193,733,792	50,370,786	9,686,690	2,617,773	308,498	C	2,617,773	308,498	47,729	257,571	-	-	4,623	79
	Colombia	45,659,710	10,045,136	3,196,180	428,004	79,252	C	428,004	79,252	21,442	57,111	-	-	249	12
	Costa Rica	4,578,945	1,648,420	91,579	4,829	262	C	4,829	262	1	261	-	0	0	1
	Dominican Republic	10,090,151	8,072,121	908,114	353,336	1,643	C	353,336	1,643	1,643	0	-	0	-	14
	Ecuador	13,625,070	7,085,036	545,003	446,740	4,120	C	451,732	4,120	551	3,569	-	-	0	0
	El Salvador	6,163,049	5,115,331	1,787,284	83,031	20	C	83,031	20	1	19	-	-	0	0
	French Guiana	226,000	226,000	226,000	-	-	C	-	-	-	-	-	-	-	-
	Guatemala	14,026,945	10,660,478	2,805,389	154,652	7,080	C	154,652	7,080	50	7,024	-	-	0	0
	Guyana	762,497	709,122	266,874	169,309	13,673	C	169,309	13,673	6,206	6,029	-	-	599	-
	Haiti	10,032,620	10,032,620	4,715,331	270,438	49,535	C	270,438	49,535	49,535	0	-	-	-	-
	Honduras	7,465,999	3,135,720	1,941,160	106,480	9,216	C	106,480	9,216	1,283	7,834	-	-	-	1
	Jamaica	2,718,761	0	0	34,149	22	C	34,149	22	17	4	7	-	-	0
	Mexico	109,610,036	5,480,502	2,192,201	1,240,087	2,703	C	1,240,087	2,703	1	2,702	-	0	0	0
	Nicaragua	5,742,799	4,823,951	172,284	544,717	610	C	544,717	610	93	517	-	0	0	0
	Panama	3,453,895	3,350,278	345,390	158,481	778	C	158,481	778	3	775	8	0	38	-
	Paraguay	6,348,919	4,380,754	1,968,165	64,660	91	C	64,660	91	9	81	-	-	10	0
	Peru	29,164,883	13,707,495	9,916,060	36,886	36,886	C	-	36,886	3,910	32,976	-	-	-	2
	Suriname	519,739	57,171	57,171	29,603	1,371	C	31,441	1,371	277	397	1,025	-	19	0
	Venezuela (Bolivarian Rep.)	28,583,367	7,717,509	571,667	370,258	35,828	C	370,258	35,828	7,739	27,002	728	-	-	-
EMRO	Afghanistan	28,149,918	27,586,920	20,267,941	843,866	386,929	P+C	521,817	64,880	4,026	60,854	-	120	3,920	32
	Djibouti	864,198	432,099	0	7,120	7,120	P+C	-	2,686	-	-	-	-	-	0
	Egypt[2]	82,999,389	0	0	94	94	C	-	94	81	13	94	-	-	2
	Iran (Islamic Rep.)	74,195,739	11,871,318	4,451,744	744,586	6,122	C	744,586	6,122	485	5,485	1,645	-	-	-
	Iraq	30,747,296	3,997,148	0	1,493,143	1	C	1,493,143	1	0	1	1	-	-	0
	Morocco[1]	31,992,593	0	0	145	145	C	290,566	145	134	3	145	-	-	1
	Oman[2]	2,845,412	0	0	898	898	C	-	898	160	718	898	-	-	2
	Pakistan	180,808,099	179,000,018	27,121,215	7,973,246	4,242,032	P+C	3,898,793	167,579	37,079	95,604	-	-	-	-
	Saudi Arabia	25,720,605	13,889,127	3,343,679	1,078,745	2,333	C	1,078,745	2,333	1,649	672	2,275	-	-	0
	Somalia	9,133,124	9,133,124	6,393,187	105,332	56,153	P+C	59,181	10,002	9,802	200	-	-	-	45
	Sudan[3]	42,272,435	42,272,435	-	4,766,516	2,686,822	P+C	2,791,156	711,462	-	-	-	-	130,188	1,396
	North (low transmission)	33,352,951	33,352,951	27,682,950	4,440,882	2,361,188	P+C	2,791,156	711,462	-	-	-	-	130,188	1,142
	South (high transmission)	8,919,484	8,919,484	8,919,484	325,634	325,634	S	-	-	-	-	-	-	-	254
	Syrian Arab Republic[2]	21,906,156	0	0	39	39	C	-	39	38	-	39	-	-	0
	Yemen	23,580,222	19,099,980	17,685,167	899,320	138,579	P+C	816,187	55,446	52,836	589	-	4	-	38
EURO	Armenia	3,082,950	0	0	1,190	0	C	1,190	0	0	0	0	-	-	0
	Azerbaijan	8,832,175	203,140	0	451,436	80	C	451,436	80	0	80	2	-	-	0
	Georgia	4,260,332	42,603	0	4,120	7	C	4,120	7	5	1	6	-	-	0
	Kyrgyzstan	5,482,205	4,362	0	33,983	4	C	33,983	4	0	4	0	-	-	0
	Russian Federation	140,873,645	0	0	27,382	107	C	27,382	107	62	40	107	-	-	1
	Tajikistan	6,952,225	2,322,043	236,376	165,266	165	C	165,266	165	1	164	1	-	-	0
	Turkey	74,815,703	16,974	0	606,875	84	C	606,875	84	16	65	46	-	-	1
	Turkmenistan[1]	5,109,880	0	0	94,237	0	C	94,237	0	0	0	0	-	-	0
	Uzbekistan	27,488,219	0	0	916,839	4	C	916,839	4	1	3	4	-	-	0

Annex 7A – Reported malaria cases and deaths, 2009 *(continued)*

		Population			Reported malaria cases									Inpatient malaria cases and deaths	
WHO region	Country/area	UN Population	At risk (low + high)	At risk (high)	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
SEARO	Bangladesh	162,220,762	55,155,059	11,355,453	569,767	79,853	P+C	553,787	63,873	18,242	6,853	-	-	3,287	47
	Bhutan	697,331	516,025	90,653	62,790	1,421	P+C	62,341	972	559	413	-	0	552	4
	DPR Korea	23,906,070	11,713,974	2,868,728	34,848	14,845	P+C	34,848	14,845	0	14,845	523	-	-	
	India	1,198,003,273	982,362,684	311,480,851	103,395,721	1,563,344	C	103,395,721	1,563,344	837,130	723,612	-	-	-	1,133
	Indonesia	229,964,721	101,184,477	85,086,947	2,733,407	544,470	P+C	2,461,428	544,470	212,501	237,929	-	-	-	900
	Myanmar	50,019,774	34,513,644	25,009,887	1,095,474	591,492	P+C	940,050	436,068	121,636	40,167	-	-	47,772	972
	Nepal	29,330,508	24,051,017	7,332,627	278,907	132,012	P+C	150,230	3,335	575	1,706	-	-	129	8
	Sri Lanka	20,237,731	4,654,678	0	909,632	558	C	909,632	558	29	529	27	-	-	-
	Thailand	67,764,038	33,882,019	5,421,123	1,816,383	31,771	C	1,883,264	31,771	9,486	13,616	-	-	14,604	70
	Timor-Leste	1,133,593	1,133,593	872,867	198,867	108,434	P+C	137,960	47,527	29,252	12,160	-	-	682	53
WPRO	Cambodia	14,805,359	7,846,840	6,514,358	210,856	83,777	P+C	191,674	64,595	17,442	6,362	-	-	15,511	279
	China	1,353,311,033	690,188,627	13,533,110	4,642,372	14,491	P+C	4,637,168	9,287	948	8,214	-	0	-	12
	Lao PDR	6,320,429	3,729,053	2,275,354	266,096	22,800	P+C	257,970	14,674	5,328	176	-	-	732	5
	Malaysia	27,467,834	1,098,713	824,035	1,565,982	7,010	C	1,565,982	7,010	1,885	3,379	584	-	-	-
	Papua New Guinea	6,732,157	6,732,157	6,328,228	1,431,395	1,355,668	S	153,485	77,758	48,681	11,472	-	-	22,896	604
	Philippines	91,983,099	73,387,216	6,598,788	370,802	19,198	C	370,802	19,955	13,933	4,951	-	-	757	24
	Republic of Korea	48,332,822	3,383,298	0	1,343	1,343	C	-	1,343	-	1,343	26	-	-	-
	Solomon Islands	523,168	517,936	517,936	282,297	84,078	P+C	231,221	33,002	19,580	8,544	-	0	1,785	53
	Vanuatu	239,788	237,390	237,390	35,523	14,814	P+C	24,624	3,915	1,543	1,618	-	5,372	143	2
	Viet Nam	88,068,900	79,262,010	31,704,804	2,907,219	49,186	P+C	2,874,163	16,130	12,719	3,206	-	43,115	11,681	26

Regional Summary	UN Population	At risk (low + high)	At risk (high)	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	821,773,179	696,290,014	566,952,666	86,565,938	68,925,435		29,396,123	13,284,900	3,966,232	290,460		3,255,947	3,803,557	111,885
Americas	543,294,910	158,542,528	42,082,941	7,273,098	561,587		7,243,042	561,587	141,051	412,788	1,768	0	5,543	109
Eastern Mediterranean	555,215,186	307,282,169	115,865,365	17,913,050	7,527,267		11,694,174	1,021,687	106,290	164,139	5,097	124	134,108	1,516
Europe	276,897,334	2,589,123	236,376	2,301,328	451		2,301,328	451	85	357	166			2
South-East Asia	1,783,277,801	1,249,167,170	449,519,136	111,095,796	3,068,200		110,529,261	2,706,763	1,229,410	1,051,830	550	0	67,026	3,187
Western Pacific	1,637,784,589	866,383,240	68,534,003	11,713,885	1,652,365		10,307,089	247,669	122,059	49,265	610	48,487	53,505	1,005
Total	5,618,242,999	3,280,254,244	1,243,190,488	236,863,095	81,735,305		171,471,017	17,823,057	5,565,127	1,968,839	8,191	3,304,558	4,063,739	117,704

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
[3] National totals for some columns are incomplete, see details in the sub-sections

Annex 7B – Malaria trends 1, 1990–2009

WHO region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
AFRO	Algeria	Probable and confirmed	152	229	106	84	206	107	221	197	-	701	27,733	26,411	18,803	17,059	16,686	18,392	13,869	14,745	11,964	-
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	541	435	307	427	163	299	117	288	196	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	506	427	299	421	160	297	116	261	193	-
	Angola	Probable and confirmed	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	2,295,136	2,151,072	2,221,076
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	889,572	1,029,198	1,295,535	1,106,534	1,120,410
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	53,200	237,950	271,458	453,012
		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	-	717,290	782,818	819,256	853,034	803,462	861,847	1,171,522	1,147,005	1,256,708
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	534,590
		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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	8,056	4,716	1,588	1,830	3,453	530	2,548	381	914	951
		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	-	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18,256	21,335	44,265	44,246	36,514	59,420
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	123,107
		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	1,424,026	1,757,387
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	308,095	312,015	327,138	353,459	363,395	327,464	649,756	860,606	690,748	892,356
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	141,975	241,038	185,993	292,286
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Cameroon	Probable and confirmed	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	313,083	-	-
		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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	144	107	18	68	45	68	80	18	35	65
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	15	7	76	20	13	14	17	16	19	-
	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	-	78,094	129,367	131,856	114,403	119,477	152,260	175,210
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	40,078	38,287	43,933	45,195	1,360	31,668	45,155	48,288	47,757	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Comoros	Probable and confirmed	-	-	-	12,012	13,860	15,707	15,509	-	3,844	9,793	-	-	-	-	43,918	29,554	54,830	53,511	46,426	49,679
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12,874	6,086	20,559	-	-	5,982
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Congo	Probable and confirmed	32,428	32,391	21,121	15,504	35,957	28,008	14,000	9,491	17,122	-	-	-	-	-	-	-	157,757	103,213	117,291	92,855
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	103,213	117,291	92,855
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Côte d'Ivoire	Probable and confirmed	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	DR Congo	Probable and confirmed	-	-	-	-	-	-	198,064	-	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	897	1,531	1,735	2,438	2,684	2,971	2,050	740,615	1,618,091	1,873,816
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	243	127	4,889
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Equatorial Guinea	Probable and confirmed	25,552	22,598	25,100	17,867	14,827	12,530	-	-	-	-	-	-	-	-	-	-	-	15,828	62,312	78,983
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5,842	7,883	11,603
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	445	1,620	2,581
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Annex 7B – Malaria trends 1, 1990–2009 *(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
	Eritrea	Probable and confirmed	-	-	-	-	-	81,183	129,908	-	255,150	147,062	-	125,746	74,861	65,517	27,783	24,192	10,148	19,568	10,572	21,298
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	9,716	6,078	10,346	4,119	9,073	6,541	9,528	4,364	6,633
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6,037	4,400	5,126
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Ethiopia	Probable and confirmed	-	-	206,262	305,616	358,469	412,609	478,411	509,804	604,960	647,919	-	2,555,314	2,929,685	3,582,097	5,170,614	3,901,957	3,038,565	2,557,152	2,532,645	3,043,203
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	392,377	427,795	463,797	578,904	538,942	447,780	451,816	458,561	927,992
		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	-	127,024	132,918	157,440	166,321	170,182	176,610	33,458	93,529	77,278	112,840
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	50,810	53,167	62,976	58,212	70,075	70,644	33,458	45,186	40,701	660
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Gambia	Probable and confirmed	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39,164	50,378
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	475,441	655,093	472,255	476,484	956,359	962,599
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	138,124	141,771
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Guinea	Probable and confirmed	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	4,800	6,238	16,561	107,925	103,069	50,452	41,228	28,646	33,405	20,932
		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	-	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14,659	15,120	14,284	11,299	11,757
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Kenya	Probable and confirmed	-	-	-	-	6,103,447	4,343,190	3,777,022	-	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	20,049	39,383	28,328	-	-	-	839,904	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Liberia	Probable and confirmed	-	-	-	-	-	-	239,998	826,151	777,754	-	-	-	-	-	-	44,875	886,543	553,774	606,952	871,560
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5,025	115,677	80,373	157,920	212,657
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39,850	645,738	411,899	449,032	626,924
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Madagascar	Probable and confirmed	-	-	-	-	-	196,358	-	-	-	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	6,946	8,538	5,272	6,909	7,638	6,753	5,689	4,823	4,096	2,720
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43,674	89,138	212,390
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Malawi	Probable and confirmed	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	4,204,468	4,376,870	4,580,226	5,455,423
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		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	-	243,942	224,614	318,120	224,840	223,472	158,073	222,476	199,791	167,705
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,061	-	268	603
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	34	337
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mozambique	Probable and confirmed	-	-	-	-	-	-	12,794	-	194,024	2,336,640	-	-	-	-	-	-	-	6,155,082	4,831,491	4,310,086
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	141,663	120,259	93,874
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Namibia	Probable and confirmed	-	-	-	380,530	401,519	275,442	345,177	390,601	353,110	429,571	-	538,512	445,803	468,259	610,799	339,204	265,595	172,024	128,531	81,812
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	41,636	23,984	20,295	36,043	23,339	27,690	4,242	4,907	505
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Annex 7B – Malaria trends 1, 1990–2009 *(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
	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	-	1,340,142	888,345	681,783	754,934	745,428	790,817	249,027	596,858	309,675
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	56,460	76,030	46,170	-	55,628	62,243	79,066
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9,873	3,956	193,399	534,615	230,609
		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	2,969,950	2,834,174	4,295,686
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	150	380	-	-	-	-	-	143,079	335,201
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	144,644
		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	-	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	423,493	506,028	553,150	589,315	683,769	573,686	382,686	316,242	698,745
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sao Tome and Principe	Probable and confirmed	-	-	-	-	-	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	3,893
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	31,975	42,086	50,586	42,656	46,486	18,139	5,146	2,421	1,647	3,893
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4,611	2,384
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Senegal	Probable and confirmed	-	-	-	-	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	1,002,918	443,828	222,232
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	44,959	14,261	15,261	28,272	23,171	38,746	49,366	78,278	24,830	19,614
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40,054	217,096	146,319
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sierra Leone	Probable and confirmed	-	-	-	-	-	-	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	2,206	3,702	3,945	2,206	3,702	3,945	-	154,459	273,149
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,106	987	-	154,459	373,659
		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	6,072
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	26,506	15,649	13,459	13,399	7,755	12,098	6,327	7,796	6,072
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Swaziland	Probable and confirmed	-	-	-	-	-	-	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	1,395	670	342	574	279	155	84	58	106
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Togo	Probable and confirmed	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	516,640	602,908	618,842
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	117,720	152,724	192,966
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	103,390	192,138	198,372
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Uganda	Probable and confirmed	-	-	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	6,993,533	8,892,642	9,736,328	8,864,473	8,797,632	10,675,641	10,184,961	9,775,318
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	557,159	801,784	879,032	1,104,310	867,398	1,045,378	979,298	1,301,337
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	UR 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	-	423,967	17,734	342,969	340,478	9,059,437	8,872,075	6,211,753	8,358,110	5,769,646	3,812,350	40
		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
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mainland	Probable and confirmed	-	-	-	-	-	-	-	-	-	-	-	344,736	323,495	9,043,732	8,860,139	6,204,125	8,356,525	5,769,353	3,812,283	-
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	20,152	25,485	1,960,909	2,490,446	2,756,421	1,926,711	1,845,624	-	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Zanzibar	Probable and confirmed	-	-	-	-	-	-	-	-	-	-	17,734	18,385	16,983	15,705	11,936	7,628	1,585	293	67	40
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	17,734	18,385	16,983	15,705	11,936	7,628	1,585	293	67	40
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Annex 7B – Malaria trends 1, 1990–2009 *(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
	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	-	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	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	-	-	-	-	1,815,470	1,494,518	1,313,458	1,154,519	1,003,846	736,897
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33,980	37,908	39,404	116,518	16,394	57,014
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AMRO	Argentina	Probable and confirmed	1,660	803	643	758	948	1,065	2,048	592	339	222	440	215	125	122	115	259	209	387	130	-
		Confirmed with microscopy	1,660	803	643	758	948	1,065	2,048	592	339	222	440	215	125	122	115	259	209	387	130	-
		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	-
		Confirmed with microscopy	4	3	2	2	0	3	0	8	21	30	2	4	1	3	2	1	49	6	14	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	4	3	2	2	0	3	0	8	14	21	2	4	1	3	2	1	30	5	2	-
	Belize	Probable and confirmed	3,033	3,317	5,341	8,586	9,957	9,413	6,605	4,014	2,614	1,855	1,486	1,097	928	928	1,066	1,549	844	845	538	256
		Confirmed with microscopy	3,033	3,317	5,341	8,586	9,957	9,413	6,605	4,014	2,614	1,855	1,486	1,097	928	928	1,066	1,549	844	845	538	256
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bolivia (Pluri. State)	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
		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
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,300	730	-	-	509
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-
	Brazil	Probable and confirmed	560,396	614,431	609,860	466,190	564,406	565,727	455,194	392,976	471,892	609,594	613,241	388,303	348,259	408,821	464,901	606,067	549,469	458,652	315,642	308,498
		Confirmed with microscopy	560,396	614,431	609,860	466,190	564,406	565,727	455,194	392,976	471,892	609,594	613,241	388,303	348,259	408,821	464,901	606,067	549,469	458,652	315,642	308,498
		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	185,455	66,845	144,432	231,233	204,916	180,956	142,241	121,629	120,096	128,462	80,559	79,252
		Confirmed with microscopy	99,489	184,156	184,023	129,377	127,218	187,082	135,923	180,898	185,455	66,845	144,432	231,233	204,916	180,956	142,241	121,629	120,096	125,262	79,230	79,252
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,200	1,329	95
		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
		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
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	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
		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
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0
		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	11,882	16,365	43,696	87,620	104,570	104,434	88,038	51,345	28,621	17,062	11,459	8,464	4,891	4,120
		Confirmed with microscopy	71,670	59,400	41,089	46,859	30,006	18,128	11,882	16,365	43,696	87,620	104,570	104,434	88,038	51,345	28,621	17,062	11,459	8,464	4,891	4,120
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	El Salvador	Probable and confirmed	9,269	5,933	4,539	3,887	2,803	3,362	5,888	2,719	1,182	1,230	745	360	117	85	112	67	49	40	33	20
		Confirmed with microscopy	9,269	5,933	4,539	3,887	2,803	3,362	5,888	2,719	1,182	1,230	745	360	117	85	112	67	49	40	33	20
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	12	10

Annex 7B – Malaria trends 1, 1990–2009 *(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
	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	5,200	-
		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	3,264	-
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,031	1,936	-
		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
		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
		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
		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
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	41	-
	Haiti	Probable and confirmed	4,806	25,511	13,457	853	23,140	-	18,877	-	34,449	1,196	16,897	9,837	9,837	9,837	10,802	21,778	32,739	29,825	36,774	49,535
		Confirmed with microscopy	4,806	25,511	13,457	853	23,140	-	18,877	-	34,449	1,196	16,897	9,837	9,837	9,837	10,802	21,778	32,739	29,825	36,774	49,535
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	5	-
	Honduras	Probable and confirmed	53,095	73,352	70,838	44,513	52,110	59,446	74,487	65,863	42,979	46,740	35,125	24,149	17,223	14,123	17,293	16,007	11,561	10,270	8,225	9,216
		Confirmed with microscopy	53,095	73,352	70,838	44,513	52,110	59,446	74,487	65,863	42,979	46,740	35,125	24,149	17,223	14,123	17,293	16,007	11,561	10,270	8,225	9,216
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		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
		Confirmed with microscopy	0	3	6	6	3	5	14	4	3	5	7	6	7	9	141	88	194	199	22	22
		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	7,329	6,293	4,805	25,023	13,450	7,390	4,996	4,624	3,819	3,406	2,967	2,514	2,361	2,357	2,703
		Confirmed with microscopy	44,513	26,565	16,170	15,793	12,864	7,329	6,293	4,805	25,023	13,450	7,390	4,996	4,624	3,819	3,406	2,967	2,514	2,361	2,357	2,703
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	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	42,819	33,903	38,676	23,878	10,482	7,695	6,717	6,897	6,642	3,114	1,356	762	610
		Confirmed with microscopy	35,785	27,653	26,866	44,037	41,490	69,444	75,606	42,819	33,903	38,676	23,878	10,482	7,695	6,717	6,897	6,642	3,114	1,356	762	610
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	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
		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
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
		Imported cases	-	-	-	147	130	10	-	-	-	6	23	22	-	26	26	20	12	16	12	8
	Paraguay	Probable and confirmed	2,912	2,983	1,289	436	583	898	637	567	2,091	9,947	6,853	2,710	2,778	1,392	694	376	823	1,341	341	91
		Confirmed with microscopy	2,912	2,983	1,289	436	583	898	637	567	2,091	9,947	6,853	2,710	2,778	1,392	694	376	823	1,341	341	91
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	7	0
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Peru	Probable and confirmed	28,882	33,705	54,922	95,222	122,039	192,629	208,132	183,740	247,004	166,579	68,321	79,473	85,742	85,742	93,581	86,272	64,871	50,797	42,214	36,886
		Confirmed with microscopy	28,882	33,705	54,922	95,222	122,039	192,629	208,132	183,740	247,004	166,579	68,321	79,473	85,742	85,742	93,581	86,272	64,871	50,797	42,214	36,886
		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	1,104	2,086	1,371
		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
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	682
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,025

Annex 7B – Malaria trends 1, 1990–2009 *(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
	Venezuela (Bolivarian Rep.)	Probable and confirmed	46,910	43,454	21,416	12,539	13,727	16,371	18,858	22,400	21,862	19,086	29,736	20,006	29,491	31,719	46,655	45,049	37,062	41,749	32,037	35,828
		Confirmed with microscopy	46,910	43,454	21,416	12,539	13,727	16,371	18,858	22,400	21,862	19,086	29,736	20,006	29,491	31,719	46,655	45,049	37,062	41,749	32,037	35,828
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	506	554	728
EMRO	Afghanistan	Probable and confirmed	317,479	297,605	-	-	88,302	-	303,955	202,767	288,070	-	-	-	626,839	585,602	273,377	326,694	414,407	456,490	462,689	386,929
		Confirmed with microscopy	-	-	-	-	75,696	-	-	-	-	-	-	-	414,611	360,940	242,022	116,444	86,129	92,202	81,574	64,880
		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	7,120
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	122	413	1,796	210	119	2,686
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	45	43	23	29	30	80	94
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	9	2	7	13	61	17	11	10	45	43	23	29	30	80	94
	Iran (Islamic Rep.)	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	19,716	19,303	15,558	23,562	13,821	18,966	15,909	15,712	11,460	6,122
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	6,436	6,502	6,219	4,570	2,782	2,434	3,111	1,645
	Iraq	Probable and confirmed	3,924	1,764	5,752	49,863	98,243	98,705	49,840	13,959	9,684	4,143	1,860	1,263	952	307	154	47	23	3	6	1
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	1,265	952	307	155	47	23	3	6	1
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	3	1	1	2	1
	Morocco[1]	Probable and confirmed	837	494	405	198	206	197	102	125	121	60	59	59	107	73	56	100	83	75	142	145
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	73	56	100	83	75	142	145
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	31	49	49	53	43	56	59	88	69	55	100	83	75	142	145
	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	740	615	544	443	705	965	898
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	637	662	897	979	871	688	633	584	734	615	544	443	701	957	898
	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
		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	104,003	101,761	125,152	126,719	127,825	124,910	128,570	104,454	132,688
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	34,891
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	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	0	3,074	2,612	1,724	1,232	1,059	1,278	2,864	1,491	2,333
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	3,074	2,612	1,724	1,232	1,059	1,278	2,864	1,491	2,333
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	1,471	1,402	1,024	924	855	1,008	2,397	1,430	2,275
	Somalia	Probable and confirmed	-	-	-	3,049	-	-	-	-	-	9,055	-	10,364	96,922	23,349	36,732	28,404	49,092	50,444	56,408	56,153
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	15,732	7,571	11,436	12,516	16,430	16,675	23,905	10,002
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sudan	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	4,223,414	3,516,456	3,730,993	2,599,669	2,853,275	2,233,987	3,141,189	3,145,944	2,686,822
		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	621,307	711,462
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Annex 7B – Malaria trends 1, 1990–2009 *(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
	Sudan, *North*	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
		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
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sudan, *South*	Probable and confirmed	-	-	-	-	-	-	-	-	-	-	-	237,712	462,056	646,673	515,958	337,582	116,473	101,008	71,948	325,634
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	52,011	-
		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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	24	13	28	34	37	51	39
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	44	65	47	46	38	36	16	12	22	12	28	34	37	51	39
	Yemen	Probable and confirmed	11,384	12,717	29,320	31,262	37,201	500,000	416,246	1,394,495	-	2,781,640	-	-	187,159	265,032	158,561	200,560	217,270	223,299	158,608	138,579
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	75,508	50,811	48,756	44,150	55,000	67,607	42,134	53,445
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	70	661	2,001
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EURO	Armenia	Probable and confirmed	0	0	0	0	196	502	347	841	1,156	616	141	79	52	29	47	7	230	1	1	0
		Confirmed with microscopy	0	0	0	0	196	502	347	841	1,156	616	141	79	52	29	47	7	0	1	1	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	0	0	-	195	502	198	274	614	287	85	48	36	21	41	4	0	1	1	0
	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
		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
		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
	Georgia	Probable and confirmed	1	2	1	0	1	1	7	1	16	51	173	438	472	315	256	155	60	25	8	7
		Confirmed with microscopy	1	2	1	0	1	1	7	1	16	51	245	438	474	316	257	155	60	25	8	7
		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
	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
		Confirmed with microscopy	1	1	2	0	6	3	26	13	11	5	12	28	2,743	468	93	226	318	96	18	4
		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
	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
		Confirmed with microscopy	216	169	160	209	335	425	611	831	1,081	792	795	898	642	533	382	205	143	122	96	107
		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
	Tajikistan	Probable and confirmed	175	294	404	619	2,411	6,103	16,561	29,794	19,351	13,493	19,064	11,387	6,160	5,428	3,588	2,309	1,344	635	318	165
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	19,064	11,387	6,160	5,428	3,588	2,309	1,344	635	318	165
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	1	1	0	4	1
	Turkey	Probable and confirmed	8,680	12,218	18,676	47,210	84,345	82,096	60,884	35,456	36,842	20,963	11,432	10,812	10,224	9,222	5,302	2,084	796	358	215	84
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	11,432	10,812	10,224	9,222	5,302	2,084	796	358	215	84
		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
	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
		Confirmed with microscopy	1	17	11	3	9	10	14	14	137	49	24	8	18	7	3	1	1	0	1	0
		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
	Uzbekistan	Probable and confirmed	28	12	25	36	21	27	51	52	74	85	126	77	74	74	66	102	76	89	27	4
		Confirmed with microscopy	28	12	25	36	21	27	51	52	74	85	126	77	74	74	66	102	76	89	27	4
		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

Annex 7B – Malaria trends 1, 1990–2009 *(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
SEARO	Bangladesh	Probable and confirmed	53,875	63,578	115,660	125,402	166,564	152,729	100,864	68,594	60,023	63,723	302,011	2,776,477	2,543,782	2,554,223	3,016,262	1,445,831	1,320,581	248,449	168,885	79,853
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	54,223	54,216	62,269	54,654	58,894	48,121	32,857	58,659	50,004	25,203
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,207	34,686	38,670
		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	2,768	1,825	1,868	1,407	450	1,421
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	5,935	5,982	6,511	3,806	2,670	1,825	1,868	793	329	972
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	DPR Korea	Probable and confirmed	-	-	-	-	-	-	-	-	1,085	7,980	-	296,540	241,190	60,559	33,803	11,507	9,353	4,795	16,989	14,845
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	115,615	98,852	16,538	15,827	6,728	6,913	4,795	16,989	14,845
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	450	853	523
	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	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
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Indonesia	Probable and confirmed	1,484,496	1,631,710	1,431,284	1,337,373	1,448,595	1,312,738	1,517,406	1,086,074	1,453,475	1,503,381	1,554,787	1,400,596	1,494,165	1,481,748	1,494,636	1,792,992	1,327,431	1,182,933	746,120	544,470
		Confirmed with microscopy	459,858	355,072	291,914	360,399	354,595	308,439	407,111	287,128	420,852	381,457	256,993	267,592	273,793	223,074	268,852	315,394	347,597	311,789	266,277	471,556
		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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	120,029	170,502	174,101	174,733	155,668	167,467	203,071	216,510	223,174	164,965
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	157,448	223,899	271,103
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nepal	Probable and confirmed	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	316,272	67,691	111,215	132,012
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	7,981	6,396	12,750	9,506	4,895	5,050	4,969	4,220	3,888	3,335
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,052	-
	Sri Lanka	Probable and confirmed	287,384	400,263	399,349	327,020	363,197	273,502	184,319	218,550	211,691	264,549	210,039	66,522	41,411	10,510	3,720	1,640	591	198	670	558
		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
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21	27
	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	31,771
		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
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8,444
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Timor-Leste	Probable and confirmed	-	-	-	-	-	-	-	-	10,332	-	123,821	83,049	120,344	117,196	242,957	185,367	223,002	215,402	143,594	108,434
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	15,212	-	26,651	33,411	39,164	43,093	37,896	46,869	45,973	41,824
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5,944	5,287	5,703
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WPRO	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	51,320	42,150	38,048	42,234	37,389	26,914	33,010	22,081	20,347	24,999
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	11,122	11,451	8,854	29,031	22,356	22,522	45,686	20,437	21,777	39,596
		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	-	26,945	172,200	169,828	145,676	100,106	116,260	133,699	135,467	14,491
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	21,237	25,520	28,491	27,197	21,936	35,383	29,304	16,650	9,287
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	556	621	1,714	2,632	2,097	1,192	780	-

Annex 7B – Malaria trends 1, 1990–2009 *(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
	Lao PDR	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	40,106	27,076	21,420	18,894	16,183	13,615	8,093	6,371	4,965	5,508
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10,289	11,087	14,382	9,166
		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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	12,705	12,780	11,019	6,338	6,154	5,569	5,294	5,456	7,390	7,010
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	2,002	1,224	1,038	868	788	588	697	829	873	584
	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	79,839	94,484	75,748	72,620	91,055	92,957	88,817	82,979	81,657	62,845
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5,121	3,976	2,795	14,913
		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	37,469	44,605	39,946	46,342	35,405	36,235	23,655	19,198
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	36,596	34,787	37,005	48,441	50,850	46,342	35,405	36,235	23,655	19,316
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	639
		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	1,343
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	4,183	2,556	1,799	1,171	864	1,369	2,051	2,227	1,052	1,343
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	41	68	36	64	38	45	30	35	29	26
	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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	68,107	76,493	74,936	92,227	90,297	76,390	75,337	65,404	40,535	33,002
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	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	17,398	14,814
		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
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	574
		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
		Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	74,316	68,699	47,807	38,790	24,909	19,496	22,637	16,389	11,355	16,130
		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
Africa	15,707,308	12,808,592	16,096,895	20,292,113	27,014,847	21,642,318	28,431,539	22,877,000	26,576,925	34,963,534	32,151,570	43,111,806	45,338,182	64,110,279	69,328,489	68,240,133	70,606,535	71,625,606	59,726,885	68,925,435
Americas	1,055,901	1,230,161	1,186,061	988,155	1,113,461	1,279,672	1,167,542	1,054,001	1,299,382	1,213,262	1,181,138	979,171	892,551	896,283	909,413	1,049,400	922,389	787,550	564,136	561,587
Eastern Mediterranean	8,051,292	7,459,945	9,580,797	10,149,767	8,970,329	7,152,895	5,548,379	5,819,082	5,514,224	7,145,401	7,696,936	7,840,359	8,691,031	8,847,098	5,044,765	7,454,992	7,253,649	8,449,274	8,500,073	7,527,267
European	9,126	12,826	19,306	48,100	87,991	92,007	91,636	76,913	63,843	38,369	33,293	24,785	20,891	16,558	10,123	5,331	3,111	1,436	757	451
South-East Asia	5,139,813	5,401,912	5,082,295	4,859,181	5,342,265	5,499,396	5,612,630	4,717,063	4,654,666	4,864,092	5,096,373	7,708,899	7,359,443	7,231,337	7,632,798	6,163,490	5,552,611	3,783,867	3,380,850	3,068,200
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	2,384,040	2,336,229	2,637,477	2,377,597	2,313,711	1,945,826	1,861,658	1,652,365
Total	30,737,340	27,719,963	32,780,602	37,001,596	43,190,021	36,284,472	41,376,834	34,979,644	38,474,207	48,557,959	48,979,650	62,021,159	64,686,138	83,437,784	85,563,065	85,290,943	86,652,006	86,593,559	74,034,358	81,735,305

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] No local transmission in these countries

Annex 7C – Malaria trends 2, 1990–2009

WHO Region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
AFRO	Algeria	Suspected	152	229	106	84	206	107	221	197	-	701	54,925	52,387	37,299	33,691	33,209	36,485	27,621	29,202	23,732	-
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	261	247	188	313	71	242	91	261	185	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	277	181	116	111	92	57	24	24	10	-
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of 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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	534,590
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
		Number of 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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	381	914	951
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of 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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of 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	2,039,353	2,583,428
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of 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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of 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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	144	107	18	68	45	68	80	18	35	65
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0
		Number of 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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of 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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	20,977	19,520	21,959	21,532	665	14,770	21,354	24,282	24,015	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	19,101	18,767	21,974	23,663	695	16,898	23,801	24,006	23,742	-
		Number of 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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5,771
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	79
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	132
	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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	103,213	117,291	92,855
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
		Number of 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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	DR 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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	889	1,517	1,727	2,418	2,659	2,844	2,043	1,642	1,196	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	6	7	110	3	7	27	-
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Equatorial Guinea	Suspected	25,552	22,598	25,100	17,867	14,827	12,530	-	-	-	-	-	-	-	-	-	-	-	20,948	67,196	84,532
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5,842	7,883	11,603
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Eritrea	Suspected	-	-	-	-	-	81,183	129,908	-	255,150	147,062	-	138,667	121,011	107,599	65,025	64,056	49,703	80,428	62,449	77,946
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	8,994	5,335	8,998	3,480	7,506	5,750	3,006	1,519	3,358
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	722	743	1,348	639	1,567	791	6,508	2,832	3,244
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0

Annex 7C – Malaria trends 2, 1990–2009 *(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
	Ethiopia	Suspected	-	-	206,262	305,616	358,469	412,609	478,411	509,804	604,960	647,919	-	3,014,879	3,617,057	4,129,225	5,904,132	4,727,209	3,375,994	2,844,963	3,060,407	4,335,001
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	233,218	262,623	291,403	396,621	374,335	293,326	269,514	274,657	594,751
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	157,625	164,772	171,388	178,676	158,658	149,020	171,710	173,300	287,114
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	50,810	53,167	62,976	58,212	70,075	70,644	33,458	45,186	40,701	187
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
	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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of 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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	457,424	918,105	924,095
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19,060	38,254	38,504
	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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	4,800	6,238	16,561	4,378	103,069	50,452	41,228	28,646	33,405	20,932
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of 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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of 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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	39,383	28,328	-	-	-	839,904	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Liberia	Suspected	-	-	-	-	-	-	239,998	826,151	777,754	-	-	-	-	-	-	66,043	1,171,175	694,428	874,607	1,035,940
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	44,875	761,095	80,373	157,920	212,657
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of 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	4,204,468	4,376,870	4,580,226	5,455,423
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of 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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of 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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mozambique	Suspected	-	-	-	-	-	-	12,794	-	194,024	2,336,640	-	-	-	-	-	-	-	6,155,082	4,831,491	4,310,086
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Namibia	Suspected	-	-	-	380,530	401,519	275,442	345,177	390,601	353,110	429,571	-	538,512	445,803	468,259	610,799	339,204	265,595	172,024	128,531	81,812
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	505
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	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	4,459,624	4,716,312
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	53,637	74,129	44,612	54,515	60,998	77,485
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,113	1,245	1,581

Annex 7C – Malaria trends 2, 1990–2009 *(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
	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
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of 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	-	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
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sao Tome and Principe	Suspected	-	-	-	-	-	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	38,583	59,064
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	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
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	44,959	14,261	15,261	28,272	23,171	38,746	49,366	78,278	24,830	19,614
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of 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
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	2,206	3,702	3,945	2,206	3,702	3,945	-	-	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	-	-	-
		Number of 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
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Swaziland	Suspected	-	-	-	-	-	-	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
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	1,395	670	342	574	279	155	84	58	106
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
		Number of 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
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	117,131	151,960	191,357
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	195
	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
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	546,016	785,748	861,451	1,082,224	850,050	1,024,470	959,712	1,275,310
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	UR 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	378,388	421,362	11,433,310	11,949,603	11,485,323	10,596,877	8,585,711	7,656,233	19,328
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	17,734	18,385	16,983	15,705	11,936	7,628	1,585	293	67	40
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of 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	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Zanzibar	Suspected	-	-	-	-	-	-	-	-	-	-	53,533	53,804	51,968	53,899	50,976	43,642	30,676	23,511	13,183	19,328
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	17,734	18,385	16,983	15,705	11,936	7,628	1,585	293	67	40
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	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
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Annex 7C – Malaria trends 2, 1990–2009 *(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
	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	-	-	-	-	1,997,066	1,709,890	1,493,398	1,272,731	1,046,584	802,016
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AMRO	Argentina	Suspected	24,725	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	-
		Number of P.f.	1	3	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	-
		Number of P.v.	1,529	800	643	757	947	1,065	2,048	592	339	222	439	215	125	122	115	259	209	387	130	-
		Number of other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
	Bahamas	Suspected	-	-	-	-	-	-	-	-	-	-	22	-	-	34	17	9	546	-	35	-
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	-	-	13	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	-	-	0	-
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	-	-	1	-
	Belize	Suspected	17,204	25,489	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
		Number of P.f.	43	131	156	251	420	475	419	126	222	52	20	6	0	0	6	34	10	0	0	0
		Number of P.v.	2,987	3,181	5,175	8,335	9,991	8,938	6,150	3,887	2,392	1,801	1,466	1,091	928	928	1,049	1,544	834	845	540	256
		Number of other	6	5	10	0	0	0	0	0	0	0	-	0	0	0	2	0	0	0	0	0
	Bolivia (Pluri. State)	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	163,307	208,021	214,616	180,316	164,826	133,614
		Number of P.f.	652	1,103	2,757	5,375	4,833	3,374	4,164	5,224	10,557	7,183	2,437	776	702	764	666	1,031	1,638	1,514	782	561
		Number of P.v.	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
		Number of other	0	0	0	0	0	0	0	0	0	0	1	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	2,008,764	2,194,780	2,660,539	2,959,489	2,986,381	2,721,017	2,617,773
		Number of P.f.	252,191	265,597	267,054	176,379	197,009	203,402	135,132	95,084	102,719	117,591	131,616	81,333	80,188	83,765	104,376	147,150	136,868	88,615	46,289	47,729
		Number of P.v.	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	315,963	348,258	442,661	394,387	364,912	266,299	257,571
		Number of other	-	-	-	-	-	-	-	-	3,226	3,637	7,609	574	826	4,696	6,242	8,230	9,218	5,125	3,054	3,198
	Colombia	Suspected	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	589,755	470,381	428,004
		Number of P.f.	35,490	70,868	69,198	42,466	33,811	62,192	36,879	65,591	98,460	24,718	50,476	98,049	8,684	7,315	53,106	41,781	43,547	53,852	21,475	21,442
		Number of P.v.	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
		Number of other	-	-	-	-	-	-	-	-	-	-	1,254	2,193	2,132	2,580	2,052	1,691	2,600	657	917	699
	Costa Rica	Suspected	112,325	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
		Number of P.f.	5	18	16	8	3	16	65	45	15	15	12	1	2	14	5	3	32	11	0	1
		Number of P.v.	1,147	3,255	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
		Number of other	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
		Number of P.f.	334	367	694	983	1,664	1,807	1,112	812	1,999	3,584	1,225	1,034	1,292	1,528	2,353	3,829	3,519	2,708	1,839	1,643
		Number of P.v.	22	10	4	4	5	1	2	4	7	5	7	4	4	1	2	8	6	3	1	0
		Number of other	0	0	0	0	1	0	0	0	0	0	1	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	544,820	546,848	455,812	432,033	349,539	350,147	318,307	352,426	384,800	446,740
		Number of P.f.	21,871	13,868	15,970	21,646	10,241	4,738	1,886	3,091	21,448	50,158	48,947	37,269	20,330	10,656	5,891	2,220	1,596	1,158	396	551
		Number of P.v.	49,799	45,532	25,119	25,213	19,765	13,390	10,028	13,274	22,248	37,462	55,623	67,165	67,708	40,689	22,730	14,842	9,863	7,306	4,495	3,569
		Number of other	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	113,754	97,872	83,031
		Number of P.f.	18	18	6	4	5	6	4	5	11	9	0	2	0	2	1	2	1	2	0	1
		Number of P.v.	9,251	5,915	4,533	3,883	2,798	3,356	5,884	2,714	1,171	1,221	0	360	117	83	111	65	48	38	32	19
		Number of other	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	-	47,974	48,162	44,718	44,718	32,402	32,402	32,402	32,402	32,402	11,994	-
		Number of P.f.	2,532	1,745	2,758	3,136	3,809	4,107	3,980	2,349	2,626	4,529	3,051	3,166	2,547	3,080	2,437	1,777	1,847	806	1,077	-
		Number of P.v.	3,292	1,757	1,151	720	415	545	687	715	552	564	657	657	954	759	600	1,637	2,227	1,804	920	-
		Number of other	10	71	125	100	17	29	57	131	242	252	214	0	160	0	0	71	27	62	28	-
	Guatemala	Suspected	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	132,410	173,678	154,652
		Number of P.f.	1,008	1,616	1,480	2,094	376	671	130	879	1,049	1,548	1,474	1,044	1,825	1,300	794	1,017	792	192	40	50
		Number of P.v.	40,703	56,059	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
		Number of other	0	154	0	0	47	17	0	0	-	160	36	0	16	10	58	93	12	4	10	0

Annex 7C – Malaria trends 2, 1990–2009 *(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
	Guyana	Suspected	135,240	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
		Number of P.f.	12,776	23,192	23,717	17,955	22,413	29,652	17,958	19,867	22,799	15,872	12,188	12,660	10,478	12,820	11,842	15,558	9,258	4,351	5,252	6,206
		Number of P.v.	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
		Number of other	128	205	154	136	90	324	281	371	-	272	136	171	121	153	883	2,171	1,246	594	636	1,438
	Haiti	Suspected	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
		Number of P.f.	4,806	-	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
		Number of P.v.	0	-	0	0	-	-	0	-	0	0	0	0	0	0	0	0	0	1	6	0
		Number of 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	293,740	315,983	324,234	257,024	300,063	236,222	237,074	175,577	174,430	178,616	136,979	144,945	153,140	122,783	127,529	119,378	106,480
		Number of P.f.	632	1,644	1,216	448	568	1,124	874	858	1,067	1,220	1,447	938	588	493	845	974	734	778	570	1,283
		Number of P.v.	52,436	71,621	69,622	44,065	52,110	58,322	73,613	65,005	41,912	45,520	36,676	23,211	16,617	13,583	16,425	15,008	10,793	9,457	7,615	7,834
		Number of other	27	87	0	0	0	0	0	0	0	44	21	-	18	47	23	25	34	35	40	99
	Jamaica	Suspected	281	-	-	-	-	-	206	110	207	219	874	596	725	394	3,879	2,470	6,821	-	30,732	34,149
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	21	17
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	1	4
		Number of other	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
	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
		Number of P.f.	62	278	129	202	63	73	87	67	159	96	131	69	19	44	49	22	16	4	0	1
		Number of P.v.	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
		Number of other	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	544,717
		Number of P.f.	1,568	1,702	2,192	2,492	1,524	4,103	2,693	1,815	2,843	1,538	1,369	1,194	995	1,213	1,200	1,114	336	106	61	93
		Number of P.v.	34,217	25,951	24,674	41,445	40,551	65,322	72,913	50,043	24,673	32,532	22,645	9,304	6,700	5,525	5,699	5,498	2,784	1,250	701	517
		Number of other	0	0	0	0	0	0	0	-	-	0	0	0	0	0	0	0	0	0	0	0
	Panama	Suspected	315,359	336,569	308,358	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
		Number of P.f.	105	118	111	20	18	18	25	179	124	40	45	39	337	627	882	766	62	47	4	3
		Number of P.v.	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
		Number of other	0	0	2	0	0	0	0	0	1	0	0	0	0	0	1	2	0	1	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	93,365	115,937	97,246	85,942	111,361	92,339	94,316	64,660
		Number of P.f.	55	18	10	1	12	35	5	1	3	2	0	4	0	3	1	0	2	2	7	9
		Number of P.v.	2,857	2,965	1,279	435	571	862	632	565	2,087	9,944	6,853	2,706	2,777	1,389	693	376	821	1,337	333	81
		Number of other	0	0	0	0	0	1	0	1	1	0	0	0	1	0	0	0	0	2	1	1
	Peru	Suspected	90,940	109,654	-	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	36,886
		Number of P.f.	131	187	793	9,634	21,203	37,591	50,009	53,016	84,289	67,169	20,618	17,687	19,154	19,154	13,581	14,782	8,437	7,766	4,487	3,910
		Number of P.v.	28,693	33,502	54,129	85,504	100,801	152,868	161,375	127,287	162,695	94,077	47,690	61,680	66,588	66,588	67,739	71,490	56,488	43,031	33,895	32,976
		Number of other	58	16	0	84	35	62	124	35	79	46	13	11	10	13	10	-	-	-	-	0
	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	31,768	28,137	29,603
		Number of P.f.	1,584	1,402	1,326	5,930	4,384	6,249	14,942	9,222	10,140	11,685	9,489	13,138	9,752	8,740	6,693	6,877	2,298	498	802	277
		Number of P.v.	21	33	25	84	240	256	744	1,125	1,699	1,371	1,091	1,229	1,648	1,047	915	1,611	733	509	639	397
		Number of other	3	55	53	113	80	101	258	274	573	883	40	79	34	42	45	54	33	49	17	15
	Venezuela (Bolivarian Rep.)	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	479,708	414,137	370,258
		Number of P.f.	11,511	8,182	5,105	2,959	3,677	4,251	4,098	4,038	5,115	3,486	5,491	2,705	2,533	5,394	4,230	5,725	6,576	7,570	5,021	7,739
		Number of P.v.	35,804	34,641	16,417	9,557	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
		Number of other	4	3	2	23	17	82	40	90	198	52	1	77	51	214	453	339	375	586	579	1,087
EMRO	Afghanistan	Suspected	317,479	297,605	-	-	88,302	-	303,955	202,767	288,070	-	-	-	626,839	585,602	273,377	326,694	789,186	869,144	930,609	843,866
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	83,783	44,243	12,789	5,917	6,216	6,283	4,355	4,026
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	330,083	316,697	229,233	110,527	79,913	85,919	77,219	60,854
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
	Djibouti	Suspected	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	3,969	6,457	7,945	6,305	7,120
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	413	1,796	210	119	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Annex 7C – Malaria trends 2, 1990–2009 *(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
	Egypt[2]	Suspected	75	24	16	17	527	322	25	11	13	61	17	11	10	45	43	23	29	30	80	94
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19	27	28	76	81
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Iran (Islamic Rep.)	Suspected	77,470	96,340	76,971	64,581	51,089	67,532	56,362	38,684	32,951	23,110	19,716	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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	2,158	2,382	4,475	1,380	2,219	1,199	1,266	938	485
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	17,145	13,176	19,087	12,441	16,747	14,710	14,322	10,337	5,485
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Iraq	Suspected	3,924	1,764	5,752	49,863	98,243	98,705	49,840	13,959	9,684	4,143	1,860	997,812	1,072,587	681,070	913,400	954,987	970,000	844,859	1,105,054	1,493,143
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	0	0	0	1	0
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	346	154	47	24	3	5	1
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
	Morocco[1]	Suspected	837	494	405	198	206	197	102	125	121	60	59	59	107	73	56	100	83	75	142	145
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	93	69	66	118	134
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Oman[2]	Suspected	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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	152	100	101	94	160
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	718
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Pakistan	Suspected	79,689	66,586	99,015	92,634	108,586	111,836	98,035	77,480	73,516	91,774	3,337,054	7,046,267	7,536,541	8,662,496	6,074,739	8,671,272	8,680,304	9,330,723	8,330,040	7,973,246
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	41,771	32,591	39,944	32,761	42,056	37,837	39,856	24,550	37,079
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	83,504	75,046	85,176	93,933	85,748	86,999	88,699	79,868	95,604
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
	Saudi Arabia	Suspected	15,666	9,962	19,623	18,380	10,032	18,751	21,007	20,631	40,796	13,166	-	821,860	825,443	819,869	780,392	715,878	804,087	1,015,781	1,114,841	1,078,745
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	2,360	1,999	1,234	867	798	984	2,349	833	1,649
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	678	567	462	352	254	280	515	658	672
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	12
	Somalia	Suspected	-	-	-	3,049	-	-	-	-	-	9,055	-	10,364	102,540	28,356	55,423	63,770	49,092	50,444	106,488	105,332
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	15,732	7,571	11,436	12,516	16,430	16,058	23,427	9,802
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	617	478	200
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sudan[3]	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	4,223,414	3,516,456	3,730,993	2,599,669	2,853,275	2,233,987	4,698,262	4,691,546	4,766,516
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	North (low transmission)	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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	South (high transmission)	Suspected	-	-	-	-	-	-	-	-	-	-	-	237,712	462,056	646,673	515,958	337,582	116,473	101,008	136,492	325,634
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Syrian Arab Republic[2]	Suspected	107	54	456	966	583	626	345	130	60	43	42	79	27	24	13	28	34	37	51	39
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17	27	35	46	38
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Yemen	Suspected	11,384	12,717	29,320	31,262	37,201	500,000	416,246	1,394,495	-	2,781,640	-	-	667,794	612,693	611,552	629,380	962,017	740,940	902,146	899,320
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	73,667	47,782	47,306	42,627	53,887	64,991	42,702	52,836
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	1,659	1,474	1,297	1,442	1,019	2,339	745	589
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	4	3

Annex 7C – Malaria trends 2, 1990–2009 *(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
EURO	Armenia	Suspected	0	0	0	0	196	502	347	841	1,156	616	356	174	165	126	220	209	230	658	471	1,190
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	1	0	0	4	2	0	0	1	1	0
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	140	79	52	25	45	7	0	0	0	0
		Number of other	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0
	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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	0	1	0	0	0	0	0	1	1	0
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	1,526	1,056	506	482	386	242	143	109	72	80
		Number of other	-	-	-	-	-	-	-	-	-	-	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
		Number of P.f.	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	1	0	1	5
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	245	438	473	314	255	155	59	24	7	1
		Number of other	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	1	0	1
	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
		Number of P.f.	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	12	28	2,742	468	93	226	318	96	18	4
		Number of other	-	-	-	-	-	-	-	-	-	-	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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	42	47	62
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	76	46	40
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	3	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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	831	826	509	252	151	81	28	7	2	1
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	18,233	10,561	5,651	5,176	3,437	2,228	1,316	628	316	164
		Number of other	-	-	-	-	-	-	-	-	-	-	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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	7	11	12	12	13	32	29	29	23	16
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	11,424	10,799	10,209	9,209	5,289	2,052	767	329	191	65
		Number of other	-	-	-	-	-	-	-	-	-	-	1	2	3	1	0	0	0	0	1	3
	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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	24	8	18	7	3	1	1	0	1	0
		Number of other	-	-	-	-	-	-	-	-	-	-	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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	1	0	1	0	0	0	3	2	0	1
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	125	77	72	74	66	102	73	87	27	3
		Number of other	-	-	-	-	-	-	-	-	-	-	0	0	1	0	0	0	0	0	0	0
SEARO	Bangladesh	Suspected	53,875	63,578	115,660	125,402	166,564	152,729	100,864	68,594	60,023	63,723	302,011	2,972,519	2,757,500	2,744,827	3,142,583	1,617,735	1,497,715	458,720	526,701	569,767
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	39,272	39,274	46,418	41,356	46,402	37,679	24,828	44,910	34,920	18,242
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	14,951	14,942	15,851	13,298	12,492	10,442	8,029	13,063	14,409	6,853
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bhutan	Suspected	9,497	22,126	28,900	28,116	39,852	23,188	15,696	9,029	7,693	12,237	76,445	65,974	74,696	61,246	54,990	60,152	66,079	52,060	47,389	62,790
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	2,738	2,915	3,207	1,518	966	853	772	288	136	559
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	2,956	2,805	3,015	2,126	1,580	871	963	414	148	413
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
	DPR Korea	Suspected	-	-	-	-	-	-	-	-	1,085	7,980	-	324,599	272,227	76,104	45,066	16,094	15,423	7,985	24,299	34,848
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	115,615	98,852	16,538	15,827	6,728	6,913	4,795	16,989	14,845
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	1,045,170	1,005,236	897,446	857,101	890,152	805,077	838,555	741,076	768,030	837,130
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	984,572	1,080,248	943,781	1,012,302	1,025,211	1,011,492	946,554	764,878	760,827	723,612
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Annex 7C – Malaria trends 2, 1990–2009 *(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
	Indonesia	Suspected	1,484,496	1,631,710	1,431,284	1,337,373	1,448,595	1,312,738	1,517,406	1,086,074	1,453,475	1,503,381	1,554,787	2,737,577	2,660,692	2,482,906	2,335,585	2,675,219	2,226,158	2,621,144	2,185,836	2,733,407
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	85,596	98,430	81,591	98,729	127,594	160,147	-	193,733	212,501
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	94,497	190,608	190,048	161,180	175,367	165,870	177,006	159,179	232,463	237,929
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	868	0
	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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	95,489	130,029	134,087	136,020	116,955	124,835	149,399	149,931	167,562	121,636
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	21,749	35,783	35,125	34,597	35,050	38,553	50,667	62,057	52,256	40,167
		Number of other	-	-	-	-	-	-	-	-	-	-	252	941	864	775	572	810	453	505	288	319
	Nepal	Suspected	22,856	29,135	23,234	16,380	9,442	9,718	6,628	8,957	8,498	9,699	345,464	387,483	474,969	570,039	446,985	545,816	477,779	199,280	260,658	278,907
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	836	428	2,165	1,195	743	1,181	1,358	1,295	792	575
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	6,216	10,621	8,200	3,892	5,691	3,932	3,870	3,096	1,706
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sri Lanka	Suspected	1,182,774	1,398,002	1,538,650	1,503,902	1,370,831	1,098,105	1,288,990	1,330,659	1,338,146	1,582,111	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
		Number of P.f.	57,736	76,541	82,655	77,970	47,638	119,056	44,957	54,694	42,396	-	59,650	10,600	4,848	1,273	549	134	27	7	47	29
		Number of P.v.	223,245	323,722	316,694	285,227	225,864	23,238	139,362	163,856	169,295	-	150,389	55,922	36,563	9,237	3,171	1,506	564	191	623	529
		Number of 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	1,910,982	1,816,383
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	35,440	29,061	20,389	19,024	13,371	14,670	14,124	16,557	12,108	9,486
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	42,672	34,467	24,166	18,331	13,319	14,921	15,991	16,495	13,886	13,616
		Number of other	-	-	-	-	-	-	-	-	-	-	47	40	40	32	29	59	35	16	10	23
	Timor-Leste	Suspected	-	-	-	-	-	-	-	-	10,332	-	123,821	83,049	154,004	167,570	283,252	240,055	281,591	308,899	215,338	198,867
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	26,651	33,411	39,164	43,093	37,896	34,174	34,406	29,252
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	11,148	15,392	16,158	15,523	13,477	12,544	11,295	12,160
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
WPRO	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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	46,150	37,105	33,010	36,338	31,129	17,482	24,779	16,518	15,095	17,442
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	4,505	4,408	4,386	5,179	5,709	9,004	7,551	4,987	4,625	6,362
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	China	Suspected	117,359	101,600	74,000	59,000	62,000	47,118	33,382	26,800	27,090	26,797	-	5,397,517	5,788,432	4,776,469	4,331,038	3,892,885	4,076,104	4,062,585	4,435,793	4,642,372
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	3,732	5,753	3,497	3,879	3,588	2,808	1,613	1,222	948
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	17,295	19,581	24,852	23,138	18,187	32,345	27,550	15,323	8,214
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	141	105	125
	Lao PDR	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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	38,271	25,851	20,696	18,307	15,648	13,106	18,058	6,171	4,697	5,328
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	1,689	1,204	712	574	491	473	316	193	247	176
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	21	0
	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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	6,000	5,643	5,486	2,756	2,496	2,222	1,790	1,778	2,268	1,885
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	5,953	6,315	4,921	3,127	3,167	2,729	2,774	2,862	3,820	3,379
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	615	1,011	1,502
	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
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	63,591	74,117	58,403	54,653	63,053	62,926	56,917	60,168	60,000	48,681
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	14,721	18,113	14,187	14,055	18,730	22,833	22,744	16,239	16,806	11,472
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,787	1,444	1,024
	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	377,804	526,874	446,104	593,996	396,706	408,254	297,729	370,802
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	25,912	18,006	22,831	32,948	29,018	20,033	24,515	8,789	11,807	13,933
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6,482	8,839	3,622	4,806	4,951
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17	197	262
	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	1,343
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,227	1,052	1,343
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Annex 7C – Malaria trends 2, 1990–2009 *(continued)*

WHO Region	Country/area		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	200
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	282,29
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	46,703	50,806	50,090	64,910	64,449	54,001	54,441	48,612	29,492	19,58
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	21,322	25,649	24,822	27,399	25,927	22,515	20,971	16,653	11,173	8,54
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	139	84	
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	44,192	35,52
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	3,226	3,402	7,016	8,406	6,999	3,817	3,522	2,424	1,579	1,54
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	2,972	4,236	7,210	6,582	6,350	4,453	4,405	2,987	1,850	1,61
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	
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	2,907,21
		Number of P.f.	-	-	-	-	-	-	-	-	-	-	57,605	52,173	36,583	29,435	19,023	14,231	17,911	11,470	8,901	12,71
		Number of P.v.	-	-	-	-	-	-	-	-	-	-	15,935	15,898	10,846	9,004	5,681	5,102	4,497	4,737	2,348	3,20
		Number of other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	

Suspected cases: are calculated by adding Examined cases" to "Probable cases".
Probable cases : are calculated by subtracting "Confirmed cases" from "Probable and Confirmed cases ". For details please refer to "Methods for preparing the country profiles"

[1] Morocco and Turkmenistan are certified malaria-free countries, but are included in this listing for historical purposes

[2] No local transmission in these countries

[3] National totals for some columns are incomplete, see details in the sub-sections

Annex 7D – Reported malaria deaths, 1990–2009

WHO region	Country/area	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
AFRO	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
	Benin	-	-	-	-	-	-	-	-	682	544	-	468	707	560	944	322	1,226	1,290	918	1,375
	Botswana	-	-	-	-	-	-	-	141	23	49	-	29	23	18	19	11	40	6	12	6
	Burkina Faso	-	-	-	-	-	-	-	-	2,624	2,808	-	4,233	4,032	4,860	4,205	5,224	8,083	6,472	7,834	7,982
	Burundi	-	-	-	-	-	-	-	-	-	-	691	417	483	425	689	776	434	167	1,511	714
	Cameroon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	836	930	1,811	7,673	4,943
	Cape Verde	-	-	-	-	-	-	-	-	-	-	-	0	2	4	4	2	8	2	2	2
	Central African Republic	-	-	-	-	-	-	-	-	374	484	439	535	-	417	859	668	865	578	456	667
	Chad	-	-	-	-	-	-	-	-	-	-	712	957	98	1,021	13	558	837	617	1,018	221
	Comoros	-	-	-	-	-	-	-	-	-	50	-	-	-	-	28	92	56	20	47	-
	Congo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	113	143	116
	Côte d'Ivoire	-	-	-	-	-	-	-	-	1,337	974	-	-	-	-	-	-	-	797	1,249	18,156
	DR Congo	-	-	-	-	-	-	-	-	-	-	3,856	416	2,152	989	13,613	15,322	12,970	14,372	17,940	21,168
	Equatorial Guinea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	23
	Eritrea	-	-	-	-	-	-	-	-	404	169	-	133	86	79	24	49	47	42	19	23
	Ethiopia	-	-	-	-	-	-	-	-	-	-	-	1,681	1,607	2,138	3,327	1,086	1,357	991	1,169	1,121
	Gabon	-	-	-	-	-	-	-	-	-	-	2,016	1,693	1,141	692	466	353	238	216	156	197
	Gambia	-	-	-	-	-	-	-	-	-	-	-	275	259	192	153	426	150	424	403	240
	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
	Guinea	-	-	-	-	-	-	-	-	13	13	626	517	440	586	528	490	-	472	441	586
	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	-	-	-
	Liberia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	41	877	310	345	1,706
	Madagascar	-	-	-	-	-	-	-	-	-	640	591	742	575	817	715	699	441	428	276	173
	Malawi	57,649	-	-	-	-	-	-	35,982	-	4,747	-	3,355	5,775	4,767	3,457	5,070	7,132	6,529	6,748	6,527
	Mali	-	-	-	-	-	-	-	-	-	583	748	562	826	1,309	1,012	1,285	1,914	1,782	1,227	2,331
	Mauritania	-	-	-	-	-	-	-	-	279	525	-	-	-	-	-	-	67	142	-	91
	Mozambique	-	-	-	-	-	-	-	-	896	1,189	-	-	-	-	-	-	-	5,816	4,424	3,747
	Namibia	-	-	-	-	-	250	469	547	404	531	-	1,728	1,504	1,106	1,185	1,325	571	181	171	46
	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
	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
	Rwanda	-	-	-	-	-	-	-	-	2,736	1,881	-	4,275	3,167	2,679	2,362	2,581	2,486	1,772	566	809
	Sao Tome and Principe	-	-	-	-	-	-	-	-	154	-	254	248	321	193	169	85	26	3	16	23
	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
	South Africa	35	19	14	45	12	44	163	104	198	406	424	81	96	142	88	63	87	37	43	45
	Swaziland	-	-	-	-	-	-	-	-	109	149	-	62	46	30	28	17	27	17	10	13
	Togo	-	-	-	-	-	-	-	-	475	766	-	1,394	1,661	1,130	1,183	1,024	819	1,236	2,663	1,556
	Uganda	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4,252	7,003	2,372	6,296
	UR Tanzania[3]	-	-	-	-	-	-	-	-	-	-	379	1,228	815	15,251	19,859	18,322	20,962	12,593	12,434	840
	Mainland	-	-	-	-	-	-	-	-	-	-	-	838	441	14,943	19,547	18,075	20,825	12,529	12,405	819
	Zanzibar	-	-	-	-	-	-	-	-	-	-	379	390	374	308	312	247	137	64	29	21
	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
	Zimbabwe	-	-	-	-	-	-	-	1,192	1,248	1,139	-	-	1,844	1,044	1,809	1,916	802	401	232	14
AMRO	Argentina	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	-
	Bahamas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Belize	-	-	-	-	-	-	-	-	0	0	0	0	0	-	0	0	1	0	0	0
	Bolivia (Pluri. State)	7	2	-	-	29	-	14	21	27	15	11	0	5	2	0	0	0	0	0	0
	Brazil	-	-	-	-	413	-	-	90	156	193	231	142	93	103	100	122	105	94	67	79
	Colombia	69	47	-	-	81	-	-	16	33	12	41	58	40	24	25	28	53	19	22	12
	Costa Rica	0	0	0	-	-	0	2	-	0	0	0	0	0	0	0	0	0	0	0	1
	Dominican Republic	2	0	7	-	11	14	5	5	14	13	6	17	11	12	16	16	10	17	11	14
	Ecuador	0	0	0	-	67	-	-	18	16	16	0	0	0	0	0	0	0	0	1	0
	El Salvador	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	-
	Guatemala	180	127	-	-	-	-	-	0	9	0	0	0	0	0	2	4	2	3	0	0
	Guyana	-	4	14	-	150	-	-	32	34	-	-	-	-	-	8	22	20	10	10	-
	Haiti	-	101	-	-	-	-	61	-	25	-	-	16	16	16	16	29	32	28	-	-
	Honduras	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	1	0	0	2	1
	Jamaica	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
	Mexico	39	-	-	-	-	-	1	-	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
	Panama	1	1	1	0	0	0	0	0	0	0	1	1	2	4	2	1	1	1	1	-

Annex 7D – Reported malaria deaths, 1990–2009 *(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
	Paraguay	1	0	0	-	-	-	-	-	0	1	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
	Venezuela (Bolivarian Rep.)	-	38	48	2	17	-	-	40	26	2	24	28	23	40	35	17	11	16	-	-
EMRO	Afghanistan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	25	46	32
	Djibouti	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29	1	-	0
	Egypt[2]	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	0	0	2	2
	Iran (Islamic Rep.)	-	-	-	-	-	-	-	22	-	3	-	2	2	5	1	1	1	3	3	-
	Iraq	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0
	Morocco[1]	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	1	2	2	1	1
	Oman[2]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	2	2
	Pakistan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	52	9	24	-	-
	Saudi Arabia	-	-	-	-	-	-	-	6	28	-	-	0	0	0	0	0	0	2	0	0
	Somalia	-	-	-	-	-	-	-	-	-	-	-	-	8	54	79	15	58	45	49	45
	Sudan[3]	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	1,388	1,396
	North (low transmission)	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
	South (high transmission)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	263	254
	Syrian Arab Republic[2]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	1	1	0
	Yemen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	73	-	-	38
EURO	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	-	1	3	2	3	4	-	3	2	-	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	1	0	0
SEARO	Bangladesh	-	-	-	-	-	1,393	794	469	528	552	478	490	588	577	535	501	307	228	154	47
	Bhutan	-	-	-	-	-	-	25	14	17	-	-	-	-	14	7	5	7	2	2	4
	DPR Korea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	India	-	-	-	-	-	-	2,803	879	666	-	892	1,015	973	1,006	949	963	1,708	1,311	1,061	1,133
	Indonesia	-	-	-	-	-	-	148	199	45	-	-	-	-	-	-	-	494	-	669	900
	Myanmar	-	-	-	-	-	-	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
	Nepal	-	-	-	-	0	0	15	2	7	-	-	1	3	5	7	10	42	3	-	8
	Sri Lanka	-	-	-	-	-	-	26	61	115	-	77	52	30	4	1	0	1	1	0	-
	Thailand	1,287	-	-	-	-	856	826	764	688	740	625	424	361	204	230	161	113	97	101	70
	Timor-Leste	-	-	-	-	-	-	-	-	-	-	-	-	-	-	61	88	58	60	33	53
WPRO	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
	China	35	-	52	19	43	34	30	46	24	67	-	28	42	52	31	48	38	18	23	12
	Lao PDR	372	457	438	418	609	620	608	606	427	338	350	244	195	187	105	77	21	14	11	5
	Malaysia	43	-	25	23	28	35	40	25	27	21	35	46	39	21	35	33	21	18	29	-
	Papua New Guinea	457	-	500	448	281	415	514	390	651	567	699	619	678	559	644	731	668	559	628	604
	Philippines	913	924	864	811	784	643	536	514	561	755	-	-	-	-	-	-	-	73	56	24
	Republic of Korea	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	0	-
	Solomon Islands	33	46	33	40	49	51	30	27	33	23	-	55	59	71	34	38	12	15	21	53
	Vanuatu	32	32	26	6	7	12	8	1	9	4	3	4	13	14	3	5	1	5	4	2
	Viet Nam	3,340	4,646	2,632	1,026	604	348	203	152	183	190	142	78	44	50	24	18	38	20	25	26

Regional Summary	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Africa	67,115	6,964	4,397	6,154	7,473	3,562	10,178	49,395	30,821	73,053	77,642	103,036	110,516	152,657	114,045	137,269	137,623	101,533	102,894	111,885
Americas	329	373	95	12	837	89	143	302	422	317	362	312	226	230	224	248	241	194	118	109
Eastern Mediterranean	1,434	1,898	1,935	2,404	2,464	2,759	1,944	1,853	1,986	2,625	2,162	2,254	2,135	2,538	1,894	1,860	1,367	1,357	1,492	1,516
Europe	1	2	0	2	3	2	3	11	0	3	2	0	2	4	5	3	4	4	5	2
South-East Asia	1,287				0	2,249	8,061	5,331	5,248	4,940	4,828	4,796	4,589	4,286	3,772	3,435	4,377	2,967	3,108	3,187
Western Pacific	6,245	7,268	5,978	3,891	3,414	2,772	2,714	2,572	2,536	2,856	1,837	1,550	1,527	1,446	1,258	1,246	1,195	963	1,006	1,005
Total	**76,411**	**16,505**	**12,405**	**12,463**	**14,191**	**11,433**	**23,043**	**59,464**	**41,013**	**83,794**	**86,833**	**111,948**	**118,995**	**161,161**	**121,198**	**144,061**	**144,807**	**107,018**	**108,623**	**117,704**

Deaths reported before 2000 can be probable and confirmed or only confirmed deaths depending on the country.

*Data for Sudan, after 1999, only represents 15 northern states.

[1] Morocco and Turkmenistan are certified malaria free countries, but are included in this listing for historical purposes

[2] No local transmission in these countries

[3] National totals for some columns are incomplete, see details in the sub-sections

Less than 18% of countries reporting in Africa during 1990-1999

The *World Malaria Report 2010* summarizes information received from 106 malaria-endemic countries and from malaria control partners. It highlights continued progress made towards reaching international targets for malaria control by 2010 and by 2015. International funds disbursed for malaria control increased from US$ 200 million in 2004 to US$ 1.5 billion in 2009. Since 2008, more than 289 million insecticide-treated mosquito nets have been delivered to sub-Saharan Africa, enough to protect three quarters of the 765 million people at risk of the disease. Over the last decade, 11 countries in the WHO African Region and 32 countries in other Regions have reported reductions of 50% or more in either confirmed malaria cases or malaria admissions and deaths. Malaria control is making an important contribution to attaining the health-related Millennium Development Goals.

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